

Chemistry Department

Standard Operating Procedure

Title: Oxidizing Chemicals

Oxidizing chemicals are materials that spontaneously evolve oxygen at room temperature or with slight heating or promote combustion. This class of chemicals includes peroxides, chlorates, perchlorates, nitrates, and permanganates. Strong oxidizers are capable of forming explosive mixtures when mixed with combustible, organic or easily oxidized materials. Examples of strong oxidizers are listed at the end of this SOP.

Decontamination procedures

Personnel: Wash hands and arms with soap and water immediately after handling oxidizing chemicals.

Area: Carefully clean work area after use. Paper towels or similar materials contaminated with strong oxidizing chemicals may pose a fire risk.

Emergency procedure

Emergency procedures which address response actions to fires, explosions, spills, injury to staff, or the development of sign and symptom of overexposure must be developed. The procedures should address as a minimum the following:

Who to contact: (University police, and Office of Environmental Health and Safety, Principal investigator of the laboratory including evening phone number)

The location of all safety equipment (showers, spill equipment, eye wash, fire extinguishers, etc.)

The method used to alert personnel in nearby areas of potential hazards

Special first aid treatment required by the type of oxidizing chemicals material(s) handled in the laboratory

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Eye protection

Eye protection in the form of safety glasses must be worn at all times when handling oxidizing chemicals. Ordinary (street) prescription glasses do not provide adequate protection. (Contrary to popular opinion these glasses cannot pass the rigorous test for industrial safety glasses.) Adequate safety glasses must meet the requirements of the Practice for Occupational and Educational Eye and Face Protection (ANSI Z.87. 1 1989) and must be equipped with side shields. Safety glasses with side shields do not provide adequate protection from splashes; therefore, when the potential for splash hazard exists other eye protection and/or face protection must be worn.

Eyewash

Where the eyes or body of any person may be exposed to oxidizing chemicals, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use. Bottle type eyewash stations are not acceptable.

Fume hood

The use of certain concentrations of perchloric acid must be performed in a fume hood equipped with wash down facilities. Such a hood is available in Fulmer 219.

Gloves

Gloves should be worn when handling oxidizing chemicals. Disposable latex or nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals. Lab workers should contact EHS or the chemistry department storeroom for advice on chemical resistant glove selection when direct or prolonged contact with hazardous chemicals is anticipated.

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Hazard assessment

Hazard assessment should address proper use and handling techniques, fire safety, storage, and waste disposal issues.

Notification

You should notify the chemistry department storeroom prior to the initial use of perchloric acid to arrange access to the perchloric acid hood.

Protective apparel

Lab coats, closed toed shoes and long sleeved clothing should be worn when handling oxidizing chemicals. Additional protective clothing should be worn if the possibility of skin contact is likely.

Safety shielding

Safety shielding is required any time there is a risk of explosion, splash hazard or a highly exothermic reaction. All manipulations of oxidizing chemicals that pose this risk should occur in a fume hood with the sash in the lowest feasible position. Portable shields, which provide protection to all laboratory occupants are acceptable.

Safety shower

A safety or drench shower should be available in a nearby location where the oxidizing chemicals are used.

Signs and labels

Containers: All oxidizing chemicals must be clearly labeled with the correct chemical name. Handwritten labels are acceptable; chemical formulas and structural formulas are not acceptable.

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Special storage

Oxidizers should be stored in a cool and dry location. Keep oxidizers segregated from all other chemicals in the laboratory. Minimize the quantities of strong oxidizers stored in the laboratory.

Never return excess chemicals to the original container. Small amounts of impurities may be introduced into the container which may cause a fire or explosion.

Special ventilation

The use of certain concentrations of perchloric acid must be performed in a fume hood equipped with wash down facilities. Such a hood is available in Fulmer 219.

Spill response

Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the material safety data sheet. This should occur prior to the use of any oxidizing chemicals. Spill control materials for oxidizers are designed to be inert and will not react with the reagent. Never use paper towels or other inappropriate combustible materials. The waste materials generated during spill cleanup may pose a flammability risk and should not remain in the laboratory overnight unless it is stored in an appropriate container.

In the event of a spill. Alert personnel in the area that a spill has occurred. Do not attempt to handle a large spill of oxidizing chemicals. Vacate the laboratory immediately and call for assistance.

- Office of Environmental Health & Safety 335-3041 or 911
- University Police 911
- This is a 24 hour service.

Remain on the scene, but at a safe distance, to receive and direct safety personnel when they arrive.

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Vacuum protection

Evacuated glassware can implode and eject flying glass, and splattered chemicals. Vacuum work involving oxidizing chemicals must be conducted in a fume hood, glove box or isolated in an acceptable manner.

Mechanical vacuum pumps must be protected using cold traps and, where appropriate, filtered to prevent particulate release. The exhaust for the pumps must be vented into an exhaust hood.

Waste disposal

All materials contaminated with oxidizing chemicals pose a fire hazard and should be disposed of as hazardous waste. Contact the chemistry department storeroom to dispose of wastes. See the Waste Disposal SOP for collection, storing, submitting and labeling instructions.

Examples of Strong Oxidizers

Ammonium perchlorate	Ammonium permanganate
Barium peroxide	Bromine
Calcium chlorate	Calcium hypochlorite
Chlorine trifluoride	Chromium anhydride
Chromic acid	Dibenzoyl peroxide
Fluorine	Hydrogen peroxide
Magnesium peroxide	Nitrogen trioxide
Perchloric acid	Potassium bromate
Potassium chlorate	Potassium peroxide
Propyl nitrate	Sodium chlorate
Sodium chlorite	Sodium perchlorate
Sodium peroxide	

Source: CRC Handbook of Laboratory Safety, 3rd edition.