The Vespiary

Main Topics => Drug Synthesis & Extraction => Topic started by: testex on April 15, 2017, 02:45:52 PM

Title: **P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 15, 2017, 02:45:52 PM**

I was told following:

With vigorous stirring, to 5ml of IPA / 1g of P2NP and 0.4 times volume of H2O in RBF was dumped 6 mol eq. of NaBH4.
Recrystallized P2NP was washed with sodium bisulfite solution, then with and water and it was then added in small portions to the mixture to minimize frothing. No external cooling applied. After all substrate was added and near-colourless solution is obtained, the solution left stirring for 30 minutes. Claisen adapter was fitted to the rbf with reflux setup and addition funnel. With one portion, 10%-mol equivalent (for the nitroalkene) of CuCl2.2H2O dissolved in IPA was added to the solution via the funnel. It was refluxed for 30 minutes. After which the remaining NaBH4 was destroyed by adding about 50% acetic acid untill the fizzing stopped and the solution was fairly acidic. With the claisen adapter still attaced, short path distillation setup was rigged and everything below 100'C was stripped.
Then the solution was made basic dripping strong NaOH solution to the reaction flask and steam distilled. Additional very dilute NaOH solution was added through the addition funnel every now and then. The distillate was then made slightly acidic with H2SO4 and evaporated.
Total yield after recrystallization: 80% mol wise from the P2NP due to very sloppy work

Functional groups can be reduced in the order of ketones > aromatic nitro groups > aliphatic esters > aliphatic nitros > nitriles > olefins. Dunno where to place the halogens though. But basically with methylamine or even nitromethane, you could reduce straight to methamphs as well. How neat is that :)

Notes: use pure IPA (without lubricants and shit like that), maybe ethanol (without mek etc ketones).. and remember to recrystallize the P2NP and/or wash it with sodium bisulfite to get rid of aldehydes. They interfere the reaction. Unfortunately, this reduction does not work with ring halogenations. It will efficiently reduce 4-chloro-2,5-diMeOP2NP to 2,5-DMA though..

The modification is based onISSN: 2231-1963 (http://www.archives-ijaet.org/media/30I4TRANSITION-METAL-CATALYZED-NaBH4-MeOH-REDUCTION-OF-NITRO-CARBONYL-AROMATICS-TO-HYDROGENATED-PRODUCTS-AT-ROOM-TEMPERATURE-Copyright-IJAET.pdf)

Please try it yourself and post your results :) I say: fuck the Zn/Al reductions, even though the Al-Cu or even Zn-Cu with formic acid works like a charm (and the yields are quite comparable). But too much work and hassle anyway. Btw, I use 4%-mol of CuCl2.2H2O for the zinc reductions with formic/potassium formate reactions.

http://www.sciencemadness.org/talk/files.php?pid=331291&aid=31340
(http://www.sciencemadness.org/talk/files.php?pid=331291&aid=31340)

Edit: another trial with 0.1mol scale: yield: 87% mol wise after recrystallisation. It was left refluxing for about 45 minutes. So monitor with TLC!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 15, 2017, 04:15:09 PM**

By the way - why is it that the distillate from the steam distillation of amines are usually extracted with nonpolar? The amine usually just sits on the top of the water anyway. Okay, It's way much efficient to extract it with NP, then evap etc, but why bother unless the bottom layer is very cloudy? Though it usually is because of the IPA..

Oh and one thing: for the nitroethenes, I would seriously recommend water bath for the reduction from the nitrostyrene to nitroethene to minimize the polymerization. I reduced 4-Br-2,5-dimethoxynitrostryene to the respective nitroalkane with NaBH4 and yielded this hard-as-a-rock white-yellowish plastic-like gunk when the NaBH4 reduction was quenched and cooled down.. Any ideas what to do with it?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **April 15, 2017, 06:21:46 PM**

To the first one - Amphetamine freebase is

"Sparingly soluble in water (1:50)"

"Slightly soluble in water"

Taken from - http s://pubchem.ncbi.nlm.nih.gov/compound/amphetamine#section=Solubility

Please note the link is broken......

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 15, 2017, 06:29:48 PM**

Quote from: Corrosive Joeseph on April 15, 2017, 06:21:46 PM

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> Please note the link is broken......
>
> /CJ

Sure, but those funky ones with for example 2,5-(di)substitution has much greater negative logP and logS :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 15, 2017, 08:54:21 PM**

Really? Even 2,5-Dihydroxy ones? ;)

Nice thread by the way, I am very interested in reproducing those results personally.

How have you recrystallised the amphetamine sulfate? Which solvents and conditions have been used, in particular?
What was the melting point of the obtained product(s)?

Please share your analytical data obtained, I am interested in those.

Edit: Forgot to say, please feel welcomed here :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 15, 2017, 09:59:02 PM**

Quote from: carl_nnabis on April 15, 2017, 08:54:21 PM

> Really? Even 2,5-Dihydroxy ones? ;)
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> Please share your analytical data obtained, I am interested in those.
>
> Edit: Forgot to say, please feel welcomed here :)

The methoxylated ones :D
Anyway, acetone was used with toluene. The sulfate goes pretty much yellow and reeks.
No mp test has been made yet. And I've been here for a long time with another nick :)
Just forgot the passwd..

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 15, 2017, 10:15:43 PM**

Oh, than be welcomed back in that case.

If your product smells, it probably is impure, the colour indicates that too.
So your obtained yield has probably to be scaled down.

Please tell me how you recrystallised the sulfate salt.
A simple salt formation from a xylene solution and precipitation with acetone is not a recrystallisation.

I am asking, because this salt in special is, since it is an amorphous solid, not really recrystallisable.
So if you are able to still do it, I would like to know how.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 16, 2017, 07:56:28 AM**

Quote from: carl_nnabis on April 15, 2017, 10:15:43 PM

> I am asking, because this salt in special is, since it is an amorphous solid, not really recrystallisable.

This indeed. For a test, some of it was actually liberated from the salt, extracted with toluene, washed with water and dried. Then it was made sulphate once again. The initially white powder turned pink bc apparently too much of the H2SO4 was added. It was noticed while vacuum filtering it. Then it was dissolved in minimum amount of boiling acetone after which some dry toluene was added and azeotropically evaporated to push all the water out. It was cooled down to minus centigrades, filtered and dried. Within a day the white impalpable powder turned yellowish mush. One spot on TLC.

Interestingly, after additional day, the colour has changed to opaque mass. Only slightly yellowish tinted, but the smell is still apparent.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 16, 2017, 03:51:02 PM**

Quote from: carl_nnabis on April 15, 2017, 08:54:21 PM

> Nice thread by the way, I am very interested in reproducing those results personally.

Estimated date when you can confirm the success? :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Shy Guy** on **April 16, 2017, 05:01:20 PM**

Very interesting. :D Can do this before the end of the month. Initial plan was the Nickel Boride reduction. The procrastination was a result of insecurities regarding preserving opened container of $NaBH_4$ and finding appropriate thermometer for the Nickel Oven.

So how to properly store opened $NaBH_4$? A nitrogen tank is accessible.

"Recrystallized P2NP was washed with sodium bisulfite solution, then with and water and it was then added in small portions to the mixture to minimize frothing."

Can you please re state this sentence? Also how is it washed? Dissolve the P2NP in IPA and wash with Aqueous bisulfite sln? That doesn't make sense.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**

Post by: **carl** on **April 16, 2017, 05:59:42 PM**

As for the shelf life of NaBH4, it is really great.
You really do not need nitrogen for storing it.
I used to get it straight from the drum from a friend, and throughout the years it only tended to clump together, but it´s activity wasn´t diminished noticeably.
And with years, I´m talking about a decade.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 16, 2017, 06:00:47 PM**

Quote from: Shy Guy on April 16, 2017, 05:01:20 PM

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> Can you please re state this sentence? Also how is it washed? Dissolve the P2NP in IPA and wash with Aqueous bisulfite sln? That doesn't make sense.

Just keep the NaBH4 container/bag airtight after use.
I wash the nitropropene with sodium bisulfite solution to get rid of unreacted benzaldehyde. Maybe crashing the nitroalkene into bisulfite solution would be better, then recrystallization... Anyway then I rinse the crystals with ice cold water (either by dumping them into water and then filtering or just on the buchner) and suck to somewhat dryness.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 16, 2017, 06:08:26 PM**

It is beneficial to do at least one recrystallisation of the nitropropene, using hot alcohol.
The thus formed large crystals are much better for further reactions.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 16, 2017, 06:09:51 PM**

Quote from: carl_nnabis on April 16, 2017, 06:08:26 PM

> It is beneficial to do at least one recrystallisation of the nitropropene, using hot alcohol.
> The thus formed large crystals are much better for further reactions.

Don't you just love the lachrymator effect when recrystallizing from MeOH? :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 16, 2017, 06:18:40 PM**

Well I am working on a regular base with bromopropiophenone and use a fumehood, also do not use MeOH but rather EtOH instead, so well ;D
I guess I am just good at handling such substances ;)
It´s better to use EtOH in my opinion, this has some advantages compared to MeOH in this special usage.

To say it in the words they put miss perón in the mouth:

Quote
> Don´t cry for me argentina...

;D
Really, the lachrymatory effects can be avoided easily taken some proper care and using professional techniques.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Shy Guy** on **April 17, 2017, 12:50:28 AM**

Okay thank you for the comments on $NaBH_4$ storage. Received a very bad inactive batch years and years ago from a less than reputable supplier, that's where the insecurities lie.

The P2NP generated from n-butylamine and EtOH instead of Toluene as a solvent is generally of very high purity; forming long needles, provided precise experimental parameters are used. The P2NP will be re crystallized nonetheless using EtOH.

Carl, as far as re crystallization of Amphetamine Sulfate, many different solvent systems where used (acetone, ethyl acetate,etc), the most successful was MeOH with minimal amounts of hot H_20 added dropwise.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Etxeko** on **April 17, 2017, 04:50:26 PM**

Quote
> With one portion, 10%-mol equivalent (for the nitroalkene) of CuCl2.2H2O dissolved in IPA was added to the solution via the funnel.

Very interesting I wonder if the copper quantity can be reduced to ~ 5 mol%. How much IPA did you used to dissolve?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 17, 2017, 04:54:56 PM**

Quote from: Etxeko on April 17, 2017, 04:50:26 PM
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I chose to go with the original paper and use 10 mol%. Try out and post reactions? For the ipa, I didn't measure.
For the zn or al -formic reduction I've used 4% (from the nitroalkAne), it boosts the yields very high. So I think it actually works like coordinating catalyst or something like that

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **thewire** on **April 17, 2017, 05:21:00 PM**

I might give this paper a go sometime. I guess that we can put these Saudi guys to the rest ones.... :-\

"2.2 Experimental Procedure:
In a 25 ml single neck round bottom flask 5ml of methanol is added to 2mmol substrate to it CuCl2
and NaBH4 is added with more 5 ml of MeOH and the reaction mixture is stirred for 5-10min monitoring through TLC (what sort of solvent mix was used?) . Upon completion of reaction mixture it is quenched with water (how much was added ?) and
extracted with organic solvent ethyl acetate (how much was used?) upon evaporation of ethyl acetate affording product which
is subjected to column chromatography (in deails) affording pure product which is analyzed by GC, H NMR (where are these results?) and compared with the standard samples.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 17, 2017, 05:31:31 PM**

Quote from: thewire on April 17, 2017, 05:21:00 PM

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> "2.2 Experimental Procedure:
> In a 25 ml single neck round bottom flask 5ml of methanol is added to 2mmol substrate to it CuCl2
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> extracted with organic solvent ethyl acetate (how much was used?) upon evaporation of ethyl acetate affording product which
> is subjected to column chromatography (in deails) affording pure product which is analyzed by GC, H NMR (where are these results?) and compared with the standard samples.

pffft... read http://www.sciencemadness.org/talk/files.php?pid=331291&aid=31340 .. If one extracts with ethyl acetate, you probably want to use EtOAc for the TLC. Just replicate what I did and thank me as your personal jesus later. Besides, isn't it trivial you cannot quench NaBH4 with water in any reasonable time? ;D The saudi paper is definitely a joke

I reckon the yield is even better if one uses, say, palladium chloride, but the price is waaay too high and the recovery is a bitch.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **thewire** on **April 17, 2017, 05:58:58 PM**

Quote from: testex on April 17, 2017, 05:31:31 PM

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I criticize them because they are academic researchers, not wannabe home chemists. So , I would expect some sort of professionalism.

Thanx for this witeup, hope it will work on 3,4,5-tmns as well! ;)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 17, 2017, 06:11:14 PM**

This is to be tested with 3,4,5-TMNEthane. I've been very reclutant trying to reduce because of the low yield from other reactions

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 17, 2017, 06:49:35 PM**

You might as well want to check out this: http://nopr.niscair.res.in/bitstream/123456789/21921/1/IJCB%2041B(5)%201072-1074.pdf ... The solution from the experimental I did turned indeed brown/blackish when adding the copper chloride solution (addition is exothermic as well), but the sequence of addition as well as the excess of NaBH4 prevents the dimerization and formation of unwanted products of the markovnikov-like order. And bear in mind, I used copper chloride. Not sulfate. I reckon it must be done as tandem reaction in one pot first reducing the C=C and then the nitro - just the way I did it. I reckon the NaBH4 reduces it to zero valence copper which acts as the catalyst here as well as with the zinc/aluminium + CuCl2 + Formic acid / potassium formate reaction)..

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **lullu** on **April 17, 2017, 11:05:14 PM**

Quote from: testex on April 15, 2017, 04:15:09 PM

> I reduced 4-Br-2,5-dimethoxynitrostryene to the respective nitroalkane with NaBH4 and yielded this hard-as-a-rock white-yellowish plastic-like gunk when the NaBH4 reduction was quenched and cooled down.. Any ideas what to do with it?

It is the nitronate - you need to lower the pH and likely add water and get it to rt+ to get it back into solution.
I've observed this too when running the reaction in EtOH/EtOAc (no idea about your solvent system), quench in salt icebath add dH2O and let it come to rt. on its own. It should have gone into solution by then.

Interesting post, I've seen quite a few papers dealing with Copper (Co, Ni) nanoparticles to reduce nitro groups (mostly aromatics) but most saturate the cat by portionwise addition of NaBH4.

Have you tried that?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Etxeko** on **April 18, 2017, 08:32:40 AM**

Quote

> I chose to go with the original paper and use 10 mol%. Try out and post reactions? For the ipa, I didn't measure. For the zn or al -formic reduction I've used 4% (from the nitroalkAne), it boosts the yields very high. So I think it actually works like coordinating catalyst or something like that

Yes it probably acts as Lewis acid coordinating with the oxygen of the nitro and making the ipso carbon more reactive. I think you are right to in recrystallizing p2np several times to remove aldehyde traces because the oxygen of the aldehyde coordinates better than nitro so this can stop the reaction or create byproducts. I will try.. this can be the holy grail right now if it really works.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **lullu** on **April 18, 2017, 11:34:26 AM**

As most copper nanoparticle papers only ran nitroarenes (much easier to reduce) or beta-nitrostyrene (Synlett)
I've tried to find references that worked on more sterically bulky nitroalkanes.
If anyone is interested in DOI: 10.1007/s13738-016-0864-4 they list a 2-nitroheptane reduction with excellent yield by portion wise NaBH4 addition in H2O at 80°C.

testex, were you able to confirm the product is actually the isopropylamine?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 18, 2017, 02:46:09 PM**

Quote from: lullu on April 17, 2017, 11:05:14 PM

> Quote from: testex on April 15, 2017, 04:15:09 PM
>
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> Have you tried that?

I used the "gold standard" solution: 5 times of IPA and 0.4 times H2O for gram of the nitrostyrene. I've seen the nitronate many times as well, but it usually forms while adding the NaBH4. This bastard solidified after quenching with acetic acid. The whole mess is still in the flask and I don't really know what should I do. I broke a piece out from the solidified cake - it's like hard plastic.

For the second question: I have not, because the whole point was to do it as one pot reaction.

Quote from: lullu on April 18, 2017, 11:34:26 AM

> testex, were you able to confirm the product is actually the isopropylamine?

Thehee... I have been very energized at least. The freebase gave one spot on TLC, rf ~0.70 (acetone) and identical with the reference sample

Quote from: Etxeko on April 18, 2017, 08:32:40 AM

> I will try.. this can be the holy grail right now if it really works.

Please do - and it is! I'm going to run int again within couple of weeks and take some pictures as well :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **lullu** on **April 18, 2017, 05:12:30 PM**

Quote from: testex on April 18, 2017, 02:46:09 PM

> I used the "gold standard" solution: 5 times of IPA and 0.4 times H2O for gram of the nitrostyrene. I've seen the nitronate many times as well, but it usually forms while adding the NaBH4. This bastard solidified after quenching with acetic acid. The whole mess is still in the flask and I don't really know what should I do. I broke a piece out from the solidified cake - it's like hard plastic.

I am fairly certain that it is the nitronate not any borate.
Have you tried adding water after addition of GAA and letting it come to rt?
Like I said I've observed this too in the past, it was a very solid white shiny cake making stirring absolutely impossible and it took its time to redissolve after quenching at 0°C.
It is not soluble enough in IPA and you need water and get it at least to rt.

It is btw easy to oxidize this to the corresponding ketone using Oxone or H2O2.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **April 18, 2017, 09:20:27 PM**

Just a word of caution-be careful handling the nitronate. Do NOT try and grind it or pound it to powder to get it into solution, it may well explode. Those nitroparaffin type compounds form nitronate salts with strong alkalis (not sure about group II, but certainly group I metal hydroxides for example) and they are known to be explosives.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Etxeko** on **April 19, 2017, 08:24:00 PM**

If the pH is slightly acid (5.5-6) the boron nitronate salt disappear, maybe the white solid is just $B(OH)_3$ that isn't dissolve.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **lullu** on **April 19, 2017, 09:00:39 PM**

Quote from: Etxeko on April 19, 2017, 08:24:00 PM

> If the pH is slightly acid (5.5-6) the boron nitronate salt disappear, maybe the white solid is just $B(OH)_3$ that isn't dissolve.

I very much doubt this, what is your reasoning behind this?
Boric acid solubility is a lot higher and would thereby go into solution much easier in IPA/EtOH compared to the nitronate salt.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Etxeko** on **April 19, 2017, 10:51:21 PM**

Normally when the reaction is quenched with acid the white solid disappear very fast and you got a slightly yellow oil (nitroalkane), if you quench at 0 ºC I don't know.. but i don't see necessary to work at 0 ºC because you are adding a weak acid. Maybe you are right and it's the nitronate and the problem comes from the temp.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **lullu** on **April 20, 2017, 07:29:27 AM**

The reason behind quenching at such low temperature 0-5°C is that even weak acids were reported to induce the formation of the carbonyl duo the Nef reaction on some subtrates.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **frank** on **April 20, 2017, 08:56:49 AM**

Can anyone confirm the results? The reduction sounds to easy. Reminds me of the NaBH4/NiCl2 system claimed to reduce phenyl-2-nitropropene, which did not work at all (for the mentioned substrate of course).

I don't want to offend anybody but while reading this thread I got a funny feeling that I am reading bariums alleged work.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Etxeko** on **April 20, 2017, 09:16:38 AM**

Quote

> The reason behind quenching at such low temperature 0-5°C is that even weak acids were reported to induce the formation of the carbonyl duo the Nef reaction on some subtrates

I really doubt that Nef reaction happens quenching with AcOH at 25 ºC... I'm not talking about quench at 60 ºC

Quote

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>
> I don't want to offend anybody but while reading this thread I got a funny feeling that I am reading bariums alleged work

I'm skeptical to but I will give a try next week, maybe it works...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **lullu** on **April 20, 2017, 10:16:57 AM**

Quote

> The reason behind quenching at such low temperature 0-5°C is that even weak acids were reported to induce the formation of the carbonyl duo the Nef reaction on some substrates

Quote

> I really doubt that Nef reaction happens quenching with AcOH at 25 ºC... I'm not talking about quench at 60 ºC

Understandable so - you can read about it on hyperlab if you are interested.
Nef was confirmed by HPLC by a respectable chemist.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **lullu** on **April 20, 2017, 11:49:55 AM**

Find attached a report (of failure) from our russian comrades over at hyperlab trying to replicate the reduction as published in Synlett using 2,5-dimethoxynitrostyrene.
Now it is likely that the nanoparticle size is of importance and solutions used here were rather concentrated.
Personally I would try to follow a protocol similar to the DOI (or other protocols where they post their attempts on nitroarenes) I've posted before to produce the copper particles - meaning using a much higher dilution (to prevent conglomeration and maybe sonification).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 21, 2017, 01:41:07 PM**

Just replicate what I did and then start to tweak it.

Here's another gem:

~0.396 mol of P2NpropAne which was stored in freezer in IPA after NaBH4 reduction of P2NP was thawed and poured to 4L RBF along with magnetic stirbar and ~44g (~4.2mol eq) of aluminium shavings and heated on a water bath. Just before it was refluxing, 150mL of GAA was added in one portion followed by 300mls of CuCl2 solution (0.041mol), made by mixing separately by dissolving 5.45g of CaCl2 in ~100ms of H2O and 6.53g of CuSO4*5H2O and filtering out the formed CaSO4. A Claisen adapter with condenser and addition funnel was attached immediately as quite vigorous reaction initiated within few seconds after the addition of the CuCl2. The hydrogen evolution was apparent with about 2cm frothing layer. The solution turned immediately colorless. Some reddish copper(I?) salts was floating around. The addition funnel was loaded with pre-made solution of 1.6mol KHCOO [made by dissolving 35.91g of KOH in minimal amount of H2O in a beaker to which 50mL of 98% HCOOH (only 29.56g of 100% required) was added cautiously dropwise and the beaker was swirled]. The KHCOO/HCOOH mixture was added to the reaction mixture and even more vigorous reaction commenced. The reaction was then refluxed for 1h after which 100mL of concentrated HCL(37%) was added throught the addition funnel to break up the possible amides formed. The refluxing was continued for additional hour. The heating was stopped at this point. Some hydrogen evolution was still noticed. 1000ml of H2O was added and the setup was rigged for short path distillation. Odd clear layer was noticed floating on the top. The IPA was stripped (collected everything under 99’C).

Next, 200g of NaOH was dissolved in 300mL of H2O. This solution was added to the cooled reaction mixture to make it strongly basic. It was allowed to stir for 15 minutes and steam distilled. After regular workup, 83% of amph sulfate was recovred from theory (calculated from the nitroalkEne. The nitroalkene wasn't isolated)

Next what should be tried is the same formula, but with 110g of zinc dust/granules.

I reckon the yield would've been significantly better with longer refluxing time and/or larger surface area for the aluminium. Also, some zinc should've been added to neutralize the copper at the same time the HCl was added, but it was omitted.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 26, 2017, 03:11:10 PM**

Just for a reference (thanks thewire):

Quote from: thewire on August 13, 2016, 10:36:44 AM

> https://www.jstage.jst.go.jp/article/cpb1958/44/11/44_11_2165/_pdf
> (https://www.jstage.jst.go.jp/article/cpb1958/44/11/44_11_2165/_pdf)
> It is also worth to mention that the same group managed to prepare 2-amino -1,2 dihydro-acronycine (6) with sodium borohydride and
> copper acetate from 2-nitro acronycine (2) , (yield 60%). (nitrostyrene to amine)

Use the copper chloride!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **April 28, 2017, 04:33:18 AM**

Similar work was done by Isomeric_Fred nearly 11 years ago................ Check it out

'NaBH4/CuSO4 nitro reduction success!!' -
https://sciencemadness.org/talk/viewthread.php?tid=6733

'new/old nitroalkene reduction method' -
https://sciencemadness.org/talk/viewthread.php?tid=7190

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **April 28, 2017, 03:36:10 PM**

But the 50% yield suck! I have managed now to push the yield even higher: last run was 87% The key is two-step-one pot. With the CuCl2 hydrate. I reckon we have a winner here.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **April 28, 2017, 06:01:05 PM**

Something that, given the reduction is reducing nitro to amine, could perhaps affect yield is complex formation of tetraminecopper (II) derivatives. It might be an idea to treat the end liquor/product with aqueous ammonia after the reaction in order to displace any amine that isn't immediately obvious, owing to coordination of 4 units of the target amine to a central divalent copper site. Ever tried addition of plain aqueous ammonia to a Cu (II) salt? in the case of the chloride there is an instantaneous reaction that forms an attractive deep cobalt-blue color (not to imply presence of cobalt, rather, the complex is the dark blue color of cobalt-doped glass)

Don't think the tetraaminecopper (II) complexes are all that stable though, a solution of tetraaminecopper (II) chloride lost its color and deposited a precipitate of a much lighter green copper compound than CuCl2, akin to copper carbonate or acetate in color after standing for a couple of days, so its probably slowly offgassing NH3, or forming an aqueous solution of ammonium chloride (haven't tested which) but within 1-2 days on a test tube scale it did indeed discharge the cobalt blue color when stored over excess CuCl2 solution and the aq. NH3 poured over so as to form a bilayer.

Other salts of copper form similar complexes, of varying shades of blue-blue green-cyan, such as the nitrate, the sulfate and the chlorate (this last is a primary explosive, wouldn't be terribly surprising if the nitrate was too)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CaptainPike** on **April 30, 2017, 02:40:37 AM**

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https://www.erowid.org/archive/rhodium/chemistry/amphetamine.phosphate.html (https://www.erowid.org/archive/rhodium/chemistry/amphetamine.phosphate.html)

For work up here and the divided cell electro-reduction??

You guys must have seen this already.

I think the author of this paper might very well have performed extensive testing just before writing the document!

What's the downside to monobasic amphetamine phosphate?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **June 15, 2017, 09:19:20 PM**

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wtf. still no other experimentals?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Kykeon** on **June 16, 2017, 09:59:45 PM**

Quote from: testex on June 15, 2017, 09:19:20 PM

> wtf. still no other experimentals?

This will be a pointless post but I just want to let you know that research is in progress.

Initial results are promising, but I have yet to analyze the products so I cant confirm the method just yet. Assuming that the product is what I believe it is, yields have not been too great so far (60-70%). But a significant difference is that I am reducing nitroethenes and not nitropropenes which seems to require different solvent ratios which might affect yields.

More optimization will soon be undertaken. And big thanks for sharing your work testex.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **June 17, 2017, 02:06:05 AM**

Quote from: Kykeon on June 16, 2017, 09:59:45 PM

> Quote from: testex on June 15, 2017, 09:19:20 PM
>
> > wtf. still no other experimentals?
>
> This will be a pointless post but I just want to let you know that research is in progress.
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> Initial results are promising, but I have yet to analyze the products so I cant confirm the method just yet. Assuming that the product is what I believe it is, yields have not been too great so far (60-70%). But a significant difference is that I am reducing nitroethenes and not nitropropenes which seems to require different solvent ratios which might affect yields.
>
> More optimization will soon be undertaken. And big thanks for sharing your work testex.

Yes - there's more to come! Did you follow my experimental to the point with the nitroethenes? Pay attention to the electron donating/withrdawing steric effects!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **June 24, 2017, 12:29:38 PM**

Quote from: Kykeon on June 16, 2017, 09:59:45 PM

> But a significant difference is that I am reducing nitroethenes and not nitropropenes

Can you share what PEA's you are working on with? 2C-H? Can you do a small test for 3,4,5-trimethoxy-P2NE? If possible, let's make a table for all the yields, reaction times etc?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CaptainPike** on **June 24, 2017, 01:44:22 PM**

Now don't get testy, testex :-)

Slim is still messing around with the last great idea you had – I think it's you(name changed to protect the forgetful). We were talking amongst ourselves here and I think we wanted to try a fiberglass bridge. Other materials got disintegrated by the acids.
I found my nice fiberglass cloth and I see that Slim's home – back from somewhere. So all in good time my man (or woman).

This copper coupled hydride reduction business is next up in the pipeline. In fact, Slim is also most interested in that very substrate you mentioned. And he has some (not much) of the 3, 4, 5 m–o–b'dehyde starting material needed to form the nitro compound.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CaptainPike** on **June 24, 2017, 02:14:30 PM**

Quote from: testex on April 21, 2017, 01:41:07 PM

> Just replicate what I did and then start to tweak it.
>
> Here's another gem:
>
> ~0.396 mol of P2NpropAne which was stored in freezer in IPA after NaBH4 reduction of P2NP was thawed and poured to 4L RBF along with magnetic stirbar and ~44g (~4.2mol eq) of aluminium shavings …

Do you mean that a nitropropane was the result of a P2NP reduction with sodium borohydride?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **June 24, 2017, 03:30:56 PM**

Quote from: CaptainPike on June 24, 2017, 01:44:22 PM

> Slim is still messing around with the last great idea you had – I think it's you(name changed to protect the forgetful). We were talking amongst ourselves here and I think we wanted to try a fiberglass bridge.

Sorry - not me :(

Quote from: CaptainPike on June 24, 2017, 01:44:22 PM

> This copper coupled hydride reduction business is next up in the pipeline. In fact, Slim is also most interested in that very substrate you mentioned. And he has some (not much) of the 3, 4, 5 m–o–b'dehyde starting material needed to form the nitro compound.

Use KOH for catalyst and do the reaction in freezing temps to get +95% yield for that nitrostyrene. If someone knows the route, please paste a link of it here as a reference!

Quote from: CaptainPike on June 24, 2017, 02:14:30 PM

> Do you mean that a nitropropane was the result of a P2NP reduction with sodium borohydride?

Yes.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **dr.whoop** on **July 27, 2017, 01:11:52 PM**

Unexpected success - sort of.

I had the remainder of P2NPropane insolution (250ml) stored in the freezer and wanted to get rid of it. It contained toluene and alcohol (ethanol, isopropanol). I put it in a 0.5l beaker and added 25ml acidic CuCl2 solution and a handfull MgZn5 alloy shaving. Because the temperature was way below zero not much happened at first but the reaction got going. After the CuCl2 was consumed and the beaker was very warm to the touch the reaction didn't stop but continue to work and after adding additional shavings increased. A strong amine smell was present and the reaction kept going. I wonder what comes out after workup- I will keep you updated.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **August 09, 2017, 07:21:15 PM**

Quote from: dr.whoop on July 27, 2017, 01:11:52 PM

> Unexpected success - sort of.
>
> I had the remainder of P2NPropane insolution (250ml) stored in the freezer and wanted to get rid of it. It contained toluene and alcohol (ethanol, isopropanol). I put it in a 0.5l beaker and added 25ml acidic CuCl2 solution and a handfull MgZn5 alloy shaving. Because the temperature was way below zero not much happened at first but the reaction got going. After the CuCl2 was consumed and the beaker was very warm to the touch the reaction didn't stop but continue to work and after adding additional shavings increased. A strong amine smell was present and the reaction kept going. I wonder what comes out after workup- I will keep you updated.

Strong stirring is essential here! With fresh Al shavings, without stirring (just manually shaking the HDPE-container for the first few hours) the reaction hasn't completely stopped even after a month (after squeezing the air out, closing and shaking the container it will be bulging after 24h) and there's still huge amount of unreacted shavings. After the reaction is complete you might want to add some HCl there and reflux for an hour or two, then filter out the unreacted metals, then basify with ammonia and then with NaOH. I like to steam distill at this point.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Ian Batrach** on **August 09, 2017, 08:00:37 PM**

Should be in a position to give this a try tonight. Got everything needed (will have to reduce the nitropropene to the nitropropane w/ borohydride. Just happened to find a decent sized batch of P2NP that has been awaiting a cleanup and being put to good use.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **August 09, 2017, 08:14:20 PM**

Quote from: Ian Batrach on August 09, 2017, 08:00:37 PM

> Should be in a position to give this a try tonight. Got everything needed (will have to reduce the nitropropene to the nitropropane w/ borohydride. Just happened to find a decent sized batch of P2NP that has been awaiting a cleanup and being put to good use.

So are you going to use plain NaBH4 and CuCl2 or are you going to add some metal shavings there?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Ian Batrach** on **August 09, 2017, 09:07:51 PM**

Will try using Al or Zn.Haven't an alloy of that sort, although Al dust (500-600 mesh) so would need adding slowly in small portions. Zn dust is available, as is Mg. Not sure about the Zn, the Mg is about 300 mesh. The Zn has never been used, but it is stated on the container to be self-heating, and that it should be handled under inert gas. With some experience with this reaction, what would you recommend?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **August 09, 2017, 10:48:20 PM**

Quote from: Ian Batrach on August 09, 2017, 09:07:51 PM
> Will try using Al or Zn.Haven't an alloy of that sort, although Al dust (500-600 mesh) so would need adding slowly in small portions. Zn dust is available, as is Mg. Not sure about the Zn, the Mg is about 300 mesh. The Zn has never been used, but it is stated on the container to be self-heating, and that it should be handled under inert gas. With some experience with this reaction, what would you recommend?

The Al would be better to use than Zn. Just remember to activate it (stir for 2 minutes with dilute HCl, wash thoroughly with H2O and then with IPA) And do proceed cautiously! Even with shavings the reaction mixture does simmer quite a bit... Anyway, there's no need for any Al/Zn/Mg if you use CuCl2 directly with the excess of NaBH4...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **nomud2.0** on **August 10, 2017, 07:39:30 AM**

Kind of off topic.But didn't involve metals or acids.

Clostridium innocuum-(micro organism)"may have" fully reduced the
P2NP to amphetamine.But the reduction efficiency
was poor.Ref: Chem Pharm Bull (tokyo)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hooloovoo** on **August 10, 2017, 08:54:08 AM**

When you say that the efficiency of the bio route using the bacteria was poor, do you just mean that not much of the P2P was converted?

If so, did that just leave unreacted P2P?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **August 10, 2017, 10:01:10 AM**

More likely partially polymerised products.
If you want bacteria to do the work for you, get some limburger "red smear", thats brevibacterium linens and can transaminate phenylacetone to dextro-amphetamine. And you only need a few liter culture, not a few hundred...
here: https://www.thevespiary.org/talk/index.php?topic=3704.msg36833#msg36833

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **August 10, 2017, 10:12:34 AM**

Testex, in the first post, was this preparatory to a leukart-like rxn using formate/formic acid or were HCOOH and formates not present? about to give this a shot and start recrystallizing the P2NP, adducting out any aldehyde etc.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **testex** on **August 10, 2017, 01:58:51 PM**

Quote from: Tsathoggua on August 10, 2017, 10:12:34 AM

> Testex, in the first post, was this preparatory to a leukart-like rxn using formate/formic acid or were HCOOH and formates not present? about to give this a shot and start recrystallizing the P2NP, adducting out any aldehyde etc.

It was not a leuckart-like rxn; no formate/formates were present. Just 6mol equivalent of NaBH4 and 10-mol% equivalent of CuCl2 for the nitropropene. By the way, you are right about the tetrammine compounds. after quenching the reaction, it is wise to basify and reflux with ammonia, then further with NaOH before steam distillation or extraction.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **nomud2.0** on **August 10, 2017, 02:07:48 PM**

Quote from: Hooloovoo on August 10, 2017, 08:54:08 AM

> When you say that the efficiency of the bio route using the bacteria was poor, do you just mean that not much of the P2P was converted?
>
> If so, did that just leave unreacted P2P?

It was just a brief statement,not even a abstract.
It was mentioned in passing more of a surprise to them.
It was PN2P not P2P.I think they were shooting for the oxime.

I'm surprised that noone mentioned the Strecker syn.
as alternative to Leuckart.I know it doesn't give amine directly
but the Leuckart gives the N-formyl.I always liked it if it wasn't
for the cyanide.

There's one other rxn that's not too out there, but it gives the
N,N-diethyl amphetamine and I really don't see much on
The Vespiary on N-ethylamph, so I'd guess the N,N-diethyl
wouldn't be too interesting to many either.

I'll have to save that for later.I'ts really odd one step.
Give the forum something to anticipate (hopefully) ;)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **August 10, 2017, 06:43:18 PM**

N-ethylamphetamine is pretty nice stuff. Simple stimulant amines can tolerate either primary or secondary amine, in the amphetamine pharmacophore, and its similar derivatives. That goes out the window with psychedelics, where the typical result is a huge drop in the effects, both quantitatively and qualitatively (excluding the entactogens like MDxx)

Actually, its N-ethylamphetamine that Tsath' would go for every time, if going via the ketone and performing a red-am. It lacks a lot of the jittterier, sharper edges that methamphetamine has. Whilst Tsath' hasn't tried N,N-diethylamphetamine, it would not be expected to follow suit however, since N,N-dimethyl substitution results in a massive drop in potency compared to the secondary amine. Potency goes from N-methyl>N-ethyl>primary amine>(the dimethyl/diethylamphetamines, and N-isopropyl and N-(n)-propylamphetamine. IIRC N-(n)propyl is something like cut down to 1/5th of the potency of straight amphetamine, and N-propan-2-yl is less potent than N-propan-1-yl. Where cyclopropyl fits, now that, Tsath' is afraid he doesn't know.)

With respect to secondary amines amongst the simpler amphetamines (inc. things like ring monofluorination) N-methyl gives the highest potency by weight, whilst N-ethyl seems to be qualitatively more pleasing and less harsh. But not quite as potent. Ethamphetamine is the sort of thing a chemist would concentrate on if they want something a little better for themselves, but not so ideal for a mexi-meth cartel who just wants to knock out as much as they can as quick as they can and sell it for the most they can.

There might be a little more room to tweak things (so to speak) in terms of alteration of the alpha-substitution, aephetamine is known active, and there were some alpha-alkylated and alpha-arylated analogs of MDMA looked at for parkinson's treatment, such as alpha-cyclopropyl, alpha-phenyl. Alpha-phenyl looks like an interesting substitution pattern, closer to lefetamine than amphetamine though, but that doesn't sound like a bad thing. These would be analogs of diphenidine, methoxphenidine (both of which Tsath' really quite likes), ephenidine (never tried it). Lefetamine is an unusual drug in that it has amphetamine-like psychostimulant effects, combined with NMDA antagonism of modest strength and weak to modest Mu-opioid agonist effects (never had lefetamine itself, but the opioid agonism is reported as being somewhat more potent than codeine.)

And there is another interesting one, Lanicemine, https://en.wikipedia.org/wiki/Lanicemine an NMDA antagonist, of low-affinity, low-trapping binding kinetics, lacking 'psychotomimetic' effects, at least at lower doses, wouldn't be too surprising if, like the drug it is most similar to, memantine, it does show such effects if pushed dose wise. Memantine STRONGLY potentiates opioids and also helps in both delaying/suppressing the acquisition of tolerance to MOR agonist opioids, and where tolerance exists already helping to drive it down.

https://en.wikiped ia.org/wiki/UWA-001 alpha-phenyl-MDMA and alpha-cyclopropyl respectively.
https://en.wikiped ia.org/wiki/UWA-101

Tsath' expects that if the substitution is tolerated, and retains activity with alpha-phenyl on both MD(m)A and lefetamine then alpha-cyclopropylamphetamine might well be tolerated, there seems a lot more scope for steric bulk at the alpha-carbon of amphetamines and derivatives compared to the amine, even tert-butyl is tolerated (phentermine and its analogs)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **thewire** on **August 20, 2017, 08:35:21 PM**

> Quote from: testex on August 10, 2017, 01:58:51 PM
>
> > Quote from: Tsathoggua on August 10, 2017, 10:12:34 AM
> >
> > > Testex, in the first post, was this preparatory to a leukart-like rxn using formate/formic acid or were HCOOH and

> > formates not present? about to give this a shot and start recrystallizing the P2NP, adducting out any aldehyde etc.
>
> It was not a leuckart-like rxn; no formate/formates were present. Just 6mol equivalent of NaBH4 and 10-mol% equivalent of CuCl2 for the nitropropene. By the way, you are right about the tetrammine compounds. after quenching the reaction, it is wise to basify and reflux with ammonia, then further with NaOH before steam distillation or extraction.

I don't think Cu2+ ion is present so long that coordination could happen. Reduction occures very fast, forming Cu NPs. I don't see how Cu would be able to coordinate anything.By the time one is reached quenching all Cu2+ have converted to Cu.
See lullu's post and attached doi (brilliant paper btw , thanx for that :))

The driving force of the reaction is Cu nanoparticles which forms in situ.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **thewire** on **August 20, 2017, 08:48:07 PM**

Quote from: CaptainPike on April 30, 2017, 02:40:37 AM

> https://www.erowid.org/archive/rhodium/chemistry/amphetamine.phosphate.html (https://www.erowid.org/archive/rhodium/chemistry/amphetamine.phosphate.html)
>
> For work up here and the divided cell electro-reduction??
>
> You guys must have seen this already.
>
> I think the author of this paper might very well have performed extensive testing just before writing the document!
>
> **What's the downside to monobasic amphetamine phosphate?**

I had already mentioned somewhere that acetone isn't a good a choice . Both substances ought to be dissolved in IPA separately. This way one can avoid local overheating and easier to follow the required end point.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **August 24, 2018, 10:23:26 PM**

I can't believe my posts in this thread!
Shameful how arrogant I sound, I really have to apologise to the OP :-[
I thought, this sounds way too good to be true, and still thought so a while back...
And even worse, then I forgot about this method when I finally got to nitroalkenes again.

Now I tried it a few times in very small scale, both on P2NP as well as on 4-Fluoro P2NP.
The first time on the 4-F derivative, I only achieved somewhat around the higher 70ies in percent, but this was also because I made a few mistakes.
But the other times when doing it exactly as testex described in his first post, it was always(!) above 80% and even nearing the 90%! :)

This is, without a doubt, the best one-pot method for the nitroalkene to amine reduction that is existing.
Ever! Period!
Bees, write that behind your ears and never forget about it ever!

It is not that this is a very fast and high yielding method, it is also free from annoying side reactions that make the work up complex, no, this is the easiest method out there :)
And a nice bonus besides the high yield is, that one can just steam distill the post reaction to get the amine out :D

It is so very cool because completely failure proof, there is nothing keeping one from instant success directly at the first approach.
Please bees, go and try it out for yourselves, you will not be disappointed.
And that is promised! :)

It really needs to be tried out for other nice amines, must be tried for TMA before nitroethenes will be tried out too.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **vulgaricum** on **August 28, 2018, 10:21:33 AM**

Quote from: carl on August 24, 2018, 10:23:26 PM

> Shameful how arrogant I sound, I really have to apologise to the OP :-[

"First they ignore you, then they laugh at you, then they fight you, then you win." :)
No need to apologise - yes, I am the OP, just forgot the password (again). This is the golden standard for the reduction now ;D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **August 28, 2018, 11:42:10 AM**

Quote from: vulgaricum on August 28, 2018, 10:21:33 AM

> ...No need to apologise...

I am relieved, ok then :)

Quote from: vulgaricum on August 28, 2018, 10:21:33 AM

> This is the golden standard for the reduction now ;D

It sure is!

Should I make it a sticky topic then?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **vulgaricum** on **August 28, 2018, 12:03:42 PM**

Quote from: carl on August 28, 2018, 11:42:10 AM

> Should I make it a sticky topic then?

Would be an honor! I'll get back to the topic (with gc-ms reports etc) as soon as I get some spare time. Too much going on at the moment ::) :-\

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fuckyou** on **September 07, 2018, 11:57:24 PM**

So afther all i read i can use methylamine straight in the reaction to make meth from p2np, it really would be the best method ever. Can i replace cucl2 with cuso4 ?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fuckyou** on **September 08, 2018, 12:27:24 AM**

Quote from: testex on April 15, 2017, 02:45:52 PM

> Functional groups can be reduced in the order of ketones > aromatic nitro groups > aliphatic esters > aliphatic nitros > nitriles > olefins. Dunno where to place the halogens though. But basically with methylamine or even nitromethane, you could reduce straight to methamphs as well. How neat is that :)

What abaut that ???

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 08, 2018, 12:57:55 AM**

I do not understand how the reaction would proceed then.
Maybe you can, or someone else smarter than me, explain how that should work, because if it does work, then it is too big for my own understanding.

But I see only ketones getting reduced.
What you want are imines, and there is no mention of these.

Anyway, you know the saying:
Experiment is king, so instead of asking every few days, again and again, you could instead have tried it out for yourself several times now...
At least you would answer that for you, and that answer would have much more value then, or am I wrong?

And yes, you can replace the CuCl2 with CuSO4, but then you will, for some reason, get a lower yield, as some post years ago on SM shows.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **September 08, 2018, 01:45:06 AM**

Quote from: carl on September 08, 2018, 12:57:55 AM

> you can replace the CuCl2 with CuSO4, but then you will, for some reason, get a lower yield, as some post years ago on SM shows.

This reminds me of a similarity with precipitated nickel........

"As for the soluble nickel salt, the chloride, nitrate, sulfate, and acetate were successively employed, and nickel chloride was found to be the most appropriate for

obtaining a catalyst of high activity. Nickel nitrate solution hardly reacts with zinc dust, and nickel sulfate solution yields a catalyst of rather low activity. Nickel acetate, on the contrary, readily yields precipitated nickel, which proves to give as good a catalyst as that obtainable from nickel chloride."
'Preparing Urushibara catalysts' - https://www.thevespiary.org/talk/index.php?topic=7338.0

Nickel(II)Acetate is also the salt of choice in P-1 reductions
And it is already well known that sulfur compounds poison nickel catalysts.

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 08, 2018, 11:45:34 AM**

Rather than just tossing in the borohydride to the isopropanolic solution of the nitroalkene, would it not be better to prepare first an isopropanolic solution of the borohydride and add the nitroalkene dropwise in IPA? this ought to minimise michael addition between nitropropene and nitropropane? this way it ought to ensure that the substrate is reduced rapidly, more chance of meeting up with borohydride/Cu than meeting up with a molecule of nitropropane, as the more dilute concentration of nitropropane is kept low..

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 08, 2018, 01:16:32 PM**

How much borohydride and CuCl2 are used per gram of P2NP? apologies for asking what to most would bee a simple matter, but Tsath' is having a really, really bad day neurologically speaking, and being dyscalculic to begin with, right now that kind of processing just isn't going to happen

Could someone bee so go good as to validate his calculations?

For 5g P2NP,, 0.1836g boro, and 0.00306g CuCl2. is this correct?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 08, 2018, 02:28:23 PM**

Ugh, Tsath' keeps figuring the quantity of borohydride to bee either 0.1836, or 1.008g for 5g P2NP.

Could really use some help checking these calculations, the quantity of CuCl2 doesn't feel right either.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 08, 2018, 02:42:12 PM**

Look, if you need the six molar equivalent of borohydride to the P2NP, so 1g can't be

right... ans 180mg neither.
But a valuable hint: the second number is of importance, it is the right number for the borohydride, but just not in gram.
I.e. somewhere you done it a little bit correct, just not completely.
This is also true for calculated quantity of cupric chloride.
Both aren't the quantity in gram.

Look, the dihydrate of cupric chloride and P2NP are nearly of the same mol weight, and the former is used in 1/10th, so the numbers should be somewhat close to each other.
Similar to borohydride, six equivalents are close to 1,5 of the mol weight of both nitroalkene and copper salt.
Everything, the quantities, are somewhat closely related to each other, one can obviously notice this.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 08, 2018, 02:46:04 PM**

Tsath' can't. He is dyscalculic as hell. That doesn't make any sense at all to him.

What second number do you mean? this is such a pain in the arse. Causing so much fucking brain fog that Tsath' doesn't even know if he'll be able to run the rxn.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **callejularbo** on **September 08, 2018, 04:07:01 PM**

Quote

> Nitrostyrene 32 (2.77 g, 10 mmol) was added carefully in portions to a stirred suspension of $NaBH_4$ (2.84 g, 75 mmol) in IPA (32 ml) and water (16 ml) causing an exothermic reaction increasing the temperature of the mixture to 50-60°C. Thereafter a 2M solution of $CuCl_2$ (0.5 ml, 1 mmol) was added carefully dropwise causing further exothermicity. The reaction was then held at 80°C for 30 minutes using external heating. After reaching r.t, a 25% solution of NaOH (20 ml) was added under stirring and the phases were separated. The aqueous phase was thereafter extracted with IPA (3x30 ml). The extractions were combined, dried over $MgSO_4$ and filtered. A stoichiometric amount of 4M HCl in dioxane was added to the filtrate under stirring. The mixture was evaporated yielding a greyish sludge that was suspended in dry acetone and stirred for 1 h. The suspension was thereafter filtered and washed with dry acetone to yield 33 as a colorless amorphous solid (2.02 g, 71%).

http://www.sciencemadness.org/talk/viewthread.php?tid=84596

Anyone willing to try it out?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 08, 2018, 04:25:58 PM**

Thanks, that solves the problem, just adjusted the ratios for the nitroalkene. Nice one ^

Will try it out and see how it goes.

Right, about to give this a shot, now the notes have been taken. Will get back with results once the procedure is complete.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fuckyou** on **September 08, 2018, 06:26:20 PM**

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im going to try it out tomorow too, what form of Cucl2 i need the anhydrous one or dihydrate ?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 08, 2018, 06:51:14 PM**

Think about it. One adds water in the reaction mixture, a mixture of isopropanol and water, to which the borohydride is added. So obviously, if one used the anhydrous form, it wouldn't STAY anhydrous. It shouldn't matter, bar maybe slight effects from altering the H2O content, in order to hydrate and solvate the CuCl2.

Otherwise it shouldn't make a difference. Tsath' is just performing a bisulfite wash, then re-X the nitropropene then it's time to get creative :)

Just had to do a quick chromic acid wash of the flask to be used, as there was some stubborn crap on the side. DAMN that stuff works fast!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 08, 2018, 07:03:46 PM**

Largest reaction for me now worked up, 30mmol/4,9g P2NP...
Yield of final amine 82% !!

Have especially for this reduction method prepared 10mmol of both the 3,4,5-trimethoxy- and 2,5-dimethoxy-P2NP, we will see how these work out here :)

We really need to push that method, before it goes unnoticed, this is **THE** clan. lab reduction method of the youngest generation of bees!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 08, 2018, 08:13:39 PM**

It's on the go now. Running at a 10mmol scale of the nitropropene. Bloody went and dropped it the first time, while doing the bisulfite cleansing, re-doing it now.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 08, 2018, 09:10:12 PM**

Immmediate blackening and fizzing on adding the nitro., Having to stir manually because the damn magnetic stirrer isn't behaving itself. Bloody pest. Oh well, it'll get done one way or the other, even if it does end up with blackened fingers.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or

acids.
Post by: **Tsathoggua** on **September 08, 2018, 09:40:17 PM**

Returning to room temp now.

Anyone got advice for the quench? say, using 25% AcOH, ice-salt-methanol bath?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 08, 2018, 10:30:27 PM**

I use dropwise 80%, the first time I put it in an ice-bath, but at this tiny scale, and yours is considered this, cooling is not the least bit neccessary...

But come on tsath, you're a grown up drug chemist, you don't need to ask such things like borohydride quenching... ::)
Also, it is all in the papers, all can be read here, etc..
This is just a request for spoonfeed you're doing here, you really should know better.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 08, 2018, 10:46:47 PM**

Decided to quench in an ice-salt-MeOH ice bath, adding 50% AcOH dropwise, only took a few drops to kill excess hydride, separation into two phases after addition of strong hydroxide, should see how it went very soon.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 09, 2018, 12:16:21 AM**

Just setting up for short-path to strip the IPA off.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 09, 2018, 01:13:56 AM**

Looks like we might have some success here, Tsath' used short-path distillation to partially strip the isopropanol, before crashing with acetone dried over molecular sieves (3A). Got a layer of a fine white precipitate, and an upper layer, added 5 drops of conc. sulfuric (98%) to the upper layer, drop by drop, and now fine white snowy material is precipitating out on the lower layer.

Soon as it is filtered, MP and bioassay of the product will be performed. Anyone know the MP of amphetamine sulfate?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **September 09, 2018, 01:32:51 AM**

Quote from: Tsathoggua on September 09, 2018, 01:13:56 AM

> Anyone know the MP of amphetamine sulfate?

280 - 281 degreesC - http://www.caslab.com/Amphetamine_sulfate_CAS_60-13-9/

Decomposes at 300......... And other useful information........... Attached

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 09, 2018, 02:34:56 AM**

Nice one.

Got a white solid in the bottom of the flask after decanting most of the upper layer for evaporation, presumed to be the sulfate salt, formed after addition of 5 drops of conc. H2SO4 to the upper layer whilst the two layers after crashing with anhydrous acetone and stirring. Came out like snow, then settled.

Thanks for the information on testing.

Don't suppose you know how it reacts to PdCl2? don't have the Pt reagents, and really, really CBF buggering about making aqua regia.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 09, 2018, 03:24:13 AM**

Doing a bioassay on the precipitate.

Appearance-snow white, clumpy to a degree but easily reduced to powder between the fingers.

Strong flowery smell, sweet, feels like something smelled before, but Toady can't quite put his fingers on it. Stings momentarily when insufflated. Awaiting further effects.

Adrenergic 'skin crawling' evident to a degree, not too bothersome, ADD tendencies have gone, feel like I just got a kick up the arse, but in a useful way.

Verdict-think it worked. Will do a MP test, but right now, kind of got the hyperfocus coming on, and I really don't feel like stopping reading that paper by Trachsel on fluorinated phenethylamines/amphetamines.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 09, 2018, 03:38:35 AM**

Are you doing that on purpose or is it more like complete ignorance tsath?
Especially someone with your history involving so much police visits should know better not to post "live synthesis reports"... actuall keep that to yourself until you're done, especially when it involves you not being able to search for references...
It is a horrible safety problem, you need to get that clear.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 09, 2018, 03:49:57 AM**

Actually for a change, searching for references is no problem. Doing just that at the moment, although aimed at another target, or relatives of it.

Definite nootropic type effects.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **vulgaricum** on **September 09, 2018, 10:18:23 AM**

Quote from: Tsathoggua on September 08, 2018, 10:46:47 PM

> Decided to quench in an ice-salt-MeOH ice bath, adding 50% AcOH dropwise, only took a few drops to kill excess hydride, separation into two phases after addition of strong hydroxide, should see how it went very soon.

Quote from: Tsathoggua on September 09, 2018, 12:16:21 AM

> Just setting up for short-path to strip the IPA off.

After quenching with the acid, strip the IPA off. The conjugate amine salt doesn't distill out azeotropically. Then basify and steam-distill the goodies out :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 09, 2018, 10:31:29 AM**

Tsath' found that partially stripping the isopropanol off via short-path distillation then after cooling, crashing with acetone dried over mol. sieves works well.

Saves buggering about with steam distillation. This process is the bees bollocks, getting to love it already. Fucking gacked atm off a few small bumps.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 12, 2018, 05:08:16 AM**

Question-has anybody as of yet, tried, keeping them away from oxygen of course, to recycle and reuse the copper nanoparticles created in the course of this reduction? I.e performing the original reduction using CuCl2/borohydride, and after all is said and done, decanting off and washing the Cu nanoparticles to reuse them with a fresh quantity of substrate and borohydride, just as say, Raney nickels are recycled and used again in the absence of catalyst poisons such as sulfur. ?

Also, are they pyrophoric when dry?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 12, 2018, 12:00:17 PM**

Can't you read?

Can't you just put the information to use that is given here?
It states explicitly that it does reduce the halogen!
Please read and THEN ONLY post :o
You're making a nuisance out of yourself spamming here all over the thread.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 12, 2018, 09:16:25 PM**

Apologies Carl, not much excuse there, only that looking at the timestamp of his last post, he was post-ictal at the time he wrote that. Had just recovered from attempting to make pasta for breakfast using isopropanol because of the same.

Its not that he hasn't read this thread, he has. Its just that immediately after (and during, of course) a seizure, he, well, really isn't at his best. He's read this thread through and through, believe you me he has. But in his postictal periods things get really confused and screwed up.

Again, apologies. He'd like to guarantee he'd not ask such obvious questions again, ever; but he cannot give you or any other that specific promise. He can't help what his seizures do to him immediately afterwards.

He ended up taking a mouth-full (and immediately spitting out in disgust, that pretty much shocked him back out of his postictal state) of isopropanol, the same time that pasta was 'cooking', that was when he realized what he'd done with the pasta. Had broken a mug, just glad as fuck it wasn't any precious glassware that hit the floor and was destroyed.

So again, apologies. He really wasn't on good form at the time, and until after it passes off, Tsath' is unable to tell that something isn't right to begin with. He wasn't trying to be a nuisance, Tsath' asks only that you consider that there was a physical, neurological cause affecting him at the time, preventing his posting succinctly and preventing also his realization that something was wrong.

Anyway, with respect to his other question, has anybody attempted using the copper nanoparticles, keeping them carefully out of contact with air, perhaps conducting the initial formation of the Cu nanoparticles and reduction of substrate under argon, so that the nanoparticles could be ensured to be free of surface oxide layers.

When clean of surface oxidation or other surface films; are the CuNPs themselves reusable? or is chloride or another halide, or some manner of ionic ligand (like sulfate for example, which was noted to work more poorly than did CuCl2 when preparing the CuNPs)

Have the halides other than chloride been tested (in this context meaning copper halides), and have both divalent and monovalent Cu salts been tested.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 13, 2018, 05:47:20 AM**

> Quote from: Tsathoggua on September 12, 2018, 09:16:25 PM

> ...He wasn't trying to be a nuisance, Tsath' asks only that you consider that there was a physical, neurological cause affecting him ...

Yet you get no bonus for that ???
If you are only able to post such things, then just try not to post nothing at all!
Or be so kind and delete them afterwards... otherwise I will do.
Your behaviour has again gotten almost unacceptable, and you have after we needed to nstall the measures against this, promised you will better your posting behaviour.

I still need to remove all the rambling and the questions showing nothing else but laziness/amphetamine consumption.
Such things encourage the newbees to do it likewise to you!

You have been spamming all over the thread like it would be the short question thread :-X
And that after it was made sticky!
It should have served as a good reference, not like your personal playground...
Now the value of that formerly neat looking thread went down a lot because of this..

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CaptainPike** on **September 13, 2018, 05:57:09 PM**

Quote from: carl on September 09, 2018, 03:38:35 AM

> Are you doing that on purpose or is it more like complete ignorance tsath?
> Especially someone with your history involving so much police visits should know better not to post "live synthesis reports"... actuall keep that to yourself until you're done, especially when it involves you not being able to search for references...
> It is a horrible safety problem, you need to get that clear.

Aww …c'mon, I think that Ts8th's play-by-play is the most compelling technical reporting in the whole thread! Now, I GOT to try it. Plus, Carl, you'll make him paranoid.
And Tsath, you had me at "insufflated"! Plus, those pork rind 'd, arse munching, Glocks-their-hooves, writ seeking ingrates wouldn't be able to think quickly enough to knock down your door in time, anyway! I was right there with you, buddy.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 13, 2018, 06:50:04 PM**

Carl-Tsath' edited the post about halogenated rings, to leave solely the question of whether the CuNPs are reusable if kept in a totally anoxic environment, and using fresh borohydride.

Apologies. If he does have more and he doubtless will) have more seizures and post-ictal states during which he does not know he is in the post-ictal confusion, please, don't penalize him, not without pointing the problem out and allowing him time to rectify his error. Does this sound an unfair request to you, Carl? All Tsath' asks is that you PM him or otherwise point it out to him, and allow him sufficient time to see your post or PM, and to then correct his posting in error? He genuinely cannot help his having seizures, the medication prevents most of them, but sometimes he gets breakthrough fits, and after, he HONESTLY is unaware, until he has recovered completely.. At the time, he feels...not quite normal, but not 'with it' enough ty o realize he is post-ictal. And he humbly requests that you don't penalize him for his neurological issues when alerted to a problematic post and then tries to correct one as soon as he is made aware.

Have edited the offending post.

Oh and cptn. Pike, if we still had karma, Tsath' would + you for the vitriol poured over those filthy fucking porcine verminborn trash :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **souka** on **September 18, 2018, 06:13:26 PM**

Does this work with ketoximes? Have you seen this paper attached where they use NaBH4 and CuSO4 to reduce oximes with good yields? Which procedure would be better to tried it out? Why IPA instead of MeOH?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 18, 2018, 06:22:42 PM**

MeOH reacts with borohydride fast ;)

It would surely work with ketoximes too :)
Please report!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **September 18, 2018, 06:27:25 PM**

Quote from: souka on September 18, 2018, 06:13:26 PM

> Does this work with ketoximes? Have you seen this paper attached where they use NaBH4 and CuSO4 to reduce oximes with good yields?

Seems to produce a mixture of primary and secondary amines........ Usually favouring secondary amines......... I'm not so sure   :-\

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **souka** on **September 18, 2018, 09:48:23 PM**

Quote from: carl on September 18, 2018, 06:22:42 PM

> MeOH reacts with borohydride fast ;)
>
> It would surely work with ketoximes too :)
> Please report!

Should I run it without the water or the way it is?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **September 19, 2018, 11:12:51 AM**

As far as I understood it the water mainly serves to slow down the reaction speed, correct me if I'm wrong. Therefore, especially because MeOH reacts even quicker, water is advised. Better wait for someone to confirm this though.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **unlikely_username** on **September 19, 2018, 05:53:43 PM**

It seems like this has been proven a fairly straightforward and effective reduction scheme that mitigates many of the issues with previously accepted methods. What would it take to get a version of this in the publications section?

I ask because stickied threads tend to attract a lot of chatter that can dilute their usefulness. Rather than leaving it to the moderators to try to prevent that by culling this thread repeatedly until the end of time, I'd propose we compile something more permanent.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **unlikely_username** on **September 19, 2018, 06:15:59 PM**

Quote from: loft on September 19, 2018, 11:12:51 AM

> As far as I understood it the water mainly serves to slow down the reaction speed, correct me if I'm wrong. Therefore, especially because MeOH reacts even quicker, water is advised. Better wait for someone to confirm this though.

My first impression was that the water was included to solvate the various inorganics being added to the solution. NaBH4 does not dissolve particularly well in isopropanol in my experience.
As previously noted, methanol reacts rather quickly with borohydride at elevated temperatures to produce sodium tetramethoxyborate. Because this reaction is not run at reduced temperatures methanol isn't used. For reductions at reduced temperature methanol is often preferable because it dissolves NaBH4 fairly well without causing undue decomposition.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **September 19, 2018, 06:24:28 PM**

Quote from: unlikely_username on September 19, 2018, 06:15:59 PM

> Because this reaction is not run at reduced temperatures methanol isn't used. For reductions at reduced temperature methanol is often preferable because it dissolves NaBH4 fairly well without causing undue decomposition.

I have a question myself........... Is it possible to run the reaction at RT.........? This would blow the doors open for bucket chemistry.
Now that would be the bomb

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 19, 2018, 07:21:53 PM**

> Quote from: Corrosive Joeseph on September 19, 2018, 06:24:28 PM
>
> > Quote from: unlikely_username on September 19, 2018, 06:15:59 PM
> >
> > > Because this reaction is not run at reduced temperatures methanol isn't used. For reductions at reduced temperature methanol is often preferable because it dissolves NaBH4 fairly well without causing undue decomposition.
> >
> > I have a question myself........... Is it possible to run the reaction at RT.........? This would blow the doors open for bucket chemistry.
> > Now that would be the bomb
> >
> > /CJ

No - you need to reflux it in the second part, after the copper salt is added.
But the first, of course exothermic part, is run without any adjustment to the temperature.

> Quote from: unlikely_username on September 19, 2018, 05:53:43 PM
>
> > ...
> > What would it take to get a version of this in the publications section?
> > ...

A nice, referenced writeup, and cf course someone willing to do one :)
The publication section is free to post in for everyone of course.

Here, some people think it would be wise to clutter this thread up with things like their health problems or burying it under lots of live-postings...
Something we all, I assume, despise of ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **September 20, 2018, 12:24:09 AM**

Is it important to get the nabh4 to fully dissolve? I'm not getting great yields from this procedure. I use the exact quantities listed but don't seem to get good yeilds. Should I add more H2O untill nabh4 totally dissolves or should more IPA be added?

Also cucl2 doesn't dissolve well in the IPA so I use a mixture of IPA and h20 to get it to dissolve not sure If this is affecting yeilds?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 20, 2018, 12:37:56 AM**

Just powder your borohydride well before you add it.

When your CuCl2 is not dissolving very well...I remember, you made yours yourself.
Maybe it is not really "CuCl2", but has lots of impurities ;)
Mine, bought, is dissolving very great in both EtOH as well as IPA.

Have you now finally did it a second time?
Because, your first trial was a failure due to several reasons, not just one... ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **September 20, 2018, 12:47:49 AM**

Yes I did it 3 times now. And yes I made the cucl2 myself I have a green cucl2 and I have a nice blue cucl2. The first attempt I used the green cucl2 and I got the best yeild even tho I got that big tar like ball that formed. And it seems like the blue cucl2 is giving me worse yeilds. I am now going to try this on a 1g P2np scale with the 2 different copper salts and see what gives me the best results.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **September 20, 2018, 12:49:17 AM**

Carl how much IPA do you use to dissolve your cucl2?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **unlikely_username** on **September 20, 2018, 02:51:47 PM**

I see one problem right off the bat. If your copper chloride is blue to blue/green you have the dihydrate of copper chloride. Either dry it out or factor the extra weight of the water into your calculations.

Here's a nice little solubility table:
https://periodic-table-of-elements.org/SOLUBILITY/copper-II_chloride

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 20, 2018, 03:54:18 PM**

Dihydrate works fine here, the anhydrite is way too expensive anyway.
Mol weight of the dihydrate should be something around 170g/mol right out of my head ???

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **unlikely_username** on **September 20, 2018, 03:59:51 PM**

Quote from: carl on September 20, 2018, 03:54:18 PM

> Dihydrate works fine here, the anhydrite is way too expensive anyway.
> Mol weight of the dihydrate should be something around 170g/mol right out of my head ???

It should work just fine yeah, I just meant at 25% increase in molar mass could be an issue if not accounted for, mostly an issue when someone makes their own and doesn't know the compound forms a hydrate. 170g/mol sounds about right.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **September 20, 2018, 06:58:49 PM**

The OP calls for the dihydrate I thought?
"10% mol eq. (Of nitroalkene) CuCl2.2H2O"

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Shy Guy** on **September 20, 2018, 10:48:05 PM**

Quote from: unlikely_username on September 19, 2018, 06:15:59 PM
> Quote from: loft on September 19, 2018, 11:12:51 AM
>> As far as I understood it the water mainly serves to slow down the reaction speed, correct me if I'm wrong. Therefore, especially because MeOH reacts even quicker, water is advised. Better wait for someone to confirm this though.
>
> My first impression was that the water was included to solvate the various inorganics being added to the solution. NaBH4 does not dissolve particularly well in isopropanol in my experience.
> As previously noted, methanol reacts rather quickly with borohydride at elevated temperatures to produce sodium tetramethoxyborate. Because this reaction is not run at reduced temperatures methanol isn't used. For reductions at reduced temperature methanol is often preferable because it dissolves NaBH4 fairly well without causing undue decomposition.

Thank you for your post. Is the water necessary if using MeOH as the solvent (under cooling)? Also could the NaBH4 mol to mol amount be reduced when using MeOH?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 20, 2018, 11:32:11 PM**

Quote from: Shy Guy on September 20, 2018, 10:48:05 PM
> Thank you for your post. Is the water necessary if using MeOH as the solvent (under cooling)? Also could the NaBH4 mol to mol amount be reduced when using MeOH?

The amount of borohydride can definitely not be reduced, there is another paper floating around, and there are 7,5mol eq. used in it.
It is not advised to use methanol at all here.
IPA works best, and EtOH works good too, but it seems according to my limited trials, not likewise well.
A trial using EtOH together with 2,5-dimethoxynitropropene, very slightly basified to counter NaBH4 decomposition, yielded for some reason a disappointingly lower yield of 2,5-DMA-HCl :(

The OP said to the solvent:
Quote from: testex on April 15, 2017, 02:45:52 PM
> ...
> Notes: use pure IPA (without lubricants and shit like that), maybe ethanol (without mek etc ketones).. and remember to recrystallize the P2NP and/or wash it with sodium bisulfite to get rid of aldehydes. They interfere the reaction. Unfortunately, this reduction does not work with ring halogenations. It will efficiently reduce 4-chloro-2,5-diMeOP2NP to 2,5-DMA though..
>
> The modification is based onISSN: 2231-1963 (http://www.archives-ijaet.org/media/30I4TRANSITION-METAL-CATALYZED-NaBH4-MeOH-REDUCTION-OF-NITRO-CARBONYL-AROMATICS-TO-HYDROGENATED-PRODUCTS-AT-

> ROOM-TEMPERATURE-Copyright-IJAET.pdf)
> ...
> http://www.sciencemadness.org/talk/files.php?pid=331291&aid=31340
> (http://www.sciencemadness.org/talk/files.php?pid=331291&aid=31340)

I am not so content with changing much, although that reference for the ketoxime reduction together with CuSO4 is using MeOH...
I do not understand the reaction mechanics good enough to know if that could be a reason for the lower yield they get with the oxime there, or if it is maybe the fault of using CuSO4 instead of another salt like CuCl2? ???

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **unlikely_username** on **September 20, 2018, 11:39:10 PM**

Quote from: Shy Guy on September 20, 2018, 10:48:05 PM

> Quote from: unlikely_username on September 19, 2018, 06:15:59 PM
>
> > Quote from: loft on September 19, 2018, 11:12:51 AM
> >
> > > As far as I understood it the water mainly serves to slow down the reaction speed, correct me if I'm wrong. Therefore, especially because MeOH reacts even quicker, water is advised. Better wait for someone to confirm this though.
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> > My first impression was that the water was included to solvate the various inorganics being added to the solution. NaBH4 does not dissolve particularly well in isopropanol in my experience.
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>
> Thank you for your post. Is the water necessary if using MeOH as the solvent (under cooling)? Also could the NaBH4 mol to mol amount be reduced when using MeOH?

I'm not sure I would change this reaction to be in methanol with cooling unless I was trying it out just to see if it would work. You're more than welcome to give it a shot, but I'd run it normally first and make sure you don't have any issues with the proven route.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 20, 2018, 11:51:08 PM**

By the way, it is in my experience, important to powder the borohydride before really well, this works much better this way.
Also, I usually use a bit more IPA to get everything well into solution, and fast enough too.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **September 21, 2018, 12:17:42 PM**

I did this reaction with 1g P2np and the light blue cucl2 that I made and got a yeild of .61g of amph. Sulphate.
I will now try it with the green cucl2 that I made and also I would like to try it with copper sulphate and see what kind of results I'll get just for shits and giggles.

Also 5ml of IPA and 2.5ml H2O for every gram of P2np does not seem enough unless you run the first step with a condenser maybe. The light exothermic reaction plus the evolution of hydrogen from the nabh4 seems to evap off quite a bit of the IPA leaving me with a thick foamy mess every time that I have to top up with more IPA and water.

How much acetic acid is suggested to quench the nabh4 on say a one gram scale? Is adding too much counter productive? The last reaction I added straight GAA and after a couple minutes of stirring the solution turned a nice clean blue coolaid color and seemed to dissolve the cucl2? I always just add a random amount most Likely very much over kill just so I know everything g is acidic before I strip IPA.

Another question I have when adding h2so4 to the H2O and amph. Base, I understand one can over acidify and say if the base is in a solvent like toluene the amph.sulphate will dissolve back into solution. Is it salvageable when this happens? I would think to just add NaOH and turn into free base again but when ever this happens it seems I lose everything and can't recover the amph. Anymore .

What happens to the amph when too much h2so4 is added? Why does it redissolve? How does one salvage the amph. When this happens?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 21, 2018, 01:45:35 PM**

It decomposes ;)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 21, 2018, 04:37:40 PM**

Has anybody tried running the rxn under a pad of argon *(to prevent oxidation of the CuNPs) and with several washes with degassed iPA, attempting to reuse the catalyst? it'd be interesting to see if there is any difference in yield if performing the rxn (with freshly prepared CuNPs that is) under inert gas, because being nanoparticles they ought to oxidize a lot faster than bulk copper metal, or regular copper powder, and in reflux conditions they are continually being brought to the surface of the reaction to contact air.

Will do some experiments as soon as possible, just recovering from some physical and immunological health issues at the moment so it'll be a little while before Tsath' can do it, so if anyone else wants to experiment with doing a rxn under inert atmosphere, whether or not attempts are made to reuse the catalyst, it'd be interesting to compare with a reaction open to the air.

For quenching the borohydride, when done at a 10mmol scale, it only took a few drops of 50% v/v AcOH to quench, there seems to be very little left over, once the borohydride has first reduced the nitroalkene to nitroalkane and then reduced the CuCl2 to Cu(0) (assuming of course that the nanoparticles are copper metal and not a very finely divided oxide resultant from first formation of zero-valent copper and then rapid atmospheric oxidation during the reflux (another reason Tsath' is curious to see what happens when done under inert atmosphere)

Whats the visual appearance of the CuNPs in the experiments of fellow bees? in Tsath's case it was dark, in suspension, and after the reaction, precipitated out as a black sludge.

Thinking further, this isn't entirely dissimilar to how Rieke metals are prepared, reducing agent used to reduce
a metal salt to the zero-valent metal in solution forming extremely fine metal particles, anyone know if CuCl2 is soluble in either THF or diethyl/diisopropyl ether or 1,4-dioxane? would be interesting to see if there is any difference in activity between CuNPs formed with borohydride and when the CuCl2 is reduced with Na, K, maybe Li, Ba or Sr.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Shy Guy** on **September 21, 2018, 04:45:04 PM**

The concern related to a larger scale than what is posted here would be that the reaction would create too much exotherm, so it might be wise to cool down the reaction even when using IPA/Water. Unfortunately, that would make the NaBH4 even less soluble so that's why MeOH was suggested. Any comments on this would be appreciated.

Carl, any suggestions on how to powder NaBH4?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **September 21, 2018, 05:01:19 PM**

Assume its in pelleted/prilled or tablet form? just put it in the middle of a folded piece of paper and crush it with the bottom of a coffee mug or other flat surface of an object that won't break under pressure,and then use the side of the mug to roll back and forth over it. The air stability/moisture sensitivity of NaBH4 is really not a problem.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 22, 2018, 12:28:14 AM**

Quote from: Shy Guy on September 21, 2018, 04:45:04 PM

> The concern related to a larger scale than what is posted here would be that the reaction would create too much exotherm, so it might be wise to cool down the reaction even when using IPA/Water. Unfortunately, that would make the NaBH4 even less soluble so that's why MeOH was suggested. Any comments on this would be appreciated.
>
> Carl, any suggestions on how to powder NaBH4?

As for the exothermic reaction, it can easily be controlled through the addition of nitroalkene and I would not change that.
Higher temperature in MeOH would also lead to faster decomposition of the borohydride, so better to still use IPA here.
The bit of water in there helps to dissolve the borohydride anyway, so we're only talking about a few minutes, 20-30min at most if it is not finely powdered.

I have not thought about the one in prill/pellet form, I would assume crushing similar to tsath has described, but not in a piece of paper but in a plastic bag.
Mine usually comes in a rather powdery form, just some not very hard lumps in there at most, and these can very simply be powdered by crushing with a larger spatula or spoon... not to a fine, dust-like powder, that is not needed, just getting rid of the larger lumps is sufficient for me.

I know older borohydride can form hard masses with large lumps...

A friend told me, that LiAlH4 which is coming in large lumps, is conveniently powdered when put into a plastic bag and hit with a hammer(:o) until fine enough for ones wishes, of course the bag is here an airtight and stable one.
It sounds, especially on this reagent, somewhat dangerous, but I was told it can stand this treatment.

Found yet nothing that would indicate this as being not advised for sodium borohydride...
The bag here is of course not so important to be a tight one, but I would advise against paper as NaBH4 is a bit hygroscopic and will stick to paper when left on it too long, and for sure faster when it was powdered.
Also, I would expect the borohydride to loose a bit reducing power when it is really fine, I do not know though, but it would not matter much anyway.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Shy Guy** on **October 09, 2018, 03:24:29 PM**

First attempt (fairly large one by the standards here) resulted in failure.

0.5 mol was reduced (washed with bisulfite solution/ water as well as a previous ethanol wash.)

6 mol equivalent NaBH4

Addition took place over around 2hours. It was done in a 5L RBBF sitting in a mantle under overhead mixing. Putting it in a mantle during addition is a bad idea as it retains heat from the reaction.

Temp for the most part stayed between 48-52C, with a one time peak near the end of 62C

It was allowed to stir for 45mins at which point a large solid white mass had formed which threatened the glass stirring shaft. Addition of CuCl2 broke that mass up and allowed things to go back to mixing properly.

It was brought to reflux for 30-40 mins at which point the mantle was turned off. **Is there a downfall to refluxing for too long?**

The next day, GAA was added slowly. It was hard to measure by pH paper if the solution had turned slightly acidic. One indication was that with eventual additions, the liquid would go from black to a vivid blue color. Too much acid could have been used on this attempt.

Distillation was halted at 98C. The distillate was clear and had a fairly strong acidic reading by litmus paper. NaOH solution was then added + large amounts of water.

Some weird things were observed during steam distillation:

1- Temp was around 93C
2- A fluorescent oil like product was coming over which eventually settled at the bottom of the Aqueous layer.

Some droplets of oil were floating on top of the Aqueous layer. No further steps were taken.

It should be noted that lots of H20 was used during reaction: 392mL. This was a direct scale up of the amount used in the initial write up in this thread.

How to dispose of this reaction safely?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 09, 2018, 09:55:01 PM**

Oh well... have you omitted to include the step where you basified the reaction maybe?
It reads like only that is what happened?
You can add too much GAA, no problem, it will get neutralised anyway in the later steps.

If I am right on this, I am eager to hear what comes out after you have steamed the basic post reaction :)

Edit: on the other hand.... if you add too little GAA, you could directly distill some base out, happened to me once, but I am also sure this is not as safe with residual borohydride in there.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Shy Guy** on **October 10, 2018, 12:36:10 AM**

Hi Carl, yes the NaOH addition was included in the post: *" NaOH solution was then added + large amounts of water. "*

Also, the reaction mixture tested as highly alkaline before steam distillation.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **October 10, 2018, 04:51:01 PM**

Tsath' didn't note any fluorescent oily material.

By fluorescent, do you mean it actually exhibited fluorescence under either visible or UV/blacklight? or more of a highlighter pen lurid yellow-green?

Can't comment about the scale-or increased quantities of H2O.

When Tsath' performed his first experimental with this procedure, he did it on a small scale (half scale compared to the original, because only a very small amount of CuCl2 was available, just a crust, weighing a few hundred mg so the CuCl2 was in that case, the limiting reagent.

Also,he allowed the reaction to cool before adding acid, and used either a 25% or 50% (can't remember which now) solution of GAA in H2O rather than neat GAA, when it came to quenching the borohydride.VERY little of it was actually needed, and dropwise addition of a dilute AcOH solution (25-50%) took perhaps 2-3 drops at that scale before hydrogen evolution ceased upon addition of a further drop)

As for the black to blue coloration, Tsath's guess is that you added too much acid, especially if you used neat GAA, he is of the opinion that the black is the nanoparticulate copper, black due to it's extremely finely divided surface area, akin to say, nickel black (Tsath' has some very,very fine Ni metal dust, and it too is black, although it is nowhere near as fine as any nanomaterial.Perhaps akin to platinum black)

The metal,being more reactive (the Cu(0) that is) due to being nanopowder probably made it easier for copper acetate to form, which could be responsible for the coloration,

Quench of the borohydride wasn't violent at all, slight fizzing when adding the AcOH (as either 25 or 50%, forgot which, aqueous) dropwise, just a bit of hydrogen evolution, one can tell when the NaBH4 is quenched by the way that after it has, adding the acid dropwise, H2 evolution takes place with each drop, until one drop after the last one required to decompose the remaining NaBH4 traces, which, as it's all quenched, will not induce any further fizzing or bubbling, since it's all done. Using the bubbling of H2 during the quench, and dropwise adding 50% or 25% AcOH allows it to bee precise, to within a single additional drop of acid.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **vulgaricum** on **October 10, 2018, 08:29:14 PM**

Quote from: Shy Guy on October 09, 2018, 03:24:29 PM

> First attempt (fairly large one by the standards here) resulted in failure.
>
> 0.5 mol was reduced (washed with bisulfite solution/ water as well as a previous ethanol wash.)
>
> 6 mol equivalent NaBH4
>
> Addition took place over around 2hours. It was done in a 5L RBBF sitting in a mantle under overhead mixing. Putting it in a mantle during addition is a bad idea as it retains heat from the reaction.
>
> Temp for the most part stayed between 48-52C, with a one time peak near the end of 62C
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> It was allowed to stir for 45mins at which point a large solid white mass had formed which threatened the glass stirring shaft. Addition of CuCl2 broke that mass up and allowed things to go back to mixing properly.
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> It was brought to reflux for 30-40 mins at which point the mantle was turned off. **Is there a downfall to refluxing for too long?**
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>
> 1- Temp was around 93C
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> Some droplets of oil were floating on top of the Aqueous layer. No further steps were taken.
>
> It should be noted that lots of H20 was used during reaction: 392mL. This was a direct scale up of the amount used in the initial write up in this thread.
>
> How to dispose of this reaction safely?

You formed the nitronate - not enough of solvent. What you should've done is add more IPA.
I modified this reaction employing the same ratios and w/o consenser. It caused gooey nitronate forming and stirrer to stick in the bottom of the flask.
The P2NP (200g!) was _10 years old_ and not recrystalled (well, priorly twice, 5 years(!) ago). The addition rate was such that the reaction was boiling. Remember: no cooling!.
Nickel acetate (as hydrate) was added with same ratios and after the solution became green like a poison, it started to climb out from the reaction as black foam from the flask. The mag-stirrer was stuck. Cooling was employed but nevertheless it escaped.

After 48h the black foam which partly escaped from the flask (part of it was taken to a beaker and tried to dissolve to GAA didn't react with petroleum ether!) was dissolved and the reaction was neutralized with GAA (no reaction) and and stripping the IPA out. After cooling, about 200 mL of oil floating over. Aftrer basification, over 85% yield.

I cannot understand why you got the fluorescent oil. I always add the P2NP so the reaction readily refluxes! Maybe that's the problem?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Shy Guy** on **October 11, 2018, 03:04:25 PM**

So a few more pieces of info.

IPA was probably very low since the addition was done while the flask was open and much of the solvent escaped.

Way too much GAA was used for quenching borohydride.

Will report back with any further attempts.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **October 11, 2018, 05:52:48 PM**

I've always used a lot of extra gaa when quenching and never seemed to hurt anything. One time I got a really blue coolaide looking mixture, I think you mentioned this color in your earlier post.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 11, 2018, 05:57:46 PM**

Thank you vulgaricum, adding the nitroalkene too slow as a reason, this explains the nitronate oil and the low yield when I did this reduction using dimethoxy-P2NP ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fuckyou** on **October 11, 2018, 06:09:40 PM**

Quote from: carl on October 11, 2018, 05:57:46 PM

> Thank you vulgaricum, adding the nitroalkene too slow as a reason, this explains the nitronate oil and the low

> yield when I did this reduction using dimethoxy-P2NP ::)

i am thinking how this reaction will be with nitrostyrenes, if nitropropenes are low yield, i thinking now how it will go with 2,5-dimethoxynitrostyrene, and at what temperature did you do the destilation of the post rxn.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 11, 2018, 06:15:53 PM**

If done properly, I would not had that low yield, look a few pages earlier, because another member did it with trimethoxynitrostyrene and got a yield of 70% still.

Of course you can't steam distill every amphetamine likewise good as the unsubstituted...
So I just extracted the 2,5-DMA out of the reaction.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fuckyou** on **October 11, 2018, 07:53:24 PM**

Quote from: carl on October 11, 2018, 06:15:53 PM

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>
> Of course you can't steam distill every amphetamine likewise good as the unsubstituted...
> So I just extracted the 2,5-DMA out of the reaction.

is there any impurities left from the reaction, deriven from the water ? As i see this coper reaction is so colorfull, can you crystalize it into white crystals or powder, wich salt did you make the dob, i think try it soon too, but 2cb first?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 11, 2018, 10:56:20 PM**

You can remove impurities, but to me the work-up wasn't that hard to realise.
Copper(II) salts are, while soluble in some solvents, as anorganic substances luckily only in few but when basic salts usually insoluble ;)
The final product was white crystalline matter as its hydrochloride when recrystallised, yes.
And why DOB, I am talking about 2,5-DMA?

Salt when halogenated depends anyway on the method, as some use HCl, some the freebase(thus result in HBr) of substrate, but lets stay on topic ok?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fuckyou** on **October 12, 2018, 09:22:10 AM**

Quote from: carl on October 11, 2018, 10:56:20 PM

> You can remove impurities, but to me the work-up wasn't that hard to realise.
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> salts usually insoluble ;)
> The final product was white crystalline matter as its hydrochloride when recrystallised, yes.
> And why DOB, I am talking about 2,5-DMA?
>
> Salt when halogenated depends anyway on the method, as some use HCl, some the freebase(thus result in HBr) of substrate, but lets stay on topic ok?

wtf, is there any properties of 2.5DMA ? if not brominated it seems usles compound for me. its good news that i can isolate pure product without doing steam destilation, the only problem i see is the volume of the reaction, if scaled 1mol for example there is too much liquids.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 12, 2018, 09:33:07 AM**

Quote from: fuckyou on October 12, 2018, 09:22:10 AM
> wtf, is there any properties of 2.5DMA ?

hydrochloride mp of 114-116 °C.
hydrobromide melts at 129-131 °C.

Why always brominating?
You can also with valuable goal iodinate for DOI or nitrate for DON :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fuckyou** on **October 12, 2018, 10:37:22 AM**

Quote from: carl on October 12, 2018, 09:33:07 AM
> Quote from: fuckyou on October 12, 2018, 09:22:10 AM
> > wtf, is there any properties of 2.5DMA ?
>
> hydrochloride mp of 114-116 °C.
> hydrobromide melts at 129-131 °C.
>
> Why always brominating?
> You can also with valuable goal iodinate for DOI or nitrate for DON :)

this DON seems very intrested compund for me, is it amphetamine-like compund from DO(X) series that dont have psychedelic effects at low doses and acts as amphetamine in doses such as 1-3mg ? It woud be holy grail for me if true, how you make the nitronate, a nitrtation with sulfuric acid and nitric acid ?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **October 12, 2018, 04:14:30 PM**

A solution of 8.4 g 2,5-dimethoxyamphetamine base in 40 mL acetic acid was added dropwise over the course of 0.5 h to 43 mL of 50% nitric acid which was well stirred and cooled with an external ice bath. The resulting solution was quenched with ice water, made basic with aqueous NaOH, and extracted with a benzene-ether mixture. The residue that remained after the removal of the solvent was dissolved in dilute HCl which, upon evaporation of the H2O, yielded a nearly colorless residue. Recrystallization from an ethanol/ether mixture gave, after drying, 10.5 g of 2,5-dimethoxy-4-nitroamphetamine hydrochloride (DON) with a mp of 206-207 °C. The acetamide derivative melted at 166-168 °C. The formamide derivative was easily hydrolyzed with 3N HCl. And the R-isomer of DON hydrochloride had a mp of 231-232 °C.

always look up in phikal for 2-CX or DOX substrates

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **October 20, 2018, 12:52:38 AM**

I'm only yielding around 50% at best from this reaction what's going on here?? Following procedure to a "T". I think after steam distilling out the base then acidifying and boiling water off to leave amph. Sulphate is where I'm losing everything. I'm scared to over acidify/ under acidify. What is a better method for work up after steam distillation?
Possibly extracting with a non polar and then acidifying with h2so4/Methanol solution this way I can actually see the amph precipitate out and I can filter precipitate then add more acid to filtrate this way preventing over acidification?
Any tips??

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **callejularbo** on **October 24, 2018, 07:45:51 PM**

Why bother quenching the reaction? Just stabilize the residual NaBH4 with NaOH and leave it behind in the aqueous phase in the workup. See my previous post.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 24, 2018, 08:29:45 PM**

Quote from: LD5050 on October 20, 2018, 12:52:38 AM

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> Possibly extracting with a non polar and then acidifying with h2so4/Methanol solution this way I can actually see the amph precipitate out and I can filter precipitate then add more acid to filtrate this way preventing over acidification?
> Any tips??

Just measure the pH dude...

Quote from: callejularbo on October 24, 2018, 07:45:51 PM

> Why bother quenching the reaction? Just stabilize the residual NaBH4 with NaOH and leave it behind in the aqueous phase in the workup. See my previous post.

How do you want to get rid of the alcohol then?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **callejularbo** on **October 26, 2018, 08:31:56 PM**

Which alcohol? The IPA? That is distilled off.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **October 29, 2018, 10:48:38 PM**

How much can this reaction be scaled up ? I just tried it on a 15g P2np scale and it doesn't look like it turned out too well. I steam distilled off freebase but doesn't look like I got much at all...

On a scale this size should reaction/reflux be held much longer than 40 min?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **vulgaricum** on **October 30, 2018, 01:13:30 PM**

Quote from: LD5050 on October 29, 2018, 10:48:38 PM

> How much can this reaction be scaled up ? I just tried it on a 15g P2np scale and it doesn't look like it turned out too well. I steam distilled off freebase but doesn't look like I got much at all...
>
> On a scale this size should reaction/reflux be held much longer than 40 min?

It's been done with 500g of P2NP using 10L RBF and refluxing for 2 hours, 90% yield.
Adding everything (near) refluxing temperature increase yield.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **October 30, 2018, 02:01:43 PM**

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everything? So you added P2NP @ near reflux?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **October 30, 2018, 02:51:36 PM**

Wow 500g 90% yeild!!? Well that's good to hear. Could you maybe write up your procedure, what do you mean you added everything at near reflux?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **souka** on **October 30, 2018, 04:48:24 PM**

Quote from: carl on September 18, 2018, 06:22:42 PM

> MeOH reacts with borohydride fast ;)
>
> It would surely work with ketoximes too :)
> Please report!

Didn’t work...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **October 30, 2018, 04:56:28 PM**

Quote from: souka on October 30, 2018, 04:48:24 PM

> Didn’t work...

Would you be so kind as to give us more details than two words..............? You surely produced something.
Did you do any characterization............? Just because a primary amine doesn't make a salt at the end means nothing in an experimental.
You could have nitropropane, oxime, hydroxylamine, etc., etc.........

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **October 30, 2018, 05:12:41 PM**

My yeilds continue to be horrible from this process, I don't get it... I just did a 7g P2np reaction and got 1.5g amph. Sulphate from it...

What am I doing wrong!!?! Possibly I'm thinking it could be due to my home made cucl2.
What if I used say copper sulphate as catylist what kind of yields can be expected from that?
I want to use some other copper salt just so I can determine whether or not my self made cucl2 is the problem here.
What are some other good catylists to use in this process?

Another problem I'm having is the amount of water and isopropyl alcohol I use in the beggining evaporates off pretty fast from the exothermic/hydrogen evolving reaction when adding the P2NP to the NaBH4, IPA, H2O solution. This causes a lot of foaming/frothing/heat which evaporates off the already small amount of IPA/H2O that's in the flask.

To remedy this I'll either just add more IPA/H2O and/or add a condenser or place reaction flask in a water bath to keep the heat and frothing down.
Is it important the reaction stays hot while adding the P2np? Should I don't place in water bath?

Another thing I can think of is the NaBH4 doesn't fully dissolve in the IPA/H2O in the beggining even after letting stir for a good 15-20 min. This time I'll try grinding the NaBH4 into a fine powder before addition but for some reason I don't think this will help.

One more thing, my NaBH4 smells a bit like ammonia with a very faint "eggy/natural gas" aroma. Could my NaBH4 be bad?

I'm not looking to be spoon fed but the research I conducted doesn't answer these questions I have and I have tried this reaction about 6-7 times now and I don't believe I have ever got over a 50% yeild.
If anyone could help me out and give me some tips or explain what works well for them it would be much appreciated.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **October 30, 2018, 05:38:12 PM**

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what amounds of solvent do you use? i tried this reaction just 1 time and got around 50% too.

but with 70ml Ethanol + 20ml water - 7g $NaBH_4$ dissolves easy.
Then 5g P2NP added in small amounds under strong stirring, after addition solution kept stirring for 30 min.

then Cu salt is dissolvet in water and dripped under stirring in. then stir and reflux. hope this helps

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Title: **Re: P2NP to amine with $NaBH_4$-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **October 30, 2018, 06:30:15 PM**

I use 5ml IPA and 2.5ml H_2O for every gram of P2NP I use.
After extremely slow addition of P2NP to minimize frothing and after it is all added I let this react with vigorous stirring for 30-45 min.

I'll then attach a reflux condenser and add in all at once/or in 2-3 additions an IPA/H_2O solution of my home made very light blue in color $CuCl_2$. (10% mol eq. For P2NP)
So for every gram of P2NP I use .1g of $CuCl_2$.
When I add this the reaction mix instantly turns black and heats up.
I'll then reflux this for a good 30-45min

After I let reflux I'll add to reaction mixture through reflux condenser (while still hot) Glacial Acetic Acid untill fizzing stops and mixture is very acidic. (Usually I add a large excess of GAA)
After I add GAA, shortly after the reaction mixture takes on a very blue transparent color. Exactly like blue coolaid.
When I stop stirring two blue transparent layers form in the flask and a small amount of black precipitate sits on the bottom.

I'll then set up for distillation and distill off everything below 100c.
Once temp reaches 100c I'll switch the receiving flask. I'll then add very strong NaOH/H_2O (I don't usually make a specific NaOH/h20 % solution , I basically just add a large amount of NaOH to a beaker and add water and mix untill it dissolves) I then add this to reaction flask.
I then collect H_2O/freebase oil in receiving flask.
Usually the H_2O/freebase mixture in the receiving flask is a milky white solution with small amounts of clear oil floating on top.

Once the water distillling over becomes clear I stop distillation.
I now drip in 2 drops (I don't have any PH paper at the moment) of phenolphthalein solution into the freebase and water mixture turning it purple/pink.
Now I'll drip in diluted H_2SO_4 until the pink color disappears and I don't see any freebase oil floating on top of the water.

I now place the solution in a beaker on the hot plate with a stir bar and boil down to dryness with stirring.
I am then usually left with a whitish substance caked to bottom of the beaker to which I'll add acetone and boil with mixing for around 1 minute
Then I filter through a coffee filter and collect amphetamine sulphate and let residual acetone evaporate.

I'm always left with a shitty yeild and don't understand why. I think next time after distilling off IPA I'll basify the reaction mix and then extract freebase with DCM. I'll then separate/collect DCM, dry with MgSO4 and then evaporate off DCM leaving me with just the freebase oil. I'll then know exactly how much I have and then I can add the exact amount of H2SO4 need to convert it into the sulphate.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **October 30, 2018, 06:57:07 PM**

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i feel you, i do this workup too, but with PH paper. Do you recrystallized your P2NP good? no smell not damp, etc.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **October 30, 2018, 07:51:59 PM**

Recrystalized P2NP from MeOH 3x.
P2NP is a very pretty bright yellow dry crunchy needle like crystals.
The smell of the P2NP reminds me of cinnamon or fireball candy. I find this smell is not an indicator of impurity but rather a sign of purity. The smell is more apparent after more crystallizations.

A melting point was performed on the P2NP which was 64-66c which is dead on with the literature.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **souka** on **November 06, 2018, 03:38:04 AM**

Quote from: Corrosive Joeseph on October 30, 2018, 04:56:28 PM

> Quote from: souka on October 30, 2018, 04:48:24 PM
>
> > Didn’t work...
>
> Would you be so kind as to give us more details than two words..............? You surely produced something.
> Did you do any characterization............? Just because a primary amine doesn't make a salt at the end means nothing in an experimental.
> You could have nitropropane, oxime, hydroxylamine, etc., etc.........
>
> /CJ

I tried it out on isosafrole ketoxime, yielded nothing. That’s it. Maybe the procedure described in the paper works...who knows? This one didn’t work.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **November 06, 2018, 03:46:03 AM**

Quote from: souka on November 06, 2018, 03:38:04 AM

> I tried it out on isosafrole ketoxime, yielded nothing. That’s it. Maybe the procedure described in the paper

> works...who knows? This one didn’t work.

Oh, I had forgotten you were talking about the oxime and not the nitropropene (facepalm)

Apologies................. And thank you very much for your feedback................ Much appreciated

/CJ

[EDIT] - As far as I am aware, nickel boride will reduce your oxime   :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **vulgaricum** on **November 06, 2018, 11:09:23 AM**

Quote from: souka on November 06, 2018, 03:38:04 AM

> I tried it out on isosafrole ketoxime, yielded nothing. That’s it. Maybe the procedure described in the paper works...who knows? This one didn’t work.

What?? That does not make any sense. Even the NaBH4 itself would reduce the ketoxime to N-OH-MDA :o

Quote from: Corrosive Joeseph on November 06, 2018, 03:46:03 AM

> [EDIT] - As far as I am aware, nickel boride will reduce your oxime   :)

As should copper boride as well :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **thewire** on **November 11, 2018, 09:58:30 PM**

Problem solved!

Nitrostyrene 32 (2.77 g, 10 mmol) was added carefully in portions to a stirred suspension of NaBH4
(2.84 g, 75 mmol) in IPA (32 ml) and water (16 ml) causing an exothermic reaction increasing the
temperature of the mixture to 50-60°C. Thereafter a 2M solution of CuCl2 (0.5 ml, 1 mmol) was
added carefully dropwise causing further exothermicity. The reaction was then held at 80°C for 30
minutes using external heating. After reaching r.t, a 25% solution of NaOH (20 ml) was added
under stirring and the phases were separated. The aqueous phase was thereafter extracted with
IPA (3x30 ml). The extractions were combined, dried over MgSO4 and filtered. A stoichiometric
amount of 4M HCl in dioxane was added to the filtrate under stirring. The mixture was evaporated
yielding a greyish sludge that was suspended in dry acetone and stirred for 1 h. The suspension

> *was thereafter filtered and washed with dry acetone to yield 33 as a colorless amorphous solid*
> *(2.02 g, 71%).*
>
> Code: [Select]
> ```
> https://www.sciencemadness.org/whisper/files.php?pid=523623&aid=69287
> ```

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Zippy** on **November 11, 2018, 10:58:57 PM**

Extracting with IPA and then drying the IPA over MgSO4? I ould think DCM or chloroform would be a better choice.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **vulgaricum** on **November 12, 2018, 10:18:26 AM**

Quote from: thewire on November 11, 2018, 09:58:30 PM

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>
> *Nitrostyrene 32 (2.77 g, 10 mmol) was added carefully in portions to a stirred suspension of NaBH4 (2.84 g, 75 mmol) in IPA (32 ml) and water (16 ml) causing an exothermic reaction increasing the temperature of the mixture to 50-60°C. Thereafter a 2M solution of CuCl2 (0.5 ml, 1 mmol) was added carefully dropwise causing further exothermicity. The reaction was then held at 80°C for 30 minutes using external heating. After reaching r.t, a 25% solution of NaOH (20 ml) was added under stirring and the phases were separated. The aqueous phase was thereafter extracted with IPA (3x30 ml). The extractions were combined, dried over MgSO4 and filtered. A stoichiometric amount of 4M HCl in dioxane was added to the filtrate under stirring. The mixture was evaporated yielding a greyish sludge that was suspended in dry acetone and stirred for 1 h. The suspension was thereafter filtered and washed with dry acetone to yield 33 as a colorless amorphous solid*
> *(2.02 g, 71%).*
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> ```
> https://www.sciencemadness.org/whisper/files.php?pid=523623&aid=69287
> ```

For reducing nitrostyrenes, I would recommend keeping the temperature down, like in 5-15'C range to minimize dimers/polymerisation and maximising yield. 71% is poor yield!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **souka** on **November 14, 2018, 06:18:42 PM**

Quote from: vulgaricum on November 06, 2018, 11:09:23 AM

> Quote from: souka on November 06, 2018, 03:38:04 AM
>
> > I tried it out on isosafrole ketoxime, yielded nothing. That’s it. Maybe the procedure described in the paper works...who knows? This one didn’t work.
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> What?? That does not make any sense. Even the NaBH4 itself would reduce the ketoxime to N-OH-MDA :o
>
> Quote from: Corrosive Joeseph on November 06, 2018, 03:46:03 AM
>
> > [EDIT] - As far as I am aware, nickel boride will reduce your oxime   :)
>
> As should copper boride as well :)

Maybe I’m too much of a newbie then, still that’s my results.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stuffed** on **November 17, 2018, 05:53:39 PM**

> Quote from: vulgaricum on November 12, 2018, 10:18:26 AM
>
> For reducing nitrostyrenes, I would recommend keeping the temperature down, like in 5-15'C range to minimize dimers/polymerisation and maximising yield. 71% is poor yield!

When do you think it is best to keep at this temperature, during addition of ns, Cu or the whole reaction? Have you tried this with ns and can you provide more details?

Thanks,
Stu

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 01, 2018, 02:43:20 AM**

> Quote from: vulgaricum on October 10, 2018, 08:29:14 PM
>
>> Quote from: Shy Guy on October 09, 2018, 03:24:29 PM
>>
>> First attempt (fairly large one by the standards here) resulted in failure.
>>
>> 0.5 mol was reduced (washed with bisulfite solution/ water as well as a previous ethanol wash.)
>>
>> 6 mol equivalent NaBH4
>>
>> Addition took place over around 2hours. It was done in a 5L RBBF sitting in a mantle under overhead mixing. Putting it in a mantle during addition is a bad idea as it retains heat from the reaction.
>>
>> Temp for the most part stayed between 48-52C, with a one time peak near the end of 62C
>>
>> It was allowed to stir for 45mins at which point a large solid white mass had formed which threatened the glass stirring shaft. Addition of CuCl2 broke that mass up and allowed things to go back to mixing properly.
>>
>> It was brought to reflux for 30-40 mins at which point the mantle was turned off. **Is there a downfall to refluxing for too long?**
>>
>> The next day, GAA was added slowly. It was hard to measure by pH paper if the solution had turned slightly acidic. One indication was that with eventual additions, the liquid would go from black to a vivid blue color. Too much acid could have been used on this attempt.
>>
>> Distillation was halted at 98C. The distillate was clear and had a fairly strong acidic reading by litmus paper. NaOH solution was then added + large amounts of water.
>>
>> Some weird things were observed during steam distillation:
>>
>> 1- Temp was around 93C
>> 2- A fluorescent oil like product was coming over which eventually settled at the bottom of the Aqueous layer.
>>
>> Some droplets of oil were floating on top of the Aqueous layer. No further steps were taken.
>>
>> It should be noted that lots of H20 was used during reaction: 392mL. This was a direct scale up of the amount used in the initial write up in this thread.
>>
>> How to dispose of this reaction safely?
>
> You formed the nitronate - not enough of solvent. What you should've done is add more IPA.
> I modified this reaction employing the same ratios and w/o consenser. It caused gooey nitronate forming and

> stirrer to stick in the bottom of the flask.
> The P2NP (200g!) was _10 years old_ and not recrystalled (well, priorly twice, 5 years(!) ago). The addition rate was such that the reaction was boiling. Remember: no cooling!. Nickel acetate (as hydrate) was added with same ratios and after the solution became green like a poison, it started to climb out from the reaction as black foam from the flask. The mag-stirrer was stuck. Cooling was employed but nevertheless it escaped.
>
> After 48h the black foam which partly escaped from the flask (part of it was taken to a beaker and tried to dissolve to GAA didn't react with petroleum ether!) was dissolved and the reaction was neutralized with GAA (no reaction) and and stripping the IPA out. After cooling, about 200 mL of oil floating over. Aftrer basification, over 85% yield.
>
> I cannot understand why you got the fluorescent oil. I always add the P2NP so the reaction readily refluxes! Maybe that's the problem?

Ok wait, something is odd: you wrote nickel acetate, did you mean nickel really, not copper? :o
Was it a typo or what, as you know that is a really important difference.
And the nickel boride method, done likewise to the one with cupric chloride, was as I heard something many people had issues to get it to work on P2NP, while if that was not a typo from you, you actually used it on the nitroalkane then, not nitroalkene...
And with 85% yield, oh well!
You really have to clarify this, it is most interesting.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **December 02, 2018, 04:35:03 PM**

One question-does this particular nitronate present an explosive risk? certainly low mol. weight nitronates can be shock/friction sensitive.

How does this one behave if subjected to shock, excessive heat, friction etc?

Apparently the nitronate can be reduced to the amine via diborane, or borane:THF. Although diborane isn't for the faint of heart or badly prepared, BH3:THF prepared in-situ by oxidation of borohydride using I2 would be a lot easier than handling diborane gas.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **vulgaricum** on **December 02, 2018, 04:46:33 PM**

Quote from: carl on December 01, 2018, 02:43:20 AM

> Ok wait, something is odd: you wrote nickel acetate, did you mean nickel really, not copper? :o
> Was it a typo or what, as you know that is a really important difference.
> And the nickel boride method, done likewise to the one with cupric chloride, was as I heard something many people had issues to get it to work on P2NP, while if that was not a typo from you, you actually used it on the nitroalkane then, not nitroalkene...
> And with 85% yield, oh well!
> You really have to clarify this, it is most interesting.

I did not have CuCl2 around so I tried it with NiCl2 - not a typo

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 02, 2018, 05:01:50 PM**

Ah ok, thank you for the clarification :)

So we can assume it was not nickel boride acting as reducing agent there, but nickel nanoparticles?
Seems the intermediate is quite easy to reduce to the amine finally.

Nickel gets more and more fascinating to me :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Odessy007** on **December 04, 2018, 07:56:01 PM**

That's really interesting

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **dextromolecule** on **December 04, 2018, 08:22:33 PM**

It is intresting but i prefer the normal Nabh4 reduction of P2np, than washing the p2npane a lot with brine and reducing it with hcl and iron, simple and high yielding requiring only nabh4 gaa and fe, but this method is intrested too.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **December 06, 2018, 03:11:22 AM**

Carl, Tsath' has read that whilst the acetate salt (Ni (II) acetate that is to say), is preferable for preparation of nickel boride, NiCl2 has been used too, to prepare Ni2B, although apparently nickel acetate yields a superior catalyst.

Actually, Toady has been mulling this over for a while, as it happens, and was about ready to make the same point, concerning the similarity of Ni2B preparation or that of cobalt boride, to this route. IMO, it is so similar Tsath' is of the opinion that copper boride, of a likely stoichiometry Cu2B is more likely the result of this preparation than Cu(0) nanoparticles.

Also, if the acetate salt of nickel affords a superior catalyst to that prepared from NiCl2, why not attempt to prepare the acetate salt of copper, starting from something like basic copper carbonate in the hope of the resultant catalyst giving superior yields, potentially? and also taking into account that nickel boride comes in two grades, P1 and P2. The former is more active, IIRC, believed to have less interfering surface-adherent crap leftover from the synthesis, Tsath' has read of the P1 boride beeing compared to some grades of commercial Raney nickel.

Also, reading up more about Ni2B, the increased activity of the alcohol-media prepared P1 has VASTLY less NaBO2 on the surface.

Also, the structure is a rather intriguing nano-scale hetereostructure in it's own right. A series of connected hollow globular clusters, like bunches of the ghosts of suicidal grapes after they pulled the trigger and took both barrels full of buckshot, made of nickel, coated with a surface layer of amorphous boron, forming clusters which house tiny crystallites of what according to X-ray diffraction data, is believed to be metallic nickel in a host-guest system, along with interstitial deposition of a boron containing species which is believed to prevent sintering of the nanoparticulate structure. The crystalline nickel guest crystallites are very fine indeed, with a size range of between 1-3nm.

So, it might well be that this is a more complicated story than at first might seem to meet the eye, not just nanocopper, but botryoidal nanocopper cages of a few 10s of nanometers per cell, of amorphous boron coated copper, hosting 1-3nm particles of copper?

This is about nickel boride and it's ultrastructure as formed in the paper, but here, this has the XRD and electron microscopy analyses. It's such a close procedure to that used to make 'nanocopper' that Tsath' now believes that it is in fact more likely to be a copper boride with internally trapped ultra-nano metallic copper guest species inside such cages.

http://sci-hub.tw/10.1039/B615529D#

''Geng, J., Jefferson, D. A., & Johnson, B. F. G. (2007). The unusual nanostructure of nickel–boron catalyst. Chem. Commun., (9), 969–971. doi:10.1039/b615529d''

Tsath' would bee appreciative of the swarm if a Bee could save a copy of it and upload to this thread. Tsath's stuck working without a HD in a buggered old laptop ATM so can't save, even the screen doesn't work, has to be hooked to an external secondary screen. It is, and no mistake, a fucking piece of shit.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 06, 2018, 03:49:53 AM**

Yeah I used nickel boride from the acetate already to reduce the oxime of I-PAC, so thank you.
Your file is attached :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Loki** on **December 06, 2018, 12:29:34 PM**

I think Nickel (II) Acetate is preferred because Cl(-) is a poison for Nickel catalysts, or it is at least for Ni(0).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **December 07, 2018, 01:25:31 AM**

What about copper based catalysts?

Might be a bit of a difficult question, come to think of it, because the activity of copper is generally pretty low.

Wonder how well copper acetate would serve compared to $CuCl_2$? and another thing Tsath' has wondered, is how other cupric halides, such as the bromide or iodide would yield in comparison.

Didn't realize chloride ions were a catalyst poison for Ni(0)

Definitely aware of things like sulfur, Pb, poisoning platinum group metal cats and more than likely nickel based ones too but copper and halides, now that would bee valuable to know.

Dextromolecule, your reactions reducing P2NPane with Fe/acid could benefit from the addition of a catalytic quantity of FeCl3 (hydrate is just fine). And if it is performed using GAA/Fe, then the addition of FeCl3 is required. It will be generated in the course of a Fe/HCl reaction, of course, But, there will bee a lag time before the reduction kicks off while some Fe dissolves and forms FeCl3 in-situ.

How much iron do you use per 100g P2NP (after reduction into P2NPane), and what are your yields like based on both P2NP, and P2NPane?

Excess Fe tends to be used by Shulgin, but Tsath' is wondering what the optimal amount of excess is.

Of course though, the more iron used, the more can bee wasted, so knowing exactly how much per 100 gram of P2NP and per 100g P2NPane? so Tsath' would very much like to know how much excess is desirable and at what point addition of further iron just adds more crap to vac-filter without contributing to improvement in yields.

And Carl-interesting. What were your yields with your oxime>amine reduction with the boride, what was your protocol and how was your boride prepared? you use P1 or P2?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 07, 2018, 01:58:19 AM**

In alcohol in the cold, gave somewhat 50-60% of norephedrine HCl, used four times as much borohydride than nickel salt.
Honestly, I prefer Al/Hg for that and everyone else should too.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **dextromolecule** on **December 07, 2018, 11:10:47 AM**

For big scale i prefer Fe/HCl/Fecl3, for a smaller batches i can easily make them fast and cheap (Al/Hg), So tsath i am doing it with the same ratios as P2NP-P2P and P2NPane-amine, usuly i use araud 300g Iron in a 2L flask, and it need to be shaken by hand very often, because the iron fals to the botom and only the higher layer of the iron reacts with the acid, and it need to be shaked like that araud for 6 hours until it become white, and then when i filter it throu the vacum pump, the is always a big exess unreacted iron a little changed by look, but still a lot of precipitate, maybe 250G woud be enough, i have learned for that procedure from you, but have wasted Nabh4 for that just a few times it works and the yields are high araund 70g of hcl salt out of 100ml p2npane, the vacum filtration is not enough and the amine need to be destiled with the water and diluting with more water and aplying vacum to do not decompose of the temperature, and the destilate is make basic extracted and again vac distiled for pure colorless base, i am thinking how much % levo and % dextro amph is produced by the different methods, i was reading somewhere that the Al/Hg when cooled and make in under 50C the isomer of the hydrogen produced is different and there is more dextro, i once make a al/hg in a glass botle in ice bath and shaking and realising pressure from the gap, and it was done all under 50C and i remember the product was more speedy and crazy then before, but i never atempted it again.
and i forget to mention that the iron precipitates in the flask and in the vac filter very

fast with contact with air it oxidisies to rust.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 07, 2018, 03:02:28 PM**

Quote from: dextromolecule on December 07, 2018, 11:10:47 AM

> and again vac distiled for pure colorless base, i am thinking how much % levo and % dextro amph is produced by the different methods, i was reading somewhere that the Al/Hg when cooled and make in under 50C the isomer of the hydrogen produced is different and there is more dextro

That is not true.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **dextromolecule** on **December 07, 2018, 03:59:16 PM**

Maybe, but i remember it was somethink more good than before dont know, but then for first time i filtered the non-polar throu sand and it was very pleasant for sniffing (sulfate) and vas unexpected strong (dosage) and a little bit more of the effects, now when vac distiled it is even more good, but i remember i was exited and i was doing it in very cold conditions like 15g p2np in 2L laboratory glass bottle with plastic blue gap you have used these 100% and unexpected yeld without condenser was high i remember and under 20g it reacts not too much exotermic and can be made even in a bottle for araud a 30m with foil xd

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 07, 2018, 05:25:04 PM**

That is just the difference between badly purified stuff, and at other times the not so bad stuff, thus it is stronger or less.
That has nothing to do with what you think ::)
Racemate is racemate, please keep such pseudoscientific stuff out of otherwise relevant threads.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **December 29, 2018, 02:05:12 PM**

I'm not sure where else to put this.. I found this paper regarding the same topic, but using an even better available reducing agent for the nitro group, Ammonium sulphate. Advantages over the system used in this topic is the stability of halogen substituents, just a 2x mol-eq of NaBH4, reaction time 30 minutes, performing at rt. It's definitely worth looking at :)

Code: [Select]

```
Gohain, S., Prajapati, D., & Sandhu, J. S. (1995). A New and Efficient Method for the Selective
Reduction of Nitroarenes: Use of Ammonium Sulphate-Sodium Borohydride. Chemistry Letters, 24(8),
725–726. doi:10.1246/cl.1995.725
```

https://www.jstage.jst.go.jp/article/cl/24/8/24_8_725/_article/-char/en
http://sci-hub.se/https://doi.org/10.1246/cl.1995.725

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 29, 2018, 09:44:00 PM**

Uh, piece of candy! :D

Just made 2C-H for the first time, using this method here.
The outcome was nothing revolutionary, but I found the need to improve the workup much.
Just followed the paper and it was not satisfying, it honestly sucked.
Had to re-extract everything again, and that surely has contributed to the low yield in terms of mechanical loss
I oriented the work on that paper which thewire has linked a page back, here:
https://www.thevespiary.org/talk/index.php?topic=15090.msg54179525#msg54179525
As in the discussion on SM already said, their workup is really disadvantageous, so below after the experimental I propose what I intend to do the next time, regarding the production of substances that can not be steam distilled and require another workup.

Quote

> 2,51g DMNS(12mmol) was added to
> 3,5g $NaBH_4$(93mmol) in 32/16ml of IPA/H_2O, 20min after the reaction(no cooling applied), a
>
> solution of
> 0,2g $CuCl_2 \cdot 2H_2O$(1,2mmol) in 6ml 1:1 IPA/H_2O was added at once, then refluxed for 40min
>
> After reaching r.t, a 25% solution of NaOH (20 ml) was added, the phases separated and
>
> aqueous phase extracted again with IPA(2x30 ml).
> The extractions combined, dried with Na_2SO_4, filtered, acidified.
> The IPA was distilled off then, but the residue was still dirty.
> So it was extracted with 3x15ml DCM, then basified and the freebase extracted greyish
>
> with 3x30ml DCM, the extracts acidified using diluted HCl, the aq. portion separated and
>
> evaporated, boiled in dry acetone then filtered, washed with acetone to give
> -1,84g of white HCl salt(8,4mmol or 70%)

Bad workup method, never again this way!
In the future, will rather simply add lye, more concentrated, like 40% to keep the volume as small as possible, then extract the freebase using three portions of DCM.
Washing, drying, as usual, and I think the salt can be formed from the extract then directly and much cleaner... but aqueous, so it allows to wash this aqueous acidic extract using, for example DCM, again.
Followed by a recrystallisation as usual, this way we would not have as much loss as I likely have suffered here.

But anyway! I am happy about the outcome...
When the final product was weighed, it looked so fluffy I have even said out loud "please let it bee at least a half gram..." ::) ;D
I had expected only a tiny yield, with all the workup problems, and the uncertainty about the proper course of a most effective reduction and extraction on nitrostyrenes opposed to the nitropropenes..
And yes! Everything went better than expected, a whole lot :D
I already had a somewhat disappointing yield with 2,5-DMA, I feared it could be the same for the 2,5-DMPEA, so you can imagine how happy I was when I saw the number on the scale :)
Although this can be improved, I know... just to pre-empt vulgaricum/testex before he chimes in and says that as well haha :D

Now where have I put the NBS...

Edit: thanks tsath, corrected that :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **December 30, 2018, 05:05:34 PM**

Just a minor error noted-quantity of NaBH4 is given in mol, should be mmol.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **December 31, 2018, 02:23:11 AM**

Ever so slightly off-topic, but touched on already...............

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **dumb_ass_teen** on **January 01, 2019, 09:49:24 PM**

Quote from: carl on September 21, 2018, 01:45:35 PM

> It decomposes ;)

That's utter bullshit. A hydrogen sulfate salt forms which is soluble or forms an oily phase.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **January 01, 2019, 10:43:06 PM**

Dextromolecule-that seems rather a long time difference, compared with running the same to perform a Nef reaction and produce the ketone from the nitroalkene. Although admittedly, experience there is all with GAA.

Tsath' has been running the Nef for 2-2.5 hours on the nitroalkene to go to the ketone with success.

The reduction of the nitroalkane to the aminoalkane, is the time difference due to using HCl rather than GAA, or due to the difference in substrate, using P2NPane rather than P2NP, reducing to the amine rather than Nef to the ketone?

Also, assuming one were to run the Nef, and form the ketoxime, NaBH4 reduction of ketoxime to the N-OH-amphetamine, has anyone any personal experience with N-hydroxyamphetamine? is it any different, or more like the HOT-series of compounds of Shulgin's, in that the difference is only really in molecular weight? whats the receptor/transporter binding profile like when compared to both amphetamine and the C1-C2-N-monoalkylated amphetamines?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or**

acids.
Post by: **Loki** on **January 01, 2019, 10:55:08 PM**

Quote from: Tsathoggua on January 01, 2019, 10:43:06 PM

> Dextromolecule-that seems rather a long time difference, compared with running the same to perform a Nef reaction and produce the ketone from the nitroalkene. Although admittedly, experience there is all with GAA.
>
> Tsath' has been running the Nef for 2-2.5 hours on the nitroalkene to go to the ketone with success.
>
> The reduction of the nitroalkane to the aminoalkane, is the time difference due to using HCl rather than GAA, or due to the difference in substrate, using P2NPane rather than P2NP, reducing to the amine rather than Nef to the ketone?
>
> Also, assuming one were to run the Nef, and form the ketoxime, NaBH4 reduction of ketoxime to the N-OH-amphetamine, has anyone any personal experience with N-hydroxyamphetamine? is it any different, or more like the HOT-series of compounds of Shulgin's, in that the difference is only really in molecular weight? whats the receptor/transporter binding profile like when compared to both amphetamine and the C1-C2-N-monoalkylated amphetamines?

Pretty sure that n-hydroxyamphetamine is an intermediate in deamination by the body, so likely wont be active for very long. If at all. It's a hydroxylamine, so an acidic dissolving metal reduction should take it to the amine.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsathoggua** on **January 01, 2019, 11:42:57 PM**

Tsath' meant in that case, to just use the acidic dissolving metal reduction on P2NP to get to the ketone, form the ketoxime then reduce to the N-OH-amine with borohydride; in the hopes that doing things that way round, rather than reduction of P2NP to P2NPane using NaBH4, and then acidic iron reduction to the amphetamine, could allow for less NaBH4 to be used, given one needs a large (5 fold) excess of borohydride to reduce the nitroalkene, otherwise a Michael addition can take place between the nitroalkene and formed nitroalkane, causing polymerization and result in garbage.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **January 02, 2019, 04:59:20 PM**

I have a stupid question especially because I already performed this whole reduction successfully but I'm having a moment of doubt.
After the CuCl2 reduction step where the phases are seperated the first time (I'm not distilling as my substituted phenylethylamine doesn't come over with steam distillation) I've got an IPA layer and an aqueous layer. The lower one should be the aqueous and the upper, slightly discolorated one, the one where the nanoparticles are present, the alcoholic layer.
Please just confirm that the aqueous one is the one containing the base and therefore the one which needs to be further extracted. Why is the amine base in the aqueous and not the alcoholic layer?
I'm really feeling stupid right now^^ Can one just clear the confusion in my head?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hydroxetamine** on **January 02, 2019, 10:43:27 PM**

The amine should be pushed into the alcohol layer. Because sure some IPA remained in the aqueous layer, some product still stays there too, which is because why you should extract it further. But the main part of your product should be dissolved in the IPA layer already.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **January 02, 2019, 11:47:50 PM**

This really unsettles me. Was I really that stupid? I separated it but just kept the aqueous layer last time. And did every further extractions with DCM similar to Carl‘s recent publication. What the hell did I recovered then? I haven‘t tried the product yet and it was just a 50% yield.. I‘m confused :o

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **January 05, 2019, 02:23:37 AM**

@loft, probably better to acidify with AcOH, then distill the IPA off, basify again(important also to free amine from any copper complexes), and then to extract the freebase using DCM as usual.

Quote from: vulgaricum on December 02, 2018, 04:46:33 PM

> Quote from: carl on December 01, 2018, 02:43:20 AM
>
> > ...you wrote nickel acetate, did you mean nickel really, not copper? :o ...
>
> I did not have CuCl2 around so I tried it with NiCl2 - not a typo

I am sorry, could you please clarify again? :D
Not that it matters much in the overall context though, just for the information.
At first, you wrote you have used Ni(AcO)2, and when I asked you about that, you said NiCl2?
Now what was it you have really used? Thank you! :)

Quote from: dumb_ass_teen on January 01, 2019, 09:49:24 PM

> Quote from: carl on September 21, 2018, 01:45:35 PM
>
> > It decomposes ;)
>
> That's utter bullshit. A hydrogen sulfate salt forms which is soluble or forms an oily phase.

Is it?
That entirely depends on the quantity of acid which is meant with "too much".
What I had in mind when LD5050 wrote "too much H2SO4", was way too much.
And then it decomposes for sure, forming reddish tar and all.

But yeah, when a little bit too much is added, then it goes back into solution, like you said.
So it is not "utter bullshit", it depends on the circumstances ;)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hydroxetamine** on **January 21, 2019, 04:29:51 PM**

Hello fellow bees and wasps,

finally I tried this synthesis and obtained 3,1 g of a golden oil, that's a decent yield of 69% for the first run I guess.

Didn't made the sulfate yet, because a part of the product will be methylated by $NaBH_4$ reduction of the preformed imine.

Will post the procedure later when I have translated my german write-up.

But something disturbes me.. After the steam distillation I pushed the amine out of the turbid distillate by addition of brine. The layers were separated and the aqueous layer was extraced thrice with DCM, which was added to the wet amphetamine. Surprisingly a liquid separated, which I first expected to be a very concentrated NaCl solution, but then I realized that brine does not have a higher density than DCM. The clear, colourless liquid has a fruity and somewhat flowery scent and a density of 1,146 g/ml. All substances that come to mind, like benzyl alcohol (dunno how it smells though) from remaining benzaldehyde, have a significantly lower density. Has someone an idea what this could be? Marquis caused some fizzing, but no colour change. Maybe a slight hint of yellow, but that is propably due to contamination with amphetamine.

Any input appreciated, thanks in advance!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **the_only_edeleanu** on **January 21, 2019, 07:41:28 PM**

maybe you didnt fully reduce and formed some oxime or hydroxylamine impurities.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stuffed** on **January 22, 2019, 05:01:56 AM**

Everyone whom is bashing the workup from the paper wire posted has clearly not read the paper. The paper is not writen to synth the 2c's but use them as a precursor, the final workup is done later after the final step and the poor workup is just for precursor use, this is clear if you read the paper. I dont know anything but its frustrating to see people repeatedly bashing this well written work then they have not read it..

On the other hand good work everyone this is a very interesting method, seems quite clean.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **vulgaricum** on **January 23, 2019, 07:19:48 PM**

Quote from: Hydroxetamine on January 21, 2019, 04:29:51 PM

> The clear, colourless liquid has a fruity and somewhat flowery scent and a density of 1,146 g/ml. All substances that come to mind, like benzyl alcohol (dunno how it smells though) from remaining benzaldehyde, have a significantly lower density. Has someone an idea what this could be? Marquis caused some fizzing, but no colour change. Maybe a slight hint of yellow, but that is propably

Benzyl acetate perhaps?

OT: Anyone ever smelled (1-methoxy-2-nitropropyl)benzene? It's lovely! Conveniently prepared from P2NP + NaOMe (just adding 1.1eq amount of Na in reasonable dry methanol and dripping it in). Gives yellow oil with sweet floral aroma!

Quote from: carl on January 05, 2019, 02:23:37 AM

> I did not have CuCl2 around so I tried it with NiCl2 - not a typo

I am sorry, could you please clarify again? :D
Not that it matters much in the overall context though, just for the information.
At first, you wrote you have used Ni(AcO)2, and when I asked you about that, you said NiCl2?
Now what was it you have really used? Thank you! :)
[/quote]

My bad. Ni(AcO)2 was used (nickel acetate). Not NiCl2.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **January 23, 2019, 07:27:11 PM**

(1-Methoxy-2-nitropropyl)benzene - just drip into solved P2NP? watcha want to do with it? - reduce to the amine? cleave the ether? and how?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **vulgaricum** on **January 23, 2019, 07:36:12 PM**

Quote from: fastbre4k on January 23, 2019, 07:27:11 PM

> (1-Methoxy-2-nitropropyl)benzene - just drip into solved P2NP? watcha want to do with it? - reduce to the amine? cleave the ether? and how?

Just wanted to bioassay some 1-methoxy-1-phenylpropan-2-amine after musings from pihkal (BOB) - so yes, it was just dripped into the solved P2NP (in MeOH). It was followed by AcOH and extracted with DCM, washed with brine and then rotovaped off (yields nice yellowish oil) and reduced with Zn at that time. It was over 10 years ago. The reduction with Zn or the workup was failure, never had the chance to bioassay it. But I still remember the sweet sweet aroma of the intermediate!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **callejularbo** on **January 25, 2019, 12:30:10 PM**

Quote from: stuffed on January 22, 2019, 05:01:56 AM

> Everyone whom is bashing the workup from the paper wire posted has clearly not read the paper. The paper is not writen to synth the 2c's but use them as a precursor, the final workup is done later after the final step and the poor workup is just for precursor use, this is clear if you read the paper. I dont know anything but its frustrating to see people repeatedly bashing this well written work then they have not read it..
>
> On the other hand good work everyone this is a very interesting method, seems quite clean.

If you check the NMR spectras of the 2C's he made it seems like that unconventional workup actually gives VERY pure compounds. But yea you are right in that the 2C-TFM is just an intermediate compound in his synthesis.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **February 02, 2019, 09:34:10 AM**

This is interesting.............

'New nitroalkene reduction with NaBH4 / Cu(OAc)2' - https://chemistry.mdma.ch/hiveboard/novel/000246001.html

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **vulgaricum** on **March 05, 2019, 12:16:28 PM**

Slightly OT: post-reaction soup (reduction with NaBH4-Nickel) was acidified with GAA and the solvent was stripped off. It was stored in bottle at RT for 5 months. The bottle is now filled with whiteish solid and on top of that is red syrupy phase. Any suggestions for the workup with the solid? I reckon the top layer contains amine...?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 05, 2019, 12:33:30 PM**

---

i think that could boric acid and the red syrup could be leftover P2NP or P2NPANE that undergo addition in acid media.

i guess you added enough acetic acid, so all of the amine should bee in salt form.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 05, 2019, 12:37:23 PM**

Quote from: Corrosive Joeseph on February 02, 2019, 09:34:10 AM

> This is interesting.............
>
> 'New nitroalkene reduction with NaBH4 / Cu(OAc)2' - https://chemistry.mdma.ch/hiveboard/novel/000246001.html
>
> /CJ

jeah it's interesting because they ad the NaBH4 to the Nitroalkene and don't forming the nitroalkane before.
Let's have a look.

but upscaled it would look like.:

0.36g P2NP + 50ml MeOH
0.72g Cu(OAc)2*H2O + 10ml H2O
0.9g NaBH4

so let's try this?:

3.6g P2NP + 50ml MeOH	(0.0220628792057363 mol)
7.2g Cu(OAc)2*H2O + 10ml H2O	(0.0360649168503306 mol)
9g NaBH4	(0.2379064234734338 mol)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 16, 2019, 08:58:31 PM**

---

the experiment from above is crap, i tried. but then,

Ok, i have done it like i found it to be the right way.

80g EtOH 96% (1%MEK) that's ~100ml
40g H2O
5.2g NaBH4
was combined.

then under strong stirring was added 10g of P2NP(grinded into fine powder) in small portions.

after that the mixture was let stirring for 40 min.

then this was heated to 65°C and another 5g NaBH4 was added, followed by 1.5g CuSO4*5H2O (grinded into fine powder).
resulted in bubbling, reflux condensor attached and let it stirred for 15 min until the bubbling stopped, then the mixture was refluxed for 30 min.

after cooling, 47g of HCl (31%) added together with tap water to fill the flask up.

EtOH distilled out.

cooled, made basic with 20g NaOH in ~50ml H2O.

Steam distilled the amine out. Neutralized with H2SO4 and evoporated.

the product was so white that i decided to not wash the powder.

Yield.: exactly **10g Amphetamine sulfate 88.56%**

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **March 16, 2019, 09:08:20 PM**

Wow that's something! Congratulations ;D
What made you use EtOH instead of IPA? I thought other alcohols wouldn't be as good.

I know you are superior when it comes to making amphetamine, but don't you think washing always is a good idea?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 16, 2019, 09:25:37 PM**

I wanted to use EtOH because then i just need to go into the supermarket and buy it, instead of buying it online , i think i just need to go out of my house sometimes... :D

maybe in IPA the yield would be even higher? Experimentation needed.

Jeah washing is always a good idea but i neutralized the solution on point. + the whole reaction mixture was water clear at the end on the reaction. Even after basification the solution was waterclear, some orange stuff precipitated but this seemed that it was just copper.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **March 16, 2019, 11:01:17 PM**

Quote from: fastbre4k on March 16, 2019, 08:58:31 PM

> **CuSO4*5H2O**

Huh...........? It works..........!!! :o Now I am even more confused than usual ???
What gives, up until now the consensus has been that copper sulfate won't do it........... And that was actually the reason I posted the link above. I'm sorry now I never replied to your quote, but if I had, maybe this wouldn't have been tried.

Quote from: fastbre4k on March 16, 2019, 08:58:31 PM

> **10g Amphetamine sulfate 88.56%**

Nice work there dude, that is absolutely stunning

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 17, 2019, 01:11:36 AM**

I am seriously impressed too!
Especially since you had issues to get that reaction to work, and now this, just wow!

Regarding the different Cu(II) salts, atara offered the following possible explaination on SM:

Quote from: clearly_not_atara

> $CuSO_4$ is much less soluble in organic solvents than $CuCl_2$. I assume the copper particles are much smaller when using $CuCl_2$ than $CuSO_4$, with $Cu(OAc)_2$ somewhere in between. Following this trend $CuBr_2$ may be even better since it is more covalent, but more expensive. (the correlation is more covalent -> more soluble -> better catalyst)

88,56% is, I believe, more than my experiments have ever yielded with this reduction system so far ???
But your molar amounts confuse me a little bit, the quantity of $NaBH_4$ seems to be only 4,4 molar eq, while the original calls for 6 eq instead?
And to divide it into two portions, the second(added at once I guess?), directly followed by the copper salt, and first only a rather small molar excess...
I mean, you told me about this when it was just planned before you attempted it and I was too busy with my own work to pay much attention on it...
But now with that impressive outcome I really start to wonder which of these changes was possibly the responsible for that yield, or was it due to all of them together, but I don't understand it really?

Anyway, my congratulations to this! :)

loft, the product was steam distilled at least, he neutralised it on point, if he hasn't violently boiled it over then it is already much cleaner than the crap people usually produce from P2NP in Al/Hg reduction, straight from the separated IPA layer... in that case a washing would help not much anyway, only to improve color... but the real nasty shit remains, it is just not that visible.
His product is for sure a lot cleaner here :)
I don't think washing it would remove even a percent of its weight, not enough impurities for that.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **March 17, 2019, 01:38:14 AM**

Even if we just consider the counter ion, in the Urushibara nickel, catalytic activity goes
Acetate --> Chloride --> Sulfate --> Nitrate
Although Brown states : Acetate --> Sulfate --> Chloride --> Nitrate for P-1 Nickel Boride - https://sci-hub.se/10.1021/jo00831a039

I have numerous reports that say $NaBH_4$/copper(II)sulfate was inconsistent and unreliable ???

'NaBH4/CuSO4 nitro reduction success!!' - https://sciencemadness.org/talk/viewthread.php?tid=6733
'new/old nitroalkene reduction method' - https://sciencemadness.org/talk/viewthread.php?tid=7190
'New nitroalkene reduction with NaBH4 / Cu(OAc)2' - https://chemistry.mdma.ch/hiveboard/novel/000246001.html

I am shocked beyond belief.......... It looks like this is the Gold Standard so far :o

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 17, 2019, 03:10:57 AM**

---

i know i know, the molar amounts a bit confusing, but from experiments back then i watched one phenomenon - after reducing the nitroalkene with NaBH4 in an huge excess, i proceed further and destroyed the NaBH4 with acetic acid - and i noticed that a huge amount of borohydride left there unreacted so i decided to reduce the amound.. you can see it on my experimental on the raney nickel. i used 2.5g NaBH4 for 5g P2NP and i got and high yield too at the end of the reaction.

so it is not a must to use so large amounds of NaBH4.

I noticed that when you use too much NaBH4 in an Ethanol water system you could get these brown/black tar like ballz that won't dissolve.
grinding the P2NP up helped a bit but never fully "solved" ::) the problem.
that was before i planned raney systems.

other alcohols seem better just because they solve better i think!

so with the bypasses for solubility problems, an single phrase that i have read casual that NaBH4/Metal systems only need 3eq. for nitro reductions + my stinginess not using more than i need , this method or experiment came out :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 17, 2019, 07:11:02 AM**

When I did that on 2,5-DMNS, and that was with 7,5eq in IPA, I had not noticed such issues, I suspect we talked about it being in your case related to the stirrer, or something like this, I think?
The dimer forming is what I immediately have in mind, but that is avoided with 4eq at least, I think.
But borohydride can be expensive, in the tiny amounts usual for poorer chemists, so even better!

Anyways... very nice job and valuable findings, especially when that can be repeated! :)

You know what substrate you have to use next, no? ;)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **March 17, 2019, 07:20:26 AM**

Dimerization is much less of a problem with nitropropenes than nitrostyrenes ;) I am much impressed with the grinding technique actually. This and the fact that EtOH and CuSO4 are OTC almost everywhere.

Another victory for the swarm 8)

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 17, 2019, 08:03:12 AM**

His P2NP is in bigger crystals as I know so grinding makes sense :P
I have my nitroalkenes usually in smaller/finer crystals, and chop them up well beforehand if not.
It is simple to effect the recrystallisation that should be done right before one is starting the synthesis, so to achieve a very fine and tiny crystal lattice.
This helps likewise, if one has no grinder or mortar that can be sacrificed to the almost forever staining P2NP...

My first trial with MDP2NP proves this right too, as those were in the form of bigger nuggets and consequently my yield was somewhat around 20%... :-X
Also, I have used it in that experiment without prior recrystallisation too, due to being so excited for the product and wanting to start quickly... :-[
Got rewarded with only 20% from 1,5g nitroalkene for doing such crappy work consequently ::)
Nitroalkene still had much smell of piperonal, the second mistake killing my yield there... these carbonyl containing precursor compounds really are bad yield killers and have to be avoided at all cost.

Second time it went much better though, 1,1g MDP2NP gave 0,9g MDA.
Still only a bit above 70%, and thus room for improvement.

But both experiments I had used 7 eq. of borohydride... as we know now, this was a waste of good reducing agent :-X

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 17, 2019, 04:54:55 PM**

Quote from: fastbre4k on March 16, 2019, 08:58:31 PM

> the experiment from above is crap, i tried. but then,
>
> Ok, i have done it like i found it to be the right way.
>
> 80g EtOH 96% (1%MEK) that's ~100ml
> 40g H2O
> 5.2g NaBH4
> was combined.
>
> then under strong stirring was added 10g of P2NP(grinded into fine powder) in small portions.
>
> after that the mixture was let stirring for 40 min.
>
> then this was heated to 65°C and another 5g NaBH4 was added, followed by 1.5g CuSO4*5H2O (grinded into fine powder).
> resulted in bubbling, reflux condensor attached and let it stirred for 15 min until the bubbling stopped, then the mixture was refluxed for 30 min.

> after cooling, 47g of HCl (31%) added together with tap water to fill the flask up.
>
> EtOH distilled out.
>
> cooled, made basic with 20g NaOH in ~50ml H2O.
>
> Steam distilled the amine out. Neutralized with H2SO4 and evoporated.
>
> the product was so white that i decided to not wash the powder.
>
> Yield.: exactly **10g Amphetamine sulfate 88.56%**

currently trying it out with 20g P2NP .
after acetification the mixture became red.

what i want to mention is that on my above experiment actually - before adding the rest of the NaBH4 first 1g NaBH4 added, then the CuSO4 and then the rest of the NaBH4 - i just thought that would not matter - but now i think this matters much. because the reactivity was much more violent at this scale when CuSO4 added to all the NaBH4. later we ll see the yield.... and then i ll do it again...

i noticed that when i gave the rest of the NaBH4 to the flask a reaction occurs. So at this scale i think more NaBH4 or even more solvent could be used here. + longer stirring. And maybe the actually NaBH4 and CuSO4 addition sequence as i mentioned.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **March 17, 2019, 06:37:53 PM**

Experiencing upscaling problems at close quarters. I'm wound up to a high pitch :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 17, 2019, 08:46:50 PM**

---

im am pissed as FUCK.

tried to steam distill - jeah meanwhile neutralizing the destillate. in that moment where i decided that i stop the destillation the stirbar fucking everythink up, Bullshit shootin tru the condensor in my neutralized destillate.

OK , I WANT TO KILL.

another try , SAME SHIT.

now i made it all acetic and stored in an beaker. Fuck this shit for now.

i ll work up when i want it to....

guess i start just a new reaction in the 10g scale... m*** fu** SH***

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or**

acids.
Post by: **fastbre4k** on **March 19, 2019, 12:42:42 AM**

Made another run on the 10g scale but only got 6.4g of Product. visible goo shit at the end of the reaction.

And then another run.

80g EtOH
40g H2O
5.5g NaBH4

to this 10g P2NP* added in 1 minute intervals.
stirred 45 minutes.

Solution heated to 55°C, then

1.5g CuSO4*5H2O grinded and added with an spatula in portions, took ~1 min.
Followed by 5g NaBH4 also in portions, took~1-2 min.

Stirred 30 min.
Stirred under reflux 45 min.

water added and 47g HCl 31%, alc distilled. A lil bit of red color noticed. - distilled 15min extra for steam distilling byproducts out.
distillate was a bit yellow.**

After cooling green solution, becourse Cu solved a bit.

Made basic with 20g NaOH + Water.

Steamdistilled. waterclear base. Neutralized. Washed with DCM. Yielding.: **8.06g Amphetamine sulfate** that's **71.4%**

* P2NP was grinded and washed with EtOH 1 day before., grinded again before use. - In my other experiment i used P2NP from another batch. accompanied with superior quality. So the quality of the Nitrostyrene/propene is a important factor in this reduction.

** At this stage i thought: what if we just go straight to bee. The reaction looks water clear before addition of the acid. Byproducts undergo reactions in acid media. So in Alkali. i wonder if the product get touched if we just add base to it and then steamdistill.

aaand sorry for my language .... .. i have an strong inner life ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **March 19, 2019, 06:27:30 AM**

So the main difference to your previously higher yield was the temperature (here 55°C, before 65°C) and the order of addition (here first Cu, then another NaBH4). Is that right?
So what were your personal conclusions after this experiment?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 19, 2019, 05:05:35 PM**

I used P2NP that just 1 time recristallized, grinded and washed with EtOH. - I think i should recrystallize at least 2 times and then wash.
in the 88% experiment i was using P2NP that grown in needles but not big. also not fine.

actually in my 88% experiment i added 1g NaBH4 then CuSO4 and then 4g NaBH4 in an 1-2 min. interval like now. i only wrote that i threw 5g NaBH4 and then the CuSO4 in becourse i thought that would not much matter. -foolish- BUT yea, maybee the amound of NaBH4 that's reacting with the CuSO4 change the catalyst in ways i don't know. Also the temperature could do an change.

Maybee cooling on addition of the P2NP could be helpful. - an simple water bath would do the trick i guess. - i noticed in my last experiment that there was red shit i think that comes from the first step. or could.

i should try another run, in the first step cooling with an simple water bath to transfer some heat away.
then heating again to 65°C (i hope i hit the temperature..), adding first 1g NaBH4 then the CuSO4 and then the rest of the NaBH4.
currently and sadly im out of NaOH. Na2CO3 is available but does it do his job? IDK, i read somewhere about that Na2CO3 free the amine and somewhere that's not enough. Can anybody clarify that for me?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 21, 2019, 07:08:58 PM**

---

ok

done it again.

In an waterbath and 1l Roundbottomflask added.:

80g EtOH
40g H2O
5.5g NaBH4

10g P2NP (grinded in an elec. coffee grinder, washed with EtOH) added minute by minute 14 additions ~0.71g each spoon.

stirred 50 min.

heated to 68°C added 1g NaBH4, 1.5g CuSO4*5H2O (grinded) 0.3g each spoon, 4g NaBH4 1-2 min.

stirred 30 min.
reflux + stirring 30 min.

47g HCl 31%

bade basic with pipe cleaner says 50-80% NaOH.

steam destillation.

neutralized, washed with DCM, evaporated , yielding 8g thats ~71% again. mhmp

but, the Al granules from the pipe cleaner lead to an overshoot tru the condensor. maybe some of the product got lost by mechanical losses.

maybee i should recrystallize my p2np another 2 times and then do it again

and jea, Na2CO3 doe snot suffice to make amphetamine basic.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 21, 2019, 07:14:16 PM**

Commercial sodium carbonate contains small amounts of NaOH I believe, so it should usually suffice.
Na2CO3 of course, not NaHCO3.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **March 24, 2019, 11:25:45 AM**

Quote from: fastbre4k on March 21, 2019, 07:08:58 PM

> made basic with pipe cleaner says 50-80% NaOH.

99% NaOH is available in hardware stores as 'caustic soda' or 'lye'............ Just ignore anything that says "contains sodium hydroxide", that's the stuff that isn't pure.

Quote from: fastbre4k on March 21, 2019, 07:08:58 PM

> and jea, Na2CO3 doe snot suffice to make amphetamine basic.

Did you try that, I am very interested.............. Makes me think of this post actually.

Quote from: fishinabottle on June 03, 2013, 10:06:20 PM

> - Water added and alcohol distilled from solution
> - Water distilled from solution - not all but a good part of it. Boil it as hard as possible to drive all shit out.
> This removes by steam-distillation all the stuff which steamdistills and is not a salt at this moment like amphetamine.
> - Sodium carbonate and water added until no more fizzing (CO2 formation)**. NaOH 10% solution (cold) added to ph 14.
> - Product steamdistilled rather slowly and not pushed at all for thats another key to quality.
>
> ** thats much softer on the product and no insane amounts of NaOH or KOH are needed.

https://www.thevespiary.org/talk/index.php/topic,3701.msg36848.html?PHPSESSID=o37n5e9bir6kbr0rptq6s0pmf5#msg36848

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **March 24, 2019, 11:59:34 AM**

Also in a paper about aminorex analogues they use saturated sodium carbonate to basify the product. I don't think it's impossible to apply here too. Another successful use was reported in the case of GHB production, where NaOH can be replaced by NaHCO3.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 24, 2019, 09:02:40 PM**

Jes i tried and i can confirm that Na2CO3 do not have the power to free Amphetamine from it's salt form.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 28, 2019, 01:56:10 AM**

Ha! I know why it has not sufficed for you!
Because you made it acidic with HCl, and not with acetic acid...
Na2CO3 is not sufficient to release the freebase from the HCl salt, but from the acetate it is seemingly.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 30, 2019, 12:28:26 PM**

wow! Yea! never thought that, this could be the reason. must try it too.

And i did it again.

Sits in waterbath:
80g EtOH
40g H2O
5.1g NaBH4

10g P2NP (grinded)- added every minute - 19 additions (i think adding 0.5g every minute should be good)

stirred 1h

added 1g NaBH4 then added 1.5g CuSO4*5H2O(grinded) and then 4g NaBH4.

took waterbath away an stirred for 1h

then set up for reflux attached and slowly heat applied until a mild reflux was present. 3-

4 drops per second.
(while heating the mixture, it became unstirrable because the NaBH4 and the Cu sticked on the walls and the bottom of the flask. after continious heating this solved again an resulted in an mild exothermic reaction.) time refluxed 1.25 h

made acetic with HCl ::) distilled EtOH out and most of water.

Bade basic and filled gain with water - steam distilled. distillate neutralized and concentrated, washed 2 times with DCM and evoporated.

yielding: 8.7g of Sulfate that's **77%**

for my research im fine with that yield. maybe ultra pure nitropropene could help rising the yield.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **March 30, 2019, 01:00:43 PM**

Again some satisfying results. Congrats :) I wonder what you're doing with all that product ::) ;D

To clearify things, a few questions:
1) Did your waterbath contained just plain cold water? Have you ever tried using an icebath? Did you renew the bath during the addition/stirring time?
2) Have you ever had the problem that the solution got blue after acidyfing? I know this can happen with AcOH, but I don't know about HCl.
3) How often do you, on this scale, refill for steam distillation? I've had a hard time estimating the volume of water needed to carry all base over.
4) When you're saying concentrated, you mean to dryness?
and lastly 5) I guess you're using denatured EtOH? Do you look for a specific composition when buying it? I had different products in the past, some clearly with denatonium benzoate, some with 1-Butanol and I'm wondering how this affects the product. I've done this with IPA in the past and I just don't want to risk having this disgusting denatonium benzoate on my product.

Ugh, more questions than I supposed to ask. Anyway, thanks for your contributions!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **March 31, 2019, 12:59:25 AM**

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i don't need so much of this product.. so it goes down the drain or some friends can "spend" it ::)

1) just plain cold water from the fountain - but 2-3L used. never renewed. no icebath tried and i don't think is needed even at bigger reaction scales. i even had no bath at all on the 88% experiment.

2) never got blue, but got green but that's from the copper.

3) i distilling in an 1l roundbottom flask, strong stirring, i don't refill @ all ! just filled to max at the beginning. the most of the product goes with the first steam actually :) it's very volatile in steam, all the amine stick to the condensor and then just "washed" down the condensor from the steam. i always just steam distill 500-700ml and the pH of the following distillate is even neutral.

4) concentrated to 50-70ml then washed with DCM the red color out. **then** concentrate to dryness. - product is perfectly white :)

5) actually i use 96% EtOH with 1% MEK - i think it's not a big deal here :) - i think DCM at the end ll solve any problems. even denatrium benzoate and so on.. it reacts with the acid first etc. then with the base etc. steam distilling get rid of something too.. and the DCM kills the rest.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **April 19, 2019, 06:57:53 AM**

Why don't people extract amphetamine base after steam distillation with let's say diethyl ether, DCM or toluene and gas it (hydrochloride) / add conc. acid (sulfate) then? Wouldn't that bee much more convenient than boiling of hundreds mL of water?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 19, 2019, 10:20:07 AM**

Hundreds of ml of water?? :o
20ml of H2O as steam carry 3g of amphetamine base!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **April 19, 2019, 01:01:00 PM**

Seriously? :o
Didn't fastbreak said he distills 500-700mL over? Maybe thats my problem..

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 19, 2019, 01:55:52 PM**

Internal vs. external steam generation ;)
Get a steamcan then, no problem.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **April 19, 2019, 02:44:39 PM**

Oh stupid me.. :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **April 19, 2019, 03:36:26 PM**

.. so I tried to replicate fastbreak's results but hmm.. any suggestions?
I used the same relative amounts, 4.4eq NaBH4 total instead of 6 - the way fastbreak got his >80%.

3.20g P2NP: 32 mL IPA, 12.8mL H2O, 1.67g NaBH4, 0.32g NaBH4, 0.48g CuSO4, 1.28g NaBH4 (3.27g NaBH4 total)

Quote

> To a strong stirred suspension of 0.52g NaBH4/g P2NP in 10mL IPA/g P2NP and 4mL dH2O/g P2NP in a two-necked flask, P2NP (hair-like crystals) was added carefully in small portions. The mixture was stirred for additional 45 minutes after adding the last portion. Thereafter 0.1g NaBH4/g P2NP, followed by 0.15g CuSO4/g P2NP and another 0.4g NaBH4/g P2NP was added causing exothermicity. This addition scheme showed the best results in previous experiments. A reflux column was attached and the reaction was brought to 80°C (water bath temperature) and held there for 30 minutes. The solution was cooled to r.t., a volume equal to the current of dH2O was added, then 1M HCl was added until the solution was acidic (pH 2). Before acidifying, the solution was clear with a copper metal layer on the bottom. During addition, the solution turned green and some precipitate formed around pH 7. After approaching pH 2, the solution turned turquoise and stayed opaque. A simple distillation setup was attached and about a quarter of the volume, the alcohol and some water, was stripped. The distillate had some oily droplets in it and it smelled like benzaldehyde. Probably some unreacted aldehyde that was still present with the P2NP. During distillation, the solution turned clear with a slightly yellow tint. The solution was cooled to r.t. (turned opaque again) and made basic with 50% NaOH solution (pH 12). The color changed to green with some particles precipitating. To the flask dH2O was added and the free base was steam distilled until the coming over distillate was neutral. The distillate then was carefully neutralized with 1M H2SO4 (pH 7) and concentrated to dryness to leave a white powder.
> Using the protocol, following batch sizes were attempted:
> 3.20g P2NP (19.6mmol) -> 1.26g Amphetamine sulfate (6.8mmol, 35% yield)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 19, 2019, 03:43:37 PM**

Use purer P2NP.
I found out that is the only real source of failure one can have at all.
Was it fresh recrystallised? And how often recrystallised at all?
I mean, it smelled like benzaldehyde even...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **April 20, 2019, 12:04:21 AM**

Yes the smell was detectable but they looked so pure ::) Once recrystallized a couple weeks ago. I will try it again with purer P2NP :) thank you for the hint!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **April 30, 2019, 03:16:41 PM**

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very good yields with fastbreaks CuSO4 EtOH method much better than IPA CuCl for me atleast....

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 30, 2019, 03:36:41 PM**

> Quote from: LD5050 on April 30, 2019, 03:16:41 PM
>
> very good yields with fastbreaks $CuSO_4$ EtOH method much better than IPA CuCl for me atleast....

It is still the same method, just slightly variied ;)
But glad to hear you finally got it to work too :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **the_only_edeleanu** on **May 22, 2019, 10:22:50 PM**

I thought i'd make a small addition to the subject, i've tried this route and kept pretty thorough notes.
I was planning on shortening the thing but i thought that it'd be better to give as much detail as possible so others might improve.
If you know of anything to improve, i'd love to hear it.

Here we go:

7,89 mol% of anhydrous cucl2 were dissolved in about 100ml of a 1:1 mixture of h2o/ipa, this is about 2,4 grams.
Next, a mixture of 158 ml IPA and 74 ml h2o were combined in a 2L rbf and this was placed in an oil bath (no heat applied, just setup for later) and a condensor was placed on the flask with ice cold water running through.
51 grams of sodium borohydride (more like 51/54 tbh) were ground up in a mortar and pestle to get rid of the big chunks and with vigrous stirring this was added to the solvent mixture, quite a bit of hydrogen was generated.

37 gr of unsubstituted p2np (recrystallized twice, washed with bisulfite/water twice) was added in portions and this caused a lasting exothermic reaction with lots of foaming, a bit of IPA/H2O was added because of clumps forming but this didn't really work.
On further examination it seemed like the stirring wasn't working properly so the flask was removed from the oil bath and the stir bar was replaced with a bigger one, afterwards everything was stirring just fine and the solution was left for about 45 minutes, at this point a slightly cloudy solution was obtained but this was most likely just bubbles of hydrogen that caused a cloudiness to form.
The CuCl2 solution was at that point poured in an addition funnel and extra ice was added tot he condensor water, upon addition of the CuCl2 some hydrogen was evolved but this was quite managable.

The solution turned gray and where the cucl2 solution hit the reaction mix it turned a dark brown/red color, i'd guess this would be copper hydride.
The addition of the copper salt was way less exothermic than i'd expected but during the addition my stir bar thought it would be a great time to crap out on me so halfway through i removed the condensor, swirled te flask around a bit and presto, the stir bar worked.
So y'know, i went on my holly jolly way and added the rest of the copper chloride buuuuuuut stirring crapped out again. I guess my stir bar isn't as magnetic as it once used to be.

*In hindsight it probably was the oilbath, i shouldn't have picked a steel pan for this.

The issue stirred me up quite a bit (haha, stirred, getit? cause its not stirring?) so i just started heating it to reflux thinking that the problem would probably solve itself and it sure did, nice to have something go as planned for a change.
I had to remove some oil during heating because i didn't keep in mind that the oil expands as it heats up because i almost never work with oil baths (i fucking hate oil baths, everything gets greasy and shit).
The reaction really took off during this time, lotsa gas getting produced and the condensor dripping like a whore at a bull milking plant.
I added some more ice in my cool water reservoir and turned down heating a bit, copper (presumably) nanoparticles could be seen on the walls of the flask before getting swept up by the high speed current in the flask.

I just wanna take a moment here to reiterate, I fucking hate oil baths.
I have to use a metal cooking pot to hold the oil so it's pretty much impossible to see whats goïng on.
That, and the fact that i smell like the kitchen of a goddamn Burger king while having everything i touch instantly become greasy.
I kow that sand baths are also a thing and even though i like em more than oil baths they heat up reaaaaaaaly slowly and are just not practical, I really gotta get a 2L heating mantle.

Reflux rate was kept at around 2 drops per second for around 35 minutes, I was aiming for something like 45 on this scale and i subtracted some time because the addition of the copper chloride had kicked it into a nice reflux a couple of minutes prior to he oil bath heating up.
Afterwards, the mixture was allowed to cool down a bit and was acidified with some acetic acid. The solution fizzed at first but this stopped after a few minutes.
It took quite a bit of acid to get the ph down enough, it seemed to hover around slightly basic/neutral and through the IPA smell an amine like odour was quite noticable.

I eventually ran out of GAA so i had to supplement it a bit with some 30% HCL, the ph at this point was around 5 but i really wanted it 100% surely acidic. No freebase amine at all, at this point i had around a 750ml of liquid btw.
When the right pH had been reached the RBF was set up for vacuüm distillation to get the IPA out, the solution was somewhat cum-colored or what could be discribed as a piss colored liquid with a small amount of white solid.
The IPA came over at about 58*C using a cheap chinese diaphraghm pump (these are a lot more reliable than people give em credit for) and the reaction mixture turned pink, a bit worrying tbh and i guess i shouldn't have used HCl because of the whole azo dye formation stuff but nothing i can do about it now. Might also be $CuCl_2$ HCl complexes or some $FeCl_3$ contamination though, not too sure about this.

In total about 500 ml of liquid was removed, i kept on distilling for a while when water started to come over because i'd be adding NaOH solution later on and i didn't wanna have to heat up a huge amount of liquid during steam distillation, i didn't feel like setting up an external steam generator.
I let the solution cool down overnight because, y'know, sleep and when i tried to remove the glass stopper on the second neck of the reaction flask i had a bit of a panic attack, it was frozen up.
Luckily this was solved by heating up the neck a bit with a small flame (IPA and fire, lovely), i was quite happy that the glass didn't just shatter as i've had happen before.

With lots of stirring a strong NaOH solution was slowly dripped in using an addition funnel untill the pH had reaced about 10/11. The heat of the reaction was a nice starting point to get the steam distilation up to temp, so heating was commenced and after a bit of clear liquid coming over around 95*C the white freebase water suspension started

distilling at 97*C. Nice.
The temperature was quite stable, hanging around 98*C and slowly crawling it’s way up to 98.4*C, this took about two game of thrones episodes, perhaps a bit more and at this point the temperature stabilized and the liquid coming over was clear with only a slight amount of white smuck that got stuck on the glass.

The receiving flask got switched out for a clean one and something like 75 ml extra were distilled, in total about 500/600.
The funny thing is that there’s quite a difference between the way the condensate flows when there’s a lot of product vs a little, it tends to drip out less regular when there’s a lot of product and likes to stick together.
Around 200 ish ml’s of NaOH solution was prepared and cooled down in rhe fridge, i didn’t really bother weighing anything and just added a hefty scoop of NaOH with some stirring.

When everything was at a nice cool not-as-fucking-hot degrees Celsius i threw it all in a 1L sep funnel and extracted the whole shebang with 3 30 ml portions of DCM. I really love dcm for this kinda shit, separates like the parents of an autistic child and sinks like a refugee filled rubber boat.
The DCM was washed with some NaCL solution and dried over silica gel balls, i prefer these over molecular sieves because they shatter when saturated. This makes it really easy to see when you’ve added enough.
The next day the solution had turned a bit yellow and after filtering out the gel the DCM was distilled off and when the temp had reached 60/70 *C heating was turned off (I washed the flask i stored the freebase solution in with some IPA so thats probably why the temp got higher than it should).

The setup was adjusted by switching in a 3 neck distillation adapter and after a decent vacuum had been pulled heating was turned on.
A small amount of pre-cum came over with the temp just kinda doïng its thing, bouncing around 30/55 *C I didn’t think much of it as it was probably just some solvent.
After about 20 minutes the temperature quickly rose to 173*C and fluctuated, i had calculated that the temp should be around 168 but i overestimated the pressure a bit.
A white glassy liquid started coming over, at this point I thought to myself “i should have used a 100 instead of a 250 ml RBF” because the liquid had some difficulty coming over at the end.

I insulated the walls of the flask with some alu foil but didn’t get everything.
After i had distilled over everything i could i was left with 20,5(5) gr of crystal clear liquid that smelled like a kick in the balls while having an orgasm, this corresponds to about a 68% yield but with all the fuckups i had this was still quite nice.
Imma get that last bit that was left in the distilling flask transfered over in a smaller one and see what i can get though. I’ve also got the idea that i didn’t quite get everything out during the steam distillation so i guess i’ll check it out but tbh i doubt that it’s still in there after 3 days (well, two and a bit) because it was exposed to open air.

That's all folks *insert old cartoon outro here*

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **May 23, 2019, 06:54:37 AM**

Quote from: the_only_edeleanu on May 22, 2019, 10:22:50 PM

> No freebase amine at all, at this point i had around a 750ml of liquid btw.
> ...
> The DCM was washed with some NaCL solution and dried over silica gel balls, i prefer these over molecular sieves because they shatter when saturated. This makes it really easy to see when you've added enough.
> The next day the solution had turned a bit yellow
> ...
> After i had distilled over everything i could i was left with 20,5(5) gr of crystal clear liquid that smelled like a kick in the balls while having an orgasm, this corresponds to about a 68% yield but with all the fuckups i had this was still quite nice.
> ...

Where does this volume come from? Did you add that much GAA or was it the addition of more IPA/H2O at the beginning?
...
What kind of silica balls did you used? Remember the coloring dyes are carcinogenic.
...
Luckily I don't know how THIS feels like :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **the_only_edeleanu** on **May 23, 2019, 01:40:31 PM**

Huh, i thought i'd already replied.
Anyway, i used a stong acetic acid solution cause it's a bit of a hassle to get GAA. Gotta order it and stuff and they ship only limited quantities at a time.

I just used beads i bought in bulk from a shipping company, undyed. meant for shipping dried flowers or something.

You know what it smells like though, don't you? :p

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **May 25, 2019, 02:02:45 AM**

instead of adding solid P2nP in portions to the alcohol/NaBH4 mix, would it make more sense to dissolve the p2np in a minimal amount of alcohol and add it to reaction flask by dripping the p2np alcohol solution through a pressure Eq. addition funnel?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **May 25, 2019, 11:40:07 AM**

do you know the solubility of P2NP in IPA @ RT? :D

with EtOH - just nope.
With IPA this could be worth a try.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **the_only_edeleanu** on **May 25, 2019, 09:20:13 PM**

isn't the solubility of nitropropenes in ipa quite low? in my experiences with nitropropenes (recrystallization) the ipa only dissolved all of it when it was boiling hot, otherwise it'd just stay mostly in suspension.

I always recrystallize by getting a minute amount of ipa up to boiling temp and then just adding in the propene, with the unsubbed p2np i got away using around 20 ml and it formed beautifull crystals.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **May 26, 2019, 03:25:10 AM**

so maybe we change the solvent system? :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **the_only_edeleanu** on **May 26, 2019, 12:07:11 PM**

could do, maybe one of those high boiling ether crapshows that they're trying to sell as a replacement for acetone these days.
Something like 1-butoxyethanol should dissolve it rather easily but will it survive the reduction though?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **May 26, 2019, 01:24:23 PM**

it's an ether so i don't think anything ll happen.

im not gonna try it because EtOH here is dirt cheap.
maybe out of curiosity but anyway, i have other projects on mind.

Maybee you could spare some time on this and do a report?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **the_only_edeleanu** on **May 26, 2019, 03:34:54 PM**

Quote from: fastbre4k on May 26, 2019, 01:24:23 PM

> it's an ether so i don't think anything ll happen.
>
> im not gonna try it because EtOH here is dirt cheap.
> maybe out of curiosity but anyway, i have other projects on mind.
>
> Maybee you could spare some time on this and do a report?

Tbh i don't think it'll matter a whole lot, you gotta keep the reaction running hot anyhow so as long as you just don't add huge amounts of the nitroalkene at a time you should be fine.
Haven't these kind of reductions been done before in thf or something? i can vaguely remember something about it.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **May 26, 2019, 04:39:45 PM**

Well, when I did a TMNS reduction with Red-Al in ether, I found out that stuff is also sparingly soluble in it...
Is THF said to be better?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **May 26, 2019, 09:04:10 PM**

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i think i can remember that THF is an very good solvent for p2np

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **the_only_edeleanu** on **June 17, 2019, 07:39:58 PM**

So i've dug through the whole thread to get some clarity on this but couldn't find anything except for a bit of back and forth between Carl and Tsha, it has been stated multiple times that this reaction is incompatible with halogen substituted rings but on the fourth page carl states that he got a 70% yield on 4f-p2np. So is fluorine the exception because of the strong F-C bond and were they more talking about 2c-x's like 2c-b/c/i or was that the yield of the cu/zn reduction that had been discussed previously?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 17, 2019, 08:33:43 PM**

They talked about the borohydride/copper reduction in this regard.
Testex/vulgaricum has made just some 2C-H from the 2C-C nitrostyrene ::)
Flourine is really the exception(also, you can neatly distill the freebase out like one can with amphetamine :D).

Damn, I really need to purify this thread soon from tsaths "live-action" synthesis and his other spam...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **the_only_edeleanu** on **June 20, 2019, 04:09:32 PM**

I just tried this on some 4f-p2np, ran really smoothly and looked like the yield was gonna be good.
It's a shame that the screw holding my stand decided to break causing like 1/2000 bucks worth in damaged glass/floor.

God exists, he's just a dick.

Anyway, i feel like the biggest improvement would be finding a way to get rid of the solid that forms when adding in the nabh4. It seems likely to me that this would be sodium metaborate, could be the nitronate but i don't know if the solution is basic enough to form a nitronate salt.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 20, 2019, 04:13:29 PM**

As far as I know the nitronate is an oil here.

Condolences for your loss :(

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **the_only_edeleanu** on **June 20, 2019, 04:42:09 PM**

Eh, shit happens. At least i got to use that bucket of perlite i had just in case ;D

So it's probably metaborate? in that case it'd be nice if we could add something to change it into sodium tetraborate to make it more stirrable.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 20, 2019, 10:44:55 PM**

With lye prestabilised NaBH4 solution probably?
It surely can't hurt and sodium borohydride is quite stable even in concentrated lye(since I know a place where it is sold in conc. lye).
Edit: but P2NP is not stable with lye... so better trying to do the the reagent addition opposite to the usual method (similar to the reaction of P2NP to P2P via oxone oxidation of the nitropropane).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **June 21, 2019, 10:56:04 AM**

What solids are you talking about? The black particles? Those are supposed to be borides and useful to provide H2 surface.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 21, 2019, 10:58:36 AM**

The white stuff that initially appears during the nitropropene addition.
The copper particles are either borides or just nanoparticles.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **June 21, 2019, 11:06:27 AM**

Oh I see, yeah I wondered about that too^^

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**

Post by: **carl** on **June 26, 2019, 09:03:08 PM**

There is still something that buggers me about this reaction:

We know about the experience of Shy Guy trying this reaction, but on a larger scale and for the first time.
He somehow failed several times and that is mysterious, no one could help there really.

And now I got told from someone else who tried it, likewise larger scale and for the first time too, failed as well(only nitropropane was recovered).
We know that at least Shy tried to keep the temperature under stricter control than is usual done at the smaller scales, which can result in a lower yield than a very vigorous one.
And the other friend reported, that he had to cool during the copper salt addition, which is also a possible cause for a lower yield.
But no yield at all, for both?

What could be the reason for that, can we help to improve that, to get it to work for them?
If someone can help getting the reaction to work for them?

Shy Guy has reported quite some details about his failed attempts, here:
https://www.thevespiary.org/talk/index.php?topic=15090.msg54178618#msg54178618
The other one said, he thinks is it only suitable for small scales.
Yet testex/vulgaricum has reported having done it at a scale of 2mol(or was it 0,2mol? can't find the post), but still with a yield of 85%.

Maybe the solution would simply be to run that reaction at 10-20g at first to get a feel for a successful run at first, before moving on with it and nothing else?
Since testex has done it several times before and knows the reaction, I think maybe that is the difference?

I am just wondering about these two reports, as they are actually the only people who have done that reaction without success of us all, since besides them everybody else got it to work and many of them achieved high yields.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **June 26, 2019, 09:46:23 PM**

Quote from: carl on June 26, 2019, 09:03:08 PM

> at a scale of 2mol or was it 0,2mol? can't find the post

200g - https://www.thevespiary.org/talk/index.php?topic=15090.msg54178642#msg54178642

and 500g - https://www.thevespiary.org/talk/index.php?topic=15090.msg54179172#msg54179172

Useless piece of information - This thread has just made it into the Top 10 'thread by replies', which means it has more posts than any Hive thread here ever had, and is one of our most successful threads to date.

Well done everyone.

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **the_only_edeleanu** on **June 26, 2019, 11:42:55 PM**

I've really got the feeling that it has to do with stirring. i've had that fluorescent oil come over once before but i noticed that during that attempt quite a bit of the copper got on the sides of the RBF i was using and there was also a bit trapped in that white solid that stuck to the sides of the flask.

Keeping everything suspended seems to be simpler at smaller scale but after 20+ gr it becomes quite difficult.

Maybe the problem could be solved by using as small as possible of a flask size or adding more catalyst at large scale.

Could it have something to do with the rate of addition of the cucl2? the formed particles seem to wanna stick together somewhat so a slow(er) addition should result in more evenly sized particles because it would get distributed more evenly.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **June 26, 2019, 11:54:17 PM**

I was going to suggest upping the molar eq. of CuCl2 as the scale went up, but that is just a brainfart right now.

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 27, 2019, 12:42:57 AM**

Exactly, the stirring can be a huge problem and the reason for it all to fail.
One of us had that problem due to stirring, also got that blob of copper particles you describe too instead of dispersing them finely, and got nothing at all.
Then, with a new stirrer, it suddenly worked, and directly with very high yields too.

vulgaricum said the nitronate, which seems to be that fluorescent oil you mention, is the result of using too little solvent.

I agree, it could be likely that these attempts failed as a result of unsuitable formation of the copper nanoparticles.
The formation of the nitroalkane was confirmed too, so the first reaction has definitely worked.
But the CuCl2 was added not even close as usual to small scale(eg in one portion), but rather 1-2h for the addition.
I guess that could be the reason.

Probably a much larger vessel would allow for an addition quick enough.

As said, it really bugs me that especially some of our best chemists had such issues with this otherwise excellent reduction method.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **the_only_edeleanu** on **June 27, 2019, 02:04:25 AM**

I had some really weird results with 4-fp2np though (well, kinda. i'm not done).
everything went amazing but i had to skip steam distilling it and go straight to solvent extraction after getting rid of the IPA.
aaaaanywho, i extracted with xyle's and hcl gassed trying in both dcm and xylene but i had to evap everything off, add acetone and throw it in the freezer before i saw anything.
How soluble is this shit? Everything was acetone washed and oven dried before gassing.
weird stuff man, the dcm i can understand but xylene is just weird.

Edit: yield was 75% btw with a 20 gr theorethical yield.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **July 11, 2019, 07:26:36 PM**

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ok since i cannot replicate my high yield experiment i maked another experiments.

40g EtOH + 20g H2O + 2.5-2.7g NaBH4
in this 5g grinded P2NP added scoop by scoop. (not more as 5min took the addition)
stirred 30min

then added another 2.5-2.7g NaBH4

to this added 0.8g CuSO4*5H2O solved in 25g H2O

this refluxed 45min.

Roundbottomflask filled with water and then the setup changed to direct distillation. (no need to add base, NaOH produced by NaBH4)

steam distilled like 500-600ml. - neutralized, boiled down, washed with DCM, boiled to dryness to yield: 4g of white Product.

That's 70.86%

i noticed when i don't use the extra water the Borohydride form lumps with the copper.
and the yield drops to 2.5g product!
Maybee more catalyst next time, like 1.25g Coppersulfate

soon i ll try it with 2,5-dimethoxynitrostyrene. but with more NaBH4 for the double bond reduction, so more solvent too. And cooled/water bath.

like this, without prior heating before additions of Borohydride and copper, the reduction

seems easier and works great too.
and you can chill out and don't need to fight the ethanol fumes :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **July 26, 2019, 07:36:25 PM**

I can also confirm the method working, so reporting another success ;) Here is a detailed writeup with some images to please you.

Here is the freshly re-x'd P2NP, about 65 grams (it was ~76 g originally - few months old batch; I used 2.5 mL IPA per gram of P2NP so maybe I will use less IPA next time or maybe it was too dirty in the first place):

(http://i.imgur.com/xFgcDPSm.jpg) (https://imgur.com/xFgcDPS)

I've set up 3-neck 1 000 mL RBF in a cold water bath (just few cubes of ice added), equipped with an overhead stirrer and a powder funnel:

(http://i.imgur.com/jdwZpy0m.jpg) (https://imgur.com/jdwZpy0)

I started strong stirring. Then I added, in portions, 8.5 g (0.225 mol) freshly ground NaBH4 (it was already pretty loose, like table salt, with only few clumps easily broken by the pestle). I washed the funnel with little water to get all powder in. I left NaBH4 dissolving for approx. 20-30 min. Then I added, in portions, 16.32 g (0.1 mol) freshly ground P2NP. I washed the powder funnel with little IPA to get all powder it.

The solution, started bubbling vigorously and the yellow color disappear shortly after addition of P2NP. After the last addition, little of the yellow color retained:

(http://i.imgur.com/V1jPA0Om.jpg) (https://imgur.com/V1jPA0O)

I left the suspension stirring for 30 min. It heated up only to about 36-45 °C (lukewarm/warm). The water bath seemed to did some cooling job, but maybe not absolutely necessary.

I stopped the stirring, washed the paddle with little IPA and set up for reflux. I equipped the RBF with addition funnel, reflux condenser and a thermocouple probe. The addition funnel contains 2.2 g (0.016 mol) CuCl2 (anhydrous) in 100 mL water):

(http://i.imgur.com/LDI1qUym.jpg) (https://imgur.com/LDI1qUy)

I started the addition of CuCl2 slowly and in portions. A black precipitate formed immediately (copper boride?). Some gray sediment also formed (see below). I observed some heating and frothing, but no signs of a runaway reaction - it might be possible to add CuCl2 all at once (no need for funnel). The temperature rose up several degrees, sometimes up to reflux (maybe I have a shitty probe, it does not respond well sometimes).

Magnetic stirring was almost impossible but as the solution heated up and the sediment dissolved, it resumed.

(http://i.imgur.com/DBtWMIMm.jpg) (https://imgur.com/DBtWMIM)

(http://i.imgur.com/hDcC7bSm.jpg) (https://imgur.com/hDcC7bS)

(http://i.imgur.com/2Fw24sam.jpg) (https://imgur.com/2Fw24sa)

I continued stirring strongly and refluxing for 45 min:

(http://i.imgur.com/X79wZdrm.jpg) (https://imgur.com/X79wZdr)

I left the suspension cool down a bit. The supernatant liquid was now clear and P2NP smell completely gone.

(http://i.imgur.com/vIbLc0Qm.jpg) (https://imgur.com/vIbLc0Q)

I acidified the mixture with 100-150 mL GAA. Lots of the sediment dissolved and the mixture turned light emerald green (probably from the copper ions):

(http://i.imgur.com/207tNJBm.jpg) (https://imgur.com/207tNJB)

I topped up the RBF with some more GAA because pH was still too high to turn my indicator paper red - I added some water to dilute the GAA and improve pH reading - this caused clouding:

(http://i.imgur.com/pBPTz0ym.jpg) (https://imgur.com/pBPTz0y)

The pH reading was 4.46 (according to pH probe) - probably not acidic enough. Maybee I should have added strong acid like HCl ti push the pH down even more to ensure the amine is fully salted. I haven't.

I filtered the solution to get rid of the little black precipitate and washed the cake with water. In the hindsight, filtration was unnecessary as there was so little sediment; not an issue for mag. stirring.

I've set up simple distillation and distilled off the IPA. I continued the distillation until the still head temperature was 100 °C and then some more.

(http://i.imgur.com/4j4zz1pm.jpg) (https://imgur.com/4j4zz1p)

The alcoholic distillate contained some oily droplets on bottom and was quite cloudy so I stooped the distillation in the fear of losing product:

(http://i.imgur.com/lOv9ObUm.jpg) (https://imgur.com/lOv9ObU)

The reduced reaction mixture:

(http://i.imgur.com/AAGPbSSm.jpg) (https://imgur.com/AAGPbSS)

I added lots of 25% NaOH, then some 50% NaOH until the mixture was strongly basic to the pH paper (dark blue). The mixture turned brown and some precipitate appeared (cooper hydroxide?). I topped up with water to 1 600 mL which caused some white clouding:

(http://i.imgur.com/0giXPvVm.jpg) (https://imgur.com/0giXPvV)

Again, I've set up for simple steam distillation (2 000 mL flasks this time):

(http://i.imgur.com/SN6LvVam.jpg) (https://imgur.com/SN6LvVa)

BTW I am confused about the alcoholic distillate. I've acidified it with HCl (to conserve any amine product that might slipped in it) and it turned white and opaque. I will keep this for the next batch and then add it to the acidified mixture. Then I will probably use fractional distillation to better separate IPA from the water, or reach lower pH to prevent the product coming over:

(http://i.imgur.com/5e9Mikzm.jpg) (https://imgur.com/5e9Mikz)

Aqueous distillate containing the oily product (we all love this look, don't we?):

(http://i.imgur.com/LbflNMom.jpg) (https://imgur.com/LbflNMo)

I distilled over about 600 mL of liquid, but probably should have distilled more like 1 500 - 1 800 mL but this is a test run and I started running out of ice:

(http://i.imgur.com/d4yzSebm.jpg) (https://imgur.com/d4yzSeb)

I added few spoons of salt (to push the amine out of aqueous phase), then extracted with 5 x 75 mL pet ether (30-75 °C fraction). I added some more salt for the last two pulls, and finally the depleted aqueous layer became completely clear:

(http://i.imgur.com/pderaQPm.jpg) (https://imgur.com/pderaQP)

(http://i.imgur.com/ZGKiAu2m.jpg) (https://imgur.com/ZGKiAu2)

I wanted to wash the pooled pet ether extracts with basic saline, but I forgot.

I dried the pooled extracts with CaCl2, filtered and evaporated off the solvent on rotavap (heated up the water bath slowly up to 75 °C, then cooled down a bit and pulled 100 mbar of vacuum to boil off all the solvent):

(http://i.imgur.com/du27y4xm.jpg) (https://imgur.com/du27y4x)

I was left with **7.85 g** of crude amine base:

(http://i.imgur.com/KymwD1Mm.jpg) (https://imgur.com/KymwD1M)

This was dissolved in 50 mL dry IPA and salted with 1.4 mL conc. H2SO4 in 7 mL IPA:

(http://i.imgur.com/1cGkTHLm.jpg) (https://imgur.com/1cGkTHL)

Now this was quite stupid. I assumed the base is 90% pure (mol-wise) and I need 0.5 mol of acid per mol of amine (sulfuric acid is diprotic) - so I used 0.45 mol% of acid. This turned out to be too much as I should have:

- use more IPA (100 mL or more per 5 grams of amine base)
- stir while adding acid
- test for pH with wetted pH paper continuously to avoid overshooting

In the end, I added about 4 mL diethyl ether to better crash the amine salt from alcohol and then tried to filter it:

(http://i.imgur.com/B3yiC4Zm.jpg) (https://imgur.com/B3yiC4Z)

It was too hard to filter so I simply evaporated the alcohol with heat & air, which of course leads to a lesser quality product as it keeps the impurities (and introduces some airborne nastiness):

(http://i.imgur.com/YspezkKm.jpg) (https://imgur.com/YspezkK)

(http://i.imgur.com/ifBKAJUm.jpg) (https://imgur.com/ifBKAJU)

I realized there was too much acid since the product turned pink on top after final drying in the oven:

(http://i.imgur.com/p4RbSlbm.jpg) (https://imgur.com/p4RbSlb)

To purify further, I ground the product under acetone and then filtered; then repeated the procedure 2 more times:

(http://i.imgur.com/AM7vbWrm.jpg) (https://imgur.com/AM7vbWr)

The washed product was still difficult to filter (it was pasty), but somewhat easier to filter still:

(http://i.imgur.com/1EuD61gm.jpg) (https://imgur.com/1EuD61g)

Here is the washed product and the acetone washes on the right:

(http://i.imgur.com/lW5j1s0m.jpg) (https://imgur.com/lW5j1s0)

The final product:

(http://i.imgur.com/6rBjWefm.jpg) (https://imgur.com/6rBjWef)

After drying in hot air, I ground the product in a mortat and weighed:

(http://i.imgur.com/iVXOHItm.jpg) (https://imgur.com/iVXOHIt)

Total yield: 6.64 g (36.2%) of DL-amphetamine sulfate

The yield was poor probably because of incomplete steam distillation, incomplete salting, various fuckups along the way, mechanical losses and who knows what else... Maybe I will try this with copper sulfate as fatbre4k had success with it.

I was too curious and I tested the product, 20 mg orally on empty stomach provided smooth stimulation and mood lift.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **July 26, 2019, 10:15:25 PM**

Your yield was poor because you didn't added the CuCl2 all at once.

Use a larger flask next time to be able to do so, this is the part which kills most yield and is essential to do at once, otherwise there are too little nanoparticles in the solution at one time.
That was also observed by others in large scale reactions and at the hyperlab too.

Other than that, good work, thank you for your pictorial! :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **FormerBeagle** on **July 26, 2019, 11:00:20 PM**

Another potential yield loss: use of CaCl2 to dry the amine. It has a tendency to form adducts with amines.

Quote

> 1. Calcium chloride (n=6, e=1.5 mg/L) is a very good drying agent for a broad variety of solvents but is generally not compatible with hydroxy (alcohol, phenol), amino (amine, amide) and carbonyl (acid, ketone, ester) functions due to basic impurities such as Ca(OH)2 and CaCl(OH). In addition, it tends to form adducts with some of those compounds as well.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Dyinglight** on **July 26, 2019, 11:15:13 PM**

Nice work psyhare well done

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **July 26, 2019, 11:18:15 PM**

Quote from: FormerBeagle on July 26, 2019, 11:00:20 PM

> Another potential yield loss: use of CaCl2 to dry the amine. It has a tendency to form adducts with amines.

Thanks. I will therefore use MgSO4 instead.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **LD5050** on **July 27, 2019, 01:24:39 AM**

I have had best results with 96% EtOH over anhydrous ipa, and CuSO4 over CuCl2. I’ve performed this reaction 20-25 times nothing worked as good as EtOh and CuSO4. I should add that CuCL2 was home made and I made it several different ways starting from copper metal to starting with CuSO4. I believe the purity of my home made CuCl2 was poor in the beginning but I eventually got it to pretty high purity after many tries but still I couldn’t get good yields with it.
I then used the EtOH/CuSO4 method and have gotten 70%+ yields. Also I used unsubstituted P2NP.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **July 27, 2019, 08:55:58 AM**

First of all: great pictorial :) I really hope there will be more like these in future :)

Besides the already mentioned things, why did you decide to add the CuCl2 with so much water?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **July 27, 2019, 12:06:42 PM**

I am usually short of ethanol but just distilled a new batch of it so I will try the rxn with EtOH 96% / CuSO4 next week.

Already took about dozen notes for the improvements, great!

Quote from: loft on July 27, 2019, 08:55:58 AM

> First of all: great pictorial :) I really hope there will be more like these in future :)
>
> Besides the already mentioned things, why did you decide to add the CuCl2 with so much water?

Oh sure :)

Not really a good reason for the extra water, only that when I went over the writeups above, additional water was sometimes needed to dissolve everything and allow stirring. My reaction mixture contained lots of solids so I added extra water with CuCl2.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **July 27, 2019, 02:22:53 PM**

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that was some eye candy for me psyshare :D

I'm curious about your next experiment

it's nice to see the attempts & documentation from other users :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **July 27, 2019, 03:11:48 PM**

To stress out what carl said: the black boride particles are very important. Adding too much solvent might redissolve them. I propose to increase the amount of CuCl2 used (maybe even 20mol%).

Edit: I just read you were already using 16mol%. I guess that's better than 10mol%.
Edit #2: psyhare, why do you think you added too much sulfuric acid? Based on pH testing?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **July 29, 2019, 03:02:37 PM**

I see. So I will try to use less solvent, just enough to enable stirring.

Quote

> Edit #2: psyhare, why do you think you added too much sulfuric acid? Based on pH testing?

It's based on the observed colour of dried paste which turned pink/red - I assume this happens when the product gets "burned" by too much acid but I am not sure. I will be more careful about the salting next time (using like 10% v/v H2SO4/IPA, using more solvent and mag. stirring during the addition of acid, testing the pH periodically).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **fastbre4k** on **July 30, 2019, 01:08:15 AM**

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actually, i believe the red forms from nitroalkane/alkene addition reactions. from the way you worked up, surely some of these impurities tracked down in to your endproduct.

i believe too that when the A.sulfate is very pure and too much acid used, the shit turns rather yellowish than red. because excess acid should then form an hemisulfate or not? i am wrong? idk.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ozymandias** on **August 04, 2019, 02:57:03 PM**

While I am checking the vespiary for some time now this is my first post/report. I hope it is clear enough.

In a 1000ml two-neck round bottom flask is poured 80g denaturalized ethanol and 40g demineralized water. The flask is put in the fridge. While the ethanol/water mixture is cooling 12,5gr p2np is recrystallized in 30 ml IPA. The crystals are then dried for 30min in a oven at 40C.

The cooled ethanol/water mixture is taking out of the fridge and placed on a magnetic stirrer. 5.2G powdered NABH4 is added in 3 portions in under a minute with strong stirring. The dried p2np is ground up with a coffee-grinder. 10G of the powdered p2np is weighted out and divided in portions of 750mg. The p2np is added to the ethanol/water/nabh4 mixture at 1 minute intervals with strong stirring. During the whole process in one neck of the flask a thermocouple is fitted and in the other a stopper is loosely placed. This prohibits too much solvent from escaping while not allowing too much pressure to built up within the flask. When all the NABH4 is added the mixture is left stirring for another 45min. The temperature never exceeded 37c.

1.5g grounded NABH4 is added to the semi-colorless mixture and after 2 minutes 1.7g of CuSO4-5H20 dissolved in 25ml DH2O is poured under a minute in two portions in the flask. 3.7G NABH4 is added in 3 portions at 1 minute intervals. The mixture is left stirring for 45 minutes.

Because of a broken heater function the flask is removed from the stirrplate and put on a hotplate. The stopper is removed from the flask and a reflux-condenser is attached. The mixture is refluxed for 45 minutes. At the moment the heating is turned off the flask is again placed on the stirrer. When the mixture is cooled to 35c dilute HCL is added until PH 2-3. 200ML DH2O is added and a simple distillation setup is build. Everything under 100c is distilled.

The mixture is allowed to cool to room temperature and 18g Noah in 50ml DH2O is drop-wise added under strong stirring till PH 11-12. 250ml DH20 is added and the base is steam-distilled until the distillate coming over is clear (+-350ml).

2ml 96% H2SO4 is added to 20ml DH2O. The H2SO4 in water mixture is drop-wise added (+- 11ml was used) to the distillate under strong stirring until PH5(I aimed for 7). The resulting liquid is evaporated until 100ml is left. The liquid is washed with 30ml of DCM and further evaporated till dryness. The dry powder is washed with acetone twice.

A little bit of the powder is used for a marquis test which turns orange nicely.
Result: 8.55gr Amphetamine sulphate - 75.7%

Next week I will bring it to a testing lab to check for purity/byproducts.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **August 04, 2019, 03:25:59 PM**

Nice writeup and congrats to your results!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **August 06, 2019, 10:52:55 PM**

Thanks for the writeup!

I have also just finished the synthesis using EtOH/CuSO4. It really seems to work much better than IPA/CuCl2.

I found it is important to add P2NP in small batched as the solvent may heat up too much and escape, as you wrote. Next time I will use magnetic stirring and loosely close the flask, or use reflux condenser.

In my case, I cooled the flask maybe too much and lots of NaBH4 crystallized out of solution. Is that possible? Maybe I allowed too much ethanol to escape and NaBH4 precipitated... it formed a crust that was hard to break down, but upron heating and later addition of catalyst and more NaBH4, it eventually dissolved.

I've done 0.15 mol scale, used 250 mL EtOH and 100 mL water, but later had to add 100 mL EtOH and 100 mL water later to keep everything dissolved.

I probably won't use ice water bath in the beginning, just pre-chill the solvent like you did.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **August 07, 2019, 10:22:01 AM**

My last yield was **37.8%** even though I used EtOH/CuSO4.

I will probably do less cooling in the beginning (no ice water bath), be more careful about the P2NP addition and extract+vacuum distill the product instead of steam distill.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ozymandias** on **August 11, 2019, 03:28:39 PM**

Quote from: psyhare on August 07, 2019, 10:22:01 AM

> My last yield was **37.8%** even though I used EtOH/CuSO4.
>
> I will probably do less cooling in the beginning (no ice water bath), be more careful about the P2NP addition and extract+vacuum distill the product instead of steam distill.

I only pre-cooled the solution and did not use a water bath at all. I think it is important to not let to much solvent escape, strong magnetic stirring and adding the p2np as powdery (crushed) as possible.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **August 21, 2019, 10:47:43 PM**

One stupid basic question. How do you deal with the waste?

There are copper compounds in the spent reaction mixture which should ideally be removed. I was left with a bunch of metallic copper powder in the reaction flask which I removed by filtration. However, the heavy metal test revealed there is still considerable amount of copper dissolved (it tests for Cu[2+] ions in ppb range):

(https://i.imgur.com/RjVLuhvm.jpg)

In a test tube, I tried adding conc. H2O2 to oxidise the copper and precipitate it as copper oxides. This seems to work:

(https://i.imgur.com/wl5cnR5m.jpg)

However, it can take quite a lot of hydrogen peroxide, which is precious to me and I haven't found any alternatives.

Perhaps re-acidifying the mixture, then precipitating copper as carbonate using soda ash (sodium carbonate)? Or displacement with another metal?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **September 20, 2019, 11:12:20 PM**

Writeup for my last trial of this synthesis, my best yield so far. This is 0.3 mol scale which seem to still fit comfortably in a 2L flask:

To a 2 000 mL 3-neck RBF equipped w. an overhead stirrer, thermometer and powder funnel, add 500 mL 95% EtOH (cold) followed by 200 mL water. Protect the stirrer shaft with a foil to prevent too much alcohol vapours escaping. While stirring, add, in portions, 25 g NaBH4 (freshly ground). Stir for 25 min or until all boroydride is dissolved. Add, in portions, 50 g P2NP (recrystallized, freshly ground). After each portion, wait for the fizzing to diminish and the mixture to discolorate a bit before adding next batch. Total addition time ~5 min. Cool the mixture as needed during addition to prevent ethanol vapours escaping. Stir for 25 min.

Set up reflux with an efficient condenser (long Liebing works, but Alinh or spiral seems better). While sitrring, add, in portions, 25 g $NaBH_4$. To this add, at once, 10 g $CuSO_4$ dissolved in 100 mL water. Reflux for 45 min. Let the mixture cool down a bit. Add GAA until pH is definitely acidic (150-200 mL ??). Filter to remove black boride particulates. Setup for simple distillation. Distill off alcohol (distill until head temperature reads >100 °C). Let the mixture cool down a bit.

Add 25% NaOH to pH 13+. Extract w. 4 x 100 mL diethyl ether, dry with Na_2SO_4, filter. Set up for simple distillation w. oil bath , short Liebig condenser and a cow adapter. Distill off ether at atm. pressure and oil temp. 50-60 °C. Let the mixture cool down a bit and remove distillate. Pull vacuum, start stirring and distill off fractions.

I collected these fractions at 33 mmHg:

1. 60 °C, ~3 mL
2. 90-92 °C, ~40 mL
3. 100-120 °C, ~5 mL

I combined fractions 2 and 3, dissolved the oil in 800 mL anhydrous IPA (pre-dried with 3A mol. sieves) and while stirring, slowly added 10% H_2SO_4 in IPA. When the mixture gets too thick, filter (it is very slow but works).

Air-dry filter cakes, occassionally breaking them. Break the clumps furter under anhydrous acetone in a mortar. Filter, air dry.

Yield: **38.1 g (67.5%)**

One problem I still have is the borohydride crystallizing in the flask, preventing stirring. Cooling is needed occassionally to keep the temperature relatively low (<50 °C), but too much cooling seems to precipitate the borohydride.

Nevertheless, everything finally dissolves after the addition of copper catalyst, only that I cannot stir the whole time.

The ethereal extract is deep green containing lots of sludge. I am thinking about first washing the acidified mixture with DCM before basifying and extracting.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **September 21, 2019, 01:34:02 AM**

Quote from: psyhare on August 21, 2019, 10:47:43 PM

> One stupid basic question. How do you deal with the waste?
>
> There are copper compounds in the spent reaction mixture which should ideally be removed. I was left with a bunch of metallic copper powder in the reaction flask which I removed by filtration. However, the heavy metal test revealed there is still considerable amount of copper dissolved (it tests for Cu[2+] ions in ppb range):
>
> (https://i.imgur.com/RjVLuhvm.jpg)
>
> In a test tube, I tried adding conc. H_2O_2 to oxidise the copper and precipitate it as copper oxides. This seems to work:
>
> (https://i.imgur.com/wl5cnR5m.jpg)
>
> However, it can take quite a lot of hydrogen peroxide, which is precious to me and I haven't found any

> alternatives.
>
> Perhaps re-acidifying the mixture, then precipitating copper as carbonate using soda ash (sodium carbonate)? Or displacement with another metal?

I think Cu(OH)2 is insoluble in water and primary alcohols? So maybe add some more NaOH?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **September 21, 2019, 09:41:01 AM**

Thank you for your detailed report psyhare!

A couple remarks if I may:
- I feel like 5min for 50g P2NP is a bit short. I'd suggest adding it slower, this might increase the yield.
- Did you really use sodium sulfite to dry your ether or sulfate? I guess it's a typo, so just correct it :)

Oh and what do you mean be crystalizing borohydride? I never encountered this specific phenomenon.

And when you say that your etheral extract is green and full of sludge, at which point? The leftover oil after distilling of the ether?

Okay one last remark^^ I appreciate your effort to vac distill the base, but wouldn't it be easier to steam distill it?

Cheers :b

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 21, 2019, 10:02:11 AM**

I would suggest adding the nitrostyrene as fast as possible on the contrary.

With crystallising borohydride, he meant the borate salts that precipitate often in the solution.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **September 21, 2019, 11:10:32 AM**

Quote from: carl on September 21, 2019, 10:02:11 AM

> I would suggest adding the nitrostyrene as fast as possible on the contrary.

Why?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 21, 2019, 11:32:42 AM**

Because these were the runs with the highest yield I had.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **September 22, 2019, 12:18:29 PM**

Quote from: loft on September 21, 2019, 09:41:01 AM

> I feel like 5min for 50g P2NP is a bit short. I'd suggest adding it slower, this might increase the yield.

Why? Doesn't suffice to just to dissolve all NaBH4? How does keeping it longer in solution help before addition of P2NP? I thought the longer it stays in solution the worse because the reducing hydrogen would escape and the reducing power would be weaker??

Quote from: loft on September 21, 2019, 09:41:01 AM

> Did you really use sodium sulfite to dry your ether or sulfate? I guess it's a typo, so just correct it :)

Corrected it thanks. Of course I meant Na2SO4.

Quote from: loft on September 21, 2019, 09:41:01 AM

> Oh and what do you mean be crystalizing borohydride? I never encountered this specific phenomenon.

It's white crystals looking like hardened sugar. It's very hard to scrape it off glass to enable stirring. It cakes on the sides of the flask after addition of P2NP if the mixture gets too cold. I am not sure what it is - borohydride, borate? Borate of what?

Quote from: loft on September 21, 2019, 09:41:01 AM

> And when you say that your etheral extract is green and full of sludge, at which point? The leftover oil after distilling of the ether?

After adding GAA, the solution is turquoise (perhaps form the leftover CuSO4 / Cu++). After adding NaOH, the solution gets brown/emerald-green with three layers: oily dark green amph. layer + sludge + aqueous layer.

The ethereal extract is still dark green even after drying. There is leftover dark green/brown sludgey oil after distillation.

Quote from: loft on September 21, 2019, 09:41:01 AM

> wouldn't it be easier to steam distill it?

Steam distillation takes ages and does not allow picking fractions. It is not selective to the various volatile components.

I am yet to try external steam if this works better/faster but I have concerns about the resulting purity of steam distillate vs oil fractions.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **September 28, 2019, 03:32:39 PM**

I felt like the addition frame was a bit short because I personally always waited until the yellow color completely ceased. Maybe I was just doing it wrong when carl approves the fast addition as well.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **September 28, 2019, 03:44:41 PM**

AFAIK no one reported on doing this reduction on 3,4,5-Trimethoxyphenyl-2-nitropropene (3,4,5-TMP2NP).

Initially I didn't plan to report about it because it was one of my first trials and the yield wasn't extraordinary.
After all, it still proves this reduction system to be applicable to another substrate. So here you go :)

Reduction of 3,4,5-TMP2NP

Without cooling, 3,4,5-TMP2NP (6mmol, 1.520g) was added carefully in portions (in a rate that causes continuous reflux) to a stirred suspension of 7.5eq NaBH4 (1.70g, 45mmol) in IPA (20mL) and dH2O (10mL) causing an exothermic reaction that increases the temperature of the mixture to 50-60°C. The mixture was stirred for additional 30 minutes after adding the nitroalkene. Thereafter a 10-mol% solution of CuCl2 (0.6mmol, 102mg in 1mL dH2O) was added carefully causing further exothermicity, turning the solution black immediately. The reaction was then held at 80°C for 30 minutes using a water bath. The solution was clear with some black copper nanoparticles flowing around. After reaching r.t., a 50% solution of NaOH (6mL) was added under stirring and the phases were separated. The aqueous phase was thereafter extracted with DCM (3x 20mL). The extractions were combined, dried over MgSO4 and filtered. The obtained dry organic solution was extracted with a 16% solution of HCl (3x 10mL). The aqueous phases were combined, evaporated and recrystallized (5mL MeOH). Crystallization occurred after cooling it in the freezer overnight. It was filtered and washed with ether to receive a reddish-white, crystalline-powdery mixture. Yield: 680mg (MW TMA-HCl: 261.745, 2.6 mmol, 43%).

Clean up
In a test tube, 680mg TMA-HCl were suspended in 6mL anhydrous acetone, heated to a boil and shaken. After cooling down to r.t. and settling of the solids, the acetone was decanted. The procedure was repeated one more time (6mL acetone, heated, shaken) and the whole solution was filtered and washed with some dry acetone (6mL total). Each time the acetone took on a dirty brownish tint. The second pull was much cleaner though. Weight at this point: 680mg. The almost pure white crystals were dried in the air at r.t. and added to a small 50mL beaker. To this anhydrous IPA was added in stages while the beaker was heated on a hot plate and occasionally shaken. 20mL IPA was used to dissolve everything in the heat. The flask was left untouched on the bench for a few hours. Crystallization started all over the place. The beaker was then transferred to the fridge for a few hours and finished off in the freezer for another couple hours. The crystals were filtered (filtrate was brownish discolored) and washed with dry acetone (6mL) to receive a final yield of 580mg (2.2mmol, 37% from nitroalkene) clean, white crystals.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 28, 2019, 03:55:32 PM**

Cool, thanks for that!
I also have a bit over 2g of that nitropropene(remember we both made some when we waited on the nitromethane :D) so I guess I should try that substrate soon as well.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **October 01, 2019, 07:01:24 PM**

Thanks!

Do you think this would work on beta-3,4,5-trimethoxynitrostyrene? ... I would make a nice synthesis of M from 3,4,5-TMB.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 01, 2019, 07:23:54 PM**

It does work, two people confirmed it, Kykeon on the thread, another in private, both got around 70% :)
I still bite my own ass that I have used my 3,4,5-TMNS up with the damn Zn/HCl reduction ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **electromancer** on **October 09, 2019, 04:13:14 PM**

Hi,

Does anyone know how well this synthesis scales up?

I will hopefully be running it soon at 0.5 mole, 1 mole and then 2 mole, to test if it is scalable.

testex: did you need to run your 0.4 mol reaction in a 4L RBF, or was that just the closest size of flask that you had?

If anyone has run it successfully at 1+ mole, can you help out (post or PM me) with any difficulties encountered,
and/or any advice on equipment to be used/fabricated, changes to increase speed and ease of workup,
and ideally any yield optimizations? :)

I will post details of my tests and their results.

--
Additional info:
Will be performing 0.5M in lab glassware (boro 3.3), 2M in modified device similar to custom built reactor made in section 4.4.1 of Reductive Amination of P2P through Catalytic Hydrogenation Using Adams Catalyst by Louis Freeh (https://erowid.org/archive/rhodium/chemistry/meth.louisfreeh.html).

Will be using P2NP previously synthesised from a 19.5 mole reaction using the following method:

2 L Benzaldehyde 99.5%
1.5 L Nitroethane 98.5%
0.1 L n-butylamine 99.95% (Basic catalyst)

Added together in a glass vessel, I used a 1 gallon brewing demijohn (gal.uk=4.6L).
//Can be purchased from Wilko's with bung and airlock for under 10 GBP.

Bung hole enlarged and then bung wrapped in PTFE tape, inserted a standard lab angled drying tube.
Used anhydrous sodium sulphate (cotton wool either end to hold it in) to prevent atmospheric moisture from entering and to adsorb water released from the nitroaldol reaction thereby driving it to the right.
Swirled vessel well to mix liquids, then left in a dark, dry location for between 2.5 weeks.
Swirled once a week, as soon the vessel was mostly a solid mass of pale yellow crystals, harvested them.
Broke up mass with long metal rod and then washed them, first with sodium metabisulphite solution (to remove any aldehydes/ketones),
rinsed with cold deionised/distilled water, then rinse with ice cold IPA (for smaller amounts can vacuum dry for 5 mins in a buchner funnel),
these were then stored in a freezer in an air tight container.
//viable for at least 3 months and potentially up to 2 years.

Dry crystals of P2NP weighed just under 2.75 kg (there will still be a small amount of residual IPA).

Note: If left too long the product begins to polymerize, turning orange and the red.
Can recover large percentage of product (the lighter the colour the higher the percentage) by
recrystallizing in minimal amount of hot IPA, cover and allow to cool slowly @RT then using fridge and freezer.

If you are UK based, *no sources*.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **October 10, 2019, 05:16:09 PM**

I run 0.3 mol scale in 2 L RBF without any problems. No active cooling is needed except of pre-cooling the solvent in a freezer. Reflux condenser is attached all the time (the overhead stirrer is sealed and the 3rd neck for addition stoppered when not adding reagents).

Maybe 0.4-0.5 mol might still be possible in 2 L flask, but external cooling might be necessary then.

I have issues just with the workup. There is some emulsion forming (at 0.3 mol scale, I have sth. like 1 L of mother liquor) - there is lot of gunk appearing after the addition of base (NaOH), the ether extract is dark green, picking up some of the gunk. It's next to impossible to filter it.

Maybe my copper sulfate is not of greatest quality and contains some other metals, causing the green discoloration (it's blue when acidic, green when basic). I will try next run with CuCl2 made from very pure copper powder.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **October 14, 2019, 10:54:55 AM**

Here how the greenish basic soup looks like - it is a second pull with ether showing some emulsion as well:

(https://i.imgur.com/MxlE0dcm.jpg)

And here is the ethereal extract. The emulsion was destroyed by adding excess sodium sulfate (seen on bottom of the flask), but after filtering there was still some water:

(https://i.imgur.com/CxYEPRxm.jpg)

I use aqueous EtOH as solvent and $CuSO_4$ as catalyst. I have no idea why the green is pulled into organic layer - it seems like some copper salt, an acetate perhaps? But why is it soluble in ether?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 14, 2019, 12:01:16 PM**

Do you know the chen kao reagent test for aminoketones and aminoalcohols(namely ephedrine)?
It is a copper based colorimetric reagent, where ether is added to the complexiated amine, and the colour then travels into the ethereal layer too.
So you should probably just use another solvent where the copper does not follow in, this is what happens there.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **electromancer** on **October 16, 2019, 03:05:54 PM**

Psyshare have you tried refluxing with ammonia to break up the copper-amine complexes?
I have ammonia solution 33% SG 0.88, as its aqueous it will be ammonium hydroxide, stronger than household ammonia for cleaning, the water content is immaterial as it's followed by steam distillation after basification with 40% NaOH.
I'm using 16%-mol Copper chloride dihydrate (CuCl2.2H2O) per mole of P2NP, so am adding a slight excess of 4x amount of ammonia to break up the tetra copper complexes. Ammonia was recommended previous within this thread. BTW my CuCl2.2H2O is 97% directly from chem supply .

I quench with a GAA, then distil off everything under 96 degC before refluxing with ammonia then refluxing with NaOH(aq), followed by steam-distillation directly into my 2L sep funnel.

carl do you think yield would be increased by stripping off the IPA etc. after addition and reflux with ammonia rather than before directly after quenching the NaBH4?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **October 17, 2019, 01:14:24 AM**

Try an steam distillation direct after reaction, no need for quenching the remaining NaBH4.

The mixture is basic already from formed NaOH.

First the alc u used comes over but keep that, Maybe at the edge of water alc azeotrope steam distillation worked already and steam at this moment carrying a tiny bit of amine with IT. The just neutalise the distillate. Evoporating mostly, wash with dcm and then evoporate to dryness.

Cheers.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **October 23, 2019, 11:33:30 PM**

Thanks carl for the explanation. There is so much to learn about these color reagents. I will therefore switch solvent to pet ether or DCM, hopefully this won't pick up the copper-ammonia complex.

Steam distillation right away is a good idea, but the alcohol distills off quite quickly - it takes less than hour before I get head temperature of 100 °C. Since I recycle my ethanol, I pour the distillate in the "Used Ethanol" container for later processing.

I am more of a fan of vacuum distillation than steam, but I work at microscale so there are relatively large mechanical losses. I will try external steam distillation next time. Perhaps even using DCM to extract the product. DCM seems to have 2 advantages: forms a bottom layer (convenient extraction), has lower b.p. than pet ether and a constant b.p. since it's not a mixture. On the other hand, it might be harder to put it in good contact with the amine as it is lighter than water.

Okay I will learn more about the copper-ammonia complex and try a separate experiment on breaking the complex. This might be useful to this synthesis.

Is refluxing the basified reaction mixture that important? Does this considerably increase the yield?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **October 25, 2019, 03:25:31 AM**

Found an interesting paper. Copper nanoparticles are formed from NaBH4/CuCl2, supported on activated charcoal, and then reacted with an oxime and additional NaBH4 to yield amines in >90% yield. https://anonym.to/?http://ijsts.shirazu.ac.ir/article_3407_0c89cf089f7cce999fae76eb505f90d0.pdf

It's more steps than a one-pot reaction and more NaBH4, but I wonder if running it like this would make it more reliable, as some members reported inconsistent results on larger scale reactions.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ozymandias** on **October 25, 2019, 10:50:39 AM**

About two weeks ago I found a true otc source of NABH4 in my country. I simply rode my bike (12 KM) to the nearest store that sells the product and bought myself 900gr nabh4 for 60 euro's. Because not much information is available about the purity of the product I extracted a small amount of it with isopropylamine. The product turns out to be 90-93% pure NABH4 and 7-10% of which I am 99% certain NaOH. I did an reaction with this product without purification (but used 10% more as normal) to figure out if the NaOH would react with the P2NP and ruin the reaction. I managed to get a yield of 86% percent (my highest yet)! But what is most interesting is that I found out that after the addition of the nabh4 the solution was crystal clear within 10-20 seconds while normally it always stays at least somewhat cloudy and it takes at least a few minutes longer for everything to be totally dissolved. I think NaOH increases the solubility of nabh4 which may be a helpful for the people who are finding problems with the formation of salts during the reaction. Also the reaction from the addition of copper sulfate was a lot bigger (not uncontrollable or volcano like extreme btw). Maybe someone is willing to try and confirm my findings by adding 7-10% of NaOH in a small run?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hooloovoo** on **October 25, 2019, 12:45:04 PM**

Seems like a pretty good price - what kind of shop was it, as a matter of interest?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **electromancer** on **October 26, 2019, 02:49:03 PM**

Normally it's vital to reflux after basification though that's because it is normally the second part of an AB extraction, and you want to ensure all of the amine's acid salt is converted to the freebase.
In this case, if you quench with an acid then safest to reflux a short time (30 mins depending on rxn size) with ammonia (aq) and then NaOH (aq) to release the freebase amine from any complexes.

Though I am going to test yield gained from going directly from nitro-group reduction, to 30 minute reflux with ~100ml ammonia 33%, and then distill off IPA etc. up to 96 degC, then change receiver flask to 2L sep funnel and connect external steam source to steam distil amine. Add NaCl to saturate aqueous layer in funnel, pushing out any solvated amine.

First time: Extract aqueous phase with 3x diethyl ether (will test combined ether extracts for presence of amine - may not need due to the ionic medium created NaCl saturation)

Dry organic layer by storing over molecular sieves 3A for 12 hours.

In europe it's become custom to buy base (e.g. Dutch paste) rather than the sulphate, it cuts out an extra step for the larger scale manufacturers, the freebase oil is mixed with (crystalline) anhydrous caffeine.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hooloovoo** on **October 26, 2019, 06:26:37 PM**

Are you sure about that 'Dutch base'?

What good would mixing freebase amphetamine with Caffeine do? o_0

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **October 26, 2019, 07:47:23 PM**

Once reflux is finished and the reaction mixture is basified, is it normal for the upper organic layer to be black with particulate matter and the lower aqueous layer to be almost crystal clear? Somehow I was under the impression that the organic layer was supposed to be clear, and the black particulates would settle in the bottom aqueous layer. Even after sitting for hours, it still remained in the organic layer.

Also, is there a trick to washing these fucking black particles off stir bars and flasks? Dilute NaOH and a lot of swirling seems to help but it's still a pain in the ass.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hooloovoo** on **October 26, 2019, 08:39:29 PM**

Maybe try something acidic to wash the equipment?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **October 26, 2019, 09:00:27 PM**

Quote from: Hooloovoo on October 26, 2019, 08:39:29 PM

> Maybe try something acidic to wash the equipment?

That was the first attempt, using dilute HCl. NaOH appears to work a little better.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hooloovoo** on **October 26, 2019, 10:57:18 PM**

Acetone, then?

There's always Piranha Solution if all else fails. 8)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **November 03, 2019, 01:12:19 PM**

This reaction is not as simple as it seems. Second attempt on ~2.5 g beta-3,4,5-trimethoxynitrostyrene also ends in failure. The reaction was ran similar to what is described in the paper. IPA/water/NaBH4 solution completely dissolved and nitrostyrene added with stirring in 7-10 small portions over the course of 30 minutes with no external heating or cooling. The CuCl2 solution (0.2 g CuCl2 in 5 ml 1:1 IPA/water) was added dropwise over the course of about 1 minute with heavy stirring, then refluxed at 80 C for 30 minutes then cooled to room temperature.

Light brown upper layer and clear aqueous layer observed, even before basification, with the black precipitates floating at the interface of the two layers. Filtered precipitates, washed precipitates with small amount of water and IPA. Basified filtrate, separated, extracted 2 x 30 ml IPA while noting that final extraction was nearly clear. Attempted to dry over MgSO4. Made slightly acidic, pH between 6 and 7, with distilled HCl in IPA because H2SO4 was unavilable. Left all liquids to evaporate overnight, only to yield a brown oily mess. A small amount of ugly white precipitate was crashed out by addition of 5-10 ml water while the bulk of the brown oil remained. This makes no sense considering the HCl salt should be very soluble in water. The precipitate may have been the intended HCl salt but at any rate the yield would have been minuscule.

I'm assuming this is related to polymerization. The freebase should be yellow-ish in color while the IPA extracts were honey-brown in color. No melting point of the nitrostyrene has been taken but it has been recrystallized once from methanol or IPA, dried thoroughly, and is vibrantly yellow and finely powdered -- I doubt the failure of the reaction is related to the purity of the starting material.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 03, 2019, 02:00:07 PM**

You added the CuCl2 solution dropwise, thus you did not have a sufficiently high concentration of the copper nanoparticles to affect complete reduction.
You need to add it all at once.
We have seen now several times that the issue of this reaction not working is very, very often only in the rate with which the CuCl2 solution is added.
Your other issue is that you tried to form the HCl salt of mescaline, this often will result in what you have observed when tried directly from the reaction mixture, on undistilled mescaline freebase.
Form the sulfate the next trial instead.
I assure you it will work much better when you keep both these issues in mind.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **November 03, 2019, 02:06:37 PM**

Quote from: carl on November 03, 2019, 02:00:07 PM

> You added the CuCl2 solution dropwise, thus you did not have a sufficiently high concentration of the copper nanoparticles to affect complete reduction.
> You need to add it all at once.
> We have seen now several times that the issue of this reaction not working is very, very often only in the rate with which the CuCl2 solution is added.

I don't see how that would reduce polymerization but I will try adding the CuCl2 in one portion. The flask will have to be very large. On the first attempt of this reaction the CuCl2 was added over the course of 20 seconds, only for it to shoot up the condenser.

I also noticed in the first trial the black particles were smaller in size and formed a suspension that never settled in the organic layer, even after the addition of base. As such, the particles were filtered after addition of base.

I plan on on running Zn/HCl, as persona has written, as a control experiment. Maybe the nitrostyrene in the issue, but I really doubt it.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**

Post by: **blade_runner** on **November 03, 2019, 03:15:06 PM**

If rapid addition of CuCl2 is so important then why is it not simply added to the initial solution of IPA/water/NaBH4, followed by addition of nitrostyrene in small batches? The original paper shows the procedure working on a very similar nitrostyrene with "careful dropwise addition" of the CuCl2 solution.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 03, 2019, 06:33:04 PM**

Well, you need to reduce the double bond first, otherwise you will probably get the nef reaction going on and end up with trimethoxyphenylacetaldehyde.
But have you seen fastbre4ks adaption of this method, using CuSO4 instead?
Also important, rapid stirring, without good stirring this reaction will not work either.
It is a tricky reaction, but you will get a feeling for it.

And really, make the sulfate of mescaline!

As for the polymerisation, you don't know if this really happened, no?
It is just an assumption, it could be something else instead.

Also, have a look at my experiment making 2C-H, the writeup is in this thread.
You can not really form a good and clean salt from the IPA layer.
Just extract the IPA with acid, distill the IPA off of it, and then base and extract again with another solvent... only then you can expect to get a nice and clean salt!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **November 03, 2019, 08:11:10 PM**

Quote from: carl on November 03, 2019, 06:33:04 PM

> Well, you need to reduce the double bond first, otherwise you will probably get the nef reaction going on and end up with trimethoxyphenylacetaldehyde.
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> Also important, rapid stirring, without good stirring this reaction will not work either.
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> You can not really form a good and clean salt from the IPA layer.
> Just extract the IPA with acid, distill the IPA off of it, and then base and extract again with another solvent... only then you can expect to get a nice and clean salt!

Polymerization was just an assumption. I don't think it was Nef reaction because a previous NaBH4/Zn/HCl reaction formed what I suspect to be the Nef product, a very hard white precipitate, which looked dissimilar to the shitty brown oil that was yielded in the NaBH4/CuCl2 experiment. Or maybe that hard white precipitate was just a nitronate salt, who knows.

Regardless, will have to try it again with very rapid addition of CuCl2 in a large vessel, followed by H2SO4 salt formation. Can the sulfate salt be washed with dry acetone as the HCl salt can?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 03, 2019, 08:22:43 PM**

Hopefully some feds will make an issue where they cover this reaction, so we can stop guessing about the byproducts in this reaction under certain conditions, and we can finally optimise that reaction even more than now :P

And yes, the mescaline sulfate can be washed with acetone too.
You can then recrystallise it into shards using hot water.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **November 06, 2019, 02:54:34 AM**

Quote

> 32 ml 91% IPA and 16 ml of water were added to a 500 ml RBF, followed by 2.93 g NaBH4. Borohydride was completely dissolved with stirring and then 2.44 g beta-nitro-3,4,5-trimethoxystyrene was added in 7-10 small portions over the course of 25-30 minutes with constant and heavy stirring. The side of the flask was rinsed with a small amount of IPA/water after the final portion was added, and allowed to stir for another few minutes.
>
> A dilute solution of 0.19 g CuCl2 to 2.5 ml 91% IPA and 2.5 ml water was prepared and added in a single portion to the flask with rapid stirring. The flask refluxed at 85 C for 30 minutes with external heating. Heating was removed and the mixture was cooled to room temperature.
>
> The mixture was gravity filtered and the black precipitate was washed with a small amount of 1;1 91% IPA/water. Filtrate was made basic with 13 g NaOH in 20 g water. The organic layer was extracted, and the aqueous layer extracted twice more with 2 x 30 ml 91% IPA. Organic extracts were combined, dried over MgSO4, and filtered. The organic extracts, which were colored somewhere between beer and urine, were made acidic to pH = 6 to 7 by dropwise addition of a previously prepared solution of approximately 1 ml 98% H2SO4 in 10 ml 99% IPA. The beaker was placed in a freezer for 2 hours, vacuum filtered, and washed with a small portion of acetone to yield a snow-white amorphous solid with a slight glitter (1.84 g or 58% yield.) No MP taken.

Some thoughts about this reaction. The rate of addition of CuCl2 is apparently very important. In previous trials the CuCl2 was added in (1) two or three portions spaced 10 seconds apart or (2) dropwise via pipette over the course of 1-2 minutes. These both resulted in failure. The successful trial employed addition of CuCl2 in one rapid motion. The stirred reaction mixture immediately turned black and the bottom of the flask was coated in a black solid. After about 10 minutes of reflux at 85 C the black coating on the bottom of the flask broke up and turned into free-flowing solids that whirled about the flask with stirring. I have no idea if this phenomena is important or noteworthy. It's also unclear how the paper obtained good yields with dropwise addition.

The paper reports 71% yield on a substrate very similar to beta-nitro-3,4,5-trimethoxystyrene. It's unclear why yield is so slow compared to the paper.

Also, the sulfate salt is much easier to form than the hydrochloride salt, at least with respect to 3,4,5-trimethoxyphenethylamine. Only consideration is addition of too much acid: excess H2SO4 cannot evaporate, unlike HCl. Maybe pH indicator would be useful here, rather than constant checking against wetted pH strips.

If one is doing this small scale, it's probably a waste of time to attempt recrystallization from water. This was attempted on 1.84 g of "crude" product dissolved in 20 ml boiling water and 20 ml acetone. Recovery was poor due to mechanical losses and yield was brought down to about 40%. The product looked a little more glittery but it did not look impure to begin with.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Bollos** on **November 10, 2019, 06:12:51 PM**

Will it work on 1-(3-indolyl)-2-nitropropene? For example Al/Hg produce a real mess in this case.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 10, 2019, 06:23:09 PM**

I would say yes, since I know of reactions with indole glyoxylic acid ester and NaBH4, which will not reduce the pyrrole ring.
Maybe the copper nanoparticles will though?
Experiment is king, as always.

E: seems you would need cyanoborohydride to reduce the pyrrole ring double bond.
I still don't know about the action of the copper nanoparticles on that double bond.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Bollos** on **November 10, 2019, 09:04:47 PM**

Thanks, gonna try this method on 4-methylphenylnitropropene and 1-(3-indolyl)-2-nitropropene.
By the way, anybody done it in closed vessel, something like stainless steel gas bottle or used fire extinguisher?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 10, 2019, 09:12:43 PM**

Pressure won't do anything good to the reaction in my opinion.
Just do it as usual and choose a very large reaction vessel, similar to an Al/Hg because it is very reactive.
Like, 1/20th reaction volume to flask.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ozymandias** on **November 12, 2019, 04:10:26 PM**

Quote from: Hooloovoo on October 26, 2019, 06:26:37 PM

> Are you sure about that 'Dutch base'?
>
> What good would mixing freebase amphetamine with Caffeine do? o_0

I was a volunteer for several years at the DIMMS (better known in the Netherlands as the

Drugs testcentrum). I have never heard of this “Dutch base”. But then again I stopped working there in 2016. Caffeine was a common cutting agent encountered but not with just base amine. The most encountered alduturating agents where simply solvents in the case of amfetamine. Totally off topic: I tested a sample that should haven been 2c-b but turned out to be 2c-p (It may have been fatal if he ingested 25mg 2c-p)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 12, 2019, 05:03:45 PM**

What solvents are in there? I come across this claim again and again but I cannot imagine any other solvent than water would be common.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **electromancer** on **November 19, 2019, 06:01:32 PM**

Hooloovoo and ozymandias are correct, I was mistaken, the european "base" is the sulphate cut with magnesium stearate and crystalline caffeine. Sorry about that.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **November 22, 2019, 09:07:51 PM**

It seems beneficial to add a little NaOH to the mix as it preserves NaBH4. According to the article attached:

Quote
> At room temperature in 1.0 N NaOH, the degree of hydrolysis is 0.01% NaBH4/h

I think even 0.1M or 0.01M of NaOH is more than enough since the borohydride will be used right away. NaOH is also said to improve solubility of NaBH4.

So I will probably add 1 g of NaOH to the reaction mixture, then follow the standard procedure here (add 1st batch of NaBH4, add P2NP, add 2nd batch of NaBH4, add catalyst, reflux, work-up).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **thewire** on **November 22, 2019, 09:21:40 PM**

Quote from: psyhare on November 22, 2019, 09:07:51 PM

> It seems beneficial to add a little NaOH to the mix as it preserves NaBH4. According to the article attached:
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>> At room temperature in 1.0 N NaOH, the degree of hydrolysis is 0.01% NaBH4/h
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>
> So I will probably add 1 g of NaOH to the reaction mixture, then follow the standard procedure here (add 1st batch of NaBH4, add P2NP, add 2nd batch of NaBH4, add catalyst, reflux, work-up).

As soon as Cu salts hit the reaction media , it will form Cu hydroxides. NaOH in this case acts as catalyst poison, IMO.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **November 22, 2019, 11:08:37 PM**

I see, but doesn't the redox reaction produce NaOH anyway?

In any case, the amount of stabilising NaOH is deficient to the catalyst mole-wise. 0.10 g of NaOH is equivalent to 0.33 g of $CuCl_2$.

I was thinking about the amount that keeps the alcohol-water solution ever so slightly basic, just to prevent significant breakdown of $NaBH_4$ that can occur in acidic/neutral environment.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **November 23, 2019, 01:40:32 AM**

To be honest I don't think it's an issue. You're starting with a very large molar excess of $NaBH_4$. You'll still get large amounts of heat and bubbling if/when you neutralize the post-reaction mixture with acid, indicating that a large excess still remains in solution.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 23, 2019, 02:55:35 AM**

Quote from: blade_runner on November 23, 2019, 01:40:32 AM

> To be honest I don't think it's an issue. You're starting with a very large molar excess of $NaBH_4$. You'll still get large amounts of heat and bubbling if/when you neutralize the post-reaction mixture with acid, indicating that a large excess still remains in solution.

The issue is rather in the amount of copper salt used of course, since we use that in much smaller amounts.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hooloovoo** on **November 23, 2019, 10:39:55 AM**

Quote from: electromancer on November 19, 2019, 06:01:32 PM

> Hooloovoo and ozymandias are correct, I was mistaken, the european "base" is the sulphate cut with magnesium stearate and crystalline caffeine. Sorry about that.

It appears to be one of those things that 'everyone knows'. 8)

Interesting that you mention Magnesium Stearate - it's something you will often see if you're paying attention to a lot of pill excipients and cosmetics. It's used as an agent that prevents clumping and makes powders flow better, and help pills stay together IIRC.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CathCath** on **November 23, 2019, 11:32:32 AM**

Quote from: Hooloovoo on November 23, 2019, 10:39:55 AM

> Quote from: electromancer on November 19, 2019, 06:01:32 PM
>
> > Hooloovoo and ozymandias are correct, I was mistaken, the european "base" is the sulphate cut with magnesium stearate and crystalline caffeine. Sorry about that.
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> Interesting that you mention Magnesium Stearate - it's something you will often see if you're paying attention to a lot of pill excipients and cosmetics. It's used as an agent that prevents clumping and makes powders flow better, and help pills stay together IIRC.

magnesium stearate in amphetamines, its very unusual, this stuff have low solubility and is probalby mistaken for the magnesium sulfate used in combination with caffeine as a cut in amphetamines, the magnesium stearate is a pill lubricant, it dont also makes the pills press better but it also makes them shine like they are of plastic :P

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **November 26, 2019, 12:38:57 AM**

Quote from: blade_runner on November 23, 2019, 01:40:32 AM

> To be honest I don't think it's an issue. You're starting with a very large molar excess of NaBH4. You'll still get large amounts of heat and bubbling if/when you neutralize the post-reaction mixture with acid, indicating that a large excess still remains in solution.

Okay I will thus use just ethanol + deionised water. I will just make sure it is pH-neutral or ever so slightly basic before adding NaBH4.

Quote from: electromancer on October 16, 2019, 03:05:54 PM

> Psyshare have you tried refluxing with ammonia to break up the copper-amine complexes?
> ...
> I'm using 16%-mol Copper chloride dihydrate (CuCl2.2H2O) per mole of P2NP, so am adding a slight excess of 4x amount of ammonia to break up the tetra copper complexes.

How do you calculate the amount of ammonia needed?

I searched the net over and under for the "cu(ii)-amine complex" or "copper-ammine complex" but haven't found much except some elaborate articles.

Apparently, if you add too much ammonia, it will form a new complex that will redissolve in water:

https://chemdemos.uoregon.edu/demos/Copper-Ammonia-Complex (https://chemdemos.uoregon.edu/demos/Copper-Ammonia-Complex)

What I need ideally, is to add just enough ammonia to break the Cu(II)-amine complex, then just enough NaOH to precipitate all the copper as Cu(OH)2, filter the mixture to get rid of the toxic copper, then acidify, distill, basify, steam-distill OR extract.

BTW instead of steam distillation, I plan the wash the acidified mixture with DCM, then basify, then extract with DCM. Hopefully this will get rid of the bulk of impurities that make vacuum distillation of the amine difficult...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **electromancer** on **December 01, 2019, 08:39:27 AM**

In my 0.25 mole rxn:

Added 16 mol% of CuCl2.2H2O

After quench of NaBH4 and ensuring amine in aqueous phase by reducing pH=3 with addition of 50ml HCl 35%
Stripped off IPA.

Then added 4 times amount of ammonia ie. 4 * 0.16 = 0.64 mol * 0.25 mol rxn * 17.04 g/mol = 2.7g
Using 33% ammonia solution i added 3 * 2.7 = 8.1g or approx 9.3ml (SG0.88).

The ammonia reacts with/removes the black tetra-copper complexes on the RBF sides, releasing product amine and forming a green translucent solution that then becomes murky green.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **December 01, 2019, 09:14:44 AM**

Quote from: psyhare on November 26, 2019, 12:38:57 AM

> I searched the net over and under for the "cu(ii)-amine complex" or "copper-ammine complex" but haven't found much except some elaborate articles.

I remember reading years ago that refluxing in 10% NaOH aqueous solution breaks copper-amine complexes..... And was sure I had saved that tiny, random snippet of information to my hard drive like I usually would...... For some unknown reason, this fact is embedded in my brain but I cannot prove it..... I have searched over and over again, up and down all my drives and alll around the Interweb and I cannot re-find this piece of information.

Does it sound familiar to anyone.....?

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hooloovoo** on **December 01, 2019, 11:43:25 AM**

Does Copper form complexes with all amines, or lots of different ones, anyway?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **December 01, 2019, 02:27:59 PM**

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https://anonym.to/?https://en.wikipedia.org/wiki/Metal_ammine_complex

I've read that they can be destroyed with base but I can't find any authoritative sources. They will, for example, break the zinc-amine complex to an appreciable extent when reducing nitrostyrenes to amines with Zn/HCl, as NaOH is used to form the freebase amine for extraction.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 01, 2019, 02:54:15 PM**

See, that is the reason us steam distillers get a higher yield than you do.
There is a reason for that.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **December 01, 2019, 05:06:02 PM**

Quote from: carl on December 01, 2019, 02:54:15 PM

> See, that is the reason us steam distillers get a higher yield than you do.
> There is a reason for that.

If only all compounds steam distilled with ease. :'(

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **December 01, 2019, 05:07:21 PM**

Hmmm, it all makes sense now...

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **December 10, 2019, 02:50:35 AM**

Today I tried to remove copper from the spent reaction mixture (after the volatile organics have been steam-distilled).

If I understand correctly, most of the copper turns into insoluble boride (the black stuff) and the rest stays dissolved in the +2 state, right?

So I filter the spent rxn to remove borides and insoluble waste. The rest is greenish, strongly basic liquid.

My heavy metal test strip says there is still > 1 000 ppb of Cu(II) ions so I want to precip. the copper. I tried to:

- add Na2CO3 (to precipitate basic copper carbonate), no reaction
- add Na2S (to precipitate copper sulfide) - the soln. darkened but no precipitation
- add H2O2 (to ensure copper is oxidised to Cu(II)) - some fizzing occurs, but no further reaction

I am perplexed... The last thing missing to make this rxn perfectly environmentally friendly is to remove the copper catalyst and make the spect mixture flush-able.

Perhaps the catalyst is too dilute (less than say 5 g/L) so maybe it makes more sense to first concentrate the mixture (e.g. after the steam distillation - just continue heating the mixture to distill most of the water), then either precipitate the now concentrated copper OR let it residue dry on a place and dispose as dry waste (perhaps incinerate, reclaim copper, before disposal).

...wow thinking about it, there reaction is a reducing reaction, so the copper is likely in +1 state, not +2. So the addition of H2O2 is perhaps necessary before precipitating the copper (as a carbonate or sulfide).

Any advice, please?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **December 10, 2019, 04:33:36 AM**

...and one more idea. Why not to prepare copper boride beforehand by reacting NaBH4(aq.) with Cu(II)(aq.), then filtering off and washing the powder.

This has an advantage of getting rid of any solvated copper in the reaction mixture (easier cleanup/disposal) and better stoichiometry as we don't use up borohydride for boride formation. All borohydride is used just for the reduction.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **December 10, 2019, 06:15:43 AM**

Correct me if I am wrong but the whole idea of the order of addition is to reduce the double bond first with the NaBH4, followed by the reduction of the nitro group with NaBH4 catalyzed by copper nanoparticles produced by the reduction of the copper salt with borohydride.

Now it's possible that copper boride is involved somewhere, but doesn't Vulgaricum say he got it to work with nickel acetate using these exact same conditions, when we all know the old pre-formed nickel boride reduction on P2NP doesn't work..... Or at least poorly.

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **December 11, 2019, 10:12:08 PM**

Thanks for clarifying that.

What about the cleanup? It seems practically all the copper is in the form of insoluble boride after the rxn, with some minute amounts floating in the rxn mixture... unfortunately, it does not precipitate by the addition of either sodium carbonate or even sodium sulfide.

My heavy metal test strip shows there is still a strong copper contamination (unfortunately the amount is beyond the range of the test strip). So I took the solids from the spent rxn mixture, mixed with excess ammonia and got a deep blue copper-ammonia complex. Upon addition of sodium sulfide, considerable amounts of copper gets precipitated, so it seems there is still a lot in the mixture.

I would really like to reduce the Cu(II) concentration below - say - 200 ppb since I really don't want to flush harmful heavy metals down the drain...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **December 11, 2019, 11:31:22 PM**

The copper nanoparticles can be formed separately, see my post here https://www.thevespiary.org/talk/index.php?topic=15090.msg54186661#msg54186661

What is your goal? To simply capture all dissolved and undissolved copper in a non-aqueous form? Then why not evaporate your waste and deal with the copper solids in that way?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **December 12, 2019, 06:23:32 AM**

Quote from: blade_runner on December 11, 2019, 11:31:22 PM

> The copper nanoparticles can be formed separately, see my post here https://www.thevespiary.org/talk/index.php?topic=15090.msg54186661#msg54186661
>
> What is your goal? To simply capture all dissolved and undissolved copper in a non-aqueous form? Then why not evaporate your waste and deal with the copper solids in that way?

Oh I missed your post. I downloaded the article and will experiment with the Cu catalyst made separately.

Quote from: blade_runner on December 11, 2019, 11:31:22 PM

> What is your goal? To simply capture all dissolved and undissolved copper in a non-aqueous form? Then why not evaporate your waste and deal with the copper solids in that way?

The goal is simply environmentally responsible waste disposal. I hope majority of people here don't pour everything down the drain.

Boiling off liters of water is time-consuming and takes a lot of energy - it's still an option as I end up with 400-600 mL of waste water (most is removed in the process of internal steam distillation), so it's not a big deal at the moment. I plan to scale up so then it will become several liters of waste water per batch. Natural evaporation is an option, too, but works only in summer months.

Professional labs use waste disposal facilities - but this is of course not a option for a an amateur clandestine chemist.

According to EPA, the acceptable Cu concetration in drinking water is 1.3 ppm, or approx. 1.3 mg/L. I think this is easily achievable by precipitating copper as sulfide. Adsorption with activated charcoal or reverse osmosis are said to be effective, too.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **electromancer** on **December 18, 2019, 05:15:02 AM**

I found that addition of ammonia solution before basification, when gently heated with temperature kept well below reflux with magnetic stirring, caused the black deposits on the sides of the reactor/rbf to go back in to solution as a transparent green solution becoming murky green mixtures just prior to basification before steam distillation. I assume it's the copper nano particles and copper tetra amine complexes being broken up by the ammonia either replacing the product amine in the complexes or more likely the fact that it is an alkali that breaks up the complexes.

Regardless, this stage removes the black encrusted deposits from the sides, then after you have distilled all the product amine out of the reaction mixture, you should pour the remaining reaction medium into your waste storage while it's still hot from the steam distillation. If it cools even slightly it will form a tough plastic like solid. Once you have poured most of it away, allow rbf to cool before rinsing with acetone.

Your glassware should now be clean.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **electromancer** on **December 18, 2019, 05:24:22 AM**

Tsathoggua you mentioned a flowery like smell to your product amine, I noticed the same from the reduction of p2np.
I received approximately 73% yield from a 0.3 mole reaction, however the testers all reported a clean euphoria, but it's strength was approximately 1/4 of the usual pink amphetamine sulphate paste they were used too.

Has anyone else noticed a reduced potency? Anyone have any ideas why?

Someone suggested it needed time.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 18, 2019, 06:04:03 PM**

Quote from: electromancer on December 18, 2019, 05:24:22 AM

> Tsathoggua you mentioned a flowery like smell to your product amine, I noticed the same from the reduction of p2np.
> I received approximately 73% yield from a 0.3 mole reaction, however the testers all reported a clean euphoria, but it's strength was approximately 1/4 of the usual pink amphetamine sulphate paste they were used too.

That is simple, the pink crap is full of byproducts, oxime, whatnot, they are used to the shitty feeling these byproducts give and perceive the purer stuff due to the cleaner effects as less potent.
They are used to feeling somewhat wasted, without these effects of impurities they think the stuff lacks something.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **thewire** on **December 18, 2019, 06:57:57 PM**

There is no way the pink crap kicks harder that the purer amph.
If it does you probably experience toxic reactions from that "dirty" amphetamine.

Who the hell needs that?

Minimum steam distill your shit, for f**k sake. Is it so hard to follow one of the many purifying protocols?
No, it isn't.

off:
It is getting super annoying that over and over again the same questions are asked. Although most questions had been answered multiple times here , UTFSE people.

BTW the red , pink colour is a result of azoxy-, azo- group presence in a byproduct molecule.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 18, 2019, 07:06:20 PM**

Quote from: thewire on December 18, 2019, 06:57:57 PM

> There is no way the pink crap kicks harder that the purer amph.
> If it does you probably experience toxic reactions from that "dirty" amphetamine.
> Who the hell needs that?

Junkies that are used to it need that to think it feels like "real" amphetamine.
They just get wasted more, they don't feel better, but they are usually used to that feeling for years, so the first time they get the real stuff they actually miss these toxic reactions :o
Imagine that! :o

Agreed, it becomes annoying to answer that again and again... I should state UTFSE way more often and not try to be helpful ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hooloovoo** on **December 18, 2019, 10:11:01 PM**

The pink thing is likely a stimulus/response thing IMO - people learn to associate taking the pink stuff with potency and having a good time.

IDK if that should only work when the pink stuff is consistently good gear though, or at least better than any crappy white stuff or 'paste' that's around.

I know that food coloring has been used to give that look to perfectly good white colored product.

Is the pink color generally from when the reaction mixture has been over acidified/not neutralised at some later stage?

Makes literally no sense that pink gear would 'blow away' clean white crystalline product synthed cleanly.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CathCath** on **December 18, 2019, 11:05:29 PM**

> Quote from: Hooloovoo on December 18, 2019, 10:11:01 PM
>
> I know that food coloring has been used to give that look to perfectly good white colored product.

really .... , i have never had any problems with amph purity, therefore if you distill your freebase, you wont have any color problems, your stuff will be white as snow, and really the pink stuff is not more good than the pure, as Carl describes ...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 18, 2019, 11:09:33 PM**

> Quote from: thewire on December 18, 2019, 06:57:57 PM
>
> BTW the red , pink colour is a result of azoxy-, azo- group presence in a byproduct molecule.

This.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hooloovoo** on **December 19, 2019, 12:28:07 AM**

> Quote from: carl on December 18, 2019, 11:09:33 PM
>
> > Quote from: thewire on December 18, 2019, 06:57:57 PM
> >
> > BTW the red , pink colour is a result of azoxy-, azo- group presence in a byproduct molecule.
>
> This.

why tho

Or more appropriately - how?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **electromancer** on **December 19, 2019, 02:00:33 AM**

My amine sulphate has come out as an amorphous white solid, that when allowed to air dry may become a very pale shade of yellow.

I know my product is purer, but i could not work out why the testers were saying it was only 0.25 potency, makes sense that they are used to a product with high neurotoxic effects. Thank you for your responses.

Actually the most experienced tester said he thought the amine from this process had a much cleaner euphoric effect compared to the 'pink' amine sulphate - incorrectly purified over acidified product from a manufacturer only interested in income, not purity of the molecule.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Hooloovoo** on **December 19, 2019, 05:08:14 AM**

'4x the potency' - lol.

They meant weight for weight as well? ;D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **December 20, 2019, 10:39:59 AM**

Quote from: electromancer on December 19, 2019, 02:00:33 AM

> My amine sulphate has come out as an amorphous white solid, that when allowed to air dry may become a very pale shade of yellow.

I've experienced this as well. No loss of quality though.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Bollos** on **December 22, 2019, 03:47:12 PM**

Guys but not every product can be distelled with steam, for example 4-methyl-amphetamine or mescaline or 2C-B

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **December 22, 2019, 04:13:21 PM**

I am sure 4-Me amphetamine can be steamed.
For everything else, see the other workup method I provided here in this thread, for the synthesis of 2C-H.
It is taken from one of the original papers and works well too, it is just more work.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **January 14, 2020, 03:05:46 AM**

Does anyone think this reaction could work just as well in 1:1 water:toluene with TBAB as a phase transfer catalyst? Boiling point wouldn't moderate the reaction temperature as well during the addition of CuCl2 but I don't think it would be too bad?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **January 14, 2020, 04:41:33 PM**

Quote from: electromancer on December 19, 2019, 02:00:33 AM

> My amine sulphate has come out as an amorphous white solid, that when allowed to air dry may become a very pale shade of yellow.
>
> I know my product is purer, but i could not work out why the testers were saying it was only 0.25 potency, makes sense that they are used to a product with high neurotoxic effects. Thank you for your responses.
>
> Actually the most experienced tester said he thought the amine from this process had a much cleaner euphoric effect compared to the 'pink' amine sulphate - incorrectly purified over acidified product from a manufacturer only interested in income, not purity of the molecule.

I have the similar reports - one guy said it was "slower". Some people consume the paste containing many byproducts - maybe the alcohol in the paste speeds up the comeup? Maybe they consume wet amphetamine hydrochloride? Maybe they consume some base with it? All this would increase potency I guess... With amphetamine, the "potency" greatly depends on route of administration and gut acidity (I think).

I vacuum-distill the base even though it has been steam distilled. There is quite a lot of orange-brown residue so the purity increases greatly with distillation.

I also wash the sulfate twice with dry acetone. This removes some colored impurities (pale yellow) and smelly compounds - perhaps unreacted base. After the washing, the powder dries very quickly.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **January 14, 2020, 05:41:01 PM**

Quote from: blade_runner on January 14, 2020, 03:05:46 AM

> Does anyone think this reaction could work just as well in 1:1 water:toluene with TBAB as a phase transfer catalyst? Boiling point wouldn't moderate the reaction temperature as well during the addition of CuCl2 but I don't think it would be too bad?

Should work for the first step to the nitroalkane, but I am not entirely sure if it works likewise well for the CuCl2 addition.
You probably have better results with a high boiling alcohol, like whatever butanol isomer is available to you.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **BakingBrad** on **February 05, 2020, 04:52:37 AM**

Can this reaction be used for md-substituted substrates as well?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **February 05, 2020, 05:23:36 AM**

Quote from: BakingBrad on February 05, 2020, 04:52:37 AM

> Can this reaction be used for md-substituted substrates as well?

Yes, I ran that on MDP2NP and got around 70% yield of MDA with it.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **solipsist1212** on **February 22, 2020, 12:31:14 AM**

Very interesting.

So I tried this experiment, according to the thesis by Simon Jademyr. very interesting, but in the original route, they don't quench the sodium borohydride with acid, they go straight to basification. Unfortunately I followed this route through and my top IPA layer (which btw separated very cleanly from the aqueous) had a lot of black tar and gunk in it. I can take photos later but it was very impure, much worse even than the gunk I get from zinc/HCl (which can be messy). I was wondering does the acid quench help fix this issue?

Also, I have some other questions. If I quench first with acid, can I extract impurities from the IPA layer using toluene or heptane? And also, after acidifying, Should I discard the bottom aqueous layer before or after basifying? Sorry if this sounds dumb, I'm still studying the mechanism of the reaction too btw.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **February 22, 2020, 12:42:47 AM**

If you quench with acid, you simply distill the IPA layer off.
Read the first post in the thread.
If you discard the aqueous layer after acidification and before basification, you're throwing away your product.
Read my 2C-H writeup in this thread, there I do the same workup of the paper you mentioned.
You need to reextract the freebase after you acidified it from the IPA layer of your product of course.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **February 22, 2020, 02:16:47 PM**

Quote from: solipsist1212 on February 22, 2020, 12:31:14 AM

> Very interesting.
>
> So I tried this experiment, according to the thesis by Simon Jademyr. very interesting, but in the original route, they don't quench the sodium borohydride with acid, they go straight to basification. Unfortunately I followed this route through and my top IPA layer (which btw separated very cleanly from the aqueous) had a lot of black tar and gunk in it. I can take photos later but it was very impure, much worse even than the gunk I get from zinc/HCl (which can be messy). I was wondering does the acid quench help fix this issue?
>
> Also, I have some other questions. If I quench first with acid, can I extract impurities from the IPA layer using toluene or heptane? And also, after acidifying, Should I discard the bottom aqueous layer before or after basifying? Sorry if this sounds dumb, I'm still studying the mechanism of the reaction too btw.

Unless your reaction is going much differently than expected, the "black tar and gunk" are the copper borate something something nanoparticles. They do look like small solid flakes, right?

You can't wash or extract IPA with toluene or heptane because they are miscible, regardless of whether or not you quench the unreacted borohydride. Run the reaction as written in the original paper on ScienceMadness. Do not bother quenching. If there are a lot of copper nanoparticles, filter them and wash them thoroughly with IPA/water because the amine will complex, to an extent, with these nanoparticles. Combine all filtrate, make basic, extract with IPA. Dry IPA with MgSO4, make acidic to pKa-2, freeze precipitate, filter, wash, recrystallize.

If your amine can be steam distilled then you could also steam distill it out of your IPA extracts, which would provide better purity. But not all amines can be steam distilled...

You can also do the reaction in ethanol/water -- not methanol/water as it will react with borohydride quite rapidly, especially at elevated temperatures. Water, ethanol, and toluene are usually miscible but the toluene is easily salted out in strongly basic conditions. I believe this is true for DCM and xylene as well. This allows for easy acid/base workup because you don't have to worry about carrying over IPA in your organic extracts, which would fuck up the acid/base workup due to co-solvent effects.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **February 24, 2020, 11:42:16 PM**

Anyone have any thoughts on stability of TMA-6 in post-reaction mixture? Friend is trying to optimize workup and wants to go straight into acid/base without fear of co-solvent effects (extraction of reaction mixture with DCM or toluene will carry over IPA and fuck up the A/B washes.) Assume reaction is completed. Will the amine survive stripping of IPA at atmospheric pressure as is? Or should NaBH4 first be neutralized with GAA or HCl? I realize this might be straightforward with amphetamine or MDA but mescaline derivatives are unusually sensitive and my friend doesn't want to waste his very small amount of TMA-6 nitrostyrene.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **February 26, 2020, 07:26:49 PM**

@blade_runner I have had no problems with TMA but I'm not sure what kind of sensitivity you're talking about. Demethylation?

Different question.. There is a paper about NaBH4/Ni2B reduction of nitro groups* that I think was discussed on this board previously because I've seen it before. Anyways, what bothers me know is the fact that in their experience, Ni2B (or any metal boride if you want to talk about CuB) is inferior when formed in situ compared to the use of it as an additional reagent.
Has anyone ever tried isolating borides and used them in an addition manner?
A method for the preparation is found in the referenced paper. Maybe this helps getting the last % of yield.

* https://sci-hub.se/https://link.springer.com/article/10.1007/s13738-014-0585-5

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **February 28, 2020, 06:12:14 AM**

Quote from: loft on February 26, 2020, 07:26:49 PM

> Has anyone ever tried isolating borides and used them in an addition manner?

I will try and post results. I have just finished reduction of 3,4,5-TMNS with NaBH4/CuCl2, using 50% CuCl2(aq.) which seemed to be too concentrated, harming yield. 25% or less is probably better for calmer reaction.

The preparation seems to be simple (just reacting NaBH4 with metal salt in 2:1 molar ratio, in water). I will use inert gas but I am not sure about storage and shelf life. Hopefully a Wheaton glass jar flushed with argon will suffice.

Here are the catalyst preparations for convenience. The second one is from:

Quote

> KarimKoshteh, M., B. Zeynizadeh, and M. Bagheri. "Selective method for reduction of Oximes to amines in the presence of Cu nanoparticle." Iranian Journal of Science and Technology (Sciences) 39.4 (2015): 527-532.

(http://i.imgur.com/dwOmOJrm.png) (https://imgur.com/dwOmOJr)
(http://i.imgur.com/VBlqDLRm.png) (https://imgur.com/VBlqDLR)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **February 28, 2020, 06:42:15 AM**

Quote from: loft on February 26, 2020, 07:26:49 PM

> Different question.. There is a paper about NaBH4/Ni2B reduction of nitro groups* that I think was discussed on this board previously because I've seen it before.

You know, regarding that method and the reduction of P2NP, somehow no one I talked about this one could ever do it successful on a nitroalkene.
We have a single report about nickel boride on 3,4,5-TMNS working in moderate yield, and another from the hyperlab about a nitrobutene, but thats it.
Many tried on P2NP, no one could get it to work for some reason.
But nickel boride in general is a good reduction system I would usually vouch for, yet it seems to be rather complicated for nitroalkenes, for whatever reason.

What I can report though, is that the nitroalcohol related to P2NP, P2NPol(1-phenyl-2-nitropropan-1-ol), can be reduced in moderate yields with in-situ nickel boride.
I know that from another member who reported success using this method to me.

I've used that myself for a few other applications and it worked well, it seems strange that several experienced people couldn't apply that on P2NP with success?
Even on SM there is no real success story, the one that was posted there turned later out to be an exaggeration("smelled like amine") but without being able to isolate the product.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **February 28, 2020, 09:41:21 AM**

This is odd. Mhh.. we know that CuCl2 works though, I'm very curious about psyhare's results using copper boride :)
Thank you for trying psyhare!
I would have done it myself but for personal reasons I'm currently unable to.

@psyhare: have you read the English wiki article about nickel boride? There seem to be two forms of boride depending on the starting metal salt compound. They differentiate chlorides and acetates IIRC.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **March 04, 2020, 01:35:09 AM**

Quote from: loft on February 28, 2020, 09:41:21 AM

> @psyhare: have you read the English wiki article about nickel boride? There seem to be two forms of boride depending on the starting metal salt compound. They differentiate chlorides and acetates IIRC.

I looked at it, thx. Unfortunately, I have just nickel chloride at hand so I will make Ni(II) acetate some time later...

For now, I would use CuCl2 or CuSO4 instead but it seems elemental copper is produced instead of Cu_2B. The nano copper seems to do the job as well, interesting...

Title: **Re: P2NP to amine with $NaBH_4$-Copper. One pot, no messing with metals or acids.**
Post by: **Bollos** on **March 11, 2020, 07:53:10 AM**

Hello, so this def works on indole compounds(tried on indolenitropropene), but yields are bit on the low side get around 45-50%. Also I don't like partial addition of nitropropene :D, and dumping all it once, like in Al/Hg, is certainly possible but results in very violent reaction, which, I think contribute to yields decrease. What solvent can be used to dissolve nitro and add it via dropping funnel? THF? Toluene?

Title: **Re: P2NP to amine with $NaBH_4$-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 11, 2020, 05:42:23 PM**

Quote from: Bollos on March 11, 2020, 07:53:10 AM

> Hello, so this def works on indole compounds(tried on indolenitropropene)

Nice to hear!
You can probably use an alcohol, if you use toluene then you would need to add a PTC agent, some quaternary ammonium salt.

So I was told the following from a friends friend(thank you!):
Quote

> 75 ml IPrOH + 30ml H_2O were placed in a 500ml rbf. To this, 7.4g of $NaBH_4$ was added. 6.251 grams of recrystallized nitrostyrene were then added spatula full by spatula full, making sure the flask was at palm temperature at all times (ice bath was used to prevent overheating). Mixture was stirred for 20 mins.
>
> After 20 mins, 1.6g of $NaBH_4$ was added and 0.4g of $CuCl_2*H_2O$ in 12ml 50% IPrOH was added in three large pipette-fulls over 15 seconds. The solution immediately turned black after the first addition. The mixture was refluxed for 60 mins-- the drip rate was maintained between 0.3-2 drops per second.
>
> The mixture was allowed to cool to room temperature for an hour. The black solid was filtered off by vacuum. Unfortunately, a dirty frit was used and some reddish impurity was taken up by the alkaline isopropanol. The frit was changed and the remaining liquid was separated from the copper-containing residue. The mixture was basified with 34g of NaOH in 50 ml of water, and the isopropanol was separated from the aqueous layer. The water layer was extracted four times with 35ml IPrOH. During the extraction a metallic-purple tar formed on the interface of the isopropanol and water-- this is probably residue from the dirty frit.
>
> The extracts were combined with the main isopropanol and dried with $MgSO_4$ (the tar adhered to the drying agent). The resulting pumpkin-orange solution was acidified with 10% H_2SO_4 in iPrOH until 2 ml water + 0.5ml solution registered a pH of 5-6. (Somewhat conveniently, the color of the solution changes near the neutral point.) The resulting milky solution was placed in a freezer for 3 hours.
>
> The crystal slurry was filtered on a glass frit. Due to the small size of the crystals, this took about an hour. The product was dried on air overnight: the yield of slightly off-white mescaline sulfate was 4.91g (60%)).
>
> There were significant mechanical losses on the glass frit-- a more aggressive recovery process could probably raise the yield to the mid 60s.

Title: **Re: P2NP to amine with $NaBH_4$-Copper. One pot, no messing with metals or acids.**
Post by: **Bollos** on **March 15, 2020, 02:20:10 PM**

Nitropropenes have very low solubility in alcohols, arent they? Will try with THF or maybe toluene and Tetra-n-butylammonium bromide, how many moles of TBAB should I use? Like 10%? Also ultrasound use seems to improve yields with NiCl2\NaBH4(can't find the article but i certainly read this), anybody tried this with CuCl2\NaBH4?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **March 22, 2020, 06:26:27 PM**

Quote from: carl on March 11, 2020, 05:42:23 PM

> So I was told the following from a friends friend(thank you!):
> Quote
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> > 75 ml IPrOH + 30ml H2O were placed in a 500ml rbf. To this, 7.4g of NaBH4 was added. 6.251 grams of recrystallized nitrostyrene were then added spatula full by spatula full, making sure the flask was at palm temperature at all times (ice bath was used to prevent overheating). Mixture was stirred for 20 mins.
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> >
> > There were significant mechanical losses on the glass frit-- a more aggressive recovery process could probably raise the yield to the mid 60s.

My friend confirms 65% "crude" yield on 3,4,5-TMNS on 5 mmol scale using this style of the reaction. He notes that the reaction mixture looks much cleaner, as the organic extracts were light champagne in appearance. Running the reaction without temperature control during nitrostyrene addition yields honey colored organic extracts. It's unclear whether the second addition of NaBH4 is necessary.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **March 22, 2020, 06:28:16 PM**

Quote from: Bollos on March 15, 2020, 02:20:10 PM

> Nitropropenes have very low solubility in alcohols, arent they? Will try with THF or maybe toluene and Tetra-n-butylammonium bromide, how many moles of TBAB should I use? Like 10%? Also ultrasound use seems to improve yields with NiCl2\NaBH4(can't find the article but i certainly read this), anybody tried this with CuCl2\NaBH4?

Take a look at this (be sure to read the full thread.) https://chemistry.mdma.ch/hiveboard/novel/000426052.html Whether or not TBAB would work -- no idea, and choosing PTCs is somewhat confusing.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **March 25, 2020, 12:59:37 PM**

So I was told the following from a friends friend(thank you!):

Quote

> 75 ml IPrOH + 30ml H2O were placed in a 500ml rbf. To this, 7.4g of NaBH4 was added. 6.251 grams of recrystallized nitrostyrene were then added spatula full by spatula full, making sure the flask was at palm temperature at all times (ice bath was used to prevent overheating). Mixture was stirred for 20 mins.
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>
> There were significant mechanical losses on the glass frit-- a more aggressive recovery process could probably raise the yield to the mid 60s.

[/quote]

I performed this reaction at a larger scale (due to only having access to 10L glassware). I followed every step as precisely as I could yet was only able to get a very small yield. My assumptions, incorrect measurements due to possibly wet and/or un-recrystalized nitrostyrene, perhaps at larger scales a longer reflux time? Also, I may have pushed my H2SO4 addition to a ph lower than 5.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **March 25, 2020, 01:38:13 PM**

Large scale reactions don't seem to do so well -
https://www.thevespiary.org/talk/index.php?topic=15090.msg54183625#msg54183625

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 25, 2020, 01:41:04 PM**

It could of course be the fault of your nitrostyrene which was possibly still dirty.
It doesn't work well/at all with dirty nitrostyrenes.

We don't know though because the informations you gave aren't really detailed.
Try it at a smaller scale to get a feeling for this reaction would be my recommendation.
Glassware isn't costly.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **March 25, 2020, 04:14:40 PM**

So, I did a 1mol run. Kept the 10L in an ice bath due to concern of run away. Vigorous overhead stirring, though I probably could have had it even more so. The NaBH4 addition probably took 30 minutes? Added until there was a very active reaction and temp. spiked. Maintained below 30* the whole time. This was based on reading about possible formation of dimers at higher temps with nitrostyrenes (though I believe Carl noted that the excess of NaBH4 may address this as well?). CuCL2 was added as fast as I could pour it - this was really not a big deal at all. Promptly taken out of ice bath, applied heat and brought to reflux for 1hr. The nitrostyrene I used was formed as the Leminger paper. It came out as a bright yellow powder almost, not at all like the nitrostyrene in PsyShares post. I did NOT recrystallize this batch. The rest of it I did afterwards, it isn't as bright yellow as I would hope but def. far more crystal than powder. After the reflux, I let it sit to room temp. Filtered the copper out, which was a nightmare, base added, separated Isopropyl portions, washed aqueous with more Iso, combined. Titrated H2SO4 in cold IPA until ph5. Did not freeze it right away. Tried to freeze it after initial filtration - on advice from a friend.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 25, 2020, 06:45:25 PM**

Then its clear.
The purity of your nitrostyrene was very likely the cause of it.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **March 25, 2020, 07:24:59 PM**

Quote from: sparklebags on March 25, 2020, 04:14:40 PM

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I assume you're talking about 3,4,5-TMNS. Recrystallize from 20-25 ml/g IPA (91% is fine) or methanol. You didn't mention anything about stirring after all nitrostyrene additions. Was it stirred after nitrostyrene reaction and before CuCl2 addition? How long was it stirred? What was the physical appearance? It should be milky white or almost milky white. This indicates the first step (nitrostyrene to nitroethane) is successful.

Second step, addition of CuCl2 and reflux. You're still running it on a very large scale. Probably needs a longer reaction time so it's a good idea to follow it with TLC. Also, at least on the small scale, stirring needs to be very good so as to break up the black solid coating the flask into free-flowing black flakes. Stirring also needs to be good enough to get good mixing because this reaction forms a biphasic solution (IPA/water) even before addition of base.

What color were the IPA extracts? Did you dry them over MgSO4?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **March 25, 2020, 08:39:14 PM**

[/quote]

I assume you're talking about 3,4,5-TMNS. Recrystallize from 20-25 ml/g IPA (91% is fine) or methanol. You didn't mention anything about stirring after all nitrostyrene additions. Was it stirred after nitrostyrene reaction and before CuCl2 addition? How long was it stirred? What was the physical appearance? It should be milky white or almost milky white. This indicates the first step (nitrostyrene to nitroethane) is successful.

Second step, addition of CuCl2 and reflux. You're still running it on a very large scale. Probably needs a longer reaction time so it's a good idea to follow it with TLC. Also, at least on the small scale, stirring needs to be very good so as to break up the black solid coating the flask into free-flowing black flakes. Stirring also needs to be good enough to get good mixing because this reaction forms a biphasic solution (IPA/water) even before addition of base.

What color were the IPA extracts? Did you dry them over MgSO4?
[/quote]

The entire reaction was vigorously stirred during the whole reaction - nonstop - the opening on my 10L is large enough to add reagents while maintaining stirring. I could most likely up the stirring even. Was def. milky white before the CuCl2 addition. CuCL2 went black promptly, once refluxing was fully going, I could see the particles suspended in a somewhat clear upper phase, though overall very dark. IPA extracts came out, orangish, IPA beer colored. I did take it off the stirrer for the base addition - used a hand drill to mix it thoroughly though.

I am thinking the culprits are clean nitrostyrene and lack of reflux time. Perhaps each phase of the reaction needs to be extended? Also, my recrystallized nitrostyrene was done in two batches. One was allowed to slowly crystalize out of boiling methanol - the next day it was filtered and washed with methanol. This batch came out more tan/sparkling. Another batch was added to boiling methanol, promptly placed in an ice bath and filtered fairly quickly thereafter - maybe 5hrs. This last batch is neon yellow/orange. Perhaps the more tan batch is just stained from sitting in the methanol overnight?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 25, 2020, 08:59:38 PM**

You need to recrystallise the nitrostyrene several times until it works with the yields given in this reaction.
Otherwise, forget about it.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **March 25, 2020, 10:32:21 PM**

Really go for that bright yellow color? I have IPA and methanol, is one superior to the other?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **March 25, 2020, 11:24:09 PM**

Quote from: sparklebags on March 25, 2020, 10:32:21 PM

> Really go for that bright yellow color? I have IPA and methanol, is one superior to the other?

Not much difference. If pure, the color will be very bright yellow ("canary yellow") without any hint of darkness or orange tinges. Add boiling solvent and stir until clear, 20-25 ml/g. Gravity filter any solid impurities. Cool to room temperature, then refrigerator temperature, then freezer temperature. Vacuum filter and wash with a small amount of cold water. If cooling was slow enough you should get some small, very fine needles.

If you think there are a lot of aldehyde impurities from unreactated 3,4,5-TMBA then it might be good idea to remove these impurities via the bisulfite adduct before recrystallization.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 25, 2020, 11:56:57 PM**

It has to be bright yellow, because of the presence of a nitro group, that results in certain wavelengths being absorbed and thus it looks yellow when pure and not white. Similar to 2,5-DMNS, that has to be bright orange when pure, it is just their normal colour.

Go for small crystals opposed to growing larger ones, the small ones formed rather quick tend to be purer because they trap less impurities.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **March 26, 2020, 12:34:56 AM**

Sounds good - one batch was neon yellow and small needles. The other (the one that sat overnight) was made of the same crystals just tan in color. I will do another run tonight and report back.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 02, 2020, 01:57:35 AM**

Cleaned up nicely after a methanol recrystallization. I noticed PsyShare used far less solvent than the previously mentioned method, is this possible? Or could that be involved in his lower yields (not to say I got great yields)? I would have guessed his workup and amount of NaBH4 may have had bearing on that, not the solvent volumes.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **April 04, 2020, 01:09:37 PM**

Quote from: sparklebags on April 02, 2020, 01:57:35 AM

> I noticed PsyShare used far less solvent than the previously mentioned method, is this possible? Or could that be involved in his lower yields

I have probably cooled the rxn mixture too much, causing the loss of yield.

At 0.1 mol scale, we will need sth like 0.46 mol NaBH4 (2 x 0.22 mol to react with 0.1 mol P2NP plus 0.02 mol to react with 0.01 mol of catalyst).

That is 17.4 g NaBH4. Given the solubility of NaBH4 in water (25 g / 100 mL), we will need 70 mL water to dissolve that.

Many people seem to use ethanol-water mixture in a 2:1 ratio (weight-wise). That is 66.7 wt% EtOH (74 vol%, 0.87548 g/cm3).

So to dissolve 17.4 g NaBH4, we need ~213 g of 66.7% EtOH (contains 71 g water). That is 244 mL 74 vol% EtOH.

I've calculated amounts of solvent for different writeups here and people sometimes use slightly less than that, e.g. here:
https://www.thevespiary.org/talk/index.php?topic=15090.msg54181723#msg54181723 (https://www.thevespiary.org/talk/index.php?topic=15090.msg54181723#msg54181723)

I would rather use more than less (just to be sure, since we are cooling stuff etc.) and for a good measure. So for 0.1 mol P2NP that is:

146 g (185 mL) EtOH + 73 g(mL) water
i.e.
219 g 66.7 wt% EtOH (= 250 mL 74 vol% EtOH)

For the next experiment (0.4 mol scale), I will therefore use 1 000 mL of solvent (740 mL EtOH + 260 mL water).

0.4 mol scale is what just fits in my 2 L RBF (I've done 0.5 mol in that RBF but that's almost over the top...)

I hope the reasoning behind the solvent amount is at least partially correct :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 04, 2020, 01:50:52 PM**

Awesome! Thanks very much for the detailed explanation :) . I was speaking directly to your successful mescaline synthesis, but this is obviously applicable. Is it fair to say that with the exception of concentration matters, the amount of solvent is primarily a function of solubility and controlling exothermic issues? You ran your mescaline at 30*-60*, I ran mine at 0*-30*, I wonder if that contributed to my yields being low as well.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **April 04, 2020, 03:54:53 PM**

I see.

Of course there are more factors you should take into account, like specific solubility and reactivity of NaBH4 in various alcohol-water mixtures. The solubility is non-trivial depending on mixture composition.

You should also consider solubility of the products and intermediates and how that contributes to driving the reaction etc. etc.

I am still tuning up the 3,4,5-TMNS reduction, I am still far from isolating yield that really corresponds to the true yield. The mechanical losses and losses during workup are too big...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 04, 2020, 04:46:17 PM**

Can you not do the usual steps to ensure that you minimise your mechanical losses?
I mean, I know it is more work and effort to get as much as possible, it consumes time and additional solvents, but at least you get more product out?
I mean, doing additional rinse and washes, trying to get it off of everything that might hold on a few hundred milligrams, etc... I am sure that will give you at least a few additional percent of your yield, you might even find a single issue and get even more?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 04, 2020, 11:35:47 PM**

I am going to attempt another run in the next day or so, is there any consensus on keeping the temperature low? I noticed PsyShare used an ice bath but ran it 30-60*. Carl and BladeRunner posted accounts keeping temps. around body temperature, particularly with 3,4,5 TMNS. Perhaps keeping it close to 0* hindered it?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 05, 2020, 12:09:38 AM**

When I did this on 2,5-DMNS I ran it as hot as possible to be honest, very fast addition of the nitrostyrene, no cooling applied during this, and the CuCl2 was added in a single portion at once with a vigorous reaction.
Still hasn't affected the yield, more like the opposite.

My conclusion would be that temperature control isn't as important as we think it is.
One of the reference papers does it likewise, the one where they reduce substituted

P2NP's and nitrostyrenes, with 2C like aromatic substitutions, they don't cool either and get still yields around 70% both for the amphetamines and phenethylamines.
I guess the idea about trying to keep the reaction cool wasn't as ínfluential on the outcome as we suspected, no?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 05, 2020, 12:20:38 AM**

I am going to attempt it tomorrow without cooling, but keep a bucket of ice water ready at hand. The cleaned up nitrostyrene is much prettier than the previous attempt, looks like PsyShares, so that should be beneficial.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 05, 2020, 02:02:06 AM**

I am sure that was the only really important factor at fault for your yield, the nitrostyrene purity, and your next experiment will confirm my suspicion and result in a better outcome as before.
Whenever this reaction was a failure for me, it was always the nitroalkene, and using the same nitroalkene but fresh recrystallised confirmed it... in one case with a miserable yield, just a single and quick recrystallisation and the yield had almost doubled in the second reduction!

About the temperature, I would even go so far and claim that we will likely see no difference in yield in two reactions both with the same substrate, one added cold and slow, one quick and hot, but otherwise identically carried out.
I believe this is probably related to the nitroalkene always facing a huge excess of borohydride, so that side-reactions(i.e. dimerisation) can not take place. But I'm just guessing.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **April 05, 2020, 09:25:28 AM**

For 3,4,5-TMNS 21% yield was obtained when adding nitroalkene at 10 °C in portions to the NaBH4 suspension, 45 minutes stirring and after CuCl2 addition, 45 minutes at 80 °C water bath temperature. It was one of the first trials though and by far not perfectly executed.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 05, 2020, 01:14:01 PM**

Thats pretty much right where my first experiment went.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **April 06, 2020, 01:08:51 AM**

As for the temp. control: I use an ice water bath sitting below the flask/reactor on a lab jack. When the reaction heats up considerably, I just lift the platform to immerse the flask, wait for the cooldown, lower the platform and continue.

Of course this requires overhead stirring. The poor JJ-1 w. PTFE stirrer and seal work fine.

When adding the nitrostyrene, I just try to keep the reaction lukewarm, not hot, but not too cold. Say 30-40 °C. Then the temperature is manageable after addition of another portion of well powdered nitrostyrene (coffee grinder does a grat job!).

I try to cool it down to room temp. before adding second batch of borohydride and the catalyst. Otherwise it tends to runaway.

Sometimes the rxn is too cold and I heat it up a bit after adding the catalyst - this jump starts the reaction and it heats up itself nicely all the way to boiling/refluxing.

I am about to reduce another batch of 3,4,5-TMNS (approx. 0.1 mol) and this time I will use more solvent and maybe $CuSO_4$ instead of $CuCl_2$? I have a suspicion my $CuCl_2$ is not really clean. Maybe I will use $NiCl_2$ as I have it in reagent grade.

BTW I have made some nickel(II) acetate - maybe this will work great... but I really don't want to f**k up this run as it's the last batch of 3,4,5-TMNS for a long time...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 06, 2020, 03:45:29 PM**

I am unclear on how long to reflux at a larger scale - I am thinking just letting it go 3hrs?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 06, 2020, 10:53:36 PM**

Refluxed 3hrs. Ended up with a fair amount of grey solids in the bottom of the reflux flask. Had vigorous stirring. When filtered, obtained the black particles with an almost cake at bottom of flask. Washed with IPA and set aside. IPA came out pumpkin/orange/reddish color as before. Workup soon to follow. This was on a 1 mole scale.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 07, 2020, 05:56:36 PM**

When forming a sulfate salt, we don't want the ph much lower than 5? Is that even too low? If you overshoot the ph, is it possible to bring it back up? The issue is you could form the bisulfate correct? Also, with the mescaline, I am thinking of letting it crash out in the freezer? It is such a wonderfully fine powder, not sure if there is a way to expedite filtering it. I believe I read somewhere that folks were also reducing the IPA volume via distillation and/or boiling some off before crashing it out?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 07, 2020, 06:25:52 PM**

If you want to crash it out, just add some acetone and filter when cooled.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 07, 2020, 06:51:10 PM**

Acetone to the acidified IPA containing the product?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 07, 2020, 06:54:04 PM**

Dry acetone of course.
Is that method not known to you to precipitate amine salts, maybe from the technique of dual solvent recrystallisations?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 07, 2020, 06:59:18 PM**

No not at all. I have only learned how to gas with HCL and this is my first time forming sulfate salts. I added base to the IPA solution, separated the aqueous layer. Dried the IPA portion. Added 10% H_2SO_4 to the IPA until a ph of 5.5 was achieved. It produced a very fine powder when placed in freezer.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 07, 2020, 07:04:01 PM**

And you never did a dual solvent recrystallisation on the HCl salts produced via gassing?
Dissolution in IPA, and when warm, adding acetone and allowing it to cool?
Salts are usually insoluble in acetone and thus adding it(or ether) to a solution of a salt in alcohol will result in precipitation, or like in your case, will force anything out that may still remains dissolved.
And in case you didn't know this ether, the filtered salt should be washed with cold and dry acetone additionally, directly in the filter even, to remove any acid residue on it and other crap.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 07, 2020, 07:09:06 PM**

I always cleaned with acetone while filtering. So I formed the sulfate salt correctly, there is a layer at the bottom of fine powder. So to this solution just add acetone and allow to cool? Any idea on the amount of acetone in relation to the amount of saturated IPA?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 07, 2020, 07:27:36 PM**

Essentially, you are cleaning it while in solution as well as pushing any product lingering in the alcohol....correct?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 07, 2020, 07:34:06 PM**

That is more like an estimation always when you do this, one needs to get a feeling for this when it is used for a recrystallisation.
But you're just using it to force the salt out of solution, so at least an equal amount up to twice as much, which should be usually enough and sufficient to precipitate everything still left in solution.
I wouldn't be surprised if most of the salt is already out of solution, so in your case an equal amount and sufficient cooling(like -18°C) should probably be enough.

If you are using this for a recrystallisation instead, you warm the least amount of alcohol up until the salt is in solution and add the likewise warm acetone to the alcohol, which is then left to cool as slow as possible to result in nice crystals, but not sure if this works well for ths specific sulfate salt.
It is however a very good method to recrystallise many HCl salts we commonly work with.

Yes, pushing the product out of solution while additionally useful because impurities stay dissolved(or get dissolved) because of the acetone.
When acetone is used, it is important to use dry acetone, as residual water will cause some loss.
In case of HCl salts that were formed with conc. aq. HCl in alcohol, we can use diethyl ether and that would work the same way, but even better, since even the tiny bit of water that was introduced with the HCl will not disturb the precipitation of the salt(Shulgin uses that method a few times in Pihkal).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 07, 2020, 07:40:10 PM**

Awesome! Thanks Carl :). I wonder if adding acetone will help with the formation of crystals vs the powder I am currently dealing with. Like wet baby powder, very tedious to filter. I'll report back.....

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 07, 2020, 08:22:39 PM**

Acetone will not help in the formation of crystals, it will only force them out of the solution and does so quick.
The powder you are getting this way is actually more pure since it is too fine to trap impurities in them.
This is beneficial for the next step, the recrystallisation which will give you the wanted crystals.

For mescaline sulfate, water is the ideal solvent if you want huge crystals, so dissolve it in the least amount of hot water and put it away for a few weeks, this will result in huge and spectacular crystals.
The addition of some acetone seems to be helpful too, but I would take care not to use too much, because this could lead to the crystallisation happening too quick and thus resulting in smaller crystals.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **April 08, 2020, 04:27:35 PM**

Gross yields on a 1mole scale = 70%. Now to clean it up. Lessons learned that may be of value to other newbies. 1st and foremost, clean your starting material many times. There is no need to cool the reaction, though one must be very patient with the NaBH4 addition. It seems to work better adding a portion of the NaBH4, then the nitrostyrene, then the remained of the NaBH4. Use a large enough vessel to add the CuCl2 all at once, it appears to be violent at first, but it really doesn't get out of control at all. I refluxed this for 3hrs, not sure if that is necessary. Adding acetone and cooling seemed to help a lot. Be patient filtering, it is certainly a very fine powder and I have had 1 implosion from not paying attention to the vacuum.

In other news, I know have a bunch of seemingly saturated IPA - not sure what it is saturated with. I think I might concentrate it down to a manageable volume, then distill it over? I know mescaline sulfate - at least from what I have read - is sparingly soluble in IPA, however, at 1 mole scale - that could be worth recovering? Thanks everyone for the direction!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ozymandias** on **April 18, 2020, 11:20:25 PM**

Quote from: sparklebags on April 08, 2020, 04:27:35 PM

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I noticed that the addition of cucl2 creates an initial much vigorous reaction than with copper sulphate. On a 50gr regular p2np scale cucl2 created a vulcano in a 2l rbf while with the sulfate salt it did not.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 18, 2020, 11:39:32 PM**

Quote from: ozymandias on April 18, 2020, 11:20:25 PM

> I noticed that the addition of cucl2 creates an initial much vigorous reaction than with copper sulphate. On a 50gr regular p2np scale cucl2 created a vulcano in a 2l rbf while with the sulfate salt it did not.

And have you also noticed a difference in yield with those salts.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **April 20, 2020, 10:43:13 AM**

I tried both Cu(II) salts without noticing a difference. I can confirm the CuCl2 surely gives more vigorous reaction.

I wonder how acetate salts of Cu and Ni would perform. Nickel(II) acetate is more water soluble, easier to add dissolved in cold water, but copper(II) acetate works perhaps better for P2NP ?

I would try Ni(OAc)2 at least for mescaline. I can also prepare Ni2B, the solid pre-made catalyst, but not sure how that will perform in our EtOH/H2O solvent. It might give less vigorous reaction and perhaps better yields?

Oh I found my CuCl2 contains elemental copper so I will backtrack to using CuSO4 (or the acetate). Using my impure CuCl2 causes formation and precipitation of copper metal (it looks like rusty mud).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **May 03, 2020, 06:26:38 AM**

It was found out that the nitroalkene addition for larger reactions(~15g and more) needs to be carried out under cooling, otherwise the reductions tends to be less reliable and not easily replicated.
This is of no importance in smaller scales of a few grams, just like in the reference too, but more and this will have an impact on the yield.
I'll try to explain, it is really not complex, just very easy to miss out with even some very good chemists overlooking it.

When the nitroalkene is added to the reaction without cooling it will become very warm of course, and the important difference there is, that a larger quantity takes much longer to add than a small one, and this means it will stay very warm for a much longer time.
Long enough to elevate the reaction rate of the borohydride notably, causing it to react with the water and alcohol present.
This doesn't affect the reduction to the nitroalkane thanks to the excess, but will be apparent when the cupric chloride is added, as too much NaBH4 is used up during a temperature peak over a prolonged time.
The reaction is obviously less vigorous than it would be at smaller scales, where the nitroalkene addition was too quick so the temperature peak being way too short to have any impact on the whole reaction.
The nitro group will consequentially not be reduced properly in the first case as it should and results in less product, and this is directly connected to the heat evolving at the start and the time it holds that temperature.
An experiment with identical parameters to earlier reactions, but with additional cooling applied at the start, confirms that theory, as it ran as it should, with a very lively reaction with the CuCl2 and the resulting foaming and bubbling persisting for a good part of the reflux.
Final results proved that it worked well with a good yield obtained just like it should from

the observations of the course of the reaction, and all that while it ran just as reliable and well as would smaller reactions.

So, cooling is important at the start above a certain size, and a flask large enough too, very important as we still have to add the CuCl2 all at once no matter how violent it will be(like the Al/Hg!), and finally increase the reflux time to like 2-3h.
With this in mind a good and realiable running reaction will be no problem in any scale.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Bollos** on **May 03, 2020, 07:03:51 PM**

May be we can use double adding of NaBH4? First portion for first reduction and second for CuCL2 part?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **May 03, 2020, 08:38:12 PM**

Yes, that is an option as well.
It was just to optimise the usual way without changing its parameters that much and without using much more NaBH4 than that.
But a second addition of borohydride does the trick too.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **bubbles** on **May 05, 2020, 06:11:13 AM**

I've performed this reaction on 3,4,5-TMNS several times. When working carefully and with pure reagents I got good yields. Two detailed write-ups and some general notes:

Reagents:
NaBH4 used was around 93% pure, probably stabilized with NaOH.
3,4,5-TMNS was recrystallized 3 times, crunchy crystals. Ground up finely before addition.
CuCl2 was supposedly anhydrous, but not packaged airtight and had picked up H2O. I assumed a bit too much wouldn't hurt, and have assumed it to be the dihydrate in stoichiometry to be sure.

Run 1:
0.2 mole / 47.84 g TMNS
1.2 mole / 45.4 g NaBH4
0.3 mole / 5.114 g CuCl2 in 100ml 50% IPA
575 ml IPA and 230ml H2O

Dissolved all NaBH4 in IPA/H20 in 2000ml flat bottom flask, added ground TMNS slowly. T during addition rose to 37C. RM was cooled with a water bath to 30C, then Cucl2 was added all at once with an addition funnel while stirring with a large triangular magnetic stir bar. Temp rose to 41C. Heating started, refluxed for 90 min, then let cool for 120 min to 33C, and stirring turned off. Vacuum filtered off copper particles, which took over an hour (they were fine, no copper-amine complexes). Separated IPA and extracted water layer once more with IPA. Adding GAA to an aliquot of the water layer did not result in fizzing, meaning all NABH4 had been used up (I forgot to add more before Cucl2 addition

and did not keep temp during TMNS addition low).
IPA was dried with MgSO4 and then neutralized with 20% H2SO4 and placed in freezer.
Crude yield: 40 grams of a fine powder.

Run 2:
Reagents like run 1, but with an additional 0.4 moles NaBH4 added before CuCl2 addition.
All TMNS added at once, resulting in a runaway reaction (fortunately the reaction mixture was directed to my sewer instead of to the ceiling). Not too much was lost.
RM was cooled to 40C, and NaBH4 and then CuCl2 added. T rose to 50C. Refluxed for 90 min. This time there was NABH4 leftover at the end. Copper had clumped to larger 'sticky' aggregates (amine complexes). RM was filtered, extracted twice more with IPA.
IPA dried over MgSO4, then mesc salted with 20% H2SO4.
Crude yield: 39 grams silvery flakes.

Product tasted slightly salty, probably due to salts still dissolved in IPA.
Product from both runs was combined, freebased, extracted with toluene, toluene removed and distilled under reduced pressure. An oil came over at 175C. Yield of mescaline freebase was 53.5g.
This is a **64% yield** on the 0.4 moles 3,4,5-TMNS. Some was scorched, and working a bit more carefully, the yield would probably have been in the lower 70s.

Dissolved the FB in acetone, salted with 20% H2SO4 to yield 65g of a crunchy white powder. This corresponds with the anhydrous hemisulfate (predicted was 66g, but I used an inaccurate scale). It was recrystallized from dH2O into beautiful sparkly white hemisulfate dihydrate needles.

Some observations/thoughts after several more runs:

- IPA has to be clean, it is not okay to reuse it for this reaction after a simple distillation, this can result in the reaction not really taking off when CuCl2 is added and low yield (30%).
- I tried different approaches to NaBH4 quenching, because adding GAA to RM causes copper salts to dissolve into the IPA, and stay dissolved after adding NaOH. Not quenching causes some NaBH4 to stay dissolved in IPA. This will react with MgSO4. Adding GAA to this IPA can be done, but then has to be basified again which is a pain. In the end I found the dissolved copper salts are really not a problem, crystals are still pretty pure. Just quench the RM.
- While nothing got crystals as white as vacuum distillation, purifying by dissolving in ~5ml/g warm dH2O, letting cool to around 60C, then adding acetone till clouding produced good results.
- I used ethanol (denatured) and got a 52% yield. Could just be one of the other variables though..

I got 82% on amphetamine after vacuum distilling (steam distilled stuff is pretty good but I'm a bit of a purity freak).
2c-h 60%, but this was before all the practice on the the 3,4,5-TMNS.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **May 21, 2020, 04:33:28 AM**

Yesterday I found out, that the actual identity of the black precipitate already got settled at the end of last year.

Until then, it was commonly accepted that metals from the copper family(group 11), also from the zinc family(group 12), don't react to boron compounds.
Usually the fine black particles were referred to as Cu nanoparticles.
But that wasn't correct, as it was found out six months ago that copper boride actually DOES exist.
https://arxiv.org/abs/1912.06027

Now, if our black precipitate belongs to the one or other, or more likely, consists of a mixture of both, and if in what proportions?
Well, that will remain a mystery.... :-X
Its interesting anyways.
But its probably partially reduced copper boride adducts, and some fully reduced copper nanoparticles.
And I guess that this could be one of the factors that have a great impact on the reaction.
Maybe you'll get just the one without the other if you drip the copper salt in, opposed to a single and very vigorous addition, and in turn you geht nothing out except nitroalkane?

At least this is a little step towards a better understanding.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **May 22, 2020, 07:09:02 PM**

Quote from: carl on May 03, 2020, 06:26:38 AM

> It was found out that the nitroalkene addition for larger reactions(~15g and more) needs to be carried out under cooling, otherwise the reductions tends to be less reliable and not easily replicated.

This is something I still haven't figured out even after so many runs...

If I use cooling (say, keep rxn in 15-20 degC range), there is a hard white precipitate all over the flask => losing yield.

If I don't cool it so much, the rxn gets too hot => losing yield.

I even used more solvent over what people write here, but still get the precipitate. Some use about 11 mL EtOH per gram P2NP, others use 5 mL IPA per g P2NP... This seems really small amount!

Last time I've used 66 g P2NP, 713 mL EtOH 95% (v/v), 195 mL H2O. The mixture is quite dense after the rxn and I still get the hard white crystalline precipitate even when trying not to cool down to much...

I think the problem is caking of P2NP. I use a coffee grinder and it cakes a lot when placed on a spoon - it's almost impossible to add it as powder, it always falls in in large pieces as it cakes on the spoon.

Maybe I will try to mix it with some neutral anti-caking agent, maybe Celite? NaCl? SiO2? ...

I am even playing with the idea of mixing P2NP with some of the NaBH4 (as dry powders), then add them this way together.

Another idea is to add P2NP in solution, but we know how difficult it is to keep it dissolved - I was thinking about wrapping a PE addition funnel in a tube circulating hot water - or immersing a cold finger in the addition funnel (actually a hot finger :D) ... hmm....

How much solvent do you use per gram P2NP ? EtOH or IPA ? How much water? How to determine correct alcohol:water ratio ? I tried to calculate it but I found **zero** data on CuCl2/CuSO4/P2NP/NaBH4 solubility in IPA/water mixtures.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **May 22, 2020, 07:27:40 PM**

The precipitate are just borate salts, don't worry so much.

Its not caking of the nitroalkene.
You can solve that problem partially by increasing the amount of water.

And I can't tell you the exact amounts of solvent, because I was just told about this, actually we discussed that in length, so we could find the source of that issue.
I find out and then update with the numbers.
E: the solvent quantities exactly like in my writeup for DMNS, since it was also 2C-H that was made with it.

And how you determine the correct ratio? By experimentation of course :)
I mean, the first reaction in there reaction works even in water with a PTC, so you don't need to be afraid of a little bit more water in there.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **May 22, 2020, 07:35:05 PM**

Your posts always cheer me up! :)

Okay I will look up your writeup (is it in Publications? you have so many posts it's hard to find just by search... I will start in Publications)

As for the alcohol:water ratio, I was thinking about some theoretical basis for that. At least for approximating the ratio. I assume the lab worker measures solubilities of each material/product separately (in alcohol, water and mixtures of thereof), then plots these numbers in a multi-dimensional graph to find the sweet spot (optimizes for minimum amount of solvent mixture and minimum amount of water) - than he uses say 110% of that. Sth like that...

My yields are still quite low - 60-70% ... Next time I am going to use 3x re-x'd P2NP, IPA instead of EtOH (worrying about reactivity of alcohol towards NaBH4) and keep temp below 25 degC. Perhaps 10 mL IPA per gram P2NP and 2:1 IPA:water (v:v).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **May 23, 2020, 01:45:00 AM**

Hehe, happy to hear that :)

No the writeup is in this thread, and I followed the original paper closely.

Wait... here: https://www.thevespiary.org/talk/index.php?topic=15090.msg54180723#msg54180723

That friend followed this writeup and got over 80% yield, only with applied cooling at the start, because of his larger scales.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ozymandias** on **May 23, 2020, 01:49:27 AM**

> Quote from: carl on April 18, 2020, 11:39:32 PM
>
> > Quote from: ozymandias on April 18, 2020, 11:20:25 PM
> >
> > > I noticed that the addition of cucl2 creates an initial much vigorous reaction than with copper sulphate. On a 50gr regular p2np scale cucl2 created a vulcano in a 2l rbf while with the sulfate salt it did not.
> >
> > And have you also noticed a difference in yield with those salts.

On the limited evidence available I did not significant differences in yield.But because of better controllability I prever copper sulphate over chloride. The sulphate salt seems to form more consistent nano size particles.I achieved with both salths on on 40 gr p2np yields somewhere between 80 en 84 percent.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **May 24, 2020, 12:47:06 AM**

I can confirm quite consistent results with CuSO4/EtOH (going to try CuSO4/IPA).

This is the first time I got excellent yield. With ~66 g (0.4 mol) P2NP, I got 47 g of amine base out of 54 g possible. My yield was thus **86.9%** (!!) This is however weight of crude distillate in tared flask, it's probably far from pure. Still yield is greatest I got ever. The catch was probably having P2NP free of aldehydes.

I am still thinking about trying Cu(OAc)2 and Ni(OAc)2, with the latter probably just for 3,4,5-TMNS.

Another idea to try at larger scale is repurposing a short reflux condenser into a PE addition funel. When running hot water through the condenser, the P2NP can be kept in solution and added done drop-wise. It may or may not work... It's certainly quite over-engineered...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Zippy** on **May 24, 2020, 03:02:52 AM**

Instead of a heated addition funnel maybe cannulate (transfer under light vacuum using a transfer needle or tube) a warm solution from another heated RBF. Used to use various bores of double tipped SS needles but you could maybe use a small length of teflon tubing or glass if you can't get one of the SS industrial cannulas.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 11, 2020, 06:34:33 PM**

I did a reduction 2-3 days ago, on 25mmol of old unrecrystallised P2NP(it was top quality to begin with though, and then I stored that away for at least 9months).
I decided willingly not to recrystallise it freshly, because it smelled as it should, i.e. almost not at all, and it looked perfect too.
Slightly coarse consistency, 1-2mm, some up to 3mm large crystals, and I used that as it is.
Accidentally I haven't put it in several portions in additionally.... I poured around 3 of the 4g into the flask at once, and after 2sec it reacted vigorously, so I quickly put it in the cold water bath a few minutes... then added the rest of the nitroalkene, I thought fuck it, doesn't matter at this point.

Well, after the usual workup I had 3,8g and some more few mg's dusting around.
I haven't though about that, it seemed ok and I haven't done the math until now.
This corresponds to 81,6% yield, and keep in mind, that P2NP was not only stored away for many months(airtight though), it also was made some additional months before!

A funny anecdote is, that this exact material is responsible for two other +80% writeups on here... must be sprinkled with a portion of fairy dust or such, I don't know.
The chemist who made that knows his nitroalkenes, this can't be just a coincidence or luck, it really has to be connected to the nitroalkene being very good material and thoroughly purifified.
Again, the nitroalkene used was kept as it is, for over a whole year! :o

Lesson learned, purify the stuff with great care and several times, and it will keep just fine, a real surprise and a very welcome one :o

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **June 13, 2020, 08:08:45 PM**

I've run out of EtOH so I tried IPA and this time it f*** up completely :-((The yield was 19.8% :-((

People use 5 mL IPA per gram P2NP, but even with over 10 mL/g, I still get heavy precipitation and lots of white cloudy precipitates during workup, that make it difficult (even after considerable dilution of the aqueous...).

I've also used 5 mL/g water and now thinking about it, it might be too much. People use 0.4 times the volume of IPA, which is 2 mL/g and I probably should have stayed with this amount of water.

I also tried my CuCl2 instead of CuSO4, and this might be last nail in the coffin....

Or perhaps the temperature control... in my last >85% run, I've kept the temperature in the 10-20 degC range, while now it was more like 20-30 degC... (even at these higher temperatures, I got huge white precipitates that almost captured the stirrer paddle and are impossible to scrape off the flask walls. When the precipitate redissolves, the reaction gets pretty wild and vigorous...

I knew the yield might get worse under such sub-optimal conditions, but never THAT MUCH worse...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**

Post by: **carl** on **June 13, 2020, 08:28:26 PM**

That last run, in IPA and with CuCl2 by the way, I simply added some more water without measuring, to dissolve the bit of precipitate I got on the walls.
Actually, that run was quite ghetto-ish, with me working somewhat more according to feeling like cooking food, in english they say offhand(?).
Worked well, I think I got the hang of that reaction quite well, especially for (4F)P2NP I can run that while actually more concentrated on making some food a bit away of the reaction, return three times and once again when I finish that reaction.
And I spend most of my thoughts on the latter, to former just runs itself, almost instinctively ::)

I say, some things aren't critical here and that is water content for example.
The nitroalkene doesn't really go into solution and doesn't need to for a complete reaction.

But I think your borohydride might be old, that it reacts like this?
Maybe contains borate salts or such?
Or maybe you need to experiment some more, use more water, see if it hurts... it doesn't for me, so might solve your issues.
You ever tried another source of borohydride?

I never get any precipitate during workup actually, even the copper particles go mostly in solution.
Really, read the hyperlab thread, and stick to the normal workup if you're going to reduce P2NP.
There was an idiot who overcomplicated it, got told not only once to "do it like karl posted" :D
The steam distillation is a very smart move, can't get much smarter there.

Your precipitates are mysterious really, must be some of your reagents then.
No one else complained about such a difficulty with it, and to think of, that reaction spread around so fast, we would have heard by now if that would be a common issue.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **June 13, 2020, 09:18:09 PM**

It is not the NaBH4 almost certainly, since I've used the same just 2 weeks prior in the good run. There was some precipitate then, but very little.

Also same batch of P2NP.

The reaction went fine and even after the last addition of P2NP, the mixture turned colorless quickly, indicating reduction taking place.

After the addition of 2nd batch of NaBH4 and the catalyst (aqueous CuCl2, ~20% w/v), there is the typical black-foaming-vigorous reaction, the temperature went from 30 to almost 80 degC solely by it's own heat over about 40 minutes. BTW I worked at 0.5 mol scale (~80 g P2NP, 2L RBF).

The precipitate looks like this - it appeared after I washed the aqueous with pet ether twice and after the solution cooled up a bit:

(http://i.imgur.com/3GNectam.jpg) (https://imgur.com/3GNecta)

The blue colour from copper is something that also bothers me. Seems like dilute CuCl2 (unreacted). I also often find metallic copper powder after the reduction and the colored metal compounds get everywhere and I have to clean it up tediously...

I am out of ideas what could went wrong. Maybe I have not cleaned the flask or the stirrer well and left some minimal amount of the catalyst on it?

Perhaps I will try IPA/CuSO4 next time instead of CuCl2. I will also do more cooling, keeping rxg strictly below 20 degC, even after the addition of catalyst, then heat up very slowly and let it reflux for longer time.

Also maybe I was too impatient with the addition and added too much too quickly.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 13, 2020, 09:30:30 PM**

Thats strange.
But don't do what you say in the last sentence.
The reaction with the copper has not only to be quick, but it needs to be vigorous and to heat up quick.
That is really the culprit if both the colour remains as well as the yield being low.

80g in a 2l flask? :o
Thats way too small.
Use at least a 5l flask for a good reaction.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **June 13, 2020, 09:45:17 PM**

Quote from: carl on June 13, 2020, 09:30:30 PM

> The reaction with the copper has not only to be quick, but it needs to be vigorous and to heat up quick.

I see.

Quote from: carl on June 13, 2020, 09:30:30 PM

> 80g in a 2l flask? :o

I know I know... still waiting for bigger glassware. 0.5 mol (80 g) is the bare maximum I am able to do in that flask, sometimes, the frothing goes dangerously close to the top of the flask...

I will do another trial at a smaller scale and see.

Yeah the colour is really strange. Perhaps the borohydride really is old/wetted/degraded (I store it in a plastic jar with screw lid. Perhaps a sealed bottle will be better.

I will titrate my NaBH4 to get some idea about it's purity.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or**

acids.
Post by: **blade_runner** on **June 13, 2020, 11:31:57 PM**

Look at patent US2856274A if you want to try recrystallizing NaBH4. It can also be recrystallized from digylme.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **June 16, 2020, 05:11:44 PM**

Okay I've started a new run with IPA/water, this time keeping temperature low during the first stage of reduction ... and I f**ed up again as I added NaBH4, then aq. CuSO4 to relatively cold solution. I forgot to add NaBH4, then CuSO4 to room temp. or warm solution if I understand correctly (vigorous reaction...) Anyway, I kept it refluxing for an hour or so. The high temps are needed for the production of catalyst rather than the reduction, doesn't it?

Anyway, I will work it up and see...

BTW I've constructed a heated addition funnel that keeps P2NP dissolved in IPA (approx. 5 mL/g) which is added dropwise. This seems to work fine, but I am still working on improvements. Perhaps a better approach will be addition through a Graham condenser running hot water, ended with a capillary tube (cut down Pasteur pipette). This will prevent unwanted crystallization of P2NP.

Actually it seems the whole reaction might work solely in methanol (anhydrous). It is known that methanolic NaBH4 can be stabilized with a very small amount of sodium methoxide.
Furthermore, if P2NP has a reasonable solubility in MeOH at r.t., the drop-wise addition can be even done without heating the PE funnel!
Of course the conditions should be kept anhydrous to prevent sodium methoxide reacting with water. Is there any water generated during the reductions?

I will go experiment more and report back. I still can't get hang of the reaction even after so many trials (maybe I'm not very talented in experimental chemistry :( ) ...
EtOH/CuSO4 is currently what works best for me, but making it work with IPA would be even better.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Bollos** on **June 22, 2020, 12:50:55 PM**

You can try it in toluene or THF(propenes are quite soluble in these) with some phase transfer catalyst perhaps? I think it certainly will work.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **June 23, 2020, 10:55:42 AM**

Orange just made Orange powder into whitish Beige powder.

250ml Roundbottom flask:

2g 2,5-dimethoxynitrostyrene* added portionwise to an mixture of 20g Isopropanol, 20g H2O and 2.79g NaBH4. Temp.: not over 25°C
After Orange color faded this stirred for 20min.

0,15g CuCl2 anhyd. dissolved in 1ml H2O and added in one portion. Then Hotplate: 200-250°C**. for 1h

after cooling 3g NaOH added into the flask without additional H2O.

after that cooling ::) organic layer isolated. repeated extraction with 2x19g Isopropanol. (it's a bit tricky wihout the filtering but its ok)
combine3d organic phases dried over night with 1 teaspoon NaSO4.

decanted, neutralized with normal hardware store hydrochloric acid and boiled down until temp rises over 82°C
filled up with toluene and again distilled until non azeotropic toluene came over.

after cooling 2CH.HCl was visible in the flask, this washed 3 times with an eyeballed amound of Toluene. (Decanted)
then a bit of DCM poured in the flask and the content was poured on an plate. The plate was put on the stirrer and temp.: 100°C for a couple of hours.

scraped off with an razor blade and weighted.: 1.575g in other words - 76.4%

i tried it before with 8g and not so much water. and i received almost no yield..
even now i noticed white sludge on the walls in the roundbottom flask.

i assume with larger scale this could lead to problems.. only test can confirm it.

otherwise Ethanol ll be used and tested. i remember the same problems with p2np back in the day :D and ethanol solved them - literally.

* nitrostyrene : 8.1g aldehyde, 10g nitromethane, 1g butylamine, 0.81g Acetic acid, 10g Isopropanol. - heated a bit and let stood for 30 min.
flask filled with water and then filter. after filter washed with EtOH. dried, and blended in an mixxer to an fine powder. maybe next time after blending another wash with EtOH. but idk if even this is necessary.

yields suck with butylamine btw, better use ethylamine

** first half it was 200°C other 250°C i don't remember anymore.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **June 24, 2020, 08:16:16 PM**

Why is the water so important? The articles I found so far use MeOH/CuCl2 or EtOH/CuSO4 systems. Furthermore the NaBH4 is added to the substrate solution, not the other way around.

Since P2NP can be completely dissolved in MeOH at r.t. (~25 mL/g), I was thinking about simply adding NaBH4 in MeOH dropwise to a stirred solution of P2NP+CuCl2 in MeOH. Alternatively, using EtOH/CuSO4.

This will make the process automated, with no need for grinding the reagents and adding them manually. Note that less solvent can be used simply by adding more P2NP once a batch is consumed.

In the hydrogen generation studies I found, adding NaBH4 to substrate releases way less H2 gas then vice versa, so maybe this will even allow using less reducing agent as more H2 will be utilized (speculating).

As for the CuCl2 - I made a new batch of the catalyst from CuSO4 (via CuCO3) to ensure there is conly Cu(II) and no Cu(I) or other metal that might poison the catalyst (?).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 24, 2020, 10:45:46 PM**

Quote from: psyhare on June 24, 2020, 08:16:16 PM

> Since P2NP can be completely dissolved in MeOH at r.t. (~25 mL/g), I was thinking about simply adding NaBH4 in MeOH dropwise to a stirred solution of P2NP+CuCl2 in MeOH. Alternatively, using EtOH/CuSO4.

If you do it this way, in that order, your yield will decrease even more!
You know why we have to use such an excess of borohydride, that this is due to the michael addition otherwise taking place which will result in dimerisation of the nitroalkene.
If you think of dropping one into the others, then you need to dro the nitroalkene into the borohydride, to ensure that the latter is always in excess.

I really don't understand your issues, I mean, last time I literally dumped almost all the nitroalkene by accident at once(more than three quart of it), and it still worked excellent.
I haven't even bothered with the solvent amounts, to calculate how much would be needed, and how much water respectively to that amount, when I started.
I poured what seemed to me like it would suffice, and same with the water... and I used definitely more than the 0,4eq. in regard to the IPA, even 0,6eq. of water! Yet still, over 80% of amphetamine.
So far, did you try already to use more water, for your precipitate I mean? Maybe it will help with the yield too I speculate, without us knowing its identity, maybe that could be possible?

First you should with priority get a larger flask, because I have a feeling the way you do it, with your scale being actually too much for the size of the flask, it is understandable that you hesitate somewhat to push that reaction fully to the vigorous reaction needed

for a great yield.
And you need it hot and foamy, this is the critical point and you want it as extreme as possible.
The heat is needed for the reduction of course, and somewhat elevated temps(i.e. above RT a bit) will be beneficial for the catalyst production as well... but not much higher with RT being alright, you just don't want it cold because that will be bad.

If you fail at that point with the copper salt addition, it does literally mean you had your only chance but you didn't used it sufficient enough.
And that there is no way that you can make up for this, you can only continue and ensure that at least some yield will be had.

As for poisoning the catalyst... the first time I did not want to wait on an order but try directly and got a piece of copper to make CuCl2 from, and even for that first time I had over 70%, without running into any problem.
I don't think you can poison such a catalyst, thats something I never heard for non-precious metals nor outside hydrogenations.
And we would have heard already if that would be an existing problem too.

In short, I really would recommend to try the reaction like you always do it, and only change the parameters slightly to find the problem.
You will not get something better out if you radically try to change it as much as possible, using a dropping funnel for example, or the like.
First you need to tackle the reaction down, and only then it makes sense to modify, that means if you still have the desire to at that point, for whatever reason that might be.
But if you do it now, you will just have the same looses with a different way to run that reaction.
You will never get the routine in doing it like this, doing never the exactly same reaction twice, but you need that to run it ideally.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **June 25, 2020, 04:29:43 AM**

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it seems the precipitate that random occours is water soluble, so my thoughts are - isopropanol is not so polar and push the salt / wtf this is (maybe borohydride related?) (maybe complex?) out of the fucking solution! And ethanol is more polar than IPA so it's more likely to happen with IPA. And now with more water the result are far better! So maybee try ethanol ? :D

But whats with the solubility in the first part of reduction, the double bond reduction?? may someone ask.

maybee it's even better so! because the nitrostyrene takes a bit more time to dissolve so the rection rate is slowed down + nitrostyrene concentration in the reaction keeps low - that's a plus for that dimer thing.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **June 25, 2020, 11:11:23 AM**

Quote from: carl on June 24, 2020, 10:45:46 PM

> So far, did you try already to use more water, for your precipitate I mean?

Yes and actually **more** precipitate shown up. It seems to be insoluble in water - it is off-white cloudy but crystalline when looking on it close up. But I could be wrong, it's solubility seems to decrease sharply with temperature. The water added was cold and in my previous extractions, there was no precipitate until I did several two washings of the acidified liquor with pet ether, then the precip. appeared all over the place (perhaps when the mother liquour cooled down sufficiently).

Lat time I speculated maybe I should add the catalyst dissolved in alcohol:water instead just water (as in the Ni2B paper, using ethanolic and aqueous nickel(II) made a difference). So I added a little bit of IPA into my conc. aqueous CuSO4 and a **very similar precipitate appeared**!

Perhaps I've just cooled the rxn mixture too much and the CuSO4 have not dissolved, especially in a solvent mixture containing so much IPA.

Last time I kept everything at ~10 degC, then added NaBH4, then catalyst (aq. CuSO4), then heated up very slowly. Now it seems this was a big mistake.

In my previous (and more successful) runs I remember not really caring about cooling that much. This might be the issue. The second step of reduction should be done at r.t. if not hotter.
I one of my good runs I remember even pre-heating the rxn mixture to ~40 degC before adding the catalyst.

Okay I will try EtOH/CuSO4 and IPA/CuCl2 and write down the results. You are right it's wiser to get hang of the reaction first, then scale up and experiment more.

Thanks for explaining the importance of the order of addition.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **June 25, 2020, 11:31:28 PM**

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https://www.thevespiary.org/talk/index.php?topic=15090.msg54190713#msg54190713

This definitely works. It may be ideal to go back to basics as they say. Once you stir and add the CuCl2 as quickly as possible, there's no need to be gentle. Crank up the heating or submerge it into a boiling water bath and heat it rapidly to a gentle/moderate reflux and hold it there. The most critical aspects are rapid addition of CuCl2 and rapid stirring. It seems to contradict the original paper where the CuCl2 was added slowly (maybe even dropwise, I can't remember) but everyone reports poor yields when it's added dropwise.

Also may be worth it to work on a smaller scale. It looks like you're running batches with tens of grams. Cut down to 1-2 grams and run it in a 100 or 250 ml round bottom flask. Some reactions scale up differently.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 26, 2020, 12:28:10 AM**

Also, keep the stirring on high during the copper salt addition, this is very beneficial and important too!
Proven by an experiment, where the experimenter didn't stir at all, the result wasn't a low, but no yield, confirming the need for this.

Quote from: blade_runner on June 25, 2020, 11:31:28 PM

> Some reactions scale up differently.

This is one of those were this is most apparent still.
Everyone reducing 2-3 grams or a little bit more = instant success in very high yields.
But those reducing 20-30g or even more = likely instant failure, maybe somewhat around 50% if they were lucky.

This reaction runs considerably different in a larger scale, and I already put the findings of someone else up in this thread.
If you run this small, you can easily add the nitroalkene very quickly, the majority of the borohydride can stand those few minutes.
And you will easily reach very high yields, at least 70%, always and without running into any problem.

But if you run it large, then you need to cool in the first step, as during the nitroalkene addition the mixture will be heated up for long enough and high enough, that the borohydride will decompose considerably.
Thus, not enough borohydride will be left in the second step, neither for the formation of the copper catalyst and as I assume, as hydrogen source for said catalyst to be able to do its work.
This can not only be compensated with a slow and cold addition in the first step, but also with a second borohydride addition before the second step, as it is proven and documented in this thread here.
It is still somewhat more complicated to get the yields up as high as the smaller reactions always tend to produce.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **June 26, 2020, 08:55:56 PM**

Quote from: blade_runner on June 25, 2020, 11:31:28 PM

> Once you stir and add the CuCl2 as quickly as possible, there's no need to be gentle. Crank up the heating or submerge it into a boiling water bath and heat it rapidly to a gentle/moderate reflux and hold it there.

Do you mean to crank up the heat before or after adding CuCl2?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 26, 2020, 08:58:51 PM**

After, but you can just turn on the heating and directly add the copper salt, and take care its at least warm when you add the salt solution.
Prolong the reflux period to 2-3h for larger batches.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **June 26, 2020, 09:15:05 PM**

Quote from: carl on June 26, 2020, 12:28:10 AM

> Everyone reducing 2-3 grams or a little bit more = instant success in very high yields.

> But those reducing 20-30g or even more = likely instant failure, maybe somewhat around 50% if they were lucky.

That's probably an effect of reduced mass transfer and subsequently inferior mixing leading to reduced dispersion of the copper salt and less effective catalyst particle formation. Stirring a volume of liquid while providing the same amount of mixing energy per volume obviously scales terribly.

Why not pre-form the Cu particles in a separate NaBH4/solvent mix (2), then add that to the P2NP/NaBH4 mix (1)? Has this been tried? Or even the other way around, adding (1) to (2)?

Makes me want to set up an overhead stirrer for a flask with NaBH4/H2O sitting in an ultrasound bath, then slowly or quickly adding CuCl2 solution to form the Cu particles. That might give some interesting results and insights.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **June 26, 2020, 10:13:08 PM**

Quote from: stoichiometric_steve on June 26, 2020, 09:15:05 PM

> Quote from: carl on June 26, 2020, 12:28:10 AM
>
> > Everyone reducing 2-3 grams or a little bit more = instant success in very high yields.
> > But those reducing 20-30g or even more = likely instant failure, maybe somewhat around 50% if they were lucky.
>
> That's probably an effect of reduced mass transfer and subsequently inferior mixing leading to reduced dispersion of the copper salt and less effective catalyst particle formation. Stirring a volume of liquid while providing the same amount of mixing energy per volume obviously scales terribly.
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> Why not pre-form the Cu particles in a separate NaBH4/solvent mix (2), then add that to the P2NP/NaBH4 mix (1)? Has this been tried? Or even the other way around, adding (1) to (2)?
>
> Makes me want to set up an overhead stirrer for a flask with NaBH4/H2O sitting in an ultrasound bath, then slowly or quickly adding CuCl2 solution to form the Cu particles. That might give some interesting results and insights.

I posted a link several pages back where the author formed NaBH4/Cu nanoparticles on an activated charcoal matrix. It might be worth investigating for those who are interested in large scale batches.

To answer your question, add CuCl2 solution as rapidly as possible with intense stirring and then begin heating. No need to worry about being gentle with heating. Crank up mantle to a reasonable level or submerge in a hot water bath and hold at a gentle/moderate reflux. If your stirring is good the black reaction mixture, some of which coats the inside of the RBF as a solid layer, will break into little black flakes that swirl around the bubbling/foaming reaction mixture.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **June 26, 2020, 10:40:59 PM**

Quote from: blade_runner on June 26, 2020, 10:13:08 PM

> I posted a link several pages back where the author formed NaBH4/Cu nanoparticles on an activated charcoal matrix. It might be worth investigating for those who are interested in large scale batches.

I find that paper highly dubious, if not **outright bullshit**. Who really believes that by grinding copper powder with charcoal you can actually deposit copper on it? That's super dumb and probably even grinding the material in a mortar will negatively affect the particle size by clumping them together.

Always, ALWAYS be on your toes when reading through iranian/indian papers. They regularly make shit up to look good, so i've been told by some friends of these nationalities.

For a real Cu on carbon "catalyst", you'd have to add a slurry of Cu salt and carbon to the NaBH4 solution.

Also:

Quote

> The reaction vessel was then connected to the vacuum line, evacuated to ~10-3 Torr and isolated from the diffusion pumps. A water solution of CuCl2·2H2O (0.01 M, 200 ml, 2mmol) was added in ~45s.

So they claim to add an aqueous solution of something under such a strong vacuum, but why and even how? Either the vessel with the solution is separated from the main vessel in which case evacuation is pointless since once the connection is made, water evaporates instantly and breaks the vacuum. If the vessel with the solution is in atmospheric contact with the main vessel, then it will be impossible to create such a strong vacuum unless the aqueous solution is frozen with liquid N2. $^{W}T_{F}$???

On second thought, they probably do it to measure gas evolution. Which is again super dumb because they don't know the exact volume of the apparatus, and at the same time, the volume of gas evolved is also directly dependent on temperature. And, again, the vapour pressure of water from the aqueous solution adds to the volume as well.

That is really the most complicated and dumb method i have seen for this particular measurement.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **June 27, 2020, 01:08:53 AM**

Quote from: stoichiometric_steve on June 26, 2020, 10:40:59 PM

> Quote from: blade_runner on June 26, 2020, 10:13:08 PM
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>
> That is really the most complicated and dumb method i have seen for this particular measurement.

Don't shoot the messenger. :P But yes, points taken.

DOI: 10.1016/S1003-6326(11)61149-7 may be interesting reading material. Chinese journal but may be higher quality study.

Quote

> Abstract: Cu nanoparticles were prepared by reducing Cu2+ ions with NaBH4 in alkaline solution. The effects of NaBH4 concentration and dripping rate on the formation of Cu nanoparticles were studied. The optimum conditions are found to be 0.2 mol/L Cu2+, solution with pH=12, temperature of 313 K and 1% gelatin as dispersant, to which 0.4 mol/L NaBH4 is added at a dripping rate of 50 mL/min. NH3·H2O is found to be the optimal complexant to form the Cu precursor. A series experiments were conducted to study the reaction process at different time points.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **June 27, 2020, 01:52:39 PM**

Quote from: blade_runner on June 27, 2020, 01:08:53 AM

> Don't shoot the messenger.

Sowwiee...i was just really enraged about the low quality of indiranian papers, once again. IT'S FAKE NEWS!!!

Quote from: blade_runner on June 27, 2020, 01:08:53 AM

> DOI: 10.1016/S1003-6326(11)61149-7 may be interesting reading material.

diz teh good shit! Very good and relevant experimental findings here:

1. Keep NaBH4 concentration high: (~8eq.)
2. Add NH3 to Cu solution to around 1 mol/L
3. Add Cu solution quickly
4. Give it 5 minutes to fully form

Makes me think even more that preparing the Cu nanoparticles separately should give much more reproducible results and probably even enables better scaling of the reaction.

What are your thoughts on using this in a PTC system? Might avoid the solubility issues associated with precipitating Boron-Nitroalkane compounds.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**

Post by: **Orange** on **June 27, 2020, 04:29:27 PM**

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so im now @ another one.

2g DMBNS
2.8g NaBH4
20g Ethanol - from 96% hardware store, refluxed with NaOH 24h and then distilled.
20g Water

5 additions in total (of nitroalkene), temp max 25°C and let stirred for 25 minutes

addition of 0.15g $CuCl_2$ anh. in 1-2ml water. One go not slow. (while stirred)

then (hotplate 250°C) heated & stirred for an hour.

after coolin 3.2g NaOH added. organic pahse seperated. extracted 2 x 20g IPA.

combined extracts dried with 2 teaspoons $NaSO_4$ over night.

alcoholic sol. decanted, solids washed with little IPA.

Neutralized with aq. HCl. Formation of NaCl have seen in the flask. (that's and minus for ethanol as solvent. a bit more work.)

most alcohols distilled, toluene added, distilled all water out. - while hot, toluene decanted from NaC, NaCl washed with fresh toluene.

toluene extracted with water. Water solution distilled untill 10-20ml remain.

to be continued.

Aaaand i fucking burnt it.

but

i can confirm.

i didn't have seen any precipitade or white sludge like when i used IPA as solvent (even if it was only a little) in my experiment before.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or**

acids.
Post by: **blade_runner** on **June 27, 2020, 09:17:39 PM**

> Quote from: stoichiometric_steve on June 27, 2020, 01:52:39 PM
>
> > Quote from: blade_runner on June 27, 2020, 01:08:53 AM
> >
> > > Don't shoot the messenger.
> >
> > Sowwiee...i was just really enraged about the low quality of indiranian papers, once again. IT'S FAKE NEWS!!!
> >
> > Quote from: blade_runner on June 27, 2020, 01:08:53 AM
> >
> > > DOI: 10.1016/S1003-6326(11)61149-7 may be interesting reading material.
> >
> > diz teh good shit! Very good and relevant experimental findings here:
> >
> > 1. Keep NaBH4 concentration high: (~8eq.)
> > 2. Add NH3 to Cu solution to around 1 mol/L
> > 3. Add Cu solution quickly
> > 4. Give it 5 minutes to fully form
> >
> > Makes me think even more that preparing the Cu nanoparticles separately should give much more reproducible results and probably even enables better scaling of the reaction.
> >
> > What are your thoughts on using this in a PTC system? Might avoid the solubility issues associated with precipitating Boron-Nitroalkane compounds.

Barium wrote about nitrostyrene reduction (to nitroalkane) with NaBH4 in toluene with PTC. May be a good starting point for experimenters. https://chemistry.mdma.ch/hiveboard/novel/000426052.html :) I imagine biggest challenge, even with PTC, is efficient stirring.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 27, 2020, 10:23:17 PM**

I guess you're talking to the right guy regarding the topic biphasic nitroalkene reductions in presence of a PTC :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **June 28, 2020, 05:12:37 PM**

> Quote from: blade_runner on June 27, 2020, 09:17:39 PM
>
> > Barium wrote about nitrostyrene reduction (to nitroalkane) with NaBH4 in toluene with PTC. May be a good starting point for experimenters.

That's about the ONLY useful and actually working synthesis i've tried out of the many that Barium posted, and i dare say i've thoroughly mastered it.

Would be interesting to see if it works on small scale with an OTC PTC like DDAC (Didecyldimethylammonium chloride, used in laundry disinfectants).

Do you know of refs that describe heterogenous catalytic transfer hydrogenation in a PTC context? I found only homogenous ones with funky Pd complexes that are impractical.

EDIT — This one seems relevant:

Inverse Phase-Transfer Catalysis by Cyclodextrins. Palladium-Catalyzed Reduction of Bromoanisoles with Sodium Formatehxxps://www.journal.csj.jp/doi/10.1246/bcsj.63.176 (http://hxxps://www.journal.csj.jp/doi/10.1246/bcsj.63.176)

Aaaaaand...would you look at that:

Hydrogenation of Azides over Copper Nanoparticle Surface Using Ammonium Formate in Water
hxxps://pubs.acs.org/doi/10.1021/jo200915h (http://hxxps://pubs.acs.org/doi/10.1021/jo200915h)

Just dug up and not read yet, BUT if this is the real deal then Cu nanoparticles can use NH4COOH as a hydrogen source. Since the paper is indian, again...probably bullshit.

Now the double bond reduction of the nitroalkenes needs to be done with something else other than NaBH4, then we have a completely OTC reduction system for nitroalkenes.

Another one on Cu nanoparticles, this time they got them down to 15(!) nanometers:

Novel synthesis of copper nanoparticles: influence of the synthesis conditions on the particle size
hxxps://iopscience.iop.org/article/10.1088/0957-4484/16/12/059 (http://hxxps://iopscience.iop.org/article/10.1088/0957-4484/16/12/059)

Quote from: carl on June 27, 2020, 10:23:17 PM

> I guess you're talking to the right guy regarding the topic biphasic nitroalkene reductions in presence of a PTC :D

Hehe...you know i know my shit ;)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **June 29, 2020, 07:36:09 PM**

Sonication seems to be helpful in reducing particle size:

Quote

> Typically, a sonicated solution of NiCl2 in CH3OH was pre-reduced at rt using 1.0-1.5 equiv NaBH4. After sonicating for 30 min, the first-formed clumps of Ni2B were dispersed as a very finely divided precipitate. Best results ... were obtained using 25 mole percent of catalyst prepared in this fashion, along with 3-3.5 equiv of NaBH4 ...

Source: *Osby, John O., and Bruce Ganem. "Rapid and efficient reduction of aliphatic nitro compounds to amines." Tetrahedron letters 26.52 (1985): 6413-6416.*

BTW Bruce Ganem seems to be the guy who invented "ganem oxidation" (aldehyde synthesis from halides using trimethylamine n-oxide in DMSO)

Heat and STRONG stirring seems to be a poor-man's alternative to get finely divided particles. Using dilute solutions, slow addition and inert atmosphere (N2 will do), should also help.

The cited paper (from 1985 - this stuff is known a loong time...) also mentions that fine division of the boride particles avoids formation of unwanted dimer. It was hypothesized the reduction goes via imine formation (R-NO2 -> R=NH -> R-NH2) and thus the reaction could go this way: R=NH -> R=N-R -> R-NH-R

And again, heat and stirring might help promoting rapid reduction to primary amine over dimerization to a secondary(?) amine.

It should be noted the authors sonicated a suspension of NiCl2.6H2O in methanol, to which they added solid borohydride. *But isn't NiCl2 easily soluble in MeOH?*

They also waited 30 min for the catalyst formation before they added more solvent, substrate, then the second batch of NaBH4.

Perhaps a better approach would be to either use CuCl2, CuSO4 as these are are known to work and perfectly soluble in alcohol/water, or Ni(OAc)2 which is known to form boride particles (from more recent works).

I am now very eager to try using just methanol as solvent - I will definitely try on a micro-scale. With the addition of NaBH4 in MeOH (20-30 mL/g, stabilised w. Na2CO3 or NaOMe perhaps) to a soln. of P2NP in MeOH (~25 mL/g), the reaction could get pretty convenient.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **June 29, 2020, 10:03:25 PM**

Quote from: psyhare on June 29, 2020, 07:36:09 PM

> Sonication seems to be helpful in reducing particle size:

That's not universally true.

Quote from: psyhare on June 29, 2020, 07:36:09 PM

> Heat and STRONG stirring seems to be a poor-man's alternative to get finely divided particles. Using dilute solutions, slow addition and inert atmosphere (N2 will do), should also help.

No. For Cu, quick addition is most important.

Inert atmosphere has no effect on particle size, but on the chemical composition of the product formed.

Quote from: psyhare on June 29, 2020, 07:36:09 PM

> Perhaps a better approach would be to either use CuCl2, CuSO4 as these are are known to work and perfectly soluble in alcohol/water, or Ni(OAc)2 which is known to form boride particles (from more recent works).

Are you aware this thread is not about Nickel boride, Cu does not form borides and is hence quite different? Please keep contributions on topic.

Quote from: psyhare on June 29, 2020, 07:36:09 PM

> With the addition of NaBH4 in MeOH (20-30 mL/g, stabilised w. Na2CO3 or NaOMe perhaps) to a soln. of P2NP in MeOH (~25 mL/g), the reaction could get pretty convenient.

There's nothing particularly convenient about using MeOH in this reduction. Especially not when you're adding reactants in the wrong order.

ANYWAYS, we're onto something:

Glycerol: An Optimal Hydrogen Source for Microwave-Promoted Cu-Catalyzed Transfer Hydrogenation of Nitrobenzene to Aniline
hxxps://www.frontiersin.org/articles/10.3389/fchem.2020.00034/full
(http://hxxps://www.frontiersin.org/articles/10.3389/fchem.2020.00034/full)

Imagine cutting down on NaBH4 a LOT and using cheap as fuck Glycerol as the terminal reducant. Nice.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **maker** on **June 29, 2020, 11:16:40 PM**

I just spent more time than I should reading nearly all of this post/thread, but, and I have had a couple of drinks, but🤔.
There seems to be a ""dunning kruger"" epidemic raving in our community.
I will admit that I am a follower of the dunning kruger insanity, so no disrespect to all of you dumbasses.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 30, 2020, 12:19:39 AM**

Quote from: maker on June 29, 2020, 11:16:40 PM

> I just spent more time than I should reading nearly all of this post/thread, but, and I have had a couple of drinks, but🤔.
> There seems to be a ""dunning kruger"" epidemic raving in our community.
> I will admit that I am a follower of the dunning kruger insanity, so no disrespect to all of you dumbasses.

Well, but adding drivel doesn't help either?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **June 30, 2020, 03:57:25 AM**

Okay I will stick to the topic, my apologize. I was just looking for some solid academic backing for this, but they always use different systems.

As for the chinese article, I've read it more than dozen times, but still can't understand the exact procedure, so far I've written down this:

Solution A (50 mL)
- dissolve 5 g (0.02 mol) CuSO4.5H2O in ~25 mL water
- (*optional*) with stirring, add 2 g (0.12 mol) NH3 in a form of conc. ammonia soln.
- maybe dilute a bit to keep the complex dissolved, but keep soln. below 50 mL
- adjust pH with NaOH/H2SO4 to 10 or 12 (pH 10 gives fast rxn even without NH3, pH 12 gives slow rxn. but gets fast with NH3) - of course use dilute acid/base for the adjustment
- top up to 50 mL with water

Solution B (50 mL)

- dissolve 1.52 g (0.04 mol) NaBH4 in ~25 mL water
- adjust pH the same way as in Solution A
- top up to 50 mL with water

Rxn (100 mL)
- weigh both solutions, dissolve 1% of that weight in gelatin to Solution B *will it dissolve without heat??*
- pour Solution B to Solution A
- heat up the mixture to 313 K (= 40 C / 104 F)
- keep at this temp, stirring (vigorously?), for at least 10 min, *perhaps it is wise to use a pre-heated water bath*
- cool down to r.t., let the precip. settle, decant
- rinse w. water, ethanol, few times (settle+decant after each rinse)
- use either immediately or vacuum-dry at r.t. (few days) for storage

Now in the conclusion, they wrote:

Quote

> The smallest Cu nanoparticles, with an average size of 37 nm, were prepared from a solution containing 0.2 mol/L Cu2+, 0.4 mol/L NaBH4, 1.0% gelatin in mass fraction, and 1.2 mol/L NH3·H2O, at pH 12 and 313 K temperature

So I assume the FINAL solution, after mixing, should have the molar concentrations they've mentioned (not the two solutions each).
Since we are mixing two 50 mL solution, I've double the molarity because they will dilute by the final mixing.

They've wrote little confusing things like in Section 3.3:

Quote

> Gelatin (1.0% in mass fraction) and 1.2 mol/L NH3·H2O were added to 50 mL of 0.2 mol/L CuSO4 (solution A)

...but this will obviously dilute the 50 mL of 0.2M CuSO4 to something below 0.2M, plus the conclustion then won't make sense.

Since they've optimized individual parameters by fixing all the other parameters, I understand they have to deviate from the general procedure in various direction. They seem to simply collected best values from each separate optimization and stated this parameter-value set as optimal. All this assume the parameters are (reasonably) independent.

Please correct me if there are any mistakes in the procedure, I will correct it asap.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **June 30, 2020, 09:10:30 AM**

Quote from: stoichiometric_steve on June 29, 2020, 10:03:25 PM

> Are you aware this thread is not about Nickel boride, Cu does not form borides and is hence quite different? Please keep contributions on topic.

Quote from: carl on May 21, 2020, 04:33:28 AM

> Yesterday I found out, that the actual identity of the black precipitate already got settled at the end of last year.
> Until then, it was commonly accepted that metals from the copper family(group 11), also from the zinc family(group 12), don't react to boron compounds.
> Usually the fine black particles were referred to as Cu nanoparticles.

> But that wasn't correct, as it was found out six months ago that copper boride actually DOES exist.
> https://arxiv.org/abs/1912.06027
>
> Now, if our black precipitate belongs to the one or other, or more likely, consists of a mixture of both, and if in what proportions?
> Well, that will remain a mystery.... :-X
> Its interesting anyways.
> But its probably partially reduced copper boride adducts, and some fully reduced copper nanoparticles.
> And I guess that this could be one of the factors that have a great impact on the reaction.
> Maybe you'll get just the one without the other if you drip the copper salt in, opposed to a single and very vigorous addition, and in turn you geht nothing out except nitroalkane?
>
> At least this is a little step towards a better understanding.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **June 30, 2020, 02:11:45 PM**

---

ok loft, let me rephrase:

Cu does not form borides under conditions relevant or useful to the reactions referred to in this thread.

happy? ;)

Quote from: psyhare on June 30, 2020, 03:57:25 AM

> So I assume the FINAL solution, after mixing, should have the molar concentrations they've mentioned (not the two solutions each).

No, they give the concentrations of the original solutions, not the final mix.

Quote from: psyhare on June 30, 2020, 03:57:25 AM

> They've wrote little confusing things like in Section 3.3:
>
> Quote
>
> > Gelatin (1.0% in mass fraction) and 1.2 mol/L NH3·H2O were added to 50 mL of 0.2 mol/L CuSO4 (solution A)
>
> ...but this will obviously dilute the 50 mL of 0.2M CuSO4 to something below 0.2M, plus the conclustion then won't make sense.

No. You again deduce the opposite of what the authors wrote. Admittedly for a layman, their explanations aren't the most precise, but this isn't a layman's journal.

They give final concentrations of each reactant for each solution before mixing so you don't have to calculate back how much of each reactant to add when scaling to different batch size. What's so difficult about this for you to comprehend?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **June 30, 2020, 05:02:24 PM**

Quote from: stoichiometric_steve on June 30, 2020, 02:11:45 PM

> **ok loft**, let me rephrase:
>
> **Cu does not form borides under conditions relevant or useful to the reactions referred to in this thread.**

> happy? ;)

Better :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Baba_McKensey** on **June 30, 2020, 05:41:08 PM**

The Dunning-Kruger effect is a type of cognitive bias in which people believe that they are smarter and more capable than they really are. Essentially, low ability people do not possess the skills needed to recognize their own incompetence.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **July 01, 2020, 12:26:29 PM**

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yo steve, simple information would have been enough in your comment(s) i think. one does not place the mind of a learner on the level of a knower. It would be wrongdoing, wouldn't it?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **July 01, 2020, 08:21:00 PM**

---

the information in the paper was simple enough to understand as it is.

now with all these irrelevant and dumb replies diluting this thread I'm rapidly losing interest in contributing and sharing, looks like y'all just wanna jerk off to your lame cookery level skills and pretend to be chemists without even trying to really understand the matter.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **atara** on **July 01, 2020, 09:51:13 PM**

"yielded an air-stable copper-like film which based on XRD analysis indicated metallic copper with an average crystallite size of ~30 nm"

Now on the other hand copper **hydrides** have been reported as intermediates when using this reducing system. See Matsumoto and Yonaga 2014, Scheme 2.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **July 03, 2020, 01:16:56 AM**

Quote from: stoichiometric_steve on July 01, 2020, 08:21:00 PM

> the information in the paper was simple enough to understand as it is.

Maybe I am missing something obvious but thanks for not helping :(

I will do an experiment, post a photo-assay, share how it failed and hopefully someone will explain where I made error in the concentrations.

Note that I am regularly doing titrations and preparing standard solutions. So when they simultaneously **dilute** a 0.2M solution and say the final solution is 0.2M, that cannot be both true. Either they used higher Cu2+ concentration in the start (but then the experimental sections don't make sense) **OR** they made typos in the conclusion.

Sorry but mixing two 50 mL solutions where one is 0.2M results in 100 mL of solution that **has to be less** than 0.2M. Yet they concluded the rxn mixture is of 0.2M concentration (w.r.t. Cu2+).

Since the concentrations of ammonia and copper(II) have so much effect on nanoparticle size, I just wanted to be sure I will reproduce it correctly - I don't have a SEM microscope to check it out for myself...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **July 05, 2020, 08:27:33 PM**

Please calm down with that and stop it, it is unnecessary and helps nobody.
I don't wish to see personal attacks like that.
Here we all pull on the same string, so please be more considerate to each other.
You can be mean to others on some of the other forums, I am sure some there even deserve it ;D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **psyhare** on **July 07, 2020, 12:55:46 AM**

Quote from: stoichiometric_steve on June 30, 2020, 02:11:45 PM

> They give final concentrations of each reactant for each solution before mixing so you don't have to calculate back how much of each reactant to add when scaling to different batch size. What's so difficult about this for you to comprehend?

This is what I thought, thanks for the confirmation, that was all I needed to know.

Sure I am just a layman on top of the Mt. Stupid. Sometimes I work too much and study too little, missing important information. I understand it can be irritating when someone repeatedly asks about sth. very basic. But in this case I was not sure really - I wouldn't ask just for fun.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **July 07, 2020, 02:08:46 AM**

Quote from: psyhare on July 07, 2020, 12:55:46 AM

> Quote from: stoichiometric_steve on June 30, 2020, 02:11:45 PM
>
> > They give final concentrations of each reactant for each solution before mixing so you don't have to calculate back how much of each reactant to add when scaling to different batch size. What's so difficult about this for you to comprehend?
>
> This is what I thought, thanks for the confirmation, that was all I needed to know.
>
> Sure I am just a layman on top of the Mt. Stupid. Sometimes I work too much and study too little, missing

> important information. I understand it can be irritating when someone repeatedly asks about sth. very basic. But in this case I was not sure really - I wouldn't ask just for fun.

Don't feel bad, most of us aren't trained chemists (myself included) and academic papers are often dense and difficult to understand. :o

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Bollos** on **July 08, 2020, 12:41:49 PM**

Anybody tried this system for reduction of nitroalcohols?
I made some 1-phenyl-2-nitropropanol and want to get PPA, but without messing with Zinc/HCl or Al/Hg

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **July 08, 2020, 01:08:50 PM**

please try, i always wanted that but never did it, it should work.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **July 08, 2020, 02:00:17 PM**

It does work with nickel boride and good temperature control as I've been told, but with this reduction here it will not work as good.
It is just too hot for the nitroalcohol.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ozymandias** on **July 23, 2020, 10:02:05 PM**

While preparing a batch from 50 gr p2np I decided to try and use a dispersing agent during the addition of the copper sulfate salt. The copper sulfate was dissolved in some water and 15 ml of propylene glycol was added to the copper/water mixture. This solution was quickly added under heavy stirring. I have the impression that the propylene glycol did it's job nicely. Because I broke a beaker while transferring the final product I do not no what the true yield would have been. Luckely most of the product wasn't transferred yet and I ended up with 30.9gr of the monophosphate salt.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **July 23, 2020, 10:08:25 PM**

Thats interesting.
I have some PEG-400 and some 2,5-DMNS that needs to be reduced.
I will try using that the next time to increase the yield.
Thank you for this tip!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or**

acids.
Post by: **carl** on **August 14, 2020, 05:36:13 PM**

I made a strange observation I fail to explain myself.
A very little batch, a bit over a gram of P2NP, was made, and it ran well, only that the reflux was a bit long(1h) and maybe a tad bit too hot.
I smelled the freebase from the condenser, and since it wasn't much to begin with, I thought to acidify directly, and took the warm reaction mixture in a cold waterbath, and first carefully dropped some HCl in, and a few ml's a bit faster, and as expected, the whole flask got foggy on the inside.
After it was cooled down some more, and the fog of amine salt had settled, I set it up for distillation and removed the alcohol and some water as well.

Now for the strange observation I made then: in the receiving flask, I noticed a few little drops of an oil, freebase was impossible was my first thought, so I took a whiff, and apparently it is P2P?
My next thought was, that HCl to the warm post-reaction mix somehow caused a Nef reaction, no idea how that is possible, without a appropriate oxidiser?
I know it can happen with the NaBH4/Zn reduction, when HCl is used instead of ammonium formate.

Damn, I regret that I haven't used acetic acid instead, don't know why I didn't, I only had the thought that at this point the borohydride will be used up anyways so that HCl wouldn't cause a vigorous reaction anymore(and this was right), but that this could possibly happen too, not a single thought went to it.
Never seen that before ever with this reaction.
I hope its less P2P than it appears to be, as I haven't distilled the freebase out yet because of this unexpected turn.

Can someone explain how this could have happened?
I mean, at the point I added the HCl, all the nitroalkane should have reacted to the amine already.
Or has the finala product somehow reacted to the P2P, maybe somehow(its a mystery to me) the acid hydrolysed the amphetamine to P2P, with the CuCl2 that formed from the nanoparticles acting as catalyst for this conversion, similar to the production of P2P from ephedrine?
I am baffled actually.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **August 15, 2020, 01:12:04 AM**

That is interesting. Incomplete reduction seems to be the simplest explanation but who knows?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **August 15, 2020, 01:14:13 AM**

---

its gonna be nitroalkane or p2p i assume, when p2p i assume that its formed from oximes

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or**

acids.
Post by: **carl** on **August 17, 2020, 06:07:48 PM**

You guys know that I have that damn reaction well under control over the meantime.
This time it ran just as ideally as it should, like always.

But it seems that only the premature addition of HCl to the warm post rxn was the cause of the hydrolysis to P2P :o
This is what is disturbing me.
If I would have gone all the way just as usual, I am absolutely certain that I would have gotten a nice yield of over 70% as sulfate salt out.
But at this point neither the nitroalkane nor oxime should have been present anymore.
This is why I don't understand this.
The same nitroalkene gave a very good yield maybe 5 weeks earlier(and at this point, its last recrystallisation and its making have been over a year away).

It is really strange and I can't understand that.
Mechanistically, every hydrolysable intermediate should be long gone.

But!
According to that one method to hydrolyse ephedrine to P2P, they say that metal salts, including Cu(II) salts, are possible catalysts to increase the rate of hydrolysis of imines to ketones, in case of ephedrine.
We might have stumbled upon something useful, I think....
Maybe we can make P2P via Nef just from NaBH4/HCl?

I got in the end less than 150mg of amphetamine sulfate out, just for the record.
The apparently around 750mg of P2P oil were discarded(I was in a hurry, wanted to gift a friend some amp, while having to leave in around 11h, thats why I didn't have done it properly...).
But at least I could isolate some amphetamine sulfate, it was initially quite dirty from P2P residues, but well... getting reactions to completion and the stuff out afterwards, without the crap, that is something I was trained for :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **August 27, 2020, 07:14:55 PM**

As for the above post, it was actually over 170mg of amphetamine sulfate... still a very unwelcome surprise to me :o
The lesson is, don't add much of HCl to a still quite warm post-reaction to quench!
I am sure the amine has already formed, as it ran like it does everytime.
So I doubt it was either the oxime or nitronate that hydrolysed there, of course without knowing for sure.
It was absolutely unexpected and I've never seen this ever before with this reaction.

Also, an interesting side note: do you guys know they call this reduction method now "karls method" at the hyperlab? :o
I mean, of course I feel honoured... but also like a scammer, because this is not my method, I just used it.
And I think they would greatly benefit from some of you guys visiting from time to time there, you can post in english of course and they will understand it.
But most will answer in russian and I am not so convinced of the accuracy of the translations the engines give sometimes.
Here is the respective post on there, please participate if you'd like to!

Here: https://hyperlab.info/inv/index.php?s=&act=ST&f=51&t=32205&st=0
Help our russian friends, they just don't know well enough about our cool discovery to have as much use as we do with it!
After all, bees are bees no matter where they come from, those guys are our brothers and you can see how they have trouble with it yet, albeit being able to get it to work, but they would surely benefit from some good advice from anyone who got this reaction working fine for him.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **callejularbo** on **August 28, 2020, 12:19:47 PM**

Should probably be called the 'Jademyr method' if anything? Method was from his thesis. The older korean paper never reduced nitroalkenes.

No offense Carl, you have certainly contributed and improved it :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **September 08, 2020, 08:08:54 PM**

Quote from: callejularbo on August 28, 2020, 12:19:47 PM

> Should probably be called the 'Jademyr method' if anything

absolutely. i'll ask him if he's even aware of what he's done for the community!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 13, 2020, 12:32:16 AM**

For the microsmall-scale people who need some stash for their own for one weekend only: this reduction works like a charm at a scale of 0,7-0,8g P2NP, with a "huge" excess of borohyride, i.e. like 1,2-1,3g, but of course we need to use an appropriate volume and simply multiply the numbers(5ml IPA/g P2NP, 2ml H2O/g P2NP), depending on the flasks size, and use three or four times as much volume.
The CuCl2*2H2O is actually weighed on a fine milligram scale, so little is needed.
And yet still, after 4-5h, the final steam distilled, neutralised, evaporated, and acetone washed amphetamine sulfate, is ready for use with the well known yield ranging 75-80% :o
Due to the small amount of product, the steam distillation is very quickly over.
The final reflux, due to the small amount of copper, reacts vigorously as it should, but after 20min is already done reacting.
Neutralisation is only done to get it acidic, because every bit of borohydride is used up at this point.

I find this fascinating, and it turns out that this is probably the fastest stimulant synthesis, with an advantageous purity due to the distillative extraction, and little to no effort on the chemist.
Just weighing, then stirring+addition, then addition+reflux, acidification+distillation, and basification+distillation.
From there on, neutralisation+evaporation, and finally the scrape-togetheration+acetone washification :D
Each of those steps takes maybe 5min, never even close to 10min.

It is a fantastic tool, this reduction system.
You couldn't tell that anyone at the hive twenty years ago, they would have called you a liar or nutcase for inventing such an obviously too good to be true method just to brag.
And I know quite a few had the same feeling when that method was posted here first.

Barely anyone has tried it back then, only 2-3 years later I was so lucky to have nothing to do, borohydride and 4F-P2NP on hand, and a piece of copper tubing from the hardware store where I made CuCl2 from... what a breeze, I was astonished!
And the only thing that was important after that was, that I was persistent enough to try it again and again, while reporting on it each time.
So if the russians call that "karls method" again, I want you to remember that the only thing I am really responsible for, is to post again and a again on the same topic until some others catched on in turn.
What I did for this method, was to annoy you all with persistance on the first, second, third, fourth success in a row, and I think then someone else attempted it too, causing an avalanche of interest.
Thats like calling the newspaper after the delivery guy, like: "oh look, Karls newspaper is there this morning!" :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **September 13, 2020, 12:49:18 AM**

Now what are you on tonight? :o ;D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 13, 2020, 12:57:01 AM**

I literally described how I made it above ;)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **September 14, 2020, 09:04:11 PM**

Why not just use even less Nabh4 and grind it together with P2NP in a little bit of EtOH/H2O?

BTW i made fire once by touching Nabh4 with a wet glass rod that had a tiny amount of P2NP on it. That was fucking scary and incredibly stupid of me. It might have actually reduced the P2NP tho... TO FUCKING SHREDS LOL

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 14, 2020, 09:21:44 PM**

Quote from: stoichiometric_steve on September 14, 2020, 09:04:11 PM

> Why not just use even less Nabh4 and grind it together with P2NP in a little bit of EtOH/H2O?

Oh well, because of that:

Quote from: stoichiometric_steve on September 14, 2020, 09:04:11 PM

> BTW i made fire once by touching Nabh4 with a wet glass rod that had a tiny amount of P2NP on it. That was

> fucking scary and incredibly stupid of me. It might have actually reduced the P2NP tho... TO FUCKING SHREDS LOL

I made the mistake once of weighing borohydride on the same paper I weighed P2NP on before... usually I try to avoid such things, like never weighing NBS on a paper that had tosic acid on it, but damn... I felt it getting warm and I was like "oh fuck" and dumped it directly in the designated vessel.

And thats another argument why damn gloves are most of the times not a good idea!
Also, everytime they get wet inside I check for leaks... but with gloves I wouldn't have noticed the paper getting warm.

But oh man, a fire? :o
I can't imagine that actually!
Must have been because of the quantities, I guess... nothing for such a microscale(or whatever you would call it) chemist like me :D
But scary, of course, what a view that must've been :o

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **xdragon** on **September 15, 2020, 05:21:36 AM**

Quote from: carl on September 14, 2020, 09:21:44 PM

> And thats another argument why damn gloves are most of the times not a good idea!
> Also, everytime they get wet inside I check for leaks... but with gloves I wouldn't have noticed the paper getting warm.

The gloves we usually have do nothing against organic solvents, they just stress your skin and open the pores. Gloves which actually work are incredibly expensive and still a one-time-use-only product. Nothing beats proper working technique and washing your hands frequently :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **September 15, 2020, 07:46:16 PM**

It was just a mini fire of at most a few dozen milligrams of P2NP and NaBH4 each reacting on the actual glass rod in funny little undulating lines progressing along the length of the rod, but in direct vicinity of an open beaker with wafting EtOH fumes.

Yeah i see it now, stupid suggestion from me actually with the grinding. Nabh4 and P2NP need to be dissolved anyway so there's really nothing to grind.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 15, 2020, 08:01:53 PM**

Now I actually want to start a P2NP/NaBH4 fire on purpose :o
Outside of course, P2NP fumes are horrible... I had a spill on a hotplate many years ago, so I know :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**

Post by: **stoichiometric_steve** on **September 15, 2020, 09:56:00 PM**

Does Nabh4 react with or dissolve in Mercury? That would be a fun reaction, grind neat Nabh4 and P2NP under a blob of Mercury. Probably reduces the P2NP straight to the amine

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **September 16, 2020, 08:04:26 PM**

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sounds quite dangerous

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 26, 2020, 12:01:04 AM**

Something I strongly recommend anybody who made anything besides amphetamine(and 4-FA) with this reduction, is to try this oxalate shortcut for yourself that I've tested and described.

First, always use IPA for the reduction, and extract the basified postreaction mixture again twice with it.
And then wash the pooled IPA extracts with saturated K_2CO_3 solution, this works almost like brine does for other solvents as it helps to remove water, also it separates very clean fromIPA.
Then dry the IPA, filter and acidify with oxalic acid, an excess ideally, you can even simply sprinkle the solid oxalic acid into the stirred solution.
Then when its all dissolved you cool the now milky solution well down, and when cold suction filter the precipitated oxalate salt out.
The oxalate salt will be sparkling white, demonstrating the special power of oxalic acid - always able to precipitate a clean salt, and this will work even in solutions with a serious lack of purity, oxalic acid makes white and instantly forming salts out of a brown solution with ease.
Don't let it dry completely, transfer it while still a bit wet, or that stuff turns to fine dust particles who spread like a nuisance!
Just put the slightly moist white putty into a beaker and add a bit of hot water to dissolve and suspend the oxalate.

Now to the finals: the oxalate solution is now basified with some lye solution, 10-20% and at RT, until basic enough as your amine requires it.
And then it is extracted with the solvent most suitable for the respective amine(DCM, ether, toluene, one of them will always do), and in the same manner its made to a suitable salt(HCl goes in most cases well, but oxalate in all..).

The end result will be, with much less effort and pretty fast, quicker than anything besides the steam distillation, and that is already pretty close.
Thanks to the oxalic acid, you will end up with a naturally very clean product, and due to the solubility of oxalate salts in cold IPA less mechanical loss, so you will have at least the same yield you would get with the longer workups that take 2-3x as much, and its not unlikely your yields went up a bit thanks to the "shortcut".

Oh, and that works really good for the acidic Al/Hg too, but here including amphetamine.
There you will obviously use the basified solution of oxalate to steam distill the product from.

Any other product is treated just as above.

Its basically an improved, shorter and cleaner working method to purify the IPA-extracts after a reduction, including a pre-purification via oxalate.
So in general just of use for the NaBH4/CuCl2 and the acidic Al/Hg, but for those its highly recommended to use that.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **September 26, 2020, 06:20:07 AM**

Quote from: carl on September 26, 2020, 12:01:04 AM

> Now to the finals: the oxalate solution is now basified with some lye solution, 10-20% and at RT, until basic enough as your amine requires it.
> And then it is extracted with the solvent most suitable for the respective amine(DCM, ether, toluene, one of them will always do), and in the same manner its made to a suitable salt(HCl goes in most cases well, but oxalate in all..).

Is there any reason for coverting the oxalate salt to HCl? Apart from instances where one would want to smoke the substance, which is not reccommended due to carbon monoxide evolution.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **stoichiometric_steve** on **September 26, 2020, 12:12:26 PM**

So that oxalate shortcut does not work for Amphetamine and 4-FA, why?

Even so, oxalate salts should be acceptable for consumption due to the small amounts ingested. Just wash em down with some milk ;)

I'm really quite disappointed overall about the Nabh4/Cu route, it has made all the other routes redundant that i was researching, at least for small scale :(

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **September 26, 2020, 01:13:55 PM**

Quote from: Sawdust and Honey on September 26, 2020, 06:20:07 AM

> Quote from: carl on September 26, 2020, 12:01:04 AM
>
> > Now to the finals: the oxalate solution is now basified with some lye solution, 10-20% and at RT, until basic enough as your amine requires it.
> > And then it is extracted with the solvent most suitable for the respective amine(DCM, ether, toluene, one of them will always do), and in the same manner its made to a suitable salt(HCl goes in most cases well, but oxalate in all..).
>
> Is there any reason for coverting the oxalate salt to HCl? Apart from instances where one would want to smoke the substance, which is not reccommended due to carbon monoxide evolution.

for example, when u produce 2CH and want to brominate it further to 2CB, oxalate salt have an unknown behavior in the reaction and so it's better avoided.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **September 26, 2020, 01:24:39 PM**

This is the reason for forming the oxalate in the first place...

Quote from: carl on September 26, 2020, 12:01:04 AM

> The oxalate salt will be sparkling white, demonstrating the special power of oxalic acid - always able to precipitate a clean salt, and this will work even in solutions with a serious lack of purity, oxalic acid makes white and instantly forming salts out of a brown solution with ease.

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **September 26, 2020, 03:25:31 PM**

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this info is great carl, i forgot about how well the oxalates look and formed. I ll try it for sure to get some amines as pure as possible :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **September 26, 2020, 04:51:54 PM**

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carl did you come up with the idea of forming oxalate salts as a workup step? Never seen this before. Very nice. :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 26, 2020, 05:06:41 PM**

Quote from: Sawdust and Honey on September 26, 2020, 06:20:07 AM

> Is there any reason for coverting the oxalate salt to HCl? Apart from instances where one would want to smoke the substance, which is not reccommended due to carbon monoxide evolution.

Nowhere have I proposed to convert oxalates to HCl directly.
I mean you see that I said to basify the solution first and then take the extracted amine base to convert it to whatever salt is most suitable for your product.
A quick extraction of 2C-H oxalate, taking less than an hour until you start to basify the oxalate, followed by direct extraction of the freebase and HCl formation?
Thats just above circa 2h until you can collect your precipitated HCl salt, and less than 3h when you have your aqueous titrated HCl salt already evaporated.

The same for any of the following for example: TMA(-x), MDA, DMA, mescaline, PMA, some a-ethyl PEA, or absolutely whatever! :o
I am sure we can, using this way, also purify a-MT and a-ET.
Bollos had already made this, although with not so great yields when he reduced indol-3-yl-2-nitropropene(the yield is definitely connected to the nitroalkene, which is harder to purify than normal nitroalkenes), but we can improve this for sure.

Keep in mind that this is a general procedure helpful to improve the isolation of all kinds of amines that can be produced from nitroalkenes here.

They all have the issue that a solvent switch would be time-consuming and suck to do at first after the finished reaction, then the issues with the tiny copper particles floating around in most of them except in IPA, and because IPA is already there and works fine for the extraction, I put that together based on the experiences I made, where I did it as short and quick as is possible, yet responsible.

Quote from: stoichiometric_steve on September 26, 2020, 12:12:26 PM

> So that oxalate shortcut does not work for Amphetamine and 4-FA, why?
>
> Even so, oxalate salts should be acceptable for consumption due to the small amounts ingested. Just wash em down with some milk ;)
>
> I'm really quite disappointed overall about the Nabh4/Cu route, it has made all the other routes redundant that i was researching, at least for small scale :(

What do you want to say here, not really, the NaBH4/CuCl2 works TOO good for you? ;D

Of course it does work for 4-FA and amphetamine too, the thing is just that it is not needed for them as we can distill them straight out of the pot.
For the Al/Hg this method works wonderful for amphetamine as example.
Its not restricted to the others, its just not useful for plain (4F-)amphetamine

Oxalate salts are safe if you drink enough and stay behind 400-600mg oxalic acid a day.
If we would only ingest amphetamine and no fruits or vegetables besides that, it would rather be too much amphetamine as (hemi)oxalate(not anhydrous, I believe its the hydrat not dihydrate?) than oxalic acid.
1g of the anhydrous salt means we would ingest 400mg of oxalic acid, that still acceptable.
If you ask me, then I would be much more worried about what 600mg of amphetamine base do to my kidneys than 400mg of oxalic acid :o
I used 6-methylphenmetrazine and its 2-naphthyl analogue as oxalate salts just fine, I heard the same about phenmetrazine oxalate from others.

We have to keep in mind that oxalic acid totally rocks and that is has unique properties for such a common, cheap and widespread available acid.

Quote from: blade_runner on September 26, 2020, 04:51:54 PM

> carl did you come up with the idea of forming oxalate salts as a workup step? Never seen this before. Very nice. :)

Not my idea actually, Org had casually said years ago that oxalic acid is useful for exactly this, the initial salting from a dirty reaction mixture, and this stuck in my head for years now. :)
We have slowly put that wisdom to use, a few others and me, on other things though.
But since then I am talking about using this here, since the start of this year actually.

And just lately I attempted this to optimise the workup from acidic Al/Hg reductions of nitroalkenes.
It is wonderful direct, reproduceable on repeated attempts, and I am at the same time really happy about it, while also a bit annoyed on myself, I kept talking and talking and "next time I'll try it with oxalic acid", but it took at least a half year until I finally tested it out the way I imagined it.

Actually its the same as the original paper, only that they used HCl in dioxane to precipitate the salt from the IPA extract.
This is just a cheaper way, but works just as simple and direct.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or**

acids.
Post by: **NeonCortex** on **November 01, 2020, 10:55:46 AM**

Tried this reaction now, will report more thouroughly later. For now I am wondering if anyone has had 4-FA appear in the receiving flask (internal steam distillation) as a lower layer? I'd imagine that if anything it's have a density slightly lower than water? Or is it's D same as water but will be lower layer if water is contaminated with some iPrOH?

A side note: Henry rxn with ethanolamine acetate is the fucking shiznit! 88% recrystallized (neat, slightly below RT after initial exothermic reaction (amine+GAA), no stirring, just swinging the beaker a few times).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 01, 2020, 11:30:53 AM**

The lower layer, I mean, even a layer despite the IPA contamination?
My own experience with this doesn't go above very few grams at most in the distillate, but as I remember it behaved just like amphetamine.
Even up to the not quite clear layer resulting in milky turbidity when shaken.

And you have a clearly distinct lower layer, or does it also appear like being somewhat soluble?
Its possible that it for some reason settles at the bottom and not the surface, but I would expect it to be both in that case, if you see something at the bottom, some oil would be at the top too.
Although its density shouldn't be higher as water, it should differ not much from amphetamine's 930mg/ml, I mean the fluorine is just acting like a pseudo hydrogen and not that large.
Could be possible though, it just doesn't seem likely to me.

Which brings me to the conclusion: P2P, which forms a more distinct layer, can settle at the bottom and often does.
Although it does the travelling thing I described, when you got it at the bottom some will still be on top, and when you shake it some drops will float up and others down, as long as only water is present at least, but I'm sure it also can with a little of IPA being present.

How does your distillate smell though?
I know its harder with IPA present to make out the definite smell of the freebase, that will taint your impression.

However, if it isn't freebase solely, you will notice when you acidify and the layer remains.
Then it is very likely 4-fluorophenylacetone, and you can simply extract your acidic distillate with a little bit of DCM, two small portions suffice.
I had that, as reported in this thread, not long ago too, unintentional nef reaction, and was surprised to see an oil in the distillate seated at the bottom.
Happened the first and only time to me actually.

Please update!
I couldn't find the density of 4-FA freebase so this bit will be interesting to know for once, but also in general to hear how it has worked for you :)
In my experience 4-FA acted just like amphetamine with this reduction, likewise high yields and all, it was even the first substrate I tried it on.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **PharmZ** on **November 01, 2020, 11:53:22 AM**

Hi all,

Going on my 4th attempt at this and cannot seem to get it down. Yields have been pathetic and I am unsure where I am going terribly wrong. Forgive me, this is the first writeup I am doing.

Starting with calculations:
800mg p2np (washed 3x w bisulfite and water, plus previous cold methanol wash)
1.1g NaBH4
80mg CuCl2 (used the approximate 1/10th I read in earlier posts)

I did use the 2:1 ratio for IPA/H20, however from reading previous observations about the volume of solvent being too small, I opted for 30ml IPA : 15ml H20 (would this be too much to start with?)

NaBH4 was ground nicely added to IPA/H20 and mixture was mixed strongly and became clear in the 500ml 2 neck flask (2nd neck has glass encased thermometer probe to monitor temp)

Addition of P2NP was quick, with additional solvent I noticed temp did not jump past 30c. Max temp was approx 29.4c, then began decreasing. As temp dropped, I prepared CuCl2 for addition. Since the amt was so small and recommendation is to add quickly, I just dumped in the CuCl2 without any IPA. I did this after I began heating, as I thought adding the CuCl2 towards reflux will increase yield. I added when temp reached approx 50c. Mixtured turned immediately black with slight exothermicity which kicked up the temp a few more degrees. Reflux was held at 80c for 30 mins. As temp neared 80c, the mixture became more clear, with the black sludge (nanoparticles?) at the bottom. This whole time the mixture had been mixing as vigorously as my stir bar would let me. I also fitted a reflux condenser immediately after the copper was added.

After reflux was complete, I shut everything down for the night...

Tonight (about 24 hrs later) mixture appeared identical as before. I did not see or hear any fizzing, so I proceeded to add 10% NaOH solution (50ml worth) and begin distilling. (No quench)

I monitored temp of the distillation while distilling off the alcohol and it rose smoothly from about 79c all the way to about 98c. At that point I noticed the distillate became cloudy so I knew I was getting something. Also the reaction mixture initially turned clear and blue as the alcohol distilled off, then as the alcohol was removed, the flask took on a light red color, which darkened as the distillation proceeded. I pulled off tbe first 20ml of distillate which appeared cloudy with a little oil on top. I collected another 20ml after that and then shut it down when I noticed distillate was basicslly clear at that point.

I combined these, extracted multiple times with DCM (4x), then evaporated the DCM and was left with a TINY amount of yellowish residue.

I was able to take this residue and make some very nice white amph phosphate, however all I got was about 50mg.

Chemistry is something that I am teaching myself and while I know alot about drug mechanisms, the processes in place to create these drugs I am still quite unfamiliar with. My methods are rudimentary at best, so please be easy on me. I'm not even sure my calculations are right 😕

Any piece of advice would be helpful, as I've read the thread first to last page numerous times. I'm about to put up a white flag due to sheer frustration.

Thanks in advance...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 01, 2020, 01:24:12 PM**

Your issues are in the workup.
You attempt to distill of the alcohol, but you haven't acidified the reaction mixture before, why not?
What you're distilling off already contains the product because of this.

What you are supposed to do is, to acidify, distill off the alcohol, and then basify to distill the product off.
Also, while the first distillate is cloudy and/or has an oil on top, there is still a little bit to come after that.
But then you just take the aqueous distillate with the freebase and neutralise it directly.
You don't to extract it as it is already quite clean.
Just evaporate the neutralised distillate down to obtain your product as salt.

You don't quench for other amines which can't be distilled directly from the reaction mixture with steam, and then use the IPA for extraction.

I mean, obviously you made the product, you've seen and probably smelled it sitting on your distillate.
You've basically been throwing it away after this point.
800mg of P2NP should yield at least ten times as much as the pathetic 50mg of salt.
Why did you attempt to extract the distillate again?
Steam distillation is a method for purification already, even a very good one in that case.

Oh and by the way, as I ran that method at exactly these amounts already myself, 800mg are not too much really for a single addition :D
Not intentional but accidentally had all of it drop in when I attempted to sprinkle some of it down there, and that was no issue either.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **November 01, 2020, 01:28:21 PM**

Quote from: blade_runner on November 01, 2020, 01:26:21 PM

> Electrochemistry is a fun **thought** experiment because no one outside of an academic/industrial laboratory ever has the property membrane/reaction vessel.

I believe that was meant for the safrole thread?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **November 01, 2020, 01:38:40 PM**

> Quote from: Sawdust and Honey on November 01, 2020, 01:28:21 PM
>
> > Quote from: blade_runner on November 01, 2020, 01:26:21 PM
> >
> > Electrochemistry is a fun **thought** experiment because no one outside of an academic/industrial laboratory ever has the property membrane/reaction vessel.
>
> I believe that was meant for the safrole thread?

Yes. :-[

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **bubbles** on **November 01, 2020, 02:08:27 PM**

> Quote from: PharmZ on November 01, 2020, 11:53:22 AM
>
> Since the amt was so small and recommendation is to add quickly, I just dumped in the CuCl2 without any IPA.

Hi there,
If your yields still aren't satisfactory after you've fixed your workup like Carl described, I would try adding the CuCl2 dissolved instead of as powder. People have reported that adding the copper dropwise doesn't work well and it has to be all at once. Maybe you also get this negative effect if there are clumps that take some time to dissolve.
This moment of nanoparticle formation is important. Vigorous stirring is important here.
I use a bit more CuCl2, and less solvent (1/3-1/2 of what you use). But your amounts are also fine if you can distribute the nanoparticles quickly.

I will surely give that oxalate method a go when I make some 2C-H or such, it looks nifty.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **November 01, 2020, 02:41:53 PM**

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next time just distill all the alcohol + amine in basic mileu out. then just acidify your whole distillate. then just cook it down - just watch out to now burn your product. works good. And wash your product with acetone at the end.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **PharmZ** on **November 02, 2020, 12:07:50 AM**

Wow. Carl you are right.   Without acidification I literally dumped the IPA portion down the drain! I know someone had asked before if there are risks with over acidification - I have the GAA which is needed and read the part in which it appears only a few drops are needed - but if I were to add too much on accident do I risk losing product as well?

This now makes sense to me, as the acidification pushes product back into aqueous layer, IPA distilled WITHOUT product, base added, then product is steam distilled.

I think the light bulb just went off and I now see where I went wrong. Wow and to think

I have been dumping the IPA down the drain this whole time.

I kind of want to go cry 😢

Either way, much thanks for the explanation and pointing me in the right direction guys!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **PharmZ** on **November 02, 2020, 12:14:09 AM**

Now I see this can be done a multitude of ways. Thank you Orange for providing that alternative method.

And Bubbles I will surely dissolve it next time and add via addition funnel. I did have stirring on as vigorously as my stirbar would let me 🙂. Im debating purchasing a lid and stirrer bearing for the 3L jacketed reactor i have to be used w my overhead stirrer, but they are so darn pricey!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ketosis** on **November 09, 2020, 08:56:31 PM**

All out of 'store bought' methylamine, gotta learn to make it. Or wait, a quick peruse, and I see this is where the REAL parties at. Well done folks!
Maybe I won't learn to make MeAm.
'karl's method' is good yes. P2NP is made easy , many ways. Maybe some fun fires to put out. And isopropanol has always been my favorite alcohol(solvent). It's like swiss army knife of solvents. I'll be back in a few months after reading the whole thread.
Keep it up fam!
-k

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 09, 2020, 09:03:44 PM**

Actually P2NP is made only via one way.
There are possible others, but none ever played a role in the clandestine business.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ketosis** on **November 10, 2020, 03:49:29 AM**

Quote from: carl on November 09, 2020, 09:03:44 PM

> Actually P2NP is made only via one way.
> There are possible others, but none ever played a role in the clandestine business.

Oh. Good to know. I know that one way and where to find everything. Ty Carl.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**

Post by: **PharmZ** on **November 15, 2020, 11:14:33 AM**

Speaking of p2np, I took a sweet hyperlapse video of the crystal formation over the span of 25ish minutes condensed down to 40 seconds. I am a total nerd and think it is so cool, is there anywhere I could post it here?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **November 15, 2020, 11:15:48 AM**

Sure, maybe the Den or even Pretty Pictures next door if you prefer it there.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 15, 2020, 12:34:48 PM**

You need to resort to some filehoster though, the board doesn't accept file sizes above 2,5-3mb anymore :/

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **November 19, 2020, 08:16:20 PM**

Sorry about the really late update!

Quote from: carl on November 01, 2020, 11:30:53 AM

> And you have a clearly distinct lower layer, or does it also appear like being somewhat soluble?

Yes, very distinct! Formed a lower, ellipsoid layer in the RBF.

Quote

> How does your distillate smell though?

Sorry, memory a bit vague, it didn't really strike me as very similar something else familiar.

Quote

> However, if it isn't freebase solely, you will notice when you acidify and the layer remains.
> Then it is very likely 4-fluorophenylacetone, and you can simply extract your acidic distillate with a little bit of DCM, two small portions suffice.
> I had that, as reported in this thread, not long ago too, unintentional nef reaction, and was surprised to see an oil in the distillate seated at the bottom.

I went ahead and treated it as if it was freebase, i.e. acidify with HCl and evaporate, etc. A white product with a melting point around 160 C remained. The m.p.'s I found stated 152-154 C or 156-157 C. Since using a likely quite inaccurate, cheap chinese alcohol thermometer, I guesstimated that m.p. was indicative of 4-FA HCl. It was however not 4-FA, was largely inactive. The thermometer was later tried with boiling water and found to show around 6 degrees too high.

Quote

> I couldn't find the density of 4-FA freebase so this bit will be interesting to know for once, but also in general to hear how it has worked for you :)

> In my experience 4-FA acted just like amphetamine with this reduction, likewise high yields and all, it was even the first substrate I tried it on.

I can't find the reference now, but I'm quite sure I found a density for 4-FA base of 1.0 g/ml somewhere. I'll add the reference if I find it.

I had problems with proper mixing of the reaction after adding the copper. I am going to try the reaction at least a few times more, with proper stirring being the first problem to remedy.

Attached are two documents concerning properties of 4-FA, for your leisure.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **PharmZ** on **November 21, 2020, 01:51:18 PM**

Ah darn. The file size is massive since it's a 20ish min video which is condensed. Neeeeeevrmind. And btw I am still awaiting 1 more chem to put the suggestions you guys have given me into practice. Once in my possession I will run and report back some hopefully positive findings. I think we all need some positivity these days...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **November 21, 2020, 01:57:04 PM**

Quote from: PharmZ on November 15, 2020, 11:14:33 AM

> is there anywhere I could post it here?

You could host it here - https://anonfiles.com - and post the link....

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **November 22, 2020, 03:22:35 PM**

Attempted this reaction again, results to follow shortly. But I don't have high hopes, since I had bothersome stirring problems in both reaction vessels (two simultaneous trials).

I just have to build myself some suitable overhead stirring apparatus. And find my teflon paddles. Anyone have any suggestions as to what kind of household item I can take apart for a suitable motor? Suitable would be a DC motor that I can connect through a potentiometer to be able to vary speed, naturally. Looks like I'll have to buy something new, don't have anything suitable at home I think.

One of the trials is reduction of 4'-fluorophenyl-2-nitrobutene, anyone tried that substrate (or bioassayed the resulting compound)? Apart from being entirely legal, I have high hopes as for the pharmacological properties of the product.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 22, 2020, 03:39:27 PM**

I don't know if anyone else has reduced a nitrobutene with that reduction, I did though, the precursor to 4C-H.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **November 22, 2020, 04:14:30 PM**

Quote from: NeonCortex on November 22, 2020, 03:22:35 PM

> Suitable would be a DC motor that I can connect through a potentiometer to be able to vary speed, naturally.

A cheap rotary tool would probaly do. Small, light, powerful, high variable speed and easy to mount..... Even comes with a 'flex shaft'

(https://external-content.duckduckgo.com/iu/?u=https%3A%2F%2Fae01.alicdn.com%2Fkf%2FHTB1WdMyoxPI8KJjSspoq6x6MFXab%2F6mm-Rotary-Grinder-Tool-110cm-Flexible-Flex-Shaft-Tube-0-6-5mm-Handpiece-for-Dremel-Style.jpg&f=1&nofb=1)

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **November 22, 2020, 04:29:12 PM**

Quote from: Corrosive Joeseph on November 22, 2020, 04:14:30 PM

> A cheap rotary tool would probaly do. Small, light, powerful, high variable speed and easy to mount..... Even comes with a 'flex shaft'

Yes, I've considered that kind of machine, but haven't looked closely at what's available. Most similar tools I've come across runs at way too high speed to be used directly as is (which would be optimal, naturally). Flex shaft would actually be a big bonus! Gonna check it out.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **November 22, 2020, 05:40:58 PM**

Quote from: NeonCortex on November 22, 2020, 03:22:35 PM

> Attempted this reaction again, results to follow shortly. But I don't have high hopes, since I had bothersome stirring problems in both reaction vessels (two simultaneous trials).
>
> I just have to build myself some suitable overhead stirring apparatus. And find my teflon paddles. Anyone have any suggestions as to what kind of household item I can take apart for a suitable motor? Suitable would be a DC motor that I can connect through a potentiometer to be able to vary speed, naturally. Looks like I'll have to buy something new, don't have anything suitable at home I think.
>
> One of the trials is reduction of 4'-fluorophenyl-2-nitrobutene, anyone tried that substrate (or bioassayed the

> resulting compound)? Apart from being entirely legal, I have high hopes as for the pharmacological properties of the product.

Just look around for an used IKA or something similar. i bought 2 IKA, one a RW 16 and the other RW20, from an old chem teacher, for 100 coins both... deutsche tek is always good :)

But lemme say i've done this reduction only with a big stirbar and it worked just fine, i still don't have a 3 neck with a side neck adapt for my Alihn condenser, so stirbar only for now

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **November 23, 2020, 10:43:32 PM**

Quote from: ApeMaia on November 22, 2020, 05:40:58 PM

> Quote from: NeonCortex on November 22, 2020, 03:22:35 PM
>
> > Attempted this reaction again, results to follow shortly. But I don't have high hopes, since I had bothersome stirring problems in both reaction vessels (two simultaneous trials).
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>
> But lemme say i've done this reduction only with a big stirbar and it worked just fine, i still don't have a 3 neck with a side neck adapt for my Alihn condenser, so stirbar only for now

I've not come across them on *"auction site"*earlier, but I guess I should have a look again. I have both 3-necks and adapter (and teflon paddles somewhere...). Just need the motor, I'll have to be creative I guess.

Back to topic - will try the reaction again, with freshly recrystallized nitroalkenes. Since you've done it with only stir bars - may I ask what solvents and what volumes you used? IPA and water?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 23, 2020, 11:32:43 PM**

Quote from: NeonCortex on November 23, 2020, 10:43:32 PM

> *"auction site"*

Please don't call any source by their name, this too.
I know, I know... say auction site, or bezos market, the market of the forty thieves, or whatever, but please don't say their names clearly.
Even if it is clear to anyone except those who rode to school in the short bus ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or**

acids.
Post by: **NeonCortex** on **November 24, 2020, 03:14:27 AM**

> Quote from: carl on November 23, 2020, 11:32:43 PM
>
> > Quote from: NeonCortex on November 23, 2020, 10:43:32 PM
> >
> > > *"auction site"*
> >
> > Please don't call any source by their name, this too.
> > I know, I know... say auction site, or bezos market, the market of the forty thieves, or whatever, but please don't say their names clearly.
> > Even if it is clear to anyone except those who rode to school in the short bus ::)

Understood! Slipped out of me without second thought, will do that second thought futurewise.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **November 25, 2020, 08:25:56 AM**

> Quote from: NeonCortex on November 23, 2020, 10:43:32 PM
>
> > Quote from: ApeMaia on November 22, 2020, 05:40:58 PM
> >
> > > Quote from: NeonCortex on November 22, 2020, 03:22:35 PM
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> > > Just look around for an used IKA or something similar. i bought 2 IKA, one a RW 16 and the other RW20, from an old chem teacher, for 100 coins both... deutsche tek is always good :)
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> > > But lemme say i've done this reduction only with a big stirbar and it worked just fine, i still don't have a 3 neck with a side neck adapt for my Alihn condenser, so stirbar only for now
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> > I've not come across them on *"auction site"*earlier, but I guess I should have a look again. I have both 3-necks and adapter (and teflon paddles somewhere...). Just need the motor, I'll have to be creative I guess.
> >
> > Back to topic - will try the reaction again, with freshly recrystallized nitroalkenes. Since you've done it with only stir bars - may I ask what solvents and what volumes you used? IPA and water?

You can see my findings here, i wrote a detailed version of what i did, hope it helps.

By the way, yesterday i tried this reaction for a 2ch with 2gr of 2,5 dmns, brominating with Br2 and GAA the freebase evaporated from ipa and water on a rotovap, without doing the salt first and ended up with 0.8gr of clean light tan 2cb hbr, of which i sampled a good 20 mg, holy shit, it blew me off for a good 6-7 hours, and to think i've first declared it a failure, before filtering everything off

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **November 25, 2020, 02:59:30 PM**

Damn, good to hear that you succeeded man. You're increasing my appetite for this ... ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **November 25, 2020, 04:40:55 PM**

Quote from: ApeMaia on November 25, 2020, 08:25:56 AM

> You can see my findings here, i wrote a detailed version of what i did, hope it helps.

Did you forget a link, or am I missing something obvious? :)

Quote

> By the way, yesterday i tried this reaction for a 2ch with 2gr of 2,5 dmns, brominating with Br2 and GAA the freebase evaporated from ipa and water on a rotovap, without doing the salt first and ended up with 0.8gr of clean light tan 2cb hbr, of which i sampled a good 20 mg, holy shit, it blew me off for a good 6-7 hours, and to think i've first declared it a failure, before filtering everything off

Thinking about dribbling with reduction of a nitrostyrene myself. Will report. And great to hear you had success! :)

I tried the reaction again, on 4-F-P2NP that I had recrystallised twice from IPA. I crushed the NaBH4 (little over 6 eq.) fairly fine. Instead of IPA:H2O of 5:2 (ml) per gram nitroalkene I tried 7:3. Reaction looked different than before, I had no stirring problems. When adding the CuCl2 blackish particles dispersed in the rxn mixture; no heavy clumping together as earlier runs. Let it run for 50-60 minutes on reflux. Quenced with 50% acetic acid until slightly acidic. Distilled off IPA. Basified and steam distilled. Collected approximately 6,5 ml (not dried, but in itself representing a 60-70% yield if correct product) of an oil as a lower layer. This organic phase was alkaline to pH-paper. Separated and extracted the cloudy water phase twice with toluene. Then tried both hydrochloric and sulfuric acid in test tubes. Sulfuric made clumpy matter separate out from the solution, hydrochloric made solution smokey above the liquid and liquid became cloudy for a while until slightly acidic, at which point it cleared up. Evaporated some of neutralized solution and was greeted with some mixed crystals and solids appearing. Happy as a cow in the cow-rubbing machine, I scraped some up, took the plunge and down the hatch it went. Made me feel a bit dizzy and a little sick to the stomach. Anticlimax totales. :/

Doing things in the wrong order, I then measured melting point, and it seems off, around 145ish C.. The small amount of sulfate I made is in there mixed up though. I will measure again and making sure it's entirely dry, after "recrystallising" with acetone crash out. (Just did a measure that came out something like 110ish C, must've been not dry enough.

So, will ditch the p-F-substrate for now. Really would like to do an MS or NMR on the 4-f-benzaldehyde to verify it's identity. Next attempts will be with other substrates!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **November 26, 2020, 11:02:07 AM**

Quote from: NeonCortex on November 25, 2020, 04:40:55 PM

> Quote from: ApeMaia on November 25, 2020, 08:25:56 AM

> > You can see my findings here, i wrote a detailed version of what i did, hope it helps.
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> Did you forget a link, or am I missing something obvious? :)
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>
> So, will ditch the p-F-substrate for now. Really would like to do an MS or NMR on the 4-f-benzaldehyde to verify it's identity. Next attempts will be with other substrates!

Hahah, i was still in outer space on my first ever 2cb hbr, you're right :)))

https://www.thevespiary.org/talk/index.php?topic=18299.0

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **norchem** on **December 13, 2020, 07:05:50 AM**

I had been waiting for my NaBoH4 for weeks and evn payed €170 in toll for it, sent from ukraine which i was sure was toll free.
But anyway, when i went to the lab i was sure i had some cucl2 there. But i didnt, i only had NiCl2.5H20 and ZnCl2.

So i decided to try Ni:

- 4ml IPA in a 250 RBF together with 2ml water and then 1.2g NiCl2.
- Some easy fizzing as expected. Continue to stir and then dumped all p2np at the same time without solving it in ipa first. Mild reaction, did hit about 45c but then calmed down and was stirred for 20 min.

Now the mixture has some white lumps in it i think it becaue i dint disolve pn2p.
Still heavy stirring and adding in 0.08g NiCl25h20. Mix became black in one second and temperature rose quickly to about 70.

Turned on heat to 80 and refluxed, not using condensator but rather a fraction distill column.

During reflux i didnt think it would work since a dark lump was in the middle. Added 2ml IPA more snd 2ml h2o more to push down some stuff from sides of flask.
After about 30 min the mixure is clear as water with some black spots in the bottom. A clear amine smell.
I stopped it there and will destill later. I will post yeld this evening.

Edit: i have silica gel, mgso, active choal and molyculear sieve home. Can i use any of them in the process to skip the oil destilstion if i first filter away the nickel residues? I dont have a good kondenser for steam destilstion, or rather i dont have a good glas piece (the one bent down with place for vacuum, forgot name) To avoid steam destilation? I mesn its so small amout of water anyway, only 4ml.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **December 13, 2020, 01:05:53 PM**

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and at which point did you add the "NaBoH4" ?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **December 13, 2020, 01:09:40 PM**

Sounds like a recipe for disaster to bee honest..... Possibly might have worked if the thread was followed much more closely and Ni(II) was substituted exactly for the copper compound...... We will see.

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **December 13, 2020, 01:32:52 PM**

You're supposed to mix the whole thing with IPA NaBH4 water and P2NP for 30min before adding the Cu or whatever the salt is.
The topic is so vast, that you shouldn't have any problems with it, if you followed the reaction exactly.
And also, I think that you misspelled NaBH4 with ZnCl2

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **December 14, 2020, 01:42:14 PM**

Could STAB be used instead of NaBh4 for this reduction ?

I've tried it yesterday on 2ch HCl, but damn this motherfucker crashed out very dirty, i hear it happened to mostl of those who went for 2CH this route, what was your best workup to this problem ?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or

acids.
Post by: **Sawdust and Honey** on **December 14, 2020, 01:53:18 PM**

I don't think so. STAB is sodium borohydride with less reductive power than pure borohydride, and the whole point of nickel/copper salts in this method is to enhance the reductive power.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **December 15, 2020, 03:32:20 AM**

Quote from: Sawdust and Honey on December 14, 2020, 01:53:18 PM

> I don't think so. STAB is sodium borohydride with less reductive power than pure borohydride, and the whole point of nickel/copper salts in this method is to enhance the reductive power.

I found this statement confusing and had to look up what STAB actually is. For those also confused, STAB is sodium triacetoxyborohydride which acts as a reducant much like sodium borohydride albeit with less reducing power.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **norchem** on **December 15, 2020, 06:32:53 AM**

Quote from: StuffedBee on December 13, 2020, 01:05:53 PM

> and at which point did you add the "NaBoH4" ?

Yea, I misspelled, it should be NaBH4.

Quote from: mackolol on December 13, 2020, 01:32:52 PM

> You're supposed to mix the whole thing with IPA NaBH4 water and P2NP for 30min before adding the Cu or whatever the salt is.
> The topic is so vast, that you shouldn't have any problems with it, if you followed the reaction exactly.
> And also, I think that you misspelled NaBH4 with ZnCl2

Yea, i wrote wrong. Its not apperant but i added the P2NP after NaBH4 and then NiCl2.

Quote from: Corrosive Joeseph on December 13, 2020, 01:09:40 PM

> Sounds like a recipe for disaster to bee honest..... Possibly might have worked if the thread was followed much more closely and Ni(II) was substituted exactly for the copper compound...... We will see.
> /CJ

It actually did work. I got a something looking and smelling exactly like it should. But i messed up later in the process so i never got to the final. Will try again and get back when i got it all right.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **January 05, 2021, 12:51:01 PM**

Posted yesterday on the HyperLab....

Quote

> Good, good method

I have been using this recovery method with some modifications for some time now, and I would like to describe a typical procedure, as well as say thanks to comrades carl and Corrosive Joeseph for such a valuable find.

1-phenyl-2-nitropropene - 10 g (163.17 g / mol) (mp 65-66C)
iPrOH - 100 ml
H2O - 40 ml
NaBH4 - 15.2 g (37.8 g / mol)
CuSO4 * 5H2O - 1.5 g (249.6 g / mol)

To a mixture of 100 ml iPrOH and 40 ml ?2? in a flat-bottom 500 ml flask was added 7.6 g (0.2 mol) of crushed NaBH4 in one portion, with vigorous stirring, after which 1-phenyl was added in small portions, without cooling. 2-nitropropene (10g, 0.062 mol). Nitroalkene was previously recrystallized from isopropanol, dried and washed with 15% aqueous solution of NaHSO3, since it contained a significant amount of benzaldehyde. Bisulfite flushing is a very important part of the procedure, since the side reaction of the reduction of benzaldehyde to benzyl alcohol, in the opinion of SVIM, reduces the yield. This is especially critical when using steam distillation to extract the free amine base.

After adding all 1-phenyl-2-nitropropene, to the still hot mixture in small portions, but at a fast pace, another 7.6 g (0.2 mol, total - 0.4 mol, 6.5 eq) NaBH4 was added, after which PM was mixed for 5-10 minutes. Then, SWIM took an effective reflux condenser in one hand, in the other - a test tube with a previously prepared and finely ground CuSO4 * 5H2O (1.5 g, 0.006 mol, 0.1 eq), and holding the refrigerator next to the flask sleeve, poured the whole vitriol. After that, OX should be set veryquickly, less than a second after adding vitriol, otherwise Pm will most likely end up on the stirrer and flask. The contents of the flask turn black and a lot of hydrogen is released with a strong exotherm. After adding CuSO4, the contents are boiled for 40-60 minutes, cooled, and HCl (in the region of 20-30 ml 36%), slightly diluted with water, is added to the flask until a noticeably red pH indicator. After that, fractionally (!), Everything is distilled off to 100C - mainly iPrOH. It is important not to alkalize PM until all the alcohol is distilled off - otherwise part of the amine base will fly away together with the alcohol

PM is mixed with cooling, and pre-cooled 20% NaOH solution is added to it until pH ~ 10-11

Then the amine is stripped off with steam. The flask is filled with water, boiled, and the base is distilled off along with water vapor, preferably on a powerful plate. After that, 15-20% HCl solution is added to the distillate to a weakly acidic indicator, washed once with something like MTBE / EtOAc / petroleum / benzene, then the KShE of the water layer is performed, the base is extracted, for example, with MTBE or petroleum, dried over Na2SO4 and is neutralized directly in petroleum or MTBE with 5-10% solution of sulfuric acid in iPrOH. By the way, swim sometimes used acetonitrile instead of IPA, and the result is identical - a fine white powder falls out, which is then easily filtered on a Schott funnel and washed with dry acetone, acquiring a "pebble" texture.

Yield: 6.5-8.1 g of 1-phenyl-2-aminopropane sulfate from 10 g of 1-phenyl-2-nitropropene.

You can do without distillation - but for this you will have to skip a copper-contaminated but dry organic layer, previously extracted with a solvent and washed with 15% NaOH, water and then saturated. solution of NaCl, through a Schott filter with a certain amount of Al2O3 to filter this copper. Ideally, in my opinion, it is worth bothering with flash chromatography according to the rules, choosing the right eluent and dissolving the base in it)

By the effects (100 mg intravenously as an internal standard), this powder fully meets the expectations of SVIM - small dosages, good strict stim, insomnia, bruxism, mild physical side effects, and "withdrawal symptoms". The length of this post, I think, speaks for itself about the power of stimulation)

Quote

... and further improvement?

Not so long ago, a sailor who wanted to restore an unsaturated nitro compound ran out of PSI: there was nowhere to buy nearby, and it is not very convenient to go to the torchsnabs for a liter. However, a random bottle of tetrahydrofuran was found. And a thought flashed through my head: what if yes? And, running ahead, I will tell you: very much yes! Recovery in aqueous THF seemed to the swimmer in many aspects more convenient and cleaner than iPrOH / H2O - for example, workap turned out to be much easier than trying to filter copper-alcohol shit and much faster than steam distillation, and the course of the reaction in THF seemed intuitive and even visual. In general, I hasten to share:

> 1-phenyl-2-nitropropene - 5 g (0.031 M, 1 eq), mp 65-66C - recris from iPrOH, washing with 10% NaHSO3 and H2O
> NaBH4 - 8.5 g (0.225 M, 7 , 2 eq)
> THF - 120 ml - used as is
> ?2? - 60 ml
> CuCl2 * 2 H2O - 0.53 g (0.0031 ?, 0.1 eq), solution in 3 ml ?2?
>
> In a 500 ml three-necked flask equipped with adequate OX, dropping funnel and thermometer, are filled with THF, 80 ml, and water, 60 ml. Then sodium borohydride was added to the flask - all 7.2 equivalents, 8.5 g at once, stirring was turned on, and the flask was placed in an ice bath of snow and water. The nitroalkene dissolved in 40-45 ml THF was carefully added through the addition funnel, and after about half of the solution had been added, the flask was removed from the ice bath and the rate of THF + RNO2 addition was increased. By the end of the addition, the temperature in the flask, the contents of which turned white, was about 45-50C - and without hesitation, a solution of 0.53 g CuCl2 / 3 ml H2O was added from a syringe through a reflux condenser. Copper chloride was added in one portion, very quickly, and the PM turned black instantly with a violent evolution of hydrogen. The temperature continued to be in the region of 50C - despite the obvious exotherm taking place inside. According to SWIM, the evolved hydrogen thus cools Pm due to its "evaporation". The flask was then gently warmed up until the thermometer read 64-66C. At this point, firstly, the active evolution of hydrogen stops and THF itself begins to boil. At the same time, secondly, Pm is clearly divided into 2 phases - an almost transparent upper layer and a lower black from copper.Swee thinks that the rise in temperature from 45-50C to 65C (Tb. THF) is a very convenient indicator of the progress of the reaction.
>
> Then RM was cooled in an ice bath to 20C, and 15-20 ml of 37% hydrochloric acid was added through a dropping funnel - no active reaction was observed, therefore, all borohydride was consumed in the reduction process. After that, the flask was again cooled to 15-20C, and 30-35g of NaOH in ~ 150 ml of water was added through the same dropper. After a short stirring, Pm again divided into layers - and the lower, inorganic, turned orange (as I understand it, this was the destruction of the Cu-NH coordinated complex and free copper was released). And most importantly,
> there was a minimal amount of copper in the organic phase . This is, of course, by eye:)To be on the safe side, edible salt was added to Rm, and the entire contents were poured into a separating funnel. The bottom layer was extracted with a mixture of MTBE + THF (25 + 25 ml), the extract was combined with the main THF layer and diluted with 40 ml of MTBE. Then the organic matter was washed with 15% NaOH solution and saturated NaCl solution, dried with Na2SO4, and then neutralized with a weak solution of H2SO4 in CH3CN, diluted with ice-cold acetone, filtered and thoroughly washed again with acetone.
>
> Yield: 4.3 g of 1-phenyl-2-aminopropane in the form of sulfuric acid salt. You yourself can estimate the quality of the hair dryer by the length of this post. Sweeme really liked the ease of the workup, which does not require tedious, resource-intensive and time-consuming actions. Only KSChE is missing, but it is fixable.: D
>
> Encouraged by the success, in 1 evening we made 2 such loads with a total yield of 8.5 g out of 10 g P2NP, and the final product looks like this:
> Attached Images
>
> Ps after some experimentation, it was found that **this method also works for the reduction of nitriles to amines** (tested on CH3CN, and **the yield was not measured** - only the presence of amine):

https://hyperlab.info/inv/index.php?s=&act=ST&f=51&t=32205&view=all

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **spagettidick** on **January 11, 2021, 06:40:28 PM**

Hello Corrosive Joeseph. Sorry to bother you guys with newbie questions, but please help, I need some tips.

Questions.

When doing a 10 gram method of P2NP.

1-phenyl-2-nitropropene - 10 g (163.17 g / mol) (mp 65-66C)
iPrOH - 100 ml
H2O - 40 ml
NaBH4 - 15.2 g (37.8 g / mol)
CuSO4 * 5H2O - 1.5 g (249.6 g / mol)

I want to avoide overflow like bi-polar on the hyperlab, who lost all of his ingrediants due to an overflow during stomy reaction.

Would it be overkill to use a 10L glass RBF to start the reaction, and move the reaction mixture to my 1000ml flask
for reflux. (I only have a 1litre heating mantle). That way, as you have recomended in the recent past, I could dump the
CuSO4 in all at once to avoid slowing down the reaction.

Finaly, Is there a specific ratio of how much isoproply-sulphuric acid mixture (25%), that should be used for salting out at the end (recovering solid product). How much of this should be used for the above synthesis. Some said 1ml per 50ml of amine base. I'm not sure and dont want to screw up my final product.

Hope I didn't anoy anyone, (commence eye rolling lol.)

Thank you in advance, your friend

spagettidick............

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **bubbles** on **January 11, 2021, 10:16:28 PM**

Quote from: spagettidick on January 11, 2021, 06:40:28 PM

> Would it be overkill to use a 10L glass RBF to start the reaction, and move the reaction mixture to my 1000ml flask
> for reflux.

Yes. For this quantity it will be hard to flood your condenser even in a 500ml flask. That is assuming you are using a reflux condenser. If it is just a flask, the 1000ml should be fine. 10L is way overkill.

Quote

> Finaly, Is there a specific ratio of how much isoproply-sulphuric acid mixture (25%), that should be used for salting out at the end (recovering solid product). How much of this should be used for the above synthesis. Some said 1ml per 50ml of amine base. I'm not sure and dont want to screw up my final product.

One molecule of sulfuric acid combines with two molecules of amphetamine to form the salt, amphetamine hemisulfate.
Molecular weight of sulfuric acid is 98, of amphetamine 135.
You do the math.
Add less than you calculate and measure the pH, then add the last bit dropwise, because your amphetamine base might not be pure and you want to prevent overshooting pH.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **spagettidick** on **January 20, 2021, 07:12:57 PM**

I'm still stuck on final nutralisation, (salting out)

How much of the 5 -10% solution of sulfuric acid in iPrOH, do you need to add to your amine base for this method.

And how much H20 for 1.5 g of CuSO4

Please help, I'm not smart like you guys. Please please please..... Its the last thing stopping me, just sourced my NaBH4 and CuSO4. Ready to go!

Quote

> Good, good method
>
> I have been using this recovery method with some modifications for some time now, and I would like to describe a typical procedure, as well as say thanks to comrades carl and Corrosive Joeseph for such a valuable find.
>
> 1-phenyl-2-nitropropene - 10 g (163.17 g / mol) (mp 65-66C)
> iPrOH - 100 ml
> H2O - 40 ml
> NaBH4 - 15.2 g (37.8 g / mol)
> CuSO4 * 5H2O - 1.5 g (249.6 g / mol) etc......
>
> Then...
>
> ....dried over Na2SO4 and is neutralized directly in petroleum or MTBE with 5-10% solution of sulfuric acid in iPrOH. By the way, swim sometimes used acetonitrile instead of IPA, and the result is identical - a fine white powder falls out, which is then easily filtered on a Schott funnel and washed with dry acetone, acquiring a "pebble" texture.
>
> Yield: 6.5-8.1 g of 1-phenyl-2-aminopropane sulfate from 10 g of 1-phenyl-2-nitropropene.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **spagettidick** on **January 20, 2021, 07:37:51 PM**

I'm assuming that CuSO4 * 5H2O meas 5x H20 to 1 Part CuSO4

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **embezzler** on **January 20, 2021, 09:05:03 PM**

Copper sulfate pentahydrate salt

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **January 21, 2021, 11:10:33 AM**

Well, you can just add concentrated H2SO4 to the dried IPA layer. This way, you'll get rid of any water, that may frick up with your amine base. Just don't add too much of the conc H2SO4 and do it slowly.

As for CuSO4 pentahydrate, well I personally dissolve 280mg in 1ml of water, but it's not that hard to just take one procedure from this topic and do a little counting. You don't even have to know a shit about moles, you have it ready in this topic. You must be independent, otherwise, without any understanding of the reaction, you can harm yourself...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **spagettidick** on **January 21, 2021, 06:38:28 PM**

Thank you very much for taking the time to help me. Hopefully my sythesis is semi-sucessfull.

Once I have done it I will post my experience here on this thread.

Your friend and humble new bee, spagettidick.....

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **January 21, 2021, 06:42:14 PM**

You need to learn about salt hydrates, is what my former posters wanted to tell you ;)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **January 21, 2021, 06:55:33 PM**

Quote from: carl on January 21, 2021, 06:42:14 PM

> You need to learn about salt hydrates, is what my former posters wanted to tell you ;)

This and few other things. For sure molar mass too. You have a lot of time though.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **spagettidick** on **January 21, 2021, 10:52:09 PM**

Quote from: spagettidick on January 20, 2021, 07:12:57 PM

> I'm still stuck on final nutralisation, (salting out)
>
> How much of the 5 -10% solution of sulfuric acid in iPrOH, do you need to add to your amine base for this method.
>
> And how much H20 for 1.5 g of CuSO4
>
> Please help, I'm not smart like you guys. Please please please..... Its the last thing stopping me, just sourced my NaBH4 and CuSO4. Ready to go!
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> Quote
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> > Good, good method
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> > I have been using this recovery method with some modifications for some time now, and I would like to describe a typical procedure, as well as say thanks to comrades carl and Corrosive Joeseph for such a valuable find.

> > 1-phenyl-2-nitropropene - 10 g (163.17 g / mol) (mp 65-66C)
> > iPrOH - 100 ml
> > H2O - 40 ml
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> > CuSO4 * 5H2O - 1.5 g (249.6 g / mol) etc......
> >
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> >
> > ....dried over Na2SO4 and is neutralized directly in petroleum or MTBE with 5-10% solution of sulfuric acid in iPrOH. By the way, swim sometimes used acetonitrile instead of IPA, and the result is identical - a fine white powder falls out, which is then easily filtered on a Schott funnel and washed with dry acetone, acquiring a "pebble" texture.
> >
> > Yield: 6.5-8.1 g of 1-phenyl-2-aminopropane sulfate from 10 g of 1-phenyl-2-nitropropene.

thank you bubbles

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **spagettidick** on **January 21, 2021, 11:09:21 PM**

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thank you to all embezzler
carl mackolol for your tips help . i do have A long way to go before i am good at chemistry vs good anuff to pull off a reaction for self medication lol.. without fully understanding the details of how the functional groups interact react with each other to create the desired 1-phenylpropan-2-amine . i just downloaded fundamentals of organic chemistry from tpB and am starting from the beginning organic chemistry for beginners .crawl before you walk so to speak .

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **January 31, 2021, 12:05:17 PM**

What is the preferred ratio of water to IPA for DMNS reduction? I have read everything between 0.4 and 1. Does it matter?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **January 31, 2021, 07:24:43 PM**

That's a good question... I go with Orange's 25ml IPA per 20ml H2O per 2g of di or trimethoxy styrene. I wonder if there is any difference in yield

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 07, 2021, 01:58:06 PM**

The black particles had a tendency to sick together in my attempts.
A small amount of NH4Cl solution added after the initial addition of copper causes further reaction and seems to make the particles smaller.
Also using ammonia for the workup might be a good idea as it the copper can complex with your amine.

I ran this reaction with 2,5-dmns with many failures probably due to the impurity of my nitrostyrene, despite recrystallization. Recently i got an oil of what might just be 2CH*HCl, i will do a TLC.
I'd appreciate if someone tries NH4Cl and reports the yields.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **February 07, 2021, 04:17:44 PM**

I never had any problems with Orange's writeup - absolutely fool-proof. The oxalate workup however...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Planophore** on **February 07, 2021, 10:36:35 PM**

Would someone mind helping me identify the problem with this scheme? I'm not having too much luck

Reaction:

To a stirred solution of sodium borohydride (5.690g, 150mmol) in IPA (64ml) and water (32ml) in a 500ml RBF was added 2,5-dimethoxybetanitrostyrene (4.180g, 20mmol) in portions over around 5 minutes. (The temperature rose as expected, but nothing major and from what I've read on this post, it is not too important for such a small scale). The RM was left with stirring on for around 20 minutes until the entire solution was a milky white colour (nitropropene -> nitropropane).

Then, in one quick motion, a solution of dihydrated copper chloride (0.341g, 2mmol) in water (around 4ml) was added to the flask with vigorous magnetic stirring. The entire reaction mixture became enveloped in a black precipitate - as expected. Then the hotplate was turned on and the mixture refluxed for 42 minutes with continuous stirring.

Workup:

The RM was allowed to cool to RT. The particulate was then filtered out and the solids washed with two small portions of IPA. A solution of sodium hydroxide (40ml, 25% w/v) was added under stirring and the layers were separated. The upper organic layer was brown/orange and the lower aqueous layer was slightly cloudy. The aqueous was then further extracted with IPA (4 x 25ml) - subsequent extractions were essentially colourless.

These pooled extracts were then dried over MgSO4 and then filtered to give a completely clear and dry, but still brown solution. They were then acidified using aqueous 36% HCl to a pH of 6, and the solvent stripped.

Finally, the resulting red/brown viscous liquid was suspended in acetone for an hour, and then vacuum filtered and washed once with a small amount of acetone to yield slightly off white 2C-H hydrochloride product as a crystalline powder (1.472g, 34% yield).

Notes:
-The nitrostyrene was recrystallised 3/4 times and has excellent neon orange colour
-The copper chloride solution was added very quickly (and I believe stirring was sufficient)

I would really appreciate any help

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **February 08, 2021, 08:35:03 AM**

Well, you got your product, so what's the problem :D I suppose that yield...
Probably you have overheated the styrene NaBH4 system, you're supposed not to let it warm at all. It doesn't matter if it's small or big scale. Some say, that cooling isn't required, but according to thermodynamics, when you cool exothermic reaction, the yield is bigger. With endothermic, you're supposed to heat it. What I said is simplified at maximum, but that's generally it.

You added it in portions during 5 mins, so on this scale it shouldn't bee a problem, but that's the only thing I can see and could bee the issue

I didn't have big success with 2,5 dimethoxy either, in terms of yield... Ask Orange, he had a success with it. He mentioned that his temp never exceeded 25C...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Planophore** on **February 08, 2021, 12:15:35 PM**

Yes the yield is what is disappointing :-\

I would’ve thought so too but Carl’s writeup on page 10 would suggest otherwise - he says that his best runs have been with the fastest nitroalkene addition. I suppose it could be the slight difference in scale?

Has anyone had more success with the EtOH/CuSO4 method over IPA/CuCl2 with this substrate?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 08, 2021, 01:25:02 PM**

Quote from: Planophore on February 08, 2021, 12:15:35 PM

> Yes the yield is what is disappointing :-\
>
> I would’ve thought so too but Carl’s writeup on page 10 would suggest otherwise - he says that his best runs have been with the fastest nitroalkene addition. I suppose it could be the slight difference in scale?
>
> Has anyone had more success with the EtOH/CuSO4 method over IPA/CuCl2 with this substrate?

I think that better yields are achieved without cooling because then the reaction mixture is hot already when the copper is added. If you added the nitroalkene too fast to impact your yield, you would see an off color after the addition. If it was white, it's good.
I have no idea why your yields are bad, though.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Mrbovinejony** on **February 08, 2021, 01:53:35 PM**

Quote from: mackolol on February 08, 2021, 08:35:03 AM

> Well, you got your product, so what's the problem :D I suppose that yield...
> Probably you have overheated the styrene NaBH4 system, you're supposed not to let it warm at all. It doesn't matter if it's small or big scale. Some say, that cooling isn't required, but according to thermodynamics, when you cool exothermic reaction, the yield is bigger. With endothermic, you're supposed to heat it. What I said is simplified at maximum, but that's generally it.
>
> You added it in portions during 5 mins, so on this scale it shouldn't bee a problem, but that's the only thing I can see and could bee the issue
>
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I've been having trouble with 2ch as well, I had success once without temp control but all other attempts have been failures. I'm hoping oranges method with temp control works better

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Planophore** on **February 08, 2021, 02:15:02 PM**

Quote

> I've been having trouble with 2ch as well, I had success once without temp control but all other attempts have been failures. I'm hoping oranges method with temp control works better

What sort of scale have you been working on? With a previous trial of around 2g a yield of 50% or so was obtained - but nothing better than that sadly.

Seems like there's lots of conflicting opinions on the temperature control. Might be a good idea to see how it goes with not letting the RM exceed 25C.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 08, 2021, 02:27:17 PM**

Problems with 2CH? How homogenous was the black particulate for you guys? Would anyone try the NH4Cl method I suggested?

From logic, it would make sense to keep it cool during the initial reduction to the nitroalk**a**ne and have it at least warm during the crucial copper addition.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **February 08, 2021, 02:41:02 PM**

I was always successful with orange's writeup and two times IPA recrystallized nitrostyrene. I failed two times with the oxalate workup though - after that I switched to Orange's workup and always got 70-80% yield

Here some of my notes for the first step:

1. The nitrostyrene needs to be powdered before addition
2. Step 1 is conducted between 20 – 30C and not possible below
3. Check by swirling for orange crystals and only proceed after none are visible

Edit: I have an idea where the problem might be: 2CH-HCl doesn't seem to crystallize very well on acetone addition, at least it never did when I tried it. It's important to remove all IPA and all water before adding acetone

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 08, 2021, 02:49:18 PM**

Quote from: StuffedBee on February 08, 2021, 02:41:02 PM

> Edit: I have an idea where the problem might be: 2CH-HCl doesn't seem to react to acetone really, at least it never did when I tried it. It's important to remove all IPA and all water before adding acetone

I'm confused what this is supposed to mean? React to acetone? How would this be a problem?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **February 08, 2021, 02:53:53 PM**

Sorry bad choice of words. Acetone doesn't seem to crystallize it from solution as well as other salts

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Planophore** on **February 08, 2021, 03:06:19 PM**

Quote from: StuffedBee on February 08, 2021, 02:41:02 PM

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Just to clarify, do you mean that it is best to add the nitrostyrene slow enough to keep the temperature between 20-30C? Or to add it quickly but apply external cooling to keep it in that bracket.

Sorry if the writeup wasn’t clear. I stripped everything before adding the acetone so I don’t believe that was the issue - and it was definitely completely white before CuCl2 addition.

Edit - Ah I see where it wasn’t clear. The red substance left behind wasn’t a liquid at that point, it had completely solidified.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **February 08, 2021, 03:18:14 PM**

Quote

> Just to clarify, do you mean that it is best to add the nitrostyrene slow enough to keep the temperature between 20-30C? Or to add it quickly but apply external cooling to keep it in that bracket.

For me it was never particularly exothermic, I applied ice or snow bath for 3 minutes max, that being said my lab temperature approaches 0C in the winter so it might just have been cooled by the ambient temperature

Quote

> Sorry if the writeup wasn't clear. I stripped everything before adding the acetone so I don't believe that was the issue - and it was definitely completely white before CuCl2 addition.
>
> Edit - Ah I see where it wasn't clear. The red substance left behind wasn't a liquid at that point, it had completely solidified.

Interesting, my end result after azeotropic drying with toluene was always very black

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **February 08, 2021, 03:44:49 PM**

Quote from: Planophore on February 08, 2021, 03:06:19 PM

> Sorry if the writeup wasn't clear. I stripped everything before adding the acetone so I don't believe that was the issue - and it was definitely completely white before CuCl2 addition.
>
> Edit - Ah I see where it wasn't clear. The red substance left behind wasn't a liquid at that point, it had completely solidified.

The fact, that you have stripped "everything" before doesn't mean anything. Neither does the fact that it was a solid. 2C-H HCl is super soluble in water and I can confirm it. It's very hard to get rid of all of the water, especially by distillation. There had to be water present, probably in the form of hydrate if this was a solid.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **norchem** on **February 08, 2021, 11:57:41 PM**

This procedure was followed down to the milligram:

Quote

> I have been using this recovery method with some modifications for some time now, and I would like to describe a typical procedure, as well as say thanks to comrades carl and Corrosive Joeseph for such a valuable find.
>
> 1-phenyl-2-nitropropene - 10 g (163.17 g / mol) (mp 65-66C)
> iPrOH - 100 ml
> H2O - 40 ml
> NaBH4 - 15.2 g (37.8 g / mol)
> CuSO4 * 5H2O - 1.5 g (249.6 g / mol)
>
> To a mixture of 100 ml iPrOH and 40 ml ?2? in a flat-bottom 500 ml flask was added 7.6 g (0.2 mol) of crushed NaBH4 in one portion, with vigorous stirring, after which 1-phenyl was added in small portions, without cooling. 2-nitropropene (10g, 0.062 mol). Nitroalkene was previously recrystallized from isopropanol, dried and washed with 15% aqueous solution of NaHSO3, since it contained a significant amount of benzaldehyde. Bisulfite flushing is a very important part of the procedure, since the side reaction of the reduction of benzaldehyde to benzyl alcohol, in the opinion of SVIM, reduces the yield. This is especially critical when using steam distillation to extract the free amine base.
>
> After adding all 1-phenyl-2-nitropropene, to the still hot mixture in small portions, but at a fast pace, another 7.6 g (0.2 mol, total - 0.4 mol, 6.5 eq) NaBH4 was added, after which PM was mixed for 5-10 minutes. Then, SWIM

> took an effective reflux condenser in one hand, in the other - a test tube with a previously prepared and finely ground CuSO4 * 5H2O (1.5 g, 0.006 mol, 0.1 eq), and holding the refrigerator next to the flask sleeve, poured the whole vitriol. After that, OX should be set veryquickly, less than a second after adding vitriol, otherwise Pm will most likely end up on the stirrer and flask. The contents of the flask turn black and a lot of hydrogen is released with a strong exotherm. After adding CuSO4, the contents are boiled for 40-60 minutes, cooled, and HCl (in the region of 20-30 ml 36%), slightly diluted with water, is added to the flask until a noticeably red pH indicator. After that, fractionally (!), Everything is distilled off to 100C - mainly iPrOH. It is important not to alkalize PM until all the alcohol is distilled off - otherwise part of the amine base will fly away together with the alcohol
>
> PM is mixed with cooling, and pre-cooled 20% NaOH solution is added to it until pH ~ 10-11
>
> Then the amine is stripped off with steam. The flask is filled with water, boiled, and the base is distilled off along with water vapor, preferably on a powerful plate. After that, 15-20% HCl solution is added to the distillate to a weakly acidic indicator, washed once with something like MTBE / EtOAc / petroleum / benzene, then the KShE of the water layer is performed, the base is extracted, for example, with MTBE or petroleum, dried over Na2SO4 and is neutralized directly in petroleum or MTBE with 5-10% solution of sulfuric acid in iPrOH. By the way, swim sometimes used acetonitrile instead of IPA, and the result is identical - a fine white powder falls out, which is then easily filtered on a Schott funnel and washed with dry acetone, acquiring a "pebble" texture.

In the recieving flask after steam destilation is about 200ml of clear/milky oily substance.
This divided into into 2 different flasks for experimentation purposes.
One of the flasks was not washed or extracted but instead dryed slowly on a stir-plate at 50-60degress for a couple of hours until about 20ml remained.
Then carefully, a few drops, probably 3 of ~20% H2SO4 was added while stirred until pH 7 and let stand overnight.

The result after night is same transparent/milky/oily substance since steam destillation but also alot of crystals formed, looking like this: https://imgur.com/a/7fyAnYF

pH still about 6.5, the amine smell is still present but taste is very salt (touched with tounge).

Now to the question:
What is the crystals?

How to recover any product from the substance? Steam distill again? Wash with acetone? Also methanol, chloroform, toluene and DCM is available.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **February 09, 2021, 05:29:53 AM**

---

ok so, i used EtOH because of the lower solubility in the mix. Lower solubility means lower reaction rate. Plus i kept it cold. Sometime i just chunked all the ,say, 10g of nitrostyrene in and stirred. Kept all cool by an icebath. Sometimes i got it even stirring for 2h. because it was so cold and slow.

important is the workup too. Get rid of all the waters. Just distillation on an alc solution is not enough.. good luck!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **February 09, 2021, 08:21:25 AM**

Quote from: norchem on February 08, 2021, 11:57:41 PM

> In the recieving flask after steam destilation is about 200ml of clear/milky oily substance. This divided into into 2 different flasks for experimentation purposes.
> One of the flasks was not washed or extracted but instead dryed slowly on a stir-plate at 50-60degress for a couple of hours until about 20ml remained.
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> Now to the question:
> **What is the crystals?**
>
> How to recover any product from the substance? Steam distill again? Wash with acetone? Also methanol, chloroform, toluene and DCM is available.

I don't really know, why do you all steam distill the amphetamine freebase and bother with such shit. The IPA layer is already clean after the reduction, I mean, it's transparent and not colored. Why not just dry it and drip the H2SO4 directly? I've done so and got some good snow white shit ::)

And yet one question, did you try to remove the water from aphetamine freebase by heating :o?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **norchem** on **February 09, 2021, 05:11:19 PM**

Quote from: mackolol on February 09, 2021, 08:21:25 AM

> Quote from: norchem on February 08, 2021, 11:57:41 PM
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>
> And yet one question, did you try to remove the water from aphetamine freebase by heating :o?

I didnt get a clear layer. I got a light blue layer and a brown / black layer. I think i might have been sloppy since i only recrystalized nitro once or it could have been because nabh4 became a big lump which refused to disolve when heated so i needed to crush it. I Also let reaction stand overnight since i had to leave and it was blue the next day.

I remove most water with heat, yea, but also with silica gel but i didnt have so much at the time so it was the last bit.

I think btw. the crystals might be sodium bisulfate because of mix between hcl and h2s04 without washing or extracting between.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **February 10, 2021, 01:43:00 AM**

I haven't messed with this for sometime, as I recall last time the keys to 1 mole reactions were multiple recrystallizations for super clean staring nitrostyrene. I also recall that cooling wasn't really necessary at the 1 mole scale. Is this perhaps now not the case? Maybe keep it at 20*c? CuCl2 creates a more vigorous reactions but really isn't in danger of exothermic runaway. Reflux at least 3hrs. Am I missing anything?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **February 10, 2021, 09:06:01 AM**

Quote from: norchem on February 09, 2021, 05:11:19 PM

> I remove most water with heat, yea, but also with silica gel but i didnt have so much at the time so it was the last bit.
>
> I think btw. the crystals might be sodium bisulfate because of mix between hcl and h2s04 without washing or extracting between.

Well, man. Amphetamine freebase is more volatile than water and it's a liquid too. So when you heat aqueous solution of amphetamine freebase, that means that you will get rid of more amphetamine than water... Convert it to salt, by adding some acid first.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **February 10, 2021, 05:21:46 PM**

to answer the Dm's:

well the only diff is when you use Ethanol in my proportions is: the alkene reduction at the beginning is slower then with IPA. And with IPA you get better phase seperation.

i would suggest. to do the workup as followed:

filter copper precipitate.

Distill filtrate till 98-99°C reached. (Distill head thermometer) (2CH is practically unable to steam distillate over)

Extract after cooling with Toluene - use toluene not other stuff.

Wash extract with water and conc NaCl solution (filter NaCl solution before use, so you have an clear filtrate)

Add 1.2 eq. of conc HCl right into the extract and stir for 5 minutes vigorously.

Then set up for distillation and distill until the boiling point of toluene is reached (and maybe 5-10ml more) - recycle distillate.

Let the residual Toluene cool. U can stay and watch actually - when its warm you can see the crystallisation process.(its better to have an good amound of toluene left in here. its way more difficult to get your product out of it when you have an very conc. solution of it. we dont need an solid 2CH.HCl block here)

Filter product and recrystallize 2-3x in toluene.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **February 10, 2021, 08:50:36 PM**

What is the advantage of using ethanol? Higher yields?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Planophore** on **February 10, 2021, 11:44:05 PM**

Take a look at the top of this page - orange explains his reasoning behind using EtOH

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **February 13, 2021, 02:42:07 PM**

Multiple re-crystallizations are needed? My first one is a mixture of bright yellow and bright orange, I let it sit for a few days on the solution. Perfectly formed crystals.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **February 13, 2021, 02:54:57 PM**

Quote from: sparklebags on February 13, 2021, 02:42:07 PM

> Multiple re-crystallizations are needed?

Still, as I told you already half through that thread a year ago.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **February 13, 2021, 03:17:49 PM**

Half a years plenty of time to forget ;).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 13, 2021, 05:41:12 PM**

It does seem like the purity of the starting material is extremely important, which intrigues me, from a mechanistic standpoint, how this works. Not often you see a reaction completely fail because of an impurity similar in chemistry to your substrate. Logically you'd just expect the impurity to bee processed as well. Does anyone know if 2C-H fluoresces under UV?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **February 13, 2021, 06:00:30 PM**

I guess it's side reactions. I noticed that when it was reacted longer than an hour the color of the extract would become increasingly dark and the yields plummit. An hour after it is only champagne. Impurities may participate in them as well

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **February 13, 2021, 07:51:41 PM**

I let my initial nitrostyrene dry for a week or so, had a bit of HCL in it. First rextal resulted in a mixture of nice orange and yellow crystals. 2nd rextal is still crashing out but appears to be only slightly more yellow. Should I keep going until I have all yellow crystals or could it be stained from sitting in the MeOH for a few days ?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Planophore** on **February 13, 2021, 08:28:10 PM**

I’d definitely say keep going until it’s all yellow. Do 3-4 recrystallisation total

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 13, 2021, 09:03:03 PM**

Anyone that has tried this before and had gotten the reaction working, please try it with an addition of a small amount of ammonium chloride or aqueous ammonia after the addition of the copper.
In theory this could complex the copper and improve the yields.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **February 13, 2021, 10:05:23 PM**

3rd or is it 4th rextal in progress ::). Anyone noticed a difference in using MeOH or IPA for the recrystallization?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **February 13, 2021, 10:52:58 PM**

Quote from: CF3Licker on February 13, 2021, 09:03:03 PM

> Anyone that has tried this before and had gotten the reaction working, please try it with an addition of a small amount of ammonium chloride or aqueous ammonia after the addition of the copper.
> In theory this could complex the copper and improve the yields.

sooooo, why exactly is copper-salt added to the reaction mixture? ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 13, 2021, 10:54:52 PM**

Quote from: Orange on February 13, 2021, 10:52:58 PM

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>
> sooooo, why exactly is copper-salt added to the reaction mixture? ::)

To form the copper catalyst :D ammonia complexes with copper and borane. It could help homogenization and reaction.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **February 13, 2021, 11:03:28 PM**

Quote from: CF3Licker on February 13, 2021, 10:54:52 PM

> Quote from: Orange on February 13, 2021, 10:52:58 PM
>
> > Quote from: CF3Licker on February 13, 2021, 09:03:03 PM
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> > sooooo, why exactly is copper-salt added to the reaction mixture? ::)
>
> To form the copper catalyst :D ammonia complexes with copper and borane. It could help homogenization and reaction.

right and what is the catalyst doing? how works the catalyst?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 13, 2021, 11:56:12 PM**

Is an exact mechanism known? It still has potential of forming finer particles. This is why it should be tried.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **February 14, 2021, 01:30:02 AM**

Well the Copper salt forms Copper boride on cantact of the NaBH4 and the NaBH4 gets decomposed by the Copper boride, then copper boride takes some Hydrogen up and add it into the Nitro group - reducing it into an amine group.

maybe some Copper formed aswell.

So i dont personally believe that complexing the Copper could lead to better yields. It would be ripped by the NaBH4 anyway out of the complex.

maybe addition speed and conc of both NaBH4 and Copper salt solutions could change the catalyst.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **callejularbo** on **February 14, 2021, 01:30:44 PM**

The precipitate appears to be a mixture of copper and copper oxide and not copper boride.
https://link.springer.com/article/10.1007/s13738-016-0864-4

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **February 14, 2021, 01:34:49 PM**

I linked another paper a few pages back where they said that a tiny amount of copper boride can be formed too among the elemental copper nanoparticles.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **February 14, 2021, 01:52:18 PM**

Quote from: CF3Licker on February 13, 2021, 11:56:12 PM

> Is an exact mechanism known? It still has potential of forming finer particles. This is why it should be tried.

https://www.thevespiary.org/talk/index.php?topic=15090.msg54193599#msg54193599

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 14, 2021, 06:35:49 PM**

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www.sciencedirect.com/science/article/pii/S1878535212001025
2.1. Preparation of Cu nanoparticles
They use a copper ammonia complex for the preparation of the nanoparticles.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **February 14, 2021, 07:25:49 PM**

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hxxps://en.wikipedia.org/wiki/Nickel_boride_catalyst so with copper its not forming?!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **February 14, 2021, 07:28:36 PM**

> Quote from: Orange on February 14, 2021, 07:25:49 PM
>
> hxxps://en.wikipedia.org/wiki/Nickel_boride_catalyst so with copper its not forming?!

No with copper its predominantly nanoparticles.
They made a paper about it and its linked in here.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **February 14, 2021, 07:31:19 PM**

interesting.. so my first thought and claim back then was actually right xD

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **February 14, 2021, 09:48:56 PM**

Sometimes you can physically see little streaks of copper in the reaction flask...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **February 14, 2021, 10:59:18 PM**

for me its all black, when i add base and heat it turns into copper colored shards

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **February 15, 2021, 02:36:15 PM**

I also reduced the MeOH volume from the numerous recrystallizations - there was a fair amount of yellow shiny crystals left in the solution. Essentially not as big and pretty as the main volume, not sure if this is worth recovering or of high enough quality to use. It appears to just be smaller shards of the larger crystals.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **February 16, 2021, 02:23:25 PM**

Orange's method for the reaction; H2SO4/Acetone workup; carried out in 3-neck 250 mL FBF with good stirring, temp at ~22-24 C.

2.80 g NaBH was added to a chilled FBF of 20 g IPA + 20 g H2O. Fizzing immediately occurred, the reducing agent dissolved readily upon initiation of stirring.
2.75 g 3,4,5-TMNS was added in small portions (about a green pea in volume), letting the yellow of the nitrostyrene disappear and convert to white before adding the next portion, being careful to not let the temp get too close to 25 C.

0.2 g CuSO4 in 2 mL of water was added in one go. Solution immediately turned black with black precipitate forming at the interface between the solution and the flask wall. The flask was manually agitated in order to get the solution to swirl the precip back into itself, then left to reflux for 1 hour at about a drip rate of 1 drip/ 2 seconds.

The reaction mixture was cooled and 2 g NaOH pellets added. The now alkaline solution gave off flickers of elemental Cu. pH strips indicated it was about 10-11 so another 1 g of NaOH was added for good measure.

The aqueous layer settled to the bottom after about 10 minutes. The next day it was removed by pipette, leaving the alkaline IPA mixture behind. This slightly sludgy mixture was easily and quickly filtered through a cotton ball in a funnel.

The "dark Cognac" filtrate was slowly neutralized with drops of H_2SO_4 from a eye-dropper, giving off "explosive" vaporous puffs with each addition, and almost congealing the solution with its thickness. The solution was swirled to distribute the acid and then 2x the volume of dry acetone was added to draw up impurities, precip any remaining product, and make the whole thing easier to work with.

The product was filtered on the pump, washed 2x with cold, dry acetone at the pump, and air dried.

Yield: 1.9g mescaline sulfate; 53.4% molar yield.

NOTE: upon referencing my notes it appears that too much nitrostyrene was present (about 30% too much! :'( ) which explains the lower than expected yield. Fucking typos ;D

Ayway, here's some porn.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 16, 2021, 03:17:35 PM**

Quote from: aes256 on February 16, 2021, 02:23:25 PM

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> NOTE: upon referencing my notes it appears that too much nitrostyrene was present (about 30% too much! :'( )

> which explains the lower than expected yield. Fucking typos ;D
>
> Ayway, here's some porn.

Cool stuff, thanks for the contribution!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **February 16, 2021, 03:35:38 PM**

Good one aes! Your product looks indeed beautiful.
Keep in mind that IPA CuSO4 may give lower yields due to the low solubility of the sulfate in IPA, better choice would be CuSO4 in EtOH or CuCl2 in IPA, but if that works it's probably fine. Also, I'm not sure, but since the mescaline sulfate is organic salt, won't the acetone dissolve a bit of it? The imine formation is not an issue I guess due to short contact between these two.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **February 16, 2021, 03:48:36 PM**

now add 2-MeO-Benzaldehyde to it :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **February 16, 2021, 05:18:33 PM**

Quote from: mackolol on February 16, 2021, 03:35:38 PM

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No, it's insoluble. You can even stir the hydrochloride or sulfate salt in boiling acetone to get it clean, without risking loss. The sulfate salt recrystallizes nicely from a mixture of water (minimal amount of hot water followed by twice the volume of boiling 91-99% IPA) to yield absolutely pure snow white crystals.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **spagettidick** on **February 17, 2021, 03:38:00 AM**

maby i am a little fucked up or i cant read but i was under the assuption that this was for synthesising amine, not fucking mescaline. This is ether a post by the DEA trying to muddy the waters between pure amphetamine, and psycadelic garbage, whats going on????

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **spagettidick** on **February 17, 2021, 03:44:49 AM**

Quote from: norchem on February 09, 2021, 05:11:19 PM

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> > > In the recieving flask after steam destilation is about 200ml of clear/milky oily substance. This divided into into 2 different flasks for experimentation purposes.
> > > One of the flasks was not washed or extracted but instead dryed slowly on a stir-plate at 50-60degress for a couple of hours until about 20ml remained.
> > > Then carefully, a few drops, probably 3 of ~20% H2SO4 was added while stirred until pH 7 and let stand overnight.
> > >
> > > The result after night is same transparent/milky/oily substance since steam destillation but also alot of crystals formed, looking like this: https://imgur.com/a/7fyAnYF
> > >
> > > pH still about 6.5, the amine smell is still present but taste is very salt (touched with tounge).
> > >
> > > Now to the question:
> > > **What is the crystals?**
> > >
> > > How to recover any product from the substance? Steam distill again? Wash with acetone? Also methanol, chloroform, toluene and DCM is available.
> >
> > I don't really know, why do you all steam distill the amphetamine freebase and bother with such shit.
> > The IPA layer is already clean after the reduction, I mean, it's transparent and not colored. Why not just dry it and drip the H2SO4 directly? I've done so and got some good snow white shit ::)
> >
> > And yet one question, did you try to remove the water from aphetamine freebase by heating :o?
>
> I didnt get a clear layer. I got a light blue layer and a brown / black layer. I think i might have been sloppy since i only recrystalized nitro once or it could have been because nabh4 became a big lump which refused to disolve when heated so i needed to crush it. I Also let reaction stand overnight since i had to leave and it was blue the next day.
>
> I remove most water with heat, yea, but also with silica gel but i didnt have so much at the time so it was the last bit.
>
> I think btw. the crystals might be sodium bisulfate because of mix between hcl and h2s04 without washing or extracting between.
>
> steam distill the amphetamine freebase is so your amine doesnt fly off with the alchohol/IPA... ps your shit is on the ceiling lol. Cook in alchohol, extract in solvent. Distill to remove your goodies from the volatile alchohols, their not stable...then extract in solvent eg petrolium ether/DCM,,, then isolate/salt out with IPA and sulphuric acid..

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **February 17, 2021, 06:12:35 AM**

> Quote from: spagettidick on February 17, 2021, 03:38:00 AM
>
> maby i am a little fucked up or i cant read but i was under the assuption that this was for synthesising amine, not fucking mescaline. This is ether a post by the DEA trying to muddy the waters between pure amphetamine, and psycadelic garbage, whats going on????

I'm sorry, the written medium has low bandwidth for interpersonal context - are you being serious or taking the piss? I honestly can't tell. For clarity, this is a thread about reductive amination of nitroalkenes to their respective amines (e.g. amphetamine, substituted phenethylamine) with NaBH4 + Cu as catalyst. Do you follow?

And no I'm not DEA. But that's exactly what DEA *would say*, wouldn't it.. ;)

Oh, your reading is fine btw.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Corrosive Joeseph** on **February 17, 2021, 06:14:20 AM**

Quote from: spagettidick on February 17, 2021, 03:38:00 AM

> maby i am a little fucked up or i cant read but i was under the assuption that this was for synthesising amine, not fucking mescaline. This is ether a post by the DEA trying to muddy the waters between pure amphetamine, and psycadelic garbage, whats going on????

But you are a little fucked up ;D Mescaline, just like amphetamine, is an amine.... Both are primary amines.... And both are phenethylamines 8)

/CJ

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 17, 2021, 03:35:43 PM**

Quote from: aes256 on February 17, 2021, 06:12:35 AM

> I'm sorry, the written medium has low bandwidth for interpersonal context - are you being serious or taking the piss? I honestly can't tell. For clarity, this is a thread about reductive amination of nitroalkenes to their respective amines (e.g. amphetamine, substituted phenethylamine) with NaBH4 + Cu as catalyst. Do you follow?
>
> And no I'm not DEA. But that's exactly what DEA *would say*, wouldn't it.. ;)
>
> Oh, your reading is fine btw.

It's not reductive amination.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **February 17, 2021, 09:20:38 PM**

Quote from: spagettidick on February 17, 2021, 03:38:00 AM

> maby i am a little fucked up or i cant read but i was under the assuption that this was for synthesising amine, not fucking mescaline. This is ether a post by the DEA trying to muddy the waters between pure amphetamine, and psycadelic garbage, whats going on????

Psychedelic garbage ? Mescaline ?
First of all like Joeseph said they are both amines, if you wouldn't boof all that amphetamine maybe you could sync 2 neurons to work that out, and the thread is about the NaBh4-Copper method, and to all that it applies. Eat a whole gr of Mescaline then let me know if compared to the twinkywinky high of amphetamine it slapped you ass ;)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **February 17, 2021, 09:25:26 PM**

I'm starting to get better result with 2C-H, 75-80%, clean white "flower" crystals, absolutely no polymerization nor crap in the crude 2CH in Toluene. Re-xed nitrostyrene 2x, running a 20gr scale experiment based on Orange's special sauce recipe, but running it lower in temps (barely refluxing, 1 drop every 10 seconds) and the shit brominates clean and direct with Br2, after 1 re-x in Toluene.

Will write one of my nice and detailed work-ups, with love for the masses of retarded fucktards that joined in these last months <3 :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **CF3Licker** on **February 17, 2021, 10:12:43 PM**

Quote from: ApeMaia on February 17, 2021, 09:25:26 PM

> I'm starting to get better result with 2C-H, 75-80%, clean white "flower" crystals, absolutely no polymerization nor crap in the crude 2CH in Toluene. Re-xed nitrostyrene 2x, running a 20gr scale experiment based on Orange's special sauce recipe, but running it lower in temps (barely refluxing, 1 drop every 10 seconds) and the shit brominates clean and direct with Br2, after 1 re-x in Toluene.
>
> Will write one of my nice and detailed work-ups, with love for the masses of retarded fucktards that joined in these last months <3 :)

Thanks for the contribution, can't wait for the writeup. It turns out GABA as catalyst for the nitrostyrene formation forms an impurity.
I'd like to see if using ammonium chloride improves yields. I did some tests with the formation of the nanoparticles, and some ammonium chloride with the copper improved the speed at which the 2 reacted.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **February 17, 2021, 10:50:31 PM**

Quote from: ApeMaia on February 17, 2021, 09:25:26 PM

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> Will write one of my nice and detailed work-ups, with love for the masses of retarded fucktards that joined in these last months <3 :)

I thought extreme heating was key to the reaction's success?

I am very excited for the writeup!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **February 18, 2021, 02:20:12 AM**

Quote from: ApeMaia on February 17, 2021, 09:25:26 PM

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>
> Will write one of my nice and detailed work-ups, with love for the masses of retarded fucktards that joined in these last months <3 :)

proudness intensefies xD

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **February 18, 2021, 06:05:10 AM**

For those of you following along at home with a computer here is a Python script to calculate the correct molar amounts of reactants for a variable amount of starting material:

Quote
```
def calc_nabh_cu_amounts(nitroalkene_in_grams, nitroalkene):
    nitroalkene_in_grams = float(nitroalkene_in_grams)

    ALKENES = {
        'dimethoxynitrostyrene': 209.20,
        'trimethoxynitrostyrene': 239.22,
        'p2np': 163.17,
        'mdp2np': 207.18,
    }
    if nitroalkene not in ALKENES.keys():
        raise Exception(
            'unrecognised nitroalkene: ' + nitroalkene,
            'Please select from: ', ALKENES.keys()
    )

    nitroalkene_n = nitroalkene_in_grams / ALKENES[nitroalkene]
    nabh4_mm = 37.83
    cu_salt_mm = 159.61    # CuSO4
    #cu_salt_mm = 134.45    # CuCl2

    nabh4_n_coefficient = 7.714     # 7.7 x molar mass of nitroalkene
    cu_salt_n_coeffient = 0.015     # Orange's magic number

    nabh4_n = nabh4_n_coefficient * nitroalkene_n
    nabh4_m = nabh4_n * nabh4_mm
    cu_salt_n = nabh4_n * cu_salt_n_coeffient
    cu_salt_m = cu_salt_n * cu_salt_mm

    print(
        f"{nitroalkene_in_grams:.4} g ({nitroalkene_n:.4} mol) {nitroalkene}\n",
        f"{nabh4_m:.4} g ({nabh4_n:.4} mol) NaBH4\n",
        f"{cu_salt_m:.4} g ({cu_salt_n:.4} mol) Cu salt\n"
    )
```

Example: 2 grams of 2,5-dimethoxynitrostyrene

Quote
```
>>> calc_nabh_cu_amounts(2, 'dimethoxynitrostyrene')

2.0 g (0.00956 mol) dimethoxynitrostyrene
2.79 g (0.07375 mol) NaBH4
0.1766 g (0.001106 mol) Cu salt
```

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Mrbovinejony** on **February 18, 2021, 06:39:14 AM**

Huh that's pretty neat. My hobby before this was programming but I never thought to combine the two. Maybe it'd be a fun way to combine all these frequently used reactions we see on here, from generic reductions and aminations to grignard reactions

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or**

acids.
Post by: **ApeMaia** on **February 18, 2021, 10:53:15 AM**

> Quote from: StuffedBee on February 17, 2021, 10:50:31 PM
>
> > Quote from: ApeMaia on February 17, 2021, 09:25:26 PM
> >
> > > I'm starting to get better result with 2C-H, 75-80%, clean white "flower" crystals, absolutely no polymerization nor crap in the crude 2CH in Toluene. Re-xed nitrostyrene 2x, running a 20gr scale experiment based on Orange's special sauce recipe, but running it lower in temps (barely refluxing, 1 drop every 10 seconds) and the shit brominates clean and direct with Br2, after 1 re-x in Toluene.
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> >
> > I thought extreme heating was key to the reaction's success?
> >
> > I am very excited for the writeup!

Maybe on micro/small scale yeah, or even more probable, it's just not affected on very small scales by higher temps because the reaction time is way shorter. But i'm no chemist, so can't talk in a certain manner about the process, just reporting on my findings.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **February 18, 2021, 12:54:19 PM**

> Quote from: Orange on February 18, 2021, 02:20:12 AM
>
> > Quote from: ApeMaia on February 17, 2021, 09:25:26 PM
> >
> > > I'm starting to get better result with 2C-H, 75-80%, clean white "flower" crystals, absolutely no polymerization nor crap in the crude 2CH in Toluene. Re-xed nitrostyrene 2x, running a 20gr scale experiment based on Orange's special sauce recipe, but running it lower in temps (barely refluxing, 1 drop every 10 seconds) and the shit brominates clean and direct with Br2, after 1 re-x in Toluene.
> > >
> > > Will write one of my nice and detailed work-ups, with love for the masses of retarded fucktards that joined in these last months <3 :)
> >
> > *proudness intensefies* xD

Eh mes amis, after pestering you, Carl, mack and others with more questions than a mom when you come back home after 5 days missing, it worked out way better than the first trials. Of course still needs a re-x after the first HCl crude is obtained, but no more green gunk or shit floating around, and a direct bromination with Br2 actually worked also on this crude. Look at this nice crystal flowers meeting in the middle in perfect geometry <3

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **February 18, 2021, 01:16:54 PM**

What was ur yield from direct bromination?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or**

acids.
Post by: **ApeMaia** on **February 18, 2021, 01:34:00 PM**

> Quote from: aes256 on February 18, 2021, 01:16:54 PM
>
> What was ur yield from direct bromination?

From 0% to 1.0gr out of 1.2gr 2C-H, meaning sometimes it failed, sometimes it brominated nicely in mustard yellow hbr in a matter of 1-2 minutes, but i'm still trying to understand the reaction and do it better, solvents wise especially. bromination from the oxalate salts instead gave out heat but nothing happened and everything was left a red solution. Addition of random ammounts of Ethyl Acetate plus a "petrol essence" (bought the wrong petroleum ether) seemd to have crashed out the brominated final product although(this was casually done because i considered the red unbrominated solution of 2ch/Br2/GAA a fail and just threw in casual solvents)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **February 19, 2021, 06:39:49 AM**

---

sorry, are you using HBr or elemental Br?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **February 19, 2021, 08:25:06 AM**

> Quote from: aes256 on February 19, 2021, 06:39:49 AM
>
> sorry, are you using HBr or elemental Br?

Pure Bromine, like real men. I do a shot of it every time the reaction is successful

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Planophore** on **February 21, 2021, 10:50:47 PM**

Obtained an ~90% crude yield on a 10 gram scale with 2,5-DMBNS

That wont be the final yield as there's still some cleaning up to do but I reckon it will be in the 80's which is very exciting :D

Edit: Something that was found to be particularly useful for ensuring the precipitate remains well dispersed on CuCl2 addition was pouring the solution directly into a deep vortex.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **February 21, 2021, 10:59:00 PM**

A small note on IPA vs methanol for recrystallization of the nitrostyrene:
In my last run for whatever reason the whole mixture turned reddish black and after two recrystallizations from IPA, the nitrostyrene was still sticky and not the bright orange but a dull red. The next recrystallization was done from methanol which easily got rid of the

gunk and left a very nice orange powder.

So it seems that in some cases methanol might be more efficient at removing impurities

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **February 21, 2021, 11:10:45 PM**

---

when I see that dark-orange/red colour for nitrostyrne formation of the 2,5 or 3,4,5 I cry a little inside. That colour is not a good sign :/ self-flagellation imminent usually

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **February 21, 2021, 11:21:45 PM**

Quote from: StuffedBee on February 21, 2021, 10:59:00 PM

> A small note on IPA vs methanol for recrystallization of the nitrostyrene:
> In my last run for whatever reason the whole mixture turned reddish black and after two recrystallizations from IPA, the nitrostyrene was still sticky and not the bright orange but a dull red. The next recrystallization was done from methanol which easily got rid of the gunk and left a very nice orange powder.
>
> So it seems that in some cases methanol might be more efficient at removing impurities

I use only Ethyl Acetate for re-xing 2,5 DMNS and it works better than anything else, 4cm long needles/hairs everytime, look around my older posts

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **February 22, 2021, 07:12:54 PM**

Ethyl acetate ftw! Never seen such nice crystals from a solution that looks like the toilet at an open air festival

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **February 23, 2021, 03:36:58 PM**

Quote from: blade_runner on February 16, 2021, 05:18:33 PM

> You can even stir the hydrochloride or sulfate salt in boiling acetone to get it clean, without risking loss. The sulfate salt recrystallizes nicely from a mixture of water (minimal amount of hot water followed by twice the volume of boiling 91-99% IPA) to yield absolutely pure snow white crystals.

Alternatively you can go the other way and dump your mesc sulfate in warm, stirring acetone (the antisolvent) and drip water in until the last of the turbidity is gone. That way you don't overshoot the amount of water required to dissolve the mescaline.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **March 03, 2021, 12:01:15 AM**

Damn it, all went well this run - after a jillion recrystallizations. Never will I form the nitrostyrene via the Leminger paper again. At any rate, I over shot my sulfate salt - ph 9 quickly became ph 3. How would I go about adjusting this? I am really not familiar with sulfate salts.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **March 03, 2021, 12:40:11 AM**

---

try oxalate then

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 03, 2021, 12:42:51 AM**

Quote from: sparklebags on March 03, 2021, 12:01:15 AM

> How would I go about adjusting this? I am really not familiar with sulfate salts.

You just don't let that happen.
Be careful!
You have to start all over again now ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **March 03, 2021, 12:46:00 AM**

Reaaaaally!? Goddamn it! Well, one flask is fine.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **March 03, 2021, 12:51:44 AM**

---

lol, carl is taking the piss because you've neglected to learn the very most basic fundamentals of chemistry while attempting a non-trivial synthesis given your level of chemical understanding. you product is indeed there :)

clue: mesc sulfate precipitates from cold water + acetone solution

EDIT: i'm assuming you're going after mescaline and not one of the other amines in this thread

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **March 03, 2021, 12:54:23 AM**

Oh I got that....I just didn't want to play with him lol. I knew it was my cue to figure it out on my own hahaha. So once you over shoot a sulfate salt, you can't really bring it back with NaOH or KOH due to water being formed or sodium sulfate being formed? To be fair, Carl has been more than helpful to me over the years, a gentleman and a scholar!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or**

acids.
Post by: **big mac** on **March 03, 2021, 07:49:56 AM**

Too much of the anh H2SO4 and you obviously will destroy your organic compound. I don't know what's the threshold of mescaline. It probably is fine, but if you want not to overshoot the H2SO4 don't just eyeball it! Make simple molar calculations... works everytime for me.
It was like 0,5 ml H2SO4 per 2g the styrene used...? I don't remember

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **March 03, 2021, 09:12:37 AM**

I was dripping straight 98% H2SO4 into the rxn mixture and got back ~75% (beige; crude)

now, that's not to say I didn't lose some product but it speaks to the (non)destructive properties of concentrated sulfuric acid on this particular phenethylamine

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **March 03, 2021, 09:28:30 AM**

The more H2So4 in the mixture, the bigger solubility of sulfate salt is.
And also you have to put it in strong freezer in like a day or so to fully precipitate it.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **March 03, 2021, 12:41:49 PM**

I calculated moles of expected product and divided by 2. Mixed a 20% solution with cold IPA. I had 2 flasks, one titrated exactly fine, the other just went from ph 10 to 3 almost instantly. I was curious if there was a way to swing the ph back up but realized that wasn't really an option. I put both flasks in an ice bath with salt (completely covered up to the top of the neck) and let sit overnight. Seems to have worked fine enough. Next time I will just be more gentle with my H2SO4 addition.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **March 04, 2021, 09:26:19 AM**

Keep also in mind, that if your IPA layer and your h2so4 are anhydrous, your pH value won't be accurate, because, there is no water for the acid to dissociate, therefore no environment for the protons to leave acid.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **sparklebags** on **March 04, 2021, 01:59:41 PM**

Ahhhhh, good point. Yield appears to be within the usual 70%, perhaps even higher. Of course, this is before recystalization. Currently opalescent baby powder material. I am curious, why is forming the HCL salt of mescaline so problematic? I have read of people consuming it, weather or not it actually was is obviously up for debate.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **March 04, 2021, 02:39:15 PM**

Formation of HCl salt is problematic, because hydrochloric acid comes as a solution in water, a lot of water and as you probably know mescaline salts are very soluble in water.
If you want to make the HCl in anhydrous conditions, you need anhydrous, therefore dried, HCl gas and bubble it in solution. This requires special aparature too and while it isn't expensive, it's not the most comfortable thing to just set it up.
With H2SO4 you just pour the concentrated shit and even if there is some water H2SO4 is hygroscopic, so it just pulls it out.
H2SO4 salts are slightly less soluble and may have slightly weaker effect. You probably don't puke that much with sulfate though.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **callejularbo** on **March 05, 2021, 02:55:36 PM**

Anhydrous HCl can easily be made by mixing acetyl chloride and methanol.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **March 05, 2021, 03:03:20 PM**

Yeah, but acetyl chloride isn't so easily obtainable or doable.
I believe that anhydrous HCl could bee done by dripping anh H2SO4 into anhydrous chloride salt though.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **March 06, 2021, 07:46:53 AM**

Add the HCl to solvent of your choice then dry with CaCl2. If u add to acetone u have instant stoichiometric antisolvent crystal forming goodness

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **March 06, 2021, 08:41:46 PM**

Acids and acetone give polymers, but you can use ether or isopropanol.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **March 06, 2021, 08:42:31 PM**

Acetone doesn't form polymers or imines when the amine is protonated. Polymers from acid and acetone? Could you please link some sort of source?

I can see how mesityl oxide and other can be formed, but such a reaction is slow and usually requires high temperatures. Acetone has been employed to crash out salts for a long time without problems.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 06, 2021, 08:50:18 PM**

Acid catalysed aldol is what he means.
Like benzaldehyde and MEK.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **March 06, 2021, 08:54:50 PM**

Yeah sure I can see the aldol happening but is it really of any concern if the point is to either filter the solution immediately or keep it in cold freezer and filter after a couple of hours?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **March 07, 2021, 01:29:10 PM**

Did you ever add a strong acid to acetone and used that to precipitate your amine? It will give an orange/red amine salt, even when done fast in the cold.

Of course adding acetone to a neutralized amine is no problem and is the standard technique. But you don't want strong acid near aldehydes or ketones because it will strongly colored crap.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **March 07, 2021, 01:53:57 PM**

No, I first neutralized the solution of amine freebase in ether and then precipitated any leftovers with anhydrous acetone, just like Swoner in his MDA thread. You can look it up, my product is bright white. I even overacidified the amine and yet still there was absoutely no problem with acetone mixing with the leftover HCl.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 07, 2021, 01:55:20 PM**

Thats because its HCl, with sulfuric acid you would have had more issues to avoid discoloration.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **March 07, 2021, 01:58:06 PM**

Good to know. This still doesn't change that Tsjerk was referring to as's comment about adding HCl, not sulfuric acid.
Anyway, the point is - be careful with acetone, but there's no reason to discourage it's use.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **March 07, 2021, 06:29:45 PM**

I didn't want to say you shouldn't use acetone in combination with HCl at all, and precipitation of amine.HCl salts is fine even when you over-acidify. But dissolving HCl in acetone to use as acid/crystallization solvent in one is a bad idea.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Trianion** on **March 12, 2021, 01:00:14 AM**

Quote from: Tsjerk on March 07, 2021, 06:29:45 PM

> I didn't want to say you shouldn't use acetone in combination with HCl at all, and precipitation of amine.HCl salts is fine even when you over-acidify. But dissolving HCl in acetone to use as acid/crystallization solvent in one is a bad idea.

The chloride is very soluble in acetone. You can do the precipitation from acetone sure, why not? The chloride salt is easy to precipitate by gassing the nonpolar (or acetone) solution with HCl gas. After that, you must get rid of the solvent you used to contain the amine without losing any, and considering the solubility of the chloride is formidable in acetone, this is inconvenient.

As you would like to have to have the salt without any acetone, water, or similar solvent which might act as an emulgating agent in the A/B extractions needed to further achieve the desired purity to move on to recrystallization and/or other further methods of separation.

It is easier to work with the sulphate salt, as it can be conveniently purified by washing with dry acetone. This acetone wash can be done on the first extracts obtained from the reaction mixture. This reaction mixture contains (sadly) a wide variety of unwanted amines, obtained from the undesired (yet inevitable) side reactions.

This acetone wash is a convenient step to exclude a good portion of the unwanted amines from the purification steps that follow.

Obtaining this sulphate salt of course requires precise titration of the solution containing the desired amine. As we all know, titrating anything with 96-m% sulfuric acid is... Challenging to say the least.

This leaves us basically with diluting the (concentrated) H_2SO_4 you are using in anhydrous acetone, and using this acid/acetone solution in titration of the organic phase, precipitating the amine out of your nonpolar solvent, disallowing the acetone from dissolving the precipitating (sulphate) salt.

This of course calls for using anhydrous acetone, and highly concentrated sulfuric acid in order to avoid any unnecessary water in the precipitate. The crystals obtained from this can be rinsed with the anhydrous acetone to further dissolve soluble impurities.

After getting the sulphate crystals out it is only a matter of recrystallization to obtain the pure sulphate salt of the desired amine.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Trianion** on **March 12, 2021, 01:32:23 AM**

Of course if recrystallization is not your thing, vacuum distillation is the way to go.

Vacuum distillation is of course "easiest" to perform on the free base.

If going for vacuum distillation it really does not matter what acid you use to react with the desired amine, as long as the acid used makes the amine salt soluble enough in the polar phase to bring it out of your reaction mixture, while being minimally soluble in the nonpolar phase.

As you will be reacting your polar phase with a strong base in order to have the amine salt give up it's anion and hence becoming more volatile, it doesn't matter what acid you are using in the preceeding extraction step(s).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Trianion** on **March 12, 2021, 01:40:46 AM**

Quote from: aes256 on March 06, 2021, 07:46:53 AM

> Add the HCl to solvent of your choice then dry with CaCl2. If u add to acetone u have instant stoichiometric antisolvent crystal forming goodness

MgSO4 is actually less soluble in acetone and can be used with H2SO4 also. I'd say that it is also more commonly sold than CaCl2.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **March 17, 2021, 04:16:06 PM**

Quote from: Trianion on March 12, 2021, 01:00:14 AM

> This reaction mixture contains (sadly) **a wide variety of unwanted amines**, obtained from the undesired (yet inevitable) side reactions.

Do you have any evidence or literature to back up this claim? It sounds logically valid but I can't help but see it as purely conjecture. Not trying to throw shade on you, it's just that so many claims like this get accepted as lore when really there was nothing to back it up in the first place.

tl;dr: interested in what you're saying, would like to know more :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 17, 2021, 04:52:43 PM**

Quote from: Trianion on March 12, 2021, 01:00:14 AM

> After getting the sulphate crystals out it is only a matter of recrystallization to obtain the pure sulphate salt of the desired amine.

And how do you recrystallise a non-crystalline solid? As it is the case with amphetamine sulfate.

Quote from: aes256 on March 17, 2021, 04:16:06 PM

> Quote from: Trianion on March 12, 2021, 01:00:14 AM
>
> > This reaction mixture contains (sadly) **a wide variety of unwanted amines**, obtained from the undesired (yet inevitable) side reactions.
>
> Do you have any evidence or literature to back up this claim?

Nah thats not true my 2C-B made via NaBH4/CuCl2 was lab tested and its fine stuff.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **genetic777** on **March 19, 2021, 09:22:52 PM**

Oh, I didn't know that you couldn't "recrystallize" an amorphous solid? I have done such recrystallizations in the past on amph sulphate in methanol and thought I made it cleaner. Please tell me anyone if you can or not!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **March 19, 2021, 09:33:45 PM**

Quote from: genetic777 on March 19, 2021, 09:22:52 PM

> recrystallizations in the past on amph sulphate in methanol and thought I made it cleaner. Please tell me anyone if you can or not!

No you can't.
You can not recrystallise it, as it is not crystalline ;)
You can dissolve it and precipitate it out again though, which apparently is what you did.
But it is not a recrystallisation.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **March 28, 2021, 02:45:01 AM**

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how are we all liberating the 2C-H salt with the least amount of hassle?

from what I gather we're stripping the rxn of solvent then precipitating with HCl.

has anyone tried crashing the sulfate salt out ala mescaline style? I ask because I don't have solubility data for 2C-H sulfate.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Planophore** on **March 28, 2021, 08:32:39 AM**

Quote from: aes256 on March 28, 2021, 02:45:01 AM

> how are we all liberating the 2C-H salt with the least amount of hassle?

Neutralise with stochiometric quantity of aq. HCl and strip all the IPA. Then azeotropic drying with toluene.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **April 02, 2021, 06:44:37 PM**

Experiment:

2,45g DMNS(11.7mmol, img 1) was SLOWLY added to
3,5g $NaBH_4$(93mmol) in 32/16ml of IPA/H_2O, 20min after the reaction (img 2) reflux was set up and 0.2g of $CuCl_2 \times 2H_2O$ dissolved in a mixture of 3ml IPA and 3ml H_2O was added. Immediately there was bubbling and precipitation of fine black precipitate. The mixture was refluxed for 40 min. Then 20ml of water with 5.7g of NaOH was added and the mixture was stirred without heating for the next 15 min (img 3). After it wasn't warm anymore the mixture was extracted a couple times with total 70ml DCM. There was some trouble with that due to the similar densities of aq. layer and the DCM layer. Extracts were combined, washed with brine and evaporated to yield a residue of brown-yellow oil. To the oil 15ml of Et_2O was added and then Et_2O/HCl was added. This led to a formation of fine precipitate. Just to make sure, a couple drops of conc. aq. HCl were added and the mixture was flooded with acetone. Precipitate filtred, washed with acetone and dried to afford **400mg of 2C-H HCl** (img 4).

Issues:
The nitrostyrene was crude, not purified. It looked alright, but probably contained some impurities.

The stirring might've not been powerful enough. There was a cleanly defined IPA layer after the reflux ended. Maybe a larger stirbar should've been used.

Not sure about other things. Any feedback appreciated.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **April 02, 2021, 06:48:09 PM**

The nitrostyrene should bee a lot darker and intensive in color. Not all of your benzaldehyde has probably reacted resulting in mixture of DMNS and TMB.
But maybe it's just lighting and angle.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 02, 2021, 06:48:38 PM**

In the future use IPA for this extraction, as I am sure your product is still contained in the mother liquor, you just have to look for it.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **April 02, 2021, 06:51:34 PM**

Quote from: carl on April 02, 2021, 06:48:38 PM

> In the future use IPA for this extraction, as I am sure your product is still contained in the mother liquor, you just have to look for it.

That's confusing. You yourself said:

Quote

> Bad workup method, never again this way!
> In the future, will rather simply add lye, more concentrated, like 40% to keep the volume as small as possible, then extract the freebase using three portions of DCM.
> Washing, drying, as usual, and I think the salt can be formed from the extract then directly and much cleaner... but aqueous, so it allows to wash this aqueous acidic extract using, for example DCM, again.
> Followed by a recrystallisation as usual, this way we would not have as much loss as I likely have suffered here.

So just add IPA, extract and filter the extracts to get rid of the copper? Sounds possible.

You're probably right macko, the nitrostyrene had some residual smell of the aldehyde.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **April 02, 2021, 06:54:17 PM**

Never extract alcoholic layer with DCM, they're miscible...   :-[it's no wonder that your DCM had similar density to water it probably had ton of alcohol in it. I think that Carl meant that you have to extract the NaOH water solution after you probably make it from its crude salt.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 02, 2021, 07:11:30 PM**

Yeah that proposal was hypothetical, in the end the "oxalate workup" came out of it as the ideal approach ;)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **April 02, 2021, 07:14:51 PM**

Cool, I'll try what you described the next time I get around to this reaction.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Planophore** on **April 02, 2021, 10:09:24 PM**

Quote from: Sawdust and Honey on April 02, 2021, 06:44:37 PM

> Not sure about other things. Any feedback appreciated.

A friend found the following:
-The best yields (around 85%) were obtained from a workup incl. azeotropic drying with toluene
-The CuCl2 soln. should be added directly through the centre joint of the flask into a deep vortex
-Acetone washes should be avoided (unless you're absolutely sure its dry) to minimise losses
-Using a longer and especially thicker stir bar kept the black ppt. (and biphasic RM)

homogenous

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **April 02, 2021, 10:25:56 PM**

The thing I want to try next when I get around to it again is the following:
- separate IPA
- acidify
- distill IPA off until there is only water left
- extract all crap with DCM
- basify
- extract with toluene
- (wash with brine)
- acidify with HCl
- distill off the toluene

Not really sure if the extra work pays off but in theory it should yield a much purer product than just washing the 2C-H and no solid drying agent is needed

I tried the oxalate workup twice and both times it resulted in 0% yield. Is it confirmed to work on the 2C-H as substrate?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Johnathan Ferrous** on **April 02, 2021, 10:45:46 PM**

I hate how much DCM costs.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **April 03, 2021, 07:53:58 AM**

Why would you extract with toluene and not just stick with DCM? Is it a cost thing?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **April 03, 2021, 09:25:18 AM**

The extract needs to be 100% dry to crystallize 2C-H.HCl properly. The easiest way to achieve that is azeotropic distillation with toluene

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **April 03, 2021, 09:42:37 AM**

Maybe that's why my yield was so lousy, about 30% from 2,5-DMNS.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**

Post by: **blade_runner** on **April 03, 2021, 04:26:10 PM**

Quote from: Johnathan Ferrous on April 02, 2021, 10:45:46 PM
> I hate how much DCM costs.

Try using chloroform (make it yourself with acetone and high strength bleach) or tetrachloroethylene (OTC.)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **April 03, 2021, 04:48:30 PM**

Quote from: StuffedBee on April 03, 2021, 09:25:18 AM
> The extract needs to be 100% dry to crystallize 2C-H.HCl properly. The easiest way to achieve that is azeotropic distillation with toluene

indeed.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **April 03, 2021, 07:38:15 PM**

Quote from: StuffedBee on April 02, 2021, 10:25:56 PM
> I tried the oxalate workup twice and both times it resulted in 0% yield. Is it confirmed to work on the 2C-H as substrate?

Well, the first thing I thought was, you sure the yield was already there to begin with? Because 2C-H oxalate precipitates easily and there is not much you can do wrong.

Quote from: StuffedBee on April 03, 2021, 09:25:18 AM
> The extract needs to be 100% dry to crystallize 2C-H.HCl properly. The easiest way to achieve that is azeotropic distillation with toluene

Strange, I had no real issues to crystallise 2C-H HCl by aqueous extraction of a DCM solution of it?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **April 03, 2021, 08:49:01 PM**

Yeah, can agree oxalate indeed does work on 2,5 dimethoxy very well. It's just the matter of freebasing it. You have to go with KOH.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **April 03, 2021, 08:57:19 PM**

Why KOH? What's the difference?

Quote from: carl on April 03, 2021, 07:38:15 PM
> Quote from: StuffedBee on April 02, 2021, 10:25:56 PM
> > I tried the oxalate workup twice and both times it resulted in 0% yield. Is it confirmed to work on the 2C-H as substrate?
>
> Well, the first thing I thought was, you sure the yield was already there to begin with?

> Because 2C-H oxalate precipitates easily and there is not much you can do wrong.

Well i got a good amount of oxalate (not necessarily 2C-H), that dissolved in 10x water but freebasing didn't really look like much and acidifying the DCM extract did nothing at all. Even evaporated it down i think and there was like a very small amount of stuff at the bottom if I remember correctly that wasn't worth recovering

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **April 03, 2021, 09:02:58 PM**

The solubility of Na oxalate is miserable, while K oxalate is pretty soluble. I think that I don't need to explain what happens when you mix poorly soluble salt solution with DCM

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **April 04, 2021, 06:57:24 AM**

I thought no one yet succeeded freebasing the oxalate salt quantitatively?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **xdragon** on **April 04, 2021, 09:17:45 AM**

Quote from: StuffedBee on April 03, 2021, 08:57:19 PM

> Why KOH? What's the difference?
>
> Quote from: carl on April 03, 2021, 07:38:15 PM
>
> > Quote from: StuffedBee on April 02, 2021, 10:25:56 PM
> >
> > > I tried the oxalate workup twice and both times it resulted in 0% yield. Is it confirmed to work on the 2C-H as substrate?
> >
> > Well, the first thing I thought was, you sure the yield was already there to begin with?
> > Because 2C-H oxalate precipitates easily and there is not much you can do wrong.
>
> Well i got a good amount of oxalate (not necessarily 2C-H), that dissolved in 10x water but freebasing didn't really look like much and acidifying the DCM extract did nothing at all. Even evaporated it down i think and there was like a very small amount of stuff at the bottom if I remember correctly that wasn't worth recovering

I had other hiccups during my workup, it was my first time with 2C-H and on less than a gram scale, but this mirrors my experience. However, I'm not completely sure if this was the oxalate or my fault. Sadly, I decided against taking a melting point of the presumably oxalate salt. Solubility in hot water was quite bad, and after basifying, extracting with toluene, extracting with dilute HCl and boiling down the aq. layer, nothing much came out of it... However, I did with NaOH rather than KOH. I'm not sure if I still have the phases to try again. Thanks for the input mackolol!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **April 04, 2021, 03:28:50 PM**

To bee honest I haven't tried it with KOH, but it should work. I didn't have a big yield of HCl from oxalate, although there was some.

The best way would bee to take the oxalate (which indeed is the 2C-H one and gives very good yield. Reacted positive with Marquis) and react it with Br2. Quick, straightforward and high yielding (haven't tried that either, but wanna give it a go).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **April 04, 2021, 03:49:01 PM**

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well for future i would just basify oxalate,extract, evap and just add GAA to freebase, add NBS and then really make everything basic and workup. because GAA solves 2CH.HCl (even) in good amounds.

and dont worry for unreacted 2CH.HCl it really need dry conditions to precipitate and 2CB.HCl just precip out godly.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **April 08, 2021, 11:32:27 AM**

Quote from: mackolol on April 04, 2021, 03:28:50 PM

> To bee honest I haven't tried it with KOH, but it should work. I didn't have a big yield of HCl from oxalate, although there was some.
> The best way would bee to take the oxalate (which indeed is the 2C-H one and gives very good yield. Reacted positive with Marquis) and react it with Br2. Quick, straightforward and high yielding (haven't tried that either, but wanna give it a go).

Yes, i went with a 25% solution of KOH and the mf freebased clean, extracted with DCM afterwards

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **April 10, 2021, 06:48:12 PM**

Tried the reduction without DCM today. 1st thing to note - use clean IPA. After acidifying the IPA extracts any ketones from OTC IPA can and will condense into irritating oils and tar. Despite that, the acidifed IPA extracts were stripped of IPA and 50ml of toluene was added and a Dean-Stark apparatus attached. Total of 10ml of water was obtained by azeotropic drying, which was nice. The problem is that the product is very impure, brown in color. That's because the IPA extracts carry along all the organic impurities from the reaction (unreacted starting material, tars etc...). The yield is higher, but I will need to purify the 2CH HCl somehow. I don't really want to go with the oxalate if there's so much trouble with it. Any ways to recrystallize 2CH HCl? I'd just to an AB but it seems like the salt is somewhat soluble in organic solvents and that will lead to large losses.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **April 10, 2021, 07:14:46 PM**

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for rex use straight up toluene. rex like this drink "woof woof"

well the oxalate route is alot cleaner and if you just use some KOH for basification u shouldn't get any problems.

btw xdragon - i once tried to evap an aq. HCl extract of 2CH too - no chance getting product out of it unless you use the azeotripic distillation technique.
the 2CH.HCl is just too water needy and like to cling on the water like your toxic psycho ex on you. plus on heating the solubility is just too damn high in water so its difficult anyway to get some xtals out of it.

if you had reduced the water layer to an minimum and tryed adding toluene and heat and shit - MAYBE they had been some xtals

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **April 10, 2021, 07:23:41 PM**

The toluene solubility is very low, quite irritating. Got like 350ml of toluene there just to dissolve a couple grams. And there's still some crystalline sand on the bottom : (.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **April 10, 2021, 07:56:22 PM**

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try solving in water again and then azeotropic distillation for rex

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **xdragon** on **April 10, 2021, 09:06:59 PM**

Quote from: Orange on April 10, 2021, 07:14:46 PM

> btw xdragon - i once tried to evap an aq. HCl extract of 2CH too - no chance getting product out of it unless you use the azeotripic distillation technique.
> the 2CH.HCl is just too water needy and like to cling on the water like your toxic psycho ex on you. plus on heating the solubility is just too damn high in water so its difficult anyway to get some xtals out of it.
>
> if you had reduced the water layer to an minimum and tryed adding toluene and heat and shit - MAYBE they had been some xtals

Quote from: carl on December 29, 2018, 09:44:00 PM

> 2,51g DMNS(12mmol) was added to
> 3,5g NaBH4(93mmol) in 32/16ml of IPA/H2O, 20min after the reaction(no cooling applied), a solution of 0,2g CuCl2*2H2O(1,2mmol) in 6ml 1:1 IPA/H2O was added at once, then refluxed for 40min
>
> After reaching r.t, a 25% solution of NaOH (20 ml) was added, the phases separated and
>
> aqueous phase extracted again with IPA(2x30 ml).
> The extractions combined, dried with Na2SO4, filtered, acidified.
> The IPA was distilled off then, but the residue was still dirty.
> So it was extracted with 3x15ml DCM, then basified and the freebase extracted greyish
>
> with 3x30ml DCM, the extracts acidified using diluted HCl, the aq. portion separated and
>
> **evaporated**, boiled in dry acetone then filtered, washed with acetone to give
> -1,84g of white HCl salt(8,4mmol or 70%)

Hmm... Perhaps we both were too impatient and used excessive heat?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **April 10, 2021, 09:25:16 PM**

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maybe... but i rather workup with toluene and shit ... or oxalate... soon i ll be at it again. time to get some KOH

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **April 11, 2021, 03:41:22 PM**

Some photos...
In the end I had two different crops of 2C-H HCl. One was white-beige (from the DCM method I did and got a very low yield, but a nice product) and the other one was dirty grey/brownish. The second one was obtained after the IPA/toluene Dean-Stark workup and recryst from a shit ton of toluene. The yield was around 2.45g out of 2.7g theoretical (90.7%). I'm not sure if it's just a good yield or the product is just very impure. It was dried thoroughly so it's not toluene or water contamination. Anyways, I used up all the clean 2C-H on bromination and was only able to snap a photo of traces left in the weighing dish. So that's photo **[1]**. Photo **[2]** is the dirty 2C-H. Photo **[3]** is 2C-B made from the clean 2C-H (procedure was - 400mg NBS, 400mg 2C-H HCl and 4ml of GAA mixed together for an hour. Lots of precipitate formed which was filtered and washed with anhydrous cold acetone to get rid of any leftover bromine and succinimide. Bright white solid obtained and dried in 45C to get rid of solvents.) and **[4]** is the 2C-B made from the dirty 2C-H.

The difference in the two instances is that with the dirty 2C-H the precipitate was much heavier and sunk and didn't form light powder as with the clean 2C-H. With clean 2C-H the reaction mixture was opaque orange but with the dirty one it was bromine-red and see-through. With clean 2C-H yield of 180mg was obtained and with the dirty one 170mg was obtained. I'll eventually get some spectra of the two samples cuz I'm very curious how pure they are. Both are positive to Marquis as proven by my previous post in General Chemistry (the 2C-B from dirty 2C-H resulted in the same thing as the 2C-B from clean 2C-H - going from olive green to deep green to very nice blue).

Any feedback appreciated.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **StuffedBee** on **April 11, 2021, 09:41:52 PM**

Did you add ethyl acetate or ether to the reaction mixture to try to precipitate any dissolved 2C-B.HCl? The salt is apparently soluble in GAA (see this post https://thevespiary.org/talk/index.php?topic=17668.msg54203662#msg54203662)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **April 12, 2021, 06:55:19 AM**

No, I haven't, but I kept the filtrates so I'll evap. off the acetone washings from them and try flooding with ether.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **April 12, 2021, 11:02:03 AM**

Quote from: Sawdust and Honey on April 12, 2021, 06:55:19 AM

> No, I haven't, but I kept the filtrates so I'll evap. off the acetone washings from them and try flooding with ether.

On the other hand, aren't we a bit worried about succinimide crashing out? It's insoluble in ether and I'd expect there to be a bit of it in solution, like 300mg from my runs.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **April 12, 2021, 11:27:06 AM**

2C-B isn't fragile to base as far as I'm concerned, no?
If so, then I don't really understand why you all mess so much around 2C-H and nobody is freebasing the ready 2C-B. Easy solution would bee just bromination of the freaking oxalate that comes out clean and whole amount, and then, if the HBr is an issue, if anybody wants to do some crack ::) 8), then just freebase the 2C-B and do a HCl from it.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **April 12, 2021, 11:51:15 AM**

Because I don't want to work with elemental bromine. NBS is facile, clean and very convenient.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Mrbovinejony** on **April 12, 2021, 12:05:37 PM**

Use nbromosaccharin. At least if you have leftover saccharin it's safe enough to eat, and quite water soluble

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **April 12, 2021, 12:12:24 PM**

Quote from: mackolol on April 12, 2021, 11:27:06 AM

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i still didn't had any success with a direct bromination of the Oxalate without freebasing it. If someone reports a success hopefully they write it down here.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **April 12, 2021, 12:49:54 PM**

> Quote from: ApeMaia on April 12, 2021, 12:12:24 PM
>
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Really? I thought you had. Well I'll work with it when I finally am able. I'm convinced that it has to work.

> Quote from: Sawdust and Honey on April 12, 2021, 11:51:15 AM
>
> Because I don't want to work with elemental bromine. NBS is facile, clean and very convenient.

Right, I forgot, then probably second freebase should bee done in order to purify it fully

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **April 12, 2021, 06:52:09 PM**

Just an idea.. The oxalate salt precipitates clean, which is great, but what about other salts? Maybe they can be brominated. I'm thinking benzoate for example.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **April 12, 2021, 07:11:56 PM**

> Quote from: mackolol on April 12, 2021, 12:49:54 PM
>
> > Quote from: ApeMaia on April 12, 2021, 12:12:24 PM
> >
> > i still didn't had any success with a direct bromination of the Oxalate without freebasing it. If someone reports a success hopefully they write it down here.
>
> Really? I thought you had. Well I'll work with it when I finally am able. I'm convinced that it has to work.

The reaction heated up exothermically but nothing crashed out, then i just thrown some Ethyl Acetate and left it for many days unattend, and then i found something had crashed out. I freebased another Oxalate run with Koh, added probably too much Br2, but was able to recover everything by just dripping conc HCl in it. Let me know when you will try with the Oxalate !

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **April 12, 2021, 07:37:34 PM**

> Quote from: ApeMaia on April 12, 2021, 07:11:56 PM
>
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You have found something that had crashed out though. Now there is a question if it was the product. Anyways, I'll let you all know when I try, unless one of you tries it before ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **April 12, 2021, 08:01:41 PM**

> Quote from: mackolol on April 12, 2021, 07:37:34 PM
>
> > Quote from: ApeMaia on April 12, 2021, 07:11:56 PM
> >
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> >
> > You have found something that had crashed out though. Now there is a question if it was the product. Anyways, I'll let you all know when I try, unless one of you tries it before ::)

Oh you can bet my brains it was active, had my tongue and neurons try an internal GC/LS on it and it was working :)))

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **xdragon** on **April 12, 2021, 09:03:41 PM**

On the topic of the oxalate: A kind of lazy workup was tried for mescaline, with the goal of the HCl salt.

1.12 g of the (presumably) mescaline oxalate were dissolved in hot water, basified with KOH, extracted with 4x DCM, extracted with 4x dilute HCl and evaporated to leave a totally dissatisfying amount of crystalline residue (let's say 50 mg at best) behind.

All phases were kept, but can't be taken care of currently. Apparently freebasing oxalates is a bit problematic for some substrates?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **AustralisAlchemy** on **April 18, 2021, 01:52:35 PM**

> Quote from: sparklebags on March 03, 2021, 12:01:15 AM
>
> Damn it, all went well this run - after a jillion recrystallizations. Never will I form the nitrostyrene via the Leminger paper again. At any rate, I over shot my sulfate salt - ph 9 quickly became ph 3. How would I go about adjusting this? I am really not familiar with sulfate salts.

Haha, I made this same mistake too. I basified with NaOH in solution and just extracted with alcohol, and reacidified without overshooting it this time. Didn't seem to impact my yield too seriously.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **john_bob** on **May 31, 2021, 11:46:10 PM**

> Quote from: ApeMaia on April 12, 2021, 07:11:56 PM
>
> > Quote from: mackolol on April 12, 2021, 12:49:54 PM
> >
> > > Quote from: ApeMaia on April 12, 2021, 12:12:24 PM
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Oxalate is somewhat a reducing agent. You can see that the chemical formula for oxalic acid, HOOC-COOH, can be decomposed into 2CO2 + H2, where the dihydrogen plays the role of the reducing agent. I think it finds applications for reductions in solid phase, mixed with the solid to be reduced, heated until CO2 evolution ceases: the reaction is driven thermodynamically by the irreversible CO2 emission.

Maybe oxalate simply reduces the bromine, preventing the expected bromination (then there would be some CO2 evolution upon addition of Br2). Or something else might be happening... But I wouldn't spend too much efforts on attempting a bromination on an oxalate salt.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **May 31, 2021, 11:57:01 PM**

Oxalic acid as reducing agent, thats through breakdown to formic acid and works under leuckart conditions, at much over 100°C though.
But in deprotonated form, at RT? Hmm...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **big mac** on **June 01, 2021, 12:17:39 PM**

Yeah, that's what I thought about recently! I performed the oxalate bromination, but the bromine was somehow wet (took it from the bottom of my bromine water 8)) and its amount was probably too small. Obviously it didn't work.

I've read somewhere on SM, that oxalic acid decomposes in presence of chlorine according to equation:
(COOH)2 + Cl2 -> 2CO2 + 2HCl and the same can bee with bromine, so in this case big excess of bromine should bee used, but again not to form any tribromide or something, that wouldn't crash out of soution...

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 01, 2021, 01:26:29 PM**

With the success of using tryptamine benzoate for isolation, I wondered if it might work just as well for 2C-H?
And since we can easily brominate 2C-H as acetate or HCl salt, it probably should also work as benzoate.
Purchased some sodium benzoate to test this out at some time.
Could be more beneficial for that specific case we have here, otherwise, I would still go for the oxalate, if I don't plan on the bromination of the obtained product.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **June 01, 2021, 03:11:43 PM**

Quote from: carl on June 01, 2021, 01:26:29 PM

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> Purchased some sodium benzoate to test this out at some time.
> Could be more beneficial for that specific case we have here, otherwise, I would still go for the oxalate, if I don't plan on the bromination of the obtained product.

well thats an idea! where is my benzaldehyde... where are my dishes... ;D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **June 02, 2021, 06:29:27 PM**

Anyone tried the NaBH4-Cu with indoleamines and would like to share their experience?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 02, 2021, 06:38:46 PM**

Quote from: NeonCortex on June 02, 2021, 06:29:27 PM

> Anyone tried the NaBH4-Cu with indoleamines and would like to share their experience?

If you look a few pages back, someone had reported success for a-MT, rather low yielding(like 30-40% IIRC), but that could be due to purity related issues with the nitroalkene.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **June 02, 2021, 11:40:21 PM**

---

ok so i tried it and i got no precipitate of 2CH.Benzoate

seems pretty soluble in toluene. i wait for the fridge to do its thing but i think its hopeless.

well also 200ml toluene seems much for an 11g NS run. i had expectations.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **June 03, 2021, 12:11:19 AM**

Quote from: Orange on June 02, 2021, 11:40:21 PM

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>
> seems pretty soluble in toluene. i wait for the fridge to do its thing but i think its hopeless.
>
> well also 200ml toluene seems much for an 11g NS run. i had expectations.

uhhmmm ok after the fridge i was still disappointed, but after scraping and stirring slowly white crystals formed. :)

the ethanol i dissolved the benzoic acid could be the problem here. maybe the amound of solvent too. Lets see how much we got.

i ll distill the filtrate to 100ml and chill it again too.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Mrbovinejony** on **June 03, 2021, 12:43:07 AM**

Why didn't you use acetone to dissolve the benzoic acid? With tryptamine, the salt crashed right out after it formed

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **June 03, 2021, 01:28:58 AM**

because i didnt read that.

i got 6.75g of 2CH.Benzoate - 42% - its a nice white powder wich behaves like starch or flour ;D its funny.

the filtrate was reduced to ~100mls and let stood to chill in the fridge again.

also - benzoic acid is very soluble in toluene too so it may be even a shortage.

we ll see after some chilling

also 2CH isnt tryptamine ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **June 03, 2021, 06:35:53 AM**

Quote from: carl on June 02, 2021, 06:38:46 PM

> Quote from: NeonCortex on June 02, 2021, 06:29:27 PM
>
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>
> If you look a few pages back, someone had reported success for a-MT, rather low yielding(like 30-40% IIRC), but that could be due to purity related issues with the nitroalkene.

OK, thank you. I did search the topic for tryptamine but got no results.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **June 03, 2021, 08:47:33 AM**

---

mhmph. i got a crop of crytals but even after washing them 3-4 times in fresh toluene they stay pretty yellow

so, additional 3.3g was yielded. so its 62.5% yield wich is typical for an reduction with unrecrystallized nitrostyrene.

that 3.3g was solved in 10g GAA and 2g NBS was added. exotherm reaction, mix turned red. i wish that it magically fall out of solution. but i doubt it

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 03, 2021, 10:48:07 AM**

Great to hear that it worked!
We will see how it will turn out with the precipitation of the 2C-B benzoate, but in the worst case, you probably need to basify and extract the freebase, and make the hydrochloride.
That wouldn't be too bad, at least you have reduced a step in between this way 8)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **June 03, 2021, 10:56:19 AM**

---

well the freezer just froze everything like GAA does. so i waited to become it an liquid again and basified. damn thats dirty. the water layer is black :-\

ah i also tried to crash the benzoate out of sol with additional toluene. but that worked neither.

somehow its warm and i dont have more motivation to work on :-X

my 2 self just started screaming in my head: maaaaaaaaan that sux, you just can do normal extraction after reaction and do an A/B again tbh.

but, i still need to indentify my product... ok get urself together man. *looks at kratom* ::)

also that was for the dirty crop, the white crop may behave different , i hope.

edit: ok i got only 1g brominated product, but i also just extracted 1 time.
with the white batch wich is runnin rn i ll be more decent

edit 2: even with the white stuff i have an discolored product - but its ok. its acceptable - at the edge :D
6.75g 2CH.Benzoate -> 3.85g 2CB.HCl wich is 71.3% on the bromination. (NBS in GAA)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **June 03, 2021, 09:25:14 PM**

Quote from: Orange on June 03, 2021, 08:47:33 AM

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>
> that 3.3g was solved in 10g GAA and 2g NBS was added. exotherm reaction, mix turned red. i wish that it magically fall out of solution. but i doubt it

Welcome to the club of failed brominations :D :D
Me and Mac are still swearing at it everytime we fail with the Oxalate, but at least in panic mode i found out it pushes something out if you add Ethyl Acetate.
But if it's exothermic, it means it's brominating right ? The 1000000 € question is how the fuq should we do to get the Hbr salt out without EtoAc

Carl knows the answer i bet but he just enjoys seeing us cry like mf's in the midst of Bromine Vapors

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 03, 2021, 09:55:39 PM**

My south fruit doesn't fail, Maia my dude... 8) :D
I'm very delighted to hear about that outcome though!

Quote from: ApeMaia on June 03, 2021, 09:25:14 PM

> Carl knows the answer i bet but he just enjoys seeing us cry like mf's in the midst of Bromine Vapors

Do I?
Or maybe I am continually totally high, and maybe I just roll a dice to get totally random replies?
rolls
Yes, he probably does.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Rosenberg99** on **June 14, 2021, 02:51:39 AM**

Hi!

I have been lurking here for a while now, especially this topic. Thank you for all of your input, with your help, I also managed to reduce p2np to amphetamine. This is my first post here, so here we go.

After a couple of successful batches, I thought that it would be fun to scale-up the reaction. However, I have read somewhere some pages back that it is not easily done above 20g or so. Is that true and if it is then is there anything that can be done about it? I would like to try to reduced 100g of p2np , no more than that.
Is this doable or not at all?
Thank you in advance for any opinion you might share.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **June 14, 2021, 01:02:47 PM**

Quote from: Rosenberg99 on June 14, 2021, 02:51:39 AM

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> Is this doable or not at all?
> Thank you in advance for any opinion you might share.

I saw that adding the nitrostyrene in the IPA/h2O/NaBH4 mix, keeping it in between 10 and 30*C, and letting it to stir until there's no more color and the reaction mixture doesn't bubble almost no more (20-30min on a 47gr scale), helps a lot. Also run the reaction a bit on the lower temp sides, i do like 70*C/1 drop every 4-5 seconds, and then let the RM quench until the NaBH4 doesn't bubble hydrogen anymore.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Rosenberg99** on **June 15, 2021, 03:42:15 PM**

Thanks, I appreciate your suggestions, I will keep these in mind.

However, I apologise if this is going to be a stupid question, I am not exactly a noob but I have a long way to go until I can call myself a chemist. Anyway, what RM means in this context "let the RM quench"?. Sorry again if this is something obvious that I should know but everything I know I learnt it from books and the Internet, no formal training and no-one I could to discuss these things with ...so...you get the idea.

Furthermore, I assume that you run larger reactions, like 47 g you mentioned . Could you tell me what were your yields, did you have a hard time with it, why were the yields at the beginning and so on? I would like to prepare myself regarding how much precursor I am risking if I decide to run a larger batch, say, 50 to 100 g.

Have you tried even larger batches, if yes, how many grams of P2NP and what were your impressions in that range?

Sorry to bother you, I just want to make sure that I know my odds of succeeding versus failing. In short, I am not in the position to lose hundreds of grams of p2np, so if it is too risky then I might decide that it is not something that I can do at the moment.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **June 15, 2021, 04:25:14 PM**

RM - reaction mixture.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **June 16, 2021, 05:31:36 PM**

Quote from: Rosenberg99 on June 15, 2021, 03:42:15 PM

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I forgot to say, i only did Mescaline and 2C-H HCl/Oxalate with this method, but reading previous pages, it seems it works best with p2np..

Don't worry, i'm a fucking noob without a proper education too, read as much as you can !

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 16, 2021, 06:38:04 PM**

First, bee welcome you two :)

Quote from: Rosenberg99 on June 15, 2021, 03:42:15 PM

> Sorry to bother you, I just want to make sure that I know my odds of succeeding versus failing. In short, I am not in the position to lose hundreds of grams of p2np, so if it is too risky then I might decide that it is not something that I can do at the moment.

Ok, you need to study this thread more in detail because I took the time to write it all down.

Quote from: Schiesboger on June 16, 2021, 10:56:58 AM

> The question is:
> Is the product alright and my synapses are just retarded or can be assumed that there is a fair amount of unreacted 2c-h in there?

This question might be better suited to a thread about aromatic bromination but yes, that could be the case, you should do some analysis, maybe run a TLC plate and get a mp.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **June 16, 2021, 08:44:54 PM**

I neved tried separating 2C-H and 2C-B by TLC, mainly because literature suggests Rf values are too close.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **HaunzGruber** on **June 19, 2021, 04:17:36 PM**

Hello, I've been practicing this reaction for a while now with mescaline and It has been

quite successful. Now I've started experimenting with 2,5 dimethoxy betanitrostyrene and it has been hit or miss. After two successful reactions of 2c-b I go for another one. This time though, I can't get the 2c-h to precipitate out of the toluene despite azeotrop distillation.
 Ive read this whole thread a few times now. I'm kinda stumped by this and could use advice on how best proced. Any advice from bees who have experience working with 2c-b is greatly appreciated.
Thank you

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **June 20, 2021, 05:40:47 PM**

Ok guys, Bromination of 2C-H.Oxalate in GAA with 2eq. NBS (24h)(then one cook up) yielded 80%
so idk why some say it dont work on oxalate.

workup - just basify everything and extract. you just need to extract a few times more. and keep it hot.

oxalate isolation and washing the salt with etoh removed alot of impurities, the bromination step and extract is still dark as shit but still better product than straight up bromination of extracted freebase with side products and shit.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **June 20, 2021, 06:31:46 PM**

Quote from: HaunzGruber on June 19, 2021, 04:17:36 PM

> Hello, I've been practicing this reaction for a while now with mescaline and It has been quite successful. Now I've started experimenting with 2,5 dimethoxy betanitrostyrene and it has been hit or miss

If you ask me, that might be related to your nitrostyrenes purity.
Recrystallise it fresh and you will have a much better performance.

Quote from: HaunzGruber on June 19, 2021, 04:17:36 PM

> After two successful reactions of 2c-b I go for another one. This time though, I can't get the 2c-h to precipitate out of the toluene despite azeotrop distillation.
> Ive read this whole thread a few times now. I'm kinda stumped by this and could use advice on how best proced. Any advice from bees who have experience working with 2c-b is greatly appreciated.
> Thank you

Yeah I don't know what it is with this stupid azeotropic distillation.
I managed it without clearly, and it was a clean white and fine powder, I don't understand what problems got fabricated lately, but I've never heard of em before.
Neither did the russians report anything like this, and friends like bipolar actually tried to replicate my exact writeup(he used a too small flask though, but hey, still over 10% yield! no azeotropic fucky distillation though... what even for?).

Guys please do not spread misinformation.
If it hasn't worked for you, that doesn't mean its not viable.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **June 20, 2021, 07:00:26 PM**

Eventually I'll get around to distilling the freebase - I feel like that's the most reliable and facile way of puryfing this pesky compound.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **xdragon** on **June 20, 2021, 10:19:57 PM**

Quote from: carl on June 20, 2021, 06:31:46 PM

> Yeah I don't know what it is with this stupid azeotropic distillation.
> I managed it without clearly, and it was a clean white and fine powder, I don't understand what problems got fabricated lately, but I've never heard of em before.
> Neither did the russians report anything like this, and friends like bipolar actually tried to replicate my exact writeup(he used a too small flask though, but hey, still over 10% yield! no azeotropic fucky distillation though... what even for?).
>
> Guys please do not spread misinformation.
> If it hasn't worked for you, that doesn't mean its not viable.

I don't have my notes with me, the yield wasn't the best (but so was the workup), but it definitely is possible to just carefully evaporate down the water from an aq. HCl extraction. The resulting amine salt wasn't pure white, but the bromination product didn't lack in quality and was recrystallised anyways.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **June 21, 2021, 05:50:37 PM**

Quote from: Orange on June 20, 2021, 05:40:47 PM

> Ok guys, Bromination of 2C-H.Oxalate in GAA with 2eq. NBS (24h)(then one cook up) yielded 80%
> so idk why some say it dont work on oxalate.
>
> workup - just basify everything and extract. you just need to extract a few times more. and keep it hot.
>
> oxalate isolation and washing the salt with etoh removed alot of impurities, the bromination step and extract is still dark as shit but still better product than straight up bromination of extracted freebase with side products and shit.

Orange, did you save the write-up ? i might try it in the following days

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **June 21, 2021, 09:24:25 PM**

5.5g 2CH.Oxalate
60ml GAA
7.2g NBS

stir 24h after that bring to boil 1 time. while cooling prepare 60g NaOH in 120ml H2O. when booth cool basify while in water bath and stirring. The sol ll be hot and thats good.

Extract with toluene until extract gets clear (or you cant go on because ur boored af - like me - i just stopped at the 4 or 5 extraction)

dry, add 10-12ml conc HCl while stirring and see the 2C-B.HCl fall out of sol. i distill out the water out everytime. to make sure to get everything.

filter and wash with ethylacetate 20ml two or one time, as you like.

dry.

i got 4.8g

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **June 28, 2021, 04:50:56 PM**

The dirty 2C-H HCl after azeotropic distillation with toluene was extracted with water, basified and extracted once again. Then vacuum distilled in around 170C. Then the freebase was taken up in some IPA and neutralized with conc. HCl. To precipitate the salt a large amount of ether was added. Don't use acetone - doesn't work nearly as nicely as with other PEAs.
Attached is the dried flaky 2C-H HCl. Blindingly white!
Vacuum distllation has grown to become my favorite method for purifying pesky amines.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Mrbovinejony** on **June 28, 2021, 05:58:34 PM**

What's your method for vacuum distilling these amines? I tried bulb to bulb with mda freebase and burnt it all

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **June 28, 2021, 06:21:58 PM**

Quote from: Mrbovinejony on June 28, 2021, 05:58:34 PM

> What's your method for vacuum distilling these amines? I tried bulb to bulb with mda freebase and burnt it all

:o
What temperature did you heat it up to?
I just use a short-path condenser with 3 small dephlagmator thingies inside to aid the distillation. That''s hooked up to a vacuum pump (~couple milibars). It's important that there's a large gradient of temperatures - so use frosty water and cool down the receiver. I haven't had any trouble with this method so far, just make sure to include a stirbar to aid the unexpected bumping.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Mrbovinejony** on **June 28, 2021, 06:36:00 PM**

Hotplate was at 200, all solvent was rotovaped off first but I had some strong stirring. Maybe I need smaller flasks for better heat transfer

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **June 28, 2021, 06:53:45 PM**

Did you heat the RBF on a hotplate... just as is, without any oil bath or stuff like that? Then the heat transfer is terrible and no wonder it was so painstaking for you. Just use an oil bath like I do (I use regular cooking oil and apart from the typical fast-food smell it doesn't burn at these temperatures at all) and measure your pump's vacuum level beforehand so as to know what temperature to aim for.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Mrbovinejony** on **June 28, 2021, 06:55:50 PM**

It was a flat bottom flask, usually vacuum distillation goes no problem with it. My vacuum is able to boil water at 55c but I never did the math for the freebase. I'll try the oil bath next time

---

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **June 28, 2021, 07:02:55 PM**

Whaaaat :P
That sort of vacuum is nowhere near to being enough to distill high-boiling compounds. 55C for water is around 150 milibars! Optimal vacuum for these distillations is 150 times less, around 1mbar (but up to 10 is acceptable). You'll have to step up your game if you want to distill freebases.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Mrbovinejony** on **June 28, 2021, 07:04:42 PM**

Well shit, guess I'll need to invest in a better vacuum then!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Mustacho** on **July 02, 2021, 04:08:43 PM**

Look for used good brand vacuum pump on auction sites and similar and just be patient, good deals will come up.
Its also good to check what the replacement diaphragms and valves set cost before making a used pump purchase as these can be somewhat costly.
I found a very nice used Vaccubrand pump that mostly goes for 5 times more used and it works good.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **blade_runner** on **July 03, 2021, 02:42:13 AM**

Quote from: Sawdust and Honey on June 28, 2021, 06:53:45 PM

> Did you heat the RBF on a hotplate... just as is, without any oil bath or stuff like that? Then the heat transfer is

> terrible and no wonder it was so painstaking for you. Just use an oil bath like I do (I use regular cooking oil and apart from the typical fast-food smell it doesn't burn at these temperatures at all) and measure your pump's vacuum level beforehand so as to know what temperature to aim for.

A heat gun is useful too, if you ever have issues with stalled distillations.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Flashtrax** on **July 14, 2021, 07:19:41 PM**

thx for this post it makes me amazing Im now on a road to discover LIFE ;-)))

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aCertainSomeone** on **July 25, 2021, 04:46:21 PM**

Hello everyone - this is my first post :) and sorry already for technical off-posting in this valuable and interesting thread!
Nevertheless, I deemed it important to post just a general word of warning to vacuum distillers - if you use a flat-bottom reaction / distillation flask and pull a vacuum inside such a setup, you will risk shattering the flask because the internal stresses become unnecessary high because the vacuum pull will bee uneven on the internal surface of the non-symmetrical flask. A round-bottom reaction / distillation flask is usually used in vacuum distilling, since a round flask will bee evenly pulled on every side and thus is not subject to the same kind of internal stress that the flat-bottom reaction flask is... take care :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **plaka** on **August 07, 2021, 11:01:55 PM**

Quote from: Orange on April 10, 2021, 09:25:16 PM

> maybe... but i rather workup with toluene and shit ... or oxalate... soon i ll be at it again. time to get some KOH

Hi Orange,
First off, thanks for the clear protocol on 2C-H synthesis. I found it very easy to follow and your other posts informative.

During the azeotropic-drying-with-toluene workup, I encountered issues with black/brown goo precipitating and caking onto the walls of the reaction flask before and during the cooling of the toluene. The small amount of crystalline precipitate I did recover (constituting perhaps a 20% yield) is indeed mostly 2C-H, based on its melting point.

In future attempts I will use more toluene for this drying step, as you suggested earlier in that thread. However, before I proceed I have a question for you: **What grade of toluene are you working with?** Have you distilled it beforehand or treated it with sulfuric acid to remove impurities, etc?

When I asked about impurities in hardware store toluene in the Simple Questions thread, ketosis cautioned against using it without cleaning it first. I thought I should check what people are using before proceeding.
Quote from: ketosis on August 03, 2021, 04:29:41 AM

> treat with conc. sulfuric acid, then distill.

> toluene. for a solvent, is pretty damn wild and reactive(for tons of useful stuff).
>
> I haven't empirically verified the scimad claims, but 30 steps later when you're sitting there looking at some black slime as your product and you have no idea why, you may just decide to agree with me and distill all tech grade solvents and reagents prior to use, even if goodenough is goodenough. For sanity's sake.

Black slime feels bad bro
plaka

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **August 07, 2021, 11:28:27 PM**

Strange I never experienced that, but I also never did that "azeotropic drying" which apparently to some here, is neccessary.
I haven't felt a neccessity for it.
xdragon neither.

I wonder where the issues really are here?
A separate thread would probably be in order, in the topic of isolating 2C-H HCl as a dry powder.

I really don't get it, I literally just evapped a solution of its aqueous HCl, separated off from a DCM extract, and as soon as the water was gone, it simply crystallised, just as you would expect almost any other HCl salt to do.
Actually, I am convinced that the issue you guys describe is not related to any property of that specific substance's salt, but to a lack of experience in how to deal with such occurences.

It will definitely get better over time, but please refrain from assuming that your experience is the same experience the general audience gets, after having run a certain reaction just once or twice with your substrate.
What you describe in here, is so far unknown off, and you are the only people who report it.
The logical conclusion is of course, that its not an unknown property of this well known substance, but something done slightly differented than it should have been done, and thus, you get this experiencec instead of what everyone else gets.

Honey, any issue with the 2C-H HCl with vacuum distilled freebase?
No?
See. Its improper purification then.

@plaka: your attempt to "dry" that salt probably resulted in polymerisation of any residual substrate or some other side products.
The high temperature and the acid then caused the black slime to form.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **August 08, 2021, 08:45:44 AM**

Quote

> Honey, any issue with the 2C-H HCl with vacuum distilled freebase?
> No?
> See. Its improper purification then.

No, in my experience if you're going to distill the freebase anyway, you might as well just basify everything, extract and distill. The hydrochloride is still as snow white as ever.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **August 08, 2021, 12:52:54 PM**

---

well, vac distilling ist indeed th ebest workup for this synthesis.

when i would make this reduction again i would just filter the mixture after reaction to remove the copper precipitate and then add straight up NaOH to it to salt out most of the alcohol.
Then i just would start to distill, the alcohol first, there ll be a little water and some salt but thats not interfere with anything. The 2CH freebase is not prone to steam distillation so do not worry.
when the little water came over, apply vacuum and distill the freebase right away.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **jacolives** on **August 08, 2021, 01:12:01 PM**

Quote from: Orange on August 08, 2021, 12:52:54 PM

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>
> when i would make this reduction again i would just filter the mixture after reaction to remove the copper precipitate and then add straight up NaOH to it to salt out most of the alcohol.
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> when the little water came over, apply vacuum and distill the freebase right away.

Curious about this. Under reduced pressure does the amine still come over with the water? When making 2C-H with Aluminum amalgum in GAA + alcohol I would usually basify, remove insolubles by filtration, have two different phases at this point so separate then distill off the alcohol at atmospheric pressure, then pull vacuum with a different receiving flask and distill over the amine. If you distill it without separating the two layers first does any amine come over with the alcohol + water azeotrope? Forgive me if some of this sounds a little off this is something I haven’t actually had in front of me in some years.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **xdragon** on **August 08, 2021, 01:29:35 PM**

I think this is a typo and is meant to say "The 2C-H freebase is **not** prone to steam distillation **so do not worry.**".

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **August 08, 2021, 02:04:27 PM**

---

oh shit, jeah it was a typo!! its def NOT PRONE to steamdistillation!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **jacolives** on **August 08, 2021, 03:21:58 PM**

Well that answers that question. Never tried but always considered it.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Flashtrax** on **August 11, 2021, 09:20:10 PM**

excuse me, in case you have P2NP powder manufactured by some way you don't know and don't have acces to analysing of any sort.

Is it needed to make it cristallize? And how can I start and proceed?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **August 11, 2021, 09:22:40 PM**

And how are we supposed to know the purity of your P2NP? You can't even be bothered to check the melting point? All is needed is a capilarry tube or even a test tube and a thermometer.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Flashtrax** on **August 15, 2021, 01:02:51 PM**

Okay boss! I develop an assembly as ingenious as Thiele with a swift accurate digital thermometer and the stuff start liquify at 62° and is completly liquid at 65°C. And after when cool to room temp return to solid.

The only flat I heard is that my color is not bright yellow as showed by some photos but rather pale yellow or almost light brown. During the liquefaction it becomes ochre or orange brown and stay like this...

>> Do you think Im ready now to invest in a distil kit?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **August 15, 2021, 01:15:09 PM**

If you're worried about your P2NP quality you can always recrystallize it from an alcohol or alcohol/water mixture. Works just fine.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **plaka** on **August 27, 2021, 03:02:57 AM**

Quote from: ApeMaia on February 21, 2021, 11:21:45 PM

> I use only Ethyl Acetate for re-xing 2,5 DMNS and it works better than anything else, 4cm long needles/hairs everytime, look around my older posts

Hi ApeMaia,
What concentration (or inverse concentration) of ethyl acetate/EtOAc do you use when recrystallizing the 2,5-DMBNS/2,5-Dimethoxynitrostyrene? I have used 17ml/g when re-Xing from IPA and it seemed to work quite well.
plaka
(should this question be moved to to simple questions thread?)

EDIT: I ran a quick experiment to determine the solubility of the nitrostyrene in boiling EtOAc and I got a value somewhere between 1.0 and 1.3 ml/g. If someone wants to use this estimate in future, I recommend starting at 1 ml/g and gradually adding more ethyl acetate until the solids completely dissolve.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **ApeMaia** on **September 08, 2021, 08:04:53 PM**

Quote from: plaka on August 27, 2021, 03:02:57 AM

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>
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> Hi ApeMaia,
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i used somewhere in between 12 and 15ml per gr,i did many so i haven't always put the same amount, anyway EtOAc is cheap :))

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **plaka** on **September 11, 2021, 06:35:27 PM**

Quote from: ApeMaia on September 08, 2021, 08:04:53 PM

> i used somewhere in between 12 and 15ml per gr,i did many so i haven't always put the same amount, anyway EtOAc is cheap :))

Thanks for the getting back to me.
I would use your value in future. For the record when I used the minimum volume of EtOAc (at ~ 1.3 ml/g of 2,5-DMBNS) the mixture rapidly turned into a solid red-brown hockey puck on cooling to room temperature, absorbing all of the solvent. I had to add more EtOAC, reheat and recrystallize to separate the solute. So using the minimum volume of EtOAc wasn't a good approach in the end.
plaka

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **uj74eer** on **September 14, 2021, 10:23:24 AM**

First post as a bee, just wanted to say you all are absolute madlads for working out the kinks in this reduction. Many thanks to carl, orange, et al. for all of your respective contributions. So much good info in this thread.

Want to start by saying this bee has a chem degree and would love to contribute in any way I can in the coming weeks with anything I discover along the way. I've only just begun but sought input on your respective experiences with recrystallizing P2NP. I've had great repeat success recrystallizing from anhydrous isopropanol, but seem to recall allusions from others recrystallizing theirs from IPA/H2O successfully. My experiences have thus far been suboptimal with 70/30 IPA/H2O medium as opposed to pure IPA. Seems like the P2NP is quite unhappy with water around and refuses to crystallize nicely for me, so I've been sticking with anhydrous IPA.

Perhaps I'm missing something; any advice is welcome :) I've been continually recrystallizing in pure IPA followed by vac filtration of the crystals, recovery of the P2NP-rich flow-through, and subsequent concentration of the mother liquor and recycling of the IPA with a rotovap. This works great, it's just a bit of a hassle continually evaporating under vacuum to recycling the IPA and redrying it for later recrystallizations so I was interested to know if any of you all had a good IPA/H2O ratio for this particular recrystallization.

Thus far I've been left with very nice, slightly yellow (NOT orange) needles, but from what I've read it seems repeated recrystallization and exceptionally pure P2NP is necessary for the NaBH4/CuCl2 reduction to work as described.

Seriously, thanks again for all your contributions. I'll be around.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **September 14, 2021, 03:00:35 PM**

There seems to be some kind of degradation over time, so most importantly, your nitroalkene should be freshly recrystallized prior to reduction.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **jacolives** on **September 14, 2021, 03:45:29 PM**

Quote from: loft on September 14, 2021, 03:00:35 PM

> There seems to be some kind of degradation over time, so most importantly, your nitroalkene should be freshly recrystallized prior to reduction.

It gets darker and the smell changes over time. My fresh has always been more of a bright like ‘electric’ yellow (if it was a color of nail polish or hair dye) but after leaving it to sit for extended periods of time it turns more orange.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **September 14, 2021, 04:04:11 PM**

when stored in the freezer practically nothing ll happen to this molecule.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**

Post by: **Flashtrax** on **September 18, 2021, 12:27:02 AM**

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well can we just take 2 minutes to talk about ipa/h2o ratio. In original post of this thread author said:

> *5ml of IPA / 1g of P2NP and 0.4 times volume of H2O in RBF was dumped 6 mol eq. of NaBH4.*
> *> then another person have write this:*
> *2-nitropropene (16.3 g, 0.1M) is added in portions to a stirred mixture of Sodium borohydride (28.35 g, 0.75*M) in 320 ml IPA and 160 ml dH2O, which increase the temp to 50-60°C*

*$* The Question is in the solvants because there is a huge ratio difference between the 2 sentences. Is someone having an idea?
Thx

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 18, 2021, 12:36:35 AM**

Obviously because its based on more than just this single post, as its from three different papers.
There is no right or wrong between those variations, its all on a spectrum and you can do it like this or that, its still correct and works.
Solely based on your personal preference.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **September 18, 2021, 11:13:05 AM**

When I used IPA/water 10/4 I got a clear two phase reaction which I believed to be the reason I only got a 50% yield. All other tries I used 10/4 EtOH/water which gave a one phase reaction and 60-80% yield. There is always a lot of solid precipitating during the reaction, which clumps when not constantly stirred, which was probably the reason for the lower 60% yields.

The ethanol used was denatured 99%+, containing MEK and denatonium which works fine. The MEK is reduced to butanol and the denatonium doesn't distill over.

Edit: I didn't use 6/4, I used 10:4. 100 ml alcohol 40 ml water on 10 gram P2NP.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **September 18, 2021, 03:00:41 PM**

exactly bro ;)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **September 18, 2021, 06:48:38 PM**

I wonder why this hasn't been brought up before. So apparently the decomposition of borohydride in ethanol isn't a problem. What substrate did you try it on, Tsjerk? You distilled off the ethanol and extracted with what? DCM?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 18, 2021, 08:22:11 PM**

Quote from: Sawdust and Honey on September 18, 2021, 06:48:38 PM

> I wonder why this hasn't been brought up before. So apparently the decomposition of borohydride in ethanol isn't a problem.

What makes you think nobody brought this up before?
There actually was a brave bee who got called fastbre4k back then, but might be known under another name nowadays, who brought this up at least three years ago?
88% yield?

No, decomposition of borohydride is negligible, it is even in water, when I reduce some carbonyl aqueous with it.
I guess with a pinch of base, you could even run this reaction in MeOH, and why should you not?

Personally I am more satisfied with IPA, for once, in case its another amine than some (fluoro)amphetamine for the ease of extraction via eg oxalates or such.
I prefer the steam workup though, but guess you can't have it all :D
I tend to get better yields with it simply, and I like the workup more.
Personal preferences.

I think just almost about every single trial in ethanol did not run so well for me.

Except that one time.
Because that one time was worse than just bad.... I quenched the mixture still warm... with dropwise HCl :o
Somehow I got 160mg of amphetamine sulfate out after the proper workup, of, I don't remember, from how much, but its been like one and a half grams or so.
of this stuff, here, yeah, 1,5g's?, yeah or such.
Yeah, that and all that reddish oil that came over with it :o

I still don't totally understand what happened, the nef reaction I just observed, because in my memory, the CuCl2 addition ran well and quick too.
Refluxed long enough too, for a complete reduction, but well.

Since then its solely IPA for me.
Its so much faster and cleaner to work up, in my opinion.
Oh, and I also used denat. EtOH, when I used EtOH, but like 96% of EtOH, doesn't matter with the water we're going to add anyways.

I can and I think I already did confirm that, like a dozen pages back?
It has to be *very good* nitroalkene, and mine was, without touching it myself(luxury!::)).
And that exceptionally good looking P2NP from some friend, was almost around ten months old, stored in a tightly closed container but not even in the freezer most of the time.

Quote from: Orange on September 14, 2021, 04:04:11 PM

> when stored in the freezer practically nothing ll happen to this molecule.

Indeed :)
But crap can be stored in the freezer too(I mean crappy nitroalkene, not real crap of

course! :o), and it won't keep well at all.
So it is less the conditions but more importantly, the purity and how to achieve and preserve a high purity best, if you want to continue having fun for a decade or so.
It looked, most importantly also had the disgusting smell(but the right disgusting smell, not one of the dozen disgusting smells which are wrong and tell you to recrystallize), and it was so bright yellow actually, not really truly yellow or even with the slightest bit of orange.
Its performance?
Great, just as if it would have just been dried from a recrystallisation a half day prior :o

So, if your nitroalkene is pure, to the point it will not have such slight contaminations which, somehow, no idea how, catalyse the further decomposition somehow?
If those are gone and the stuff is pure just by itself, freeze it deep and it will keep quite a while without worsening its performance.
No need to do it fresh every time again, just do it well in advance, I would say.
And no need either to reduce your supply of P2NP all at once :o
Because amphetamine is not much slower to decompose compared to this nitroalkene :-X

In my opinion, this reaction is(except that one time with the surprise Nef :D) pretty easy and can easily recover from a few of the typical mistakes., as soon as you got it to work well.
And, my usual typical source of failure, was still the less than ideal purified nitroalkene.
With good substrate it will turn out good as well.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **September 18, 2021, 08:25:31 PM**

Right, it's been brought up many times, but there never was a summary of all the results and it's hard to draw any conclusions. I feel like we should've done that for a 40-page thread already?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **September 18, 2021, 09:06:41 PM**

Quote from: Sawdust and Honey on September 18, 2021, 08:25:31 PM

> Right, it's been brought up many times, but there never was a summary of all the results and it's hard to draw any conclusions. I feel like we should've done that for a 40-page thread already?

Oh we had that, and we will have that again, in this thread here, but it will likely be forgotten at this huge size of a thread, people will just post their experiments asking for advice without looking even two pages back.

What I feel its time for, is a separate thread with a collection of a a few of our best working methods, so we don't have to repeat the same discussion over and over.
Like this here:
https://www.thevespiary.org/rhodium/Rhodium/chemistry/nitrostyrene.reduction.alhg.html
But just not like.... like this, if you know what I mean :o
I mean similar to this, but actually a bit ehm, "differently" working, because of an increased level of effort put into?
That would be great.

I feel like almost everybody of us who participiates in this thread has at least one in

here... it would be a matter of minutes, if those are sufficient, to compile, post, and make that sticky somewhere, publications ideally?
We should keep that in mind, it would have kept this thread much shorter and on point if someone would have had this idea 2-4 years ago :-X
Or if tsath wouldn't had posted seven or eight pages in the middle of that thread with a live synthesis ::)

The writeup density in here must be like, forty pages, at least every three pages one of them... ehm yeah, we could easily put up a dozen, even the not that good ones(especially those! with remarks what to avoid, it would be even more helpful!).
Its time we put a summary together, in a way that it won't reach 176 pages before you even got to the experimental, just the experimental and a precise and short explaination...
I mean like papers should be, not like they are?

I guess I read at least forty pages elsewhere every day, so why not here, today, right now...? *sigh*
I take helpful hints which can be recommended via pm though :P

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **September 18, 2021, 09:08:32 PM**

Quote from: Sawdust and Honey on September 18, 2021, 06:48:38 PM

> I wonder why this hasn't been brought up before. So apparently the decomposition of borohydride in ethanol isn't a problem. What substrate did you try it on, Tsjerk? You distilled off the ethanol and extracted with what? DCM?

I only ran it on P2NP which I worked up via steam distillation. Maybe the lower 60% yields were due to less pure P2NP, but one thing is sure: EtOH works fine as a solvent. Maybe I will recrystallize my already recrystallized P2NP to give it a go in MeOH, just for the sake of it.

Edit: I didn't use 6/4, I used 10:4. 100 ml alcohol 40 ml water on 10 gram P2NP.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **September 19, 2021, 07:17:31 AM**

Quote from: carl on September 18, 2021, 09:06:41 PM

> Quote from: Sawdust and Honey on September 18, 2021, 08:25:31 PM
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>
> I guess I read at least forty pages elsewhere every day, so why not here, today, right now...? *sigh*
> I take helpful hints which can be recommended via pm though :P

Someone should write a *quality* review if he had enough time and enough enthusiasm and publish that neatly ;D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **September 19, 2021, 10:35:44 PM**

This reaction runs better in methanol than expected. I expected it to work, but I have the feeling the reaction runs cleaner in methanol compared to ethanol and isopropanol.

To start I never got any precipitation of salt any time during the reaction, while especially with IPA I had trouble stirring the reaction.

After acidification the reaction before distilling the alcohol a I always had a lot of remaining black crap sticking to the glass. Now I only saw clean copper in a colorless solution. Normally the solution is yellowish. The solution even stayed almost colorless when adding base before steam distillation, except for the black color of the freebase.

If I am to trust the amount of sulfuric acid needed to neutralize the whole distillate, my yield is well into the eighties. I neutralized because I don't like the yellow color the freebase gets when kept over night.

I will report on the final yield once I have prepared the sulfate.

What I did was just, 100 ml methanol, 40 water, 8 gram NaBH4 (contains 1% NaOH), reduce 10 grams P2NP, heat to 40 degrees. 8 more grams of NaBH4, 1 gram CuCl2, reflux 45 minutes. Workup via steam distillation, roughly estimated yield with sulfuric acid in the distillate, estimated plus minus 85%.

Less NaBH4 could be used because there was still left after 45 minutes reflux.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **September 19, 2021, 10:53:13 PM**

Good work, I'll try the same with 2,5-DMNS soon. I wonder why everyone discouraged methanol. Maybe the small amount of hydroxide in your borohydride actually keeps it from decomposing. Waiting for the final yield!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **September 22, 2021, 09:46:52 PM**

Okay, not quite 80%, but 60%. The volume used to neutralize the distillate was quite big, so I could overshoot easily without noticing.

I'm sure i keep screwing up my yields because I distill of too little alcohol though.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **October 05, 2021, 07:55:22 AM**

The volume needed to perform this reduction with a high safety margin can become quite large when size of reaction is increased. I'm curious as to which container/reactor materials has been tried. Lab glassware is naturally the best choice, but not everyone feels comfortable ordering reactors of larger volumes. Especially the refluxing part becomes troublesome if one wants to source reaction containers locally. The first step of the reaction, including addition of the copper salt, should be compatible with polypropylene. But refluxing after that becomes troublesome, no?

Using a stainless steel pot, with a lid modified to fit a reflux condenser, would make the second part very doable and easily sourced. However, the basicity from OH^- is bothersome due to the likelyhood of corrosion, wouldn't it? How about the copper, my spontaneous guess is that it won't pose a problem since the copper salt is already reduced, or am I mistaken on that? Perhaps an enameled pot of decent size can be used?

Or does anyone have a suggestion on safe heating methods if one can find plastic containers that can withstand reflux temperatures?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **October 05, 2021, 07:58:29 AM**

A second inquiry I have is what ratios of solvents and precursor:solvents that has been found to work well? How low can you go without stirring becoming a problem? Sorry, thread is too long to actually read through every page for this information. Hope you are OK with this inquiry.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **uj74eer** on **October 05, 2021, 11:42:36 AM**

Quote from: NeonCortex on October 05, 2021, 07:55:22 AM

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>
> Or does anyone have a suggestion on safe heating methods if one can find plastic containers that can withstand reflux temperatures?

don't even think about attempting this reduction without borosilicate glass, mate. you'll be exposing your reaction vessel to the full range of hellish conditions (both in terms of pH, corrosiveness and temperature) necessary to carry out the reduction.

i suppose it's possible there exists another material that can withstand NaBH4, NaOH, organic solvent and others at high temperatures... but if you're really asking these questions than I don't think you have any business messing around with sodium borohydride in the first place. you're just asking for a disaster using plastic and metal reaction vessels as opposed to laboratory glass. if you aren't comfortable buying lab glassware and having it potentially be discovered by someone else then i'd recommend you sort out your clandestine lab situation before spending the money on reagents, precursors, etc.

seriously. don't try any of this without a proper setup. even if you were able to get it to sort of work i wouldn't come anywhere near your final product with all the sources of contamination you introduce with unorthodox reaction vessels in the presence of such corrosive reagents and reaction conditions.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **uj74eer** on **October 05, 2021, 11:54:19 AM**

in other news i finally completed my first full run reducing P2NP via the method detailed in this tread with fantastic results!

i'll post a nice polished write-up once i've completed one more run as well as resolution of the racemate via fractional recrystallization of the diastereomeric bitartrate salts.

massive thank you to everyone that has put work into this thread since its conception. took a while to dig through and parse all the information in this thread, but considering my first attempt yielded an exceptionally satisfactory 79.4% of theoretical i can say without question that the information in this thread is quality.

i'm looking forward to giving back in the form of a rigorous writeup in the coming weeks.
thanks all

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 05, 2021, 02:29:48 PM**

Quote from: uj74eer on October 05, 2021, 11:54:19 AM

> i'll post a nice polished write-up once i've completed one more run as well as resolution of the racemate via fractional recrystallization of the diastereomeric bitartrate salts.

No need for the mate to let everyone know who you are ;)

Glad to hear it worked :)
Still though, try the biphasic chiral separation with monosodium tartrate in water/toluene.
Faster and easier and less loss, although I heard conflicting reports from some lately.
Better try for yourself to see.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**

Post by: **Tsjerk** on **October 05, 2021, 03:16:21 PM**

I wanted to give the resolution a try but ran out of EtOH so gave the reaction another try with iPrOH. I got a clear biphasic reaction again but apparently that is how it is supposed to be as I got a 91% yield. I used two times 16 gram NaBH4 contrasting a bit of NaOH on 20 gram PN2P and heated the mixture to 50 degrees before adding 2 grams of CuCl2 dissolved in 10/4 iPrOH/water, I guess about 20ml of that.

The reaction was refluxed for one hour, and after workup the flask was much cleaner than after previous runs, where the copper powder was sticking to the glass and stirr bar. Now only lose clean powder observed. The P2NP was crystallized from methanol and isopropanol.

The resolution extraction with sodium bitartrate from toluene seems to have worked. The levo fraction was extracted with a second amount of tartaric acid and crystallized from the water solution with as crystalline mass. I can't say the dextro fraction formed crystals, as I crashed it out with sulfuric acid.

I'm thinking about growing single crystals somehow and building an Arduino polarimeter. Any suggestions for growing nice crystals?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 05, 2021, 05:37:20 PM**

As for growing crystals, try dry ethanol and diethyl ether.
On the hydrochloride of course.
I don't know how nice they grow though, but at least that salt is crystalline.

Else, fumarate maybe.
I tried that and it forms well, mp is around 150°C.
Maybe that gets nice and large if done slowly?

But good to hear you had that much sucess, I think 91% is the highest report so far, no?
Congrats on that, very cool :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **callejularbo** on **October 07, 2021, 06:22:10 AM**

Quote from: NeonCortex on October 05, 2021, 07:55:22 AM

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>
> Or does anyone have a suggestion on safe heating methods if one can find plastic containers that can withstand reflux temperatures?

It seems refluxing is not even necessary when this reaction is ran at a certain scale, due

to the exothermic heat generated when the copper salt is added.
I ran two test reactions in parallel, few grams nitrostyrene in each. In both experiments I followed the jademyr protocol, but in one of the experiments I never used any heating, instead I left it stirring at room temp overnight after cu-salt addition. Both experiments gave the same yield (differed by 1%).

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 07, 2021, 06:38:40 AM**

> Quote from: callejularbo on October 07, 2021, 06:22:10 AM
>
> > Quote from: NeonCortex on October 05, 2021, 07:55:22 AM
> >
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Thats a surprising and interesting result!

However, good and strong stirring is still necessary, because it will not work at all when the CuCl2 solution has been added, to disperse the nanoparticles properly.
One of us did it like that and the copper just formed a clump together and did not react at all in consequence.

Given callejularbo's experience, I would say then thats actually an option, but good stirring is really essential, especially in the last step.

As for the material, you want polypropylene, thats where the russians even do Al/Hg's in :D
Check the bottom of your bucket or whatever, theres a mark, and somewhere a recycling symbol, and there must stand "PP" somewhere.
Thats the right material and besides resistance to chemicals(somewhat), it can also stand a bit of heat.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **October 07, 2021, 10:24:55 AM**

---

back then i ran Al/Hg in plasic containers too ::)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 07, 2021, 11:09:17 AM**

Quote from: Orange on October 07, 2021, 10:24:55 AM

> back then i ran Al/Hg in plasic containers too ::)

Which of the many times?
The first one? Or the last one?
Oh wait, they are both the same I forgot :P

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **October 07, 2021, 11:17:47 AM**

---

thants not correct :p

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **October 08, 2021, 06:41:51 PM**

Quote from: uj74eer on October 05, 2021, 11:42:36 AM

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>
> seriously. don't try any of this without a proper setup. even if you were able to get it to sort of work i wouldn't come anywhere near your final product with all the sources of contamination you introduce with unorthodox reaction vessels in the presence of such corrosive reagents and reaction conditions.

The view must be great up there, on your high horse?

Can you please elaborate on the disasters you mention are likely to happen? What and why? I am honestly interested in what you have to say about it, but please refrain from personal attacks. I would hardly say this reduction involves "hellish" conditions, what aspects are you referring to? There's not even any extreme temperatures involved, even if you reflux your RM. I thought stainless steel reactors were quite common in industrial operations, am I mistaken? The corrosiveness of the conditions can also be examined on a small scale.

Over the years I have read quite a few descriptions of people conducting various chemical reactions in common plastic vessels. And most likely there will be people who does it in the future to, or they will try it at least. So we might as well discuss it and hear of any experiences had. Doing so might even prevent a few accidents?

You assume a whole lot about someone you know close to nothing about (me) and use your assumptions in an insultive and depriciative manner on that person. That attitude and behavior is not helpful and might make other members become reluctant to report results, ask questions, etc.

FYI you are quite mistaken in your assumptions.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **uj74eer** on **October 09, 2021, 09:59:24 AM**

Fair enough Neon, and for that I apologize — sincerely. wasn't right of me to assume and i guess i just got the wrong impression from your question and ran with that like a brainlet. Hope you understand.

In my mind this just seemed like the wrong context to ask about unusual/niche reaction vessels, particularly considering this reduction employs metal adducts to reduce the alkene. Thinking about it in hindsight I was mostly concerned about NaOH in a steel pot at high temps, but in reflecting now I realize that's asinine because the addition of NaOH happens well after any refluxing or high temps.

Hope you have the heart to forgive me mate, wasn't right of me to assume.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **October 09, 2021, 08:28:51 PM**

NaOH and stainless steel go together fine, also in the very concentrated very high temperature range. Ever tried to cook some GHB from GBL? That works fine in normal pots and pans, you are literally cooking in this case. 30-40% NaOH at +100 degrees gives the cleanest pans you ever saw.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **October 13, 2021, 04:46:23 PM**

Guide to calculating the reagent amounts based on aes256's posted as Reply #627.
1. Go to a free online C++ compiler (for example hxtps://www.onlinegdb.com/)
2. Choose C++ 17.
3. Make sure that the code you see is:

Code: [Select]
```
#include <bits/stdc++.h>
using namespace std;

int main()
{
    double grams;
    string name;

    map<string,double> m;
    m["dimethoxynitrostyrene"] = 209.20;
    m["trimethoxynitrostyrene"] = 239.22;
    m["p2np"] = 163.17;
    m["mdp2np"] = 207.18;

    double nabh4_mm = 37.83;
    double cu_salt_mm = 159.61;
    double nabh4_n_coefficient = 7.714;
    double cu_salt_n_coefficient = 0.015;

    cin >> grams >> name;

    double nitroalkene_n=grams/m[name];

    double nabh4_n = nabh4_n_coefficient * nitroalkene_n;
    double nabh4_m = nabh4_n * nabh4_mm;
```

```
    double cu_salt_n = nabh4_n * cu_salt_n_coefficient;
    double cu_salt_m = cu_salt_n * cu_salt_mm;

    cout << grams << " g, " << nitroalkene_n << " mol " << name << endl;
    cout << nabh4_m << " g, " << nabh4_n << " mol NaBH4" << endl;
    cout << cu_salt_m << " g, " << cu_salt_n << " mol Cu salt" << endl;

    return 0;
}
```

4. Hit the "Run" button.
5. Enter your desired amount of nitroalkene in grams and nitroalkene's name (out of the 4 in the code) in this format:

Code: [Select]

```
2 dimethoxynitrostyrene
```

6. Hit your keyboard's enter button
7. Ta-daa!

All credit goes to aes. I just asked a friend to change it to C++ if it doesn't work for someone in Python.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 17, 2021, 06:59:59 PM**

So much for using MeOH as solvent:
hxxps://www.reddit.com/r/BabyBees/comments/q9zsjg/nitro_reduction_via_nabh4cucl2/hgzn2dl/
Oh man I hate this pussydestroyer guy so much :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **October 22, 2021, 12:19:09 PM**

Regarding ethanol and 2,5-DMNS - it worked terribly for me at 15g scale. The initial reaction is slower indeed (not a problem) and after adding the copper source it goes further nicely, but the workup is sooo problematic. You have to add a lot of water to dissolve the clump that forms from borates and copper residues. I have no clue what happened, but I wasn't able to separate any product after a proper extraction and A/B (first distilled off all the ethanol). The organic layer after evaporating was full of red-black goo, though, that didn't pass into acidic aqueous layer. I'll just remain with IPA.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **October 22, 2021, 02:43:24 PM**

Strange, the borates should dissolve better in ethanol and even better in methanol.

I use 140 ml of solvent (100 alcohol, 40 water) per 10 gram PN2P, how much did you use?

Edit: the last time when I got this 90%+ yield I added extra water when steam distilling the amine, the total volume from which I was distilling was 450-500 ml.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **October 22, 2021, 03:34:37 PM**

I used your ratios scaled to 15g of styrene.
You see, with 2C-H I don't have that ease and comfort to steam distill the base.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **October 22, 2021, 03:43:49 PM**

I know 2C-H doesn't steam distill, but what was the volume off solvent after adding acid and what was the volume after you basified to extract the organics?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **October 22, 2021, 04:07:56 PM**

Initially 350ml, 400 after alcohol washes during filtration, then back to ~130 after distilling off the alcohol and then I don't know, 200ml max. I don't prepare acid/base solutions with much care, just check it with pH paper until it's basic.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Newton2.0** on **October 23, 2021, 03:04:24 AM**

Thanks everyone for the insightful comments on this thread!

Ran a reaction as follows:
-3.2g 4-Br-2,5-DMNS added to a solution of 3.5g NaBH4 in 32ml:16ml iPrOH:H2O (Nitrostyrene was not dissolving and it was because the bottle of iPrOH was mislabeled and contained H2O [most probably])
-Dissolved 0.6g CuCl2 in 4ml:4ml iPrOH:H2O and added to the reaction mixture.

I noticed that iPrOH I was using was not correct, so I later added the proper amount of iPrOH to the reaction mixture and refluxed for 1 hour.

After neutralizing with KOH, a bright blue semisolid resembling taffy was observed which gave way to a dark green and then the solution became a reddish brown.

Is this the nitronate people are mentioning? And would addition of an acid force it into solution?

I mean, at this point the whole thing should probably be scrapped, but I feel there's a lot to be learned here.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 23, 2021, 07:35:56 AM**

Quote from: Newton2.0 on October 23, 2021, 03:04:24 AM

> Thanks everyone for the insightful comments on this thread!
>
> Ran a reaction as follows:
> -3.2g 4-Br-2,5-DMNS added to a solution of 3.5g NaBH4 in 32ml:16ml iPrOH:H2O (Nitrostyrene was not

> dissolving and it was because the bottle of iPrOH was mislabeled and contained H2O [most probably])
> -Dissolved 0.6g CuCl2 in 4ml:4ml iPrOH:H2O and added to the reaction mixture.
>
> I noticed that iPrOH I was using was not correct, so I later added the proper amount of iPrOH to the reaction mixture and refluxed for 1 hour.
>
> After neutralizing with KOH, a bright blue semisolid resembling taffy was observed which gave way to a dark green and then the solution became a reddish brown.
>
> Is this the nitronate people are mentioning? And would addition of an acid force it into solution?
>
> I mean, at this point the whole thing should probably be scrapped, but I feel there's a lot to be learned here.

Great, you made 2C-H and debrominated your substrate.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Newton2.0** on **October 23, 2021, 08:56:19 AM**

So, for existing 4-Br- compounds, one uses this as a stepping stone for 2C-T-X precursors and the reduction would just rip off the bromine? This same ruddy brown solution was observed with LAH and THF. So, I expect one cannot reduce a 4-halogen-substituted nitrostyrene then?

Best to react the precursor nitrostyrene with ethyl bromide, then recover the 4-ethyl-2,5-DMNS and reduce that with NaBH4, then. Since I'd rather not step back to move forward.

Fucking dumb.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **October 23, 2021, 05:53:08 PM**

Quote from: Sawdust and Honey on October 22, 2021, 12:19:09 PM

> Regarding ethanol and 2,5-DMNS - it worked terribly for me at 15g scale. The initial reaction is slower indeed (not a problem) and after adding the copper source it goes further nicely, but the workup is sooo problematic. You have to add a lot of water to dissolve the clump that forms from borates and copper residues. I have no clue what happened, but I wasn't able to separate any product after a proper extraction and A/B (first distilled off all the ethanol). The organic layer after evaporating was full of red-black goo, though, that didn't pass into acidic aqueous layer. I'll just remain with IPA.

Did you acidify before distillation? I've experimented with more water, 50/50, lessened problems with solids to a large extent.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **October 23, 2021, 06:00:22 PM**

Yes, acidified with HCl.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 23, 2021, 06:01:50 PM**

Quote from: Newton2.0 on October 23, 2021, 08:56:19 AM

> So, I expect one cannot reduce a 4-halogen-substituted nitrostyrene then?

Sure you can, with the right choice of reagents.
Like, Al/Hg, if you would have chosen this, you would have had 2C-B now.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Newton2.0** on **October 23, 2021, 06:58:41 PM**

This is a very interesting and necessary failure! I am going to read up on the mechanisms for reductions. I had a pretty good understanding of the Al/Hg system, and that is an option, but I liked the ease of workup I have read about with NaBH4.

Thanks!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 23, 2021, 07:10:09 PM**

Quote from: Newton2.0 on October 23, 2021, 06:58:41 PM

> This is a very interesting and necessary failure! I am going to read up on the mechanisms for reductions. I had a pretty good understanding of the Al/Hg system, and that is an option, but I liked the ease of workup I have read about with NaBH4.
>
> Thanks!

Yeah well but OP mentioned exactly the same situation with the 4-chlorinated precursor, so reading would have prevented this as well :-X
I think even in the first post.

If you would have switched to zinc and acid for the last step, also one-pot, you would also have 2C-B now.
What ruined it for you, was the copper nanoparticles("boride"), because that was what caused the dehalogenation.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **October 24, 2021, 09:44:48 AM**

When I run this reaction I acidify and make the total volume 250 per 10 gram substrate, when I basify I again make 250 ml per 10 gr substrate. Maybe these volumes help the workup.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **October 26, 2021, 03:38:22 PM**

Quote from: Tsjerk on October 22, 2021, 02:43:24 PM

> Strange, the borates should dissolve better in ethanol and even better in methanol.
>
> I use 140 ml of solvent (100 alcohol, 40 water) per 10 gram PN2P, how much did you use?
>
> Edit: the last time when I got this 90%+ yield I added extra water when steam distilling the amine, the total volume from which I was distilling was 450-500 ml.

Ok.... I used almost as much solvent as Tsjerk, but only half as much P2NP.

Ethanol as the alcohol, 6,8eq borohydride, and Cu(II)SO4 as the copper salt.

Its astonishing, I just ran the math thrice, because its actually too much, just from the visual appearance :o
Its actually not at 90%, but slightly higher even.... must be some wet weight or what, because there is no way to get a crude yield of 92,2% :o
But its not absolutely clean, its just the neutralised distillate, yet already white, odourless and free flowing powder.
Quote from: Tsjerk on October 24, 2021, 09:44:48 AM

> When I run this reaction I acidify and make the total volume 250 per 10 gram substrate, when I basify I again make 250 ml per 10 gr substrate. Maybe these volumes help the workup.

There's definitely some truth into this.

While on the other hand, if you steam it over with a steam can, you get humongous amounts in tiniest quantities of aqueous distillate if you force it(you shouldn't though, you get better quality freebase if you're doing it a bit slower)
A number I always have to think of is 3-4ml's of freebase in as little as 10 or 20ml H2O? :o
Of course, its much more voluminous as steam, yeah, but in the receiver it really looks funky.
Milky fluid, some oily drops may or may not(usually not) bee visible in the receiving flask.

I never accurately measured, but I know its quite a lot, it steams probably as the second-best freebase of them all! :o
Don't ask for the best, I haven't discovered that one yet ::)

Also, thats by far my best yielding reduction using NaBH/Cu(II) salt! :o
I already purified the stuff and it weighs less of course.... but not much less, its still a surprisingly large lot! :o

Is ethanol and copper sulfate a trick for owning P2NP in massive yields maybe?
I used ethanol before, with CuCl2, not sure which substrate though but it was good replacement.
However, for P2NP in special, it seems that ethanol and CuSO4 together have a certain knack for reducing the stuff especially high yielding?
Could that be?
I would think its just a coincidence.... but thats the third time ethanol and copper sulfate reduced P2NP in quite impressive yield.
Maybe Tsjerk's result counts as a coincidence.
But a third time?
Its strongly hinting at this implication now at least, no? :D

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Sawdust and Honey** on **October 26, 2021, 07:05:57 PM**

Maybe my problem was just using 2,5-DMNS then. I ran it once again, 10g scale in 250g IPA/water 1:1 and it worked very nicely, 70% yield. No problems with the workup at all. Just quench with GAA, distill out the alcohol and A/B.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**

Post by: **carl** on **October 26, 2021, 07:12:54 PM**

Quote from: Sawdust and Honey on October 26, 2021, 07:05:57 PM

> Maybe my problem was just using 2,5-DMNS then. I ran it once again, 10g scale in 250g IPA/water 1:1 and it worked very nicely, 70% yield. No problems with the workup at all. Just quench with GAA, distill out the alcohol and A/B.

Could be... maybe!

We don't really fully understand this reaction completely, I would say.
Like, last years summer, where I accidentally produced mainly P2P because I quenched with HCl, while still a bit warm.
Accidental nef reaction is an even more likely explaination for nitrostyrenes than it is for nitropropenes.
And I had easily produced like 70-80% of P2P from the used P2NP.... it was, no idea, maybe 2-3g's, something in between.
But the amount of amphetamine, I still remember it vividly.... were 170mg's of cleaned sulfate :-X

So we know that it has the potential (analogous like a metal dissolving reaction maybe, after acid was introduced to the still warm and thus reactive mixture?) to cause a nef.
We know that the phenylacetaldehydes produced this way are also very instable and tend to polymerize quickly and colorful.

Lets not forget this side reaction!
HCl and nitrostyrenes is a bad idea, and I think this has caused some damage.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **November 05, 2021, 04:52:33 AM**

Adding CuSO4 to rxn mixture:
(https://media0.giphy.com/media/anORp9jbIvoKT6qFm6/giphy.gif?cid=790b7611e69f9abf975f846d57cca5c17d5887c580b48c22&rid=giphy.gif&ct=g)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **November 05, 2021, 08:42:57 AM**

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very cool, so ppl can see how it looks like :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **November 05, 2021, 11:12:15 AM**

Nice idea to implement gifs in our work!

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **November 06, 2021, 12:17:06 AM**

Yeah we definitely need more moving images/video in this pursuit. They're very easy to make, I just used Giphy.com for this one as it's so convenient. You could however use ffmpeg (or other clientside software) if you want. ymmv.

The quality is high enough that you don't miss any information i.e. the frame-rate is sufficient. And yet the file size is a mere fraction of what the source video is. No-brainer if you ask me!

Bring on the .gif's :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 06, 2021, 12:34:39 AM**

How comes its so large? Did the board not protest because of the file size? :o

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **November 06, 2021, 09:00:05 AM**

to clarify: the size of the .gif is small but the source video (~20 MB) is not. I didn't bother downloading the .gif and then uploading it to the forum because why introduce more steps :lazy_chemist_shrug_emoji:

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **November 06, 2021, 10:28:53 AM**

Quote from: aes256 on November 06, 2021, 09:00:05 AM

> to clarify: the size of the .gif is small but the source video (~20 MB) is not. I didn't bother downloading the .gif and then uploading it to the forum because why introduce more steps :lazy_chemist_shrug_emoji:

Same reason as always: just in case the uploading page will go down someday

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **def_bee** on **November 09, 2021, 11:49:01 PM**

Hello, this is my first post. I have some questions, hopefully there will be someone who can help me :)

I have already done a few reductions as previously described and they all went as described. However, the biggest problem I have is with the precipitate from the milk/aqueous distillate.

In most descriptions after steam distillation it says "Neutralized with H2SO4 and evoporated." Does this mean that the freebase is not extracted from the aqueous distillate? Just H2SO4 is added and after evaporation the sulfate pops out ?
    - I have done a few times this way and usually there was little precipitate left at the end of which the yield was max 1g of 10g P2NP, sometimes instead of precipitate burnt oil came out.

2. I don't have a "rotovap" so it would be best to precipitate the sulfate directly in the solvent, can I drop H2SO4 directly in the extracted "freebase" with DCM/EtOAc, or is it

better to extract with IPA in this case ? (I have DCM/EtOAc/IPA/Toluene and a THF tip)
- I divided the last reaction into 2 parts and 1 extracted with DCM and evaporated leaving the beaker for 2 days, then I dissolved the "freebase" oil in IPA and poured H2SO4+IPA 1:10. The yield was also small 1g.
- 2nd part I extracted with EtOAc (without evaporating the solvent) after pouring H2SO4+IPA no sulfate precipitated (the mixture became white but could not be filtered, as if it returned to the oil with the same consistency as the milky/aqueous distillate from the earlier stage)

3. before the evaporation of IPA I use HCl for acidification, is it okay to get sulfate at the end ?

Can anyone direct me to some more detailed information on how best to get sulfate without rotovap from aqueous distillate ?

Thank you

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **November 10, 2021, 02:00:36 AM**

I've found this salt a total pain in the ass too. You'd think you could just evap the water away from the sulfate but there be dragons, for me anyway. I guess I need to study this particular amine and it's salts more closely.

I took up the freebase from the distillate using diethyl ether then dripped in 1:4 H2SO4:IPA and got no precipitate. Upon evaporating the solvents I got a puddle. Low heat failed to drive off what I assume to be excess water that somehow ?? made it over, even though I was careful to dry everything. *sigh*.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 10, 2021, 12:25:22 PM**

I think you need to look into the definition of the term "neutralisation" more closely if you experience anything else than dry "almost-crystalline" solid(its amorphous, even if takes a somewhat crystalline appearance on at first).
Because then you have not neutralised it, you overshoot.
If you overshoot just the slightest bit, it will turn pink, which can be washed away, but it will still solidify out.
But if anything you described happens like that, then its solely your own fault.
Next time stop a bit earlier, better to leave a tiny drop of freebase in than even the slightest bit of acid excess of acid(and what's meant with "freebase"even? :D), and then you will experience no issues.
And then wash the product in aqueous solution wish a solvent, because if you do not run it right, you can introduce impurities easily.
And if the yield is low, then there are logically more of them, because the substrate which did not turn into your product is not left unreacted in there, but it will turn into something else.
And if that has been gotten out, then, uh, piece of candy!
Dry amphetamine salt, no issues at all.

Although, fumaric acid.
Its even crystalline(the salt).

Its light on the nose and it forms well.
Excess is easily washed away with dry acetone(just don't use an excess tho. same lesson as with sulfuric acid, or phosphoric acid too, for that matter).
But similar, just stop at a neutral pH, as long as it remains neutral.

I heard about the phosphate being better and I tried forming some(wow, decade later :o) and not fazed by this somehow.
Can't pin it down but its in the formation(if done aqueous), also its similar, an amorphous solid.
I prefer the sulfate for my own purposes.
You just need to figure this out properly.
It helps if you take the distillate(properly strip the alcohol and ideally some water away first under sufficiently slighlty acidic conditions, similar, if you to pH5 its more than sufficient), the basic steam distillate, swirl it good and divide it into two portions, swirl it so its all turbid, that the freebase is properly in both portions.
Go on and neutralise one half.
If you overshoot slightly, add the other half.
Usually you should not need to add anything, but wait long enough, lesson in patience.
Otherwise, you need to start all over with the product and get the freebase from it, to neutralise again, etc.

And like a lesson, it needs to be repeated again, and again, and again, until it has sunken in your heads.
Should be able to wake you up at 2 AM and present you a beaker of freebase in water, you should to neutralise that well and go back to sleep before you know what you're doing and it will turn just into a normal, dry salt when the water has been evaporated off.
And if you have troubles with that, then you are not there yet :P

I know that many people are doing this and shooting the pH to insane values.
No idea why that is.
Like: "first I have to evaporate off the excess hydrochloric acid"... (read in nurdrage's voice), but yikes, no!
Then you are messing around and not doing it properly ::)
A salt will form even if you do not bathe it in acid.

You need to culture a good patience in the home lab, its harder than at work, because you care and get easily excited.
Excitement leads to failure that could have been prevented.
Its in 90-95% the one who holds the flask causing issues(what, it was the stand? I knew he was behind it all the time! :P), just like computer techies say about the user.
Someone said I'm optimistic when I said again and again to focus and keep on, and then it will work.
I'm absolutely not optimistic, but if you can afford the reaction at a smaller scale, you can always pull yourself together and try to pin the problem down with smaller runs, before you give up.
And I've seen the claim "did not work" or sometimes the more honest "did not work for the author" in theses, and with exotic and expensive substrates its understandable, but even if you want the product, you should not run grams when you have not gotten it to work yet.
Thats only for later.
And with some discipline, you will get there.

And no writeup contains all the things people without experience need to be reminded off.
Its just like you need to tell someone if you expect behaviour from him in a way that this person has no relation or way of thinking to be accustomed with yet.

Later on its becomes a habit and so natural, one forgets to mention it.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **NeonCortex** on **November 11, 2021, 01:56:23 AM**

Quench/Acidify with acetic acid (mixture usually clears up), strip the alcohol properly - until vapor is 100 C and then keep on distilling a while longer. Switch receiving flask to a new one. Let mixture cool off and then basify with an alkali hydroxide, until strongly basic (oily mess will come out of solution). Perhaps add extra water. Then distill away. When the oil co-distills with the water, inner surface of glass and condensing liquid will take on a milky appearance. When it's not milky any longer, keep distilling (perhaps 30-60 minutes?). Hopefully you will now have a reciving flask with an upper layer of oil. Pour entire contents of receiving flask in a sep funnel. You can separate the distinct oil layer first if you want to, but either way you should extract 3 times with for example iPrOH or toluene. You might want to add some KOH/NaOH and/or brine, if using iPrOH you definitely should do that. The combined organic phases are dried (for example with MgSO4) and the drying agent filtered off into a dry flask.

Put that flask in the freezer until decently cold. Put it into an ice bath and put it on a stirrer with a stir bar in the flask. Add concentrated sulfuric acid, dropwise with good stirring. Sulfate salt should be very evident within a short amount of time after adding the first few drops. Measure the pH as often as you need *use pre-wetted pH-paper*, but naturally more often as the pH approaches neutrality. *Don't overshoot!* Even just one drop too many of conc. H2SO4 can mess it up pretty badly, IME a thick paste can become a loose slurry that is not overly filterable. Filter off your salt, wash with acetone and then a dash of DCM. Let it all dry in a pyrex dish or similar, then crush lumps up and let it dry more. Voilá! :)

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **def_bee** on **November 11, 2021, 04:15:37 PM**

Thank you gentlemen for your valuable advice. Before I even started 1 Al/Hg reduction I read a whole bunch of tutorials/instructions/descriptions. Such as here:
hxxps://dark.video/video/sintez-sulfata-4-fa
hxxps://dark.video/video/sintez-sulfata-amphetamine

I have mastered the method on aluminum foil very well, usually 70-80% yields come out, without cleaning/washing the final product is perfectly white.

In the case of this method, after decanting I have free base dissolved in iPrOH and after cheating with magnesium sulfate, the mixture always turned from clear to milky and was easy to filter.

In the method described at the beginning of the thread. Only after DCM extraction it looked similar.

Currently in my flask I have a reaction stage, after evaporating iPrOH and adding NaOH I usually pour the mixture into a stainless steel distiller and add 150-200ml of water and then I get a milky suspension, unfortunately the layers never separated just all the oil was combined with water. Do you think I should distill this on a lower strength? Because in this distiller the whole process took about 30-60 minutes and then I got the whole distillate.

Usually after adding a few drops of H_2SO_4 my distillate went from milky to clear and the pH was 6-7, is that enough? Or should I bring it down to ~ pH 5? From my observations with Al/Hg, that every drop of H_2SO_4 with iPrOH turns oil into sulfate. However in case of this reduction when I have milky distillate after 2-3 drops and evaporation will salt precipitate in such a large amount (10g P2NP base)?

Title: **Re: P2NP to amine with $NaBH_4$-Copper. One pot, no messing with metals or acids.**
Post by: **Orange** on **November 11, 2021, 04:52:58 PM**

back then i used the disappearence of the emulsion of water/alcohol/amine as ph indicator and it worked fine :P

Title: **Re: P2NP to amine with $NaBH_4$-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **November 11, 2021, 07:02:07 PM**

When the steam distillate doesn't separate in the receiving flask from the start you didn't evaporate enough alcohol in the previous distillation. Amphetamine is a bit lighter than water, but not much.

No problem though, just add salt if you want to separate without solvent, or just extract with a solvent. I use petroleum ether which I know evaporates without a trace.

I directly extract my distillate with PE and neutralize with H_2SO_4 in IPA. This gives a very thick precipitation when only the minimal amount of PE is used. I'm very careful not to overshoot, but I also keep 10% of the freebase in PE behind. I carefully measure the amount of sulfuric before and after neutralization.

This way I know how much sulfuric acid was needed to neutralize, so I know how much I need for the other 10%, or when I overshoot, there is base left to counter it.

About the amount of PE to use: amphetamine is not that soluble in PE, you even get a three layer system when you don't use enough while there is no alcohol present in the water layer. If you only use that little PE, the precipitation of the sulfate will be so thick the mess will be hard to filter even with vacuum.

Title: **Re: P2NP to amine with $NaBH_4$-Copper. One pot, no messing with metals or acids.**
Post by: **def_bee** on **November 11, 2021, 08:13:43 PM**

@Tsjerk thank you so much this is very valuable advice "When the steam distillate doesn't separate in the receiving flask from the start you didn't evaporate enough alcohol in the previous distillation. Amphetamine is a bit lighter than water, but not much."

Final questions:

1. for a reaction where 10g of P2NP was used to start, the petroleum ether extraction should be about 3-5 times with ~30ml of petroleum ether or is it better to use ~50-70ml?

2. I have doubts if the petroleum ether I have is pure enough, to buy pure petroleum

ether (laboratory) I need a license. Therefore I would prefer to extract with DCM or EtOAc. I noticed that with EtOAc the water becomes almost transparent after 1 cycle, whereas with DCM I had to use NaCl to get everything out of the water. So, not sure about ether, what do you recommend to extract DCM/EtOAc/iPrOH/Toluene/THF?

@Edit:
Now it is as if the two layers have separated, collect the distillate and try to do an extraction, or is it better to wait until everything has distilled?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **November 11, 2021, 10:51:48 PM**

It doesn't really matter which solvent you use, and DCM always gives a bit of cloudiness with water. A bit of salt helps, but what helps best is doing the extraction multiple times. The first time will you get let's say 90%, the second time as well, and the third time too. But three times 90% is 99%+. Also three times 80% is almost everything.

But better not use DCM with amines, as a side note

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 11, 2021, 11:23:49 PM**

Yeah DCM is not the best choice, but if you do not keep the amine in the solvent for a week, it will not cause issues.

E: also lets not forget that amphetamine base is quite soluble(suspensable/emulsable? these words do not exist... yet :D) in water, thats a good part of the turbidity.

Amphetamine salting is such a stupid issue, either from the distillate or from extracted and waterfree base, some people say its a science on its own, I would just call it a craft, put definitely on its own, to the damn salts of that damn important substance.

But try the fumarate, directed at the more advanced people among you.
It will not be a disappointment, the opposite even! :o

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **def_bee** on **November 12, 2021, 09:02:26 PM**

Unfortunately another attempt failed, I suppose the problem is not in the final extraction but somewhere earlier in the acidification/distillation of the alcohol.

When the steam distillation was over I could see the separation of the layers but the oil layer was ~1-3ml max while the milk distillate was almost 300ml I divided it into 2 parts of 150ml each, ok I added NaCl ~ 5-10g but there was no stratification only when I added iPrOH the top layer turned yellow and the bottom layer became clear [picture 5]. I separated the layers, put them in the freezer, dried with magnesium sulfate [picture 6] and in the ice bath I strongly stirred after 3-4 drops of H2SO4 there was no visible precipitate, I checked the pH on a wet strip and it was about 6-7 (I did the same as in the case of Al/Hg reaction, which always comes out) but here I got a slightly cloudy mixture [picture 7], so I suppose that although the iPrOH became yellow there was really not much oil there.

I have another 150ml of distillate left, does anyone have any idea what to do now to make sure it is not the extraction that is wrong but before? Should I extract it with Toulene and neutralize directly in Toulene? Or should I use petroleum ether (of unknown origin), evaporate and mix with iPrOH and then neutralize?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 12, 2021, 09:11:17 PM**

I think he does not really understand us.
Probably why he did what he did.

Why the added salt? all the amphetamine in there, and then he just adds the acid to the salted mixture?
I don't know why, when he just has to drop acid into the distillate carefully until the pH is right.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **def_bee** on **November 12, 2021, 09:54:12 PM**

@Carl just like my friend NeonCortex said:

Quote from: NeonCortex on November 11, 2021, 01:56:23 AM

> Quench/Acidify with acetic acid (mixture usually clears up), strip the alcohol properly - until vapor is 100 C and then keep on distilling a while longer. Switch receiving flask to a new one. Let mixture cool off and then basify with an alkali hydroxide, until strongly basic (oily mess will come out of solution). Perhaps add extra water. Then distill away. When the oil co-distills with the water, inner surface of glass and condensing liquid will take on a milky appearance. When it's not milky any longer, keep distilling (perhaps 30-60 minutes?). Hopefully you will now have a reciving flask with an upper layer of oil. Pour entire contents of receiving flask in a sep funnel. You can separate the distinct oil layer first if you want to, but either way you should extract 3 times with for example iPrOH or toluene. You might want to add some KOH/NaOH and/or brine, if using iPrOH you definitely should do that. The combined organic phases are dried (for example with MgSO4) and the drying agent filtered off into a dry flask.
>
> Put that flask in the freezer until decently cold. Put it into an ice bath and put it on a stirrer with a stir bar in the flask. Add concentrated sulfuric acid, dropwise with good stirring. Sulfate salt should be very evident within a short amount of time after adding the first few drops. Measure the pH as often as you need *use pre-wetted pH-paper*, but naturally more often as the pH approaches neutrality. *Don't overshoot!* Even just one drop too many of conc. H2SO4 can mess it up pretty badly, IME a thick paste can become a loose slurry that is not overly filterable. Filter off your salt, wash with acetone and then a dash of DCM. Let it all dry in a pyrex dish or similar, then crush lumps up and let it dry more. Voilá! :)

I added salt and iPrOH to make the water layer separate with the oil, the layers separated and the iPrOH layer dried and neutralized with H2SO4.

Sorry my experience is very small, that's what I understood from the descriptions. If I did something wrong, I do not know :/

@Edit

In my opinion, the iPrOH was not dry or I added too little NaOH during steam distillation.
2nd part of milky distill I extracted with "unknown origin" ether petrol and I got white substance as in Al/Hg

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Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 13, 2021, 03:30:02 AM**

Alright.
Sorry, no offense.

Well if you extract with IPA, you will get I think around 9% water in there.
I know of only one way to get much of the water out: washing it with a saturated solution of potassium carbonate, K2CO3.
And no it will not work with sodium carbonate

Well I can only say, that I get a dry and clean white solid out of the distillate directly.
I do not need to isolate the base again and salt it out waterfree.
Neither anyone else, if done the right way, which is *careful and patient*.
Do not try to reach pH 7, too dangerous for the start, aim for 6 at most.
And then try evaporation of the fluid(it turns clear nearing neutralisation, when its clear, immediately after it cleared up, then its likely good already, thats the sweet spot.
Should be around pH 5-6 somewhere.

But if you are using that method anyways, and there is nothing precipitating... you measured the pH during that operation of course, no?
Because the sulfate precipitates readily.
What you describe sounds like you added too much acid and the sulfate got turned into the hydrogen sulfate, which is soluble and thus it will disappear.
At this point you just have to start all over.
This could have happened in your case, I think.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **aes256** on **November 13, 2021, 06:20:31 AM**

Quote from: carl on November 13, 2021, 03:30:02 AM

> What you describe sounds like you added too much acid and the sulfate got turned into the hydrogen sulfate, which is soluble and thus it will disappear.

aaah, this is interesting. That's the first time I've read about the hydrogen sulfate salt of amphetamine.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **def_bee** on **November 13, 2021, 07:39:05 AM**

Gentlemen finally !!!

I thought it was some fault in the reduction or in my solvents, from the post above at 7 [photo 7] you can see orange oil and some light solid inside the substance. I left it like that and started the Al/Hg reduction to make sure everything was ok. The reaction went very well, at the end I got a similar color as in the case of the NaBH4/Cu reduction only more intense colour [photo 8]. I fired up the stirrer and started drop H2SO4, after a time the same as in the case described a few posts above, no sulfate precipitated. I was mega pissed because every time I did Al/Hg it came out very well 0 burnt reactions. I run the "Hydra - 4-FA" video and saw that the bee in the video was adding iPrOH/Acetone 1:1 to

the contents of the beaker. I took pure Acetone from the freezer and added another 150ml to my mixture (Al/Hg 150ml), suddenly in a fraction of a second the orange oil turned overall into a white cloudy suspension. I filtered and came out 70-80% yield :)
After this reaction I took an old beaker of NaBH4/Cu oil and added acetone 1:1 and got the same white solid in the same way :) [photo 9].

My advice to all, if one extracts oil with solvent from the water layer then one must then 1:1 mix with pure IPA/Acetone !

Edit:

@Carl now I think I understood your way and many other users what they wrote in posts above. I will try to describe how I understand it and please confirm that or not :)

I collect distillate after steam distillation (milky just like clove oil), the pH usually of this distillate is 9-11 depending on how much water I use and how much NaOH I throw in before distillation. This distillate is acidified with HCl or H2SO4 or possibly GAA (in this case it is not important). After acidification the mixture should have a pH of 6 or lower (because the oil, that is my product will evaporate along with the water ?).

1) I evaporate the water until there is only oil left and then I set the stirrer again and drop in H2SO4 slowly until I see the consistency as in the case of Al/Hg or NaBH4/Cu only after extraction?
2) When the distillate is below pH 6 does it just evaporate and at the very end when there is almost no liquid the powder/sediment pops out?

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **November 13, 2021, 10:11:35 AM**

Quote from: def_bee on November 13, 2021, 07:39:05 AM

> I collect distillate after steam distillation (milky just like clove oil), the pH usually of this distillate is 9-11 depending on how much water I use and how much NaOH I throw in before distillation. This distillate is acidified with HCl or H2SO4 or possibly GAA (in this case it is not important). After acidification the mixture should have a pH of 6 or lower (because the oil, that is my product will evaporate along with the water ?).
>
> 1) I evaporate the water until there is only oil left and then I set the stirrer again and drop in H2SO4 slowly until I see the consistency as in the case of Al/Hg or NaBH4/Cu only after extraction?
> 2) When the distillate is below pH 6 does it just evaporate and at the very end when there is almost no liquid the powder/sediment pops out?

Just to make sure there's no missunderstanding: the basic pH of the distillate does not stem from NaOH. NaOH won't distill over. It's the basic properties of amphetamine that will give a basic reading of the distillate.
And as said before, the pH should not be much lower after acidification. pH 5 max I'd say. When evaporating this solution, you will not receive an oil because you just formed the salt - a solid will result, e.g. the sulfate.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **carl** on **November 13, 2021, 02:30:08 PM**

And you can not evaporate the basic water and expect anything to be left, because steam distillation?
You have not wondered at all why it works how it works?

Hint: it has to do with the evaporating water, in gaseous form, its the same situation if you try that ;)
You might be quite high for a while, or sick, or both, because of all the amphetamine in the air, and eyes and throat irritated.
So do not try that.

And do you not have the means to measure pH?
If you do that without, and without the sufficient experience(like Orange mentioned how he did it), then it will fail.
This has nothing to do with anything, except with you not measuring pH.
You can not learn how to do this properly if you never did it properly.
It is very finnicky and it will result in trouble.

pH papers cost like 1€, sufficient for a year or two(if you use them economical or thrifty... I actually use tiniest pieces, maybe 2-3mm squares, just because I am used to this, and more is not required anyways, so why use more?
Don't try or expect to get this done just by guessing.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **loft** on **November 13, 2021, 03:16:08 PM**

Quote from: carl on November 13, 2021, 02:30:08 PM

> pH papers cost like 1€, sufficient for a year or two(if you use them economical or thrifty... I actually use tiniest pieces, maybe 2-3mm squares, just because I am used to this, and more is not required anyways, so why use more?

Anecdote: In one of my first labs at the university, I think it was pharmaceutical technology, we had to monitor pH changes with pH paper. When the lab supervisor came around and saw our group using only 2-3 mm squares (because I was used to do it this way in my lab), he was really impressed and told me that in all his years doing this job, he never saw a student being so resourceful with pH paper and that this is in fact the way we should use it.

So 100% agree with you + tweezers will ensure that you're able to reach your solution even in large RBF's.

Title: **Re: P2NP to amine with NaBH4-Copper. One pot, no messing with metals or acids.**
Post by: **Tsjerk** on **November 14, 2021, 11:44:43 AM**

What I do is using a glass rod to get a drop of water on my pH paper (pre-wetting when my solution is not aqueous) and then get a drop out of the flask with the other side of the rod. Otherwise I always loose my paper in the flask. Also sticking the paper in the reaction is not best practice purity wise.

And of course 3 mm is enough.

What I noticed was that especially the cheap paper doesn't always show the color corresponding to the color listed on the pH color sheet coming with the paper. What I did when I realized this was making a series of acid and base solutions and write the correct pH value next to the specified value. What I saw with my last papers was a very steep change from orange to red, somewhere between pH 4 and 3. This was comparable with the change from green to blue in the other direction, which happens between 9 and 10.

It doesn't matter for my purposes, but it could give the impression of overshooting by a lot while it was only a little.

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