Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Microphase Separation in Thin Films of Block Copolymer Supramolecular Assemblies: Composition Dependent Morphological Transitions and Molecular Architecture Effect[1] BHANU NANDAN, MANFRED STAMM, Leibniz Institute of Polymer Research Dresden — Block copolymer based supramolecular assemblies (SMAs) recently have attracted lot of attention because of their potential application as nanotemplates. These SMAs are prepared by attaching small molecules selectively to one of the blocks of the copolymer through physical interactions. In the present study, the phase behavior of SMAs formed by polystyrene-block-poly(4-vinylpyridine) (PS-b-P4VP) with 2-(4'-hydroxybenzeneazo)benzoic acid (HABA) was investigated with respect to the molar ratio (X) between HABA and 4VP monomer unit in bulk as well as in thin films. It will be shown that these SMAs show some interesting composition dependent and solvent induced pathway dependent phase transitions. Moreover, the orientation of cylindrical or lamellar microdomains of P4VP(HABA) depends on the selectivity of the solvent as well as on the degree of swelling of the thin film. Furthermore, it will be shown that the molecular architecture of the block copolymer influences the orientation and ordering of microdomains in the SMA. Hence, whereas, the cylindrical and lamellar microdomains of SMA composed of a P4VP-b-PS-b-P4VP triblock copolymer were perpendicular to the substrate, those composed from a PS-b-P4VP diblock of similar composition had in-plane orientation of the microdomains.

[1]This research was supported by the priority program of Deutsche Forschungsgemeinschaft (SPP1165, Project No. STA324/31).

Bhanu Nandan
Leibniz Institute of Polymer Research Dresden

Date submitted: 19 Nov 2009 Electronic form version 1.4