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Induced PEO Crystal Orientation within the Inversed Cylindrical Morphology of PEO-b-PS Block Copolymer PING HUANG, STEPHEN Z. D. CHENG, YA GUO, RODERIC P. QUIRK, The University of Akron, Akron, OH44325, BENJAMIN S. HSIAO, CARLOS A. AVILA-ORTA, IGORS SICS, SUNY, Stony Brook, NY11794 — A poly(ethylene oxide)-*block*-polystyrene (PEO-*b*-PS) diblock copolymer with a M_n for the PS and PEO blocks being 7.7k and 20.1k g/mol, respectively, was studied by small and wide angle X-ray scattering. An inversed cylinder phase morphology was observed with the PS cylinders hexagonally distributed within the PEO matrix. Since the T_g of the PS blocks ($\sim$30 $^\circ$C) is lower than the T_m of PEO crystal ($\sim$ 62 $^\circ$C), the d-spacing of the inversed cylinder phase increased with increasing temperatures greater than 30 ^{o}C. In the inversed cylinder morphology, the PEO is the major phase, and PS cylinders cannot confine the crystallization of PEO. However, T_c dependent PEO crystal orientation changes are induced by the PS cylinders. Furthermore, different from the one-dimensionally preferred crystal orientations when T_c is lower than 30 ^{o}C, the PEO crystals are preferentially oriented in two dimensions when the T_c is higher than 30 ^{o}C in the inversed cylindrical morphology.

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