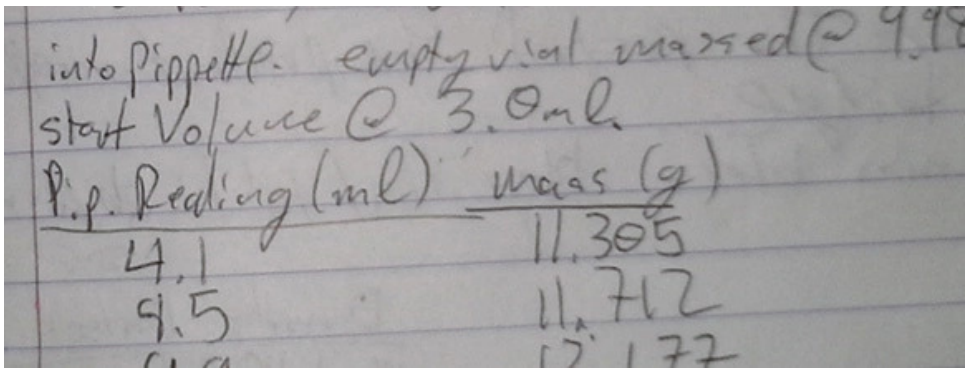
MAKING HIGH CONCENTRATIONS OF HYDROGEN PEROXIDE AT HOME

by: Brian Benchoff

64 Comments

February 3, 2013



Hydrogen peroxide – the same stuff you can pick up from a drug store or beauty supply store – is one of those very interesting chemicals that belongs on every maker's cabinet. At concentrations of about 30%, it's perfect for etching PCB boards, and at even higher concentrations – about 70% – it can be used as rocket fuel. Unfortunately for the home hacker, it's very difficult and expensive to obtain peroxide in concentrations above 3% or so. That's alright with [Charlie], though, because he's come up with a way to concentrate peroxide and measure the concentration once he's done.

There are a few YouTube videos of kitchen chemists concentrating peroxide by heating it on a stove to just under 100°C. Because hydrogen peroxide boils at 150°C, they're simply boiling off the water and increasing the concentration of peroxide. This is a qualitative method, and you'll never know what concentration you're getting. [Charlie] rigged up a small-scale with a pipette to measure the weight of his concentrated peroxide per unit of volume, giving him the density of his concoction and thus the concentration.

We have to note that concentrated peroxide is dangerous stuff, but the results of [Charlie]'s lab work aren't much more dangerous than what hair stylists work with every

day. If you're going for high-test peroxide, good job, that's awesome, but do be aware of the risks.

Posted in chemistry hacks
Tagged analytical chemistry, Chemistry, density, hydrogen peroxide

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64 THOUGHTS ON "MAKING HIGH CONCENTRATIONS OF HYDROGEN PEROXIDE AT HOME"

luckybot says:
February 3, 2013 at 10:14 am

Hydroponics stores and sometimes pool stores carry hydrogen peroxide at 30%.

Reply Report comment

lifehacks says:
June 20, 2015 at 3:16 pm

bruh the article said above 3% is expensive

Reply Report comment

Martin says:
March 25, 2016 at 7:54 am

And buying and distilling 10 times the amount of the diluted stuff is free?

Reply Report comment

Arthur says:
February 3, 2013 at 10:16 am

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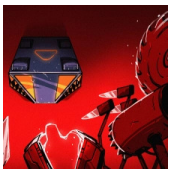
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In the UK trying this sort of thing may get the attention of the Anti-Terrorism Squad, given the recent past history of terrorists trying to use peroxide derived explosives. Just something to be aware of.

Reply Report comment

Phil F says:
February 4, 2013 at 2:56 am

You can buy the 20% stuff in Lloyds pharmacy, if they ask what its for just say its for getting acrylic off a leather couch.

Reply Report comment

Martin says:
March 25, 2016 at 7:56 am

This should have been answered to another comment.
Here in Vienna we buy the stuff (30%) regularly in the 10l canister to fight algae in the swimming pool.

Reply Report comment

Matt says:
February 3, 2013 at 10:18 am

It warms my heart that he propagated his error and used an actual paper for his density-concentration curve instead of just using wikipedia.

Reply Report comment

Hans says:
February 3, 2013 at 1:18 pm

Sure. Because every paper is already right while this pesky Wikipedia can't be trusted upon, even if they (as they nowadays work hard on) make citations.

Reply Report comment

cevat candar says:
February 3, 2013 at 11:33 am

hydrogen peroxide also good for removing yellowish stain on computer plastic parts

Reply Report comment

mosey says:
February 3, 2013 at 11:49 am

thats smoke

Reply Report comment

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Quin says:
February 3, 2013 at 12:06 pm

some of it is, some of it is bromine from the fire retardant in old plastics. UV degrades the compound, leaving a bromide yellow. See http://retr0bright.wikispaces.com as they covered the stuff.

Reply Report comment

Dra says:
February 3, 2013 at 12:10 pm

Nope. It's not smoke. It's a mix of the nature of plastics decaying when exposed to light and heat and chemical fire retardants used in older plastics.

Reply Report comment

qwerty says:
February 3, 2013 at 4:57 pm

It could also be smoke. When I was a smoker I had to literally wash every damn white plastic surface with strong kitchen soap twice a year because they became yellowish over time. Switched to normal cleaning when I quit smoking.

Reply Report comment

Kris Lee says:
February 3, 2013 at 5:12 pm

@qwerty

Surface is not the only thing that gets affected by smoke. I once buyed a CPU from eBay. They claimed it to be barely used. When took it out I noticed the dust on the heatsink and then that smell – it smelled like an ashtray.

Report comment

Quin says:
February 3, 2013 at 12:00 pm

Getting 12% isn't hard, it's called #40 activator from the hair salon supply store.

Reply Report comment

semicolo says:
February 3, 2013 at 5:41 pm

I was wondering if activator was ok (for cupric acid for instance), isn't there other chemicals in there too?

alpha le ciel liked nedoPC-85.

alpha le ciel liked Publys: An open source biosensing board .

"Ninja" Mike liked MAD 1.1 - Modular Audio Devices.

"Ninja" Mike liked MAD - Modular Audio Devices .

SHAOS wrote a reply on project log External memory connector?.

Vije Miller has updated the project titled Ionic Sonic Heatic Fork.

Vije Miller has updated details to Ionic Sonic Heatic Fork.

Daren Schwenke has updated the log for Interdimensional Portal Gun.

Yann Guidon / YGDES wrote a comment on project log External memory connector?.

Lutetium has added Nguyễn Phan Hùng Thuận as a contributor to Hack Chat.

Reply Report comment

Jax Coldwolf says:
February 3, 2013 at 1:08 pm

As a user of Retr0bright, I recently needed to find higher than average concentrations of hydrogen peroxide as well. What I discovered was 5 gallon drums of 30% for sale from a local industrial cleaning supply place. It's sold under the brand "Max lift" and, according to the MSDS sheet, is nothing more than hydrogen peroxide and water. I think they expect dry cleaners to buy it.

IIRC it was about $100 for a bucket of the stuff. That may sound like a lot, but it's much cheaper than buying 50 gallons of 3% and distilling it to get the same 5 gallons of 30%

Hopefully this'll prove beneficial to someone.

Reply Report comment

James says:
February 3, 2013 at 1:17 pm

Huh, this must be about the first time I've seen that somebody in the US says it's hard to get a chemical, while here in NZ our domestic ebay type site has several sellers of 35% h202 in 1, 2 and 5L quantities. A Litre of 35% would cost me about $20 US equivalent, including shipping.

Just looked on ebay.com and quite interesting, 35% listings in the UK, but none in the US, looks like you guys don't sell over about 17%. Is there some law preventing the sale of higher concentrations, or is there maybe just no market for it.

Reply Report comment

Rob says:
February 3, 2013 at 2:22 pm

One of the reasons is that 30%+ H2O2 mixed with acetone gives you triacetonetriperoxide and/or a big explosion. It is this reaction that caused the banning of liquids on carry on luggage in planes.

Reply Report comment

matt says:
February 4, 2013 at 2:03 am

I thought you needed sulfuric acid too to make TATP

Reply Report comment

Rob says:
February 4, 2013 at 4:02 am

the acid is just a catalyst, only small amounts are required. That's what car batteries are for ;)

Reply Report comment

Megol says:
February 4, 2013 at 5:15 am

You don't need 30% peroxide to make an explosive, 3% is more than enough.
But seriously anybody making such a dangerous mixture should be considered insane. There are stronger explosives that are just a bit more complicated to make and have the advantage of not exploding by its own weight, exploding due to crystallization (which can increase inner strain) or explode due to light (!) pressure changes static electricity or the color of ones clothes. Ok, I made the last thing up on the spot but wouldn't be surprised if TATP reacted with some coloring agents.
BTW here I can order 55% H2O2 without any problem or buy 20% locally.

Reply Report comment

MikrySoft says:
February 4, 2013 at 5:40 am

Worst part about TATP is that it sublimates – leave some in a jar and it will sublimate and recrystalize in the threads. Say goodbye to your hands when you want to open it. But I agree, making nicer explosives is very easy, RDX is just hexamine (fuel tablets) with nitric acid – all you need then are some plasticizers and you have C4 or Semtex.

Reply Report comment

defaultex says:
February 4, 2013 at 3:58 am

We have an abundance of people in the US that are just too stupid for their own good. For example mixing bleach, drano, and water creates a visible gas that almost instantly gives you an intense headache, stay exposed long enough and the headache goes away while euphoria sets in, even longer and your either in a coma or dead. The average reaction to this is not to vent the area, it's to sit in the gas filled home while complaining about how much it makes their nose sting.

It seems like common sense, if it makes your nose sting, you should not be breathing it, but never underestimate stupidity.

Reply Report comment

Kyle says:
February 3, 2013 at 1:33 pm

Look at the "note to self" safety message he left on the peg board
"Wear yer apron and ya might not have to get nekkid during a spill" [sic]
=)

Reply Report comment

Me says:
February 3, 2013 at 1:34 pm

Be careful with peroxide, I work regularly with high concentration HP from 35 to 75%, and it can be dangerous. Keep away from organic materials if you don't want to burn your house down !

Reply Report comment

g7gij says:
February 3, 2013 at 1:55 pm

This statement is incorrect "Because hydrogen peroxide boils at 150°C, they're simply boiling off the water and increasing the concentration of peroxide"

H2O2 does decomposes into water and oxygen slowly a room temperature if you try to distill it, by boiling it you increase the rate of decomposition. This is why you can never
get rocket fuel from low volume H2O2. There is a much better method of peroxide determination by iodometric titration, here's a good reference its method 2
http://www.ch.ic.ac.uk/spivey/documents/iodometric.pdf

Reply Report comment

starsky says:
February 3, 2013 at 3:42 pm

terrorist protection.

cant buy iodide crystal, or over 2% anymore either...

http://farmwars.info/?p=9963

Reply Report comment

Pinky's Brain says:
February 4, 2013 at 2:22 am

How the hell is a terrorist going to successfully make a sufficient amount of nitrogen-tri-iodide in-situ (moving it is pretty much impossible) to do any real damage? WTH?

Reply Report comment

MikrySoft says:
February 4, 2013 at 5:30 am

Make it wet and let it dry on target? Besides NI3 is better for scaring people. My chemistry teacher painted some spots on the lab floor with this stuff and laughed as people walked over it.

Reply Report comment

Jonathan Wilson says:
February 4, 2013 at 4:51 am

I am not 100% sure but I think the iodine restrictions are also because iodine is used in the making of illicit drugs (in addition to its uses in explosives)

Reply Report comment

ejonesss says:
February 3, 2013 at 4:11 pm

you know you can place the stuff in the freezer and separate the water from it

http://en.wikipedia.org/wiki/Applejack_(beverage)

applejack used to be made that way they would would leave the raw liquor mash in the cold and skim off the ice/slush

i think you can do the same thing with soda leave a bottle of soda in the freezer too long and you get ice and slush and remove the ice slush and you should be left with the soda syrup.

Reply Report comment

Greenaum says:
February 3, 2013 at 8:59 pm

No, that doesn't work. You just get frozen soda.

Reply Report comment

Coligny says:
February 4, 2013 at 4:40 am

Works with grapefruit juice...

Water freeze leaving you with the bitter sirup.

Reply Report comment

Alex says:
January 16, 2016 at 9:07 pm

Freeze distillation, for the record, should work fine for hydrogen peroxide solutions. And I reckon it's likely to be both safer and more effective in terms of yield than conventional distillation. H202 lowers the freezing point and raises the boiling point of an aqueous solution; this simultaneously increases the expected efficacy of freeze distillation and decreases that of conventional distillation.

Reply Report comment

NoX says:
April 16, 2013 at 1:14 am

Depends on how it's frozen.
Had it happen sometimes to me, if its frozen at a temperature just below the freezing point of water.

Reply Report comment

Tom says:
February 3, 2013 at 4:14 pm

In The Netherlands it's very easy to buy 30% H2O2 (euro 8,32/l); most on-line pharmacies have it in stock. The same goes for 30% HCl (euro 8,8/l), sulphur (euro 5,51/800g) and many other fun chemicals.

Reply Report comment

Pinky's Brain says:
February 3, 2013 at 11:49 pm

The EU has plans to clamp down hard though ... they want a max of 12% for private purchase, member states are allowed more but knowing our country's propensity to talk tough but act slavish I'm sure this will be rammed here through in no time. Enjoy it while you can.

http://register.consilium.europa.eu/pdf/en/12/pe00/pe00048.en12.pdf

Reply Report comment

Pyrimethamine says:
November 2, 2015 at 9:53 am

(a) hydrogen peroxide (CAS RN 7722-84-1) in concentrations higher than the limit value set out in Annex I, but no higher than 35 % w/w;
(b) nitromethane (CAS RN 75-52-5) in concentrations higher than the limit value set out in Annex I, but no higher than 40 % w/w;
(c) nitric acid (CAS RN 7697-37-2) in concentrations higher than the limit value set out in Annex I, but no higher than 10 % w/w.
(This is from the document you posted).
That nitric acid concentration would be terrible, luckily one can purify by use of distillation, fractional would be ideal.

Reply Report comment

Måns says:
February 3, 2013 at 5:33 pm

How about using a closed system and a simple vaccum pump and then make the destillation at room temperature? If the vaccum pump does not get damaged by the rather agressive hydrogen peroxide it should work.

Reply Report comment

vpoko says:
February 3, 2013 at 5:43 pm

Why distill? Hydrogen peroxide has a higher boiling point than water, so boiling off is enough. Distilling the vapor would give you water.

Reply Report comment

andres says:
February 3, 2013 at 9:44 pm

Because higher temperatures promote its decomposition

Reply Report comment

maken says:
June 1, 2015 at 2:01 am

At 1 psi, pure water will boil at near room temperature. The idea here is to boil it with vacuum pressure then use a desiccant stored in the same system to remove the water vapor from the container. Could work readily to produce the small amounts of high conc hper that are kind of safe to work with.

Reply Report comment

Martin says:
March 25, 2016 at 8:03 am

Why do you need the desiccant, if you are drawing a vacuum on the container? Just leave the pump running.

Report comment

mike says:
February 3, 2013 at 9:40 pm

i had to do this a few weeks ago for ap chem. we had to find the concentration of sugar in 7up assuming it was just a solution of sugar water. we had to do something like find the difference in the density of water and sugar and then do some other calculations to get the right answer by comparing the masses and densities. the special part we did with the difference in density gave us accurate results, while everyone was off by a good 6%

Reply Report comment

f.r0ze.n says:
February 5, 2013 at 11:22 am

too dangerous, don't keep it at your home
that's what sank the Kursk submarine, it's a highly unstable stuff and will burn your house down or just explode in your face
in a word: don't

Reply Report comment

heartphotopress says:
July 10, 2015 at 8:59 am

I thought ruskis sank the Kursk coz they refused assistance from available help

Reply Report comment

Brent Tibbetts says:
January 6, 2016 at 6:24 am

Friend of mine had a chemical explosion in high school chemistry. 10 years and 3 eye transplants later finally had a successful transplant and regained vision in second eye. Know what you are doing before doing stupid stuff.

Reply Report comment

Martin says:
March 25, 2016 at 8:05 am

eye transplant? More probably cornea transplants. I don't think you could transplant eyes.

Reply Report comment

sneha says:
November 11, 2013 at 5:33 am

it is very dangerus

Reply Report comment

sam says:
November 17, 2013 at 12:37 pm

What percentage did germans used in the h2o2 subs...also how did they work..i understand it was enought to burn underwater and provide water
and some o2.

Reply Report comment

Epic knowledge says:
June 30, 2015 at 5:25 pm

It is used above 70% up to high 90% in the torpedoes. It is passed through a mesh of platinum which acts as a catalyst, changing the hydrogen peroxide back to water in the form of steam at over 600 degrees Celsius which propels it.

Reply Report comment

keith says:
August 9, 2015 at 4:09 pm

Your correct

Reply Report comment

Russ C. says:
November 21, 2015 at 8:01 pm

Folks one point seems to be missing from the H2O2 discussions. That is if you buy Clear developer at Beauty supply store it is fairly cheap and no records are kept of the sales or other headaches. However it is sold as 20 volume strength, 30 Volume strength and other concentrations up to about 40 or 45 volume strength, VOLUME STRENGTH IS NOT SAME AS PERCENT CONCENTRATION ! IE 20 Volume strength is NOT 20% H2O2 !! it is much less than that. I don't recall the exact percentages to volume strength conversions however even 20 Vol. St. will turn your fingers white and cause mild chemical burns (not real problem, mostly pulls oils and water from a few layers of skin, hand lotion and moisturizer and a bit of time cures these 'wounds', gloves is smarter choice!). Rocket fuel strengths of H2O2 that can power a jet belt (old jet pack by BELL seen in James Bond movie uses 80% H2O2 and higher as its fuel which is pushed by N2 gas into a reaction chamber filled with activated silver or Nickel gauze which decomposes it violently into very high pressure live steam, which is what is responsible for its thrust!) 80% is very different from any available H202 with out special purchase and handling requirements from very few supply houses.

Reply Report comment

kris says:
January 26, 2016 at 8:10 am

Hi. I would like to ask. How can I dilute 10% H202 to 3% H202. I probably bought 10% H202 at the pharmacy just this afternoon. I am wondering if How can I possibly use this peroxide if it is 10% solution. I would like to try it in laundry, kitchen utensils, seed sprouting, vegetable cleaner as well as dishwashing cleaner. Can anyone help me please, It gives me a headache whether I can use it directly or not. The vegetable stuff and as a cleaning spray to my son's toys. Pretty please. Help me with this

Reply Report comment

RandondomNut says:
March 24, 2016 at 9:28 pm

Its simply add cold water according to the below the equation: (M1*V1)/M2=V2)
where m1= initial concentration
where V1= initial volume
where m2= initial concentration
where V2= initial volume

Reply Report comment

Sunil Shegaonkar says:
April 15, 2016 at 9:37 pm

During distilling off water from a mixture of 30/ 70 % Hydrogen Peroxide, it is quite possible that peroxide will be lost?
How much?, It is a matter of finding experimentally.

Reply Report comment

Polymath says:
November 11, 2016 at 2:19 pm

http://www.tecaeromex.com/ingles/destilai.htm

If you have the time and money you can contact this lunatic. He's been doing scary stuff with hydrogen peroxide for a while now.

Reply Report comment

Stephanie Wright says:
November 16, 2016 at 10:51 am

I was just wanting to make higher concentration to whiten teeth?

Reply Report comment

notarealemail says:
November 16, 2016 at 11:17 am

I hope you're joking. Please use the special toothpaste, or you can use regular 3% H2O2 as an oral rinse. I strongly recommend rinsing your mouth with water after though, from personal experience.

Reply Report comment

garry mackner says:
February 18, 2017 at 2:52 pm

The developer at the beauty supply has additional chemicals in it. too many to list

Reply Report comment

BotherSaidPoohAsHeChamberedAnotherRound says:
April 16, 2017 at 3:41 am

What is even more stupid: thanks to *one idiot* trying to make a boom boom box out of of defunct laptop batteries, you now can't get 18650's locally. I mean I ask you, you can go to any corner shop and buy a "phone charger" pack with 18650s but they have been replaced with gelpacks now because of IATA restrictions.

Reply Report comment

Jodi says:
November 4, 2017 at 2:45 am

Can I dilute 50 % down to 3% and use for general household cleaning

Reply Report comment

Jeff says:
December 19, 2017 at 12:04 pm

Damn i just wanna clean some old yellow star wars figures

Reply Report comment

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