





The following minimum Personal Protective Equipment must be worn during operations with pure osmium tetroxide and concentrated solutions:

**Chemical goggles** (safety glasses alone are not adequate protection because of osmium tetroxide's severe effects on the eyes).

**Disposable nitrile gloves** (NOT latex). Double-gloving is recommended when working with pure osmium tetroxide or concentrated solutions. Change gloves frequently and when contaminated, punctured or torn. Wash hands immediately after removing gloves.

A standard or disposable laboratory coat or disposable coveralls. A standard laboratory coat may be reused before laundering if it has not been contaminated with osmium tetroxide. If a garment is contaminated, remove, place in chemical hood, and decontaminate with corn oil before disposing of in hazardous waste or laundering.

Closed-toed, leather shoes (not fabric or mesh).

Wash hands thoroughly immediately after working with any concentration of osmium tetroxide.

### **Handling and Solution Preparation**

When moving pure osmium tetroxide to a chemical hood, place the vial in a padded metal can and cover. Place on a lab cart with a supply of a neutralizing absorbent consisting of kitty litter soaked in corn oil.

Prepare the smallest amount of solution necessary for the procedure, typically 50mL or less. Prepare the solution volumetrically rather than gravimetrically. If a balance must be used, weighing must take place in the chemical hood.

Pure osmium tetroxide or its concentrated solutions must be opened only in a chemical hood that has been certified within the last 12 months. Just before use, the operation of the chemical hood must be verified by the use of an installed chemical hood monitoring device, a smoke test using a smoke generating tube, or a mechanical or electronic device that indicates air flow. During use, the sash must be lowered to operating height.

**All lab ware that has come in contact with osmium tetroxide must be decontaminated by rinsing or dipping in corn oil before removing from the chemical hood.**

Immediately after work with osmium tetroxide, decontaminate any spills with kitty litter that has been soaked with corn oil. Discard kitty litter as hazardous waste.

### **Neutralizing Osmium Tetroxide.**

To reduce the hazards involved in discarding osmium tetroxide, the following neutralization procedure should be employed:

Perform neutralization in a chemical hood. A 2% solution of osmium tetroxide can be fully neutralized by twice its volume of vegeta

- ii) If osmium tetroxide has been spilled on skin or clothing, rinse the affected area with water, using a safety shower or eyewash, as appropriate, for a minimum of 15 minutes. During washing, remove contaminated clothing. A disposable laboratory coat or jumpsuit should be available for the exposed individual to wear after using a safety shower.
- iii) Notify the victim's supervisor, if immediately available. The supervisor, a co-worker, or the victim must contact the campus Employee/Occupational Health Program to determine what additional steps should be taken.
- iv) If the incident occurs off-hours, or an ambulance is needed because of injury, contact Public Safety to advise them of the medical emergency.

## **SIGNATURES**

EM Users: the EM user's signature indicates that the user has read this document and understands the hazards and safe work practices as detailed in this therein.

Supervisor: a student supervisor's signature indicates that the supervisor understands the hazards of Osmium Tetroxide and will train his/her student safely handle osmium tetroxide according to this document.

Name of EM User: (Print): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name of Supervisor: (Print): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### Appendix:

1. Collections on how to store Osmium Tetroxide from Microscopy Listserv
2. Osmium Tetroxide: Storage Conditions (from EMS)

## **Appendix 1: Collections on how to store Osmium Tetroxide**

**Question:**

Does som:



Typically, the stock solution is made up by taking a 1 gram ampoule, scoring and then snapping it open, and then dropping the entire contents *and ampoule* into the bottom of an Erlandmeyer flask (or equivalent) containing 25 ml de-ionized and distilled water (to make a 4% stock solution). The crystalline osmium tetroxide is quite slow to dissolve in water at room temperature and patience is needed. We would recommend this be interpreted as meaning that an overnight dissolution time might be quite necessary. Before going away and leaving it to dissolve by itself, the following procedure should be followed:

The mixture of partially dissolved osmium tetroxide and water, are poured into some kind of a glass-stoppered reagent bottle (leaving the glass bits and pieces behind in the flask), the top is wrapped with Parafilm® which in turn itself is placed inside of a second bottle with a screw on cap. The larger second bottle should contain something to "cushion" the interior bottle from banging (with the risk of breaking) on the bottom of the outer bottle. While some laboratories have been using cotton for this purpose, we would recommend something that is not prone to lint, thereby becoming a possible source of contamination.



all unusual. When you switch to the refrigerated storage of the solution, and apply new Parafilm wrapping, you will still find that the Parafilm will eventually start turning black. But since everything is at a lower temperature, this process should be occurring much more slowly.

But by following these instructions, and by replacing the Parafilm wrappings on a regular basis, you should be able to be successful at keeping osmium tetroxide vapors from leaking out into the environment and turning the entire refrigerator black. Now this has not ever happened to us in our own laboratory, but we have heard of it happening to others. So apparently it can happen. Therefore it is important that you have set up, as part of your safety procedures, the constant checking of your stock solution bottle to make sure that nothing is leaking out into the refrigerator or the environment.

Be sure to consult the MSDS sheet for osmium tetroxide for further information about safety precautions and procedures.