Autor(en) des Beitrags:
Vaida, Mihai E.; Bernhardt, Thorsten M.; Barth, Clemens; Esch, Friedrich; Heiz, Ueli; Landman, Uzi

Titel des Beitrags:
Ultrathin magnesia films as support for molecules and metal clusters: Tuning reactivity by thickness and composition

Abstract:
Ultrathin metal oxide films have attracted considerable interest in recent years as versatile substrate for the design of nanocatalytic model systems. In particular, it has been proposed theor. and confirmed exp. that the electronic structure of adsorbates can be influenced by the layer thickness and the stoichiometry, i.e., the type and no. of defects, of the oxide film. This has important consequences on the chem. reactivity of the oxide surface itself and of oxide supported metal clusters. It also opens new possibilities to influence and to control chem. reactions occurring at the surface of these systems. The present feature focuses on very recent expts. that illustrate the effects of a proper adjustment of layer thickness and compn. of ultrathin MgO(100) films on chem. transformations. On the magnesia surface itself, the photodissocon. dynamics of Me iodide mols. is investigated via femtosecond-laser pump-probe mass spectrometry. Furthermore, the catalytic oxidn. of carbon monoxide at mass-selected Au20 clusters deposited on magnesia is explored through temp. programmed reaction measurements. In the latter case, detailed first principles calcns. are able to correlate the exp. obsd. reactivity with structural dimensionality changes that are induced by the changing thickness and compn. of the magnesia support. [on SciFinder(R)]