Morphological Transitions in a Triblock Copolymer and Its Sulfonated Ionomer: Thermal Annealing and Solvent Effects

SHUJUN CHEN, SAMUEL P. GIDO, Dept. of Polymer Sci. and Eng., Univ. of Mass., Amherst, MA 01003 — The microphase separation behavior of poly(styrene-\(b\)-(ethylene-\(co\)-butylene)-\(b\)-styrene) (SEBS), as well as its sulfonated ionomer (S-SEBS), was studied using TEM and SAXS. The SEBS triblock used in this study has 30 wt % styrene and is expected to form a cylindrical morphology. Upon casting from toluene, a slightly preferential solvent for styrene, however, SEBS revealed a lamellar morphology in TEM, as confirmed by SAXS. After thermal annealing, the morphology changed to core-shell cylinders with EB as the core and styrene as the shell. SAXS confirmed the formation of cylinders in annealed SEBS. The S-SEBS studied has an intermediate sulfonation level of 23 mol %. S-SEBS cast from toluene formed disordered spheres, while S-SEBS cast from THF revealed disordered lamellae. Thermal annealing resulted in little change in the morphology for both samples. Initial examination of S-SEBS samples cast from these two solvents suggested much different viscoelastic properties and quantitative measurements are being conducted using dynamic mechanical analysis.

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