

## *Basics of Laboratory Technique: Chem 5a Lab 2003*

**General:** Conduct every experiment as if it is the most important reaction you have ever performed...*it could be!!*

Here are some very basic guidelines:

1. *Think* about every aspect of an experiment (how to set it up, which reagents to use, how you will work it up) before you start. Fully understand the mechanism of the reaction, the expected products (and by-products), and the nature of the reagents used before you start. If something goes wrong, you may have very little time to take corrective action to avert disastrous consequences. Optimize reactions on small scale first, to minimize wasting your material in large runs.
2. All glassware should be spotless.
3. Oven dry reaction glassware and be cautious of materials that you are using (i.e., air and moisture sensitive reagents).
4. Weigh out materials cautiously. Quantify everything!
5. TLC every reaction multiple times--*From the first 30 seconds on!* TLC is the cheapest easiest and fastest method available to obtain meaningful qualitative information about what is going on in your flask. It is also my favorite thing to do! Before you know it...it will be your best friend...trust me.
6. Be skeptical--if a new spot shows up...don't believe it! Rerun the TLC until you are absolutely convinced. Always co-spot...No excuses!! Always spot every fraction of a flash column.
7. Strive for maximum efficiency and perfecting your laboratory technique. Lab work is a mental and physical challenge, to succeed you need to try to perfect both aspects.
8. You should keep your benches and desks organized. Housecleaning is essential for safety and reproducibility.
9. Always be skeptical yet optimistic. Design small experiments to prove or disprove something (i.e., TLC experiments, NMR reference spectra, etc.). Constantly think of control experiments which will help you sort out what is going on (i.e., run a reaction in the absence of a "key" reagent and see if you still get the same reactivity).
10. Start to think about the next reaction you want to run, as soon as you have a handle on the current one.
11. Document everything in your notebook (all physical observations, appearance of TLC plates, solvents for TLC and for flash columns, dimensions of the flash column used, cross-references to your NMR's, etc....*Everything!*)! If you are careful, negative results will be as important as positive ones!