Sungmin Park et al., Chem Sci J 2016, 7:2(Suppl)
http://dx.doi.org/10.4172/2150-3494.C1.003

Phase transition behavior of Asymmetric Polystyrene-*b*-Poly(2-vinylpyridine) Thin Films under Strong Interfacial Interactions : A stable Hexagonally Modulated Layer (HML) Structure

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Phase transition behavior and self-assembly of block copolymer (BCP) have attracted much attention in material science and engineering, due to the periodic nanoarrays providing the platforms with various morphologies. BCP film is confined on the substrate, uaually in thin film geometry, the phase transitions would be altered from those of the bulk, more than likely because the ordering and microdomain orientation are appreciably influenced by the interfaces at air/polymer and polymer/substrate, and commensurability of film thickness to the equilibrium period. In this study, the phase transition of an asymmetric polystyrene-*b*-poly(2-vinylpyridine) (PS-*b*-P2VP) with the minor PS block was investigated by grazing incidence small-Angle x-ray scattering (GISAXS) and transmission electron microscopy (TEM), particularly in the films subjected under the strong interfacial interactions. The resulting transitions in film geometry were dramatically changed with decreasing thickness due to the growing preferential interactions from the substrate. A thickness-dependent transition diagram exhibited a hexagonally modulated layer (HML) as a stable structure that was extended over the entire temperature range.

Biography

Sungmin Park received a BS in Chemical & Biomolecular Engineering at Yonsei University, Korea, in 2011. He is currently a PhD student at Yonsei University. His research interests include the self-assembly and phase transition behavior of block copolymer in thin films.

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