

Fall 2017 CHEM480: Solid State Chemistry

Instructor: Prof. C. S. Yoo (509) 335-2712; csyoo@wsu.edu

Class Schedule: MWF 10:10 – 11:00 AM at Troy G005

Description:

This class is designed for upper-level undergraduate and graduate students in chemistry, material science and physics. The class will cover fundamental principles of physics and chemistry in solids, explore crystal structure-properties relationships, and discuss about the applications to real world problems such as lasers, semiconductors, multi-functional materials, and energy generation and storage. The relationships among chemical bonding and crystal structure will be emphasized, as well as the experimental methods commonly used to study solids such as synchrotron x-ray diffraction and other spectroscopic methods.

Topics to be covered:

- Crystal Structures
- Bonding in Solids
- Crystallography and Diffraction Techniques
- Other Preparative Methods: Synchrotron X-rays, Laser Spectroscopies, Thermal Analysis
- Crystal Defects
- Phase Diagrams and Polymorphism
- Electric Properties
- Magnetic Properties
- Optical Properties
- Solid State Reactions and Synthesis

Grading:

- Two mid-terms: each 150 pts
- One final: 200 pts.

Text and References:

- R. West, Basic Solid State Chemistry, 2nd editions; also, Solid State Chemistry and its Applications.
- L. E. Smart and E. A. Moore, Solid State Chemistry: An Introduction, 3rd edition
- P. A. Cox, The Electronic Structure and Chemistry of Solids