

Standard Operating Procedure (SOP)

This Standard Operating Procedure (SOP) describes basic chemical safety information for strong oxidizers. Prior to conducting work with strong oxidizers personnel must obtain approval from their Principal Investigator (PI) and/or Supervisor and attend the appropriate laboratory safety training. The PI must complete the Lab-Specific Use Procedures section and provide their personnel with a copy of this SOP and a copy of the SDS from the manufacturer.

Strong Oxidizers

Date SOP was written:	
Date SOP was approved by PI/lab supervisor:	
Principal Investigator:	
Principal Investigator Signature:	

Type of SOP: Process Hazardous Chemical Hazardous Class

Purpose


The purpose of this standard operating procedure is to acquaint you with the proper and safe handling, use, storage, and disposal of strong oxidizers.

Properties & Hazards

General Hazards:

Chemicals in this band, while not necessarily combustible themselves, may cause or contribute to the combustion of other materials, generally through the release of oxygen or other gases. Strong oxidizers are capable of forming explosive mixtures if mixed with incompatible materials such as combustible, organic, or easily oxidized materials. All chemicals in this band are considered highly hazardous.

The GHS and Cal/OSHA definition of this band is described in the table below:

GHS Pictogram	UCI Hazard Level	GHS Category	GHS H-Code	Cal/OSHA Definitions
	Highly Hazardous	Oxidizing Gases (Cat. 1)	H270	Oxidizer
		Oxidizing Liquids (Cat. 1, 2, 3)	H271, H272	Oxidizer
		Oxidizing Solids (Cat. 1, 2, 3)	H271, H272	Oxidizer

This band generally includes all chemicals with an NFPA special notation (white) of "OX".

The NFPA defines four categories of oxidizers, divided by the severity of risk when mixed with other compounds:

- Class 1. An oxidizer that does not moderately increase the burn rate of another material.
- Class 2. An oxidizer that will moderately increase the burn rate.
- Class 3. An oxidizer that will cause a severe increase in burn rate.
- Class 4. An oxidizer that has the potential to lead to an explosive oxidation when combined with other materials.

Personal Protective Equipment (PPE)

Skin and Body Protection:

A flame resistant Nomex® lab coat, long pants (or equivalent) completely covering legs, and closed toed shoes must be worn. Do not wear synthetic clothing when working with strong oxidizers.

Hand Protection:

Nitrile, neoprene, or butyl rubber gloves are typically adequate for minor splashes. Thicker gloves should be used for longer operations, larger quantities, or direct contact. Consult the SDS, and/or the lab specific use section to determine whether the material or process requires alternative hand protection.

If there is a high risk of fire, fire-resistant hand protection should be worn, including a chemical resistant outer glove (neoprene) over an approved fire-resistant (Nomex®) inner glove/liner.

Eye Protection:

ANSI Z87.1-compliant safety glasses or safety goggles if a splash hazard is present. If an explosion or high fire hazard is present, a face shield over safety glasses is recommended.

Administrative Controls

- Never work alone with strong oxidizers.
- Review the Safety Data Sheets (SDSs) for all chemicals used in the experiment. Online SDSs can be accessed at <https://www.ehs.uci.edu/sds/index.php>.
- Avoid the use of Class 4 oxidizers.
 - The use of Class 4 oxidizers must be pre-approved by the Principal Investigator and campus fire marshal prior to use and training must be well documented.

Engineering Controls

- Manipulations of strong oxidizers should be conducted in a fume hood to minimize exposure and the potential spread of a fire if one should occur.
- The use of a portable blast shield inside the fume hood is highly recommended, if there is a risk of explosion or fire. Place the blast shield between yourself and the reaction so you can reach around.
 - All work with Class 4 oxidizers must be carried out in a fume hood with the addition of a blast shield.

Special Storage and Handling Requirements

Storage:

- All containers and storage locations must be clearly labeled.
- Strong oxidizers must be stored in unbreakable secondary containment.
- Store away from organics, flammables, reducing agents, and all other incompatible materials. Protect strong oxidizers from heat, sources of ignition, and sunlight.
- Do not store oxidizers in untreated wooden cabinets.

Handling:

- All manipulations (open chemical use) must be conducted in a fume hood.
- Prepare your workstation prior to using strong oxidizers (e.g. remove any solvent/flammable squirt bottles and flammable materials such as Kimwipes and paper towels).

Spill, Accident, and First Aid Procedures

Spills:

Refer to the spill response flowchart. Notify others in the area of the spill. Evacuate and prevent access to the location where the spill occurred. Notify your supervisor and EHS at x4-6200 immediately.

Skin or Eye Contact:

Remove contaminated clothing or contact lenses and flush the affected area with water for at least 15 minutes. Obtain medical attention immediately.

Inhalation:

Move to fresh air. Obtain medical attention immediately.

Ingestion:

Obtain medical attention immediately. (The poison control center, (800) 222-1222, is available 24 hours every day).

Waste Disposal Procedure

Disposal:

- Hazardous waste must be transferred to EHS for disposal within 6 months of being generated.
- Hazardous Waste Disposal
 - Send a text message [Text a pick up](#) to hwp@uci.edu, EHS will pick up your waste within 1-3 days
 - Or visit <https://ehs.uci.edu/enviro/haz-waste/>

Additional Information

For additional information about handling explosives and potentially explosives read Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards (section 4.D.2.3 – 4.D.3.3. “Incompatible Chemicals – Other Oxidizers). The National Academies Press: Washington, DC, 2011. (http://www.nap.edu/catalog.php?record_id=4911).

APPENDIX A: **Lab-Specific Use Procedures**

The following procedures describe how the subject chemicals are used in this laboratory beyond the practices described above.

Please see the General Information for ***Hazardous Materials Standard Operating Procedure*** for specific instructions on writing lab-specific use produces.

This section must describe lab-specific procedures to address the safe use of all highly hazardous chemicals from this band in use in the laboratory. These procedures may be organized around specific chemicals, specific tasks or the band as a whole.

