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Stability of Core-Shell-Cylinder Structure of Poly(styrene-*b*-1,3-cyclohexadiene) Diblock Copolymers ASHOUTOSH PANDAY, University of Massachusetts, Amherst, MA 01003, SAMUEL GIDO, Department of Polymer Science and Engineering, University of Massachusetts, Amherst, MA 01003, KUN-LUN HONG, JIMMY MAYS, Department of Chemistry, University of Tennessee, Knoxville, TN 37996 — A new free energy model for rod-coil block copolymer systems is proposed in which the distortion splay energy of continuum elasticity theory is incorporated into the rod domain energies. The model is applied to explain the stability of a core-shell-cylinder morphology which was observed by Gido and coworkers for diblock copolymers of polystyrene (PS) and poly-(1,3-cyclohexadiene) (PCHD). Based on its Kuhn length, the PCHD block can be treated as a rod. The model suggests that the core-shell-cylinder structure is energetically favorable for this system compared to a solid cylinder structure.

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