

Chemistry of the Elements Laboratory
Chem 2141
Spring Quarter, 2013

GENERAL INFORMATION

Instructor: Dr. Todd Wells
Office hours: By appointment in Physics 205
Email: towells@du.edu

Teaching Assistants: There will be a Graduate Teaching Assistant (GTA) and an Undergraduate Teaching Assistant (UTA) in each lab section. These teaching assistants will have scheduled times that they will be available outside of lab to help you understand the concepts, perform calculations, etc.

| Section | Time | Day | Room | TA | Email |
|---------|-----------|-----|------|------------------|--|
| 1 | 2:00-4:50 | M | 225 | Michael Holden | Michael.Holden@du.edu |
| 2 | 6:00-8:50 | M | 225 | Michael Holden | Michael.Holden@du.edu |
| 3 | 2:00-4:50 | T | 225 | Jixiao (Yuri) Li | yuriljx@gmail.com |
| 4 | 6:00-8:50 | T | 225 | Gino Braiotta | Gino.Braiotta@du.edu |
| 5 | 2:00-4:50 | W | 225 | Gino Braiotta | Gino.Braiotta@du.edu |
| 6 | 2:00-4:50 | R | 225 | Glenn Capodagli | Glenn.Capodagli@du.edu |
| 7 | 6:00-8:50 | W | 225 | Jixiao (Yuri) Li | yuriljx@gmail.com |

Laboratory Manual:

Available on the CHEM 2141 Blackboard website.

Lab Notebook - All observations should be recorded in a bound laboratory notebook, or directly into the computer. If data is recorded into the computer, a paper copy (e.g., a print out) must be made before you leave the lab, and this becomes part of the lab notebook. The lab notebook recommended for the course, available in the bookstore, makes two copies as you write. However, a composition notebook or the notebook you used in last quarters lab are also acceptable. **The GTA must initial your lab notebook at the end of each lab session. It is your responsibility to show your notebook to the GTA and get it initialed.**

CHEM 2131, Chemistry of the Elements, (the lecture course) is a corequisite for CHEM 2141 (the lab course) and students who register for 2141 are also expected to register for 2131.

| Week of Experiment | Experiment | Due |
|--------------------|--|-------------------------------|
| Mar. 25 | No lab | |
| April 1 | Check in, Inorganic Nomenclature | End of Lab period |
| April 8 | Synthesis of Al (acac) ₃ . (part one of superconductor experiment)* | Week of 4/22 |
| April 15 | Synthesis of Co (acac) ₃ | Week of 4/29 |
| April 22 | Synthesis of Co(acac-NO ₂) ₃ . UV/Vis of Al(acac) ₃ . | Week of 5/6 |
| April 29 | Characterization of Co(acac) ₃ and Co(acac-NO ₂) ₃ by IR, UV/Vis and NMR (possible - part two of superconductor experiment)* | Week of 5/13 Week of 5/28* |
| May 6 | Synthesis of aquapentaamminecobalt(III) Nitrate | |
| May 13 | Determination of K _a of [Co(NH ₃) ₅ (H ₂ O)] ³⁺ and Purity of the Complex (possible - part two of superconductor experiment)* | Week of 5/20 Week of 5/28* |
| May 20 | Descriptive Chemistry | Week of 5/28 |
| May 27 | Finish-up, check out | |

* The solid state reaction for the superconductor experiment requires 24hrs at very high temperatures. Due to limited space in the tube furnace this experiment will be conducted in stages.

Computers

You will be using your laptop in the laboratory every week, including the first week.

How to succeed in this course

In prior years, some students have spent much more time in the laboratory than is intended, apparently largely because they were unprepared to do the laboratory work when they came to the lab, and/or did not think about what they were doing in the lab. You cannot successfully “cookbook” this lab or sleep-walk through it.

- Be prepared for lab sessions.

- Plan your work.
- Understand what concepts each laboratory experiment is intended to help you learn.
- Do the “Prelab” exercises well before the day of the laboratory.
- Understand the calculations you will perform to analyze your data, and how the data you will acquire is used in the calculations.
- Learn how to create Excel spreadsheets, perform calculations, plot graphs, etc.
- If an Excel spread sheet is going to be used in the lab, set it up before you come to lab.
- Think about what you are doing.
- Work safely. Think about the safety aspects of your actions.
- Follow the guidelines for writing in your lab notebook.
- Follow the guidelines for writing your lab reports.
- Answer all questions you are supposed to answer.

Safety

- The lab manual contains some brief guidelines.
- The Graduate Teaching Assistant has absolute authority on matters of safety. If the GTA judges that you cannot work safely in the laboratory, you may be asked to leave the lab. No opportunity to make up a missed lab will be provided if you miss for safety reasons.
- Fashion changes faster than safety guidelines can be rewritten! Think. Layers of clothing are your primary protection against spilled reagents or broken glass. The laboratory is designed to minimize hazards, but safety is ultimately your responsibility.
- Since students in this lab work with aqueous solutions, experience is that wet floors are the major hazard. If you spill water on the floor, clean it up or call it to the attention of the GTA or UTA and warn other students who may be nearby.

Perform and preserve backups of your computer files. Disasters do happen with computers! It is your responsibility to be sure that you preserve all of the original data acquired in this course and files, such as Excel spread sheets, that you prepare. It is good practice to make a paper copy of spectra and spread sheets before you leave the lab. There is a campus printer available in Olin 105, to which you can print via Ethernet. If you do not have the appropriate software to use DU campus printers, you will need to obtain the software from the Help Desk in Penrose Library.

Working together

In several labs we will encourage you to share equipment. For example, we will have 10 UV/Vis spectrometers and 2 FTIRs and possibly as many as 20 students in a lab section. Each student should record all data into their own laboratory notebook and into computer files as appropriate. When data is recorded in computer files, the laboratory notebook should describe the information in the computer file, and record the name of the file. A paper copy of the computer file should be printed and taped into the lab notebook, as well as turned in as part of your lab report.

Regardless of how much you are told to share or work together in acquiring data, your lab report is to be entirely your own work.

Blackboard

Class handouts and assignments will be available through the web on Blackboard.

If you miss a lab

If illness or a university-sponsored activity causes you to miss a lab, as early as possible seek to schedule a time that you can make it up during another regularly-scheduled lab (there are 7 each week). Except by special arrangement with the Graduate Teaching Assistant, reagents and apparatus will be available only during the week in which the lab is scheduled.

Deadlines

Prelab exercises must be completed before you come to the laboratory. ***You will not be given credit for late Prelab exercises.*** It is important that you write up your lab reports while information is fresh in your mind. Lab reports are due during the week shown in the lab schedule. The GTA's will grade and return your lab reports at least 24 hours before your next lab report is due. This will give you time to make any last minutes corrections based on feedback from the GTA's.

Late lab reports will not be accepted.

Course Grading

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|--------------------------------|------------------|
| Lab notebooks/technique | = 50 pts |
| Prelabs 8 x 10 pts | = 80 pts |
| lab reports 8 x 100 pts | = 800 pts |
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| total possible points | = 950 pts |