

SO₂ deactivation mechanism of NO oxidation and regeneration of the LaCoO₃ perovskite

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Description

The deactivation mechanism and methods to cope with the poisoning by SO₂ of LaCoO₃ perovskite-based NO oxidation catalysts were investigated. The LaCoO₃ perovskite was synthesized by a sol–gel method and the fresh, sulphate-deactivated and regenerated catalysts were characterized by X-ray diffraction, X-ray photoelectron spectroscopy, H₂- and soot-temperature programmed reduction, temperature programmed desorption and diffuse reflectance infrared Fourier transform spectroscopy. The SO₂ poisoning strongly affected the NO oxidation activity. It was demonstrated that the deactivation mechanism proceeds in two stages: initially the active sites with a basic character are blocked by SO₃ and subsequently the lanthanum sulphate salts grow progressively on the surface and cobalt is unaffected. Above 500 °C, the surface bound sulphates become mobile and migrate into the bulk of the catalyst. Several ...