

Thermodynamics and Kinetics of the Adsorption of Carbon Monoxide on Supported Gold Catalysts Probed by Static Adsorption Microcalorimetry: The Role of the Support

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Received: November 6, 2008; Revised Manuscript Received: April 3, 2009

The interaction of carbon monoxide and oxygen with gold particles supported on zinc oxide, alumina, and titania was investigated by microcalorimetry. Multiple processes were detected during CO adsorption, including adsorption of CO on the gold particles and support, oxidation of CO, and formation of carbonates. The rate of O₂ adsorption was much slower than that of CO adsorption. The heats and entropies of CO adsorption on the Au sites indicated that the interaction between CO and Au supported on TiO₂ is much stronger than that between CO and Au supported on ZnO. The Au/ZnO sample had the largest amount of lattice oxygen (7.6 μmol/g), which reacted with CO to give CO₂.