

Reversibility and Kinetic Trapping in Polymeric Nanostructures

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Motivation

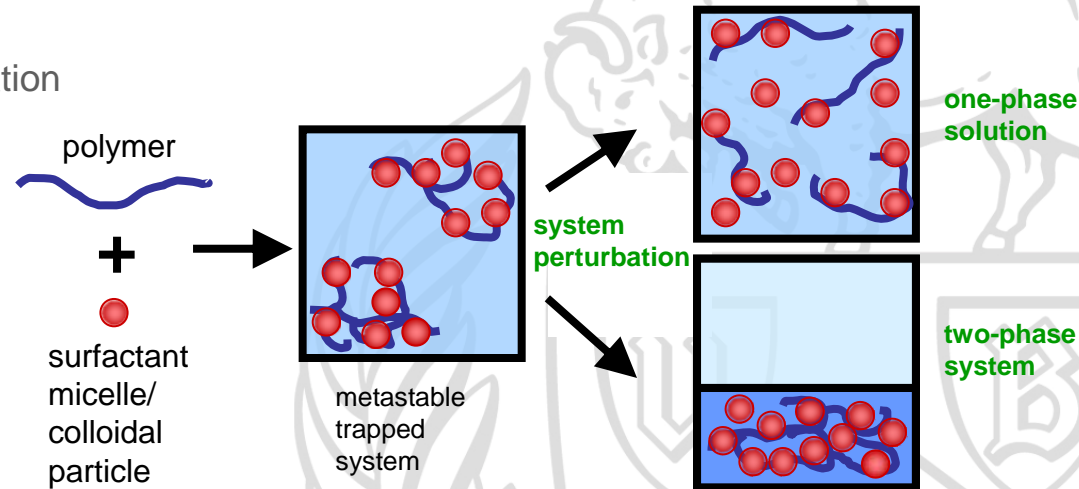
Mixtures of oppositely charged polymers/surfactants/nanoparticles are frequently added to aqueous media to confer desirable properties and structuring. Such organization often requires long times to attain true equilibrium. Despite the widespread use of such systems in large-scale applications, and their great promise in emerging technologies, most aspects that pertain to metastability, kinetic trapping, and redissolution phenomena remain not well understood.

Objectives:

- characterize oppositely charged systems near phase transitions
- examine the time-evolution of complex formation and structure upon mixing
- establish the relationship between phase behavior in polyelectrolyte complexes and multilayer growth

as affected by the

- mixing procedures
- molecular characteristics of species
- charge density of polymers
- sample stoichiometry
- pH, temperature



Possible outcomes following the perturbation of a metastable polymer-surfactant system. The polyelectrolyte and surfactant charges and the counterions are omitted for clarity reasons. Surfactant micelles are depicted as spheres.