HIGHLANDS IN CHEMISTRY SEMINAR SERIES

ANDREJ SINGER

CORNELL UNIVERISTY

"Non-equilibrium dynamics in functional materials"

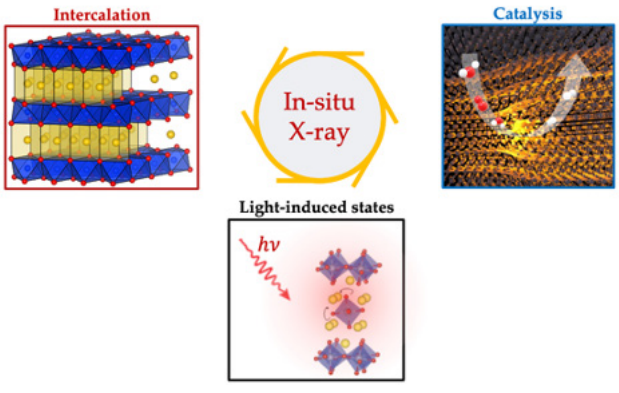
NOVEMBER 13, 2020

2:30PM

ZOOM

FACULTY HOST:
FENG LIN

A major challenge in modern materials science is characterizing of processes at ultrasmall and ultrafast scales. Nanoscale phenomena are essential in manipulating energy (ionic systems) and processing information (electronic systems). X-rays are excellent probes of matter and developments of an x-ray microscope date back to Röntgen and Bragg, who attempted to focus x-rays more than a century ago. However, it was not until the past decade that x-ray microscopy finally matured combining superb spatial (sub-100 nm) and temporal (sub-1 ps) resolution. I will present recent developments in x-ray science and discuss how we apply advanced x-ray scattering and imaging techniques to a wide range of systems – spanning from "real" materials and devices in-operando to studies of fundamental interactions in strongly correlated electron systems. Especially, I will talk about in-operando imaging of ionic diffusion, line and planar defects in lithium(sodium)-ion energy storage, and structural phase transformations in Mott insulators. I will also outline future directions in materials science in the context of the new generation of fully coherent x-ray sources, which will be available soon.



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