

# CHE 385: Inorganic Chemistry II Laboratory

## Syllabus and policies, Spring 2012

*M 2:30 – 6:30 pm, Nobel Hall room 305/306*

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**About this lab:** The primary goals of this laboratory course are to highlight some inorganic chemistry principles, introduce or review some laboratory techniques common in inorganic chemistry, to help you learn and practice searching and using the chemical literature, to develop your experimental design skills and independence in the laboratory, and to improve your communication skills. For experiment information, refer to the *course* Moodle page.

**Lab philosophy:** You will NOT receive detailed instructions for most of the experiments in this course. Instead, your group will receive a general goal for the experiment and will have to work together to develop a plan to carry it out. You will begin by reading the literature and techniques manuals and consulting with local experts (including your instructor) to create your own protocol. You will do most of your own reagent preparation. If you need to use an unfamiliar technique or experiment, we will arrange for you to learn how. You will keep a detailed laboratory notebook and interpret your results in the context of the scientific literature and your understanding of inorganic chemistry. You will present, defend, and improve strategies for your work at “group meetings.” This approach to laboratory work more closely resembles what you might experience in a job or research group.

### **Lab ground rules:**

- Wear safety glasses/goggles at all times when *anyone* is handling chemicals in the room.
- Wear gloves when handling hazardous chemicals.
- Dress appropriately for lab, including shoes and clothing that adequately protect you from spills, splashes, and dropped objects.
- Become familiar with the hazards associated with your experiment before beginning.
- Do not begin any experiment until it has been approved by me.
- Work done outside the Monday lab time must be approved in advance by me.
- Never work alone.
- Sign out everything you borrow from the stockroom, every time. Return items promptly.
- Do not scavenge or borrow supplies, equipment, or chemicals from any other location without checking with your lab instructor or obtaining permission from the rightful owner. Return items promptly.
- Clean your messes fully before you leave the lab.
- When using an instrument, be sure you know how to operate it properly.
- Arrive on time every week, even if you will not need the whole lab period.
- If I see or hear that you are being reckless in the laboratory, I may ask you to leave lab for the day or for the rest of the semester, depending on my judgment of the severity of the incident.

Required experiment theme/focus	Required methods/techniques
Inorganic materials chemistry	Anaerobic techniques (need 2)
Bioinorganic chemistry	NMR (need 2, one beyond routine $^1\text{H}$ 1D)
Paramagnetism	IR
Organometallic chemistry (recommended)	UV-Vis
One follow-up/expanded experiment	A different physical (fluorescence, microscopy, GC/MS, magnetic susceptibility, LC/MS, Raman, etc) or computational method
	Some reagent preparation (solvent drying, reagent purification, etc)

### ***Experiments***

Your group will be selecting most of your experiments, fulfilling the required elements of the lab, including appropriate total experiment time – most likely this will be 5-6 total experiments.

***Notebooks:*** Keeping a clear and detailed laboratory notebook is an essential skill for any chemist. Each research group will keep a joint notebook. Write your protocols and observations as you carry out the experiment, not later. Spectra or other printed data may either be attached to the notebook directly or maintained in an indexed and referenced binder. Your laboratory notebook will contain experimental objectives, procedures, data, observations, and references.

***Planning worksheets and group short reports:*** Templates for these will be available on Moodle. The planning worksheet must be completed in advance and approved by me before you begin the experiment. The group short report should be completed within a week of completing the experiment. Keep your planning worksheets and short reports organized in a binder or folder.

### ***Group meeting presentations:***

Sometimes, we will hold group meetings, either during lab or class time. Your group will come to these meetings prepared to present and defend an experiment or experimental plan (I will let you know in advance which experiment it will be.). Your presentation should be around 10 minutes long. Presentations are fairly informal and may be PowerPoint, chalkboard, and/or overhead projection, but you must show all relevant spectra on transparencies or computer projection. Your presentations will be assessed primarily on organization, clarity, and completeness of information, since your analysis is ultimately graded elsewhere.

### ***Grades (worth 20% of your course grade):***

You will be graded on the quality and completeness of your experimental plans, the execution of those plans, and your interpretation of results. Grades will also take into account your demonstration of good and safe laboratory technique, and the quality of your notebook and participation in group meetings.

I will grade and comment on your short reports and notebooks at a few unannounced times during the semester. At these times, your group will be assigned temporary grades for each experiment you have begun. Your group should review these grades and comments, also taking into account feedback from group meetings, and consider whether you need to do more work on the experiment. No experiment grades are final until the end of the semester. You are encouraged (and expected) to continue working on past experiments to bring them up to the course standards (which will give you a higher grade).