Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Soft X-ray Scattering for Soft Materials at ALS CHENG WANG, ALEXANDER HEXEMER, ANTHONY YOUNG, HOWARD PADMORE, Lawrence Berkeley National Laboratory — The function and properties of organic and biological soft-condensed matter systems are largely determined by their nano- and mesoscopic chemical morphology. The understanding and rational use of such systems thus require that this structure be known. Using x-ray energies close to the absorption edge of constituent atoms, soft x-ray scattering is a combination of conventional x-ray scattering with x-ray absorption spectroscopy that yields both elemental and chemical sensitivity. The strong resonance enhancement of the scattering contrast offers large scattering signal for thin organic films with only tens of nanometers thick. The enhanced scattering and tunable sensitivity for organic materials can be achieved without any chemical modifications. Various scattering geometries including specular reflectivity, transmission, and grazing incidence with soft x-ray scattering make it a great complimentary tool for the study of soft material thin films. By taking advantage the unique features including elemental/chemical sensitivity, mesoscale probing size, large coherence length, and molecular orientation sensitivity with the polarization of the beam of photons, an inherent characteristic of synchrotron sources, soft x-ray scattering provides yet another key to unlock structure-property relationships that will lead to better materials. A dedicated soft x-rays scattering instrument optimized for soft materials has been constructed at Beamline 11.0.1.2 at the ALS. Some recent results on organic PV, block copolymer thin films will be presented.

Cheng Wang
Lawrence Berkeley National Lab

Date submitted: 10 Dec 2012 Electronic form version 1.4