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Sunday, December 4, 2011 02:06

Tetrameric acetone peroxide (TetrAP)

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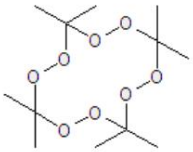


Ordinary oxidation of acetone with hydrogen peroxide, catalyzed by mineral acids, leads to trimeric acetone peroxide (incorrectly called TCAP - tricycloacetone peroxide in Poland, while the correct name is CTAP or TATP - cyclo(triacetone triperoxide)). This substance is very no
it sublimates easily and is of little use as an initiating explosive. However, if the oxidation is catalyzed by tin ions, the tetrameric peroxide with the formula C12H24O8 - which is much more stable, e.g. withstands 4-hour heating to 120°C without visible
signs of decomposition and 120 hours of cooking in solvents with the addition of substances that catalyze the decomposition of peroxides, such as iron (III) acetylacetonate pentoxide and cobalt (III) acetylacetonate. The stimulating power is similar to TATP. Its disadvantage is high sensitivity to friction and impact
In this article, I will use the abbreviated name TetrAP.

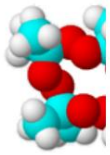
Receiving

Reagents

- Acetone C3H6O
- Perhydrol (30% aqueous solution of hydrogen peroxide) H2O2
- Tin (IV) chloride 5 hydrate SnCl4 5H2O , or
- Tin (II) chloride 2 hydrate SnCl2 2H2O

Equipment

- Beaker or crystallizer
- Funnel
- Filter
- Magnetic stirrer (optional)



In a beaker, dissolve 1.4 g of hydrated tin (IV) or (II) chloride in 40 ml of perhydrol. When dissolving tin (II) chloride in perhydrol, we must be careful and add it very small portions - rapid oxidation occurs, accompanied by characteristic "popping" and drops of perhydrol may spray from the vessel. Then
add 40 ml of acetone and, if you have a mixer, turn it on at full speed. Leave the beaker with the stirrer and its contents for 24 hours (if you don't have one mixer, this time must be longer, even up to 3 days). During this time, TetrAP slowly precipitates and floats on the surface of the liquid.

After the reaction is completed, evaporate the unreacted acetone by heating the post-reaction mixture or simply leaving it to evaporate for 1-2 days in a wide dish. Then we filter the TetrAP precipitate (vacuum filtration can be used) and wash it with water. To get rid of the impurity, we crystallize it TetrAP from benzene or a 50% solution of acetone in water (this cannot be omitted, because at this stage TetrAP is separated from small amounts of CTAP that is also being formed). Efficiency of about 41% (based on acetone) if we used tin (IV) chloride, if we use tin (II) chloride it will be slightly lower. The resulting compound has a melting point of 93-94°C. Pot use a cast primer (preferably by heating in a boiling water bath) without much fear of an accidental explosion.

Security

Although TetrAP is relatively stable, this does not mean that it can be handled like potatoes. You need to be as careful as possible when handling it, as with organic peroxide, especially when melting it. Contamination or contact with reducing substances may degrade TetrAP, so always avoid contact with it

metals. Suicidal ideas such as primers in metal casings are categorically excluded.

Article

Sources:

- J. Chem. Research (S), 1999, 288-289

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