

## Supplementary Material

### **Mechanism of ammonium bisulfate deposition on $V_1M_5/Ti$ catalysts with synergistic effect of V and M (M=Ce, Co, Fe, Mn) in the selective catalytic reduction of NO with $NH_3$ at low temperatures**

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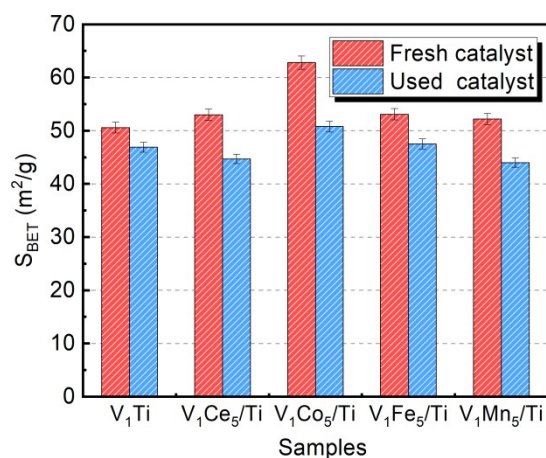
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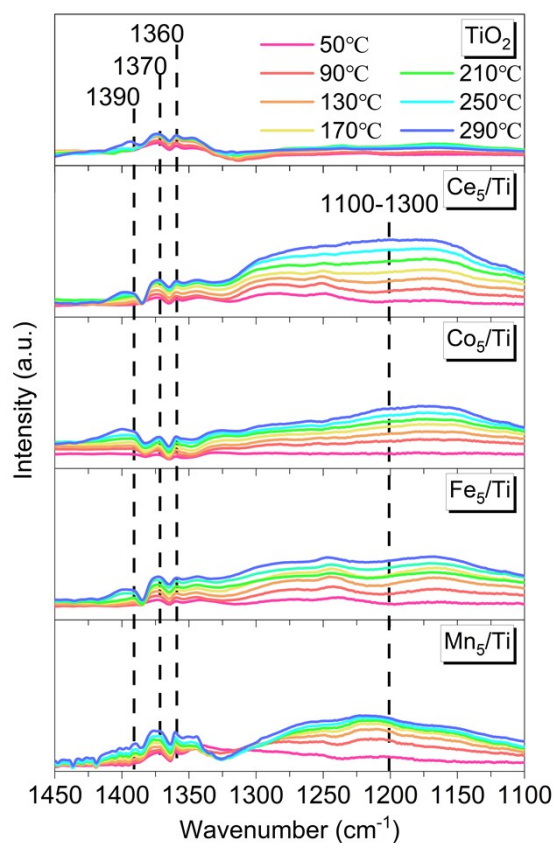
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## Results and discussion



**Fig. S1** The change of specific surface area before and after the reaction in the presence of SO<sub>2</sub> and H<sub>2</sub>O on various catalysts



**Fig. S2** In situ DRIFTS spectra of the carriers at various temperatures (Samples were treated at 1000 ppm SO<sub>2</sub> and 6% O<sub>2</sub>)

In situ DRIFTS spectra have been collected for various supports, with results

shown in Fig. S2. The peak at  $1390\text{ cm}^{-1}$  is attributed to tridentate sulfate, the wide peaks at  $1100 - 1300\text{ cm}^{-1}$  are attributed to monodentate sulfate and bidentate sulfate [1, 2], the two peaks at  $1370\text{ cm}^{-1}$  and  $1360\text{ cm}^{-1}$  belong to the vibration of gaseous  $\text{SO}_2$  [3, 4]. The tridentate sulfate peak occurs on  $\text{TiO}_2$  above  $290\text{ }^\circ\text{C}$ , indicating that the  $\text{TiO}_2$  carrier without active sites hardly oxidizes  $\text{SO}_2$  to tridentate sulfate at low temperature. The intensity of tridentate sulfate peak is much lower on various carriers without V sites, and the monodentate sulfate and bidentate sulfate peaks occur on  $\text{M}_5/\text{Ti}$  carriers. It is indicated that the V sites as main active sites oxidize  $\text{SO}_2$  to form tridentate sulfate and transitional metal sites as main active sites oxidize  $\text{SO}_2$  to form monodentate sulfate and bidentate sulfate.

## References

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