

Abstract Submitted
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Non-resonant inelastic x-ray scattering spectra of lithiated titanium oxides for battery applications KENNETH NAGLE, University of Washington, MALI BALASUBRAMANIAN, Advanced Photon Source, Argonne National Laboratory, CHRISTOPHER JOHNSON, Chemical Engineering Division, Argonne National Laboratory, GERALD SEIDLER, University of Washington, ILIAS BELHAROUAK, Chemical Engineering Division, Argonne National Laboratory — Although lithium-ion batteries now see widespread use, there remain considerable questions concerning the basic solid state chemistry of both electrodes. Improved understanding of the local electronic structure, particularly the mechanism of charge transfer upon insertion and removal of lithium, could lead to innovation in battery design and improved performance. We present non-resonant inelastic x-ray scattering (NRIXS) spectra from 2p initial states in titanium; these spectra are among the first recorded for such states in a transition metal. These spectra were obtained using the lower energy resolution inelastic x-ray scattering (LERIX) spectrometer, which is capable of making simultaneous measurements at nineteen values of momentum transfer. We demonstrate the ability to obtain soft x-ray absorption-like information using a bulk-sensitive, hard x-ray technique. In addition, at high momentum transfer NRIXS provides information about non-dipole transitions that are inaccessible by soft x-ray spectroscopic methods.

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