

Nanostructured ceria-zirconia catalysts for CO oxidation: Study on surface properties and reactivity

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Description

In the present work, a set of Ce-Zr-O catalysts was prepared to study the effect of Zr-content (in the range 10–30 at.%) and the surface-dependency activity towards CO oxidation, a prototypical reaction for oxidation catalysis. The physico-chemical features of the prepared materials were investigated using complementary techniques.

As a whole, it was observed that the oxidation activity of ceria-zirconia nanocatalysts mainly depends on the presence of (100) and (110) crystalline planes, thus confirming the structure-sensitivity for this reaction over Ce-Zr mixed oxides. Moreover, the abundant population of carbonate-like species on more open and reactive surfaces has a beneficial effect on the reactivity of the Ce-Zr-O nanomaterials.

The best compromise between the structural defects and redox-active centres (Ce³⁺/Ce⁴⁺ pairs) was observed for the most active nanocatalyst, namely the Ce_{0.9}Zr_{0.1}O₂NP ...