UC | Center for Laboratory Safety

# Standard Operating Procedure

# Carbon (powder and activated)

*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)<br>*(Name and Phone Number)* |
| **Location(s) covered by this SOP:** | ESB 3324 and 3328.<br>*(Building/Room Number)* |

**Type of SOP:** ☐ Process ■ Hazardous Chemical ☐ Hazardous Class

## Purpose

Carbon powder and activated carbon are carcinogens. Hence, it is important to follow safety protocols to handle this chemical.

**Uses:** Gas absorption, catalyst support.

## Physical & Chemical Properties/Definition of Chemical Group

**IUPAC Name:** carbon
**CAS number**: Carbon Black: 1333-86-4

**Appearance**

Form: solid
Color: black

**Safety data**

pH: No data available
Melting point/freezing point - Melting point/range: No data available
Boiling point: No data available.
Flash point: Not applicable
Ignition temperature: No data available
Auto-ignition temperature: No data available
Lower explosion limit: No data available
Upper explosion limit: No data available
Vapor pressure ~0 hPa (~0 mmHg) at 20.0 °C (68.0 °F)
Density: 0.4-0.7 g/cm3 at 25 °C (77 °F)
Water solubility: Not soluble
Relative vapor density: No data available
Odor: None
Odor Threshold none
Evaporation rate: No data available

## Potential Hazards/Toxicity

**Emergency Overview**

**OSHA Hazards**
Not OSHA regulated

**Target Organs**

**Other hazards which do not result in classification**

**GHS Classification**

Eye irritation (Category 2B)
Respiratory irritation (Category 3)

**GHS Label elements, including precautionary statements**

Pictogram

**Signal word**: Warning

Hazard statement(s)

Contact may cause eye irritation. Dust may be slightly irritating to eyes and respiratory tract.
Precautionary statement(s)

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/spray
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If inhaled, remove to fresh air.
Use in a well-ventilated area

**HMIS Classification**

**NFPA Rating**

**Health hazard**: 0
**Fire**: 1
**Reactivity Hazard**: 0

**Potential Health Effects**

**Inhalation** Dust may cause respiratory tract irritation.
**Skin** Dust may cause mild skin irritation.
**Eyes** Dust may cause mild eye irritation.
**Ingestion** Dust may cause mild irritation, resulting in nausea or diarrhea.

**Signs and Symptoms of Exposure**

- Dust may cause irritation or redness of eyes, or the respiratory system

## Personal Protective Equipment (PPE)

**Respiratory protection**
General guidelines: Respirators should be used only under any 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 in the laboratory, handle with ***Nitrile*** or ***Supported PolyVinyl Alcohol*** *(PVA).*
http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf
Wash and dry hands.

**Eye protection**
Safety goggles.
**Skin and body protection**

- ✓ Lab coat

**Hygiene measures**
Avoid contact with skin, eyes and clothing.
Wash hands before breaks and immediately after handling activated carbon.

## Engineering Controls

- ✓ All operations involving activated carbon must be carried out in a certified chemical fume hood (certified once every year by EH&S).
- ✓ Chemical fume hoods used as containment areas for Particularly Hazardous Substances (Select Carcinogens, Regulated Carcinogens, Reproductive Toxins and Acute Toxins) must have a face velocity of 100 ft/min averaged over the face of the fume hood.
- ✓ Laboratory rooms must be at negative pressure with respect to the corridors and external environment. To achieve this, the laboratory/room door must be kept closed at all times.

## 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**
Wash off with soap and plenty of water. Take victim immediately to hospital. 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.

## Special Handling and Storage Requirements

**Precautions for safe handling**
Avoid contact with skin and eyes. Avoid inhalation of dust.
**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

**Personal precautions**
- Wear respiratory protection.
- Avoid breathing dust.
- 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.

**Methods and materials for containment and cleaning up**
- Soak up with inert absorbent material and dispose of as hazardous waste.
- Keep in suitable, closed containers for disposal.

## 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

- Label Waste
  - Affix an on-line 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
  - 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 (irrespective of the container size)
  - 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
  - Wear eye protection & closed toe shoes; bring gloves

## Material Safety Data Sheet (MSDS) Location

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

## Protocol/Procedure

In the laboratory, carbon powder is mainly used as a support in the synthesis of metallic nanoparticles and for purification of reagents.

Carbon powder has to be handled while wearing a lab coat, safety goggles and nitrile gloves.

Due to the irritation caused by its dust and its carcinogenic properties, carbon powder is preferably handled within a fume-hood or a glove box. Carbon powder has to be kept in sealed containers when stored and in capped/closed vials when transferred.
The vials, containers or reaction vessel have to be labeled with their contents.

Carbon powder has to be discarded in the powder waste containers, kept sealed at all time.

**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 carbon (powder and activated), 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 activated carbon MSDS 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 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 | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |