

## Environmentally-benign Selective Catalytic Reduction of NO<sub>x</sub> by Hydrocarbons

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Environmentally-benign catalysts for SCR reaction are requisite to be developed urgently for NO<sub>x</sub> removal from mobile sources. We recently developed new SCR catalysts, including FeTiO<sub>x</sub>, CeTiO<sub>x</sub> and CeWO<sub>x</sub> for NH<sub>3</sub>-SCR and Ag/Al<sub>2</sub>O<sub>3</sub> for HC-SCR. These catalysts are potential substitutes for vanadium based catalyst to be utilized for NO<sub>x</sub> removal from diesel engines exhaust. In this report, our recent research works on the HC-SCR of NO<sub>x</sub> by hydrocarbons over Ag/Al<sub>2</sub>O<sub>3</sub> were briefly reviewed. The NO<sub>x</sub> reduction by butyl alcohol isomers confirms that the formation of enolic species plays a crucial role in the NO<sub>x</sub> reduction by alcohols over Ag/Al<sub>2</sub>O<sub>3</sub>, which also provides an intrinsic criterion for the selection of reductants with high efficiency for NO<sub>x</sub> reduction over Ag/Al<sub>2</sub>O<sub>3</sub>. Using the precipitable silver compounds greatly facilitates the preparation of monolith catalyst for practical usage. The activity of Ag<sup>+</sup> in various silver precipitable compound catalysts supported on Al<sub>2</sub>O<sub>3</sub> for the SCR of NO<sub>x</sub> has been confirmed using both powder and washcoated honeycomb catalysts. In fact, the high DeNO<sub>x</sub> performance of the AgCl/Al<sub>2</sub>O<sub>3</sub> honeycomb catalyst was confirmed by bench test of heavy duty diesel engine.