

# **“Chemical Reactivity and Surface Restructuring at the Nanoscale: Oxidation Reactions promoted by Au”**

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Abstract:

Due to the catalytic importance of oxidation reactions at low temperature, Au is under intense investigation as a component in low-temperature catalysts since Haruta discovered that Au nanoparticles are active for these processes. We have studied the fundamental nature of CO, hydrocarbon oxidation, and oxidative dehydrogenation reactions on oxidized Au(111). Our studies clearly illustrate that mobile Au complexes are formed upon adsorption of electronegative atoms, including oxygen, and that they are key for controlling reactivity and selectivity. We have also used our fundamental understanding to predict new classes of reactions on Au—nitrogen functionalization—and ways to enhance selectivity. In related work, we have also investigated metal oxide nanostructure grown on Au to form a novel system for surface reactions.