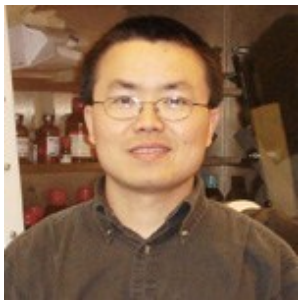
DEPARTMENT OF **CHEMICAL & ENVIRONMENTAL ENGINEERING**

2011 - 2012 **SEMINAR SERIES**



YADONG YIN

ASSOCIATE PROFESSOR
DEPT. OF CHEMISTRY
UC RIVERSIDE

FRIDAY **OCT 7, 2011**
9:30 - 10:30 AM
ENGRII 205/206

Magnetically Responsive Photonic Nanostructures: From Ordinary to Extraordinary

In this presentation I will introduce our recent work on the fabrication of magnetically tunable photonic nanostructures through a self-assembly approach. Superparamagnetic iron oxide colloidal particles are synthesized by using a high temperature hydrolysis reaction, and then self-assembled into ordered photonic crystal structures in solution phase using external magnetic fields. The colloids form chain-like structures with regular interparticle spacing of a few hundred nanometers along the direction of the external field so that the system strongly diffracts visible light. The balance between attraction (magnetic dipole interaction) and repulsion (electrostatic force) dictates interparticle spacing and therefore optical properties. By changing the relative strength of these two forces, we can tune the peak diffraction wavelength over the entire visible spectrum. By controlling the surface properties of the magnetic particles so that the repulsive forces involved, we have been able to assemble the photonic structures in water, alcohols, and nonpolar solvents. The fast, reversible response and the feasibility for miniaturization impart these photonic materials great potential in applications such as optoelectronic devices, sensors, and color displays.