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Morphological Change of Poly(4-*tert*-butylstyrene-*block*-4-*tert*-butoxystyrene) in a Wide Range of Segregation Strength Though Hydrolysis Reaction SITI SARAH ABDUL RAHMAN, DAISUKE KAWAGUCHI, YUSHU MATSUSHITA, Department of Applied Chemistry, Nagoya University, Japan — Morphological change of symmetric poly(4-*tert*-butylstyrene-*block*-4-*tert*-butoxystyrene)s (BO) upon hydrolysis reaction was investigated by transmission electron microscopy and small-angle X-ray scattering. Segregation strength, χN (χ: interaction parameter, N: degree of polymerization), which governs the chain dimension, was gradually tuned since poly(4-*tert*-butoxystyrene) (O), a non-polar polymer, can be converted into poly(4-hydroxystyrene) (H), a polar one, through hydrolysis. Samples with different molecular weights and conversion rates of O into H, f_Hs, were prepared. Domain spacing of the lamellar structure, D, increased as f_H increases where it abruptly increased at a critical f_H, indicating that the chain stretched perpendicularly to the lamellar interface. The degree of chain stretching compared to a random coil, D/D_0s (D_0: correlation length at f_H=0), were scaled by χN. Three regimes can be distinguished in the plot of (D/D_0) vs. χN: (I) the weak segregation regime with D/D_0 ∼1 that associates with the scaling behavior of $D \sim N^{0.55}$, (II) the intermediate segregation regime with the scaling behavior of $(D/D_0) \sim (\chi N)^{0.34}$, and (III) the strong segregation regime with D/D_0 ∼2.3 which corresponds to $D \sim N^{0.67}$.

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