

CHM 218 Organic Chemistry I: Laboratory
Section 11
Summer Session I 2008

Course Information

Lab Time: 1:00-4:50 PM, Monday and Wednesday
Class Room: Room 123, CFS (Chemistry and Forensic Science Building).
Lab Location: Lab 119, CFS.

Instructor

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Textbook: Chemistry 218 Laboratory Manual. It is highly recommended that the student obtain a copy of "The Organic Chem Lab Survival Guide" by Zubrick, ISBN: 0-471-12948-8.

Course Description: Laboratory for CHM 238. Prerequisite: A minimum grade of C in CHM 119, and prior credit for or concurrent enrollment in CHM 238. Credit 1

Prior to the Lab

- Eye protection is required in all labs during every experiment. You must have a **pair of Department approved safety goggle**. Safety goggles can be purchased from the Chemistry Club (Room 310, in the Chemistry and Forensic Science Building) or home improvement stores like Home Depot.
- A **laboratory notebook** with duplicate copies for each page that is approved by the Department.
- **Except for the First laboratory session, the CHM 218 Lab Manual is not allowed in the Laboratory.**
- **Only non-erasable pens (Blue or Black ONLY) are allowed for all laboratory work entries. Pencils, erasable pens, or white-out are not acceptable.**
- If you do not follow these guidelines, you will be required to leave the lab and will receive a zero for that lab.
- **Meet first in CFS 123 for Pre-Lab. Then move to CFS 119 for the "Lab" operations.**

Acceptable Attire

In the laboratory, shorts and open-toed shoes are **unacceptable** and will not be allowed. If you show up wearing unacceptable attire, you **will not** be admitted to the laboratory and will lose the points for that day's lab. Long hair must be tied back and loose flowing clothing is highly **discouraged**. These are for your safety and not for your convenience. We are thinking of your safety even if you are not.

Interaction with the TA or Instructor

You are expected to be prepared to perform the assigned laboratory experiments, in a timely and efficient manner, when you arrive. The TA or Instructor will not give you instructions on what to do outside of the pre-lab instructions given at the beginning of the lab period except for those instructions necessary for the successful execution of the assigned experiment. The TA and Instructor's main job are to:

- Monitor the safe operation for the laboratory.
- Ensure the availability of materials and equipment
- Ensure the smooth operation of laboratory
- To protect your classmates from you and you from them.

Class Format

A pre-laboratory lecture/Quiz will be conducted during the first 15-60 min of class in room 123 prior to going to the lab 119. During this time any changes or additions to the scheduled procedures will be discussed and the lab quiz will be given.

In the lab, each student is to work independently, efficiently, and neatly to accomplish the scheduled experiments.

Professional Laboratory Behavior

In the chemical laboratory, it is extremely important that one acts in a professional manner. Unprofessional behavior will cost lab points (10-100%). Most problematic behavior is quickly corrected and involves minimal (20%) point loss, but dangerous/criminal behavior/actions may result in failure of the course. Generally, if it is not explicitly given as an instruction, any activity will be considered unprofessional if not authorized by the TA or Instructor.

Attendance

Attendance is required at each scheduled laboratory since each experiment will only be performed during the week it is scheduled and cannot be made-up. However, life is not always flexible and one laboratory grade (the lowest) will be dropped, so that if a scheduled laboratory missed then that will be the dropped lab grade. Any additional missed labs will be recorded as zeros. NO EXCEPTIONS.

Check-In and Check-Out

At the first scheduled meeting of the laboratory, each student will be assigned a lab cabinet and drawer containing equipment to perform the experiments scheduled for the semester. During this time make sure to examine each piece of glassware for chips, cracks, and breaks for your own safety and so that you will not be charged to replace it later. Make a note of any missing equipment on the sheet provided.

After you have "checked-in", you are responsible for the equipment in your cabinet, so do not leave it unlocked as one can rarely assume their neighbors are as conscientious as they are.

If you decided to drop the lab, resign from the University, or finish the course, after you have checked-in you must "check-out" with your TA. During "check-out", the cabinet is inventoried against the "check-in" sheet. If you do not "check-out", you may

not take the lab final, the TA will check-out the cabinet and you will be charged a \$25 Check-out Fee.

Schedule of Experiments

Lab Day	Experiment #	Title
June 4	Check-In, Functional Groups & Exp #1	Lab Safety and Procedures, Molecular models
June 9	Exp#2, IR Continued with Problem set	Extraction Techniques, Infrared Continued
June 11	Exp#3 Intro. to ¹ H NMR, Problem set	Recrystallization, Introduction to Nuclear Magnetic Resonance (NMR)
June 16	Exp#4, NMR Spectroscopy, Problem Set	Distillation, NMR Continued
June 18	Exp#5, NMR Continued, Problem Set	Dehydration of Cyclohexanol and NMR
June 23	Exp#8 & 10, NMR & IR Continued, Problem Set	Benzpinacol- Benzpinacolone and Synthesis and Purification of Aspirin
June 25	Finish 8&10, Lab Final	Clean up, Check-out

Laboratory Notebooks

The laboratory notebook should be of the type specified in **Prior to the Lab** and only indelible blue or black ink pen may be used to make entries in the laboratory notebook. No pencil will cost all notebook points for the labs for it was used. You may not use loose leaf paper to record information to be put into your laboratory notebook later. If you make a mistake in an entry, put only one line through the mistake and write the correct entry immediately above or after the mistake.

Prior to coming to the lab, the notebook must be prepared as outlined below:

1. First Page with Name and Table of Contents
 - a. Name and ID# at the Top.
 - b. Table of Contents to show Page Experiment Title
 - c. An entry must be made for every experiment.
2. For each Experiment
 - a. Title
 - b. A one or two sentence summary of the Experiment
 - c. If a reaction is to be performed, the reaction should be shown using complete structural formulas.
 - d. Reagent table as follows: should include all reagents used in the experiment

Reagent	Formula	.mol. Wt .	mass or vol	Mmoles	Mo or Bp	Cautions
sodium hydroxide	NaOH	40.0	5.0 g.	125	High	Caustic, strong base

- e. Outline of experimental procedure with sufficient detail to actually perform the experiment. This is very important since the lab manual is not allowed in the laboratory.
- f. Describe your actual procedure. The true amounts of materials weighed out and equipment used. Include any observations such as temperature or color changes. For example:

"I weighed out 4.98 g of NaOH pellets and placed them into a 100mL single-neck boiling flask. Two boiling chips were added to the flask with 25 mL of water. The dissolved NaOH was very warm....."

- g. Calculation of percentage yield (if you don't remember how find your freshman text).
- h. Discussion/Conclusions: Discuss any observations, or concerns about the experiments, Did it match your expectations for results?, Why was my yield so low or high?, What did the test results mean?
- i. Answers to questions for the experiment.

Grading

For each Lab a grade will be computed as follows:

$$\begin{array}{rcl} \text{Attendance} & \times (\text{Quiz}(4\text{pts}) + \text{Report}(4\text{pts}) + \text{Notebook}(2\text{pts})) & = \text{Grade} \\ (0 \text{ or } 1) & \times (4 + 4 + 2) & = \text{max of } 10 \end{array}$$

Quiz: A quiz will be given at the beginning of each lab before the prelab discussion or opening of the drawers. The quiz will cover safety, the previous laboratory experiment, and the current experiment. It may ask about the reactions, the work-ups, what would be the expected product with a different starting material, etc.

Report

Your report will be the duplicates taken from your notebook.

1 point for the pre-lab write-up

1 point for "actual" lab write-up

1 point for questions

1 point for discussion of experimental observations

(If there is a reaction involved in the experiment, a required part of the discussion is description of the work-up detailing the purpose of each step, what happens, what dissolves or does not dissolve, and how it is effective for purifying the expected product.)

Notebook

Your notebook grade will be performed at each lab period. The TA will check person's lab notebook during the lab period to see if it is written in ink, that it is present

during the lab period, that observations are being recorded, that each experiment is included in the Table of Contents at the beginning of the notebook.

Problem Sets

During the pre-lab, problem sets bearing on the use and interpretation of Spectroscopy or Separation techniques will be given out. They are due at the beginning of the next lab period. A key will be posted after all sections have turned in their problems sets. These problems are chosen to give you the opportunity for self-development and to apply in a real manner what is covered in the laboratory to the types of problems that must be dealt with in the real world. Other than the posted key, no class room time will be given to reviewing these problems sets.

The total of the labs make up 50% of lab grade	50%
Problem Sets make up 20% of lab grade	20%
Lab Final (comprehensive) will count 30%	30%

Grades 100%

Grade scale:

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
Below 60	F