

Standard Operating Procedure

Sodium Hydroxide

Department:	Chemical Engineering
Date SOP was written:	10/1/2020
Date SOP was approved by PI/lab supervisor:	<i>Michelle O'Malley</i> 4/12/21 O'Malley
Principal Investigator:	Michelle O'Malley, Mark Brzezinski, Brad Chmelka
Internal Lab Safety Coordinator/Lab Manager:	Michelle O'Malley
Lab Phone:	805-893-3993 (O'Malley lab, Elings Hall #2416)
Office Phone:	805-893-4769
Emergency Contact:	Michelle O'Malley <ul style="list-style-type: none"> • 805-403-7607 (cell) • 805-893-4769 (office)
Location(s) covered by this SOP:	Elings Hall, #2436

Type of SOP: ☐ Process ☒ Hazardous Chemical ☐ Hazardous Class

Overview

Sodium hydroxide is a corrosive, strong base. It reacts with strong acids, during which heat is liberated due to exothermic reaction. If not stored and handled properly, this can pose a serious threat to the health and safety of laboratory personnel, emergency responders and chemical waste handlers. Hence, it is important to follow safety protocols to handle this chemical.

Bases are generally chemicals containing the hydroxide (OH⁻) anion, or materials that form hydroxide when added to water, e.g., carbonates. Bases are “corrosives” (like acids) and will destroy body tissue. The extent of injury depends on factors such as the type and concentration of the chemical, the route of exposure, the type of tissue contacted, and the speed used in applying emergency measures. Skin contact with strong bases usually goes unnoticed, since pain does not occur immediately.

The eyes are especially susceptible to bases and must be immediately flushed with water for at least 15 minutes if exposure occurs. Inhaling airborne dust and mist from bases irritate the nose, throat, and lungs. Pulmonary edema, a severe irritation of the lungs resulting in fluid production that prevents the transfer of oxygen to the bloodstream, can also occur from extreme airborne exposures. Secondary toxic effects may occur if the material is absorbed from the lungs into the bloodstream. The extent of these effects depends on

the concentration in air and the duration of exposure.

Dilution of bases is exothermic and can result in the surface boiling and spattering. Therefore, always add the base to the water, thereby having a more dilute solution surface heating. This is particularly true for potassium hydroxide. Concentrated solutions of inorganic bases are not in themselves flammable.

Protocol/Procedure

Sodium hydroxide is used to adjust pH of other aqueous solutions. Solutions will be made from sodium hydroxide pellets and stored at room temperature for the later use. Dilution of concentrated base is done by adding small amount of base to a large amount water, not in reverse.

Gloves, labcoat, safety glasses, long pants and close-toed shoes must be worn at all times during the handling of sodium hydroxide containing solutions.

NOTE

Any deviation from this SOP requires approval from PI.

Physical & Chemical Properties/Definition of Chemical Group

CAS#: 1310-73-2

Class: **Corrosive**

Molecular Formula: NaOH

Form (physical state): Pellets

Color: White

Boiling point: 1,390 °C (2,534 °F)

pH: 13.0 – 14

Synonym: Caustic soda

Potential Hazards/Toxicity

OSHA Hazards - Corrosive

Pictogram



Signal word: Danger!

Potential Health Effects

Inhalation May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.

Skin May be harmful if absorbed through skin. Causes skin burns.

Eyes Causes eye burns. Causes severe eye burns.

Ingestion May be harmful if swallowed.

Signs and Symptoms of Exposure

Spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, cough, wheezing, laryngitis, shortness of breath, headache, nausea & vomiting. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.

Personal Protective Equipment (PPE)

Hand Protection

Always use gloves: Latex or nitrile gloves may be used.

NOTE: Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with Sodium hydroxide (pellets).

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

As always, ANSI approved safety glasses must be worn

Skin and Body Protection

A lab coat, long pants, closed-toed shoes and goggles must be worn.

Hygiene Measures

Avoid contact with skin, eyes and clothing; this material is extremely caustic.

As always, wash hands before breaks

Engineering Controls

All concentrated bases should be transferred and dispensed in an annually certified laboratory chemical fume hood with the sash at the certified position or lower.

First Aid Procedures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water (under safety shower). Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water until emergency responders arrive and for at least 15 minutes (using emergency eyewash) and consult a physician. Continue rinsing eyes during transport to hospital.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

Special Handling and Storage Requirements

Precautions for safe handling

Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place. **Materials to avoid:** Segregate from strong oxidizing agents, strong acids, organic materials

Spill and Accident Procedure

Personal precautions

Use appropriate Personal Protective Equipment (PPE). Avoid dust formation. Avoid breathing dust, vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal. Dispose of the spill clean up waste according to EH&S guidelines.

Chemical Spill on Body or Clothes – Remove clothing and rinse body thoroughly in emergency shower for at least 15 minutes. Seek medical attention. *Notify supervisor and EH&S immediately.*

Chemical Splash Into Eyes – Immediately rinse eyeball and inner surface of eyelid with water from the emergency eyewash station until emergency responders arrive and for at least 15 minutes by forcibly holding the eye open. Seek medical attention. *Notify supervisor and EH&S immediately.*

Medical Emergency Dial 9-911

Life Threatening Emergency– Dial **9-911**. Nearest phone (landline) is located in the O'Malley lab Elings Hall #2416. Contact PI and EH&S as soon as practical. *Note: All serious injuries must be reported to EH&S at x3194 within 8 hours.*

Non-Life Threatening Emergency – Go to Student Health, building 588, **x5361**, Hours: M, T, R, F 8 a.m. to 4:30 p.m, W 9 a.m. to 4:30 pm and R 5 to 7 p.m. by appointment. At all other times report to Goleta Valley Cottage Hospital (emergency room) at 351 South Patterson Avenue, **805-967-3411**. Contact PI and EH&S as soon as practical. *Note: All serious injuries must be reported to EH&S at x3194 within 8 hours.*

Decontamination/Waste Disposal Procedure

Wearing proper PPE, please decontaminate equipment and bench tops using water. Please dispose of the used material and disposables contaminated with this material as hazardous waste.

General hazardous waste disposal guidelines:

Label Waste

- Affix a hazardous waste tag on all waste containers as soon as the first drop of waste is added to the container

Store Waste

- Store hazardous waste in closed containers, in secondary containment and in a designated location
- Double-bag dry waste using transparent bags
- Waste must be under the control of the person generating & disposing of it

Dispose of Waste

- Dispose of regularly generated chemical waste within 90 days
- Call EH&S for questions and for pick-up
- Empty Containers: Dispose as hazardous waste irrespective of the container size

Prepare for transport to pick-up location

Check waste tag

Use secondary containment

Safety Data Sheet (SDS) Location

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

Documentation of Training (signature of all users is required)

- Prior to conducting any work with Sodium Hydroxide, 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 a copy of 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 one year.

I have read and understand the content of this SOP:

[illegible]