Materials Seminar

Thursday, Oct. 20

12:15 pm in Room 1315

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"Multi-compartment/multi-component micelles with block copolymer bending through kinetic control of solution assembly"

The combination of charged block copolymer architecture with the kinetic control of solvent processing offers great flexibility for the creation of new assembled morphologies in solution and outstanding ability to control and manipulate those morphologies. When charged, acidic blocks are present, assembled structures are tunable in a well-defined way via co-assembly of organic bases with adjustable chain structure and control of the solution assembly pathway. A rich variety of polymeric nanostructures have been made such as toroids, disks, and helical cylinders from poly(acrylic acid)-containing diblock and triblock copolymers in THF/water mixtures with multiamines to complex with the PAA. Both the type and amount of multiamine were found to be critical for formation of specific micelles.

Kinetic pathways and temporal stabilities of different micelles and nanoscale aggregates have also been studied. Due to low chain exchange dynamics between block copolymeric micelles in solution, global thermodynamic equilibrium is extremely difficult, if not impossible, to achieve. In our block copolymer/THF/water/multiamine quaternary systems, thermodynamics and kinetics of morphological evolution are governed by three important factors, including chain length of hydrophobic blocks, ratio of THF to water, and the interaction of multiamine with hydrophilic PAA block in the corona. Slow kinetics associated with these factors in solution greatly hinders the system from reaching a global equilibrium. However, by taking advantage of slow kinetics behavior of polymeric micelles in solution, one can purposely produce multicompartment micelles and multigeometry micelles by now mixing different . . .

ATTEND THE SEMINAR TO HEAR THE REST OF THE STORY!