
CHEM 542L PHYSICAL CHEMISTRY II LAB

Syllabus and Class Schedule

Course Description Chemistry 542L involves the application of experimental and computational techniques to the study of quantum mechanics, spectroscopy, and molecular structure. (1 credit hour)

Prerequisites Completion of CHEM 541L and CHEM 542 (co- or prerequisite).

Instructor Lisa Lever, Ph.D.
Office: Smith 409
Office hours: M 10:00-11:00, TTH 9:30-10:30, and T 1:00-3:00 and by appointment
email: llever@uscupstate.edu
website: <http://faculty.uscupstate.edu/llever/>
Phone: 503-5713

Required Lab Notebook: Students must have a laboratory research notebook with carbonless paper. These are available in the USC Upstate bookstore. During lab, students should record their lab procedures, observations made, and data taken in their lab notebook.

Full length lab coat with long sleeves

Goggles stamped with "Z87.1"

Attendance All lab work must be completed. Any labs missed must be made up at a time when the instructor is available. Lab experiments are performed in groups, and all students are responsible for their contribution to the group.

Lab Preparation

Students should carefully read the lab handout before coming to lab and plan how to make the best use of the lab time. If solutions need to be prepared during the first lab period, the student should do all the necessary calculations to determine the masses or volumes needed before coming to lab. These calculations should be done in the lab notebook. Before the second week of the lab experiment, students should complete all lab calculations from the previous week's work, and be prepared to discuss their results.

Internet

Lab assignments and course web links will be posted on the instructor's web site at:

<http://faculty.uscupstate.edu/llever/>

Lab handouts on safety, keeping a lab notebook, writing lab reports, Excel and Mathcad assignments, and references needed to write the reports will be posted on Blackboard:

<https://blackboard.sc.edu/>

Technology

Students are encouraged to bring their laptops or tablets to lab to work on exercises, data entry, and analysis. Mathcad and Gaussian/GaussView software is accessible only through the Pchem Spartan GreenSky desktop. You will need to download the appropriate VMware software to your personal device to access the Pchem desktop. Information on downloading the software is found at

<https://spartangreensky.uscupstate.edu/>.

Lab Reports

Lab reports in physical chemistry should be written and formatted to resemble articles in the *Journal of Physical Chemistry*. Abbreviated reports will be written for three of the lab experiments, and complete or formal reports will be written for two of the lab experiments (see Grades section). Even though students work in groups in the lab, **lab reports must be an individual effort**. Abbreviated lab reports will be due one lab period after completion of the lab. The formal reports will be due about two weeks after completion of the lab (see schedule for dates). There is a 3 point deduction per day (including Sat. and Sun.) for late lab reports, and **reports more than 4 days late will not be accepted**.

Grades Grades for the laboratory course will be based on lab reports and report revisions, assignments, lab notebooks, preparation for lab, and participation in lab. Grades will be calculated as follows:

Lab safety and Laser safety tests	10%
Abbreviated lab reports for 3 expts:	45%
Flash photolysis	
Fluorescence quenching	
IR and Raman spectroscopy	
Formal lab reports for 2 expts:	40%
Cyclodextrin inclusion	
Cl ₂ O ₄ in the Stratosphere	
Preparation for lab, lab participation	5%

Grading scale: A ≥ 90 > B+ ≥ 87 > B ≥ 80 > C+ ≥ 77 > C ≥ 70 > D+ ≥ 67 > D ≥ 60 > F

Learning Goals

Students will

- Test theoretical principles and obtain basic experience with physical measurements.
 - Keep a laboratory notebook record of experimental work.
 - Use computer skills to fit experimental data to theory and to analyze data.
 - Interpret findings and make judgements based on statistical analysis.
 - Communicate results through written lab reports.
 - Work cooperatively in a group setting.
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Disability Statement

USC Upstate supports the ongoing development of an accessible university that embraces diversity through educational programming, services, resources, and facilities that are usable by all members of the campus community. In keeping with University policy, any student with a disability who requests academic accommodations should contact Disability Services at 503-5199 to arrange an appointment with a Disability Services staff member. Students are encouraged to seek an appointment as early in the semester as possible, as accommodations are not provided retroactively.

Chemical Exposure

Consult a physician if you are pregnant or have any other medical condition which might render you susceptible to exposure to the chemicals used in this laboratory.

Chemistry 542L Tentative Schedule

Date	Group 1	Group 2	Due
Jan. 11	Organizational meeting, safety, laser safety training, solution prep		
Jan. 18	Cyclodextrin inclusion complex	Flash photolysis	Safety quiz
Jan. 25	Cyclodextrin inclusion complex	Flash photolysis	
Feb. 1	Cyclodextrin inclusion complex	Cyclodextrin inclusion complex	Gr. 2 Expt. 1 report
Feb. 8	Flash photolysis	Cyclodextrin inclusion complex	Laser safety test
Feb. 15	Flash photolysis	Cyclodextrin inclusion complex	Gr. 1 Expt. 1 full report
Feb. 22	IR and Raman spectroscopy	Fluorescence quenching	
Mar. 1	IR and Raman spectroscopy	Fluorescence quenching	Gr. 1 Expt. 2 report Gr. 2 Expt. 2 full report
Mar. 8	Spring Break		
Mar. 15	Fluorescence quenching	IR and Raman spectroscopy	Expt. 3 report
Mar. 22	Fluorescence quenching	IR and Raman spectroscopy	
Mar. 29	Cl ₂ O ₄ in the stratosphere		Expt. 4 report
Apr. 5	Cl ₂ O ₄ in the stratosphere		
Apr. 12	Cl ₂ O ₄ in the stratosphere		
Apr. 19	Make up day		

Mar. 17: Last day to withdraw without penalty

This is a tentative syllabus, and the instructor reserves the right to make adjustments in the syllabus and schedule as necessary.