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Development of Resonant Soft X-ray Scattering for Polymer Systems at Advanced Light Source CHENG WANG, ALEXANDER HEXEMER, JAMES NASIATKA, ELAINE CHAN, HOWARD PADMORE, LBNL — It is envisioned that many polymer applications will rely on the heterogeneous morphologies of polymer blends or block copolymers to yield specific functional properties, such as organic light-emitting diodes and photovoltaics. Over the past few years, it has been strongly demonstrated that scattering at soft x-ray energies near the carbon K-edge yields chemically specific and enhanced contrast, thereby enabling structural studies of heterogeneous polymer films with thicknesses of only tens of nanometers. Resonant soft x-ray scattering (RSoXS) will provide the capability for a high-resolution chemical probe with interfacial sensitivity. We will discuss here the development of a dedicated RSoXS setup at the ALS Beamline 11.0.1, which is an elliptically polarized undulator beamline that covers the energy range of 200-1300 eV. It can accommodate a large variety of thin film samples and scattering geometries, including transmission, specular and off-specular reflection, as well as grazing incidence geometries, that will enable users to study both laterally- and depth-resolved structures. The generality, strength, and ease of RSoXS will have significant and immediate impacts in many areas of polymer science and technology. This will be achieved through systematic, collaborative studies of materials with potentially high impact applications.

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