

CHEM.523 Spring 2016

C523Spring16-1

Relationship to other courses:

The pre-requisite is CHEM.522.

Planned Course Content.

- Raman spectra: polarization of Raman lines; resonance Raman.
- Molecular orbital symmetry for metal complexes; projection operators, π -bonding.
- *Electronic Spectra: electronic circular dichroism*: Optical rotation units, ORD & CD; Cotton Effect; magnetic-dipole rule (qualitative); Kuhn anisotropy; sources of chirality in metal complexes; metalloprotein CD.

Electrochemical methods.

- Introduction to inorganic electrochemistry: potentiometric measurements, E° , E_f & $E_{1/2}$ values, (cyclic) voltammetry; peak current ratio, (ir)reversibility.
- *Intro. to Electron Paramagnetic resonance*: hyperfine splitting; spin-orbit coupling, g -anisotropy, solution & 'powder' spectra, structure examples from Cu(II) chemistry, Zero-Field Splitting exemplified by Fe(III).
- *Kinetics of substitution at T.M. centres*: Lability & inertness. Mechanism: associative, dissociative, interchange; Experimental aspects, CFAE model and other ligand effects. Solvolysis, anation. Square-planar associative mech., *trans*-effect
- *A Bit More Organometallic Chemistry.*
Metal nitrosyls, oxidative addition, cone angles, metallocenes.
- *Bioinorganic Chemistry Examples:*
Oxygen-transport proteins, cytochrome-*c*.

Text Sources:

- 1) There will course material on the course's Bb/Learn website.
- 2) Shriver & Atkins: : *Inorganic Chemistry* (currently 6th Edn., Freeman 2015), or Housecroft & Sharpe: *Inorganic Chemistry* (currently 4th Edn. Prentice-Hall, 2012) The texts usually have related web-based illustrative materials.
- 3) A. Vincent: *Molecular Symmetry & Group Theory*. 2nd Edn., Wiley, 2001.
- 4) On Reserve in Hagerty Library: R.S. Drago, *Physical Methods for Chemists*, Saunders College Publishing, 1992 (QD453.2.D7.1992)

Other stuff: Attempt to solve the homework problems 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. Your grade is based on the three exams (two midterms plus a final exam, and I'll possibly also assign gradeable homework. If you are not registered in the course, no midterms or quizzes will be graded or returned.

My grade ranges are: D= 43-45; D+=46-49; C-=50-53; C=54-56; C+=57-59; B-=60-64; B= 65-69; B+=70-75; A-=76-83; A=84-91; A+=92-100.

Much communication about exams, problem sets, *etc.*, will be by Email.

Make-Up Exams ?

You don't need an excuse to take a make-up exam if you miss a midterm or final. You can take a makeup for just one exam, but you must attend the make-up at the designated time and place or take a zero on it - no excuses. The final exam is planned to be 6-8 PM on Tuesday June 7th; make-ups will be held shortly thereafter - likely on the 10th or 13th. Tentative midterm dates are April 19th & May 17th.

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