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# Support Effect of Arc Plasma Deposited Pt Nanoparticles/TiO2 Substrate on Catalytic Activity of CO Oxidation

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The smart design of nanocatalysts can improve the catalytic activity of transition metals on reducible oxide supports, such as titania, via strong metal－support interactions. In this work, we investigatedtwo-dimensional Pt nanoparticle/titania catalytic systems under the CO oxidation reaction. Arc plasma deposition (APD) and metal impregnation techniques were employed to achieve Pt nanoparticle deposition on titania supports, which were prepared by multitarget sputtering and sol－gel techniques. APD Pt nanoparticles with an average size of 2.7 nm were deposited on sputtered and sol－gel-prepared titania films to assess the role of the titania support on the catalytic activity of Pt under CO oxidation. In order to study the nature of the dispersed metallic phase and its effect on the activity of the catalytic CO oxidation reaction, Pt nanoparticles were deposited in varying surface coverages on sputtered titania films using arc plasma deposition. Our results show an enhanced activity of Pt nanoparticles when the nanoparticle/titania interfaces are exposed. APD Pt shows superior catalytic activity under CO oxidation, as compared to impregnated Pt nanoparticles, due to the catalytically active nature of the mild surface oxidation and the active Pt metal, suggesting that APD can be used for large-scale synthesis of active metal nanocatalysts.

**Keywords:** Strong metal-support interaction (SMSI), CO oxidation, Pt nanoparticles, Arc plasma deposition (APD)