



CALIFORNIA STATE UNIVERSITY
DOMINGUEZ HILLS

Standard Operating Procedure

Sodium Hydroxide

Print a copy of this SOP and insert into your Safety Binder.

- SOP Information

Department:	CSUDH – (Name of your Department)
Date SOP was written:	1/25/2022
Date SOP was approved by PI/lab supervisor:	Click or tap to enter a date.
Principal Investigator:	Click or tap here to enter text.
Chemical Hygiene Officer /Lab Manager:	Ricardo Magallanes/
Lab Phone:	(XXX) – XXX – XXXX
Office Phone:	(XXX) – XXX – XXXX
Emergency Contact:	EHS (310) 243 – 3000 (Name and Phone Number)
Location(s) covered by this SOP:	Campus (Building/Room Number)

SOP Type:

☐

Specific lab procedure or experiment

☒

Generic use of specific chemical or class of chemicals w/ similar hazards

☐

Generic use of equipment

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Definitions

P.I. – Principal Investigator. Usually, a professor in charge of a laboratory or set of laboratories who is actively undertaking research. They are considered the front-line supervisor and are responsible for training and personnel safety in the laboratory.

SDS – Safety Data Sheets. An essential component of the GHS and are intended to provide comprehensive information about a substance or mixture for use in workplace chemical management. Also Known as MSDS (Material Safety Data Sheet)

S.O.P. – Standard Operating Procedure. A written set of instructions that document how to safely perform work involving hazardous chemicals or hazardous operations. Includes training documentation.

1. Purpose

This document covers basic chemical safety information for sodium hydroxide (NaOH). The use of sodium hydroxide is subject to pre-approval by the Principal Investigator (PI) and/or Supervisor.

2. Subject Chemicals Used in this Laboratory

DO NOT USE SODIUM HYDROCHLORIDE UNTIL YOU HAVE OBTAINED THE NECESSARY PRE-APPROVAL FROM YOUR PI OR SUPERVISOR.

3. Properties & Hazards



Sodium Hydroxide is a noncombustible colorless to white, odorless solid, when in contact with water may generate sufficient heat to ignite combustible materials. It is a corrosive, strong base. It can cause damage to the respiratory system, skin, and eyes and is harmful if swallowed.

The Cal/OSHA Permissible Exposure Limit (PEL) for **sodium hydroxide** is 2 milligrams per cubic meter (2 mg/M³) for a Ceiling Peak (C). Consult the Safety Data Sheet (SDS) for additional information on hazards.

4. Administrative Control

In addition to the practices described below, follow procedures as specified in the lab-specific and special handling/use sections of this SOP.

General practices:

1. Be sure to review the Safety Data Sheet (SDS) for all chemicals to be used in the experiment.
2. **Never work alone.** At least one other person must be present in the same laboratory when any work involving hazardous chemicals is being done.
3. Eliminate or substitute for a less hazardous material when possible.
4. Design your experiment to use the least amount of material possible to achieve the desired result.
5. Verify your experimental set-up and procedure prior to use. Be familiar with the Safety Data Sheets for all chemicals in use. Assess the hazards to ensure that appropriate controls are in place to minimize risk and address emergency shut-down procedures as appropriate.
6. Consult with the PI if the work involves procedure scale-up or other large quantities or there are any questions regarding appropriate safety procedures.

5. Engineering Control

Sodium hydroxide pellets should be handled and grounded in the fume hood to prevent unwanted exposure.

In addition to the practices described below, follow procedures as specified in the lab-specific and special handling/use sections of this SOP.

General practices:

1. In general, it is preferable to perform all work with hazardous chemicals in a fume hood. Sash height should be kept as low as possible to avoid the escape of vapors, gases and particulates.
2. Supplemental equipment such as blast shields should be used when working with chemicals or processes that may result in explosions or pressure releases.
3. Consider the use of a glove box, toxic gas cabinet or other local exhaust in order to further contain hazards as appropriate.

6. Personal Protective Equipment

In addition to the practices described below, follow procedures as specified in the lab-specific and special handling/use sections of this SOP.

Hand Protection

When handling sodium hydroxide, natural rubber, butyl, neoprene, polyvinyl alcohol (PVA) or nitrile gloves are recommended. Long cuff, thick chemical resistant gloves (extending over the sleeve of lab coat) shall be worn whenever working with strong corrosives in quantities beyond small scale pipetting.

For additional information on selection of glove material, review the specific chemical Safety Data Sheet. Consult with your preferred glove manufacturer's website to ensure that the gloves you plan on using are compatible with a specific chemical substance. Common manufacturer glove selection guidance can be found at:

http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf
<http://www.allsafetyproducts.biz/page/74172>
<http://www.showabestglove.com/site/default.aspx>
http://www.mapa-pro.com/our-gloves/protections/chemical-protection/b/handled_product.html

Eye Protection

Use safety glasses with side shields or tightly fitting safety goggles whenever working in the laboratory. Face shields are also highly recommended.

Skin and Body Protection

Long pants, closed toed-shoes, shirt and a lab coat must be worn whenever working in the laboratory. Flame resistant Nomex® lab coats should be used when working with chemicals or processes that

increase the risk of fire. Fully extend sleeves to the wrists and keep buttoned at all times. Avoid wearing synthetic clothing when practicable.

Hygiene Measures

Avoid contact with skin, eyes, and clothing. Wash hands before breaks and immediately after handling the product



Lab Coat

Chemical-resistant lab coat.



Gloves

Consult with your PI or supervisor to determine the proper glove for your operation



Eye Protection

ANSI Z87.1-compliant safety glasses or safety goggles.

7. Special Handling & Storage Requirements

In addition to the practices described below, follow procedures as specified in the lab-specific section of this SOP.

KEEP AWAY from water because of violent exothermic reaction.

KEEP AWAY from metals such as aluminum, tin & zinc.

KEEP AWAY from flammable liquids.

KEEP AWAY from organic halogens. Nitromethane.

KEEP AWAY from sources of ignition.

ALL CHEMICALS containing strong acids or bases must be secondarily contained and stored in a corrosive cabinet with proper signage on containers and the storage cabinet.

Acids and bases **MUST BE** segregated from each other and stored separately.

8. First Aid

In addition to the practices described below, follow procedures as specified in the lab-specific and special handling/use sections of this SOP.

Consult the Safety Data Sheet for the subject chemical for specific first aid procedures. General first aid procedures for hazardous chemicals are provided below.

If inhaled

Move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Take off contaminated clothing immediately. Wash off with soap and plenty of water for 15 minutes. Take victim immediately to hospital. Consult a physician.

For mucous membrane exposure

flush the affected area for 15 minutes using an eyewash station.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately. Continue to wash eyes during transport to the hospital.

If swallowed

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

9. Medical Emergency

Be familiar with information in the CSUDH Emergency procedures (see poster).

a. Life Threatening Emergency (all times: Business Hours, After Hours, Weekends and Holidays)--

CALL 911 if the condition is LIFE THREATENING or REQUIRES IMMEDIATE MEDICAL ATTENTION.

Note: All serious injuries must be reported to EH&S at ext. 2895 within 8 hours. Complete online incident report at <https://www.csudh.edu/Assets/csudh-sites/rm-ehos/docs/risk-management-ehos/accident-report-form-std-268.pdf>

b. Non-Life Threatening Emergency – Notify your supervisor or faculty staff if condition is not life threatening or does not require immediate medical attention.

ALL WORK RELATED INJURIES MUST BE REPORTED via the On-line Incident Form

<https://www.csudh.edu/hr/workers-compensation/> or call Human Resources, Workers Compensation (310) 243-3771.

10. Spill & Accident Procedures

In addition to the practices described below, follow procedures as specified in the lab-specific and special handling/use sections of this SOP.

Evacuate the spill area. Post someone or mark-off the hazardous area with tape and warning signs to keep other people from entering the area. Keep the appropriate fire extinguisher nearby. Avoid incompatible extinguishing agents. Use Class A-B-C or B-C for flammable liquids. **Fire extinguishers containing water are not suitable for flammable liquid fires.**

Spill – Assess the extent of danger. Help contaminated or injured persons if safe to do so. Evacuate the spill area. Avoid breathing vapors. If possible, confine the spill to a small area using a spill kit or absorbent material. Keep others from entering contaminated area (e.g., use caution tape, barriers, etc.).

Small (<1 L, <100 g) – If you have training, you may assist in the clean-up effort. Use appropriate personal protective equipment and clean-up material for chemical spilled. Double bag spill waste in clear plastic bags, label and take to the next chemical waste pick-up.

Large (>1 L, >100 g) – Dial 911 and EH&S at ext. 3000 for assistance.

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 at ext. 3000 immediately.*

Chemical Splash Into Eyes – Immediately rinse eyeball and inner surface of eyelid with water from the emergency eyewash station for 15 minutes by forcibly holding the eye open. Seek medical attention. *Notify supervisor and EH&S at ext. 3000 immediately.*

11. Decontamination & Waste Disposal Procedure

In addition to the practices described below, follow procedures as specified in the lab-specific and special handling/use sections of this SOP.

Waste sodium hydroxide must be disposed of as a hazardous waste per the CSUDH Chemical Hygiene Plan.

Label Waste

- Hazardous waste labels must be placed on the hazardous waste container upon the start of accumulation. Waste containers containing strong corrosives must be labeled: “**CORROSIVE** or **ACID WASTE**” (for acid) and “**ALKALAI** or **BASE**” (for base).

Store Waste

- Hazardous waste containers must be kept closed, except when adding waste.
- Hazardous waste containers must be stored in secondary containment to adequately contain all of the contents of the container.
- Hazardous waste containers must be inspected weekly for signs of leaks, corrosion, or deterioration.

Dispose of Waste

- Hazardous waste must be transferred to EH&S for disposal within 6 months of being generated.
- Empty Containers: At no time should full or partially full containers be placed in the trash.
- Hazardous Waste Disposal:
 - Visit: <https://www.csudh.edu/ehs/environmental/hazardous-waste>
 - Fill out the “CSUDH Hazardous Waste Label”
 - EH&S will pick up your waste within 1-3 days.
- **DO NOT** dispose of chemicals by pouring them down the drain or placing them in the trash.
- **DO NOT** use fume hoods to evaporate chemicals.

Refer to the CSUDH Chemical Hygiene Plan for more information on waste management.

12. Safety Data Sheet (SDS) Location

Online SDSs can be accessed at <http://hq.msdsonline.com/csuedu>

13. Required Approvals

In addition to the practices described below, follow procedures as specified in the lab-specific and special handling/use sections of this SOP.

All work with the subject chemicals requires the following prior to beginning work:

1. Must be pre-approved by the Principal Investigator prior to use and all training must be well documented.
2. Must be familiar with the CSUDH Chemical Hygiene Plan.
<https://www.csudh.edu/ehs/health-safety-programs-policies/>
3. Must have documented Laboratory Safety training.
4. Must read the relevant Safety Data Sheet (formerly referenced as **Material Safety Data Sheets**).
5. Any additional laboratory specific training that is needed is referenced in the 'Laboratory Specific Use Procedures' section. Signed and dated training documents must be uploaded into each assigned researchers training records.

14. Additional Notes

Any deviation from this SOP requires approval from EH&S. PIs and supervisors are responsible for using sodium hydroxide in a safe manner and protecting the health and safety of personnel under their supervision.

15. Documentation of Training

- Prior to working with sodium hydroxide, personnel must be trained on this SOP and on the laboratory specific procedures involved in working with sodium hydroxide.
- 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]

16. Lab Specific Procedures

The following describe how the subject chemicals are used in this laboratory beyond the practices described above.

This section must describe lab-specific procedures to address the safe use of all highly hazardous chemicals from this band in use in the laboratory. These procedures may be organized around specific chemicals, specific tasks or the band as a whole. The following minimum requirements must be met:

- Identify designated use areas within the laboratory for highly hazardous chemicals
- Identify maximum use quantities for which the procedures in this band apply.
- If it is determined that this SOP is sufficient to address the safe use of subject chemical in this lab, then include the following statement in this section: *“Procedures described in this SOP are sufficient for addressing the safe use of subject chemical in this laboratory within the listed quantity limitations.”*
- If it is determined that this SOP is not sufficient to address the safe use of a chemical from the lab, then write lab-specific procedures for to address these high hazard operations. Such operations are generally indicated by:
 - tasks requiring the use of specialized PPE,
 - tasks using highly hazardous chemicals outside of the fume hood,
 - tasks using larger quantities of hazardous chemicals,
 - tasks involving the use of particular chemicals considered by CSUDH EHS to be extremely hazardous, and
 - tasks considered to present high risk by lab personnel.

A few examples of what lab-specific tasks may look like are provided below:

Task #1: Title of the specific procedure being done.

- 1) Provide step-by-step instructions in a numbered/lettered format.
- 2) Include in the procedure any relevant:
 - a) Locations of “designated areas” as called for in the special handling section of the SOP, or as otherwise required by regulations. *The entire laboratory, fume hood, or a portion of the laboratory may be considered as a designated area.*
 - b) Use of specific administrative, engineering and PPE controls.
 - c) Specific quantity use limits/restrictions.
 - d) Specific storage requirements.
 - e) Specific first aid and spill procedures (including what should be handled by whom).
 - f) Specific disposal procedures.
 - g) Process-specific PI approvals required.

Task #2: Making dilutions of the acids and bases.

- 1) Consult with PI and obtain approval if quantities greater than 4 L are needed.
- 2) In a fume hood, add the appropriate amount of concentrated acid or base to the calculated amount of water.
- 3) Return the concentrated acids/bases to the proper secondary containment or cabinet.

Task #3: Using the pH meter.

- 1) Calibrate on the day of pH testing using at least 2 standards.
- 2) Before use, rinse the electrode with deionized water and blot dry with a kim-wipe.
- 3) Transfer the electrode to the test solution.
- 4) If using a stir plate, make sure the electrode does not touch the stir bar.

- 5) Record the pH when the reading is stable (5–20 seconds after insertion of the electrode into the solution)
- 6) Add dilute acid or dilute base drop-wise until the correct pH is reached.
- 7) Rinse the electrode with deionized water and store according to the manufacturer's instructions.
- 8) Make sure the acid and base caps are on tightly.

Add as many tasks as necessary.