Donnerstag, 02.05.2013 **Hörsaal C, Chemie Zentralbau, 17:15 Uhr**

Sprecher: Martin Wolf

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Thema: Dynamics of Interfacial Charge Transfer and Femtochemistry of Molecular Adsorbates

Abstract:

Electronic non-adiabatic processes at surfaces are frequently discussed in the context of the interaction of adsorbates with metal surfaces leading to phenomena like interfacial charge transfer, chemicurrents or electron induced reactions. The dynamics of such processes occur on ultrafast (typically femto- to picosecond) timescales. In his talk, he will present several examples for laser-induced surface femtochemistry as well as electron-transfer at molecule-metal interfaces. These processes are accompanied by pronounced changes of the electronic structure which can be studied directly in the time domain by appropriate spectroscopic techniques.

Starting with the CO oxidation on Ru(001) as an example for electronic non-adiabatic surface femtochemistry, the speaker will discuss how the corresponding transient electronic structure changes can be probed using an x-ray free-electron laser (LCLS). By employing time-resolved resonant inelastic x-ray scattering (trRIXS) the electronic structure of CO molecules on Ru(001) is probed as their chemisorption state changes after excitation with a fs laser pulse. The observed transient changes are consistent with a pronounced weakening of the CO chemisorption bond, whereby a large fraction of these molecules are transiently trapped in a precursor state on ps timescales prior to desorption.

Furthermore the speaker will discuss ultrafast dynamics of photoinduced electron transfer and solvation processes at ice-metal interfaces. With the aid of femtosecond time-resolved two-photon photoelectron spectroscopy his group can unveil all elementary processes like the charge injection across the interface, the subsequent electron localization and solvation, and the dynamics of electron transfer back to the substrate. For amorphous D_2O-layers these processes occur typically on a femto- to picosecond timescale. However, this is fundamentally different for crystalline ice layers where the stabilization of trapped electrons at the ice vacuum interface is observed from femtoseconds up to minutes. Recently his team has extended these studies to ice layers doped with alkali ions leading to the formation of electron alkali-water complexes as well as the bulid-up of a solvation shell around individual alkali atoms at the metal surface.

Organisation: T. Hertel

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Informationen zur Forschergruppe unter: http://www.for1809.uni-wuerzburg.de