University at Buffalo
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Invited Talk:

Efficient Solar-Rechargeable Lithium-Ion Battery Energy Storage

Abstract: Lithium metal anodes are expected to drive practical applications that require high energy-density storage. However, direct use of metallic lithium causes safety concerns, low-rate capabilities, and poor cycling performance due to unstable solid electrolyte interphase (SEI) and undesired lithium dendrite growth. This talk will focus on the development of novel energy storage materials such as effective and robust solid-electrolyte interface (SEI) materials for high-capacity Li-metal batteries and their integration with solid state electrolytes. New nanofabrication methods including plasma enhanced deposition of Li_3N and radio frequency sputtered graphite-SiO_2 ultrathin bilayer on Li metal chips have been used as effective solid-electrolyte interface (SEI) layers. These lead to a dendrite free uniform Li deposition to achieve a stable voltage profile and outstanding long hours plating/stripping compared to the bare Li. I will also talk about perovskite solar cells that can be used to photocharge lithium ion batteries.

Biography: Dr. Quinn Qiao is currently a professor at Mechanical and Aerospace Engineering Department and an affiliate professor at Electrical Engineering and Computer Science Department at Syracuse University. He is site director for NSF Industry University Cooperative Research Center (IUCRC) for Solid State Electric Power Storage (CEPS). He has also been working on batteries (lithium ion, lithium metal, solid state, etc.), solar cells, and biosensors. He has published more than 200 peer reviewed papers in leading journals including Science, Nature Communications, Energy and Environmental Science, Journal of the American Chemical Society, Advanced Materials, Advanced Energy Materials, Advanced Functional Materials, Nanoscale, Joule, ACS Energy Letters, Nano Energy, IEEE Sensors Journal, IEEE Transactions on Electron Devices, IEEE Journal of Photovoltaics, IEEE Electron Device Letters, etc. He has more than 13,600 citations on google scholar and a H-index of 62.