In-Situ Investigations of Interfacial Electrochemical Processes at Metal Oxide Cathodes

The Stanford Synchrotron Radiation Lightsource (SSRL), a Directorate of the SLAC National Accelerator Laboratory, Stanford University, and a national research facility, seeks a Ph.D. Postdoctoral Scholar with research interest in characterization of electrified interfaces. This position will involve in situ X-ray scattering and absorption spectroscopy for understanding the underlying chemistry and physics of the cathode-electrolyte interface in next generation batteries. This position will involve a collaboration with the Army Research Lab (K Xu and O Boridin).

The processes that occur at cathode-electrolyte interfaces are poorly understood which limits our ability to develop strategies to stabilize these interfaces under strongly oxidizing conditions. To tackle this challenge, we will combine molecular-scale modeling with advanced x-ray spectroscopic and electrochemical characterization using model, thin film, transition-metal oxide (TMO) electrodes and high purity electrolytes. The project will involve the development and use of in situ and ex situ synchrotron x-ray methods to characterize the structural and chemical behavior of the interface before, during and after reaction layer formation. These can be supplemented with electron microscopies, taking advantage on the new cryo-TEM facilities at SLAC. This is a two-year appointment, with a possible extension to three years, available to begin immediately.

Qualifications:

- Ph.D. in physics, materials sciences, chemistry, or related fields.
- experience with synchrotron X-ray scattering, or X-ray absorption spectroscopy or electron microscopies
- experience with energy storage chemistries
- Strong experimental, analytical and computation skills.
- effective written and verbal communication skills.
- ability to work and communicate effectively with a diverse population; good interpersonal skills are essential.
- ability to work independently and in a team environment.

Please send a cover letter with CV to Mike Toney - mftoney@slac.stanford.edu. See for more information - https://www-ssrl.slac.stanford.edu/toneygroup/