

Heterogeneous mechanism of NO_x-assisted soot oxidation in the passive regeneration of a bench-scale diesel particulate filter catalyzed with nanostructured equimolar ceria ...

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Description

An experimental study of passive regeneration of bench-scale diesel particulate filters (DPF) catalyzed by morphologically varied ceria and ceria-praseodymia (equimolar mixture) washcoats was carried out. The microstructured washcoat was prepared in the DPF via in situ solution combustion synthesis, whereas the nanostructured counterpart was deposited in the DPF via wetness impregnation with its suspension. Soot model was loaded via impregnation until the weight ratio of soot to catalytic washcoat was 1–20. The experiments revealed that after 4 h of isothermal regeneration at 400 °C, in the presence of 10% O₂ and 1000 ppm NO, the reaction over nanostructured ceria-praseodymia washcoat resulted in the highest soot conversion (82%). Moreover, this catalyst achieved the highest NO₂ exploitation efficiency in soot conversion, estimated as the ratio of the converted soot C atoms per mole of consumed ...