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The Effect of Tunable Surface Energy Interlayers on the Control of Phase Behavior and Orientation of Block Copolymers in 2D Confinement YOUNGKEOL KIM, SUNGYOUL HWANG, KOOKHEON CHAR, Seoul Natl Univ — There have been many studies to investigate the phase behavior of block copolymers (BCPs) in cylindrical confinement. In the nanometer scale 2D confinement, the phase behavior of BCPs is mainly dependent upon the commensurability of BCPs within confinement and interfacial interaction. However, most studies have focused only on the effects of commensurability on the microdomains of BCP. In this study, we employed organosilicates (OS) which have surface energy, tunable by curing temperature, as interlayers to examine the phase behavior and orientation of BCPs. The OS interlayer was coated on the inner surface of anodized aluminum oxide (AAO) pores by template-wetting method and cured in a range of temperature to control the surface energy of the interlayers. Lamellae-forming poly(styrene-*b*-methyl methacrylate) (PS-b-PMMA) (SMA) was infused into the OS-coated AAO pores by capillary forces. With the detailed analysis, we could identify that the self-assembly of SMA within 2D confinement is influenced by competing entropic and enthalpic effects as the interfacial energy is varied. By simply controlling the curing temperature of the OS interlayer, various morphologies and orientations arising from both the preferential and neutral wetting were identified.

Youngkeol Kim
Seoul Natl Univ

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