



College of Arts & Sciences

Inorganic Chemistry Laboratory - CHEM 4190-01L Syllabus

Instructor: Mohamed Hassan**Email:** mhassan@tamus.edu**Office Hours:** Friday 10 am-12 am, SciTech 311H**Lab Hours:** M 11am-1:45am**Class Location:** SciTech 328

Course Description

This advanced laboratory course focuses on synthetic methods relevant to modern inorganic chemistry. The laboratory experiments are designed to reinforce the chemical principles and concepts covered in CHEM 4390. You will be introduced to techniques for synthesizing coordination complexes, metal-organic frameworks, and nanomaterials, as well as various methods of characterization. **Corequisite:** CHEM 4390.

Course Materials

- A. Handouts describing each laboratory experiment will be provided.
- B. Laboratory notebook (carbonless copy or regular notebook).
- C. Textbook - *Micromodel Inorganic Chemistry: A Comprehensive Laboratory Experience*, Zvi Szafran, Ronald M. Pike, Mono M. Singh, Wiley, ISBN: 978-0-471-61996-3.

Laboratory Handouts: You must print a copy of all handouts from Blackboard before each lab session. Reports are submitted with permanent blue or black non-water-soluble ink. Five points are deducted for data recorded in pencil. Refer to attached schedule for the sequential list of labs. The completed laboratory handouts (i.e. laboratory reports) in PDF format are due at the end of the day in which the laboratory experiment was performed unless otherwise stated in Blackboard. All students submit individual reports for grading.

Calculator: scientific/engineering calculator. Examples of acceptable calculators include TI30Xa and TI36X.

Proper attire for lab:

- A) Closed-toe shoes that covers your foot in its entirety.
- B) The following list is NOT appropriate lab attire:
Shorts, skirts, mid-riff shirts, tank tops, $\frac{3}{4}$ length pants, pants with large holes.
- C) Lab coats
- D) Approved safety googles **THIS POLICY WILL BE STRICTLY ENFORCED AND STUDENT IN NONCOMPLIANCE WILL BE DISMISSED FROM THE LABORATORY AND WILL RECEIVE NO CREDIT FOR THAT WEEK'S EXPERIMENT.** We take YOUR safety in the laboratory very seriously and we expect the same from you.

Goggles and laboratory coats are **ALWAYS** worn properly in the laboratory. Your instructor may change goggle/lab coat wear depending on the laboratory activity.

Learning Objectives:

The goal of this course is to familiarize you with the diverse synthesis and characterization methods employed by inorganic chemists in the preparation and study of inorganic and nanomaterials, as demonstrated through the scheduled laboratory experiments.

By the end of this course students will be able to:

1. Demonstrate their understanding of safe laboratory practices, such as responsible disposal techniques and proper use of personal protective equipment (PPE) while performing experiments.
2. Identify the categories of hazards associated with chemicals and use Safety Data Sheets (SDS) as well as reference materials.
3. Synthesize various inorganic complexes and frameworks.
4. Characterize the complexes you create using common spectroscopic techniques.
5. Read and interpret inorganic chemistry texts and journal articles.
6. Communicate your research findings effectively.

Communication: The best way to contact instructors is via email. All correspondence between professors and students must occur via Texas A&M University San Antonio email accounts. Students are expected to access Blackboard regularly for updates on the course, announcements, and other course materials. All students are strongly encouraged to come to office hours or make appointments at other times to discuss course material and ask questions. Discussions concerning grading/grades will not be addressed through email and will only be discussed during office hours or scheduled appointments.

Attendance Policy: All students are expected to attend all laboratories and be fully and actively engaged in lab activities. Attendance will be monitored. Absences will be excused if due to illness (medical excuse), death of a close family member, religious holiday (please inform instructor), official university activity, cancellation of classes/closure of the University, military duties, pregnancy & related conditions, or participation in legal proceedings.

Late Work Policy: 20% deduction for every day late. No work will be accepted 3 days after the due date.

Late Arrivals: Punctuality is essential to maintaining a safe and efficient laboratory environment. Timely arrival ensures that you are present for important safety instructions and lab procedures. A point from your experiment grade will be deducted for every minute you are late, up to 10 minutes. If a student arrives more than 10 minutes late, they will not be permitted to participate in the lab for that day. This will result in a grade of "0" for that week's lab report. Please plan your schedule accordingly to ensure prompt attendance at every lab session.

Lab Partners: Students will work in groups of two unless directed otherwise by the instructor.

Visitors: Only students enrolled in the course are allowed in the classroom. No visitors are allowed.

Conduct and Behavior: My goal is to create a safe and engaging learning environment. Class disruptions are unacceptable, asking questions to clarify material during class does not qualify as a disruption and is encouraged. If you disrupt the class, you will be asked to leave for the day. Technology in the classroom may be a great resource, but it can also hinder the learning process. Therefore, students are not allowed to wear ear buds and headphones and/or use cellphones during class. All cellphones must be on vibration mode or turned off for the entirety of the class/lab period. In case of an emergency call, leave the room before answering the call. Texting during class is absolutely prohibited. The use of laptops, tablets or other devices for non-class related activities is not allowed.

Electronic Devices During Exams: All electronic devices must be completely stored during exams and quizzes. Academic misconduct and attempts to cheat during the exam will be pursued according to

Texas A&M-San Antonio code of conduct policy. You are discouraged from leaving the room during an exam. If you need to use the restroom, ask and leave all electronic devices with the instructor.

AI policy: This class assumes that all work submitted by students will be generated by the students themselves, working individually or in groups. Students should not have another person/entity do the writing of any portion of an assignment for them, which includes hiring a person or a company to write assignments and/or using artificial intelligence (AI) tools like ChatGPT. Use of any AI-generated content in this course qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.

Academic Calendar: The complete academic calendar and final exam schedule are available online at <https://www.tamusa.edu/academics/academic-calendar/index.html> . Please be familiar with important dates.

Tentative Schedule[®]

Week #	Week of	Experiment
1	Jan 21-23	Introduction, Safety training
2	Jan 28-30	Silicone polymers: preparation of bouncing putty
3	Feb 4-6	Synthesis of $\text{Co}(\text{mimt})_4(\text{NO}_3)_2 \cdot \text{H}_2\text{O}$
4	Feb 11-13	Synthesis of $\text{Co}(\text{mimt})_4(\text{NO}_3)_2 \cdot \text{H}_2\text{O}$
5	Feb 18-20	Preparation of $\text{Cr}(\text{acac})_3$
6	Feb 25-27	Preparation of $\text{Mn}(\text{acac})_3$
7	Mar 4-6	Determination of Δ_o in Cr(III) complexes
8	Mar 11-13	Spring break-no labs
9	Mar 18-20	Ferrite Magnetic Nanoparticles for Ferrofluids
10	Mar 25-27	Synthesis of Cadmium Selenide Quantum Dots
11	Apr 1-3	Study day- no labs
12	Apr 8-10	Synthesis of Metal-organic Frameworks
13	Apr 15-17	Synthesis of Metal-organic Frameworks
14	Apr 22-24	Molecular modeling
15	Apr 29-May 1	Presentations/Posters
16	May 6-8	Final week- No labs

[®]These are the tentative topics. The instructor reserves the right to make changes as deemed necessary.

Data Sheets and Excel files: Data sheets are due Sunday by 11:59pm. Data sheets must be uploaded on blackboard as **pdf files**. If an Excel file is required, it should also be uploaded in blackboard in the original **Excel** format.

All written assignments must be worked on individually. All written assignments are subject to analysis by anti-plagiarism software. Plagiarism will result in a grade of a zero for the assignment.

Grading:

laboratory Reports = 400 points

Lab notebook = 100 points

Presentations/Posters=100 points

$$\text{Your grade: } \left(\frac{\text{Total points earned}}{600} \right) * 100\%$$

All laboratory report/worksheet grades will be posted to Blackboard. However, course percentages, letter grades, etc. are not to be considered as official and students should use caution when using those to evaluate overall course grades. To calculate your grade, use the equation above. Using that equation, letter grades will be determined as:

Letter Grade:	A	B	C	D	F
% of Total Points:	90.0 - 100%	80.0 - 89.99%	70.0 - 79.99%	60.0 - 69.99%	0 - 59.99%

Should you have a question concerning the way that your lab was graded, or if you think that there was an error in calculating the lab score, then it is your responsibility to bring the matter to the attention of the instructor within three calendar days of the date when your lab score was updated on your blackboard.

Laboratory Notebook: All written work related to the lab, must be recorded in the notebook using permanent ink. You are expected to maintain an accurate and detailed record of your work in this laboratory notebook, which should be solely devoted to this course. Always bring your lab notebook to class so you can document step-by-step experimental details and observations for each experiment. Your notes should be thorough enough that another person could accurately reproduce the work you conducted. Photograph your notebook pages and insert them as supporting information, in the correct order, at the end of your report.

Lab Performance: In addition to your lab report, you will be graded on your performance and skill during each lab session. This includes your preparedness for the lab (e.g., completion of the pre-lab and understanding of the procedure), your execution of the experiment (e.g., awareness and competence in what you are doing), adherence to safety protocols (e.g., wearing goggles, keeping reagents in the hood), and maintaining the cleanliness of your work area.

Lab Reports: Lab reports must be written in the ACS journal style format. Unless otherwise specified, lab reports in PDF form are due at the beginning of the following lab period. Your report should be concise yet thorough, providing a complete account of the experimental work conducted, along with relevant characterization data and spectra. The report must include the following sections:

- A. Title.
- B. Author and affiliation.
- C. Abstract: A summary of the experiment.
- D. Introduction: Background information and the purpose of the experiment.
- E. Experimental: A detailed step-by-step account of the procedures you followed.
- F. Results and Discussion: Presentation and analysis of the data, including any relevant calculations.
- G. Concluding Remarks: A summary of the key findings.
- H. References: A list of any literature cited.
- I. Supporting information: notebook pages.

Reviews and Revisions: Manuscripts are rarely accepted for publication in a journal without requiring some revisions by the authors. Similarly, you will have the opportunity to revise and resubmit your laboratory reports for a better grade. To do so, you MUST append the original graded report to your revised submission and include a brief "Letter to the Editor" explaining how you addressed the initial comments (from the Editor and peer reviewer, if applicable). However, please note that the opportunity to revise may or may not be granted by "the Editor", depending on the quality of your original report.