Predictive Modeling of Low-Dimensional Materials for Solar Energy Conversion and Storage

Advanced materials, in particular materials of reduced dimensionality, are playing an essential role in exploration of alternative and sustainable energy sources. In this talk, we will try to highlight the importance of interdisciplinary science and synergetic efforts between theory and experiment in designing advanced materials for enhanced solar energy utilization, as exemplified by a few success stories. The first is the formulation of non-compensated n-p codoping as a novel enabling concept for narrowing the bandgap of oxide semiconductors for a variety of catalytic applications, including photolysis and environmental cleanup. Next we will outline some guiding principles in predictive design of light-element based nanomaterials as potential high-capacity media for hydrogen storage. In the third example, we will outline some opportunities in utilizing the nanoplasmonic properties of elegantly fabricated metallic nanostructures for one-photon to multiple electron-hole pair conversion. Collectively, these examples hopefully help to convey the vital importance of fundamental understanding and control of the elemental energy carriers and their conversion from one form to another.

TIME: 11:00 am, Wednesday June 2, 2009
PLACE: 104 Corcoran Hall, GWU
725 21st Street, N.W. (Between G and H Streets)
METRO STATION: GWU/FOGGY BOTTOM (BLUE & ORANGE LINES)