

Seminář odd. 26

Tenkých vrstev a nanostruktur

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TÉMA

STM investigation of laser driven processes at surfaces

Karina Morgenstern

Chair of Physical Chemistry I; Ruhr-Universität Bochum, Germany

While photochemistry in the gas phase demands a resonant excitation of the molecules, the presence of a metal surface in surface chemistry opens a different pathway via the creation of hot electrons in the metal and subsequent attachment of these energetic electrons to adsorbed molecules. We use two set-ups that combine a low-temperature scanning tunneling microscope operating below 10 K with a frequency doubled femto-second laser and a tunable pico-second laser, respectively, to investigate processes induced by these electrons on a single molecule basis.

In this talk, I will first present recent results on the effect of intense fs-laser illumination on the structure of metal surfaces, in particular Ag(100) and Cu(111). Then I will compare laser-induced diffusion to thermal diffusion of CO molecules on Cu(111). In particular the long-range interaction between diffusing molecules differs in the two cases. Finally, I will present results obtained by electrons attaching to and solvating in different ice structures adsorbed on Cu(111) without and with halogenated (chlorine or bromine) benzene molecules adsorbed on them. These model systems enhance our understanding of the impact of ionizing radiation on the chemical composition of Earth's upper atmosphere (e.g. its ozone density), which is known to trigger chemical processes at the surfaces of cold ice covered grain particles.

odborný garant: *Ing. Pavel Jelínek, Ph.D.*