

Standard Operating Procedures for Sodium Azide (ABB467)

Introduction:

Sodium azide is a colorless crystalline inorganic salt. It is a very reactive and highly toxic chemical. Sodium azide decomposes explosively upon shock, concussion, heating (>275 °C), or friction.

Sodium azide reacts with various metals to form shock-sensitive compounds.

When mixed with acid or water, sodium azide may rapidly change into a toxic and explosive gas (hydrogen azide, HN₃ or hydrazoic acid). Hydrazoic acid gas has a sharp pungent odor. Sodium Azide and hydrazoic acid form strong complexes with hemoglobin, and consequently block oxygen transport in the blood. The potential reaction with water and metals is particularly dangerous when disposed down the drain.

Sodium azide has high acute toxicity oral toxicity (oral mouse LD₅₀=27 mg/kg) and dermal toxicity (dermal rabbit LD₅₀= 20 mg/kg). Sodium azide readily penetrates intact skin, and any dermal exposure can significantly contribute to the overall exposure. Symptoms of sodium azide exposure are similar to those of cyanide. Exposure to small amounts may lead to rapid breathing, restlessness, dizziness, weakness, headache, nausea, vomiting, rapid heart rate, red eyes, clear drainage from the nose, cough, skin burns and blisters. Larger amounts may lead to convulsions, low blood pressure, low heart rate, loss of consciousness, and respiratory failure leading to death. Long term effects of those who have survived sodium azide poisoning may include brain and heart damage.

Storage:

1. Sodium azide must be stored in a cool, dry, well-ventilated location.
2. Isolate this material from incompatible materials. Reacts with heat, sources of ignition, moisture, shock, friction. Incompatible with strong oxidizing agents, water, mineral acids, strong acids, halogen acids and halogenated compounds (see note 8 under handling), barium carbonate, bromine, carbon disulphide, mercury, dimethyl sulphate, common metals especially copper and alloys (brass, bronze), lead and silver.
3. Due to the hazardous nature of the material only minimal quantities of material should be purchased and stored. Do not "borrow" sodium azide from any other laboratory as its history (possible contamination) will not be known. The lab is permitted to purchase and store (as above) no more than 10.0 g quantities of sodium azide and only one such container should be kept in the lab.

Handling:

1. The Material Safety Data Sheet and this SOP must be reviewed before use of sodium azide in the laboratory.
2. All manipulations with sodium azide, especially those that can generate vapors, fumes or sprays, must be done in a properly working chemical fume hood or glove box.
3. Proper personal protection equipment (PPE) must be worn at all times to prevent eye and skin contact. The minimum requirements are a lab coat, chemical safety goggles and rubber or neoprene gloves.
4. Do not use a metal spatula to weigh quantities of sodium azide. A ceramic spatula should be used.
5. Use the minimum quantity of sodium azide possible.
6. Turn gloves inside out while removing and tie off before disposal.
7. Always practice good laboratory hygiene. Wash hands, face, neck and forearms frequently.

8. Sodium azide is a powerful nucleophile and can react with even seemingly weakly electrophilic solvents, for example dichloromethane, generating explosive diazidomethane.

Disposal:

1. All waste must be collected in a sealable compatible container and disposed as hazardous waste as per University Hazardous Waste Guidelines.
2. All residual materials and rinsate from empty containers of this material must be collected and disposed as hazardous waste.
3. The rinsate from decontamination of all non-disposable equipment must be collected and disposed as hazardous waste.
4. A chemical pick-up request form must be completed and submitted when the hazardous waste needs to be removed. This should be done in time for the next available waste pick-up date to avoid storage in the lab.
6. Containers of sodium azide or waste products may be hazardous when empty as they may contain product residues (vapors, liquids).

References:

- Occupational Safety and Health Topics for Sodium Azide.

http://www.osha.gov/dts/chemicalsampling/data/CH_267505.html

-NorthEastern University, Sodium Azide factsheet:

http://www.ehs.neu.edu/hazardous_waste/fact_sheets/sodium_azide/

-UC San Diego: Handling Sodium Azide.: <http://blink.ucsd.edu/safety/researchlab/chemical/specific/azide.html>

-University of Southern California, Safety Guideline: Sodium Azide.

<http://capsnet.usc.edu/LabSafety/documents/SodiumAzide.pdf>

-Centers for Disease Control and Prevention: Emergency Preparedness and Response: Facts about Sodium Azide. <http://www.bt.cdc.gov/agent/sodiumazide/basics/facts.asp>

-Chemical & Engineering News: Safety Zone blog: sodium azide.

<http://cenblog.org/the-safetyzone/2010/04/sodium-azide-acid-boom-2>