



Disposal of Outdated Chemicals in the Laboratory- Potentially Explosive Compounds

Maintaining an up-to-date chemical inventory is required by regulation and critical to managing safety in your lab. Although most chemicals that are used in research laboratories are stable and non-explosive at the time of purchase, **some chemicals become explosion hazards**, or potentially explosive compounds (PECs), over time if they oxidize, dry out, concentrate, destabilize, or otherwise degrade. PECs are particularly dangerous because they may explode if they are subjected to heat, light, friction, or mechanical shock during normal handling. **Common chemicals of concern found in laboratories include:**

Potentially Explosive Compounds	Issues
Hydrated picric acid, or other tri-nitro and di-nitro compounds	<ul style="list-style-type: none"> ○ Can become dry and form shock sensitive crystals ○ Desiccated bottles of 2,4-Dinitrophenylhydrazine have been removed from several UMD laboratories
Sodium amide	<ul style="list-style-type: none"> ○ Can react with air or moisture to form super oxides
Sodium azide	<ul style="list-style-type: none"> ○ Can react when in contact with metal over time to form shock sensitive salts
Some organic chemicals (e.g., diethyl ether, tetrahydrofuran, dioxanes)	<ul style="list-style-type: none"> ○ Can form peroxides through exposure to oxygen or light (See UMD fact sheet on peroxide forming chemicals on the ESSR website for a more extensive list)

This list is not complete; therefore attention should be given to warnings on the chemical's labels, Safety Data Sheets, and other references that indicate a chemical has a potential explosive hazard.

ACTIONS for Maintaining a Safe Laboratory Chemical Inventory

- ✓ All chemicals must be added to an inventory when they enter the lab.
- ✓ Incorporate the date into the inventory to manage materials that expire.
- ✓ Remove chemicals from the inventory when they are used/removed to keep track of materials that should be monitored regularly.
- ✓ Date the physical bottle containing PECs upon opening.
- ✓ Visually inspect the physical bottles regularly (at least annually) for the condition and age of chemicals that may form PECs.
- ✓ Discarded bottles when they are close to expiration or show signs of degradation.
- ✓ Avoid stockpiling PECs; order only what you need for current work.

If a suspect chemical has expired, or shows signs that it may be unstable, do not touch or otherwise handle the chemical container. Immediately contact ESSR – Environmental Affairs at (301) 405-3990 or envaffairs@umd.edu to arrange for immediate disposal. Only laboratory personnel who have significant experience handling hazardous chemicals should be evaluating chemical inventories and conducting laboratory clean out tasks.

Laboratory personnel should use the following guidelines while sorting through physical bottles for outdated, or degraded chemicals:

- Never work alone and always use appropriate personnel protective equipment (PPE).
- Know the location of emergency eye washes and safety showers.
- Look for signs of degradation such as discoloration, crystallization within or around the lid, layering, water loss, or age. Never touch a bottle that shows visible signs that it may be an explosion risk.
 - If you picked the bottle up and any of these signs are suspect, gently place the bottle back down in a stable location and call ESSR.
- For chemicals that are no longer needed, complete an Environmental Affairs [Chemical Waste Pickup Form](#) to have the chemicals properly disposed of through ESSR.

References and Additional Resources

[Guidelines for Explosive & Potentially Explosive Chemicals – Safe Storage & Handling, Office of Environment, Health & Safety, UC Berkeley.](#)
[Potentially Explosive Compounds, University of Colorado Denver, Anschutz Medical Campus, Environmental Health and Safety.](#)
[Prudent Practices in the Laboratory: Handling and Disposal of Chemical, National Academy Press, Washington, DC, 1995.](#)