

Resonant Soft X-ray Scattering for Polymer Materials

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Over the past a few years, we have developed Resonant Soft X-ray Scattering (RSoXS) and constructed the first dedicated resonant soft x-ray scattering beamline for soft materials at the Advanced Light Source, LBNL. RSoXS combines soft x-ray spectroscopy with x-ray scattering thus offers statistical information for 3D chemical morphology over a large length scale range from nanometers to micrometers. Using RSoXS to characterize multi-length scale soft materials with heterogeneous chemical structures, we have demonstrated that soft x-ray scattering is a unique complementary technique to microscopic methods as well as conventional hard x-ray and neutron scattering. Its unique chemical sensitivity, large accessible size scale, molecular bond orientation sensitivity with polarized x-rays and high coherence have shown great potential for chemical/morphological structure characterization for many classes of materials such as nanostructured block copolymer assemblies, conjugated polymers, membranes and polymer composites, as well as bio/bio-hybrid materials. We will share some recent works using RSoXS on the characterization of soft materials especially on block copolymers.