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Resonant X-Ray Scattering in Block Copolymer Thin Films
JUSTIN VIRGILI, University of California, Berkeley, JEFFREY KORTRIGHT, Lawrence Berkeley National Laboratory, NITASH BALSARA, RACHEL SEGALMAN, University of California, Berkeley — Resonant x-ray scattering in a transmission geometry is reported in block copolymer films for the first time. By tuning soft x-rays to the carbon π^*-π^* bonds in a poly(styrene-b-isoprene) (PS-PI) diblock copolymer thin film, the scattering intensity is enhanced, thereby overcoming the small scattering volume inherent to a thin film geometry. This technique provides an alternative polymer thin film characterization technique to GISAXS that shares the same benefit of averaging over large sample areas (100's μm x 100's μm). The characterization of large sample areas is not readily accessible via real-space characterization techniques, such as TEM and AFM, and is of growing importance to applications such as optoelectronic devices. We will demonstrate the use of the resonant x-ray scattering technique in thin films of PS-PI and will demonstrate the effects block copolymer composition and film thickness on the observed scattering profiles. We will also compare our results from resonant x-ray scattering to TEM and AFM data.

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