Physics Colloquium

Thursday, April 30th at 3:40PM in SC 234

Featuring:

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Nanomaterials for Energy Harvesting and Energy Storage

Nanomaterials, with their large surface area and/or reduced charge carriers (ions and electrons) transport distance, are being actively investigated for clean energy generation and storage. In this presentation, I will discuss our recent studies using nanostructured materials for organic-inorganic perovskite solar cells and for lithium-ion batteries.
For the perovskite solar cell, I will give an overview of its current status and present several fundamental material related challenges, particularly the hysteresis problem, along with our recent results using mixed TiO2 nanoparticles and nanorods as scaffold for mesoporous structured solar cells. For the lithium ion batteries, I will discuss our development of freestanding nanostructured electrodes to achieve high charging rate and long cycling lifetime. These electrodes are based on edge-oriented graphene (EOG) foam as scaffold to load two-dimensional oxide nanosheets. I will particularly emphasize our study on Bronze phase TiO_2 nanosheets based battery electrode that potentially can run for more than 30 years.

Refreshments at 3:00PM in SC 103