

Preferred Orientation of PS-*b*-PI Diblock Copolymer Thin Films on Magnetic Nanoparticle Monolayers

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We suggest unique method for achieving perpendicular orientation of the anisotropic microdomain of poly(styrene-*b*-isoprene) (PS-*b*-PI) diblock copolymer, which shows large difference in surface tensions of PS and PI blocks. Magnetic nanoparticle (mNP) monolayers on the Si substrate were successfully prepared with aid of Langmuir-Blodgett technique. To study the internal structure of a cylinder-forming PS-*b*-PI on the mNP monolayer, we fabricated bilayer structure by spin coating PS-*b*-PI on top of mNP monolayer by varying the thickness of block copolymer. The simple treatment of Si substrate with mNP created remarkable change in orientation of the PS-*b*-PI diblock copolymer. Particularly, for the higher surface coverage of mNPs above 70 %, clear vertical orientation of the PS-*b*-PI from the mNP substrate was observed in film thickness ranges from 150 nm to 600 nm verified by GISAXS, cross-sectional TEM and AFM.