

Standard Operating Procedure
for work with

Chemical name/class: Oxidizers CAS #: _____
PI: Mark Walters Date: December 19, 2017
Building: Fitzpatrick CIEMAS Room #: Cleanroom and Sample Prep
Designated Work: Chemical processing with Oxidizers

1. **Circumstances of Use:**

Oxidizing chemicals are typically used in SMIF for wet chemical etching or cleaning. Examples of oxidizing chemicals used in SMIF are Nitric Acid, Hydrogen Peroxide, and "Piranha" (a mixture of Sulfuric Acid and Hydrogen Peroxide)

2. **Potential Hazards:**

Consult the Safety Data Sheet (SDS) for the particular oxidizer you are using

Be aware of these specific hazards:

- Oxidizers can ignite or react explosively with both organics and inorganics. Never mix oxidizers with solvents
- Some oxidizers, like Nitric acid, are corrosive and cause severe skin burns and serious eye damage. They can also burn mucosal membranes, and the respiratory tract.
- Nitric Acid is considered particularly hazardous because of its oxidizing properties. It must never be mixed with organic materials such as solvents or acetic acid

3. **Engineering Controls:**

- Always work with oxidizers in a designated acid fume hood in the Clean Room or Sample Preparation Lab.
- An eyewash and safety shower are available in the immediate area.

4. **Work Practice Controls:**

- Use only in a designated acid chemical hood.
- Never store a Piranha solution. Mix only the amount of Sulfuric Acid and Hydrogen Peroxide you need to use at that time, and dispose of the used chemical.
- Keep containers closed as much as possible. Only open a container when it is inside a designated acid chemical hood and you are wearing the proper PPE (section 5).
- Contaminated items are to be disposed of properly as hazardous waste, following SMIF's hazardous waste policy (see section 7).

5. **Personal protective equipment (PPE):**

- Wear chemical gloves
 - Always first check chemical gloves for holes or damage
 - If damaged, dispose of the gloves and get a new pair
 - Never purposefully touch a chemical even while wearing the chemical gloves. If a glove does come in contact with a chemical
 - Remove the exposed glove and dispose of it.
 - Get a new pair of gloves
 - Wear gloves to open chemical cabinets.
 - Wash and remove gloves before touching anything else (door knobs, notebooks, phone, microscopes, etc.)
- Wear chemical splash goggles (safety glasses are not sufficient).
- Wear a face shield.
- Wear a chemical-protective gown with sleeves.

6. **Transportation and Storage:**

- Oxidizer solutions must be in sealed shatter-resistant containers and stored in an exhausted chemical cabinet designated for acids and oxidizers.
- Nitric acid must be stored in secondary containment
- Wear the designated PPE (section 5) when transporting an oxidizer chemical to a chemical hood.

7. **Waste Disposal:**

Liquid Waste

Pour all oxidizer waste into the acid hood sink drain for proper disposal. These drains lead into a house acid waste neutralization system.

- Press the **Drain** button to open the drain
 - The drain will not open if chemicals are above 50°C
 - The drain has a water dilution in it to reduce the chemical waste concentration
- Rinse the sink with water from the gooseneck or water sprayer after draining chemicals to wash out any residues
- Press the **Drain** button to close the drain. ***Do not leave the drain open if it is not needed.***

Solid Waste

Solid materials that are contaminated with chemical oxidizer waste (such as wipes, dispensers, etc.) should be packed into a zip lock bag and properly labeled with the type of waste, your name, and date. The waste bag should be completely sealed.

- Bagged and labeled solid acid waste can be left in the back of the hood for pickup by SMIF staff
- Empty acid bottles should be rinsed in the sink and left in the hood for pickup by SMIF staff

8. **Exposures/Unintended contact:**

Contact Employee Occupational Health and Wellness (EOHW) at 919-684-3136 for medical advice on occupational chemical exposures. For an actual chemical exposure

- Flush exposed eyes or skin with water for at least 15 minutes.
- If there is respiratory irritation associated with exposure, remove all persons from the contaminated area and contact the OESO spill team.
- Exposed persons should seek immediate medical attention at the nearest emergency department/
- Call 911 from a campus phone or 919-684-2444 from any phone to request assistance if needed. Contact Employee Occupational Health and Wellness at 919-684-8115 for exposure-related advice.

The work-related injury or illness report found at: <http://www.hr.duke.edu/benefits/medical/workcomp/report.php> should be completed within 24 hours. Follow-up medical attention should be sought through Duke Employee Occupational Health and Wellness (919-684-3136).

9. **Spill Procedure:**

In the event of a spill, follow SMIF spill procedures and immediately contact SMIF staff. Only SMIF staff and/or appropriate OESO personnel should clean up spills

Spills Contained Inside a Chemical Hood

- Avoid breathing vapors from the spill and leave the immediate area of the chemical hood
- Alert people in the immediate area of the spill
- Notify SMIF immediately by calling emergency numbers posted near the phone
- Wait for instructions from SMIF or for SMIF personnel to arrive to complete the clean-up of the affected area.

Spills Outside of a Chemical Hood

- Attend to injured or contaminated persons and remove them from exposure
- Press the closest manual alarm button (blue box) and evacuate the lab
- Make yourself available to the SMIF staff and/or emergency responders and be prepared to tell the following:
What chemical(s) are involved, how much was spilled, where the spill is located, nature of any injuries

10. **Training of personnel:**

- All personnel are required to complete the SMIF General Lab Safety session and the SMIF Chemical Safety and Wet Hood training session.
- All personnel shall read and fully adhere to the ***Wet Hood Operating Procedure*** and the ***SMIF Lab Safety and Procedures Manual***