

Atomic scale characterization of materials is important for the fundamental understanding of their properties. Here, model systems of industrially relevant cerium and titanium oxides are characterized with the combination of the Scanning Tunneling Microscopy (STM) and Non Contact Atomic Force Microscopy (NC AFM). Cerium oxide model systems are represented by fully oxidized and partially reduced ultra-thin ceria films supported on copper single crystal. Interaction of the model ceria systems with catalytically important adsorbates (water, methanol) is studied on atomic scale. Titanium oxide model systems are represented by pentacene and C60 molecules adsorbed on the surface of bulk titania in anatase polymorph. Organic layers on titania are studied with intramolecular resolution with the help of the newly developed Double pass scanning mode of NC AFM. The atomic contrast formation mechanisms in STM and NC AFM on ceria and anatase surface are presented.