Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Manipulating the morphological behavior of ABA triblock copolymers with block polydispersity ADAM SCHMITT, MAHESH MAHANTHAPPA, University of Wisconsin-Madison — As an extension of our ongoing efforts to understand the effects of middle B segment polydispersity on the melt-phase behavior of ABA triblock copolymers, we describe the morphological consequences of block polydispersity in the context of poly(lactide-b-1,4-butadiene-b-lactide) (LBL) triblock copolymers. The complete melt-phase behavior of 52 well-defined LBL triblock copolymers was evaluated using a combination of synchrotron small-angle X-ray scattering (SAXS) and transmission electron microscopy (TEM). Through careful comparisons with monodisperse copolymer control samples, we show that block polydispersity causes large shifts in the composition-dependent phase windows in a manner consistent with previous reports. However, these polydisperse LBL triblocks do not exhibit the substantial domain dilation observed in more weakly segregated SBS triblock copolymers. Based on these observations, we discuss the possibility of using block polydispersity as a new means of tailoring the morphological behavior of microphase separated ABA triblock copolymers.

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Date submitted: 10 Nov 2011 Electronic form version 1.4