

Engineering Synergy: Energy and Mass Transport in Hybrid Nanomaterials

The interface between hard and soft condensed matter presents new and compelling research opportunities in the transport of energy and mass due to the dramatic contrasts in bond strength, chemical interactions, and transport modalities between these constituents. Often, however, when inorganic and organic materials are blended into composites, performance suffers and new failure modes appear. Here, I will discuss the design and understanding of transport properties in “hybrid” systems, which show the pivotal role that nanoscale interfaces can play in dictating macroscale transport properties.

This talk will cover recent work and future prospects in thermoelectric materials, chemical storage, membranes, and the intimate connection between water and energy.



ABOUT THE SPEAKER

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Dr. Urban is currently leading a thermoelectrics program and co-leading a new water initiative as well. His research focuses on the materials and physics of mass, heat, and charge transport in complex hybrid nanomaterials. He obtained his PhD in Chemistry and Chemical Physics with Hongkun Park at Harvard University and then did a postdoc in nanocrystal based thermoelectrics and photovoltaics with Prof. Chris Murray and Prof. Mercouri Kanatzidis.

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