Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

***In Situ* Soft X-ray Spectroscopy Characterization of Interfacial Phenomena in Energy Materials and Devices**[1] JINGHUA GUO, YISHENG LIU, MUKES KAPILASHRAMI, PER-ANDERS GLANS, ALS/LBNL, DEBAJEET BORA, ARTUR BRAUN, EMPA, JUAN JESÚS VELASCO VÉLEZ, MIQUEL SALMERON, MSD/LBNL, ALS/LBNL TEAM, EMPA, MSD/LBNL COLLABORATION — Advanced energy technology arises from the understanding in basic science, thus rest in large on in-situ/operando characterization tools for observing the physical and chemical interfacial processes, which has been largely limited in a framework of thermodynamic and kinetic concepts or atomic and nanoscale. In many important energy systems such as energy conversion, energy storage and catalysis, advanced materials and functionality in devices are based on the complexity of material architecture, chemistry and interactions among constituents within. To understand and thus ultimately control the energy conversion and energy storage applications calls for in-situ/operando characterization tools. Soft X-ray spectroscopy offers a number of very unique features. We will present our development of the in-situ/operando soft X-ray spectroscopic tools of catalytic and electrochemical reactions in recent years, and reveal how to overcome the challenge that soft X-rays cannot easily peek into the high-pressure catalytic cells or liquid electrochemical cells. In this presentation a number of examples are given, including the nanocatalysts and the recent experiment performed for studying the hole generation in a specifically designed photoelectrochemical cell under operando conditions.

[1]The ALS is supported by the the U.S. Department of Energy.

Jinghua Guo
Lawrence Berkeley National Laboratory

Date submitted: 14 Nov 2014 Electronic form version 1.4