

Redox Chemistry of Cu Colloids Probed by Adsorbed CO: An in Situ Attenuated Total Reflection Fourier Transform Infrared Study

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The IR spectroscopic investigation of both the adsorption of carbon monoxide and the interaction of oxygen and CO on the surface of copper colloids is described for the first time. The copper colloids were produced by pyrolysis of $[\text{Cu}(\text{OCH}(\text{Me})\text{CH}_2\text{NMe}_2)_2]$ in hot *n*-hexadecylamine. Upon contact to synthetic air Cu/Cu_xO core-shell particles are formed. The treatment of these particles with CO results in the reestablishment of pure Cu(0) particles. These results demonstrate that small molecules penetrate the ligand shell of the nanoparticles and reversibly adsorb at the surface without affecting the particle morphology and size distribution.