CHEM.521 Inorganic Chem. I

Syllabus, Fall 2001:

The following is a guide to the course content, though not all topics will necessarily be covered during this particular Fall quarter, and I hope to render some improvements during the quarter.

• Review: Common oxidation states & configurations of main group and transition metal ions. Electron-counting methods for assembling molecules: applicability of 8-ε criterion; Lewis structures and Gillespie-Nyholm (VSEPR) rules.

• Term & state description of metal cations. Molecular magnetism in simple cases.

• Inorganic nomenclature.

• Molecular shape and topology. Symmetry operations: Cn, Sn, σ, i; symmetry elements in molecules. Bond dipoles and molecular dipole moments.

• Cohesion in the solid state. Molecular lattices. The X-ray diffraction method.

• Polar bonds & extended interactions (SiO₂, PdCl₂, BeCl₂).

• (Poly)silicates, zeolites, covalent lattices, layer lattices, fullerenes.

• Ionic lattices: coordination numbers, the radius ratio idea, lattice energy & Born-Landé/Meyer model, Born-Haber cycle, Kapustinskii’s method.

• Introductory molecular orbitals: from homonuclear diatomics to band structure of elements' lattices; electronic (semi)conductors.

• Metallic lattices, nonstoichiometric lattices.

• The coordinate bond: Lewis acids & bases, coordination compounds, ligands.

• Metal ions in solution: hydration, common chelating agents, coordination geometries, simple isomerism. Chelate and macrocycle effects.

Text:


Another good text is:


Relationship to other courses:

CHEM.521 starts off by briefly reviewing certain essential concepts of atomic & molecular properties, treats several typical inorganic structure types and subsequently lays the foundation for CHEM.522's symmetry-based treatment of transition metal complexes and inorganic MO's.

Missed Exams?

You don't need an excuse to take the make-up exam if you miss a midterm or final. But you must then attend the make-up at the designated time and place or take a zero on it - no excuses. All the make-ups will be on the afternoon of Monday, Dec. 16th.

Other stuff: Work on the problem sets as soon as we have covered the material in class!! If you do not do the homework, you will find it hard to pass the exams, and virtually impossible to get a good grade. Answers are provided for some homework problems, while others require a descriptive/essay answer. You are encouraged to discuss these with me at our mutual convenience.

Your grade is based on the (usually three) exams: two midterms (15%, 25%) plus a final exam (60%). If you are not officially registered in the course, no midterms or quizzes will be graded or returned. Exam coverage is based on the content of the lectures and problem sets.

The 15-Minute Rule: If I'm more than 15 minutes late, consider the class cancelled. If you are going to leave early, or be more than ten minutes late for a class, please have the courtesy to inform me beforehand.

The best way to get in contact with me is normally by Email - e.g., to make an appointment to discuss course material.