Chemistry 842
Materials Chemistry
Electrical, Magnetic, and Optical Properties of Molecular Materials

Spring Semester 2006

9:55 am, MWF, 2373 Chemistry

Instructor Professor Robert J. McMahon — 6209 Chemistry
mcmahon@chem.wisc.edu — phone: 262-0660; FAX: 263-5549

Conducting Polymers

band structure of systems with extended conjugation
mechanism of conduction
methods of preparation; chemical and electrochemical properties of
polyacetylene, polythiophene, polyaniline, metallophthalocyanines, etc.
applications in molecule-based devices

Organic Superconductors

superconductivity in molecular systems
charge transfer salts
fullerides

Organic and Organometallic Ferromagnets

magnetism in molecular systems
molecules with high spin
ferromagnetic polycarbenes (Iwamura, Lahti) and polyradicals (Dougherty, Racja)
ferromagnetic organometallic and molecular inorganic systems (Kahn, Miller)

Organic and Organometallic Nonlinear Optical Materials

origin of nonlinear optical response
relationship between molecular structure and nonlinear optical response
relationship between molecular and bulk properties

"Molecular Electronics"

organic LEDs, electrical conduction, electrical insulation, rectification, bistability

Organic Thin Films

Langmuir-Blodgett films
self-assembled monolayers

Students enrolling for 2 credits will be required to prepare an original, independent research proposal on topic related to the course content. Students enrolling for 3 credits will be required to prepare both an independent research proposal and a paper on a literature topic related to the course content. The proposals will be presented to the class at the end of the semester in the context of an informal "group meeting".

Students interested in auditing or "sitting-in" on this course are welcome.
Please contact Prof. McMahon to notify him of your interest.

*Note: Chemistry 841 is **not** a prerequisite for this course.*