Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

The investigation of the dynamic morphology of block copolymer solutions by laser scanning confocal microscopy (LSCM) HYUNJUNG LEE[1], WONMOK LEE, JONGSEUNG YOON, EDWIN L. THOMAS[2], Department of Materials Science and Engineering, MIT — Recently we applied laser scanning confocal microscopy (LSCM) for the study of block copolymer 3D morphology. Besides static measurement of microstructures (direct 3-D imaging of block copolymer morphology), LSCM also enables the tracking of the fast dynamic process which has been impossible by conventional microscopic techniques such as TEM (transmission electron microscopy) or AFM (atomic force microscopy). In this study, in-situ LSCM investigation of the morphology of confined photonic BCP solution was performed in conjunction with spectroscopic measurement for the first time. When a lamellar forming polystyrene-b-isoprene (480k-360k, PS/PI) in cumene was placed between cover glasses, the continuous evaporation of the solvent induced a shear field along the radial direction (evaporation direction). As a result, the photonic lamellar BCP solution over the whole area developed a series of concentric ring pattern covering entire visible colors (blue to red). Comparison of the experimental result with theoretical calculation (transfer matrix method) revealed that this phenomenon mainly comes from the change of the orientation of BCP lamella based on the reflectivity at each region along the radius..

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Date submitted: 18 Jan 2005 Electronic form version 1.4