Chemistry 346 - Laboratory Safety

This section presents a list of some potential hazards in the organic chemistry lab. Please pay careful attention to common-sense ways to avoid injury as well as reminders of how to deal with certain types of accidents.

1. POISONING

- **Food and drink should never be brought into the lab.**

- **Do not put anything in your mouth during lab.**
  This may seem obvious, but many people have habits they don't even realize, such as biting a fingernail, touching a pen or pencil to their lips, or touching their fingers to their tongue before turning pages in a book. With many toxic substances that one can come in contact with in the organic chemistry laboratory, lab workers should be particularly careful to avoid contact between their hands or any other objects and their mouth.

- **Wear protective gloves when appropriate. Remove and dispose of gloves and wash hands before leaving the laboratory.**
  To prevent spreading chemicals outside the lab, always **wash your hands** after working in the lab, and never leave the lab with gloves on.

- **If you accidentally ingest a chemical or suspect you have poisoning from any kind of chemical, notify your TA immediately.**

2. CHEMICALS IN THE EYE

- **Always wear safety goggles in the lab.**
  Wear them even if you are just writing in your lab notebook, because spills and splashes often come from other people's work.

- **Memorize the location of the sinks and eyewashing fountain so you can find them with your eyes closed.**

- **First aid for a chemical in the eye is rinsing with a large amount of water.**
  Use water from the sinks or from the eyewashing station for this purpose.

- **If you notice a classmate reacting to something in his or her eye, help lead that person to the nearest sink or eyewashing fountain.**

- **You are advised <u>NOT</u> to wear contact lenses in lab.**
  Besides trapping chemicals on the eye in the event of an exposure, they also tend to concentrate organic vapors on your eyes during everyday lab activities. Contacts must be removed to effectively rinse the eyes, which can result in delays and increased risk of injury.

3. CUTS

Cuts are a common danger when you work with glassware.

- **Avoid making a pile of glassware** on the bench or in the sink.

- **Avoid forcing stuck joints between two pieces of glassware.**
  If the joint is stuck, wrap the part in a towel while trying to work them free.

- **Be careful while fitting a thermometer into an adapter.**

- **If you cut yourself:**
  1) **Notify a TA**.
  2) **Remove glass** from the cut.
  3) **Rinse** the cut thoroughly with water.
  4) **Apply pressure** to stop bleeding.

- **Transmission of HIV and other blood-borne diseases.**
  Despite the fact that transmission of HIV through simple first aid is unlikely, it is important to be aware of the possibility of transmitting blood-borne pathogens when bleeding occurs. Most minor cuts can and should be treated by the person who has the cut. Since rubber gloves are readily available in most organic labs, they should be used when giving first aid, and care should be taken on the part of the individual administering first aid not to allow blood to come in contact with any open cuts or sores he or she might have.

4. SPILLS

Spills on the desk.

- **Volatile Solvent.**
  If a volatile solvent, such as ether, is spilled on the desktop, the spill will probably evaporate before anything can be done.

- **Less Volatile Solvent.**
  A less volatile solvent can be mopped up with a towel. The towel should be placed in the fume hood while the solvent evaporates.

- **Weak Acids or Bases.**
  If a weak acid (e.g., acetic acid) or a weak base (e.g., ammonia) is spilled, the spill can be mopped up with a towel, and the towel rinsed with water in the sink.

- **Strong Acids or Bases.**
  A **dilute solution** of either a strong acid or a strong base can be **further diluted** with water and then mopped up with a towel, rinsing the towel in the sink. **Concentrated solutions** of strong acid or strong base can be neutralized with **solid sodium bicarbonate** poured directly on the spill (bicarbonate can neutralize both strong acids and strong bases), and the resulting mess can be cleaned up with water and a towel.

Spills on the skin or clothing.

- The very best way to avoid spills on the skin is to be neat and organized. A tidy workplace minimizes the risk of being surprised by an accidental spill.

- **Spills on Skin. Wash with lots of water.** Consult a TA.

- **Spills on Clothes.**
  Remove clothing with the spill and rinse the skin with **lots of water**. In case of a **large spill**, **remove clothing** with the spill and use the **safety shower**. You should consult a medical doctor.

- **Know the hazards of the chemicals you are working with!**

5. FUMES AND VAPORS

*Excessive exposure to fumes can result in headaches, dizziness, nausea and fatigue. If you notice these symptoms, **notify a TA**, and **step into the hall** or outside until you feel better. Although "smelly" molecules are not necessarily more harmful than "fragrant" molecules, we will try to minimize the concentration of all fumes and vapors in the air.*

- **Reflux condensers** will cool heated vapors in reactions and allow the condensed vapors to flow back down into the flask.

- **Erlenmeyer flasks** with their narrow openings will be used for heating liquids to minimize evaporation.

Be aware that the nose can become acclimated to the presence of certain vapors and will no longer provide a warning.

6. FIRE

Fires are a potential hazard in the organic laboratory because many of the solvents used are both volatile and flammable.

- **Use a steam bath or a heating mantle to heat solvents. Never use a flame.**

- **Leave bottles of solvent in hoods and away from your work area.**
  Make sure you always replace the caps.

7. IN CASE OF FIRE

- **In the event of fire, do not panic.**

- **Notify a TA.**

- **Large fire: Get out of the building.**
  If you are unsure if the fire is large or small, **err on the side of caution and get out!**

- **Small fire: Get a fire extinguisher.**
  Move flammable solvents away from the fire.

- **If the fire is inside a beaker or flask**, gently place a notebook or this book over the top of the container until the flames goes out.

- **Clothing fire: Use the safety shower.**
  If someone else's clothing is burning you should lead them to the shower and pull the chain. Do not allow that person to panic and run.