

Spring 2-1-2018

CHMY 402.01: Advanced Inorganic Chemistry Lab

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Recommended Citation

Rosenberg, Edward, "CHMY 402.01: Advanced Inorganic Chemistry Lab" (2018). *Syllabi*. 7628.
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CHEM 402

INORGANIC CHEMISTRY LABORATORY - SPRING 2018
TR 1:10-3:00 p.m., Chem. 008, lab lectures Tuesdays in Chem. 204

Instructor: Ed Rosenberg (Rm 301A)
Office Hours: MWF 3-4 PM, Rm 301A

Texts:

- *Synthesis and Technique in Inorganic Chemistry*, Robert Angelici, 2nd Ed., Saunders
- *Microscale Inorganic Chemistry*, Z. Szafran, R.M. Pike, M.M. Singh, Wiley

Texts not available for purchase; photocopies of labs and relevant material will be provided.

<u>WEEK</u>	<u>ACTIVITY</u>
1. 1/23-1/27	Organization - check in.
2. 1/29—2/2	<ol style="list-style-type: none">1. <u>Lab lecture</u> (Element of the Week): Cobalt.2. Lab #1: Angelici, Exp #8, Optical isomers of Co(en)_3^{3+} pp 71-80. Questions 3,4,6. Spectra: U.V.-Vis $^1\text{H NMR}$. optical rotation
3. 2/5-2/9	Lab #1 , continued.
4. 2/12-2/16	Lab #1 , continued.
5. 2/19-2/23	<ol style="list-style-type: none">1. Lab #1 due.2. <u>Lab lecture</u>: Chromium.3. Lab #2: Szafran, Exp 22, Synthesis of metal acetylacetonates Part A, p 224. Questions 2,3. KBr IR, Magnetic Susceptibility, U.V.-VIS.
6. 2/26-3/2	Lab #2, continued.
7. 3/5-3/19	<ol style="list-style-type: none">1. Lab #2 due.2. <u>Lab Lecture</u>: Ion Exchange.3. Exp #3: Angelici, Exp 7, Ion Exchange Separation of Ionic Complexes, pp 63-70. Questions 1,3,4. Visible

Spectra

8. 3/12-3/16 **Lab #3**, continued.
9. 3/19-3/23 Lab Lecture: Iron
- Exp #4:** Angelici, Exp 16, Column Chromatography of Ferrocene Derivatives, pp 157-168. Questions 4,5,8. Spectra, IR (KBr) ¹H NMR. Product: Acetyl ferrocene
10. 3/26-3/30 Spring Break
11. 4/3—4/7 **Lab #3** due. **Lab #4**, continued
Lab #3 due.
- 4/10-4/14 **Lab #4**, continued
13. 4/17-4/21
1. Lab lecture: Ruthenium.
 2. **Lab #5:** Szafran, Exp 20, Metal complexes of DMSO Part C, pp 218-222. Questions 1,2,3. KBr IR, ¹H NMR, RuCl₂"4DMSO
14. 4/24-4/28
1. Lab lecture: Rhodium, Copper.
 2. **Lab #6:** Szafran, Exp 24, Determination of Magnetic Moments in Metal-Metal Bonded Complexes, DBR IR, pp 231-235. Rh₂ (acetate)₄ 2EtOH, Cu₂ (acetate)₄2H₂O. Visible Spectrum, Magnetic Susceptibility.
15. 5/2-5/-4/29 **Lab #4** due. Catch up.
15. 5/1-5/5 **Lab # 5 and #6** due.

**LAB FINAL Tuesday May 8,
1:10 3:10PM**

Rm. 204

COURSE EVALUATION

6 lab reports 50 points each	300 pts
1 lab final	100 pts
Products	50 pts
Personal evaluation	<u>50 pts</u>
TOTAL	500 pts

COURSE INFORMATION

1. Room 008 will be available for working on experiments M-F, 1:00-5:00 p.m.
2. Safety goggles are required when working in Rm 008
3. The lab final will be based on the labs, lectures and the questions in each experiment.

LEARNING OUTCOMES

1. The students will gain hands on experience with instrumentation that was discussed on a theoretical level in other courses.
2. Students will learn new techniques that were not discussed at all in prior course work; specifically column chromatography, measuring magnetic moments, ion exchange chromatography.
3. The students will apply the skill of spectral assignments to molecules they synthesize in the laboratory for electronic spectroscopy of transition metals.
4. The students will learn how to prepare solid samples for measuring infrared spectroscopy.
5. The lab lectures will cover the “element of the week,” where they learn about the history, industrial importance and extraction techniques for a given element.