

## SAFE HANDLING AND DISPOSAL OF PEROXIDE FORMING CHEMICALS

### POLICY STATEMENT (OVERVIEW)

There are several compounds/elements that can react with oxygen and become increasingly more dangerous upon prolonged storage because they tend to form explosive peroxides with age. These types of chemicals can be divided into two general chemical categories (**TABLE 1**). Peroxides may form in freshly distilled, undistilled, and unstabilized materials in less than two weeks. Exposure of these types of chemicals to light, air, and heat may accelerate the formation of the peroxides. Many peroxide forming materials tend to absorb and react with oxygen from the air to form unstable peroxides which may detonate with extreme violence when concentrated by evaporation or distillation. These materials may also explode when combined with other compounds that produce a detonable mixture or when disturbed by heat, shock, or friction.

### TABLE 1: ORGANIC COMPOUNDS FORMING PEROXIDES

1. Ethers, acetals.
2. Olefins with allylic hydrogens, chloro- and fluoro-olefins, terpenes
3. Dienes, vinyl acetylenes.
4. Aldehydes.
5. Ureas, amides, lactams.
6. Vinyl monomers including vinyl halides, acrylates, methacrylates, vinyl esters.
7. Secondary alcohols

### INORGANIC COMPOUNDS OR ELEMENTS

1. Alkali metals, particularly potassium.
2. Alkali metal alkoxides and amides.
3. Organometallics.

### REASON FOR POLICY

Certain types of materials and their subsequent wastes must be handled by special procedures due to their highly hazardous nature. These chemicals can explode during opening, routine handling or transport. The purpose of the policy and guidelines is to better manage unstable materials highly hazardous materials or materials that can become unstable over time in order to reduce the risk associated with their handling. In addition, if these materials are past their expiration date, have a peroxide concentration greater than 100ppm, or are unstable, then the material is viewed as "inherently waste-like" by the U.S. EPA and laboratories may be cited as in violation of hazardous waste regulations. If injuries were to result from improper management or handling of these expired, potentially unstable materials, then laboratories could also be cited by OSHA. Finally, because these expired/unstable materials are treated as highly hazardous material, there are additional fees assessed from our waste vendor to properly handle and dispose of these materials. The additional costs are charged to the department/lab responsible for the materials.

### RESPONSIBILITIES

- 1) DO NOT purchase large quantities of peroxide forming chemicals. Purchase the amount that you will use in a 3-6 month time period.
- 2) When possible, purchase peroxide forming chemicals that have peroxide inhibitors added by the manufacturer.
- 3) Label all peroxide forming chemicals with date received and date opened using the labels provided (See guidelines document for peroxide forming materials).
- 4) For handling and use information please see guidelines document for peroxide forming materials.

- 5) Dispose of all peroxide forming materials through EH&S before or at scheduled disposal date (See guidelines document for disposal schedules).
- 6) Contact EH&S to keep potential peroxide forming materials which are rare/expensive or critical to the function of the lab past the original expiration date. Periodic testing and documentation will be required.
- 7) Additional charges incurred for handling expired/unstable materials through our waste vendor will be charged back to the appropriate department or lab.

For more information, please see the [guidance document](#) available on the EH&S website.

#### **SANCTIONS**

Violations of this policy may result in University disciplinary action and may result in regulatory fines and penalties, including civil penalties of up to \$37,500 per incident per day. All penalties and fines are the responsibility of the University department in which the infraction occurred. Grants funding may not be used to pay regulatory fines or penalties.