

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Spontaneous Evolution of Nanostructure in Composite Films Consisting of Mixtures of Two Different Block Copolymer Micelles
HEE KIM, Interdisciplinary Program in Nanoscience and Technology, Seoul National University, KOOKHEON CHAR, School of Chemical and Biological Engineering, Seoul National University, BYEONG-HYEOK SOHN, Department of Chemistry, Seoul National University — Diblock copolymers consisting of two immiscible polymer blocks covalently bonded together form various self-assembled nanostructures such as spheres, cylinders, and lamellae in bulk phase. In a selective solvent, however, they assemble into micelles with soluble corona brushes and immiscible cores. Both polystyrene-poly(4-vinylpyridine) (PS-b-P4VP) and polystyrene-poly(2-vinylpyridine) (PS-b-P2VP) diblock copolymers form micelles with PS coronas and P4VP or P2VP cores in a PS selective solvent (toluene). By varying the mixture ratio between PS-b-P4VP and PS-b-P2VP, composite films based on the micellar mixtures of PS-b-P4VP and PS-b-P2VP were obtained by spin-coating, followed by the solvent annealing with tetrahydrofuran (THF) vapor. Since THF is a solvent for both PS and P2VP blocks and, at the same time, a non-solvent for the P4VP block, PS-P2VP micelles transformed to lamellar multilayers while PS-P4VP micelles remained intact during the THF annealing. The spontaneous evolution of nanostructure in composite films consisting of lamellae layers with BCP micelles were investigated in detail by cross-sectional TEM and AFM.

Sehee Kim
Interdisciplinary Program in Nanoscience and Technology,
Seoul National University

Date submitted: 22 Nov 2009

Electronic form version 1.4