O 24: Invited Talk (Swetlana Schauermann)

Time: Tuesday 9:30–10:15 Location: TRE Phy

Invited Talk O 24.1 Tue 9:30 TRE Phy

Elementary Steps in Surface Reactions: Mechanisms, Kinetics and Thermodynamics — •Swetlana Schauermann — Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin, Germany

Atomistic-level understanding of surface processes is a key prerequisite for rational design of new catalytic and functional materials. In our studies, we investigate mechanisms, kinetics and thermodynamics of heterogeneously catalyzed reactions and adsorption processes on nanostructured model supported catalysts to provide fundamental insights into the surface chemistry. By employing pulsed multi-molecular beam techniques, IRAS and synchrotron-based spectroscopies on Pd/Fe3O4/Pt(111) model surfaces, we study mechanistic details of complex multi-pathway surface reactions, such as hydrocarbon transformation in presence of hydrogen or selective hydrogenation of multi-unsaturated hydrocarbons. The ultimate goal of our research is obtaining detailed correlations between reactivity, selectivity and the particular atomistic structure of the catalytic surface. Complementary, single crystal adsorption calorimetry is employed to address thermodynamics of adsorption processes and surface reactions, such as e.g. adsorption and reaction of oxygen and CO. Specifically, we focus on the particle size dependence of adsorption and reaction energies to obtain a fundamental-level understanding of how the nanometer scale confinement of matter effects the energetics of surface reactions.