

Title: Electrode Physics: Multiscale Electrode Physics in Energy Storage

Presenter: Partha P. Mukherjee, Texas A&M University

Overview:

Recent years have witnessed an explosion of research effort in energy storage technologies to enable vehicle electrification and renewable energy utilization. In particular, a critical imperative is to accelerate innovation toward improved performance, life and safety of the lithium-ion battery, the primary candidate for electric drive vehicles. Lithium ion batteries are complex, dynamical systems which include a multitude of coupled physicochemical processes encompassing electronic/ionic/diffusive transport in solid/electrolyte phases, electrochemical and phase change reactions and diffusion induced stress generation in hierarchical, multi-scale porous electrode microstructures. Understanding the spatio-temporal dynamics arising from the underlying electrochemical-thermal-mechanical interactions at disparate scales is of paramount interest. This webinar will offer a systematic overview of the fundamentals of multi-scale, multi-physical interactions in electrodes.

Who should attend?

- Graduate students seeking fundamental understanding of electrode physics in energy storage
- Engineers interested in battery research and development for automotive propulsion

What will you learn?

- Fundamentals of physicochemical processes in battery electrodes
- Materials-transport-performance interactions
- Computational modeling and analysis

Bio:

Partha P. Mukherjee is an Assistant Professor in the Department of Mechanical Engineering at Texas A&M University. He received his Ph.D. in Mechanical Engineering from Pennsylvania State University in 2007. He spent 4 years in the Department of Energy National Labs, as a Director's research fellow (2008-2009) at Los Alamos National Laboratory and as a Staff Scientist (2009-2011) at Oak Ridge National Laboratory. Prior to PhD studies at Penn State, he worked as a Consulting Engineer for 4 years at Fluent India Pvt. Ltd, a fully-owned subsidiary of Fluent Inc., currently Ansys Inc. His research interests include transport, materials and manufacturing aspects in electrochemical energy storage and conversion, mesoscopic modeling, and virtual materials design.