

Electronic Supplementary Information

DeNO_x performance enhancement of Cu-based oxides via employing TiO₂ phase to modify LDHs precursor

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Figure captions

Fig. S1 Experimental configurations for evaluating of catalytic performance

Fig.S2 NO_x conversion as a function of temperature over CuAl-LDO/TiO₂NTs catalyst in different rounds

Fig. S3 In situ DRIFTS spectrum of SO₂ adsorption over (a) CuAl-LDO and (b) CuAl-LDO/TiO₂NTs catalyst at 240 °C.

Fig. S4 The TEM images of TiO₂NTs (A, B).

Fig. S5 (A) N₂ adsorption/desorption isotherms and (B) pore diameter distribution of catalysts

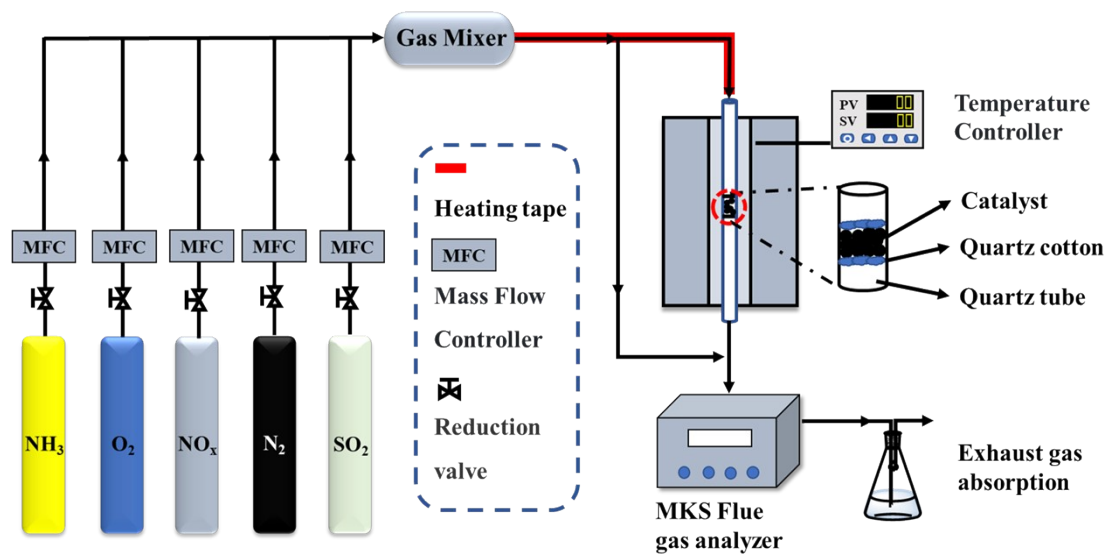


Fig. S1 Experimental configurations for evaluating of catalytic performance

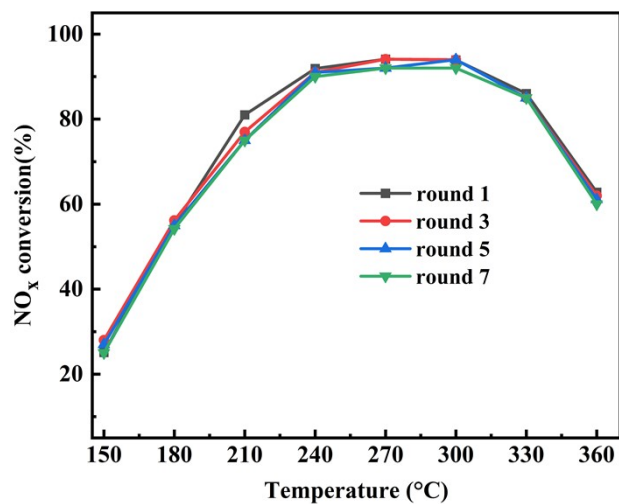


Fig.S2 NO_x conversion as a function of temperature over CuAl-LDO/TiO₂NTs catalyst in different rounds

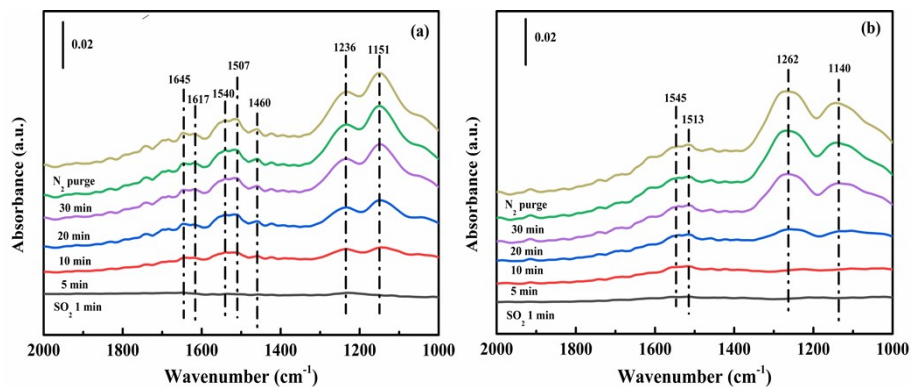


Fig. S3 In situ DRIFTS spectrum of SO₂ adsorption over (a) CuAl-LDO and (b) CuAl-LDO/TiO₂NTs catalyst at 240 °C.

The capacity of SO₂ adsorption over CuAl-LDO and CuAl-LDO/TiO₂NTs catalysts were researched by In situ DRIFTS measurement and the results are shown in the Fig. S3. For CuAl-LDO catalyst, it could be seen that the bands at 1645 cm⁻¹, 1617 cm⁻¹, 1540 cm⁻¹, 1507 cm⁻¹, 1460 cm⁻¹, 1236 cm⁻¹ and 1151 cm⁻¹ were detected, which were ascribed to the hydroxyl groups in the adsorbed water (1645 cm⁻¹ and 1617 cm⁻¹), the surface bidentate sulfate species (1540 cm⁻¹ and 1507 cm⁻¹), SO₃ species (1460 cm⁻¹), the stretching modes of surface absorbed sulfate species (1236 cm⁻¹ and 1151 cm⁻¹), separately¹⁻³. As shown in Fig. S3(b), the peaks located at 1545 cm⁻¹, 1513 cm⁻¹, 1262 cm⁻¹, 1148 cm⁻¹ were appeared for CuAl-LDO/TiO₂NTs catalyst. The peaks above could be assigned to the surface bidentate sulfate species (1540 cm⁻¹ and 1507 cm⁻¹) and the stretching modes of surface absorbed sulfate species (1236 cm⁻¹ and 1151 cm⁻¹)^{1,2}.

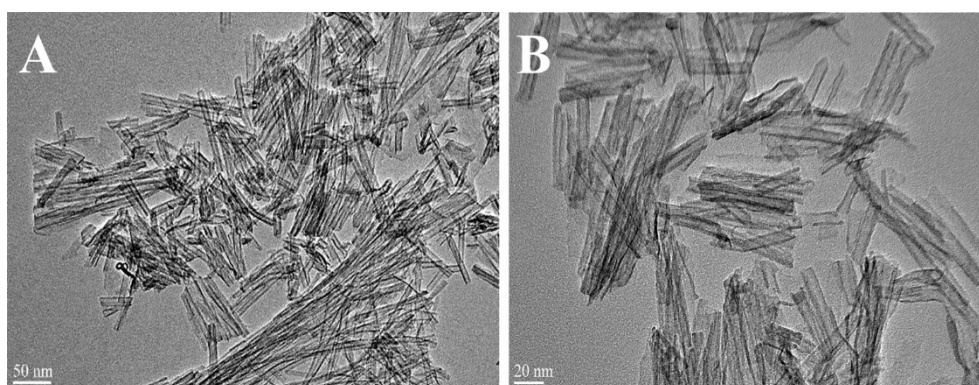


Fig. S4 The TEM images of TiO₂NTs (A, B).

The TEM images of TiO₂NTs are showed in Fig. S4 (A) and (B). It can be seen from the Fig. S4 that TiO₂NTs has a regular morphology and a complete hollow tubular structure. The wall of nanotube was smooth, no particles are attached to the surface. The diameter of the tube was uniform (about 10 nm), and the length was greater than 100 nm.

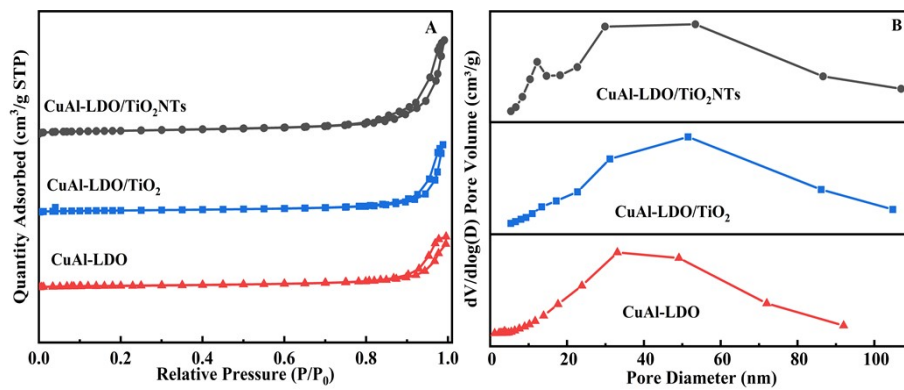


Fig. S5 (A) N_2 adsorption/desorption isotherms and (B) pore diameter distribution of catalysts

References

- 1 L. Zhao, X. Li, C. Hao and C. L. Raston, *Appl. Catal. B-Environ.*, 2012, **117-118**, 339–345.
- 2 H. Abdulhamid, E. Fridell, J. Dawody and M. Skoglundh, *J. Catal.*, 2006, **241**, 200–210.
- 3 B. Q. Jiang, Z. B. Wu, Y. Liu, S. C. Lee and W. K. Ho, *J. Phys. Chem. C*, 2010, **114**, 4961–4965.