

Abstract Submitted
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Solution Construction of Multigeometry Nanoparticles and Multicompartment Superstructures from Block Copolymer Mixtures JIAHUA ZHU, Materials Science and Engineering, University of Delaware, SHIYI ZHANG, KAREN WOOLEY, Dept of Chemistry Texas A&M University, DARIN Pochan, Materials Science and Engineering, University of Delaware — Novel soft objects with both compositional and geometric complexity at nanoscale have been constructed through solution supramolecular assembly from block copolymer mixtures due to their non-ergodic character. The mixture is composed of two block copolymers with distinctive hydrophobic blocks but the same poly(acrylic acid) hydrophilic block. First, multigeometry nanoparticles, due to segregation of unlike block copolymer molecules into multiple subdomains trapped within the same micelle-like structures, have been assembled in tetrahydrofuran/water solution. Through carefully designed molecular architecture, mixing ratio and pathway kinetics, both size and shape of subdomains can be controlled to produce a novel class of multigeometry nanoparticles, including sphere-sphere, sphere-cylinder, cylinder-cylinder, cylinder-disk, and sphere-disk hybrid nanoparticles. Second, hierarchical multicompartment superstructures including particle chains, rings and other nano to micro cluster formations, have been built up from pre-formed multigeometry nanoparticles by taking advantage of their surface anisotropy and the controlled particle-particle association. The interparticle association can be achieved via either covalent or non-covalent bindings due to different post-polymerization chemical modifications with hydroxyethyl acrylate or crown ether functionalities, respectively.

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