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THE CRUCIAL ROLE OF METAL-OXIDE INTERFACES IN CATALYSIS

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Nanoparticles deposited on an oxide support or nanostructured oxides grown on a metal surface may result in new efficient catalysts. We will discuss in particular the high reactivity of the oxygen atoms at the boundary region between a metal cluster and the oxide surface in CO oxidation, a prototype reaction. Au nanoparticles on TiO₂ and ZrO₂ supports will be used to provide compelling evidence that the reaction occurs at specific sites of the Au/oxide interface and that even a non-reducible oxide such as ZrO₂ can become reducible when interfaced with gold. Also the deposition of oxide ultrathin films on metals may result in completely different properties of deposited metal clusters and recent examples of this effect will be discussed for ultrathin, graphitic-like ZnO layers on Cu, Ag, Au. Controlling the metal/oxide interface is thus essential to design new catalysts with tailored properties.

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