


Peroxide Forming Chemical Storage Guidelines

Certain organic chemicals react with air at ordinary temperatures to form peroxide compounds which can react violently or explosively! Organic peroxides are substances that contain the peroxy group (R-O-O-R) and are classified as low-power explosives. These compounds are hazardous due to their sensitivity to shock, sparks, or other source of ignition such as heat, friction, sunlight, impact, or reaction with strong oxidizing/reducing agents. Due to this unusual instability and the fact that peroxide formation increases with age, it is important to label all peroxide forming chemicals with the date received and the date opened, and follow the storage and disposal guidelines indicated below. Some common peroxide forming chemicals are listed, but always check the SDS for confirmation of storage/disposal guidelines for the chemicals in your lab.

CAUTION! PEROXIDE FORMING CHEMICAL	
Date Received: _____	
Date Opened: _____	
Date Expires: _____	
Test Date/Result: _____	

Common Compounds That Form Peroxides During Storage		
Risk Category	Examples	Disposal Guidelines
<p style="text-align: center;">MOST DANGEROUS</p> <p>Peroxide formation occurs during storage. Form explosive levels of peroxides without concentration</p>	<p>diisopropyl ether (isopropyl ether) potassium metal potassium amide divinyl acetylene sodium amide (sodamide) vinylidene chloride</p>	<p>Test for peroxide formation before use and discard within 3 months</p>
<p style="text-align: center;">DANGEROUS</p> <p>Peroxide formation occurs during storage and becomes more hazardous when the peroxides are concentrated upon evaporation or distillation</p>	<p>Diethyl ether Tetrahydrofuran Dioxane Acetal Ethylene glycol dimethyl ether Furan Vinyl ethers Dicyclopentadiene Cyclohexene Diethylene glycol dimethyl ether</p>	<p>Test for peroxide formation before distillation or evaporation and discard within 12 months</p>
<p style="text-align: center;">DANGEROUS</p> <p>May initiate exothermic polymerization which could rupture the container, release toxic gas, or initiate combustion</p>	<p>Methyl methacrylate Styrene Acrylic acid Acrylonitrile Butadiene Vinylidene chloride Chlorofluorethylene Vinyl acetate</p>	<p>Test for peroxide formation before use and discard within 12 months</p>

Safe practices for storing and handling peroxide forming chemicals:

- If visible crystals are evident in a peroxidizable liquid or discoloration is observed in a peroxidizable solid, **DO NOT HANDLE** the chemical and contact the Safety Office immediately (828-227-7443). These conditions indicate a higher concentration of peroxide formation and require special handling and disposal procedures.
- Purchase quantities of peroxidizable compounds according to short-term needs. Avoid bulk-purchasing to save money as this often results in excess materials with peroxidation potential and subsequent disposal costs.
- Label the container with date received, opened, and expiration.
- Follow the recommended storage and disposal guidelines in the table above or as listed on the SDS.
- Test for peroxide formation per the recommended guidelines and record the date and test results. Peroxide test strips are available from commercial vendors and are convenient to use. For results less than 30 ppm, the chemical may be stabilized by adding an inhibitor or removing the peroxides. **DO NOT USE if the peroxide test result is greater than 30 ppm and contact the Safety Office for disposal.**
- When transferring peroxide forming chemicals from a stock bottle into a new container, label the new bottle with the received, opened, & expiration dates listed on the original stock bottle.
- Store peroxide forming chemicals in a flammable cabinet or explosion proof refrigerator if cooler temperatures are indicated on the SDS.
- Keep away from sources of heat and sunlight.
- Routinely test peroxide forming solvents before distillation or evaporation and don't distill to dryness. Leave at least 10% volume of liquid in the container to ensure safety.
- Properly reseal the containers to limit atmospheric contaminants (particularly oxygen).
- Empty containers of ethers and other peroxide-formers must be triple rinsed with water before discarding.
- Always wear proper personal protective equipment (PPE) in the lab. Wearing a lab coat and clothing that minimizes exposed skin provides better protection when working with chemicals.
- Work behind a safety sash such as a fume hood, plexiglass shield, or face shield, when working with potentially explosive chemicals. Rotovap explosions have occurred in the lab, so always be careful when using peroxidizable solvents in the rotovap – test the solvent for peroxides before using and shield the rotovap flasks to prevent injury from flying glass fragments in the event of an explosion!
- Always know where the emergency eyewash and safety shower are located before beginning work in the lab.
- Avoid working alone in the lab during business hours and if necessary use a buddy system to periodically check in. Never work alone during off-hours (evenings, weekends, or holidays).