Improved catalytic performance and resistance to SO_2 over V_2O_5-WO_3/TiO_2 catalyst physically mixed with Fe_2O_3 for low-temperature NH_3-SCR

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NO_x emitted from stationary and mobile combustion sources contributes to a number of environmental problems. It has been reported that commercial vanadium-based catalysts are suitable for reducing NO_x. However, there are several issues when those catalysts were applied to diesel engine-based vessel. The temperature of the flue gas from vessel engine is less than 300 °C. In addition, SO_2 come from oxidation of sulfur species in diesel fuel can deactivate catalysts. Many researchers have focused on modifying vanadium-based catalysts in order to meet the operation conditions for vessel. To overcome this problem, a number of eco-friendly transition metal oxides. Among them, Fe_2O_3 can be the most suitable oxide because of its outstanding textural properties and price competitiveness. In this work, a series of V_2O_5-WO_3/TiO_2 catalysts physically mixed with several Fe_2O_3 having different textural properties were prepared to investigate the effect of Fe_2O_3 on the catalytic activities in the NH_3-SCR reaction. Physicochemical properties of the prepared catalysts were characterized by BET, XRD, Raman, SO_2-TPD and NH_3-TPD analyses.