Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Exotic nanoparticles with block copolymer design and solution construction with kinetic contro DARRIN POCHAN, University of Delaware — Kinetic pathways and temporal stabilities of different micelles and nanoscale aggregates have been used to construct exotic nanoparticles in solution. Due to low chain exchange dynamics between block copolymeric micelles and solvent, global thermodynamic equilibrium is extremely difficult, if not impossible, to achieve in block copolymer assembly. However, by taking advantage of this slow kinetic behavior of polymeric micelles in solution, one can purposely produce multicompartment nanoparticles and mulitgeometry nanoparticles by forcing different block copolymers to reside in the same nanoscale structure through kinetic processing. While kinetically trapped in common nanostructures, local phase separation can occur producing compartments. This compartmentalization can be used within common micelle geometries to make complex spheres and cylinders or can be used to make new nanostructures such as multigeometry aggregates (e.g. hybrid cylinder-sphere aggregates, disk-cylinder nanoparticles). Furthermore, new interparticle nanomaterials can be created with hierarchical solution construction methods.

Darrin Pochan
University of Delaware

Date submitted: 13 Nov 2014 Electronic form version 1.4