MINIMIZING PEROXIDE FORMATION

There is a great deal of uncertainty regarding the hazards and safe handling of peroxidizable organic chemicals.

Peroxides may explode when concentrated by evaporation or distillation, combined with compounds that create a detonable mixture, or when disturbed by heat, shock or friction.

A wide variety of organic compounds spontaneously form peroxides by a free-radical reaction with molecular oxygen in a process of auto-oxidation. Although ethers are the most common, many other moieties can go through the same process.

Storing Peroxide Formers

- Label the containers with the date of receipt and date it is first opened
- Time-sensitive materials should be marked with a tag that identifies them easily
- Ethers and other organic peroxide formers should be stored in cans, amber bottles, or other opaque containers, and ideally under a blanket of inert gas
- It is preferable to use small containers that can be completely emptied rather than take small amounts from a large container over time
- No materials can be used or tested after the manufacturers' expiration date unless evidence of current stability has been obtained by direct testing before the expiration date
- If material is more than 1 year past label expiration date, minimize handling and DO NOT OPEN OR TEST!
  1. Call EHS to request special disposal
  2. Isolate the container from possible inadvertent use until picked up
  3. If the material is very old or shows evidence of conversion to a hazardous status (crystalline materials in or under cap of ethers), do not move the container!

Minimizing Peroxide Formation

- Any peroxidizable chemical with visible discoloration, crystallization, or liquid layers must be treated as potentially explosive - call EH&S for immediate assistance
- Label all containers of peroxide-forming chemicals with date received and opened. The label shown below may be used for this purpose
- Always store flammable materials that require refrigeration in a refrigerator approved for flammable storage (lab-safe) although it may increase peroxide formation
- Use or discard containers by the manufacturer's expiration date
- Keep an inventory of peroxide-forming chemicals in the lab - Never purchase large containers if the quantity exceeds your actual need within the 3-12 month expiration period
- Never distill to dryness - always leave at least 20% of still bottoms. Adding a non-volatile organic compound (mineral oil) can dilute the peroxides remaining after distillation
- Never force open a rusted/ stuck cap on a container of a peroxide-forming chemical
- Never scrape/ scrub glassware or containers if you see an oily or crusty residue

Visit www.ehs.ucr.edu for additional information or call EH&S at 827-5528 if you have any questions.