

Reduction of NO by NH₃ and Oxidation of Elemental Mercury over Supported V₂O₅ Catalysts

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We have studied supported V₂O₅-based catalysts with different vanadate structures to simultaneously conduct selective reduction of NO by NH₃ and oxidation of gas-phase mercury. The catalysts were prepared by a wet impregnation technique using different supports, such as anatase- and rutile-type TiO₂, SiO₂, and TiO₂-SiO₂. ⁵¹V NMR measurements disclosed that tetrahedral and octahedral coordination environments of VO_x depend not only on the support but also on VO_x amount. This was consistent with Raman spectra for the supported V₂O₅-based catalysts. These catalytic activities for the NO reduction with NH₃ strongly vary with the support, and this observation could be explained by an amount of and a thermal stability of NH₃ adsorbed on each sample. The extent of the oxidation of elemental mercury vapor at chosen temperatures was associated with the VO_x structures.