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Tunable Surface Energy Interlayer Coating to Control the Phase Behavior of Block Copolymers in 2D Confinement SUNGYOUL HWANG, YOUNGKEOL KIM, DOKYEONG KWON, 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 commensurability and interfacial interaction. However, most studies have focused only on the effects of commensurability on the microdomains of BCP. In this study, we employed organosilicate (OS) which has tunable surface energy upon adjusting curing temperature as interlayer to examine the phase behavior of BCPs as a function of interfacial energy. The OS interlayer was coated in 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 interlayer. Lamellae-forming poly(styrene-b-methyl methacrylate) (PS-b-PMMA) (SMA) in the melt was injected into the OS-coated AAO pores by capillary forces. With the detailed analysis, we note that the self-assembly of SMA within 2D confinement is competitively affected by both entropic and enthalpic effects as the contact interfacial energy is varied. Simply by controlling the curing temperature of the OS interlayer, various morphologies arising from both preferential and neutral wetting were identified.

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