

165d Flame-Made Pt/Ceria/Zirconia for Low-Temperature Oxygen Exchange

Wendelin J. Stark, Marek Maciejewski, Jan-Dierk Grunwaldt, Sotiris E. Pratsinis, and Alfons Baiker

The preparation of platinum (0-2 wt%) supported on ceria/zirconia ($\text{Ce}_{0.5}\text{Zr}_{0.5}\text{O}_2$) by flame synthesis resulted in materials with good thermal stability and improved dynamic oxygen exchange capacity at low temperatures.

Comparison to a conventionally prepared material (precipitation and incipient wetness impregnation) showed an increased specific surface area for the flame-made catalysts after sintering at 1100 °C for 6 h in air. For low Pt content (0.1 to 0.5 wt%) the onset in low-temperature oxygen exchange activity of flame-made materials was even improved after a first redox test run. Repeated test runs up to 1100°C deactivated the reference material for oxygen exchange below 300 °C while the flame-made materials showed improved activity down to around 150 °C. Fluorescence EXAFS revealed the presence of oxidized Pt on the pre-sintered materials and confirmed the role of reduced Pt on the hydrogen activation prior to oxygen exchange. It further uncovered pronounced differences in Pt reducibility depending on the Pt loading.

Ref.

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