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Orientation Control of Diblock Copolymer Thin Films by the Addition of Amphiphilic Surfactants JEONG GON SON, KOOKHEON CHAR, Seoul National University, PAUL F. NEALEY, HUIMAN KANG, University of Wisconsin — The precise control of the orientation of block copolymer (BCP) thin film is crucial to fully exploit the potential of these materials for applications in nanotechnology. The orientation control is, however, challenging as BCP nanodomains spontaneously self-assemble in a configuration that minimizes the total free energy of the system. The perpendicular orientation of BCP domains, in particular, has potential for device applications. In this presentation, we would like to introduce a new approach for the perpendicular orientation of BCP domains from the top of a BCP film toward a bottom substrate. Our concept is based on the properties of surfactants that naturally locate at interfaces to tailor the surface properties of materials. We demonstrate how the segregation of low molecular weight surfactants, oleic acid (OA) in present case, at the top surface of a PS-*b*-PMMA BCP thin film can easily create energetically neutral conditions for the BCP, resulting in the desired perpendicular orientation. The main advantage of this new approach is that nano-scale patterns can be generated at the top of a BCP film after short annealing time on any substrates. We verified the structures and mechanisms of the surfactant-assisted perpendicular orientation of thin block films using AFM, SEM, GISAXS and Neutron Reflectivity.

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