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Selective catalytic reduction of NO_x with NH_3 over Titanium modified $Fe_xMg_yO_z$ catalysts: Performance and Characterization

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Abstract: A series of titanium modified $Fe_xMg_yO_z$ catalysts were prepared by coprecipitation method and impregnation-coprecipitation method with microwave assistant and their catalytic capability in selective catalytic reduction (SCR) was evaluated. Appropriate amount of either titanium or TiO_2 could both improve the catalytic performance of $Fe_xMg_yO_z$ catalyst, especially above 350 ^oC. 7.5%Ti-$Fe_xMg_yO_z$ catalyst with wide temperature range of 225 to 400 ^oC could achieve the maximum NO_x conversion of 100%, while $Fe_xMg_yO_z/TiO_2$(b) catalyst exhibited the best catalytic performance in the present of H_2O and SO_2. Characterization results exhibited that γ-Fe_2O_3 was the main active phase, TiO_2 was mainly in the form of anatase TiO_2 and both titanium and magnesium existed in amorphous phase. The crystalline grain could be refined with the addition of either titanium or TiO_2, as well as the increase of BET surface area and pore volume. The acid sites, redox ability and the chemisorbed oxygen were the most important factors in SCR reaction. The introduction of titanium and TiO_2 had the effect of increasing the strength of the acid