

CO oxidation on nanoporous Au thin films grown on Si wafer

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The CO-oxidation reactivity of nanoporous Au thin films with W impurity (~5 % of Au) was studied. At room temperature, no CO-oxidation could be detected under our experimental conditions, whereas at 160 °C, the conversion of CO to CO₂ was observed. At higher temperatures, the initial reactivity becomes higher however, with increasing reaction time, one can recognize that the deactivation of the catalytically active sites is more facile at higher temperatures. Using temperature programmed desorption (TPD), we found that the formation of strongly bound carbonate species is responsible for the deactivation process. Based on our TPD data, it is also suggested that the decomposition of the carbonate species on the surface is the rate determining step of the CO-oxidation reaction.