Instructor

Prof. Matt Liptak
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Lecture

TR 10:05 – 11:20 AM, Rowell 115

Office Hours

WR 1:00 – 2:00 PM, Cook A116

Exams

March 3, April 21, 10:05 – 11:20 AM, Rowell 115
May 12, 1:30 – 4:15 PM, Rowell 115

Course Description

Determination of molecular and electronic structure of inorganic complexes using spectroscopic techniques. Topics include ligand field theory, magnetism, magnetic resonance, Mossbauer spectroscopy, and X-ray crystallography.

Textbook

Que, Lawrence Jr. *Physical Methods in Bioinorganic Chemistry: Spectroscopy and Magnetism*, University Science Books, 2000.

Web Content

Lecture notes will be available through Blackboard (bb.uvm.edu). These materials are available for all current, UVM-affiliated, students, but they may not be shared off-campus without permission of the instructor.

Course Goals

Upon completion of Chemistry 236, it is anticipated that you will:

1. Identify appropriate physical characterization tool(s) for an inorganic species of interest.
2. Describe the sample and instrumentation requirements for these techniques.
3. Analyze spectroscopic data using group theory.
4. Understand physical characterizations of inorganic species described in the literature.

Academic Honesty

As UVM students, you are expected to conduct yourself in accordance with the Code of Academic Integrity: http://www.uvm.edu/policies/student/acadintegrity.pdf

Our Common Ground

As UVM students, you are expected to conduct yourself in accordance with Our Common Ground: http://www.uvm.edu/~presdent/?Page=miscellaneous/commonground.html

Accommodations

All special accommodations must be requested via e-mail before February 1, 2016.

Course Schedule

Jan. 19: Chapter 2.3: Vibrational Spectroscopy
Jan. 21: Chapter 1.1-1.5,1.8-1.11,1.III: Main Group Electronic Spectroscopy
Jan. 26: ***NO CLASS***
Jan. 28: ***NO CLASS***
Feb. 2: ***PS #1 DUE,*** Chapter 1.12-1.15,1.17,1.I: Transition Metal Electronic Spectroscopy
Feb. 4: PDF on Blackboard: Luminescence Spectroscopy
Feb. 9: Chapter 9.1-9.3: XANES Spectroscopy
Feb. 11: Chapter 9.4-9.5: EXAFS Spectroscopy
Feb. 16: ***PS #2 DUE,*** Chapter 5.1-5.7: Circular Dichroism Spectroscopy
Feb. 18: Chapter 1.6-1.7,1.16, 1.II: Vibronic Coupling
Feb. 23: Chapter 2.1-2.2: Raman Spectroscopy
Feb. 25: Chapter 2.4: Resonance Raman Spectroscopy
Mar. 1: ***PS #3 DUE, NO CLASS***
Mar. 3: ***EXAM # 1***
Mar. 8: ***NO CLASS***
Mar. 10: ***NO CLASS***
Mar. 15: Chapter 3.1-3.2D,3.I-II: EPR of $S = ½$, $I = 0$ Metals
Mar. 17: Chapter 3.2D-3.4,3.III-V: EPR of $S \geq ½$, $I \geq 0$ Metals
Mar. 22: Chapter 7.1-7.5,7.I-II: Magnetic Susceptibility of Mononuclear Metal Centers
Mar. 24: Chapter 7.6-7.7,7.III: Magnetic Susceptibility of Polynuclear Metal Centers
Mar. 29: ***PS #4 DUE***, Chapter 5.8-5.9A: MCD Spectroscopy
Mar. 31: Chapter 5.9B-5.10: VTVH MCD Spectroscopy
Apr. 5: ***PS #5 DUE,*** Chapter 8.1A-B,8.I: NMR Spectroscopy of Paramagnetic Complexes
Apr. 7: Chapter 8.1C-D: NMR Relaxation of Paramagnetic Complexes
Apr. 12: Chapter 8.2,8.II-III: 2D NMR Spectroscopy
Apr. 14: PDF on Blackboard: NMR Resonance Assignment Strategies
Apr. 19: ***PS #6 DUE, Student Presentation Day #1***
Apr. 21: ***EXAM # 2***
Apr. 26: ***Student Presentation Day #2***
Apr. 28: ***Student Presentation Day #3***
May 3: ***Student Presentation Day #4***
May 12: ***FINAL EXAM***

Grading

Exams (50%): A total of 3 exams are schedule for Chem 236. Make-up exams will not be administered, but the lowest score will be dropped.

Problem Sets (25%): A total of 6 open-book, open-notes problem sets will be assigned throughout the semester. Problem sets are due at **10:00 AM** on the due date. Late Problem sets will not be accepted, but the lowest score will be dropped.

Class Presentation (25%): Each student will give a 20 minute presentation on a recent physical inorganic chemistry article from the literature of his/her choice to the class.