

Abstract Submitted
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Thin Film Morphology of Diblock and Triblock Copolymers with Bulk Order-Order Transitions (OOT) K.E. SOHN, R.C. COFFIN, G.C. BAZAN, E.J. KRAMER, UCSB, K. KOJIO, Nagasaki, B.C. BERRY, A. KARIM, NIST, M. SPRUNG, J. WANG, ANL — The thin film morphology of SEB and SEBS block copolymers that have an OOT in the bulk from cylinders to spheres as the annealing temperature is increased was studied as a function increasing film thickness using AFM and GISAXS. For both SEB and SEBS, the morphology is the same no matter if the film is annealed above or below the bulk OOT. The SEB morphology is governed by the free energy penalty due to chain stretching, showing spheres when the film thickness is less than that of a monolayer of cylinders. The cylindrical morphology dominates when the film thickness is larger than that of a monolayer of cylinders. On the other hand, the SEBS morphology is governed by the free energy penalty due to looping of the midblock at the surface. Spheres require a lower fraction of midblocks to loop at the surface than cylinders, therefore spheres pay a lower free energy penalty due to chain looping and were found for all film thicknesses studied (up to $\sim 100\text{nm}$).

Karen Sohn
UCSB

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