

CeO₂ catalysts with fibrous morphology for soot oxidation: The importance of the soot–catalyst contact conditions

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Publication date

2013/11/1

Journal

Catalysis today

Volume

216

Pages

57-63

Publisher

Elsevier

Description

Ceria nanofibers were synthesized as soot oxidation catalysts. In fact, the morphology of the catalyst was tailored to maximize the contact between the soot particles and the catalyst itself, at increasing degrees of soot–catalyst contact. Among the synthesized catalysts, the fibrous shape demonstrated to be most active towards soot oxidation: it reduced the peak combustion temperature from 600 °C (non-catalytic combustion) to 375 °C in tight contact, 428 °C in prolonged loose contact (see detailed definition in the text), and 553 °C in loose contact.

These results were compared to a very active ceria catalyst obtained with the solution combustion synthesis method, characterized by much higher porosity and SSA surface. It emerged that the nanofibers, although they have one-fifth of the BET of the nanopowders obtained with SCS, they show almost the same activity in tight conditions, and a considerably better one in ...