SW-P008

Low Temperature Dissociation of SiOx by Gold

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The native silicon-oxide (SiOx) layer at the metal/Silicon interface acts as an electrical resistance to the metal contact of devices. Various methods are proposed for removing this layer, such as sputtering before metal contact formation or high temperature annealing. We studied the chemical evolution of the Au/SiOx/Si system during the annealing at 500°C using a spatially resolved photoelectron emission method. Scanning photoelectron emission microscopy (SPEM) and core level spectra from local area of the sample show the inhomogeneous oxidation and formation of silicide of Au, as well as valence band spectra reveals the role of Au atoms during the dissociation process of SiOx.

Keywords: native silicon-oxide, gold, Scanning photoelectron emission microscopy (SPEM), annealing

SW-P009

Support Effect of Catalytic Activity on 3-dimensional Au/Metal Oxide Nanocatalysts Synthesized by Arc Plasma Deposition

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Strong metal-support interaction effect is an important issue in determining the catalytic activity for heterogeneous catalysis. In this work, we report the catalytic activity of Au/TiO_2, Au/Al_2O_3, and Au/Al_2O_3-CeO_2 nanocatalysts under CO oxidation fabricated by arc plasma deposition (APD), which is a facile dry process with no organic materials involved. These catalytic materials were characterized by transmission electron microscopy (TEM), energy-dispersive X-ray spectroscopy (EDS) and N_2-physisorption. Catalytic activity of the materials has measured by CO oxidation using oxygen, as a model reaction, in a micro-flow reactor at atmospheric pressure. Using APD, the catalyst nanoparticles were well dispersed on metal oxide powder with an average particle size (3～10 nm). As for catalytic reactivity, the result shows Au/Al_2O_3-CeO_2 nanocatalyst has the highest catalytic activity among three samples in CO oxidation, and Au/TiO_2, and Au/Al_2O_3 in sequence. We discuss the effects of structure and metal-oxide interactions of the catalysts on catalytic activity.

Keywords: arc plasma deposition, CO oxidation, support effect