



DREXEL UNIVERSITY

Materials Science
and Engineering
College of Engineering

Fall Seminar Series

Inexpensive, Efficient Approaches for Energy Production and Storage

Amy L. Prieto, PhD

Professor

Department of Chemistry, Colorado State University

Wednesday, October 17, 2:00 p.m.

PISB 104

Dr. Prieto's research group is interested in developing new synthetic methods for nanoscale materials with applications in energy conversion and storage. For this talk, Dr. Prieto will focus first on using photovoltaic devices to produce energy, and in particular the synthesis and characterization of $\text{Cu}_2\text{ZnSnS}_4$ nanoparticles. The structure-property relationships for these particles can be significantly modified as the metal and chalcogen stoichiometries are tuned. Second, she will discuss efforts to develop new architectures for rechargeable Li-ion batteries for storing that energy. Her group is working to incorporate high surface area structures of a novel anode material into a new battery architecture wherein the current collector is conformally coated with an electrolyte made by electrochemical deposition, then surrounded by the cathode electrode. The significant advantage is that the diffusion length for Li^+ between the cathode and anode will be dramatically reduced, which should lead to much faster charging rates. The general theme between both topics is the development of new synthetic methods for useful materials with an eye toward non-toxic, earth abundant chemicals and reasonable manufacturing methods.

Dr. Amy Prieto is a Professor in the Department of Chemistry at Colorado State University. In addition to her research in Li-ion batteries (high capacity anode materials, 3D battery architectures), she has active projects developing nanoparticles inks for photovoltaics, light metal nanoparticles for hydrogen storage, and novel nanowire structures. She was a Chemistry and Philosophy double major at Williams College. She then earned a Ph.D. in Inorganic Chemistry from the University of California, Berkeley, where she was a Cooperative Research Fellow supported by Bell Labs, Lucent Technologies. Her postdoctoral work was performed at Harvard University, where she measured the electronic properties of single molecules and nanoparticles. While at Harvard she was named one of the first L'Oréal USA for Women in Science Fellows. Dr. Prieto founded Prieto Battery, Inc. in 2009 with the goal of commercializing a novel three dimensional high power density lithium-ion battery made from aqueous based electroplating baths. In 2011 she was named the ExxonMobil Solid State Chemistry Faculty Fellow (an American Chemical Society award), a Presidential Early Career Awardee for Scientists and Engineers (PECASE, an honor she received from President Barack Obama) and won the Excellence in Storage Technology Commercialization Award from the Colorado Cleantech Industry Association. Her batteries are currently on display at the Smithsonian Institute, Lemelson Center in the "Places of Invention" exhibit.