

Cerium–Copper–Manganese Oxides Synthesized via Solution Combustion Synthesis (SCS) for Total Oxidation of VOCs

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Description

A set of cerium–manganese–copper oxide catalysts with various foreign metal contents was prepared via the solution combustion synthesis (SCS). The catalysts were characterized by complementary techniques such as N₂ physisorption at –196 C, X-ray diffraction (XRD), field-emission scanning electron microscopy (FESEM), H₂-temperature-programmed reduction (H₂-TPR), O₂-temperature-programmed desorption (O₂-TPD) and X-ray photoelectron spectroscopy (XPS). Their catalytic activity was tested towards the VOC oxidation using ethylene and propylene as probe molecules. As a whole, it has been observed that the Ce₅₅Mn₄₅ sample (Mn 45 at.%), containing MnO_x clusters interacting with the ceria phase, was the most active catalyst for propylene oxidation, exhibiting a complete conversion at 250 C. On the other hand, the ternary oxide catalyst (Ce₅₅Mn_{22.5}Cu_{22.5} with Mn= 22.5 at.% and Cu ...