



Chemical Fact Sheet

Osmium Tetroxide Chemical Safety Fact Sheet



Osmium tetroxide is used as a fixative and as a lipid stain for scanning electron microscopy. Osmium tetroxide is a pale or yellow colored solid characterized by an unpleasant, acrid, chlorine-like odor; however, be advised that odor alone should not be used to effectively warn of an exposure. Osmium tetroxide sublimates from the solid phase to the gaseous phase, and inhalation of chemical vapors is possible. Users should also be aware that osmium tetroxide is toxic, corrosive, an oxidizing material, and incompatible with hydrochloric acid and easily oxidized materials.

Training

Only individuals who have received proper training may use osmium tetroxide at the Harvard Institutes of Medicine (HIM) and New Research Building (NRB). The training shall include reading this fact sheet, understanding the chemical's material safety data sheet (MSDS), and receiving appropriate instruction from the supervisor or principal investigator on laboratory procedures.

Exposure Risks from osmium tetroxide:

- It may be fatal if swallowed or inhaled; causes severe irritation to skin, eyes, and respiratory tract.
- It sublimates, becoming a gas from a solid phase at room temperature. An inhalation exposure is possible.
- Exposure symptoms may include lacrimation, visual disturbance, conjunctivitis, headaches, coughing, dyspnea (shortness of breath), and dermatitis.

The Following Practices Must Be Followed Within Laboratories Using Osmium Tetroxide

- Provide job-specific training to staff.
- Provide appropriate employee Chemical Hygiene Plan (CHP) training for all work processes.
- Osmium tetroxide is a poison. It must be handled inside a chemical fume hood at all times. **If a chemical fume hood is not available then respirator use is required. No one can use a respirator without medical clearance and a respirator "fit test".**
- Osmium tetroxide should only be transported to the fume hood or storage in secondary containment.
- Nitrile and latex gloves provide satisfactory protection against osmium tetroxide.
- Do not eat, drink, smoke, chew gum, apply cosmetics or lip balm laboratory areas, ever.
- Wear appropriate personal protective equipment (PPE) (laboratory coat, gloves, and safety goggles—safety glasses are not sufficient due to the severe effect osmium tetroxide has on the eyes).
- Change disposable gloves frequently and wash hands after glove removal.
- Osmium tetroxide and contaminated debris needs to be disposed of as a hazardous waste because of its acute toxicity. Disposal can be arranged through your laboratory's satellite accumulation area.
- Call 617-432-1901 immediately if there has been a chemical spill.

Occupational Exposure Limits

The U.S. Occupational Safety and Health Administration 8-hour permissible exposure limit is 2 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). The National Institute for Occupational Safety and Health recommends that fifteen minute (15-min) exposures should not exceed 6 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Employee exposures can be reduced by using fume hoods and by exercising safe work practices including the use of appropriate PPE. If you are exposed to osmium tetroxide, you must wash and flush the affected area and report to your institution's Occupational Health Department or nearest emergency room and your supervisor.

Also See:

- Osmium Tetroxide MSDS
- HIM-NRB Chemical Hygiene Plan available on the HIM/NRB EH&S Webpage: <http://www.himnrbehs.com/himnrbehs/chemicalSafety.asp>