

Standard Operating Procedure

Zinc powder

This SOP is not complete until it 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 & Biochemistry – Chemical Engineering
Date SOP was written:	December 14, 2012
Date SOP was approved by PI/lab supervisor:	January 18, 2013
Principal Investigator:	Prof. Susannah Scott
Internal Lab Safety Coordinator/Lab Manager:	Stephanie Goubert-Renaudin
Lab Phone:	805-893-8941
Office Phone:	805-893-7403
Emergency Contact:	EH&S 24 hour line: 805-893-3194) (Name and Phone Number)
Location(s) covered by this SOP:	ESB 3324 and 3328 (Building/Room Number)

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

Purpose

Zinc powder is used as a reagent and/or catalyst in redox reactions and metal-catalyzed cross couplings. Exposure through inhalation or ingestion may have harmful effects. Skin contact may cause irritation. Additionally, exposure to zinc powder can be irritating to the eyes, skin and respiratory tract.

Physical & Chemical Properties/Definition of Chemical Group

CAS#: 7440-66-6

Class: Potentially explosive compound, Dangerous to the Environment

Molecular Formula: Zn

Form (physical state): solid: mossy, granular and fine powder.

Color: grey

Melting point: 420 °C (788 °F) -

Potential Hazards/Toxicity

Potential Health Effects

Inhalation: May be harmful if inhaled. Causes respiratory tract irritation

Skin: May be harmful if in contact with skin. Causes skin irritation.

Eyes: May cause eye irritation.

Ingestion: May be harmful if swallowed.

Personal Protective Equipment (PPE)

Respiratory Protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

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.

Hand Protection

| As a general practice when working in the laboratory, use gloves.

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

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

Safety goggles or glasses.

Skin and Body Protection

Fire/flammable resistant lab coat (100% cotton based), cotton based clothing/attire, full length pants or equivalent, closed toe shoes.

Hygiene Measures

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

Engineering Controls

All operations involving zinc should be carried out in a certified chemical fume hood in case of finely powdered material (certified once every year by EH&S).

First Aid Procedures

If inhaled

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

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

General advice:

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

Special Handling and Storage Requirements

Precautions for safe handling

Avoid dust formation or breathing vapors in case of mossy and granular zinc. Do not allow product to enter drains.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Spill and Accident Procedure

Chemical Spill Dial 9-911 and EH&S (805-893-3194)

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 **9-911** from campus phones (and 805-893-3446 from a cell phone) and EH&S (805-893-3194) 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 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 immediately.*

Medical Emergency Dial **9-911**

Life Threatening Emergency, After Hours, Weekends and Holidays – Dial **9-911** (or 805-893-3446 from a cell phone) or go to the Emergency Room of Goleta Valley Cottage Hospital at 351 South Patterson Avenue, Goleta (Phone number: 805-967-3411) *Note: All Serious injuries must be reported to EH&S within 8 hours.*

Non-Life Threatening Emergency – Go to the Student Health Building, Building 588 (phone number: 893-5361, hours: M, T, R, F 8am-4.30pm, W 9am - 4.30pm, R 5pm to 7pm by appointment). After hours go to the Emergency Room of Goleta Valley Cottage Hospital at 351 South Patterson Avenue, Goleta (Phone number: 805-967-3411) *Note: All serious injuries must be reported to EH&S 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 \ and then enter your extension. After hours go to the nearest emergency room: the Emergency Room of Goleta Valley Cottage Hospital at 351 South Patterson Avenue, Goleta (Phone number: 805-967-3411). *Note: All needle stick/puncture exposures must be reported to EH&S within 8 hours.*

Decontamination/Waste Disposal Procedure

Wearing proper PPE, sweep up or shovel spills avoiding dust formation. Dispose of the used 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 as soon as the first amount of waste is added to the container

Store Waste

- Store hazardous waste in closed containers
- 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
- Empty Containers
 - Dispose as hazardous waste if it once held extremely hazardous waste

- Consult waste pick-up schedule
- 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

SDS can be accessed online: <http://ehs.ucsb.edu/units/labsfty/labrsc/chemistry/lschemmsdsacc.htm>

Protocol/Procedure

Please see attached SOP “Procedures for Safe Use of Pyrophoric Solids”
(online link: http://web.chem.ucsb.edu/~moretto/SOP_Pyrophoric.pdf)

Prior to starting the reaction, locate the extinguisher, eyewash and safety shower.

In the laboratory, Zinc powder is employed in organic and organometallic synthesis.

Zinc powder must be handled with nitrile gloves, safety goggles and lab coat. It has to be used within the fume hood to limit inhalation and on an uncluttered space.

The accidental contact with acid must be avoided. It reacts with acidic solution evolving gaseous hydrogen. In this case, the reaction must be carried out in an open system under the ventilated fume hood.

Zinc powder residues can be dissolved with a diluted solution of acid, the solution can then be discarded in the appropriate acidic waste container, clearly labeled and kept closed all the times.

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 zinc, designated personnel, i.e. approved users listed below, 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 as required by EH&S.

I have read and understand the content, requirements and responsibilities of this SOP:

Name	Signature	Trainer	Date
Prof. Susannah Scott			
Stephanie Goubert-Renaudin			
Gary Kwanyi Ng			
Alessandro Gallo			
Anthony Crisci			
Haibo Yu			
Taeho Hwang			
Bethany Wigington			
Daniel Coller			
Zachary Jones			
Youhong Wang			
Jinghong Zhou			
Jason Fendi			

