



TEXAS TECH UNIVERSITY

Environmental Health *and* Safety

PEROXIDE FORMING COMPOUNDS

It is recommended that peroxide forming chemicals be checked for the formation of peroxides or disposed of one year after opening. If peroxides are present, remove the peroxides or dispose of the chemical. These recommendations are from Stephen R. Rayburn, *The Foundations of Laboratory Safety*, 1990 and Jay A. Young, *Improving Safety in the Chemical Laboratory*, 1991.

List of Peroxide Forming Compounds¹

This is not an all inclusive list. It is the responsibility of the laboratory to identify peroxide forming chemicals.

Acetal	Tetrahydrofuran
Acrylic acid	Tetrahydronaphthalene
Butadiene	Vinyl acetate
Chlorobutadiene (chloroprene)	Vinyl chloride
Chlorotrifluoroethylene	Vinyl ethers
Cumene	Vinyl pyridine
Cyclohexene	Vinylidene chloride
Cyclooctene	
Cyclopentene	
Diaactylene	
Dicyclopentadiene	
Diethyl ether	
Diethylene glycol dimethyl ether (diglyme)	
Dioxane (<i>p</i> -dioxane)	
Divinyl acetylene	
Ethyl acrylate	
Ethylene glycol dimethyl ether (glyme)	
Furan	
Isopropanol	
Isopropyl ether	
Methyl acetylene	
Methyl cyclopentane	
Methyl methacrylate	
Methyl-isobutyl ketone	
Potassium amide	
Potassium metal	
Sodium amide (Sodamide)	
Styrene	
Tetrafluoroethylene	



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Detection and Inhibition of Peroxides²

Peroxide Test Strips

Commercially purchased test strips can be used for the detection of peroxide formation (follow the manufacturer's instructions).

Please note that these methods are BASIC protocols. Should a researcher perform one of these methods, all safety precautions should be thoroughly researched.

Ferrous Thiocyanate Detection Method

Ferrous thiocyanate will detect hydro peroxides with the following test:

1. Mix a solution of 5 ml of 1 % ferrous ammonium sulfate, 0.5 ml of 1 N sulfuric acid and 0.5 ml of 0.1 N ammonium thiocyanate (if necessary decolorize with a trace of zinc dust)
2. Shake with an equal quantity of the solvent to be tested.
3. If peroxides are present, a red color will develop.

Potassium Iodide Detection Method

1. Add 1 ml of a freshly prepared 10% solution of potassium iodide to 10 ml of ethyl ether in a 25 ml glass-stoppered cylinder of colorless glass protected from light (both components are clear).
2. A resulting yellow color indicates the presence of 0.005% peroxides.

Inhibition of Peroxides

1. Storage and handling under an inert atmosphere is a useful precaution.
2. Addition of 0.001 % hydroquinone, diphenylamine, polyhydroxyphenols, amino phenols or aryl amines may stabilize ethers and inhibit formation of peroxides.
3. Dowex-1© has been reported effective for inhibiting peroxide formation in ethyl ether.
4. 100 ppm of 1-naphthol is effective for peroxide inhibition in isopropyl ether.
5. Hydroquinone is effective for peroxide inhibition in Tetrahydrofuran.
6. Stannous chloride or ferrous sulfate are effective for peroxide inhibition in dioxane.



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References

1 Copied from *Prudent Practices in the Laboratory*.

2 Copied from the *CRC Handbook of Lab Safety*, 2nd Ed.