

MATERIALS PROCESSING LABORATORIES

GENERAL POLICIES & PROCEDURES

1. GENERAL SAFETY

Safety is of primary concern in the laboratory at all times.

- **EVERY RESEARCHERS RESPONSIBILITY**

The *UCSB Policy on Environmental Health & Safety* states “All employees are responsible for knowing the applicable safety regulations governing the activities they carry out and are accountable for complying with them.” The **Environmental Health and Safety (EH&S)** department on campus is a valuable resource for safety information. Please visit their website regularly to keep current on safety regulations and training opportunities.

- **UNSAFE PRACTICES**

Unsafe practices will not be tolerated. Please report any observation of dangerous activities to the Lab Director (Dr. Carlos Levi) or the **Development Engineer (DE)**.

- **DOCUMENTATION AND TESTING**

Prior to working in the Materials Processing Laboratories, all personnel must successfully complete the following:

1. Successfully complete the ***EH&S Laboratory Safety Course*** (or equivalent training, as evaluated and approved by the DE).
2. Read the ***MPL Policies and Procedures***
3. Fill out the ***MPL Lab User Agreement***. ~USER MUST SIGN~
4. Read the ***MPL Chemical Hygiene Plan (CHP)***. ~USER MUST SIGN~

- **USE COMMON SENSE**

Allow enough time to do the job properly. Wear proper protective clothing and eyewear. Use the right tool for the job. Clean you own messes. Check with knowledgeable personnel before proceeding if you have any doubt about proper procedure.

When in doubt, ASK !

2. HAZARDS

Be aware of the many hazards in the laboratory. Here are some of the most common in the MPL:

- **HIGH VOLTAGE**

Most of the equipment runs on potentially lethal power. Double-check entire work area before starting any equipment. All cables and hoses should be neatly coiled and out of the way. Electrical cords should be elevated wherever possible. Route temporary power cords away from traffic lanes whenever possible. Special care should be taken with induction power leads; they should neither contact nor be in close proximity to any metal object. Under NO circumstances should equipment be operated with water leaks or standing water nearby.

- **COMPRESSED GASES**

Compressed gas cylinders present a variety of hazards: explosion or rupture of the cylinder and associated plumbing, asphyxiation, poisoning, overpressure, etc. All cylinders must be stored and used upright, with adequate support (cylinder mounts must be securely anchored to wall or other permanent structure, and held with welded chain; table-top cylinder clamps are NOT ACCEPTABLE). Always replace valve cap before unchaining or moving cylinders. Work areas must be adequately ventilated to avoid asphyxiation. Empty cylinders should be immediately returned to the Materials Dept. gas cage in the Eng. II service yard.

- **CHEMICALS**

Chemicals can possess a variety of hazards – health, flammability, reactivity, and others. Use proper guidelines for chemical handling, segregation, storage, and disposal. Consult the necessary resources to determine the best handling procedures for each chemical you use.

- **PRESSURE / VACUUM ENVIRONMENTS**

Many processes operate under a pressure which is considerably higher or lower than atmospheric pressure. Be aware of the explosion/implosion hazards associated with such instruments.

- **MOVING MACHINERY**

Many processes are automated, with moving components such as pumps, motors, actuators, etc. Use caution near any active process.

3. GENERAL LABORATORY PROCEDURES

- **CLEANING YOUR MESS**

Clean your work area daily. Items left in the lab will be placed in the *Claim Box* and discarded regularly. If an item is of importance to you, then YOU take care of it. Adequate storage space is available for most items.

- **LEAVING EQUIPMENT IN GOOD CONDITION**

Fill out instrument logs. Report problems or breakages immediately. Return equipment and tools immediately after use. Do not relocate equipment without prior approval.

- **UNAUTHORIZED USE**

The MPL is a restricted facility. All users must be authorized prior to working in the laboratory. An approved user list can be found in the *Personnel* section of the MPL website. Report any unauthorized use to the Lab Director or DE immediately.

- **SECURING THE LAB**

The labs will normally be locked after 5 PM. If you are leaving after this time, it is your responsibility to determine if you are the last person in the lab. If so, you must secure the facility by:

1. Closing any open windows
2. Turning off all lights
3. Locking all doors – make certain doors are completely shut and latched

- **“BORROWING” ITEMS**

All items taken from the lab must be:

1. Pre-approved by the Lab Director or DE
2. Signed-out in the Logbook outside Rm. 1227A

Any item taken from the facility without approval will be considered theft.

- **CHEMICAL HANDLING / STORAGE / WASTE**

Investigate the properties and hazards of all chemicals prior to use. Refer to the ***Materials Safety Data Sheets (MSDS)*** and other available resources. All containers should be adequately labeled with contents and date. All work with concentrated acids/bases and other similarly hazardous materials must be done under a fume hood. NO use of concentrated hydrofluoric acid (HF) is permitted in the MPL; take such work to an approved HF work area. Minimize purchases of new materials by checking current inventory before ordering. Follow proper waste disposal procedures.

- **PERIODIC LAB DUTIES**

All regular lab users will be assigned periodic laboratory duties to help maintain smooth and efficient operation of the facility. Lab duty assignments and descriptions can be found in the *Personnel* section of the MPL website.

- **RECYCLING**

The MPL strives to recycle many materials – aluminum, glass, cardboard, paper, etc. Please follow guidelines on each bin for acceptable materials – do not contaminate bins.

- **PACKAGES**

Properly dispose of all packing materials from any order you may receive. The cardboard recycling container is on the east side of Eng II building. Packing peanuts are collected for reuse in the SW corner of 1227E (next to the DI water system).

4. LAB USER CLASSIFICATION

There are three classes of laboratory users: CORE, LIMITED, and PROBATIONAL.

- **CORE USER**

CORE USERS are those researchers who work in the facility on a regular basis, and have good understanding and experience with general lab operations.

REQUIREMENTS: Complete all requirements for LIMITED user. Demonstrate general knowledge of major equipment in the lab and associated hazards of said equipment. Participate in laboratory activities on a regular basis.

PRIVILEGES: Lab keys will be issued. Access is unrestricted, as long as all other lab policies are maintained. (Please note that unrestricted use DOES NOT mean that one can use any instrument without proper training and approval).

- **LIMITED USER**

LIMITED USERS are occasional lab users, typically only needing access to one or two instruments on a sporadic basis.

REQUIREMENTS: Complete all steps as specified in

Section 1: General Safety : Documentation and Testing.

PRIVILEGES: Access is granted during normal hours (approximately 8:30 - 5:30 M-F), with other hours by special arrangement. Keys may be assigned, or checked out from the DE on a daily basis, subject to individual approval.

- **PROBATIONAL USER**

PROBATIONAL USERS are new to the laboratory. This status is intended to be temporary, while the researcher completes steps required for LIMITED user status. This classification allows new users to immediately work within the facility, but only under the direct supervision of an experienced lab user. Supervisory personnel include all CORE users, or a specific LIMITED user who have been designated by the DE.

5. EQUIPMENT

- **PROCEDURES / TRAINING**

Equipment will be operated by trained users only. Each new user must be trained by an instructor authorized on that particular instrument. When in doubt of any operating procedure, it is your responsibility to determine the correct procedure by:

1. Consulting the operating manual and/or user's guide
 2. Consulting an authorized instructor or the DE
 3. Contacting the manufacturer
- **HIGH-POWER INSTRUMENTS**
Never operate high power equipment alone. A minimum of two researchers must be present in the facility to operate any high-power instrument or power supply. This includes all electron beam systems, all induction power supplies (*Lepel* 2.5KW, 20KW, 50KW; *Inductotherm* 30KW, 35KW); and the Arc Melter. After-hours use of high power equipment must have prior approval of the PI or the DE.
 - **EQUIPMENT LOGS**
Equipment Logs will be maintained for all major equipment. Each user must properly fill out the log before and during use of the instrument. All equipment failures or abnormal operations must also be noted in the log, and should be reported to the DE.
 - **SCHEDULING / MAINTENANCE**
Scheduling of equipment use and maintenance will be handled by the person(s) in charge of that equipment or the DE. Users may be required to perform routine maintenance on some equipment.
 - **MODIFICATIONS**
Any major modifications to an instrument must be pre-approved by the Lab Director or the DE.
 - **CLEAN-UP**
Leave equipment in good condition. Report any problems or damage immediately.

6. RESOURCE INFORMATION

The following resource information is subject to change. Always remember to ask the Dev. Engineer if you cannot find the information you need.

- **MPL SAFETY CORNER** located outside Dev. Engr Office – Room 1227B
Current version hardcopies of *Chemical Hygiene Plan (CHP)*, *MSDS Binders*, *MPL Policies* [this document], *Lab Safety Fact Sheets*, and more!
- **ENVIRONMENTAL HEALTH & SAFETY** www.ehs.ucsb.edu
(most pertinent topics are located under *Programs* then *Lab Safety & Chem Hygiene*)
- **MATERIALS DEPARTMENT WEBSITE** www.materials.ucsb.edu
- **MPL WEBSITE** www.materials.ucsb.edu/mpl
(also located under *Research Facilities* on *Materials Dept.* website)