

SYLLABUS

Chem 4235, Fall 2014 Inorganic Chemistry Lab Dr. Jack Lu

Honesty Code: The Honesty Code is the university community's standard of honesty and is endorsed by all members of the University of Houston-Clear Lake academic community. It is an essential element of the University's academic credibility. It states: "I will be honest in all my academic activities and will not tolerate dishonesty."

(Objective) This course concerns inorganic chemistry laboratory principles, basic manipulation skills and synthesis of different inorganic compounds. (Learning outcome) Upon completion of the course, students will be familiar with some basic skills and techniques in inorganic chemistry and the related inorganic literature search. In addition, high temperature techniques, vacuum line operations, inert atmosphere, FTIR and other methods will be introduced in the experiments.

Prerequisite Courses: General Chemistry Laboratory; Inorganic Chemistry; Physical Chemistry and Laboratory.

Reference books:

*Synthesis and Technique In
Inorganic Chemistry*, 1986. By Robert J. Angelici

*Experimental Methods In
Inorganic Chemistry*, 1999. By John Tanaka, Steven Suib

Course policies:

Attendance is extremely important and regular attendance is expected. There would be no make-up labs and exams.

Grading:

Midterm exam, 20%.

Safety quiz, 5%.

Lab preparation and the understanding of the theoretical aspects and techniques of the experiments performed, 10%.

Performance (lab safety, experiment manipulation skills, housekeeping, attitude toward others in the lab, attendance and participation in all exercises, 10%.

Literature report, 10%.

Lab notebook (page 6-7 in the 2nd reference book), 20%.

Final exam, 25%.

Office Hours: Tuesday & Wednesday, 3 to 4 pm.

Phone #: (281) 283-3780

E-MAIL: lu@uhcl.edu

Office: B3525- #5

Lab List:

Lab 1. Introduction, laboratory safety discussion, techniques for obtaining IR spectra and lab check in. All students must take the BB safety training and tests.

Students need to check blackboard or uhcl email account for the instructions/link. Attached are the two main components of the training. There is a bb test on the training, and an electronic signature acknowledgement "test" on the procedures.



Courses where you are: UHCL_MANUAL_ENROLL

WRKGRP.LabSafetyStudent.coen: General Lab Safety Training
Instructor: Lisa Coen;

WRKGRP.LabSafetyAdvanced.coen: General Lab Safety Training - Advanced
Instructor: Lisa Coen;

The Advanced Lab Safety Training has more content. The test must be done by the second week of class.

https://blackboard.uhcl.edu/webapps/portal/frameset.jsp?tab_tab_group_id= 2_1&url=%2Fwebapps%2Fblackboard%2Fexecute%2Flauncher%3Ftype%3DCourse%26id%3D_25275_1%26url%3D

Lab 2. $[\text{Co}(\text{en})_3]^{3+}$ and $[\text{Ni}(\text{en})_3]^{2+}$

$[\text{Co}(\text{en})_3]^{3+}$ is optically active. Optically active materials have the ability to rotate the plane of light to the right or left to a greater or lesser angle depending on the nature of the substance. This prep is also representative of the formation of coordination compounds. The compounds formed illustrate the range of colors and stability encountered in coordination compounds as well.

Lab 3. $[\text{Cr}(\text{NH}_3)_6](\text{NO}_3)_3$

In this experiment, not only will the synthesis of $[\text{Cr}(\text{NH}_3)_6](\text{NO}_3)_3$ be carried out, but techniques involved in handling liquid ammonia will be acquired.

Lab 4. Introduction to literature search and the use of Library resources in Library.

Library staff will provide assistance in accessing library resources. Use STN (easy), Chemical Abstracts on-line (after 5:00pm) and ACS on-line journals to find two abstracts which show the actual synthesis of two inorganic compounds.

Lab 5. $\text{Co}(\text{salen})$ and O_2 absorption

In this experiment, $\text{Co}(\text{salen})$ will be prepared. The oxygen up-take capacity of the compound is also investigated. The techniques including purging with an inert gas and isolation of crystalline products will be acquired.

Lab 6. $\text{K}_2\text{S}_2\text{O}_8$ (or CdI)

In this experiment, potassium peroxydisulfate ($\text{K}_2\text{S}_2\text{O}_8$) will be prepared by the electrolysis of an aqueous solution of H_2SO_4 and K_2SO_4 .

(The CdI prep illustrates a basic type of inorganic reaction, that of metathesis. The structure of cadmium iodide is also of interest in that it is of a type exhibited by a number of compounds.)

Lab 7. Literature search and report.

Assignment for the literature search project.

Take the printed abstracts, including all the information needed to find the primary literature articles. The articles must be photocopied so that they can be submitted with report.

Lab 8. Literature search and report presentation.

Lab 9. $(\text{CH}_3)_3\text{N}:\text{BF}_3$ (or Preparation of A Zeolite, B/Al ZSM-11)

This experiment uses vacuum line system for transferring chemicals from one container to another and measuring the vapor pressure of a liquid at low temperature. The use of vacuum line is the most fundamental and important for air sensitive compounds.

(Preparation of A Zeolite, B/Al ZSM-11: Zeolites with specific catalytic properties have been one of the most important catalysts for the petroleum industry. The synthesis of zeolites with specific catalytic properties has been, and will continue to be, an important contribution of inorganic chemists to industrial chemistry.)

***6 Drop Rule Limitation - Students who entered college for the first time in Fall 2007 or later should be aware of the course drop limitation imposed by the Texas Legislature. Dropping this or any other course between the first day of class and the census date for the semester/session does not affect your 6 drop rule count. Dropping a course between the census date and the last day to drop a class for the semester/session will count as one of your 6 permitted drops. You should take this into consideration before dropping this or any other course. Visit www.uhcl.edu/records for more information on the 6 drop rule and the census date information for the semester/session.