

Halide Perovskite Semiconductors and Solar Cells

Hybrid organic inorganic semiconductors (HOIS) have witnessed a renaissance from the due to the performance of the halide perovskite HOIS in photovoltaic applications. Since the identification of HOIS for PV applications just under a decade ago the efficiencies have surpassed all other poly crystalline thin film technologies with record cell efficiencies in excess of 20%. This talk will provide an overview of NREL efforts, progress and challenges in halide perovskite solar cells with an emphasis on the role of the interface in device performance and long term stability. The importance of Pb as an enabling element in these materials and question regarding impact for the use of Pb base HOIS for terawatt scale PV will be discussed. An examination of different perovskite active layers and interfacial electronic structure of these remarkable materials will be presented and connected to basic question regarding stability. The extent to which other low dimensional HOIS system provide a unique avenue to modulate the interfaces and enable performance/stability will also be discuss. The discussion will then pivot to the larger opportunity for material functionality which lower dimensionality provides for applications beyond traditional PV. Specifically, the work within the NREL lead Center for Hybrid Organic Inorganic Semiconductors for Energy (CHOISE), US Department of Energy, Energy Frontier Research Center (EFRC) to exploit the hybrid aspects of these materials for spintronic functionality will be discussed. Characterization from a range of time resolved spectroscopy, structural, chemical and device level studies will be presented.

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Theoretical and
Applied Physics

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4:00 PM

Innovation Hall

Room E430

Refreshments will be available at

3:30 PM.

In E217

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Bio:

Dr. Berry is currently the team lead for the Nati