

Effect of the morphological and surface properties of CeO₂-based catalysts on the soot oxidation activity

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Description

In diesel particulate filters, a solid (soot)–solid (catalyst) reaction occurs and, in these cases, the catalyst morphology plays a relevant role, being the number of contact points a critical feature for the resulting reaction rate.

For this reason, two different ceria-based catalyst morphologies have been investigated in this work, for the soot oxidation reaction: first, a ceria catalyst was prepared by solution combustion synthesis (SCS), which lead to a specific surface area of 29 m²/g. On the other hand, three-dimensional self-assembled (SA) stars ceria, so-called due to their branched morphology starting from a central nucleus, exhibited a higher specific surface area (124 m²/g), a high availability of contact points between soot particles and the catalyst itself, due to the concavities of the obtained morphology, and interesting surface features at the nanoscale. The synthesis method was tuned in order to resort to a desired and ...