

# UNH Materials Science/Chemistry Joint Seminar

11:10-12:00, Thursday, October 23, 2008

Parsons Iddles L103, University of New Hampshire

## Chemical Indicators Based on the Thermal Phase Transition of Poly(N-isopropylacrylamide) Copolymers

**Prof. Rudi Seitz**

University of New Hampshire

We are developing indicators for chemical sensing based on the thermal phase transition of poly-(N-isopropylacrylamide) (polyNIPA). PolyNIPA is soluble in water at low temperatures and comes out of solutions at high temperatures. The phase transition occurs at the lower critical solution temperature (LCST). Our strategy for sensing ions is based on the observation that a small percentage of a charged comonomer has a large effect on the LCST. We've developed a system for sensing Cu(II) using bipyridine as a neutral ligand incorporated into polyNIPA. We work at a temperature between the LCST for the polymer with the neutral ligand and the much higher LCST for the polymer in the form of the charged Cu(II) complex. Under these conditions, the extent to which the polymer comes out of solution depends on the Cu(II) concentration. We follow this transition by fluorescence resonance energy transfer.

We are also exploring molecular imprinting using copolymers of NIPA and a recognition monomer. Using lightly crosslinked copolymer we have demonstrated selective and sensitive response to theophylline. The copolymer does not respond to caffeine, a compound that differs from theophylline by a single methyl group. More recently, we have explored the possibility of molecular imprinting without crosslinking. Instead, we polymerize with NIPA and a hydrophilic comonomer under conditions where we believe the copolymer will assume a particular conformation. Preliminary data suggest that we are getting molecular recognition without crosslinking.

Host: Professor Marshall Ming x1446