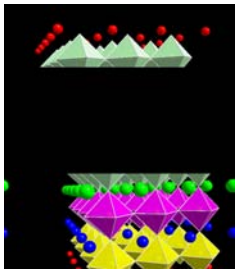
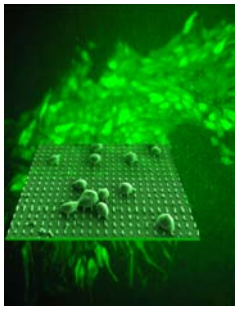
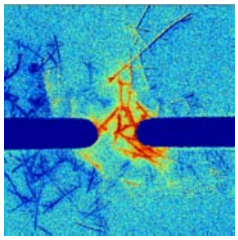
CNMS DISCOVERY SEMINAR SERIES







Friday, December 10, 2010
11:00am
Iran Thomas Auditorium, 8600

Viscoelastic effect on formation of mesoglobular phase (nanoparticles) in dilute solutions: A point of view different from thermodynamics

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Abstract:

Linear homopolymer chains in poor solvent exist either as individual crumpled single chain globules or as macroscopic precipitate, depending on whether the solution is in one- or two-phase region. However, for linear heteropolymer chains in dilute solution, they might be able to form stable mesoglobules (nanoparticles) made of a limited number of polymer chains if the degree of amphiphilicity of the chain is sufficiently high and the experimental conditions are proper. The self-assembly of block copolymers in a selective solvent is one of typical such examples. In practice, the formation of stable mesoglobules can be directly related to the formation of novel polymeric nanoparticles in solution. In this lecture, we will address the formation of mesoglobular phase not only on the basis of thermodynamics, but also mainly from kinetic point of view, which leads to the discussion of how viscoelasticity can affect the phase behavior of heteropolymer chains in dilute solution. The formation and stabilization of several different kinds of novel polymeric nanoparticles will be used to illustrate our discussion.

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Center for Nanophase Materials Sciences