



Safety Instructions and General Guide for the Physical Chemistry Laboratory Practice

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Working in a chemistry laboratory can be dangerous. You are exposed to a wide range of chemicals, flame, high temperature devices ie. hotplate, high pressure containers, sharp tools, fragile glassware. Safe laboratory practice is essential to prevent any injury to yourself or others.

First and foremost, you should always be prepared for your current laboratory practice. You should be familiar with the topic. Prepare for the practice in advance. Depending on the subject, spend at least 1 to 2 hours with preparations by studying the handout carefully at least one day before the practice, and about 15 minutes on the day of the practice. Understand the task at hand. If you do not know what you are doing, you will make mistakes, unnecessarily prolong the practice, endanger yourself and others, and ultimately fail. With good preparation, however, the practice will be useful, successful, and even fun.

1. You may carry to the laboratory only the following items:

- your notebook,
- pen,
- marker,
- calculator,
- labcoat,
- your own spatula if you have one.

2. You may NOT carry these to the laboratory:

- food,

- drinks,
- your bag,
- jacket,
- umbrella.

3. You may NOT do these in the laboratory:

- eat,
- drink,
- smoke,
- chew,
- do any other practice than your own,
- be alone in the laboratory.

Always wait for the supervising teacher to arrive before you enter the laboratory. Be punctual, arrive at least 5 minutes before the practice starts, at the entrance, ready for the work. Leave your bag, jacket, umbrella etc. in your locker at the designated area. Do not leave anything at the entrance.

Start your work by cleaning your work area. Then wash everything (eg. glassware, electrodes, cuvettes, beakers, flasks, spatulas, pipettes, burettes) first by tap water, use detergents and scrubber if necessary. Then, flush it with ionized water, or double ionized water, depending on the requirements of the practice. For example, to determine the solubility product of a sparingly soluble salt, both the electrodes, and the glassware have to be extremely clean. Wash glassware with great care for these practices. The quality of your work will depend on your effectiveness of cleaning.

It is VERY important to write down everything you do in the laboratory. A short guide about this can be found in the foreword of your practice handouts. Precise record keeping is essential for the evaluation of your work. Write down your observations, measured data, the precise time if possible, and even the results of unsuccessful work. These might turn out to be "successful" experiments later.

Always label every solution you prepare with a marker. If you are unsure about the content of an unlabeled container, do not use it! Use only labeled chemicals. It is strongly advised to bring your own marker to the practice instead of constantly keep borrowing someone else's.

Never use broken equipment. If you notice a crack or even the smallest one, dispose it in the designated waste container. Always notify the laboratory supervisor about broken equipment.

Dispose aqueous solutions with low environmental hazard into the sink. Use excess water to wash it down. Neutralize concentrated acids and bases before disposing. There is an organic solvent waste container located below the fume hood. You may dispose organic waste into this container only. Do not throw solids into the sink eg. pieces of broken glass, spatulas. Do not pour fluids into the sink if there is a magnetic stirrer in it. Remove the stirrer first.

Use protective equipment if necessary. Latex gloves and safety glasses are available in the laboratory. Always wear your labcoat and eye protection during the entire practice. It is advised to button your coat. Do not wear open shoes. Keep your hair up.

Do not smell chemicals directly. Use your hands as a fan instead to smell the chemical. Do not taste any chemical under any circumstances! If a chemical is accidentally swallowed, wash it with excessive water, and notify the supervisor immediately!

Open flame is never used during this practice. If there is a fire, however, you can find fire extinguishers in the lab, and in the corridor. There is an emergency shower located above the door in the laboratory. Use this immediately if your clothes catch fire. Stand below the shower, and pull the lever. The elevators may not be used during a fire alarm. In case of a fire alarm, use the emergency stairs to exit the building.

Fire will persist if there is flammable material, enough oxygen, and high enough temperature. Remove any of these, and the fire will stop. The building has an automatic ventilation system, the windows cannot be opened. You can cover the fire with a blanket or a piece of wet clothing to prevent oxygen resupply to the fire. Depending on the fire, use different fire extinguishers. To extinguish electric fire, do not use water-based extinguishers! Use only dry chemical extinguisher in these cases.

There is a first aid kit in the laboratory to provide basic medical assistance. If acids or bases are spilled on your skin, use plenty of water to wash it. If these are spilled into your eyes, wash it immediately with plenty of water. Do not use any "neutralizing" agents on eyes or skin (despite the advice found in many older chemistry books): the spilled chemical must be removed from contact with your body and NOT neutralized on it. After an eye accident, consulting a doctor is always necessary.

In the case of gas intoxication, get fresh air immediately. As the windows are not openable in our laboratory, you should get out of the building immediately accompanied by at least two other persons. Notify the ambulance in any case of intoxication or injury! Use the fume hood for the practices using volatile chemicals (chloroform, cc. acetic-acid). If acid is swallowed, DO NOT swallow sodium-carbonate to neutralize it, as a huge amount of carbon-dioxide could potentially evolve, and the injured stomach might rupture. In the case of electrical shock, notify the supervisor, and seek medical assistance immediately!



Figure 1: Old chemical hazard symbols.

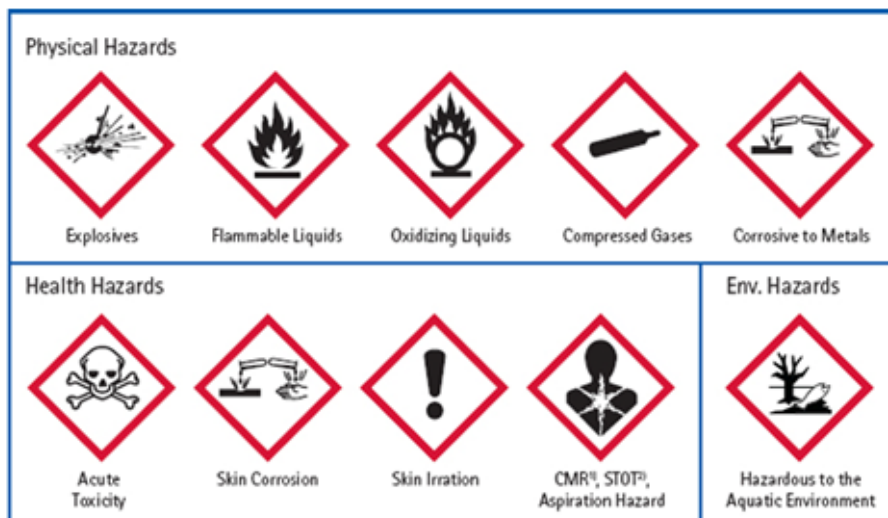


Figure 2: New chemical hazard symbols.