

## Chemistry 448 Laboratory

Textbook: *Advanced Inorganic Chemistry Laboratory Manual* and handouts

Instructor: Michael Castellani

TA: Hannah Bott

Pre-lab: Room 374 Science Hall

A list of the experiments we will be doing follows (the schedule of dates is tentative):

<u>Date</u>	<u>Expt</u>
8/27	No lab
9/3	Check-in and annealing iron (handout)
9/10	Expt. 1: Group theory (in Room 405)
9/17	Expt. 2: Bis(glycinato)copper(II) monohydrates
9/24	Expt. 3: Silicone Polymer
10/1	Transparent conductors: qualitative (handout)
10/8	Transparent conductors: quantitative (handout)
10/15	Expt. 4: Ferrocene synthesis
10/22	Solar cell – part 1
10/29	Solar cell – part 2
11/5	Solar cell – part 3
11/12	Nickel(II) complex magnetism and spectroscopy – part 1
11/19	Nickel(II) complex magnetism and spectroscopy – part 2 & check-out
12/3	Make up day if necessary.

**You must have the usual safety equipment on the first day of lab and complete the TA training by Friday, Sept. 12.** This includes safety goggles. If you wear contact lens, you must also notify the TA and me prior to the beginning of each lab period and notify me in writing before you begin work in the lab. I strongly urge anyone wearing contact lenses to use your prescription glasses during the lab.

Many of the chemicals you work with are corrosive and for that reason you may want to wear a lab apron or lab coat. In any case, open toe shoes and sandals are not allowed. Also slacks or long dresses are required. You are encouraged to wear long sleeve shirts. Anyone violating these regulations will be sent home to change.

### Grading

There are two types of labs, with each graded on a 10 point scale. For labs labeled, Expts 1, 2, 3, 4, and Ni(II) complex, there are 3 components to your laboratory grade: notebook (60%), quality of product (20%), and product yield (20%).

- i) The notebook is graded on the quality of your description of your work. In general, the outcome of your experiment will not influence this grade. It will be graded on a 0 – 6 point scale.

- ii) Your product will be judged on the basis of its purity. This may be done by spectroscopy, appearance, or other technique we discuss in pre-lab. Grades are on a 0 – 5 point scale. Attempting the experiment will guarantee a minimum of 1 point.
- iii) Your product yield will be evaluated on a 0 – 5 point scale. It may never exceed your purity score. Attempting the experiment will guarantee a minimum of 1 point.

For the conductor and solar cell experiments, your grade will come from 10 point lab reports. They will be graded using the following distribution:

Abstract/Introduction – 10%: These may be combined into one section. Don't just paraphrase the introduction to the experiment in the lab manual. Include in this section how the experiment is linked to concepts in your lecture text, the type of reaction used to synthesize each compound, the methods of characterization used and any unusual or unexpected results. Although placed at the beginning of the report, this section is typically best written last.

Experimental Section – 15%: This should be a description that allows the reader to repeat your experiment exactly as you did it. It should include the particulars of equipment and instrumentation used in the lab.

Summary of Data – 25%: This should include tables of raw data, both qualitative and quantitative, tables of calculated values and all spectra. An evaluation of the quality of the spectra will also be included in this section. A quality spectrum should have peaks labeled, have good signal-to-noise and resolution, have no significant background peaks and an appropriate title. You must submit original spectra of all the samples you prepare. No photocopies of spectra from other students are allowed except as provided by the instructor. In this section you should also have example calculations worked out in detail (such as determination of limiting reagent, percent yield, etc).

Discussion – 25%: This should include a discussion of the significance of the qualitative and quantitative data and correct assignment or chemical interpretation of all peaks in the spectra. Reference data and spectra from literature sources should be included with the report and explained.

Conclusions – 15%: In this section list the “take home” lessons you learned from this experiment. Limit these to no more than three. Also included here are the answers to any assigned study questions.

References – 10%: You must use the ACS Style Guide format for the inclusion and citation of references.