Laboratory Safety & Standard Procedures

Updated March 12, 2025

Aerosol & Particulate Research Laboratory (APRL)
Department of Chemical, Environmental, & Materials Engineering
College of Engineering

Laboratory Safety and Standard Procedure
in the Aerosol & Particulate Research Laboratory

March 21, 2025 Chang-Yu Wu
Developed based on Dr. Helena Solo-Gabriele's Environmental Engineering Laboratory Safety & Standard Procedures

Training

- One-to-one training provided by the principal investigator (PI) or senior lab members conducting the research is required as the first set of experiments are planned.
- Additional training is available through the University of Miami Office of Environmental Health & Safety (EHS). They have periodic courses focusing on laboratory Safety / Hazardous Waste, Bloodborne Pathogens, Tuberculosis, Latex Allergy, and Biomedical Waste.

Access to the lab

- Anyone who intends to use the lab for research must inform the corresponding PI one week prior to use of the lab.
- The request for card access to the lab and Frost building needs to be sent by the corresponding PI to Troy Thomspon (t.thompson6@miami.edu).

Safety

- Dress Code
    - Open shoes, high heel shoes, short pants, and short skirts are prohibited during laboratory activities. Feet and legs are to be covered as most accidents occur when something drops to the floor, and the feet and leg areas are the most susceptible to splatter under these conditions.
    - Bracelets that "dangle" and long sleeves with loose ends are not recommended. Those with long hair are recommended to pull their hair back.
- Food & Drink
    - Food and beverages are prohibited in the lab.
    - One must take off your lab coat, lab apron, and gloves when in office areas or when leaving the laboratory.
- Personal Protection
    - Wearing gloves and either a lab coat or a lab apron is required when conducting experiments.
    - Reuse of gloves is not recommended, and the used gloves should not be left at the workstation.
    - Wear eye protection at all times when conducting experiments.
    - Use of a respirator for an individual must be authorized by the EHS.
- Material Handling
    - Reading the MSDS (Material Safety Data Sheet) or the label on the bottle of chemical to determine if the chemical is toxic is very important. Neglecting the instruction on the MSDS is strongly discouraged.
    - Handling chemicals under the hood, if the MSDS (or the label) shows that it is toxic for inhalation. All acid digestions are to be performed under the hood.

All volatile compounds are to be handled under the hood. This is important because the volatile compounds will trip the gas sensors in the lab which then issues an alarm for building evacuation. Please contact the lab technician if you judge that handling such toxic chemicals under the hood is not suitable, e.g. weighing chemical. You will need to obtain an appropriate respirator and take a lecture and a fitting test conducted by the EHS.

House Keeping

- Cleaning
    - Workstations and common areas are to be cleaned after each use.
    - Clean up a weigh scale every time after use with a damp paper towel and drying area.
    - Keeping your experimental materials/devices for long time (more than 1 day) in common areas, such as a sink, oven, desiccators, and refrigerator is not recommended.
- Storage
    - All bottles and containers containing any material must be labeled properly with contents and date. Chemicals are to be labeled with date opened.
    - All chemicals must be segregated properly in the storage area, e.g. organic, inorganic, acid, and solvent.
    - If you need to keep chemicals at your workstation for a long time, inform the PI/lab technician.
    - Provide the MSDS of new laboratory chemicals to the PI/lab technician.
    - The hood should not be used for storage of chemicals including wastes.

- Other
    - Securing gas cylinders is required.
    - Circulating areas must be free from obstructions.
    - Exits and fire extinguishers must be free from obstructions.
    - Putting a memo that shows your name, contact numbers, material, and brief explanation of your experiment, on your workstation when you run any instrument and experiment without your presence is strongly recommended.

Waste Disposal

- Broken glass and Used sharps (e.g., syringes):
    - Discard the broken glassware into the specific cardboard or plastic designated trash box. Cleaning up the floor or bench is the person's responsibility. Ask the PI/lab technician about the proper approach for cleaning glass to avoid getting cut.
- Microbiological waste:
    - Autoclaving or chlorination of the incubated plates must be performed prior to the disposal of biological waste. The biological waste needs to be placed in a red bag. To dispose, contact Brian Reding of EHS (305-582-7281) who will then arrange for a pickup to the red bag disposal facility.
    - Disposable pipettes are to be disposed of in a box, not in regular garbage. They can then be disposed of with regular trash.

- Pipette tips must be disposed of in a sharps container.

- Chemical waste:
  - Putting hazardous chemicals into a sink unless the concentration meets the discharge standard is **ILLEGAL**.
  - Diluting the waste in order to meet the standard is prohibited. "40CFR268.3 Dilution prohibited as a substitute for treatment". In short, dilution is against the law as a form of treatment of a hazardous material unless you have a permit from the EPA. It should be collected and disposed of through the EHS, if it does not meet the DERM (Division of Environmental Resources Management) discharge standard limits. Diluting it to achieve this is prohibited.
  - Evaporating hazardous chemicals under the hood is not appropriate.
  - Collecting waste in an empty bottle with label in waste accumulation satellite area is required by individuals. The label must show name of waste chemical, concentration, and supervisor's name or initial. Unknown waste costs more.
  - Do not make excess solution because disposing waste is not free. You are responsible for managing your waste.
  - When the bottle is full, you need to contact the lab technician or supervisor.

Accident

- Minor Accident
  - A small spill: Clean it up using a spill kit by yourself
  - Minor injury: First aid kit is available at the safety shower.
- Major Accident
  - Big spill or hazardous spill: e.g. if you break a thermometer as the result metallic mercury is spilled, contact the lab technician or EHS officer. You should not handle metallic mercury by yourself without wearing a certified respirator.
  - Exposure to chemicals on your face: Use safety shower or eyewash immediately and contact the lab technician.
  - Major injury: Contact the PI/lab technician, your supervisor, or dial 911.
  - Fire: Use a fire extinguisher or dial 911.

  Any accident should be reported to the lab technician.

Penalty

The EPA has undertaken a compliance initiative directed toward college and universities throughout the country. The result in every case has been a large fine assessed against the institution for various violations of the EPA regulations. Examples of the more severe regulatory action within the past 3 years include:

- University of Hxxxx: $1,700,000
- University of Mxxxx: $1,000,000
- University of Rxxxxx: $ 800,000
- Bxxxxx University: $753000
- University of Mxxxxx: $582,000

Individual who commits a violation might be responsible for up to $250,000 fine or one year in jail or both.

Contact

- Primary Investigator:

Name	Cell	Email
Chang-Yu Wu	(305) 284-5650	cxw964@miami.edu
Environmental Health and Safety	Office Phone: 305-243-3400 For emergencies: 911	

- Laboratory Technician:
    - EHS office: 305-243-3400, https://ehs.miami.edu/services/laboratory-safety/index.html
    - Hazardous Waste: Brian Reding
    - Fire Safety: Francisco Lopez
    - Employee Health: Sandra Chen
- Facility and Maintenance: Troy Thompson 305-248-4115, 786-505-9725 (cell)

Additional Resources

University or Miami Laboratory Safety Manual
https://ehs.miami.edu/services/laboratory-safety/laboratory-safety-manual/index.html