

Institute of Energy Technology – Professorship of Renewable Energy Carriers***Invitation to a Seminar***

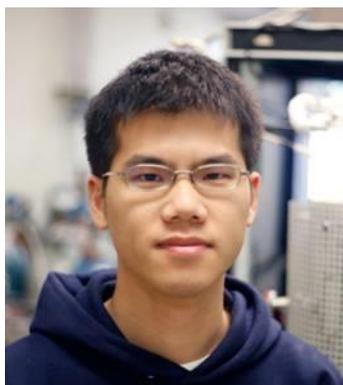
Date: Friday, May 6, 2011
Time: 11:00-12:00
Place: Maschinenlaboratorium ETH Zürich, ML-J25/26

Speaker: **Dr. William Chueh**
Materials Physics, Sandia National Laboratories, USA

Title:
Surface Phenomena in Elevated-Temperature Materials for Energy Conversion

Abstract - Energy conversion and storage present enormous materials challenges. In the case where the energy carriers are chemical bonds, abundant and effective catalysts facilitating solar-to-fuel and fuel-to-electricity conversions are essential. Because most chemical reactions are thermally-activated, carrying out reactions such as hydrogen evolution (in a solar- or electricity-driven electrolyzer) and oxygen reduction (in a fuel cell) at elevated-temperatures is a promising approach for improving performance. Solar thermochemical water-splitting is another process which benefits from facile kinetics at higher reaction temperatures.

In this talk, I will highlight fundamental investigations of surface chemistry and electrochemistry in several CeO₂-based oxide model catalysts (operating above 500 °C) relevant to the above reactions. A variety of fabrication and novel characterization techniques were developed, including photolithography, model-based impedance spectroscopy, and in-situ ambient-pressure X-ray photoelectron spectroscopy. Insights from these fundamental studies are used to guide rational materials discovery and microstructure designs to dramatically enhance device efficiencies.



William Chueh received his B.S. in Applied Physics, M.S. and Ph.D. (2010) in Materials Science from California Institute of Technology, and is currently a Distinguished Truman Fellow at Sandia National Laboratories. As a graduate student, William has received numerous awards and fellowships, including the Josephine de Karman Fellowship, American Ceramics Society Graduate Excellence in Materials Science Diamond Award, and the American Vacuum Society Thin Film Division Graduate Student Award. William's research centers on elevated-temperature materials for energy conversions, with specific focus on interfacial phenomena and bulk defect thermodynamics in ion-conducting and semiconducting materials.