Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Kinetics of HEX-BCC Transition of Cylinders to Spheres: Comparison of Time-resolved SAXS data with a Model of Coupled Anisotropic Fluctuations[1] RAMA BANSIL, MINGHAI LI, Boston University, MILOS STEINHART, Institute of Macromolecular Chemistry, Czech Academy of Sciences — The kinetics of the transition of HEX cylinders to BCC spheres was studied by coupling anisotropic fluctuations on cylinders, similar to the pearling instability, according to which the amplitude of a transverse wave along the length of the cylinder grows causing the cylinder to break up into spheroidal droplets. We find that the sphere BCC phase arises with phase shifts of 0, $4\pi/3$ and $8\pi/3$ for the sinusoidal waves on 3 neighboring cylinders on the HEX lattice, which correspond to the minimum of overlap volume of rippled cylinders and wavelength λ related to the nearest neighbor distance of the rippled cylinders by $d = 2\sqrt{2}\lambda/3$. The azimuthally averaged scattering function from an un-oriented system of cylinders, as well as the 2-dimensional scattering from an oriented system was calculated with varying amplitude of the fluctuation. The results are in excellent agreement with time-resolved SAXS measurements of the kinetics of this transition in a Styrene (S)-ethylene-co-butylene (EB)-Styrene (S)) triblock copolymer in mineral oil, a selective solvent for the EB block.

[1]Supported by NSF-DMR

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Date submitted: 16 Jan 2006 Electronic form version 1.4