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Effect of the Degree of Hydrogen Bonding on Asymmetric Lamellar Phase Transformation in Binary Block Copolymer Blends JONGHEON KWAK, SUNG HYUN HAN, HONG CHUL MOON, POSTECH, VICTOR PRYAMITSYN, VENKAT GANESAN, University of Texas, JIN KON KIM, POSTECH — A binary mixture of two block copolymers whose blocks are capable of forming the hydrogen bonding allows one to obtain various microdomains that could not be expected for neat block copolymer. For instance, we reported that the binary blend of asymmetric polystyrene-*block*-poly(2-vinylpyridine) copolymer (as-PS-*b*-P2VP) and polystyrene-*block*-polyhydroxystyrene copolymer (as-PS-*b*-PHS) blends where the hydrogen bonding occurred between P2VP and PHS showed asymmetric lamellar microdomains. Since asymmetric lamellar microdomains are formed due to the interface curvature change by favorable hydrogen bonding interaction between the hydroxyl group and nitrogen atom, a large ratio of lamellar width (thus, enhanced asymmetry) could potentially be achieved by increasing the degree of the hydrogen bonding. We employed two kinds of binary blends (polystyrene-*block*-poly(4-vinylpyridine) (as-PS-*b*-P4VP)/as-PS-*b*-PHS and as-PS-*b*-P2VP/as-PS-*b*-PHS). It was observed by SAXS and TEM that as-PS-*b*-P4VP/as-PS-*b*-PHS blend which exhibits much stronger hydrogen bonding formed asymmetric lamellar morphology at more asymmetric volume fraction where as-PS-*b*-P2VP/as-PS-*b*-PHS blend could not form and the experimental results show qualitative agreement with the SST model prediction.

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