

Abstract Submitted  
for the MAR12 Meeting of  
The American Physical Society

**Assembly and Photo-Induced Disorder in Block Copolymer-Additive Systems**<sup>1</sup> LI YAO, JAMES WATKINS, Uni-

versity of Massachusetts Amherst — Additives that hydrogen bond selectively to one block of a weakly ordered or disordered block copolymer can drive phase segregation to yield well ordered materials. Here we show that the addition of D- or L-tartaric acid to low molecular weight, weakly segregated poly(ethylene oxide-block-tert-butyl acrylate), PEO-b-PtBA, induces strong segregation and well ordered morphologies as evidenced by Small Angle X-ray Scattering. This strong interaction between enantiopure tartaric acid and the PEO block also suppresses PEO crystallinity at room temperature. While the addition of racemic tartaric acid does not strengthen segregation nor does it suppress PEO crystallization. The UV-exposure of well ordered films of PEO-b-PtBA/tartaric acid blends containing a photo acid generator followed by a post-exposure bake results in the deprotection of the tert-butyl acrylate block to yield poly(acrylic acid) (PAA). Since PAA and PEO are miscible and tartaric acid can interact strongly with either block, the system becomes disorder, resulting in a photo-induced disordering transition which can be exploited to pattern the surfaces. The kinetic behavior of the disordering transition upon deprotection of PtBA to PAA was studied using Grazing-Incidence Small-Angle X-ray Scattering.

<sup>1</sup>Funding from Center for Hierarchical Manufacturing (CHM); Facility support from Materials Research Science and Engineering Center at University of Massachusetts Amherst (MRSEC UMMS) and Massachusetts Amherst Energy Synchrotron Source (CHESS) Li Yao

Date submitted: 11 Nov 2011

Electronic form version 1.4