

Electronic Supplementary Information

Enhancement of NH₃-SCR performance of LDHs based MMnAl (M = Cu, Ni, Co) oxides catalyst: influence of doping M

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Figure captions

Table S1 The list of experimental conditions for excluding external diffusion.

Fig. S1 NO_x conversions of CoMnAl-LDO with different pellet sizes.

Fig. S2 NO_x conversions of CoMnAl-LDO under different gas flows.

In order to calculate kinetic parameters, it is necessary to use the NO_x conversion data that has excluded the effect of the internal and external diffusion. Here, CoMnAl-LDO catalyst was selected as a representative sample and the specific experimental conditions are as follows:

To ensure the elimination of internal diffusion, the catalytic test with different pellet sizes (20-40, 40-60, 60-80, 80-100 mesh) over CoMnAl-LDO catalyst was performed at 210 °C under a GHSV of 30,000 h⁻¹. The composition of the reaction gas is: 500 ppm NH₃, 500 ppm NO, 5 vol.% O₂ and N₂ as balance gas.

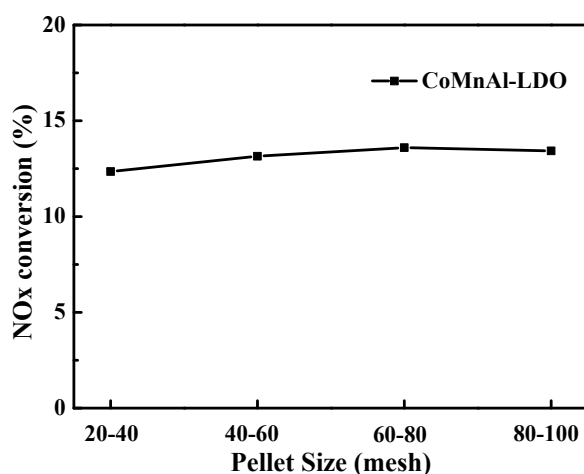


Fig. S1 NO_x conversions of CoMnAl-LDO with different pellet sizes.

Fig. S1 shows NO_x conversion as a function of catalyst pellet sizes. It can be seen that the NO_x conversion slightly increased with the decrease of pellet size. When the pellet size of catalyst is 60-80 mesh, the NO_x conversion achieved a maximum value of ~13.5% and hardly changes as the pellet size further decreases, indicating that the effect of internal diffusion can be eliminated at this pellet size (60-80 mesh) as well as smaller sizes.

To ensure the elimination of external diffusion, the catalytic test over CoMnAl-LDO catalyst (pellet size: 60-80 mesh) with different gas flows and catalyst masses was performed at 210 °C under a GHSV of 30,000 h⁻¹. The composition of the reaction gas

is: 500 ppm NH₃, 500 ppm NO, 5 vol.% O₂, N₂ as balance gas. A list of gas flows and catalyst masses is shown in Table S1.

Table S1. A list of gas flows and catalyst masses

| Catalyst mass (mg) | Gas flows (mL/min) |
|--------------------|--------------------|
| 45 | 120 |
| 65 | 180 |
| 85 | 240 |
| 105 | 300 |

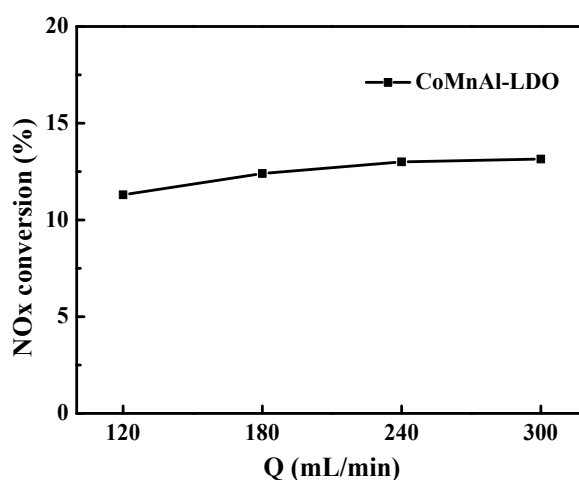


Fig. S2 NO_x conversions of CoMnAl-LDO under different gas flows

Fig. S2 shows the NO_x conversion as a function of gas flows. When the gas flow rate is low, the NO_x conversion increases with the increase of the flow rate. When the flow rate is 240 mL/min, the NO_x conversion is basically unchanged, which indicates that the influence of the external diffusion can be eliminated at this time.

Therefore, for CoMnAl-LDO catalyst, test conditions with a gas flow rate of 240 mL/min and a catalyst pellet size of 60-80 mesh can simultaneously eliminate the effects of internal and external diffusion, thus ensuring the accurate kinetic data.