

Appendix I: Peroxide Forming Chemicals Information Sheet

Potential Peroxide-Forming Chemicals

This policy refers to the proper use, storage, and disposal of peroxide-forming chemicals in order to minimize risks to personnel, university facilities and the environment.

Lists of Peroxide forming chemicals and the associated hazards

Peroxide-forming materials are materials that can react with molecular oxygen over time under normal use and storage conditions to form organic peroxides. Peroxides formed in this way can be potentially shock sensitive and even explosive, especially when dry. There are many different materials that are capable of peroxide formation, and certain molecular structures are known to exhibit this behavior. These peroxide formers are typically categorized in lists by their hazard level and also by the type of peroxide that can form.

List A materials:

Known to form dangerous peroxides in hazardous levels under normal conditions of storage. Discard or test for peroxides every 3 months after open date.

Butadiene (gas)	Potassium metal
Chloroprene	Sodium amide
Divinylacetylene	Tetrafluoroethylene (gas)
Isopropyl ether	Vinylidene chloride
Potassium amide	

List B Materials:

Known to form dangerous peroxides at potentially hazardous levels when the material is used or stored in a way that the peroxides could increase in concentration. Many common laboratory solvents fall into this category. Discard or test for peroxides at least every 6 months after open date.

1,4-dioxane	Furan
Cyclohexanol	Glyme
Decalin	Isopropyl benzene
Diethyl ether	Tetrahydrofuran (THF)
Diglyme	Tetralin

List C Materials:

Vinyl compounds that form peroxides that are capable of initiating free radical polymerization in the neat vinyl monomer. Polymerization processes that occur in this way can be very dangerous. Discard or test for peroxides at least every 6 months after open date.

Acrylonitrile	Vinyl acetate
Methyl methacrylate	Vinyl chloride
Styrene	Vinyl pyridine

The listed material above is not all inclusive. Categorization of materials known to form peroxides led to the understanding that certain molecular structures are prone to peroxide formation. Known structures include the following functional groups of possible peroxide forming chemicals:

Aldehydes	Benzylic compounds
Allylic compounds	Ethers
Amides	Vinyl compounds, particularly vinyl halides

Safe Storage and Use of Peroxide-Forming Chemicals

Maintenance of peroxide-forming chemicals requires implementation of the following procedures:

- Identify potential peroxide-forming chemicals in lab spaces, and label each container with the date it has been received as well as the date it is opened.
 - Lab managers are responsible for labeling these chemicals.
- Lab managers should minimize their inventory of peroxide-forming chemicals when possible.
- Store peroxide-forming chemicals in tightly sealed containers to minimize introduction of air.
 - Lab managers may add a blanket of Argon to opened containers
- Light can initiate the peroxide-forming process, so containers should be stored either in containers that exclude light, or cabinets that do not allow light to enter (i.e. flammable storage cabinet, or under fume hood)
- Test for peroxides at least as often as recommended for opened containers. (Every 3 months for List A chemicals, and every 6 months for List B and C)
- Any unopened chemicals from the manufacturer must be tested upon reaching the manufacturers expiration date.
- Inspect containers of peroxide-forming chemicals frequently, looking for signs of precipitation, stratification of liquid, crystal formation, or other irregularities.
 - If peroxide-forming chemical containers present any of these signs, DO NOT move or disturb the container and contact Lab Manager or and Public Safety as soon as possible.
 - Before distilling any peroxide forming chemicals, always test the chemical first with peroxide test strips to ensure there are no peroxides present. Never distill peroxide forming chemicals to dryness. Leave at least 10-20% still bottoms to help prevent possible explosions.