# STANDARD OPERATING PROCEDURE

## Barium Hydroxide

## \*Delete items in red after you have added all your lab-specific information. Modify general information as needed.

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| **1. LAB INFORMATION** | **Building:** **Room(s):** **Department:** **Principal Investigator Name:** **Procedure:****REMEMBER!** When preparing aqueous solutions, always add strong bases to water to limit exothermic reactions such as splatter, bubbling and fuming. A large amount of heat is generated when strong bases are mixed with water. Adding more base releases more heat. Adding water to strong bases forms an extremely concentrated solution of caustic material. Heat causes the solution to boil violently, splashing concentrated base out of the container.Adding strong bases to water, the resulting solution is dilute and the heat released is absorbed by the water. **Always Add Bases** to water |
| **2.** **PHYSICAL &**  **HEALTH HAZARDS**  | **Barium Hydroxide,** **CAS # 17194-00-2,** also known as Ba(OH)2. It is an odorless, white solid. Barium hydroxide monohydrate (CAS# 22326-55-2) is the commercial form.* **Highly CORROSIVE chemical. May be corrosive to metals.**
* **Causes severe skin burns and eye damage. The amount of tissue damage depends on length of contact.**
* **May be absorbed through the skin.**
* **Can affect you when inhaled, damaging the nose, throat and lungs.**
* **Toxic through ingestion.**

[**GHS hazard pictograms**](https://ehs.wsu.edu/ohs-chemhazardcommunication/ohs-ghspictograms/)   Signal Word: **DANGER**Exposure Limits:**DOSH:** TWA: 0.5 mg/m3; STEL: 1.5 mg/m3**NIOSH:** TWA: 0.5 mg/m3 **ACGIH:** TWA: 0.5 mg/m3 Toxicological Data:**ORAL (LD50):** 550 mg/kg [Rat]. \***Always refer to the Safety Data Sheet for the most detailed information**\* |
| **3. TRAINER /**  **RESOURCE** **PERSONNEL** | **Principal Investigator Name, Building, Room, Phone Number****Secondary contact Name, Building, Room, Phone Number** |
| 1. **LOCATION OF**

 **HEALTH & SAFETY**  **INFORMATION** | The Safety Data Sheet (SDS) for Barium hydroxide must be available at all times to all personnel working in the laboratory. The SDS used in this laboratory are located in **Building, Room and/or Electronic Location.**Labeling: Barium hydroxide containers shall either have original manufacturer’s label affixed or a self-made workplace label identifying the contents and hazards of the chemical at the minimum. Chemical abbreviations and formulae should be avoided unless a legend is present in the lab. For information on workplace labels, see <https://ehs.wsu.edu/ohs-chemhazardcommunication/ohs-workplacelabels/>.  |
| **5. PROTECTIVE**  **EQUIPMENT** | Wear nitrile, butyl, neoprene, polyvinyl chloride (PVC), or Viton gloves, chemical splash goggles, and a fully buttoned lab coat at the minimum. Wearing a face shield and double gloving is recommended. ANSI approved safety glasses may be appropriate when properly working behind a fume hood’s protective sash. Always wash hands after removing gloves.* **Note:** Always consult with your glove manufacturer’s glove compatibility chart to ensure selected gloves are compatible with specific chemical being used.

Full length pants and close-toed shoes are required to be worn at all times. **Insert lab specific information on personal protective equipment required for use.** Always work within a properly functioning, face velocity certified laboratory chemical fume hood.**Insert lab specific information on ventilation controls and equipment used to control exposure.** |
| 1. **WASTE DISPOSAL**

 **PROCEDURES** | **Waste Barium Hydroxide** must be managed as Dangerous Waste in its pure form and if the solution has a pH of 9 or higher. Collect solution in a compatible container (e.g. a polyethylene container provided by EH&S). Specialized waste containers and/or lids may be required for comingled wastes where reactions may generate heat or pressure. Waste containers should be stored away from incompatible materials (reference Section 10 of the SDS for incompatible materials). A completed Dangerous Waste label must be attached to dangerous waste containers before waste is added. When the container is full or no longer being used, submit an online Chemical Collection Request Form, and deliver to the Waste Accumulation Area Operator (if applicable) at **Building, Room, Phone Number.** Dangerous waste information and instructions can be found at the following link: <https://ehs.wsu.edu/Chemical-Waste/>  If the solution has a pH between 6 and 9 and does not meet the definition of toxic in [WAC 173-303-100](https://apps.leg.wa.gov/wac/default.aspx?cite=173-303-100) or exhibit other dangerous waste characteristics, it **MAY** be able to be drain discharged/disposed. For assistance evaluating dangerous waste characteristics, contact EH&S <https://ehs.wsu.edu/contact-information/>. Do not neutralize dangerous wastes for disposal, this may only be done at permitted treatment and disposal facilities.**Insert lab specific information on Barium hydroxide waste collection procedures, location, storage and handling.** |
| **7. DESIGNATED AREA**  **INFORMATION** | The Barium hydroxide is stored and dispensed in **Building, Room.**Diluted base solutions using this chemical are prepared immediately prior to use in **Building, Room**.**Confine all work with Barium hydroxide to a properly functioning certified laboratory chemical fume hood.**The designated area(s) should be shown on the floor plan in the Laboratory’s Chemical Hygiene Plan (CHP). **Insert lab specific information on Barium hydroxide storage and use locations.** |
| **8. DECONTAMINATION**  **PROCEDURES** | **Upon Accidental Exposure**: In case of **eye contact**, flush eyes with copious amounts of water at an emergency eyewash station for at least 15 minutes and seek medical attention. In case of **skin contact**, flush skin with copious amounts of water for 15 minutes and seek medical attention. For exposure over a large portion of the body, remove clothing and shoes and rinse thoroughly in an emergency shower for at least 15 minutes. Seek medical attention. In case of **inhalation**, move person to fresh air and seek medical attention.**WARNING**: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. In case of **ingestion**, immediately seek medical attention and follow instructions on SDS. **Upon Accidental Release**: **Large Release:** If a significant amount of Barium hydroxide is spilled outside the fume hood, immediately evacuate, secure area, notify others in the vicinity, and call 911 if there is an immediate threat of fire or the spill is uncontained. If personnel are exposed and need medical attention, call 911. If the spill is contained, secure the area, evacuate and call EH&S at 509-335-9000. **Small Release:** If a small amount of Barium hydroxide is spilled, (e.g. it can be cleaned up in 10 minutes) and you have been appropriately trained to clean it up, you may do so. Trained personnel should wear at minimum, nitrile, butyl, neoprene, polyvinyl chloride (PVC), or Viton gloves, chemical splash goggles and face shield, and a fully-buttoned lab coat.If material is liquid, absorb with an inert material. If material is solid, sweep up carefully with spark-resistant tools and avoid generating dust. Place material in an appropriate waste disposal container (resealable bag, etc.) and dispose of as dangerous waste (see Section 6: WASTE DISPOSAL PROCEDURES). Please do not use a neutralizer to clean up spill unless you are currently in the respiratory protection program and have been properly trained. Additional PPE such as respirators may be necessary depending upon material and concentration. You must be medically cleared, fit tested and enrolled in WSU’s respiratory protection program to wear a respirator. If it is necessary to use a respirator and personnel are not cleared to wear a respirator and not trained to appropriately clean up the spill, the employee should immediately evacuate, secure area, and follow the large release instructions above.As with all accidents, report any exposure as soon as possible to your Principal Investigator or Supervisor. Additional health and safety information on Barium hydroxide can be obtained by referring to the SDS or by calling the EH&S Office (335-3041).**Insert lab specific information on Barium hydroxide spill cleanup procedures and applicable location specific emergency procedures.** |
| 1. **SPECIAL STORAGE**

**AND HANDLING**  **PROCEDURES** | * Store Barium hydroxide containers upright in a designated, labeled area such as a chemical storage cabinet. Secondary containment such as a Nalgene/polypropylene tub is recommended. Barium hydroxide solutions should always be stored below eye level. Storage area should be a secured, cool and well-ventilated area away from direct sunlight, heat, sparks, flame, or other sources of ignition.
* Store Barium hydroxide in a designated, labeled, secure storage area away from other types of chemicals. Avoid incompatible chemicals such as strong acids, strong oxidizing and reducing agents, flammable materials, and metals (refer to Section 10 of SDS). If storage space is limited, use secondary containment such as a Nalgene/polypropylene tubs.
* Store in tightly closed original container until ready for use. Immediately close all containers after use. Containers should be in good condition and compatible with material.
* Transport Barium hydroxide between locations in secondary containment, such as polyethylene or other non-reactive, non-breakable bottle carrier.
* Purchase and store smallest quantities and lowest concentration needed for experimentation and what can be stored safely in the laboratory.

**Insert additional lab specific information on Barium hydroxide controls.** |

1. Certificate of Employee Training

The Principal Investigator must certify that they have provided training to lab personnel on the content of this SOP before work with Barium hydroxide is performed.

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| **PI Name** | **PI Signature** | **Date** |
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The following individuals attest that they have received training from the Principal Investigator on the content of this SOP.

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| **Name** | **Signature** | **Date** |
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