Supporting information for

Enhanced stability of gold clusters supported on hydroxylated MgO(001) surfaces

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Experimental details

The experiments were performed in a UHV chamber equipped with a quadrupole mass spectrometer for temperature programmed desorption (TPD) studies and a hemispherical electron energy analyzer together with a dual anode x-ray source for X-ray photoelectron spectroscopy (XPS). A small UHV compatible high-pressure cell connected to the main UHV chamber was used for hydroxylation as well as infrared experiments in reflection absorption geometry (IRAS). The Ag(001) single crystal was cleaned by repeated sputter-anneal cycles. 20 ML thick MgO(001) films were grown by reactive deposition of Mg in oxygen atmosphere (1×10^{-6} mbar) at a substrate temperature of 573 K [1,2]. The surface quality was checked with LEED. The surface of the MgO(001) film was hydroxylated at room temperature for 3 minutes at a water pressure of 1×10^{-3} mbar. According to previous studies [3] and our own experience this exposure is sufficient to obtain a hydroxyl coverage of ~0.4 ML due to dissociative adsorption of water at steps and terraces on the MgO(001) surface, where 1 ML corresponds to one OH occupying each atom of the outermost surface layer. Gold was deposited on the surface of clean and hydroxylated MgO(001) at 90 K under UHV conditions. For a gold coverage of 0.5 Å (2.5 Å corresponds to a nominal Au thickness of 1 ML) we expect the Au cluster size in the range 3 nm to 10 nm depending on the annealing temperature. TPD and IRAS spectra using CO as a probe molecule, as well as XPS spectra (Al Kα, 60° take-off angle) were collected at 90 K from the freshly deposited Au particles as well as after annealing the samples to 300 K, 500 K, and 650 K, respectively.

(1) Wu, M.-C.; Corneille, J. S.; He, J.-W.; Estrada, C. A.; Goodman, D. W. *Chem. Phys. Lett.* **1991**, *182*, 472.

(2) Wollschläger, J.; Viernow, J.; Tegenkamp, C.; Erdös, D.; Schröder, K. M.; Pfnür, H. *Appl. Surf. Sci.* **1999**, *142*, 129.

(3) Liu, P.; Kendelewicz, T.; Brown, G.E.; Parks, G.A. *Surf. Sci.* **1998**, *412-413*, 287.