

Materials Science and Engineering Winter 2020 Seminar Series
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FROM ATOM TO SYSTEM: ADVANCED CHARACTERIZATION FOR NEXT GENERATION ENERGY STORAGE MATERIALS

Y. Shirley Meng
Zable Chair Professor in Energy Technologies
Department of NanoEngineering
University of California, San Diego

Energy storage in the electrochemical form is attractive because of its high efficiency (often time over 90%) and fast response time. High energy long life rechargeable battery technology is considered as key enabling technology for deep de-carbonization (electric vehicles, stationery storage). Besides the technological importance, electrochemical devices also provide a unique platform for fundamental and applied materials research since *ion* movement is often accompanied by inherent complex phenomena related to phase changes, electronic structure changes and defect generation. In this seminar, I will discuss a few new perspectives for energy storage materials including new fast ion conductors, new intercalation compounds and their interfacial engineering. With recent advances in characterization tools and computational methods, we are able to explore ionic mobility, charge transfer and phase transformations in electrode materials *in-operando*, and map out the structure-properties relations in functional materials for next generation energy storage and conversion. Moreover, I will discuss a few future priority research directions for electrochemical energy storage.

Y. Shirley Meng received her Ph.D. in Advance Materials for Micro & Nano Systems from the *Singapore-MIT Alliance* in 2005, after which she worked as a postdoc research fellow and became a research scientist at MIT. Shirley currently holds the Zable Chair Professor in Energy Technologies and Professor in Materials Science & NanoEngineering at University of California, San Diego (UCSD). Dr. Meng is the principal investigator of the research group - Laboratory for Energy Storage and Conversion (LESC). She is the founding Director of Sustainable Power and Energy Center (SPEC). Dr. Meng received several prestigious awards, including International Battery Association Battery Research Award (2019), American Chemical Society ACS Applied Materials & Interfaces Young Investigator Award (2018), IUMRS-Singapore Young Scientist Research Award (2017), C.W. Tobias Young Investigator Award of the Electrochemical Society (2016) and NSF CAREER Award (2011). Dr. Meng is an elected Fellow of ECS society. She is the author and co-author of more than 190 peer-reviewed journal articles, two book chapters and four issued patents.

LIGHT REFRESHMENTS WILL BE PROVIDED.