Syllabus

CHM 6620

Solid State Inorganic Chemistry
Fall 2016

Lecture 6:00 PM – 8:50 PM, Tuesday HPA1 246

Instructor Dr. Fernando Uribe-Romo fernando@ucf.edu
Office: PSB 251
Office Hours: TBA

Text

West, Solid State Chemistry and its Applications, Student Edition Pearson, 2nd Edition, 2014.
Hahn, International Tables of Crystallography Volume A Brief Teaching Edition Edition, Wiley, 5th Ed. 2010.

Other useful resources:

West, Solid State Chemistry and its Applications. Wiley.
O'Keeffe and Hyde, Crystal Structures I. Patterns and symmetry. MSA.
Kittel, Introduction to Solid-State Physics. Wiley.
Cheetam and Day, Solid State Chemistry: Compounds. Oxford.
Hahn, International Tables of Crystallography Volume A. Wiley.

Course goal

To provide a comprehensive and contemporary introduction to solid-state inorganic chemistry and materials chemistry from an atomic perspective. Solid-state chemistry is concerned with the study of composition and structure of chemical compounds found in the crystalline solid state, the properties and reactivity that arise exclusively in such state, and their applications as materials. The goal of this course is to provide students with a foundation to the understanding of the field of solid-state inorganic chemistry.

Topics

The topics to be covered in this course include: basic crystallography, X-ray diffraction, crystal chemistry, crystal defects, non-stoichiometry, bands theory, synthesis, device fabrication, and the study of the electric, magnetic, optical and thermal properties that are exclusive of crystalline materials.

Exams and assignments

Only non-programmable (non-graphing) scientific calculators will be allowed. Use of electronic devices other than calculators (iPod, cell phone, music players, computer, tablets) during exams is strictly prohibited. Any use of such device will be considered an attempt of dishonesty on the exam.

There will be one partial exam, and a final exam. The final exam is cumulative. Mid-term exam will be given during class.

Exam Dates: Mid-term: *Tuesday October 11.*

Final: *Tuesday December 6, 2014. 7:00 pm – 9:50 pm.*

Each exam is 2 h and 50 minutes long.

Exams will be hand-graded. Mixed multiple choice questions and problems, inclusive of calculations/conceptual questions taken mainly from lectures, textbook (exercises, examples, suggested problems), and other course resource material(s). Work paper will be provided. Name, Student ID and signature must be written in the first page of the exam. Initials and NID must be typed at the top of each page (each side) for the work to be graded.

Make-up exam will be **only** given to students who missed exam due to university-related businesses such as representing the university in a conference or an athletic team, jury duty call or medical emergency. Students requesting make-up exams must bring complete original documents for consideration.

A 100-point assignment will be given during the course of the semester. Details on the instructions will be given during the first two weeks of class.

Homework problems and due dates will be posted on webcourses.

Grading

No *half-points* will be given at each exam.
Course Grade will be calculated as follows:

Grading Summary	
Mid term exam	**200 points**
Final exam	**200 points**
Written assignment*	**50 points**
Oral presentation	**50 points**
Homework	**100 points**
Total	**600 points**

Letter Grade:
Will be assigned according to a Gaussian distribution curve.

* A 10-page written assignment will include a literature review and an original research proposal of a topic relevant to the class presented in written and oral form. A list of topics will be published in the webcourses.

Re-grading will be accepted only when absolutely necessary and obvious mistakes were made during grading. After exams are returned, petition for re-grade must be submitted in handwriting within one week after exams are returned. In a separate sheet, print your name and sign, specify question number, correct answer and in ONE short sentence (no paragraphs nor essays), justify the reason for re-grade. Re-grade will be limited to four questions for all exams.

Tips for CHM 6620

- Be responsible of your own study, but collaborative study also complements learning.
- Attend lectures.
- **UNDERSTANDING** the concepts is vital in inorganic chemistry. Memorization is discouraged.
- Review lecture material early and often. Do not wait until the day before an exam to study.
- Sleep well, eat well, do exercise. Drink juice (sugar for the brain) before the exams.
- Review the worked ***exercises/examples*** in the textbook.

- Work on the suggested end-of-chapter problems, both with and without answers.
- Use office hours for discussing the material covered in classes and reviewing exams.
- **ASK QUESTIONS**.
- If you need help in studying techniques, get it ASAP! Make use of the Student Academic Resource Center (SARC); Howard Phillips Hall 113; www.sarc.sdes.ucf.edu.
- Do not lobby/negotiate for a grade or extra points.

Honesty – Honor your Knighthood

Complete academic honesty is expected on all aspects of the course. Any unethical conduct will not be tolerated and will be fully prosecuted according to Florida law and university regulations. Please consult the current Undergraduate Catalog and/or The Golden Rule for definitions and policies.

Student Accessibility

Please supply appropriate documentation and meet with the Student Accessibility Services, Farrell Commons, to discuss accommodations, if required.

Note

Please be reminded that the Instructor reserves the right to modify/change any part of this schedule/syllabus if the need arises.

Holidays: none

Fernando J. Uribe-Romo, Ph.D.

Fernando J. Uribe-Romo received a B.Sc. in Chemistry from Monterrey Institute of Technology and Higher Education (ITESM) in Mexico in 2006 and a Ph.D. in Inorganic Chemistry from University of California, Los Angeles in 2011 under the supervision of Prof. Omar M. Yaghi. He was then a postdoctoral associate at Cornell University with Prof. William R. Dichtel. He joined the Chemistry Department at the University of Central Florida in the fall of 2013. His research focuses on the synthesis of two- and three-dimensional self-assembled polymeric materials, in particular crystalline metal-organic and covalent-organic frameworks for their application in energy conversion, photocatalysis, charge transport and non-linear optical activity.

Tentative Schedule

	Week	Topic	Textbook Chapter
1	Aug 23	Introduction, 2-dimensional lattices and symmetry	1
2	Aug 30	Lattices and 3-dimensional symmetry	
3	Sept 6	Crystal Chemistry	1
4	Sept 13	Crystal Chemistry*	1
5	Sept 20	Crystal defects, non-stoichiometry and solid solutions	2
6	Sept 27	Bonding in solids	3
7	Oct 4	Bonding in solids	3
8	Oct 11	Exam 1	-
9	Oct 18	Synthesis, processing, and fabrication	4
10	Oct 25	Crystallography and diffraction	5
11	Nov 1	Crystallography and diffraction	5
12	Nov 8	Electrical properties	8
13	Nov 15	Electrical properties	8
14	Nov 22	Magnetic and Optical properties	9 / 10
15	Nov 29	Presentation Day	-
16	Dec 3	Last day of classes	
	Tuesday Dec 6	**FINAL EXAM 7:00 pm – 9:50 pm**	

* To be rescheduled.