## Abstract Submitted for the MAR05 Meeting of The American Physical Society

Investigation of the Unique Phase Behavior of Amphiphilic Triblock Copolymers (PAA-PMA-PS) in Solvent-Nonsolvent Mixtures KELLY HALES, HONGGANG CUI, DARRIN POCHAN, Department of Materials Science and Engineering and Delaware Biotechnology Institute, University of Delaware, Newark, DE 19716, ZHIYUN CHEN, QAI KI, KAREN WOOLEY, Center for Materials Innovation and Department of Chemistry, Washington University in Saint Louis, Saint Louis, MO 63130 — Self-assembling amphiphilic triblock copolymers containing acrylic acid, methyl acrylate, and styrene blocks were investigated under various solution conditions. The block copolymers were dissolved in tetrahydrofuran in the presence of a divalent, organic counterion. Upon the slow addition of water, a variety of unique structures were observed including bulk-like phase separation, spherical micelles, cylindrical micelles, disks, as well as toroidal (ring-like) assemblies. The specific structure formed was dependent on the architecture of the triblock copolymer, the amount of counterion present, as well as the solution conditions. The focus of this work is the basic understanding and characterization of the phase separated structures present in low water content solutions. The understanding of this bulk phase behavior and its effects on the micelles formed at higher water contents will be presented. Cryo-transmission electron microscopy and small, ultra-small angle neutron scattering were used to examine the copolymer solutions in situ while negatively stained, cast films were examined via transmission electron microscopy.

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