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Electrospun Fibers from Self-assembling Polystrene-b-Polyisoprene Block Copolymers YONG LAK JOO, School of Chemical & Biomolecular Engineering, Cornell University, TIMUR IVANNIKOV, JEANNE PANELS, PRASHANT KAKAD, Department of Textiles and Apparel, Cornell University, ULRICH WIESNER, Department of Materials Science & Engineering, Cornell University, MANUEL MARQUEZ, Los Alamos National Laboratory, Chemical Sciences & Technology Division — Formation of submicron scale fibers with various domain shapes via electrospinning poly(styrene-*block*-isoprene) (PS-*b*-PI) has been investigated. Monodisperse PS-*b*-PI block copolymers with a range of compositions were synthesized using anionic polymerization and were dissolved in THF. Solutions of 10 to 40 wt% of PS-*b*-PI in THF were electrospun, and fibers with average diameters from 100 nm to 5 μm were obtained. Transmission electron micrographs taken from a microtomed thin electrospun fiber of a PS-*b*-PI block copolymer show PI cylinders aligned along the fiber axis, whereas TEM images of thicker electrospun fibers reveal that the skin and core regions can exhibit different domain structures. This skin-core differentiation in the fiber is possibly due to concentration gradient during solvent evaporation and short residence time involved in the electrospinning process. The TEM and SAXS studies show more uniform domain structures in the fibers after the removal of the residual solvent.

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