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**Development of X-ray and neutron scattering approaches for the characterization of block copolymer thin films** NATHANIEL FREDIN, KEVIN YAGER, XIAOHUA ZHANG, RONALD JONES, Polymers Division, National Institute of Standards and Technology — One set of challenges to the implementation of block copolymer (BCP) lithography as a nanomanufacturing technology comprises the limitations of traditional approaches to characterize the nanometer-scale features of the block copolymer template. Common techniques, such as atomic force microscopy and scanning electron microscopy, provide local measurements of relatively small areas limited to the sample surface. We report on the development of neutron and X-ray based scattering techniques to provide global, quantitative characterization of three-dimensional microdomain structure and orientation, and demonstrate the application of these techniques to the investigation of thermal gradient directed self-assembly of BCP thin films. Additionally, preliminary data on the development of grazing-incidence small-angle neutron scattering (GI-SANS) for the characterization of BCP structure and orientation at buried interfaces will be discussed.

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