

NANOSTRUCTURED MnO_x CATALYSTS FOR LOW-TEMPERATURE NO_x SCR FOR STATIONARY APPLICATIONS

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Nitrogen oxides (NO, N₂O and NO₂) are by-produced and emitted in high-temperature combustion of stationary and mobile sources and constitute well-known atmospheric pollutants that can contribute to ozone depletion, acids rains, photochemical smog and greenhouse effects. Selective catalytic reduction of NO_x is an established method for power plant where DeNO_x works at high temperature (250-380°C). Given the stringent regulations, it seems necessary to apply the same technology in the stationary and mobile application to lower operating temperatures. For this purpose various studies are focusing their attention on the preparation and testing of catalyst based on transition metals. Manganese oxides are versatile materials used in reduction and oxidation reactions due to the presence of different structures and morphology. They have aroused a great research interest in the field of low temperature SCR.

MnO_x-based catalysts have been investigated for selective catalytic reduction of NO_x in order to investigate on the optimal oxidation state of Mn for achieving high selectivity as well as activity at low temperature in the SCR process. Manganese oxides samples have been prepared by SCS, hydrothermal and precipitation methods. The samples have been characterized by XRD, BET, H₂-TPR, FESEM and their catalytic activity tested for NO_x removal in a NH₃/NO_x gas mixture. MnO_x with different structure average oxidation state and morphology were obtained. The presence of Mn₃O₄ seems the key factor to obtain active and selective catalysts for SCR.

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