

Cerium-copper oxides prepared by solution combustion synthesis for total oxidation reactions: From powder catalysts to structured reactors

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Publication date

2017/5/15

Journal

Applied Catalysis B: Environmental

Volume

205

Pages

455-468

Publisher

Elsevier

Description

A set of cerium-copper oxide catalysts with various Ce/Cu contents was synthesized using the solution combustion synthesis (SCS) technique. Catalytic activities of the prepared materials were tested for the CO oxidation, total oxidation of ethene and soot combustion. As a whole, the best performances in terms of both CO oxidation and ethene total oxidation were achieved for the binary oxide catalysts having Ce/Cu ratio ranging from 0.67 to 1.5. It has been observed that catalysts with CuO_x clusters interacting with CeO_2 are particularly effective for both the oxidation reactions. This confirms that CeO_x and CuO_x domains may cooperate synergistically, leading to higher oxidation activity because of the easier surface reducibility and more abundant structural defects (oxygen vacancies). On the other hand, the soot combustion activity increases as a function of the Ce-content up to 95 at.%. Indeed, the best soot ...