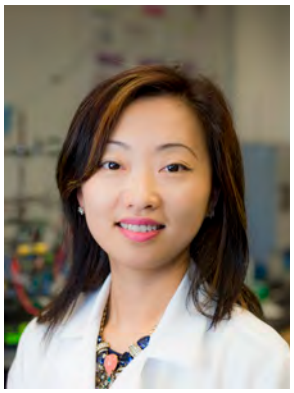
Spring 2016 Joint Colloquium
Materials Department & Materials Research Laboratory

Professor Shirley Meng
Dept. of NanoEngineering and Materials Science
UC San Diego

Friday, May 27th, 2016
11:00 am, ESB 1001



Materials Challenges for Electrochemical Energy Storage

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 enable the effective use of renewable energy sources. All electrochemical energy storage and conversion materials function as "living" systems (batteries and fuel cells), within which electrons and ions are moving during charge and discharge. These electronic and ionic motions often trigger defect generation and phase transformations, and consequently result in significant changes in energy density and power capability of the materials. Establishing the fundamental basis for these dynamical mechanisms during electrochemical processes will accelerate the creation of new synthetic materials with superior energy storage and conversion properties.

In this seminar, I will talk about the recent efforts on "closing the gap" between the theoretical and practical energy density of the state-of-the-art lithium ion batteries. Furthermore I will discuss a few new perspectives for energy storage materials including atomistic modeling and design of novel energy storage materials and operando characterizations. I hope to demonstrate how we can combine knowledge-guided synthesis, advanced characterization and computational modeling to develop and optimize long-life high performance energy storage and conversion materials.

Bio Dr. Shirley Meng received her Ph.D. in Advance Materials from the *Singapore-MIT Alliance* in 2005. She completed her postdoctoral research in MIT. Shirley is currently the Associate Professor of NanoEngineering and Materials Science at Jacobs School of Engineering. Dr. Meng is the Founding Director of Sustainable Power and Energy Center (http://spec.ucsd.edu) at University of California San Diego (UCSD). Shirley received the National Science Foundation (NSF) CAREER award in 2011, UCSD Chancellor's Interdisciplinary Collaboratories Award in 2013, Science Award in Electrochemistry by BASF&Volkswagen in 2014 and Frontier of Innovation Award in 2014. Shirley is the author and co-author of more than 100 peer-reviewed journal articles and 1 book chapter. She serves on the executive committee for battery division at the Electrochemical Society and she is the technical Editor for Journal of Power Sources

http://smeng.ucsd.edu/

Hosted by Anton Van der Ven