

General Precautions

1. Safety glasses are to be worn at all times in the laboratory except in the study area adjacent to the lab.
2. No horseplay. This includes running, throwing of any item (ice included), or the squirting of any liquid (water and liquid nitrogen included).
3. Know the location of fire-extinguishers in case of fire.
4. Know the location of sinks or eye washes in case a chemical needs to be washed off.
5. Know the special precautions needed for handling all the chemicals with which you are working before you begin lab work. The Merck Index is a good source of this information. Material Safety Data Sheets (MSDS) are on hand and should be read. See Mike Beliveau.
6. Clean off any tools, equipment or glassware that might be contaminated with corrosive, toxic or oily substances, including dirty glassware placed at the sink to be washed later.
7. All loose papers will be thrown away. Write in your lab books. If you must use loose paper, put it in a folder or the lab book or a cabinet. Lunch bags, bookstore bags, copies of the Daily Universe, etc. go in the trash basket.
8. Label all containers that hold gas mixtures corrosive or dangerous materials with a list of the dangerous compounds, so appropriate action can be taken in case of accident. Include names of team, date and list of contents.
9. After a project is completed, properly dispose of all used and unneeded chemicals. Talk to your supervisor about disposal of the chemicals.
10. No equipment should be left running unattended, except in an emergency, and then only with the permission of the instructor. If an emergency arises, and a piece of equipment must be left running unattended the equipment should be checked frequently and a note should be attached to it prominently showing the name and phone number of the students responsible.
11. All tools must be returned to their appropriate places before leaving the lab. All glassware should be cleaned before leaving. All materials (tape, chemicals, etc.) should be returned as soon as you are finished with them.
12. Report all accidents to your instructor.
13. If a serious injury occurs, report immediately to the health center after applying first aid. Note: Make sure all harmful substances are washed off before going to the health center. Even at emergency you may have to sit and wait before seeing a doctor.
14. Keeping your work area clean of superfluous material and organized will avoid most accidents (i.e. practice good housekeeping!!).

Safety in Handling Gases

1. All gas cylinders should be moved with their safety caps on and preferably on a cart.
2. All gas cylinders should be secured.
3. Always use adequate ventilation when working with toxic gases.
4. Never use a flammable gas in the presence of an open flame or near an electrical device that could start a fire.
5. All gas mixtures should be labeled stating the composition of the mixture, approximate pressure, and appropriate date.
6. Never use gauges or fittings that could be corroded by the gas being used.
7. Protect your eyes with safety glasses when using compressed gas to dry glassware, to clean a part, or to clear a line.
8. Dispose of gases properly in a scrubber, aspirator, etc.
9. Use caution when charging a cylinder with a gas that could liquify or solidify.
10. Here is a partial list of toxic gases commonly used. See the Merck Index or Matheson Gas book for added information.

Hydrogen - This gas is flammable or explosive when mixed with air, oxygen, chlorine, etc. It burns with a clear flame that is often not seen. Special caution should be taken around electrical equipment and open flames. Never release in an unventilated room.

Hydrogen Sulfide - H_2S is extremely poisonous. Though H_2S has a strong odor, the sense of smell can become fatigued and fail to give warning of high concentrations. Dizziness, nausea, and/or headache indicate poisoning. Immediately go to a fresh air area if you experience these symptoms. H_2S is flammable; use caution around flames and sparks. H_2S corrodes copper, brass and other metals. Always have another person in the room when working with H_2S .

Hydrogen Cyanide - HCN is intensely poisonous. If headache or nausea occur leave the area immediately. HCN is flammable and burns with a blue flame in air. Use same precautions as with H_2S .

Ammonia - NH_3 can be fatal in high concentrations. It can be explosive and is flammable. Concentrated solutions of NH_3 can cause skin burns. Wash immediately and treat with sodium bicarbonate. NH_3 produces appreciable heat when dissolved in water or with acids.

Carbon Dioxide - CO₂ may cause unconsciousness when more than 10% of the air is CO₂. Particular caution should be made when filling cylinders so that they are not over-filled.

Carbon Monoxide - CO is highly poisonous. It is odorless and tasteless. It is also very flammable. The symptoms of poisoning and precautions to be taken are the same as with H₂S.

Safety in Handling Liquids

1. Always protect your skin from corrosive liquids. Latex gloves offer some protection but some organic solvents such as chloroform penetrate latex. See Mike Beliveau for gloves and goggles.
2. Always protect yourself from very hot or cold liquids. Use covers whenever possible when carrying such. Asbestos gloves are available in the labs. Special precautions should be taken with liquid nitrogen. It can rapidly cause burns and could rupture the stomach if swallowed.
3. Protect your eyes with safety glasses or shields when working with liquids that are boiling or being agitated and could splash.
4. Always wear safety glasses when working with liquids under pressure.
5. Always wash your hands thoroughly after handling poisonous or corrosive liquids.
6. Do not drink from any laboratory glassware or equipment. Do not eat in an area where chemicals are in use.
7. Do not drink any laboratory liquids regardless of how safe you may think they are.
8. Keep flammable liquids away from open flames and electrical motors.
9. Dispose of all used and un-needed liquids. However, don't pour anything down the sink except water. See your lab supervisor for disposal procedures!
10. Always clean-up spills immediately - this especially includes mercury which is poisonous and requires special clean-up procedures. Floor spills of any liquid can cause slips and falls. Mops and brooms are available. See the lab supervisor for disposal procedures.
11. Use a hood or work outdoors when working with extremely volatile liquids.
12. Use extreme caution when neutralizing strong acids and bases or when dissolving chemicals that produce large amounts of heat when added to a solvent.
13. Never use your mouth as a suction for pipeting liquids. Pipet bulbs are available.

14. Don't dispose of mercury by pouring it down the drain. See the lab supervisor.
15. Clean up broken glass and wrap it in old newspaper before putting it in the waste containers. This will help the custodial people avoid injuries.
16. Keep walkways clear of hoses, extension cords and other tripping hazards.

Safety in Handling Solids

- 1 Never use your bare hands to handle corrosive solids.
2. Never handle very hot or cold materials without protective gloves.
3. Use a hood whenever working with poisonous chemicals whose dust might present a hazard.
4. Always protect hands from sharp metal or glass edges by using a cloth towel or gloves. All glass edges should be fire polished.
- 5 Always turn wire ends so they touch a flat surface to prevent injury.
6. Always properly dispose of solid wastes. See the lab supervisor for disposal procedures.

Safety with Electrical Equipment

1. Disconnect electrical equipment before working on it, especially when replacing blown fuses.
2. Test resistance in heating wires before applying power. Also make sure the heater is not grounded.
3. Insulate heating wires and bare electrical wires with appropriate insulation to prevent burns or shock.
4. Periodically check electrical wires for worn insulation and replace when necessary.
5. Avoid running electrical wires on the floor in heavy traffic areas.
6. Always double-check and be thoroughly familiar with electrical hook-ups before applying power.