

# Solid State Chemistry

Chemistry 3130 & 7130 FallB 2013 Oct 21–Dec 13, 2013

Prof. Joel S. Miller (jsmiller@chem.utah.edu) HEB 2124 801 585-5455

(Secretary Whitney Cox, wcox@chem.utah.edu HEB 2108 801 581-5784)

**Inorganic Chemistry Majors**  
**Organic Chemistry Majors**  
**Physical Chemistry Majors**  
**Analytical Chemistry Majors**

**Materials Science & Solid State Physics Majors**

***Note: You Must use your University of Utah email address  
as email from other URL domains may not be received or read  
(Do not send assignments or confidential information by email)***

Text: Solid State Chemistry, 4<sup>th</sup> Ed. L. E. Smart and E. A. Moore

- I. Overview of solid-state chemistry particularly in relation to physics and materials science
  - II. Preparation of solids
  - III. Characterization of solids
  - IV. Structures and Bonding of solids
  - V. Physical Properties of solids
- Emphasis will be placed on developing materials concepts from the knowledge gained from the study to molecules and ions to solids with a focus toward the unique attributes of solids. Representative examples of materials illustrative key points will range from classical 3-D network oxides to molecular solids as well as polymers. Basic concepts and state-of-the-art controversies and limitations will be highlighted in the course.

Lectures/Discussions MTuWF (11:50 - 12:47) in HEB 2002

No classes: Nov. 29 (Thanksgiving), Dec 2, 3, 4, 6

-50% for Late Assignments

**Midterm Examination:** Monday, Nov 4<sup>th</sup> 11:50 - 12:50 in HEB 2002

**Final Examination:** Saturday, Dec 14<sup>th</sup> 9:30 - 11:30 in HEB 2002

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EXPECTED LEARNING OUTCOMES for

Chem 3130/7130 **Solid-State Chemistry**

- a. Graduate students will learn the unique properties organic and inorganic solids have with respect to compounds in solution or in the gas phase, and understand the breadth of compositions and structure solids can have.
- b. Graduate students will learn the methods used to prepare, purify, and crystallize that are specific for organic and inorganic solids.
- c. Graduate students will learn the spectroscopic, diffraction, microscopic, thermal, and magnetic methods used to characterize organic and inorganic solids.
- d. Graduate students will learn the aspects of the bonding and key structural types for ion-based solids.
- e. Graduate students will learn the unique optical, electrical, magnetic, thermal, and mechanical properties of solids that are not present for compounds in solution or in the gas phase.
- f. Graduate students will gain an appreciation of the importance and contemporary applications of solid-state science in our society.

# General Information

Cellular telephones, pagers etc. **must** be turned off during all lectures, discussion sections, and examinations. If your phone/pager, etc. rings during an exam, you will be dismissed immediately.

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations.

All written information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

Use of any electronic device, other than a calculator, is NOT permitted during examinations, and must be turned off and stowed. Unless specifically stated, you must not look at notes, books, or any papers other than your own exam paper. You may not leave the room until you have turned in your exam, without instructor permission. ID may be required to receive or turn in an exam.

## Examination Regrading Policy

Legitimate questions about the grading of an exam (either the grading of a particular problem or an addition error in the score) can be submitted up to one week after the exam is handed back in your discussion class. The procedure for handing back an exam for regrade is to attach a separate piece of paper to the front of the exam with your name, your student ID number, the number of the question(s) to be regraded, and a clear, brief justification for the regrade. This is to be submitted to me or to my secretary in HEB 2120.

**Do not write on the exam itself** or I may choose not to accept it for a regrade. Trivial resubmissions are strongly discouraged and may result in the entire exam being regraded. Anyone caught turning in an altered exam for additional credit will be promptly referred to the Dean's Office and be given a Grade of 'E.' By submitting an assignment or exam, you are representing that it is your own work and that you have followed the rules associated with the assignment. Incidents of academic dishonesty will be dealt with severely. Anyone caught cheating on an exam will be referred to the Dean for immediate disciplinary action and should expect to receive an 'E' in the course. This policy includes, but is not limited to, cheating in the classroom, altering graded course materials, and plagiarism (quoting or paraphrasing other people's words without attribution). Additionally, a letter detailing the cheating incident will be put in the student's permanent academic file. For further details, students should consult the University's "Student Code" (<http://www.admin.utah.edu/ppmanual/8/8-10.html>).

Once a student has two documented incidents of cheating, they will no longer be allowed to enroll for additional chemistry courses.