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**Study of Complex Morphology of ABC Triblock Copolymer with Resonant Soft X-ray Scattering** CHENG WANG, DONG HYUN LEE, LBNL, WEI ZHAO, THOMAS RUSSELL, UMASS, MYUNG IM KIM, TING XU, UCB, HIROKAZU HASEGAWA, UKyoto, ALEXANDER HEXEMER, LBNL — Combining the spectroscopy sensitivity with scattering, resonant soft x-ray scattering (RSoXS) is an ideal tool for characterizing morphology of multi-component soft materials thin films. Both elemental and chemical sensitivity can be achieved by changing incident photon energy close to the absorption edge of the constituent atoms. In this work, the morphologies in thin film and bulk of A-B-C triblock copolymer, Poly(1,4-isoprene)-block-polystyrene-block-poly(2-vinylpyridine), were investigated with RSoXS together with scanning force microscopy, small angle x-ray scattering and transmission electron microscopy. In thin film, hexagonal array of nanostructures were observed by all the techniques, however, RSoXS revealed the core-shell nanostructures. In bulk, hexagonally packed cylindrical microdomains was observed. By selectively staining different polymer block, TEM tomography results suggested spatial arrangement of two different cylindrical microdomains consisted of poly(1,4-isoprene) and poly(2-vinylpyridine) in polystyrene matrix. Using soft x-ray at selected photon energies to isolate the scattering contribution from two different polymer blocks, RSoXS unambiguously revealed the two different hexagonally packed lattice.

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