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Solution self-assembly behavior of block copolymer blends with the same hydrophilic block but different hydrophobic blocks JIAHUA ZHU, Department of Materials Science and Engineering, University of Delaware, KE ZHANG, Department of Chemistry and Department of Radiology, Washington University in Saint Louis, KAREN WOOLEY, Department of Chemistry, Texas A&M University, DARRIN POCHAN, Department of Materials Science and Engineering and Delaware Biotechnology Institute, University of Delaware — Novel micellar structures due to segregation of unlike hydrophobic domains trapped within the same micelle core have been produced via self-assembly of block copolymer blends in tetrahydrofuran/water solution. The blend is composed of two or more block copolymers with distinctive hydrophobic blocks but the same poly(acrylic acid) (PAA) hydrophilic block chemistry. By taking advantage of the complexation in the hydrophilic corona between the acid side chains of the PAA block and added organoamine molecules unlike hydrophobic blocks are trapped in the same micelle core and consequently, locally segregate. This segregation gives rise to a class of new multi-compartment micelle structures in which both the volume and shape of each compartment can be well controlled by changing the blending ratio, block length and kinetic pathway of micelle formation. The arrangement of hydrophilic PAA block and varied hydrophobic blocks within the micelles makes them potential templates for multi-functional composite nanomaterials by putting varied inorganic nanoparticles into targeting domains. Transmission electron, cryogenic transmission electron, and neutron scattering have been applied to characterize the assembled structures

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