UCLA ENVIRONMENT, HEALTH & SAFETY

Standard Operating Procedure

Sodium Cyanide

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:	Chemistry
Date SOP was written:	5/25/2017
Date SOP was approved by PI/lab supervisor:	5/25/2017
Principal Investigator:	Rongbiao Tong
Internal Lab Safety Coordinator/Lab Manager:	Jingxun Yu
Lab Phone:	23587393
Office Phone:	23587357
Emergency Contact:	Rongbiao Tong 53484541 *(Name and Phone Number)*
Location(s) covered by this SOP:	*CYT/6014* *(Building/Room Number)*

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

Purpose

Sodium cyanide is an acute and chronic **toxin.**

Contains cyanide which is very poisonous. Very harmful or fatal if inhaled, swallowed or in contact with the skin or eyes. Can also be fatal if inhaled or ingested. It presents toxicity by skin absorption through open wounds and by inhalation of dust. This substance inhibits cellular respiration, which leads to anoxia. Blue discoloration or the skin (Cyanosis) tends to be associated with severe cyanide poisoning, but can cause deceptively healthy pink to red skin color.

Sodium cyanide has applications in gold mining and has a high affinity for metals.

Physical & Chemical Properties/Definition of Chemical Group

CAS#: 143-33-9

Class: **Toxic**

Molecular Formula: NaCN

Form (physical state): Powder

Color: White

Boiling point: 1,496ºC

Potential Hazards/Toxicity

Sodium cyanide has a threshold limit value - time weighted average (TWA) of **5 mg/m^3 (As CN).**

Risks of cyanide exposure: Causes irritation to the eye. Contact with skin causes irritation and burns, and concentrated HCN vapor can be absorbed through skin. Can be fatal if swallowed and cause tissue anoxia, characterized by weakness, headache, dizziness, confusion, cyanosis (bluish skin due to deficient oxygenation of the blood), weak and irregular heart beat, collapse, unconsciousness, convulsions, coma and death. Inhalation of high concentrations may cause central nervous system effects and can be fatal Prolonged/repeated contact may cause skin necrosis and ulceration of the skin. Cyanide acts by inhibiting cytochrome oxidase impairing cellular respiration. Chronic exposure to cyanide solutions may lead to "cyanide" rash with itching and vesicular eruptions with secondary infection. Small amounts of cyanide over long periods of time causes loss of appetite, headache, weakness, and respiratory irritation.

Sodium cyanide has the following oral toxicities:

Oral, rat: LD50 = 6440 ug/kg;

Oral, rat: LD50 = 4.7 mg/kg;

Skin, rabbit: LD50 = 10400 ug/kg;

Skin, rabbit: LD50 = 300 mg/kg

Personal Protective Equipment (PPE)

Respirator Protection

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 EH&S. This is a regulatory requirement. (http://map.ais.ucla.edu/go/1004655)

Hand Protection
Gloves must be worn, nitrile gloves are recommended.

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

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 approved properly fitting safety glasses or chemical splash goggles. Face shields are also recommended

Skin and Body Protection
Flame resistant lab coats must be worn and be appropriately sized for the individual and buttoned to their full length. Laboratory coat sleeves must be of sufficient length to prevent skin exposure while wearing gloves. As outlined in UCLA Policy 905 personnel should also wear full length pants, or equivalent, and close-toed shoes. Full length pants and close-toed shoes must be worn at all times by all individuals that are occupying the laboratory area. The area of skin between the shoe and ankle should not be exposed.

Hygiene Measures
Wash thoroughly and immediately after handling. Remove contaminated clothing and wash before reuse.

Engineering Controls

Handle using a chemical fume hood with good ventilation and electrically grounded lines and equipment.

First Aid Procedures

If inhaled
Move into the fresh air immediately and give oxygen. If not breathing give artificial respiration. Get medical attention immediately.

In case of skin contact
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

In case of eye contact

Check for and remove any contact lenses. Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Seek immediate medical attention and continue eye rinse during transport to hospital.

If swallowed
Do NOT induce vomiting unless directed by medical personnel. Never give anything by mouth to an unconscious person. Seek medical attention immediately.

Special Handling and Storage Requirements

Precautions for safe handling: Avoid contact with skin and eyes and inhalation. Avoid dust formation or breathing vapors, mist, or gas. Use only with adequate ventilation or respiratory protection. Keep away from heat or sources of ignition. Prevent any build-up of electrostatic charge.

Conditions for safe storage: Keep container tightly closed in a cool, dry, and well-ventilated place away from incompatible materials and conditions. Avoid dust generation, moisture, and heat. Keep cool and protect from sunlight

Spill and Accident Procedure

Chemical Spill Dial 911 and x59797

Spill – Assess the extent of danger. Help contaminated or injured persons. 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) – 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) – Dial **911** (or 310-825-1491 from cell phone) and EH&S at x59797 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 x59797 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 x59797 immediately.*

Medical Emergency Dial 911 or x52111

Life Threatening Emergency, After Hours, Weekends And Holidays – Dial **911** (or 310-825-1491 from cell phone) or contact the Ronald Reagan UCLA Medical Center (emergency room) directly at **x52111** (located at 757 Westwood Plaza, enter from Gayley Avenue). *Note: All serious injuries must be reported to EH&S at **x59797** within 8 hours.*

Non-Life Threatening Emergency – Go to the Occupational Health Facility (OHF), **x56771,** CHS room 67-120 (This is on the 6th floor, 7th corridor, room 120. Enter through the School of Dentistry on Tiverton Drive and proceed to the "O" elevator to the 6th floor.)Hours: M - F, 7:30 a.m. to 4:30 p.m. At all other times report to Ronald Regan UCLA Medical Center (emergency room) at **x52111**. *Note: All serious injuries must be reported to EH&S at x59797 within 8 hours.*

Needle stick/puncture exposure (as applicable to chemical handling procedure) – Wash the affected area with antiseptic soap and warm water for 15 minutes. For mucous membrane exposure, flush the affected area for 15 minutes using an eyewash station. Page the needle stick nurse by dialing **231** from a campus phone, enter **93333** when prompted and then enter your extension. Hours: M – F, 8:00 a.m. to 4:00 p.m. At all other times report to Ronald Regan UCLA Medical Center (emergency room) at **x52111**. *Note: All needle stick/puncture exposures must be reported to EH&S at x59797 within 8 hours.*

Decontamination/Waste Disposal Procedure

Using proper personal protective equipment as outlined above, decontaminate equipment and bench tops using soap and water and properly dispose of all chemical and contaminated disposables as hazardous waste following the guidelines below.

General hazardous waste disposal guidelines:

Label Waste

- Affix an on-line hazardous waste tag on all waste containers using the Online Tag Program http://otp.ucop.edu/ 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 http://map.ais.ucla.edu/go/1002774
- 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 at x61887 for questions
- Empty Containers
    - Dispose as hazardous waste if it once held extremely hazardous waste (irrespective of the container size) http://ehs.ucla.edu/Pub/ExtremelyHazardousWaste.pdf
    - Consult waste pick-up schedule http://ehs.ucla.edu/pub/HazWaste%20Pickup%20Schedule.pdf

  Prepare for transport to pick-up location
        - Check on-line waste tag
        - Write date of pick-up on the waste tag
        - Use secondary containment

Safety Data Sheet (SDS) Location

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

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

1. Never work alone, make sure there is another worker present who is also trained in the use of sodium cyanide.

2. Sodium cyanide is incompatible with acids, strong oxidizing agents, and carbon dioxide.

3. Eliminate incompatible materials from potential spill area.

4. No acid should be used in the reaction or the workup.

5. Collect sodium cyanide waste in labeled plastic containers and never mix it with other acidic waste solutions.

6. Before the reaction, you should prepare a container with the mixture of aq. $NaHCO_3$ and aq. $FeSO_4$.

7. During the reaction, all the contamination waste including gloves, pipette tips, paper towels should be disposed into this solution.

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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 Sodium cyanide, 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:

Name	Signature	Date
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