

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Elucidation of an Unusual Pull Out Mechanism for the Additive-Driven Assembly of Poly(ethylene oxide)-Poly(propylene oxide)-Poly(ethylene oxide)Tri-block Copolymers VIKRAM DAGA, University of Massachusetts Amherst, HUA-GEN PENG, Polymers Division, NIST, YING LIN, University of Massachusetts Amherst, WEN-LI WU, CHRISTOPHER SOLES, Polymers Division, NIST, JAMES WATKINS, University of Massachusetts Amherst — The addition of poly(acrylic acid) (PAA) to disordered poly(ethylene oxide)-poly(propylene oxide)-poly(ethylene oxide) tri-block copolymers induces microphase segregation to yield well ordered blends with sub-10 nm domain sizes. Unexpectedly, even with large changes in the chain length (up to 10 times that of tri-block copolymer) and loading of PAA (>40%), the domain spacing of the ordered blend remains nearly invariant although order-to-order transitions are still observed. Here we use neutron scattering and selective deuteration of the tri-block copolymer to probe phase segregation and structure in these systems. One interesting observation is the emergence of a pullout mechanism during ordering in which PEO chain segments are drawn across the interface of a mixed PEO-PPO phase to stabilize the addition for PAA and to create a mixed PAA-PEO phase.

Vikram Daga
University of Massachusetts Amherst

Date submitted: 28 Nov 2010

Electronic form version 1.4