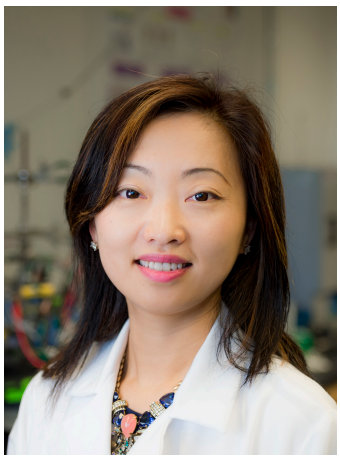
Short Bio



Dr. 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 NanoEngineering at University of California San Diego (UCSD). Dr. Meng's research focuses on the direct integration of experimental techniques with first principles computation modeling for developing new intercalation compounds for electrochemical energy storage. She is the founding Director of Sustainable Power and Energy Center (SPEC), consisting faculty members from interdisciplinary fields, who all focus on making breakthroughs in distributed energy generation, storage and the accompanying integration-management systems. Dr. Meng is the principle investigator of the research group - Laboratory for Energy Storage and Conversion (LESC). She received several prestigious awards, including C.W. Tobias Young Investigator Award of the Electrochemical Society, BASF Volkswagen Electrochemistry Science Award, Frontier of Innovation Award and NSF CAREER Award. Dr. Meng is the author and co-author of more than 130 peer-reviewed journal articles, 1 book chapter and four patents.

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Abstract

From pico Wh to mega Wh – New Perspectives for Electrochemical Energy Storage

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High energy long life rechargeable batteries is considered as key enabling technology for deep decarbonization. Energy storage in the electrochemical form is attractive because of its high efficiency and fast response time. New and improved materials for electrochemical energy storage are urgently required to make more efficient use of our finite supply of fossil fuels, and to enable the effective use of renewable energy sources. In this seminar, I will discuss a few new perspectives for energy storage materials including new gas electrolytes, new Na intercalation compounds and new organic flow batteries. I hope to demonstrate how to combine knowledge-guided synthesis/characterization and computational modeling to develop and optimize new higher energy/power density electrode and electrolytes materials for rechargeable batteries. 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 energy storage and conversion. Moreover, I will discuss a few future priority research directions for electrochemical energy storage.