Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Additive Driven Self Assembly in Poly(ethylene glycol) monomethyl ether monomethacrylate-block-Poly(ethyl methacrylate) Copolymers CHENG LI, University of Massachusetts Amherst, WENXU ZHANG, Umass Amherst, EDWARD COUGHLIN, JAMES WATKINS, University of Massachusetts Amherst — Recent work in our labs has demonstrated the concept of additive driven assembly by hydrogen bond interactions between poly(ethylene oxide) segments of a disordered PEO containing block copolymer and a nanoparticle or organic additive induces strong segregation in the composite to yield well ordered morphologies. In some cases, these interactions were introduced by light-activated deprotection of functional groups on the additive to enable regioselective, photo-induced order in block copolymer films. While PEO crystallization in these polymers is suppressed by strong interaction between the additive and the PEO segments at high additive loadings, crystallization of the PEO block with no loading or at low additive loadings is highly undesirable for many applications. To remedy this issue, we prepared PPEGMEMA-PEMA using RAFT living polymerization. This block copolymer phase mixed, noncrystallizable at room temperature. The incorporation of organic additives with multiple carboxylic acid groups or functionalized nanoparticles induces phase segregation in these systems. Furthermore, the use of additives in which the hydrogen bond donating group is protected with an acid labile group in combination with a photo acid generator enables photo-induced order of the composite films.

Cheng Li
University of Massachusetts Amherst

Date submitted: 28 Nov 2011 Electronic form version 1.4