# SFSU College of Science & Engineering
## Standard Operating Procedure for “Particularly” Hazardous Chemicals in the Laboratory

**Chemical Name:** Osmium Tetroxide (OsO₄)  
**CAS #:** 20816-12-0  
**Use/Description:**  
- Laboratory Reagent  
- Used as a fixative in electron microscopy  
**PEL/TLV:**  
- TWA: 0.002 mg/m³  
- STEL: 0.006 mg/m³ (as Osmium)  
**Hazard Summary:** CORROSIVE! POISON-Acutely toxic hazardous material. Corrosive to eyes, exposure may cause blindness. May be fatal if inhaled, swallowed or absorbed through skin. Rapidly absorbed through skin.

This substance is included on COSE’s Particularly Hazardous Substance List. It must be handled in full accordance with this protocol.

<table>
<thead>
<tr>
<th>Location Used:</th>
<th>Date:</th>
</tr>
</thead>
</table>

### PRIMARY HAZARD CONCERN
- ☑ Extremely Corrosive  
- ☑ Highly/Acutely Toxic  
- ☑ Embryotoxin, Mutagen, Teratogen  
- ☑ Carcinogen

#### Personal Protective Equipment
- ☑ Double-glove when using 4-8 mil Nitrile disposable gloves for standard laboratory operations w/ minimal contact potential.*  
- ☑ Change gloves frequently and at first sign of contamination  
- ☑ For mixing solutions from solid form, do not use thin disposable gloves.  
- ❑ Closed toe shoes must be worn when handling Osmium tetroxide.

**List PPE Details Below:**  
- **Hands:** ☑ Gloves: Rubber, neoprene, Viton, disposable Nitrile  
- **Body:** ☑ Lab Coat, full length pants  
- **Face/Eyes:** ☑ Chemical splash goggles  
- **Feet:** ☑ Closed-toe shoe  
- **Other:** ☑

Remember - dust masks, safety glasses, and chemical splash goggles provide little protection against vapors. All work with Osmium Tetroxide must be conducted in a fume hood to prevent exposure by inhalation.

#### Engineering & Ventilation Controls
- ☑ Chemical Fume Hood Required  
- ☑ Work on absorbent paper or secondary containment tray  
- ☑ Other: ________________________________

**Transportation**
- ☑ Use secondary containment such as carriers  
- ☑ Use least trafficked areas

#### Storage
- ☑ Avoid storing near organic vapors, oxidizing agents, and hydrochloric acid  
- ☑ Label containers with chemical name, hazard warnings  
- ☑ Solids or solutions of Osmium Tetroxide should be stored in tightly sealed containers and placed in secondary containment

#### Accidental Skin/Eye Contact
- Change gloves immediately once contact is noted  
- Flush eyes for 15 min. with emergency eyewash if splash to eyes  
- Utilize emergency drench shower for exposures to body  
- Report incident right away and get medical attention

**Note:** Osmium tetroxide absorbs through intact skin.  
**Symptoms:** Pain, tearing, burning

#### Inhalation/Ingestion Exposure
- Remove to fresh air  
- Give one or two glass of water if ingested  
- Get medical attention immediately and contact campus 911

**Symptoms:** Coughing, headache, dizziness, stomach pain, vomiting, eye irritation
## Chemical Name: Osmium Tetroxide

### Spill/Accident Procedures

| Small Spills: | Mix Osmium tetroxide with an absorbent material such as vermiculite or dry sand (avoid raising dust), place in an appropriately labeled waste container. To neutralize and clean residual material, wipe areas with a mild solution of potassium hydroxide. |
| Large Spill: | 1. remove all persons from the area 2. close doors to affected area 3. call 911 |

### Waste Disposal

Osmium-containing waste should be placed in a tightly sealed, labeled and tagged container. Take to stockroom for temporary storage and subsequent disposal.

### Designated Area

- Designate an area for the use of “particularly” hazardous materials.
- Only trained and authorized personnel will be permitted to use OsO₄
- Only the Principal Investigator may mix working solutions from solid form.
- Only trained and authorized personnel are permitted access to the designated area while it contains the hazardous material.

Describe how you will prevent unauthorized access to the material.

What other special precautions will you implement?

---

I have reviewed the SOP and the associated MSDS for this material with the people who report to me and/or share the restricted work area.

Signature of P.I. or Designated Lab Manager

<table>
<thead>
<tr>
<th>First Name</th>
<th>Last Name</th>
<th>Dept</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>