Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

UV-Induced Order-to-Order Transition (OOT) in Thin Films of Supramolecular Diblock Copolymer Assemblies Containing 2-(4'-Hydroxyphenylazo)benzoic Acid WEI CHEN, JIA-YU WANG, XINYU WEI, ANNA BALAZS, THOMAS RUSSELL — Long-range lateral ordering and orientation in block copolymer thin films, which are highly desired for the applications requiring addressability, as in magnetic storage, may be obtained in a controlled way via an order-to-order transition (OOT), i.e. a morphological transition in a microphase-separated system. The photoisomerization of azobenzene results in volume changes that, when integrated into copolymers, can bring about phase transitions that, in turn, by sweeping the light across a surface, will promote long-range lateral ordering, similar to zone-refinement process used to produce large single crystals. We investigated UV-induced OOT in the supramolecule-assembled thin films of 2-(4-hydroxyphenylazo)benzoic acid and polystyrene-*block*-poly(2-vinylpyridine) diblock copolymer. Grazing incidence small angle X-ray scattering demonstrated that phase transition from lamellae to hexagonally packed cylinders occurred at 150 °C after UV radiation for 1 hour due to a significantly enhanced interfacial fluctuations induced by photoisomerization as evidenced by X-ray Reflectivity. This suggested that UV light can be utilized to control OOT in the supramolecule-assembled thin films and, hence, to fabricate long-range ordered nanostructures, and even smart responsive surfaces.

Wei Chen
University of Massachusetts, Amherst

Date submitted: 17 Nov 2008

Electronic form version 1.4