

Chemistry 427: Inorganic Chemistry Laboratory

2021 Spring

Location: CSL 228

Time: Monday 2-5pm Wednesday 11-2pm; 2pm-5pm

Instructor:

Prof. Yong Yan

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Prof. Carl Carrono

GMCS 213B

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Course Catalog Description:

Skills and knowledge needed for success in inorganic chemistry experimental laboratory. This class includes techniques for inorganic synthesis, key protocols, characterization for inorganic materials.

Scope and Purpose:

This class is designed for undergraduate students and will cover four parts: 1, fundamental experimental understanding of Coordination Chemistry; 2, Deep understanding of Coordination Chemistry; 3, bioinorganic/organometallic chemistry; 4, solid state chemistry. This class will be started with the first week for general safety instruction and check-in. Four parts will be spread into 12 weeks of experiments. The designated lab will be started from week 2 with an one-hour lecture illustrating chemistry mechanism, lab procedures and specific safety related matters at the beginning and followed by the lab work. The week 14 will be dealing with lab summary/report and check out. The week 15th will be designated for final exams.

Office Hours: e-mail Prof. Carrono or Prof. Yan for an appointment

Course Information: Available on Blackboard

Grading:

40% quiz's

10% notebook

10% product yield/appearance/general lab practice

40% lab reports

Total

100 Points

Grading Scale: A = \geq 92.5%

A- = 89.5-92.4%

B+ = 87.5-89.4%

B = 82.5-87.4%

B- = 79.5-82.4%

C+ = 77.5-79.4%

C = 72.5-77.4%

C- = 69.5-72.4%

D+ = 67.5-69.4%

D = 62.5-67.4%

D- = 59.5-62.4%

F < 59.4%

Students with Disabilities:

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services (SDS) at (619) 594-6473. To avoid any delay in the receipt of your accommodations, contact SDS as soon as possible. Please note that accommodations are not retroactive, and that accommodations cannot be provided until you have presented your instructor with an accommodation letter from SDS. Your cooperation is appreciated.

week	Topic(s)	Location
1	General instructions, Safety, Check in	CSL 228
2	Coordination chemistry-1	CSL 228
3	Coordination chemistry-1	CSL 228
4	Coordination chemistry-1 (lab report due for part 1)	CSL 228
5	Coordination chemistry-2	CSL 228
6	Coordination chemistry-2	CSL 228
7	Coordination chemistry-2 (lab report due for part 2)	CSL 228
8	Bioinorganic/organometallic chemistry	CSL 228
9	Bioinorganic/organometallic chemistry	CSL 228
10	Bioinorganic/organometallic chemistry (lab report due for part 2)	CSL 228
11	Solid state chemistry	CSL 228
12	Solid state chemistry	CSL 228
13	Solid state chemistry ((lab report due for part 3)	CSL 228
14	Summary and check-out	CSL 228
15	Final exams	CSL 228

Student Outcomes

Upon completion of this course students will be able to:

- 1) Teach undergraduates successfully in laboratories.
- 2) Perform safely in a laboratory both as a student and as a researcher.
- 3) Evaluate ethical situations associated with research and know the appropriate steps to take in order to maintain high ethical standards.
- 4) Be knowledgeable of the diversity of research within the department in order to make an appropriate choice of research for their graduate study.
- 5) Search efficiently for the chemical information they will need for their course and research work.
- 6) Use popular chemistry software.

SDSU's Rest and Recovery Days policy: There will be no instruction, no assignments, no deadlines, and no exams during the Rest and Recovery Days on Friday, Feb. 12; Monday, March 8; Tuesday, March 30; Wednesday, March 31; or Thursday, April 15.

University Policies:

Accommodations: If you are a student with a disability and are in need of accommodations for this class, please contact Student Ability Success Center at (619) 594-6473 as soon as possible. Please know accommodations are not retroactive, and I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Ability Success Center.

Student Privacy and Intellectual Property: The Family Educational Rights and Privacy Act (FERPA) mandates the protection of student information, including contact information, grades, and graded assignments. SDSU e-mail will be used to communicate with you. Students will be notified at the time of an assignment if copies of student work will be retained beyond the end of the semester or used as examples for future students or the wider public. Students maintain intellectual property rights to work products they create as part of this course unless they are formally notified otherwise.

Religious observances: According to the University Policy File, students should notify the instructors of affected courses of planned absences for religious observances by the end of the second week of classes.

Academic Honesty: The University adheres to a strict policy prohibiting cheating and plagiarism. Examples of academic dishonesty include but are not limited to: ● copying, in part or in whole, from another's test or other examination; ● obtaining copies of a test, an examination, or other course material without the permission of the instructor; ● collaborating with another or others in work to be presented without the permission of the instructor; ● falsifying records, laboratory work, or other course data; ● submitting work previously presented in another course, if contrary to the rules of the course; ● altering or interfering with grading procedures; ● assisting another student in any of the above; ● using sources verbatim or paraphrasing without giving proper attribution (this can include phrases, sentences, paragraphs and/or pages of work); ● copying and pasting work from an online or offline source directly and calling it your own; ● using information you find from an online or offline source without giving the author credit; ● replacing words or phrases from another source and inserting your own words or phrases.

The California State University system requires instructors to report all instances of academic misconduct to the Center for Student Rights and Responsibilities. Academic dishonesty will result in disciplinary review by the University and may lead to probation, suspension, or expulsion. Instructors may also, at their discretion, penalize student grades on any assignment or assessment discovered to have been produced in an academically dishonest manner.

Schedule:

Part 1

Coordination Chemistry (optical spectroscopy and IR)

In this module you will:

- a) prepare 5 Co(III) complexes with various ligands
- b) Obtain and assign their optical (d-d) spectra
- c) Determine the values of B and 10 Dq from the spectra
- d) Determine a spectrochemical series based on your results
- e) Submit a lab report

Part 2

Coordination Chemistry (magnetic susceptibility)

In this module you will:

- a) Synthesize three (3) transition metal complexes of acetyl acetone

- b) Determine the metals oxidation state via magnetic measurements**
- c) Synthesize the red and green isomers of $[\text{Ni}(\text{tmen})(\text{acac})]^+$**
- d) Use magnetic measurements to determine which is octahedral and which is square planar**
- e) Submit a lab report**

Part 3

Bioinorganic/Organometallic Chemistry (NMR, and IR)

In this module you will:

- a) Synthesize two biomimetic vitamin B12 model complexes
- b) Obtain and assign the major bands in their IR and/or Uv-vis spectra as appropriate
- c) Obtain and interpret the NMR.
- d) Submit a short lab report

Part 4

Solid State Chemistry

(UV-vis, XRD)

In this module you will:

- a) Synthesize two solid state Cesium Lead Halide Perovskite Quantum Dots**
- b) Interpret their XRD pattern**
- c) Obtain and interpret their UV-vis spectra and determine their band gap**
- d) Observe their photo-luminescent properties**
- e) Submit a short lab report**