

Safety Alert – February 2024

Subject: Organic peroxides, explosive/shock sensitive chemicals and the need for regular assessment/surveillance

Background:

Organic peroxides are unstable, and when dry are explosive by shock, friction or rapid heating. When certain chemicals, such as isopropyl ether, tetrahydrofuran and acetaldehyde, are exposed to atmospheric oxygen over a period of time, organic peroxides can form. This can occur under normal storage conditions but is also influenced by light, heat, moisture and contamination from metals such as potassium. When organic peroxide forms in solvents, they can be easily identified as crystal formation.

When the crystals are allowed to grow and dry out they become extremely hazardous. Arranging disposal is much more difficult and hazardous when the crystals are dry and requires an experienced professional to make the material safe.

CAUTION!

Because of sensitivity to friction, light, and heat, extreme care should be taken in handling any container in which crystallised organic peroxides are suspected to be present. It is recommended that if crystals are identified, the container is to be isolated, and the Central Safety Team is contacted immediately at: safetysystems@unsw.edu.au

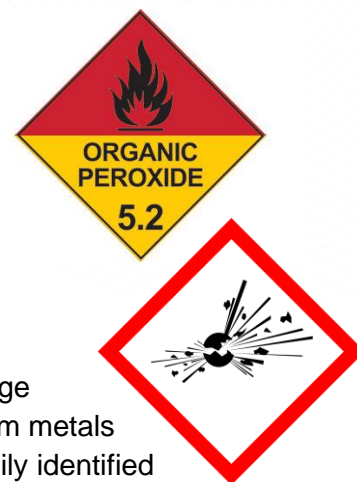
Some examples of other chemicals capable of forming organic peroxides include: potassium metal, isopropyl ether, cyclohexene and 2-Pentanol. An extensive list of known peroxide forming chemicals can be found in *HS622 – Organic Peroxide Forming Chemicals* (<https://www.unsw.edu.au/content/dam/pdfs/unsw-adobe-websites/planning-assurance/safety/documents-resources/hs-documents/2016-02-HS622-Organic-Peroxide-Forming-Chemicals-0.pdf>)

What happened:

As part of a regular testing schedule here at UNSW, a 1L bottle of acetaldehyde with tiny quantities of crystals was identified. Staff isolated the acetaldehyde in a fume hood and contacted the Central Safety Team. The Central Safety Team, in conjunction with chemistry experts, decided it was safe for expert staff to dissolve and dispose of the organic peroxides themselves.

Actions Required:

- Any areas where organic peroxide formers are present should review their processes to confirm they are following the recommendations & inspection checks as detailed in *HS622 Organic Peroxide Forming Chemicals* or the local risk management document relevant to their chemical.
- Carry out and document a risk assessment for any organic peroxide formers stored or used.



- Any groups that possess chemicals capable of forming organic peroxides should reassess whether such chemicals are still required & dispose of them if necessary. Never store quantities in excess of what is needed.
- Develop and follow a Safe Work Procedure for any use or storage of peroxide formers.
- Check all peroxide forming chemicals stored to make sure crystals have not formed. All stored peroxide forming chemicals must be checked periodically to ensure peroxide levels are not excessive. The frequency will depend on the chemical's potential to form organic peroxides refer to HS622).
- Peroxide forming chemicals should be stored away from direct light and possibly in tinted glass containers or foil-wrapped bottles.
- Never handle dried out organic peroxides. Seek expert advice from your supervisor or the Safety team.
- Take 2 minutes 2 Be Safe before every task or activity in the lab to make sure you have identified the risks and implemented appropriate controls, if you're working in a team ensure you have communicated the hazards of the task, including personal protective equipment (PPE) requirements.
- Make sure that the PPE you identify as a control in your Risk Management Form is suitable for the task, chemical or material being handled and that these details are transferred to the Safe Work Procedure

Further Information: safety@unsw.edu.au