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Phase Transitions and Honeycomb Morphology in an Incompatible Blend of Enantiomeric Polylactide Block Copolymers[1] LU SUN, JORGE GINORIO, LEI ZHU, Institute of Material Science and Department of Chemical, Materials and Bimolecular Engineering, University of Connecticut, Storrs, CT 06269-3136, LIXIA RONG, IGOR SICS, BENJAMIN HSIAO, Department of Chemistry, State University of New York at Stony Brook, Stony Brook, NY 11794-3400
— Enantiomeric PLAs, poly(L-lactide) (PLLA) and poly(D-lactide) (PDLA), are known to form stereocomplexes. In this work, by using controlled ring-opening polymerization of L- and D-lactides from monohydroxyl-terminated hydrophilic poly(ethylene oxide) (PEO) and hydrophobic poly(ethylene-*co*-1-butene) (PEB) oligomers, respectively, well-defined PEO-*b*-PLLA (2k-5.4k) and PEB-*b*-PDLA (4.2-5.4k) block copolymers were synthesized. Quantitative stereocomplex formation was achieved by casting an equimolar mixture of incompatible PEO-*b*-PLLA and PEB-*b*-PDLA from chloroform at room temperature. Depending on different thermal histories, either lamellar or inverted cylindrical morphology was observed in the molten state. Intriguingly, novel honeycomb morphology with the minor PEB component forming the matrix was observed in the inverted cylindrical phase.

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