UNRAVELING THE MECHANISM OF ENERGY STORAGE IN BATTERIES

ABSTRACT
The emergence of next-generation technologies that produce, store, distribute, and utilize energy is dependent on new, highly functionalized chemistries, materials, and devices that can be manufactured at scale. In the context of an increasingly connected world, such technologies hold promise to transform society and advance American prosperity, competitiveness, and security. The energy storage revolution, in particular, has already disrupted the communications and transportation sectors, and is poised to impact other sectors such as the electric grid. Continued development and improvement will require detailed understanding of mechanisms in existing batteries, as they relate to, for example, capacity loss, with the concurrent development of new prospective materials and architectures, matched with the ability to produce devices at scale. To accelerate the development of disruptive energy technology new diagnostics are necessary that allow us to shrink the development timeline, such that the realization of new technology is measured in years rather than in decades. High-energy X-rays are emerging as a powerful diagnostic tool that provide new understanding of complex energy technologies. This talk will cover the development of new High Energy X-ray and Neutron approaches (imaging and scattering) that allow us to better understand energy storage technology, with an emphasis on emerging technologies.

SPEAKER
Peter Chupas is currently a Visiting Professor at Stony Brook University. Prior to moving to Stony Brook, he spent 15 years as a scientist at Argonne National Laboratory working on programs spanning the basic and applied energy research spaces. He received his B.S. (1999) in chemistry from Trinity College in Hartford, Connecticut, and his Ph.D. (2003) in Materials Chemistry from the State University of New York at Stony Brook. He joined the Materials Science Division at Argonne National Laboratory as a postdoctoral fellow in 2003, and became a permanent staff scientist 2005 in the Photon Science Directorate. In 2017 he moved to the Energy and Global Security Directorate at Argonne, where he was responsible for launching new science and technology initiatives, notably the Manufacturing Science Initiative. His honors and awards include Crain’s 40 under 40 (2013) and the Sidhu Award from the Pittsburg Diffraction Society (2006). His current research interests include the development and use of diffraction based methods to determine the structure function relationships in materials for energy storage and conversion.