In-situ Full Field X-ray Nano-imaging in Energy Storage Applications

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Synchrotron based full field hard x-ray transmission x-ray microscopy (TXM) has emerged as a power tool to in situ or in operando non-destructively characterize microstructural evolution of electrode particles as the battery charging and discharging to correlate to the battery performance. The newly developed TXM at X8C beamline, National Synchrotron Light Source (NSLS) provides nano-tomography capability to track the microstructural evolutions in three dimensional (3D) at nanometer scale. It enables direct observation of morphological changes and chemical composition distributions in 3D within individual particles and throughout the electrode as cycling proceeds in an operating battery cell. Combined with x-ray absorption near-edge structure (XANES) spectroscopy, TXM-XANES provides in situ chemical mapping in 3D to track phase transformation in a battery to bring new shed into chemical reaction pathways. This talk will present unique features of the TXM and applications in battery materials.

References

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