Peroxide Forming Chemicals

Mindfulness Minute: Incorporate safety into your workflow by considering the hazards associated with your peroxide forming chemical each time you use it.

A peroxide former is a chemical which reacts with oxygen or oxidizing impurities to create peroxy compounds. These compounds have potentially explosive R-O-O-R peroxide bonds. Exposure to light and heat often accelerates this reaction. Peroxy compounds are very sensitive to mechanical shock, friction, intense light, rapid temperature changes, and heating. Common laboratory peroxide forming chemicals include diethyl ether, 1,4-dioxane, tetrahydrofuran, sodium amide, and styrene.

Peroxide Former Warning Signs:

It is important to always give a visual inspection of a container holding a peroxide forming chemical prior to moving or opening it. This is especially true where you do not know the age or history of the container. Look out for the following conditions:

- Contents: If the container is transparent, look for evidence of crystallization, solids, discoloration, or separation of liquid into layers.
- Cap or Lid: Look for solids or crystal growth visible at the cap area of the container. If this is present, DO NOT OPEN the container. The friction from unscrewing a cap can detonate peroxides.
- Evaporation: Evaporation can be a sign of age or a damaged or loose cap. Regardless of the cause, evaporation can concentrate peroxides to dangerous levels. Increased oxygen in the container also allows peroxides to form readily.
- Expired/Old Containers: If you find a peroxide forming chemical that has expired or that is in an old style of container that is no longer produced, do not handle the container.

Crystals in contents


Crystals on cap/threads

Follow this list of dos and don'ts for safe handling and use of peroxide formers:

- **Do** purchase peroxide forming chemicals in limited quantities and, if possible, with appropriate inhibitor or stabilizer (e.g.: butylated hydroxytoluene [BHT]).
- **Do** label container with the date received, date it was opened, and date of any peroxide testing and results.
- **Do** store peroxide forming chemicals away from light and heat and in a flammables-approved refrigerator. Peroxide forming chemicals **with** inhibitor should not be stored in an inert atmosphere, and **non-inhibited** peroxide formers should be stored under an inert atmosphere.
- **Do** check for peroxide formation in chemicals while in storage using peroxide test strips. If the peroxide concentration is >100 ppm, contact EHS for disposal assistance.
- **Don't distill, evaporate, or concentrate** peroxide forming chemicals until you have tested for the presence of peroxides
- **Don't open or test contents of container** if: 1) crystals are visibly present on or in the container or lid, 2) if a precipitate has formed or an oily viscous layer is present, or 3) if the container has been opened but not tested for the presence of peroxides and is more than two years old.

References:

LS-021 Time-Sensitive Chemicals