# CHEMICAL HYGIENE PLAN (CHP)

## LAB SPECIFIC INFORMATION & STANDARD OPERATING PROCEDURES (SOPs)

**FOR**

# THE SPECTROSCOPY FACILITY

**(CNSI Rooms 1414, 1403, 1407 & MRL Room 1050)**

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# Introduction

12/4/2013

This is the Chemical Hygiene Plan (CHP) for the Materials Research Laboratory (MRL) Spectroscopy Facility. All labs using chemicals are required by Cal-OSHA to have a written safety plan (CHP) in place for chemical workers. This document contains important lab specific safety information and standard operating procedures (SOPs) for procedures done in the lab.
If you do not understand part of the content or have chemical safety questions contact:

| | | |
|---|---|---|
| Jerry Hu | x 7914 | jghu@mrl.ucsb.edu |
| Or | | |
| Jaya Nolt | x 4997 | jaya@mrl.ucsb.edu |
| Or | | |
| Shamon Walker | x 6079 | shamonwalker@mrl.ucsb.edu |
| Or | | |
| UCSB EH & S | x 4899 | http://ehs.ucsb.edu |

# General Information

8/28/14

Welcome to the MRL Spectroscopy Facility. Everyone working here has to act in a professional, safe, and environmentally responsible fashion. The Spectroscopy facility is a very busy facility with many people from many backgrounds working here. Any substances brought into the lab should be labeled with the contents, and the userôs name. Everyone needs to put their samples and supplies away after working in the lab so that there is a clear work area for the next person.

The Spectroscopy labs are in general less hazardous then other labs as we are not a chemistry facility. Samples are generally prepared in the userôs own lab. The equipment is safe as long as general guidelines are followed.

# Emergency Contacts

8/28/14

**In case of an immediate emergency:**

**9-911 from campus phone**

**(805) 893-3446 from cell phones**

Also refer to the Emergency Blue Flip Chart located by the lab door.

Jerry Hu ï Facility Technical Director x 7914

Amanda Strom ï Dept. Hazard Communication Coordinator x 7925

Jaya Nolt - Lab Tech x 4997

Shamon Walker ï NMR Specialist x 6079

Joni Schwartz ï Assistant Director x 8519

EH&S 24-hotline x 3194

Student Health Services x 3371

# Earthquake & Fire Safety

10/23/09

## Earthquake

During an earthquake, you should try to stand in a doorframe until all shaking has stopped and only then evacuate the building. Another option is to seek shelter under a desk.

## Fire

If a fire alarm goes off you must leave the building. **Do not use the elevators.** If you are in the MRL buildings proceed to the nearest exit and go to the Emergency Assembly Point at the SW corner of Engineering II. If you are in the CNSI building go to the nearest exit and proceed to the grassy area south of the building to the left of Kohn Hall.

For reporting a fire, fire alarm pull stations are located on the walls of the main hallways. Per SB County Fire and UCSB campus policy, all fires must be reported to 9-911 immediately even if the fire is out. If a fire extinguisher is used it must be reported as it will need to be replaced.

# Materials Research Laboratory
# University of California at Santa Barbara
# Spectroscopy Department
# Chemical Hygiene Plan
# NMR and EPR Laboratory

Form Version 8/6/98

## 1. General Laboratory Information

**Laboratory Name** NMR and EPR Laboratory

**Date(s) this information written or updated** Oct. 14, 2009

**Facility Director** Dr. Song-I Han

Department: Materials Research Laboratory

Office Phone Number: 893-4858

Office Location (Building & Room Number): Chemistry (PSBN) 3223

E-Mail address: songi@chem.ucsb.edu

**Other Faculty Supervising Work in Lab**

| Name | Home Department | Campus Phone Number |
|---|---|---|
| Galen Stucky | Chemistry | x4872 |
| | | |
| | | |
| | | |

**Facility Technical Director Working in Lab** Dr. Jerry Hu

Department: Materials Research Laboratory

Office Phone Number: x7914

Office Location (Building & Room Number): CNSI, Room 1524

E-Mail address jghu@mrl.ucsb.edu

**Laboratory Location(s):**

Building: CNSI Bldg. 266

Room Numbers: 1414

**Department Information:**

Dept. Hazard Communication Coordinator: Amanda Strom, 893-7925, Rm 2066F

Location of Department ñSafety Cornerò: MRL Room 2042

## 2. Emergency Information

### A. Emergency Notifications

(who should be notified in the event of an emergency in this laboratory, such as PI, Lab Development Engineer, etc.)

Facility Technical Director ï Jerry Hu x7914

### B. Evacuation Procedures

(e.g., close door, turn off power, etc.)

Leave by door to interior hallway, turn right heading to exterior doors and south to the area next to Kohn Hall.

### C. First-aid kit:

(location, contents, maintenance responsibility, etc.)

NMR Room 1414 ï West wall by the sink, and Building Kits-south end of each floor

### D. Chemical, biological, or radiological spill cleanup materials:

(location, contents, maintenance responsibility, procedures for use, etc.)

Not applicable

**E. Laboratory monitors or alarms:**
(operation of, response procedures, maintenance responsibility, etc.)

Not applicable

**3. Health & Safety References**
(all lab supervisors must complete)

Laboratories are encouraged to maintain their own files of Material Safety Data Sheets (MSDS) for the chemicals in use or storage. MSDS access is also available through the EH&S Internet home page:

**http://ucsbuxa.ucsb.edu/EHandS**

**Please list here the title and location of any health and safety reference materials associated with the laboratory which employees may use to aid them in their work.**

| | **Reference** | **Location** |
|---|---|---|
| **1.** | **Laboratory Safety Program/Chemical Hygiene Plan** | **NMR Room 1414** |

A bibliography of health and safety references references and many others are available for use at Environmental Health and Safety (x4899). Some recommended general laboratory safety references include the following.

- *Prudent Practices in the Laboratory, Handling and Disposal of Chemicals,* National Research Council, National Academy Press, 1995.
- *CRC Handbook of Laboratory Safety,* 4th ed., 1995.
- *Biosafety in Microbiological and Biomedical Laboratories*, Centers for Disease Control, U.S. Public Health Services, 3rd ed., May 1993.
- *Safety in Academic Chemistry Laboratories*, American Chemical Society, 6th ed., 1995.

# Materials Research Laboratory
# University of California at Santa Barbara
# Spectroscopy Department
# Chemical Hygiene Plan
# NMR and MRI Laboratory

Form Version 8/6/98

## 1. General Laboratory Information

**Laboratory Name** NMR and MRI Laboratory

**Date(s) this information written or updated** December 4, 2013

**Facility Director** Dr. Song-I Han

Department: Materials Research Laboratory

Office Phone Number: 893-4858

Office Location (Building & Room Number): Chemistry (PSBN) 3223

E-Mail address: songi@chem.ucsb.edu

**Other Faculty Supervising Work in Lab**

| Name | Home Department | Campus Phone Number |
|---|---|---|
| Brad Chmelka | Chemical Engineering | x3673 |
| | | |
| | | |
| | | |

**Facility Technical Director Working in Lab** Dr. Jerry Hu

Department: Materials Research Laboratory

Office Phone Number: x7914

Office Location (Building & Room Number): CNSI, Room 1524

E-Mail address jghu@mrl.ucsb.edu

**Laboratory Location(s):**

Building: CNSI Bldg. 266

Room Numbers: 1407

**Department Information:**

Dept. Hazard Communication Coordinator: Amanda Strom, 893-7925, Rm 2066F

Location of Department ñSafety Cornerò: MRL Room 2042

## 2. Emergency Information

### A. Emergency Notifications

(who should be notified in the event of an emergency in this laboratory, such as PI, Lab Development Engineer, etc.)

Facility Technical Director ï Jerry Hu x7914

### B. Evacuation Procedures

(e.g., close door, turn off power, etc.)

Leave by door to interior hallway, turn left heading to exterior doors and south to the area next to Kohn Hall.

### C. First-aid kit:

(location, contents, maintenance responsibility, etc.)

NMR Room 1414 ï West wall by the sink, and Building Kits-south end of each floor

### D. Chemical, biological, or radiological spill cleanup materials:

(location, contents, maintenance responsibility, procedures for use, etc.)

Not applicable

**E. Laboratory monitors or alarms:**
(operation of, response procedures, maintenance responsibility, etc.)

Not applicable

**3. Health & Safety References**
(all lab supervisors must complete)

Laboratories are encouraged to maintain their own files of Material Safety Data Sheets (MSDS) for the chemicals in use or storage. MSDS access is also available through the EH&S Internet home page:

**http://ucsbuxa.ucsb.edu/EHandS**

**Please list here the title and location of any health and safety reference materials associated with the laboratory which employees may use to aid them in their work.**

| | **Reference** | **Location** |
|---|---|---|
| **1.** | **Laboratory Safety Program/Chemical Hygiene Plan** | **NMR Room 1414** |

A bibliography of health and safety references references and many others are available for use at Environmental Health and Safety (x4899). Some recommended general laboratory safety references include the following.

- *Prudent Practices in the Laboratory, Handling and Disposal of Chemicals,* National Research Council, National Academy Press, 1995.
- *CRC Handbook of Laboratory Safety,* 4th ed., 1995.
- *Biosafety in Microbiological and Biomedical Laboratories*, Centers for Disease Control, U.S. Public Health Services, 3rd ed., May 1993.
- *Safety in Academic Chemistry Laboratories*, American Chemical Society, 6th ed., 1995.

# Materials Research Laboratory
# University of California at Santa Barbara
# Spectroscopy Department
# Chemical Hygiene Plan
# IR/Raman and QCM Laboratory

Form Version 8/6/98

## 1. General Laboratory Information

**Laboratory Name** IR/Raman & QCM Laboratory

**Date(s) this information written or updated** Sept. 26, 2012

**Facility Director** Dr. Song-I Han

Department: Materials Research Laboratory

Office Phone Number: 893-4858

Office Location (Building & Room Number): Chemistry (PSBN) 3223

E-Mail address: songi@chem.ucsb.edu

**Other Faculty Supervising Work in Lab**

| **Name** | **Home Department** | **Campus Phone Number** |
|---|---|---|
| Galen Stucky | Chemistry | x4872 |

**Facility Technical Director Working in Lab** Dr. Jerry Hu

Department: Materials Research Laboratory

Office Phone Number: x7914

Office Location (Building & Room Number): CNSI, Room 1524

E-Mail address jghu@mrl.ucsb.edu

**Laboratory Location(s):**

Building: CNSI, Bldg. 266

Room Numbers: 1403

**Department Information:**

Dept. Hazard Communication Coordinator: Amanda Strom, 893-7925, Rm 2066F

Location of Building ñSafety Cornerò: MRL Room 2042

**2. Emergency Information**

(all lab supervisors must complete)

Please provide information regarding emergency procedures and equipment specific to the lab(s) under your control for all applicable sections below.

**A. Emergency Notifications**

(who should be notified in the event of an emergency in this laboratory, such as PI, Lab Development Engineer, etc.)

Facility Technical Director- Jerry Hu x7914

**B. Evacuation Procedures**

(e.g., close door, turn off power, etc.)

Leave by door to interior hallway, turn left heading to exterior doors and south to the area next to Kohn Hall. Turn off lights as you leave.

**C. First-aid kit:**

(location, contents, maintenance responsibility, etc.)

NMR Room 1414 ï West wall by the sink, and Building Kits-south end of each floor

**D. Chemical, biological, or radiological spill cleanup materials:**

(location, contents, maintenance responsibility, procedures for use, etc.)

Not applicable

**E. Laboratory monitors or alarms:**

(operation of, response procedures, maintenance responsibility, etc.)

Not applicable

**3. Health & Safety References**

(all lab supervisors must complete)

Laboratories are encouraged to maintain their own files of Material Safety Data Sheets (MSDS) for the chemicals in use or storage. MSDS access is also available through the EH&S Internet home page:

**http://ucsbuxa.ucsb.edu/EHandS**

**Please list here the title and location of any health and safety reference materials associated with the laboratory which employees may use to aid them in their work.**

| | Reference | Location |
|---|---|---|
| 1. | **Laboratory Safety Program/Chemical Hygiene Plan** | **NMR Room 1414** |

A bibliography of health and safety references and many others are available for use at Environmental Health and Safety (x4899). Some recommended general laboratory safety references include the following.

- *Prudent Practices in the Laboratory, Handling and Disposal of Chemicals,* National Research Council, National Academy Press, 1995.
- *CRC Handbook of Laboratory Safety,* 4th ed., 1995.
- *Biosafety in Microbiological and Biomedical Laboratories*, Centers for Disease Control, U.S. Public Health Services, 3rd ed., May 1993.
- *Safety in Academic Chemistry Laboratories*, American Chemical Society, 6th ed., 1995.

# Materials Research Laboratory
# University of California at Santa Barbara
# Spectroscopy Department
# Chemical Hygiene Plan
# Lab Specific Information

Form Version 8/6/98

**1. General Laboratory Information**

**Laboratory Name** Fluorimeter

**Date(s) this information written or updated** Oct. 14,2009, April 22, 2013

**Facility Director** Dr. Song-I Han

Department: Materials Research Laboratory

Office Phone Number: 805-893-4858 ( from campus phone 4858)

Office Location (Building & Room Number): Chemistry (PSBN) 3223

E-Mail address: songi@chem.ucsb.edu

**Other Faculty Supervising Work in Lab**

| **Name** | **Home Department** | **Campus Phone Number** |
|---|---|---|
| Dr. Kevin Plaxco | Chemistry & Biochemistry | 5558 |

**Technical Director Working in Lab** Dr. Jerry Hu

Department: Materials Research Laboratory

Office Phone Number: 805-893-7914 (from campus phone 7914)

Office Location (Building & Room Number): CNSI, Room 1524

E-Mail address jghu@mrl.ucsb.edu

**Laboratory Location(s):**

Building: MRL, Bldg. 615

Room Numbers: 1050

**Department Information:**

Dept. Hazard Communication Coordinator: Amanda Strom, 805-893-7925 (from campus phone 7925), Rm 2066F

Location of Building ñSafety Cornerò: MRL Room 2042

**2. Emergency Information**

(all lab supervisors must complete)

Please provide information regarding emergency procedures and equipment specific to the lab(s) under your control for all applicable sections below.

**A. Emergency Notifications**

(who should be notified in the event of an emergency in this laboratory, such as PI, Lab Development Engineer, ect.)

Facility Technical Director - Jerry Hu 805-893-7914 (from campus phone 7914)

**B. Evacuation Procedures**

(e.g., close door, turn off power, etc.)

Leave by door to interior hallway of MRL exit the building on the north side. Turn off lights as you leave.

**C. First-aid kit:**

(location, contents, maintenance responsibility, etc.)

Room 1050 to the right of the lab door.

**D. Chemical, biological, or radiological spill cleanup materials:**

(location, contents, maintenance responsibility, procedures for use, etc.)

Fluorimeter users in general should not be dealing toxic spills. However since the Fluorimeter is in a shared lab space it is important to know what to do in case there is a spill.

If there is a large, seriously toxic, or highly flammable spill, evacuate the area, alert neighbors, and call 9-911 immediately. Do not try to clean up any spill that presents an immediate fire hazard or where exposure to fumes would result in physical injury. Then notify the labôs Facility Technical Director.

For small spills use the chemical spill kit located in room 1050 using all appropriate personal protective equipment.

**E. Laboratory monitors or alarms:**

(operation of, response procedures, maintenance responsibility, etc.)

Not applicable

**F. Other:**

Room 1050 is a shared lab area. Although the Fluorimeter lab use does not have chemical hazards the surrounding lab area does. Users need to be aware of their surroundings and not interfere with lab space outside of the Fluorimeter.

**3. Health & Safety References**

(all lab supervisors must complete)

Laboratories are encouraged to maintain their own files of Material Safety Data Sheets (MSDS) for the chemicals in use or storage. MSDS access is also available through the EH&S Internet home page:

**http://ucsbuxa.ucsb.edu/EHandS**

EH&S also maintains the central paper files of MSDS for the campus and will provide copies on request to campus workers (See *Appendix J )*.

**Please list here the title and location of any health and safety reference materials associated with the laboratory which employees may use to aid them in their work.**

| | **Reference** | **Location** |
|---|---|---|
| **1.** | **Laboratory Safety Program/Chemical Hygiene Plan** | **CNSI Bldg. 266 NMR Room 1414** |

A bibliography of health and safety references is given in Appendix R for those interested in acquiring lab safety references. These references and many others are available for use at Environmental Health and Safety (x4899). Some recommended general laboratory safety references include the following.

- *Prudent Practices in the Laboratory, Handling and Disposal of Chemicals,* National Research Council, National Academy Press, 1995.
- *CRC Handbook of Laboratory Safety,* 4th ed., 1995.
- *Biosafety in Microbiological and Biomedical Laboratories*, Centers for Disease Control, U.S. Public Health Services, 3rd ed., May 1993.
- *Safety in Academic Chemistry Laboratories*, American Chemical Society, 6th ed., 1995.

# Materials Research Laboratory
# University of California at Santa Barbara
# Spectroscopy Department
# Standard Operating Procedures (SOP)
# For Highly Hazardous Lab Operations

Form Version 8/6/98

**Facility Director** : Dr. Song-I Han

Department: Materials Research Laboratory

Office Phone Number: 893-4858

Office Location (Building & Room Number): Chemistry (PSBN) 3223

E-Mail address: songi@chem.ucsb.edu

**Faculty supervising work in lab:** Dr. Craig Hawker

Department: Materials Research

Office Phone Number : x7161

**Facility Technical Director Working in Lab** Dr. Jerry Hu

Department: Materials Research Laboratory

Office Phone Number: x7914

Office Location (Building & Room Number): CNSI, Room 1524

E-Mail address jghu@mrl.ucsb.edu

**Date of last revision to SOP:** Oct. 14, 2009

**Lab Location(s) covered by this SOP:** **CNSI Building 266, Room** 1407 and 1414

**Process "Name" :** NMR and MRI Laboratory

**1. Laboratory Process or Equipment Description (brief)**

High field NMR and MRI spectrometers. These spectrometers produce magnetic fields with strengths of 4 to 11T

**2. Approval Required**

All personnel entering the laboratory for the first time must inform the facility manager. The facility manager then must inform the person of the inherent dangers of working around large magnetic fields.

All maintenance personnel must contact the facility manager every time before beginning any work in this room. The facility manager then must examine the procedure for possible safety problems near the magnets.

**3. Describe the training, operation, and maintenance aspects of this process.**

Personnel working in the laboratory on a regular basis will attend a brief safety lecture by the facility manager. The facility manager will then explain the possible dangers of working near large magnetic fields.

Maintenance personal must also attend the brief safety lecture. In addition, any maintenance procedure to be performed in this lab must be approved by the facility manager.

**4. Hazardous Chemicals/Class of Hazardous Chemicals**

**Chemical Name** **none** **Hazardous Property(ies)** **none**

**5. Personal Protective Equipment**

Safety Glasses are required in all MRL labs

**6. Engineering/Ventilation Controls**

None

**7. Special Handling Procedures and Storage Requirements**

.

None.

**8. Spill and Accident Procedures**

N/A

**9. Waste Disposal**

N/A

**10. Decontamination**

N/A

**12. Cryogenics**

This applies to people doing Variable Temperature experiments using MRL equipment that are handling cryogenics and transferring liquid nitrogen from a large dewar.

Primary Safety Issues

Burns
Direct skin contact causes severe frost bite and prolonged exposure may cause permanent injury. Do not bring your finger-tips into close proximity with cryogenics. Safety glasses and gloves are required whenever handling or transporting cryogenics. Wear clothing that covers your body, close toed shoes, long pants, long sleeves and/or a lab coat.

If liquid nitrogen or helium contacts skin or eyes, frozen tissues should be flooded or soaked with tepid water (only about 105-115 F / 41-46 C) -- DO NOT USE HOT WATER. Cryogenic burns that result in blistering or deep tissue freezing should be seen promptly by a physician. Liquid helium is colder then nitrogen and can cause more serious burns. **Contact 9-911 if a serious burn occurs.**

Asphyxiation
One liter of liquid nitrogen produces ~700 volumes of nitrogen gas. If liquid nitrogen is not stored in a well ventilated area, the concentration of nitrogen gas may build up to the point where it displaces oxygen in the room air and may cause asphyxiation. Even small spills can be severe in a confined space. In the event of a large spill evacuate the area immediately.

Oxygen Condensation
Cold traps or open-mouth dewars containing liquid nitrogen can condense oxygen in the surrounding air. Such oxygen enrichment may result in increased flammability and explosion hazards. The nitrogen container must be handled as if it contained liquid oxygen. No sparks or flames should be allowed in or near the area.

Handling
The lids of liquid nitrogen containers should be loose fitting to allow nitrogen gas to escape, rather than allowing the build-up of pressure within the storage vessel. NEVER place cryogenics in a sealed or glass container.
Carry liquid nitrogen in a suitable thermally insulated container. Use a container with a small surface area for the liquid nitrogen ï this will minimize the likelihood of spillage should the container be bumped whilst being carried. Although small foam eskies are often used as a cheap vessel for carrying liquid nitrogen within buildings, bumps are likely to cause spills, particularly if the volume carried is in the liter range.

There is a lot of energy in the pressurized liquid nitrogen and much more energy when the liquid evaporates. This energy can cause splashing and strange unexpected things to happen.

Procedure to Transfer into un-pressurized (open) dewar

Only dispense liquid $N_2$ into approved containers, NO GLASS!
Place the transfer line into your dewar and then open (not all the way) the *Liquid Valve* on the tank.
Fill slowly to minimize loss and sudden splashing.

## 11. Other Information

The large magnet fields in the NMR and MRI laboratory can move metallic objects and propel them across the room. Large metallic objects must be kept outside the 5 gauss line which is indicated in the lab and will be described in the safety talk. Small metallic objects, like screwdrivers, can also be propelled across the room and must be used with extreme care. Personal items like cell phones, keys, credit cards, metal watches and jewelry should be kept away from the magnets.

Persons with pacemakers should never enter the room as their pacemakers could fail.