

Standard Operating Procedure

Task: Keeping a laboratory notebook

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Background:

- Keeping a proper notebook is essential. A good notebook is not only a powerful tool for pushing your own research forward (for example, keeping track of what variations you have already tried in a reaction, or referring to previous syntheses of a known compound), but it is a critical tool for your colleagues and future group members (who will use your notebook as a guide for reactions and for deciding which direction to take various projects).

Training Requirements:

- Lab safety training

Potential Hazards:

- Annoyed labmates who cannot repeat your experiments
- Lost patent royalties and costs of associated litigation
- Lost time repeating experiments

Materials Needed:

- A standard issue Miller Group lab notebook
- Notebooks can be obtained from Alex when needed

Procedure:

- Receive your lab notebook from Alex. Notebooks are purchased from Scientific Bindery, Model number: B200PH.
- Use only non-erasable ink to write in your notebook. Don't worry if you make a mistake, just strike through the text and keep going (don't erase and hide anything).
- Table of Contents (TOC): leave ample space (~5-10 pages) for a Table of Contents at the beginning of the notebook. Update your table of contents regularly so that you can quickly find that experiment you are looking for! A digital TOC is highly recommended: you can type your experiment name, notebook page number, and date into Word to quickly generate a searchable TOC. Print the TOC out and tape it into the first few notebook pages.
- Experiments:
 - a. A new page should be started for each new experiment. This could be a reaction or monitoring of kinetics, or a specialized spectroscopy.
 - b. Write the date when you started the reaction.
 - c. Write out and/or draw the reaction.
 - d. If it is a published procedure, include a reference for the original preparation.
 - e. Make a table including the following for each reagent: molecular weight, density (if a liquid), the measured quantity (g, mL), moles,

equivalents, and the source of material (commercial vendor or notebook page number, and purity if known).

Chemical	Chemical 1	Chemical 2	Chemical 3
MW (g/mol)			
density (g/mL)			
Amount Used			
Equiv			
Supplier			
Notebook #			

- f. Write a detailed account of the experiment, including the procedure for addition of reagents (order of addition, amount of solvent used, etc). Write observations of note, including any color changes, precipitations, or temperature changes. Keep track of the time of the reaction (did it stir for 1 hour? 10 minutes?) It is helpful to write the time when the reaction was started on the page, and then note the time whenever another action is taken (reagent added, heated, cooled, stopped). Continue to write a careful account of the reaction throughout, including the workup procedure, any crystallizations, and spectroscopic characterization.
 - g. Spectra can be pasted into the notebook page if desired. This can make for an excellent notebook. At the very least, make a note of what spectroscopic techniques were used, and write the filename of the digital file in the notebook. For example, say you made a new compound on Page 54 of Notebook 1. After taking an NMR of the product, save the file with a name containing the notebook information, such as "AJMM_I_054". In your notebook, write something like "1H NMR: [spectrometer name and frequency in MHz], AJMM_I_054". Keep all your spectra in a safe folder on your computer, and back them up frequently.
- Finishing up in lab: when the time comes to stop working in lab, back up data referenced in the lab notebook in a secure location eg a thumb drive and on the group drive. Place the lab notebook in a central location that people will have access to. Typically, undergrads will leave their old lab notebooks with their mentors