Standard Operating Procedure

**Sodium Azide**

Print a copy and insert into your
*Laboratory Safety Manual* and *Chemical Hygiene Plan*.

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| --- | --- |
| **Department:** | Chemistry |
| **Date SOP was written:** | 3/10/2018 |
| **Date SOP was approved by PI/lab supervisor:** | 3/10/2018 |
| **Principal Investigator:** | Sarah Keller |
| **Location(s) covered by this SOP:** | *BAG 005, BAG 023* |
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**Type of SOP:** **[ ]** Process **[x]** Hazardous Chemical **[ ]** Hazard Class

**Purpose and Scope**

Sodium azide is an odorless, colorless crystal that is commonly used in research laboratories as a preservative. As a preservative, sodium azide usually exists in a solution at 0.1 to 2.0%. However, of greater concern is the use and storage of pure sodium azide or a solution of 10% or greater. In these forms or concentrations, the material and waste shall be considered highly acutely toxic and can be dangerously reactive when heated near its decomposition temperature. Sodium azide can also react with heavy metals to form dangerous metal halides that can be explosive; therefore, even dilute solutions (equal to or greater than 0.01%) of sodium azide must not be poured down the drain.

***This SOP documents the safe usage and handling of sodium azide.***

**Physical & Chemical Properties**

CAS#: 26628-22-8

Class: Potentially Explosive Compound (PEC)

Molecular formula: NaN3

Form: Solid

**Overview of Potential Hazards**

* Mutagen and possible carcinogen
* Water Reactive
* Potentially Explosive Compound (PEC)
* Acutely toxic

**Acute Effects**

***Eye:*** Redness, pain, irritation. Contact with dust or vapor may cause systemic toxicity.

***Skin:*** Irritation, redness, blisters. May be fatal if absorbed through the skin.

***Ingestion:*** Irritation of the digestive tract, abdominal pain, nausea, sweating, vomiting, diarrhea. May cause low blood pressure, rapid heartbeat, skin discoloration, and possible coma. May be fatal if swallowed.

***Inhalation:*** Severe irritation of the respiratory tract with sore throat, coughing, nasal stuffiness, blurred vision, shortness of breath and delayed lung edema. The vapor of hydrazoic acid may be present where sodium azide is handled. Symptoms of acute exposure to hydrazoic acid include eye irritation, headache, dramatic decrease in blood pressure, weakness, pulmonary edema and collapse.

**Routes of Exposure**

Sodium azide may enter the body through all routes of exposure

**Chronic Effects**

Chronic exposure to sodium azide may result in liver and kidney damage. Repeated exposure may cause damage to the spleen. Laboratory studies have shown mutagenic effects, development of tumors in animals, and blood effects.

**Physical Hazard**

Sodium azide rapidly hydrolyzes in water, when mixed with water or an acid, to form hydrazoic acid, a highly toxic and explosive gas. It is thermally unstable and if heated to 275ºC, sodium azide may undergo violent decomposition.

Sodium azide also form explosive compounds when it comes in contact with or dries on metal surfaces. It can also react with metal pipes in laboratory sinks, traps and drains, so do not dispose of down the sink! If introduced to the waste water treatment system in large volume or in high concentrations, the desirable anti-bacterial characteristics of this chemical can damage the water treatment process of your city and county.

It will also react with metal spatulas and metal lab equipment to form shock sensitive salts. It reacts with lead, copper, silver, gold and metal halides to form heavy metal azides which are explosive.

**Training and Documentation**

Before working with sodium azide, the lab worker should verify that he/she understands the hazards and how to work with sodium azide safely.

**Personal Protective Equipment (PPE)**

* Nitrile disposable gloves. Double-gloving is recommended when working with pure sodium azide or sodium azide solutions greater than 5%. Change gloves frequently and when contaminated, punctured, or torn. Wash hands immediately after removing gloves.
* Safety glasses with side shields or chemical splash goggles shall be worn when dealing with >5% concentration.
* A laboratory coat should be worn when working with this chemical.
* Closed toe shoes are required at all times when working in the laboratory.

**Engineering Controls**

* Work with sodium azide in a properly operating and certified chemical fume hood.
* Work at least 6” inside the hood, never place your head in the hood, set the sash at the lowest position possible (if using the horizontal sliding sashes do not open past the labeled positions).
* Safety shower and eye wash stations should be easily accessible when sodium azide is used.

**Additional Precautions and Storage Requirements**

* Do not store on metal shelves or use metal items (spatulas) to handle sodium azide.
* Store in tightly closed containers in a cool, well-ventilated area away from heat, air, light and moisture.
* Sodium azide and all other acutely toxic materials should be stored in a secondary container in a designated area from other chemicals. A refrigerator storing sodium azide must be labeled on the outside with a caution sign noting the presence of sodium azide and its hazards.
* Store away from metals, acids, carbon disulfide, bromine, chromyl chloride, sulfuric acid, nitric acid, hydrazine and dimethyl sulfate.
* When handling more than >5 ml, use only in a certified chemical fume hood.
* Sodium azide powder should be purchased in the smallest practical amount. Make stock solutions of 10%, if possible to minimize potential accidents.
* Whenever handling pure sodium azide powder or concentrated solutions of 10% or more, that may require assistance in case of a spill or accident; it is recommended that a second trained individual be present in the lab or in the vicinity.
* Wash hands thoroughly after handling (even if gloves were used).

**Spill and Accident Procedures**

* Do not attempt cleanup if you feel unsure of your ability to do so or if you perceive the risk to be greater than normal laboratory operators. Call EH&S for assistance.
* Isolate the area to prevent the spread of contamination (e.g. close doors to affected area, post warning signs, alert others in immediately vicinity to evacuate).
* Vacuum or sweep up material and place into a suitable disposal container (non-metal). Avoid generating dusty conditions.
* Wear a self-contained breathing apparatus and appropriate personal protection.
* Do not flush down the drain. Sodium azide may react with copper, lead, brass, or solder in plumbing systems to form an accumulation of the highly explosive compounds of lead azide and copper azide.
* Do not let this chemical enter the environment.
* Report all incidents or near misses to OARS through the EH&S website and complete the appropriate forms.

**Small spills (in a chemical hood):**

Don appropriate PPE. Sodium azide crystals should be swept up and surfaces cleaned with pH-adjusted water (pH greater than 9.0). Cover spills of sodium azide solution with absorbent material, and clean surfaces with pH-adjusted water. Collect spilled material and clean up material into appropriately labeled waste container. All spill clean-up material should be disposed of as hazardous waste.

**Large spills** **/ Spills outside of a chemical hood:**

Notify others in room of spill. Evacuate room/immediate area. Call EH&S. Close doors and post warning signs at entrances/exits notifying others of spill. Prevent unnecessary entry into area. Provide assistance and information to spill responders. Report all spills (minor and major) and any near misses to OARS through the EH&S website

**First Aid Measures**

***Eye Contact:*** Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

***Skin Contact:*** Wipe off excess material from skin, then immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse.

***Ingestion:*** Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

***Inhalation:*** Remove from exposure and move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled substance. Get  medical attention immediately.

**\* Note to physician:** Accidental ingestion of sodium azide is potentially life-threatening. Treatment includes gastric lavage, followed by sodium catharsis. EKG and blood pressure monitoring and support are recommended.

**Decontamination / Waste Disposal Procedures**

Sodium azide is a water-reactive poison. After working with sodium azide, decontaminate work space with 70-75% ethanol. Contaminated pipet tips, eppendorf tubes, and gloves should be discarded as hazardous waste according to EH&S waste disposal procedures.

Store liquid wastes in designated waste containers. Dispose of according the EH&S hazardous waste guidelines. Drain disposal of sodium azide solutions is not permitted.

**Material Safety Data Sheet (MSDS) Location**

*(State the location of MSDS)*

Online MSDS/SDS can be accessed at <http://msds.ehs.ucla.edu>.

**NOTE**

Any deviation from this SOP requires approval from PI.

**Principal Investigator SOP Approval**

Print name Sarah Keller

Signature\_\_    

Approval Date: 3/10/2018