

10 May 2017

SAFETY PRECAUTIONS IN THE CHEMISTRY LABORATORY.

Safety:

1. Each student must attend the meeting for each course held at the beginning of every term. A full description of the safety equipment and safety procedures available will be given during this meeting.

2. Make yourself familiar with the operation and place of:

Emergency shower/ eyewash fountain

Fire extinguishers

- CO₂ (large nozzle)
- dry powder (small nozzle, pressure gauge at top)
- sand buckets

Fire blankets

Spill kits

Fire alarms

All exits

Electrical cut-offs

Gas cut-offs

Safety telephone

MSDS information

3. Emergency Shower/Eyewash Fountain

Pulling the rod assembly of the shower releases the water. Pushing the rod assembly up stops the flow of water. A person who has been badly splashed with corrosive liquid or a lot of solvent should be quickly doused under the shower. When necessary, remove clothing to avoid chemicals being in prolonged contact with the skin. More extensive washing can be done with a controlled temperature shower on the Elliott third floor.

The eyewash fountain is used when material has been splashed into the face or eyes. Thorough flushing of the eyes (a minimum of twenty minutes is recommended) is essential for even minor splashes. Call for your instructor immediately and don't worry about spilled water.

4. Fire Extinguishers

CO₂ Extinguisher (large black nozzle) - Pull the pin on the side of the handgrip, direct the nozzle at the base of the flames and squeeze the handgrip. This type of extinguisher is used for organic liquid fires and minor electrical fires. Do not use on sodium, potassium, or metal hydride fires, which should be covered in sand.

All Purpose (ABC) Dry Chemical (small nozzle and pressure gauge) - Again, pull the pin on the side of the handgrip, direct the nozzle at the base of the flames and squeeze the handgrip. This type is useful for all fires, except sodium, potassium, or metal hydride fires (use sand).

Dry chemical extinguishers are more efficient than CO₂ extinguishers. However, the dry powder presents a formidable clean up problem.

Sand Buckets - Located in most of the teaching labs and in the corridors. Use for fires involving active metals (e.g. sodium, potassium or lithium) or metal hydrides.

Report all uses of extinguishers, however minor, to a Senior Lab Instructor. The equipment will be recharged as a partially used extinguisher has the potential for creating a severe hazard for the next user.

5. Fire Blanket

Check the location of the nearest fire blanket, which is provided to smother flaming clothing on yourself or other students. Since speed is essential, use your lab coat or roll the victim on the floor if you have to go any distance for the blanket. The shower may also be used in this situation.

6. Spill Kits

In each teaching lab, there are small spill kits appropriate for soaking up any kind of liquid spill.

Bear in mind that the used absorbent may have to be treated before disposal, so seek advice before taking action. If necessary, store the waste in a fumehood, so that any fumes are suitably drafted away from the lab.

There are special spill kits for elemental mercury (such as from a broken thermometer or pressure gauge). It is very important that all traces of mercury are retrieved from a spill area as soon as possible. Mercury has a significant vapour pressure that will cause long term problems for those constantly working in that area.

7. Exits

If the fire alarm sounds, make your experiment safe. Pull out all plugs from the electrical sockets so that security personnel can quickly check that everything has been turned off. Stop all chemical additions including gaseous reagents but leave any cooling water and inert atmosphere gases running. Close any open windows (to cut down the oxygen supply), fumehood sashes (to prevent fumes travelling from room to room through the ducts) and leave the room, taking everyone with you. Shut the door(s) but do not lock them. Leave the building by the nearest exit. Never use the elevator in such a situation.

The assembly points are on the grass between Petch and the Elliott lecture wing (for those in the south end of the Elliott lab wing) and towards the fountain (for those in the north end of Elliott lab wing). It is helpful to the instructor if the class can stay together for checking attendance and further information.

If a fire starts in the laboratory that you are in:

Assess the situation.

- a) Is this a small fire that can be easily extinguished? If so, clear the immediate area of people and flammables and then reach for the fire extinguisher.
- b) If the fire is not small, or you have any doubt as to whether you can deal with the situation, clear the immediate area of people and sound the fire alarm located in the corridor. This will ensure that the building is evacuated. The fire department should also be called (911), but not until the fire alarm has been activated. Personal safety should be the priority in such an emergency.

In the event of an earthquake, duck, cover and hold on. When the shaking has stopped, evacuate the building as in the case of the fire alarm sounding. Watch for falling debris, both inside and outside of the building. Keep well away from any structures, trees and fallen power lines. Be prepared for aftershocks. Assemble your classmates in one group so that the instructor can verify who is absent. No one may enter the building unless an emergency coordinator has indicated that it is safe to do so.

8. Electrical Cut-Offs

In each laboratory, there are emergency shut-off switches. There may be more than one switch, so check to see if there are more than one set of circuits present. Make sure that all switches are off BEFORE touching a victim of electrocution.

9. Gas Cut-Offs

Each laboratory has a gas cut-off valve located by one of the main doors. Turning this off causes a slow response at an outlet because of the residual pressure in the pipe. It may be used to cut off the fuel source in an emergency, but a valve closer to the problem would be a better choice. Nevertheless, the main valve should be closed by the instructor in the event of an evacuation.

10. First Aid

Each laboratory has a small First Aid Kit. Report all injuries, no matter how minor, to your instructor, who will give First Aid and call for medical attention if warranted. Campus security (7599) will respond, but call 911 directly if appropriate.

11. Eating and drinking are forbidden in the laboratories.

12. Eye protection must be worn at all times. Prescription glasses, especially those with small lenses, do not provide adequate protection against splashes from either the side or the top of the glasses. A pair of safety eye wear that fits over the prescription glasses is required. Users of contact lenses should be aware that vapours will be absorbed by the lens and may lead to severe irritation and damage to the cornea if not dealt with promptly. In second (except Chem 213), third and fourth year courses, students are required to provide their own safety glasses.

13. The wearing of laboratory coats is now required as of September 2017.

Appropriate footwear is required. Sandals, slip-ons and shoes that leave skin exposed are not permitted in the laboratory as they do not provide sufficient protection against broken glass or chemical spills, or may prevent quick movements if needed in an emergency.

Disposable protective gloves are provided and should be used when necessary.

For safety reasons, personal music players may not be worn during undergraduate laboratory classes. This includes listening with a single ear piece, as it is essential that everyone be able to hear without distraction. Cell phones with an ear-piece also fall into this category.

14. Waste material in the laboratory must be sorted before disposal. Separate bins and containers are provided for

- (a) **Recyclable Paper**
- (b) **Landfill Waste**, includes non-recyclable paper and innocuous material suitable for landfill disposal. Powders such as washed and dried column packing must be bagged to prevent widespread dispersal.
- (c) **Glass Waste** must be clean for it to be placed in the white flip-top bins. If it is contaminated, it must be placed in an appropriate container for disposal through waste management.
- (d) **Glass and Plastic Recyclable Containers**. Must be cleaned and dried before recycling.
- (e) **Non-halogenated Organic Liquid** waste
- (f) **Halogenated Organic Liquid** waste
- (g) Other chemical waste should be collected and given to your instructor for appropriate disposal. Please see the more detailed notes under Chemical Waste Management.

The inappropriate disposal of chemicals may have a significant effect on our environment, both within the Department and around Victoria. It is important that there be strict adherence to the above guidelines.

15. All dangerous or odorous experiments must be done in a fumehood (more details given later in this section). Whenever an experiment is left unattended, it should be clearly labelled with either a self-adhesive label or an overnight board (not a paper towel as this will often blow away). The label should bear the name and phone number of the worker, the reaction scheme and/or services running, the experiment number, and date.
16. If you have any doubt as to the safety of a given operation, consult your instructor or the Senior Lab Instructor. If you have a medical condition (either temporary or permanent) that may be compromised by performing an experiment, please see the Senior Lab Instructor in advance of the scheduled class.
17. You are not allowed to work outside the specified daily laboratory hours for the course except by special permission from the Senior Lab Instructor.

18. A chemical laboratory is a hazardous environment. A little carelessness could leave you or other students disabled for life. Do everything you can to ensure your own safety and that of others. Maintain a clean and uncluttered working area. Even tiny amounts of corrosive chemicals can cause ulcerated burns so immediately clean up any spill, no matter how minor. Minimize your exposure to organic vapours and other noxious gases by using fumehoods. Inform yourself of the hazards of the materials with which you are working. Above all, be safety-conscious every minute you spend in the laboratories. Each student is responsible for leaving the bench and adjacent sink clean and tidy.
19. Material safety data sheets are available through the web. The homepage of UVic's Occupational Health, Safety & Environment has some useful links <http://www.uvic.ca/ohse/> Most labs have printed copies of these information sheets.