

Health and Safety Standard Operating Procedure

Process or Experiment:

Osmium tetroxide: Tissue fixation CAS: 20816-12-0

Hazard Review: March 2012

Hazardous Chemicals:

DANGER!
ACUTELY TOXIC SEVERE IRRITANT OXIDIZER

The acute toxicity of osmium tetroxide is high, and it is a severe irritant of the eyes and respiratory tract. Exposure to osmium tetroxide vapor can damage the cornea of the eye. Irritation is generally the initial symptom of exposure to low concentrations of osmium tetroxide vapor, and lacrimation, a gritty feeling in the eyes, and the appearance of rings around lights may also be noted. In most cases, recovery occurs in a few days. Concentrations of vapor that do not cause immediate irritation can have an insidious cumulative effect; symptoms may not be noted until several hours after exposure. Contact of the eyes with concentrated solutions of this substance can cause severe damage and possible blindness. Inhalation can cause headache, coughing, dizziness, lung damage, and difficult breathing, and may be fatal. Contact of the vapor with skin can cause dermatitis, osmium tetroxide via inhalation, skin contact, or ingestion can lead to systemic toxic effects involving liver and kidney damage. Osmium tetroxide is regarded as a substance with poor warning properties.

Chronic exposure to osmium tetroxide can result in an accumulation of osmium compounds in the liver and kidney and damage to these organs. Osmium tetroxide has been reported to cause reproductive toxicity in animals; this substance has not been shown to be carcinogenic or to show reproductive or developmental toxicity in humans.

Odor Threshold: 2 ppm

Synonyms: Osmic acid, perosmic acid, osmium (IV) oxide

OSHA PEL: 0.0002 ppm

OSHA STEL: 0.0006 ppm

ACGIH TLV: 0.0002 ppm

ACGIH STEL: 0.0006 ppm

Designated Area: Required.

Engineering Controls:

All work with osmium tetroxide must be conducted in a fume hood. Emergency shower and eyewash must be readily available.

Personal Protective Equipment:

All skin and eye contact must be prevented. Unvented safety goggles must be worn. Nitrile gloves can be worn for incidental exposure, but neoprene or rubber gloves must be worn if skin exposure is anticipated. Lab coats must be worn.

Special Handling Procedures and Storage Requirements:

Only use required quantity (50 milliliters maximum). Store in sealed ampules placed in secondary containers. All containers of osmium tetroxide solutions must be tightly sealed. Should be stored in the refrigerator or freezer.

Used osmium tetroxide should be poured into a container of corn oil for neutralization. A 2% osmium tetroxide solution is neutralized by twice its volume of corn oil. This solution must be discarded of as hazardous waste.

Do not store near hydrochloric acid. Keep away from flammable materials and organic material.

Decontamination:

A 2% osmium tetroxide solution can be neutralized with six times its volume of corn oil soaked absorbent (100 grams of absorbent and 50 milliliters of corn oil). Test for completeness of reaction by suspending a corn oil soaked filter paper over the area. Blackening of the filter paper indicates osmium tetroxide is still present. This mixture must be disposed of as hazardous waste.

Spill and Accident Procedures:

Small spills: Sufficient quantities of corn oil absorbent must be kept in labs using osmium tetroxide. Cover small quantities of spilled osmium tetroxide with this mixture. Test for completeness of reaction before cleaning up absorbent.

Large spills: Notify others in the area. Evacuate room. Contact University Police at 911 and request Hazardous Materials Response Team.

Waste Disposal:

Follow EH&S Hazardous Waste Management Policy 8-1.

Comments:

Requires "Prior Protocol Approval".