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Phase behavior of linear ABC triblock copolymer JOON CHATTERJEE, FRANK S. BATES, Department of Chemical Engineering and Material Science, University of Minnesota — We report the study of melt phase behavior of poly(isoprene-*b*-styrene-*b*-ethylene oxide) as our model ABC triblock copolymer. Previous investigations on this system have discovered a network phase with O^{70} space group symmetry in an orthorhombic lattice adjacent to network phases with cubic lattice symmetries, namely, alternating gyroid and core-shell gyroid. The present study investigates and expands the phase diagram with varying monomer compositions and temperature. Nearly monodisperse triblock copolymers with controlled molecular weights and block compositions are synthesized by anionic polymerization techniques. Blending of homopolymers with the triblock copolymer is used to refine the phase boundaries. Dynamic mechanical spectroscopy, small angle x-ray scattering, TEM and optical experiments are used to characterize the equilibrium morphologies. Other new phases such as hexagonal cylinders and bcc spheres have been observed. We observe that the phase diagram is not symmetric across the $f_A = f_C$ isopleth.

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