Standard Operating Procedure

**Heavy Metal Azides**

*This is an SOP template and is not complete until: 1) lab specific information is entered into the box below 2) lab specific protocol/procedure is added to the protocol/procedure section and
3) SOP has been signed and dated by the PI and relevant lab personnel.*

 Print a copy and insert into your
*Laboratory Safety Manual* and *Chemical Hygiene Plan*.
Refer to instructions for assistance.

|  |  |
| --- | --- |
| **Department:** | Click here to enter text. |
| **Date SOP was written:** | Click here to enter a date. |
| **Date SOP was approved by PI/lab supervisor:** | Click here to enter a date. |
| **Principal Investigator:** | Click here to enter text. |
| **Internal Lab Safety Coordinator/Lab Manager:** | Click here to enter text. |
| **Lab Phone:** | Click here to enter text. |
| **Office Phone:** | Click here to enter text. |
| **Emergency Contact:** | Click here to enter text. |
| *(Name and Phone Number)* |
| **Location(s) covered by this SOP:** | Click here to enter text. |
| *(Building/Room Number)* |

**Type of SOP:** [ ]  Process [ ] Hazardous Chemical [x]  Hazardous Class

**Purpose**

Heavy metal azides are used predominantly as percussion sensitive explosives in such items as bullet primers and explode-on-contact ordnance. Some laboratory uses, such as the use of barium azide for the small scale generation of nitrogen gas, also exist.

These compounds combine the explosive and toxicity hazards of azides with the toxicity hazards of heavy metals, and therefore must be handled with great care.

**Physical & Chemical Properties/Definition of Chemical Group**

CAS#: Barium Azide [18810-58-7], Lead Azide [13424-46-9], Mercury Azide [38232-63-2]

Class: Potentially Explosive Chemical

Molecular Formula: Barium Azide [160OC] Lead Azide [N/A] Mercury Azide [N/A]

Form (physical state): Solid

Color: Varies

Boiling point: Barium Azide Ba(N3)2 Lead Azide (Pb(N3)2 Mercury Azide Hg2(N3)2

**Potential Hazards/Toxicity**

Heavy metal azides are common components of explosive compositions. The risk of explosion by shock, fire, friction or other ignition sources is extremely high. They must be handled gently and away from heat, naked lights, and any other possible ignition sources.

Azide ion has a similar toxicity as that of cyanide ion (LD50 = 27 mg/kg in rats). When protonated to become hydrazoic acid, it is volatile and therefore risk of exposure is greatly increased.

For heavy metal azides, the toxicity of the metal itself must be taken into account. Mercury and lead azides are acutely and chronically hazardous reagents for this reason.

**Personal Protective Equipment (PPE)**

**Respiratory Protection**

Particulate (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88)

Respirators should be used only under any of the following circumstances:

* As a last line of defense (i.e., after engineering and administrative controls have been exhausted).
* When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
* Regulations require the use of a respirator.
* An employer requires the use of a respirator.
* There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL)
* As PPE in the event of a chemical spill clean-up process

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by ORS and should contact occhealt@uga.edu. This is a UGA requirement described in more detail in the [UGA Respiratory Protection Plan](https://esd.uga.edu/sites/default/files/respiratoryprotection.pdf) and supported by the [Office of Research Occupational Health and Safety Program](https://research.uga.edu/ohsp/).

**Hand Protection**

Chemical resistant gloves. For mercury azide, skin contact is extremely dangerous. Elbow length gloves made of PVC or other resistant materials are essential.

NOTE: Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with heavy metal azides.

Refer to glove selection chart from the links below:

<http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf>

OR

<http://www.allsafetyproducts.biz/page/74172>

OR

<http://www.showabestglove.com/site/default.aspx>

OR

<http://www.mapaglove.com/>

**Eye Protection**

ANSI Z87 safety glasses with side shields. ADDITIONALLY, a full face shield may be appropriate depending on scale of use, for protection from both chemical splashes and flying debris if an explosion occurs

**Skin and Body Protection**

Please wear full-length pants or its equivalence, closed-toe shoes, and a flame-resistant lab coat. Non-sparking footwear is essential. Avoid wearing clothing made of synthetic material to reduce the risk of human static discharge.

**Hygiene Measures**

Handle gently. Keep away from ignition sources and static discharge. Be very cautious about acidifying any mixtures containing azide ion, as hydrazoic acid will form and volatilize quickly. Avoid all skin contact.

**Engineering Controls**

Handle in a chemical fume hood. A blast shield should be in place around the experimental set up. Ground all lines and equipment to prevent static discharge.

**First Aid Procedures**

**If inhaled**

Remove to fresh air. Lay person down and keep warm. Seek medical attention immediately.

**In case of skin contact**

Remove all contaminated clothing. Flush contaminated area with running water, and soap if available.

FOR MERCURY AZIDE: Immediately flush body and clothing with running water, preferably in a safety shower. THEN, begin to remove contaminated clothing. Continue flushing with water until advised to stop by emergency response personnel or a poison control center. Transport to a doctor’s office or hospital without delay.

**In case of eye contact**

Flush eyes with water for at least 15 minutes. Seek medical attention without delay.

**If swallowed**

Seek medical attention without delay. Urgent hospital treatment is likely needed.

NOTE: Azide ion protonates in the stomach. Hydrazoic acid can therefore be released from vomitus. Keep patient in a well-ventilated area and isolate and dispose of any vomitus.

FOR MERCURY AZIDE: Give a slurry of 3 tablespoons charcoal in 8 oz water to drink immediately, then seek medical attention immediately.

**Special Handling and Storage Requirements**

Handle gently. Avoid all personal contact, including inhalation. Avoid heat, friction and ignition sources. Store in a cool, well-ventilated area appropriate for the storage of explosives. Rotate stock to prevent aging.

**Spill and Accident Procedure**

**Chemical Spill Dial 911**

**24-7 On-Call Response to Research, Environment, Health or Safety Concerns Dial 2-5561 from a campus phone or 706-542-5561 from a non-campus line.**

**Spill** – Follow the procedures set out in the [UGA Chemical and Laboratory Safety Manual.](http://research.uga.edu/docs/units/safety/manuals/Chemical-Laboratory-Safety-Manual.pdf)

[If there are any chemical-specific protocols for responding to a spill, insert them here or mark “none”:]

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# **Medical Emergency Dial 911**

**Life Threatening Emergency, After Hours, Weekends And Holidays** – Dial **911** or the emergency phone numbers listed at the beginning of the UGA Chemical and Laboratory Safety Manual

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Non-Life Threatening Emergency** – Follow the instructions in the UGA Chemical and Laboratory Safety Manual.

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Decontamination/Waste Disposal Procedure**

**For general hazardous waste disposal procedures, see Appendix H of the UGA Chemical and Laboratory Safety Manual.**

**Chemical Specific Procedures: [to be inserted or marked as “none”]**

Do not pour azides down the drain. Soluble azides can react with metals present in plumbing to form insoluble azide salts. These salts can then accumulate in pockets and create a serious explosion hazard, especially during plumbing repair.

**Safety Data Sheet (SDS) Location**

UGA personnel can access Online SDS through a link in the upper left corner of the ESD home page (<https://esd.uga.edu>) and logging in by using their UGA email user name and password.

**Protocol/Procedure (Add lab specific Protocol/Procedure here)**

Click here to enter text.

**NOTE**

Any deviation from this SOP requires approval from PI.

**Documentation of Training** (signature of all users is required)

* Prior to conducting any work with heavy metal azides., designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
* The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and access to the SDS provided by the manufacturer.
* The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last 12 months.

**Principal Investigator SOP Approval**

Print name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Approval Date:

I have read and understand the content of this SOP:

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