

## Manganese Oxide Catalysts for NO<sub>x</sub> Reduction with NH<sub>3</sub> at Low Temperatures

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Manganese oxide catalysts prepared by a precipitation method with various precipitants were investigated for the low-temperature selective catalytic reduction (SCR) of NO<sub>x</sub> with NH<sub>3</sub> in the presence of excess O<sub>2</sub>. The active MnO<sub>x</sub> catalysts, precipitated with sodium carbonate and calcined in air at moderate temperatures such as 523 and 623 K, have the high surface area, the abundant Mn<sup>4+</sup> species, and the high concentration of surface oxygen on the surface. The amorphous Mn<sub>3</sub>O<sub>4</sub> and Mn<sub>2</sub>O<sub>3</sub> were mainly present in this active catalyst. The carbonate species appeared to help adsorb NH<sub>3</sub> on the catalyst surface, which resulted in the high catalytic activity at low temperatures. The catalytic filter which can remove dust and NO<sub>x</sub> simultaneously was prepared and tested in the laboratory and the pilot plant. The catalytic bag filter with 2.0 cm<sup>3</sup>/cm<sup>2</sup>/sec of permeability, 380g/m<sup>2</sup> of catalyst loading and 37.50 m<sup>2</sup> of filtering area was prepared by MnO<sub>x</sub> scattering and PTFE foam coating processes. This MnO<sub>x</sub>-coated bag filter showed 85% NO<sub>x</sub> conversion at 423 K with a space velocity of 2.0×10<sup>6</sup> h<sup>-1</sup>.