## Peroxide-Forming Chemicals

Some common laboratory chemicals can form peroxides on exposure to air. Peroxides are shock-sensitive and can be violently explosive in concentrated form or as solids. Others can result in rapid polymerization and can initiate a runaway, explosive reaction. The most commonly used peroxide-forming chemicals are: diethyl ether (ethyl ether), tetrahydrofuran (THF), dioxane. Isopropyl ether (diisopropyl ether) is a severe peroxide hazard. Organic peroxides are another class of compounds with unusual stability problems and as such are one of the most hazardous class of chemicals normally handled in the laboratory.

### Storage Procedures

The best way to manage chemicals that have the potential for forming shock sensitive peroxides is to purchase only the quantity that is required in a one-month period. Date the bottle as soon as it arrives in the lab. Store the material in a tightly closed, properly labeled container in flammable storage cabinet, away from flames, heat, and sources of ignition, light, oxidizers and oxidizing acids.

**Caution:** All peroxidizable compounds should be stored away from heat and light. They should be protected from physical damage and ignition sources.

When peroxide-forming chemicals reach their expiration date, it is recommended that you process the chemicals for waste collection.

If a peroxide forming chemical is older than its expiration date (table below) or is stored longer than the time limits, follow these procedures:

Prior to moving the container, examine it.

1. Call OEHS if crystals are visible in the chemical solution or if crystals are on or in the container. Closely examine the container near the cap for the presence of crystals. Some peroxide crystals in solution have a very fine, spun glass-wool appearance. **Do not test these compounds for peroxides; let OEHS personnel manage these containers.**
2. Call OEHS if the container has a metal screw cap. Do not open the container. Metal capped containers
3. Call OEHS if the container has been stored longer than two years. Leave the container where it was found until Chemical Waste Program staff arrive:
4. If the container was picked up, gently put it down in a safe place. Do not shake the container or place it near sources of heat or ignition. Tape-off the area containing the potentially shock sensitive compound and warn laboratory personnel of its presence.

### Warning Label

A warning label should be affixed to all containers of peroxidizable compounds, as illustrated below, to indicate the date of receipt and the date the container was first opened.

PEROXIDIZABLE COMPOUND Date Received _____ Date Opened _____ Discard or test within 1 / 3 / 6 months after opening (circle one)

**Emergency Disposal**

The OEHS will contact outside company remove any containers of peroxide forming chemicals if:

1. the container has crystals in or on it,
2. the container is metal with a metal cap, or
3. the chemical is suspected to be shock-sensitive due to its age.

You will need to be on-site during these hours to unlock doors and show the personnel where the container is located. An OEHS staff person will be on-site to coordinate activities.

**Table of Common Peroxide Forming Chemicals**

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|---|---|
| **Severe Peroxide Hazard on Storage with Exposure to Air**<br>*Discard within 3 months* | |
| Diisopropyl ether (isopropyl ether) | Potassium metal |
| Divinylacetylene (DVA) | Sodium amide (sodamide) |
| Potassium amide | Vinylidene chloride (1,1 dichloroethylene) |
| **Peroxide Hazard on Concentration**<br>Do Not Distill or Evaporate Without First Testing for the Presence of Peroxides<br>*Discard or test for peroxides after 6 months* | |
| Acetaldehyde diethyl acetal (acetal) | Ethylene glycol dimethyl ether (glyme) |
| Cumene (isopropylbenzene) | Ethylene glycol ether acetates |
| Cyclohexene | Ethylene glycol ether acetates |
| Cyclopentene | Furan |
| Decalin (decahydronaphthalene) | Methylacetylene |
| Diacetylene (butadiene) | Methylcyclopentane |
| Dicyclopentadiene | Methyl isobutyl ketone |
| Diethyl ether (ether) | Tetrahydrofuran (THF) |
| Diethylene glycol dimethyl ether (diglyme) | Tetralin (tetrahydronaphthalene) |
| Dioxane | Vinyl ethers |
| **Hazard of Rapid Polymerization Initiated by Internally Formed Peroxides** | |
| Normal Liquids<br>*Discard or test for peroxides after 6 months* | |
| Chloroprene (2-chloro-1,3-butadiene) | Vinyl acetate |
| Styrene | Vinylpyridine |
| Normal Gases<br>*Discard after 12 months* | |
| Butadiene | Vinylacetylene (MVA) |
| Tetrafluoroethylene (TFE) | Vinyl chloride |