

Characteristics of manganese supported on hydrous  $\text{TiO}_2$  catalysts for the selective catalytic reduction of  $\text{NO}_x$  with ammonia

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Selective catalytic reduction (SCR) is a well-established technology which controls  $\text{NO}_x$  emission. Recently, Mn based catalysts are widely accepted as efficient catalysts in SCR reaction, and various kinds of materials were used as support. In this study, we focused on hydrous titania with highly porous structure and a large surface area, which is regarded as potential support materials. Mn oxide supported on two different groups of titania, hydrous or crystalline titanium oxide, were investigated for the SCR reaction. Mn supported on hydrous  $\text{TiO}_2$  catalyst exhibited higher  $\text{NO}_x$  conversion over wide temperature range as well as the suppressed formation of  $\text{N}_2\text{O}$  compared to Mn supported on crystalline  $\text{TiO}_2$ . Also, Mn/hydrous  $\text{TiO}_2$  showed relatively lower performance in ammonia oxidation than Mn/crystalline  $\text{TiO}_2$  which is regarded as the side reaction. Combined several characterization results indicates that manganese species are more strongly interacted with hydrous  $\text{TiO}_2$  than crystalline  $\text{TiO}_2$ , resulting in different redox behavior and oxidation state of Mn oxides. It can be concluded that the activity and selectivity of Mn/ $\text{TiO}_2$  catalysts in  $\text{NH}_3$  SCR reaction were affected by initial state of titania support.