

Ceria-supported small Pt and Pt₃Sn nanoparticles for NO_x-assisted soot oxidation

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Description

Introduced herein are small Pt and Pt₃Sn nanoparticles, stabilized with organosilane or organostannane and impregnated on ceria support, as active sites for NO_x-assisted soot oxidation reaction. The catalysts have been tested with four reactions: CO oxidation, NO oxidation, NO_x-free soot oxidation and finally NO_x-assisted soot oxidation. Our Pt nanoparticles reportedly possess remarkable catalytic activities in CO oxidation, as they actively convert CO at 50 °C, while the alloy Pt₃Sn nanoparticles are active at higher temperature. The Pt nanoparticles also mediate more actively NO oxidation than their alloy counterpart, leading to more NO₂ production beneficial for soot oxidation. The influence of Pt and Pt₃Sn active sites on the catalytic activity during NO_x-free soot oxidation becomes less prominent than the morphology, due to the high dependency of the reaction on catalyst structure. The presence of Sn ...