

Abstract Submitted  
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**Phase behavior of binary blends of asymmetric diblock copolymers: Bulk and thin films** ADETUNJI ONIKOYI, EDWARD KRAMER, UCSB — Experimental and theoretical investigations of the phase behavior of binary blends of block copolymers in bulk state have been published, yet there is little work on the effects of confinement of such blends to thin films. We investigate the phase behavior of blends of two poly(styrene-*b*-2vinylpyridine) diblock copolymers; one sphere forming (BCP1, with  $f_{P2VP} = 0.12$ ,  $N=538$ ) and the other cylinder forming (BCP2, with  $f_{P2VP} = 0.25$ ,  $N=355$ ). SAXS, TEM and SFM are used to characterize the microstructures formed as a function of temperature, blend compositions and film thickness. Results show that increased surface-induced free energy penalties in thin films lead to a significant change in phase behavior when compared to similar samples in bulk. Order disorder temperatures (ODT), mixing regimes and overall microstructure are strongly affected by the dominant contributions of the surface to the overall free energy of the system. Furthermore, for a regime (with BCP1 blend composition  $\sim 0.4-0.6$ ) of expected mixed phases of 2D hexagonal spheres and parallel cylinders in thin films, we are able to selectively stabilize 2D hexagonal sphere phases rather than the cylindrical phase by appropriate choice of confinement size and geometry.

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