Safety Alert: Pyrophoric and Other Reactive Materials

The Research Safety Division is communicating the following safety alert regarding pyrophoric and other reactive materials usage. Recent incidents have occurred at three separate universities which illustrate the need for constant vigilance regarding these types of materials. Please take appropriate and immediate action to identify and manage these materials in a proactive and safe manner. If you need assistance please contact Environment, Health and Safety (ehsrap@ucsd.edu).

UC San Diego:

During the summer of 2019, a badly degraded chemical container was discovered within a chemical fume hood in a high-hazard chemical storage room. The discovery of such a badly degraded container caused serious concern among EH&S and research laboratory staff. There was speculation among research staff that it might be a peroxide forming material; therefore, EH&S restricted the material from further handling, and the area was secured from entry.

The primary container was approximately 500mL in size and amber in color. The contents of the primary container appeared to be crystalized and clear/white in color. In addition, the primary container was compromised: the container appeared to be cracked, and the lid had bulged off of the container. The primary container was stored in a large, clear glass, secondary container that had a small hole in the top of the lid. At the bottom of the secondary container was a discolored all-purpose drying agent. There was also a growth of unknown crystalline material running up the inside of the secondary container which terminated at the lid. Both containers were unlabeled and ownership/identification could not be determined.

After a thorough investigation, EH&S considered the material an “unknown” and possibly unstable. EH&S then contracted with a local hazardous materials vendor that specializes in high-hazard removal services to provide costly remediation/removal services. The description of the container was noted in the Certificate of Stabilization/Deactivation as provided by the vendor:

“500 ml bottle without cap is in a 2L jar over pack. There are a lot of long crystals surround the 500ml bottle.”
The material was safely removed from the research building within a few days of discovery and moved to a safe location for remediation.

IMPORTANT NOTE: Incidents/removals, such as the one described above, are very problematic for several reasons: 1) Degraded materials cause significant safety concerns for the campus community, building occupants, and EH&S staff, 2) It puts everyone involved at unnecessary risk, 3) A hazardous materials response takes considerable time and planning by many individuals, and multiple departments, 4) It’s an unnecessary and avoidable impact on the University, and generally at significant financial cost.

**Northwestern University:**

**Safety Alert: Pyrophoric and Air-Sensitive Chemicals** – A near-miss has been reported involving an Alfa Aesar’s ChemSeal™ container.

[https://researchsafety.northwestern.edu/safety-alert-pyrophoric/](https://researchsafety.northwestern.edu/safety-alert-pyrophoric/)

**University of Minnesota:**

**Dangers of Peroxide Formers—Explosion at UMN** – A large explosion occurred at the University of Minnesota involving peroxide-forming materials.

“After a thorough investigation, the most likely cause of the explosion was determined to be shock sensitive residue from a peroxide forming chemical deposited inside an empty bottle. While in solution, any shock sensitive crystals may have been stabilized. After the solvent was removed and the residue dried, a detonation of the residual peroxide crystals could have been initiated by friction from the discarded bottles in the cart.”


**Preventative Actions for Researchers:**

- **Ensure** that you review the appropriate [Hazard Control Plans (HCPs)](https://researchsafety.northwestern.edu/safety-alert-pyrophoric/) before beginning research with these materials. Ex: Pyrophoric HCP, Organic Peroxides HCP, Water Reactive Materials HCP
- **Inspect** your [chemical inventory](https://researchsafety.northwestern.edu/safety-alert-pyrophoric/) on a regular basis (put your eyes on every container).
- **Take** prompt action if you discover a degraded or suspicious container (e.g. solvent discoloration, crystal or solid formation, bottle/cap/label degradation, etc.). Inform your PI and/or EH&S.
- **Test** all [peroxide forming materials](https://researchsafety.northwestern.edu/safety-alert-pyrophoric/) every six months as per UC San Diego Policy.
- **Wear** appropriate [Personal Protective Equipment](https://researchsafety.northwestern.edu/safety-alert-pyrophoric/) when handling pyrophoric or other reactive materials.
- **Discuss** safety in group meetings.