

Soft X-ray Microscopy with Wavelength Limited Spatial Resolution

David Shapiro

Lawrence Berkeley Lab, ALS, Berkeley ,USA

The development of soft x-ray ptychography at the Advanced Light Source (ALS) has pushed the spatial resolution of our microscopes significantly closer to the wavelength limit by imaging isolated 5 nm structures. The use of soft x-rays offers sources with high coherent flux, absorption and phase contrast, and sensitivity to electronic/magnetic states and bond orientation. The ptychographic microscopes at the ALS are based on custom high performance scanning systems, high speed CCD detectors, and massively parallel reconstruction code. I will present the details of these microscopes and their application to the study of chemical composition at the nanoscale with a particular focus on phase transformations in LiFePO₄.