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Evolution of disordered micelles to hexagonally packed cylinders in a diblock copolymer studied by X-ray Photon Correlation Spectroscopy AMISH PATEL, University of California, Berkeley, SIMON MOCHRIE, Department of Physics, Yale, SURESH NARAYANAN, ALEC SANDY, Advanced Photon Source, Argonne National Lab, NITASH BALSARA, University of California, Berkeley — A poly(styrene-*block*-isoprene) diblock copolymer melt was quenched from the disordered state to a temperature where the hexagonally packed cylinder (HEX) phase is stable. During the quench, disordered micelles (DM), which are obtained during the early stages of the phase transition gradually transform into the HEX phase. The dynamics of the evolving system on molecular length scales, was measured by X-ray Photon Correlation Spectroscopy (XPCS). The relaxation of concentration gradients at a given time during the disorder-to-order transition is slowest at the wave vector corresponding to the small angle X-ray scattering peak. The conversion of micelles to cylinders results in an increase in relaxation time. Complementary dynamical data was obtained by conducting time-resolved rheological measurements on the same sample.

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