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Time-Resolved SAXS Characterization of Block Copolymer Blends on Chemically Nanopatterned Surfaces KARL STUEN, PAUL NEALEY, Univ. of Wisconsin-Madison Dept. of Chem. and Biol. Eng., DILLIP SATAPATHY, KIM NYGARD, HARUN SOLAK, Dept. of Synchrotron Rad. and Nanotech., Paul Scherrer Institut, Switzerland — The directed assembly of block copolymer/homopolymer ternary blend thin films on chemically nanopatterned substrates was investigated with *in situ* transmission SAXS. A ternary blend was used to match the block copolymer period with the period of a chemical pattern fabricated by x-ray interference lithography. The domain assembly in a 24-nm-thick block copolymer blend film on the chemical nanopattern was monitored with SAXS in real-time as a sample was heated from 100 to 240 $^\circ$C at about 20 $^\circ$C per minute. The strongest diffraction from the sample was detected after just 4.5 minutes of annealing (maximum temperature $\sim$ 190 $^\circ$C). Complementary results were obtained from top-down SEM images of films that were quenched to room temperature after various times during the temperature ramp. The SEM images revealed transient structures in the annealing process that may relate to the non-uniform distribution of homopolymer in the direction perpendicular to the substrate. The results were compared to previously reported Monte Carlo molecular simulations to better understand the three-dimensional structures that form during the annealing process.

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