CHM 6620 -- Solid-State Inorganic Chemistry

Objectives 1. To introduce students to advanced concepts in solid-state inorganic chemistry;

2. To show how solid-state inorganic materials are used in current and emerging applications.

Pre-requisite M.S. or Ph.D. chemistry graduate student or by permission of instructor.

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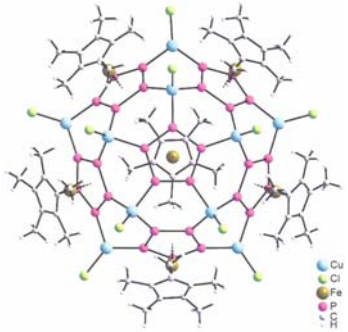
Texts
1. J. E. Huheey, *Inorganic Chemistry*, 4th edn.
2. Anthony R. West, *Basic Solid State Chemistry*, 2nd edn.
3. Selected readings provided via handouts and WebCT

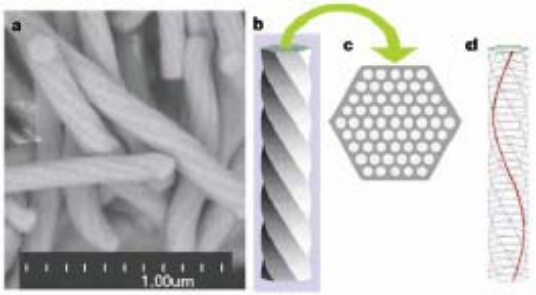


J. Bai *et al.*, *Science* **300**, 781 (2003)

Lecture and Discussion Topics
- Symmetry, bonding, and structure (review)
- Polymorphism, lattice energies, and defects
- Ionic solids
- Oxide and non-oxide crystals and glasses
- Preparative methods (*e.g.* zone refining, chemical vapor deposition, etc.)
- Micro-porous and layered solids, intercalation complexes, inorganic fibers
- Chain, ring, cage, and cluster compounds
- Nano-scale solids (e.g. quantum dots, nanowires, 2D-quantum wells)
- Linear and nonlinear optical materials
- Inorganic polymers (e.g. silicones, polysilanes, polyphosphazenes)
- Inorganic solids in catalysis

Overview

In this course we examine the structure and chemistry of a range of inorganic solids and some of their technological applications. Emphasis is placed on the chemical principles underlying their reactivity and preparation. This course will be valuable to students interested in solid-state chemistry, catalysis, materials science, environmental chemistry, or in general, all of the exciting things we can do with the 100+ elements of the periodic table!



S. Che *et al.*, Nature **429**, 281 (2004)