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# Supporting information

## $NO_x$ reduction by CO over ASC catalysts in a simulated rotary reactor: effect of $CO_2$, $H_2O$ and $SO_2$

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**Fig. S1** The schematic of the fixed bed experimental system

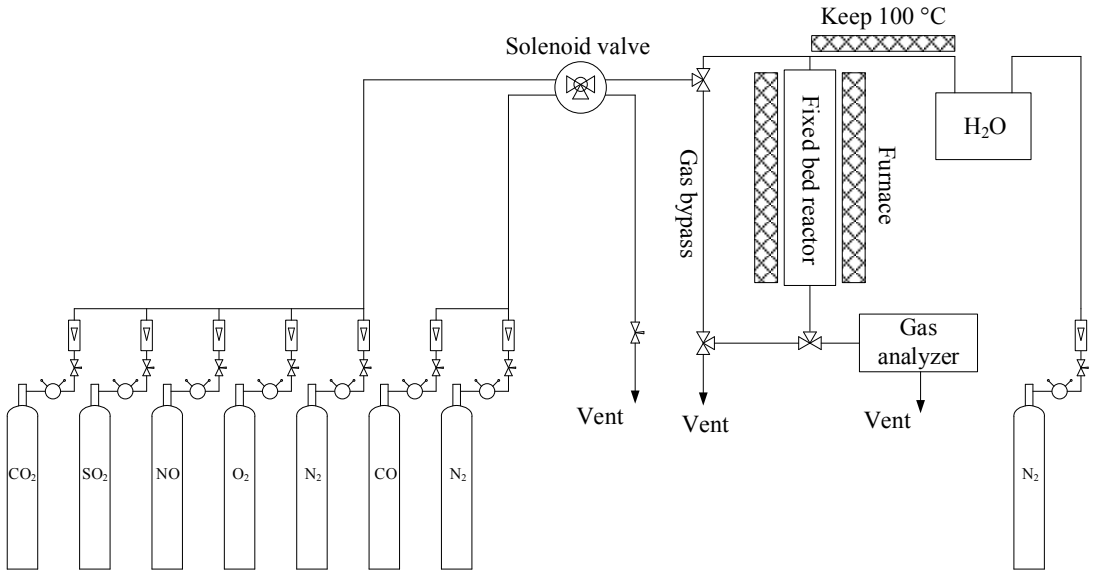



**Fig. S2** $NO_x$ adsorption capacity of catalysts at different temperatures in 800 s

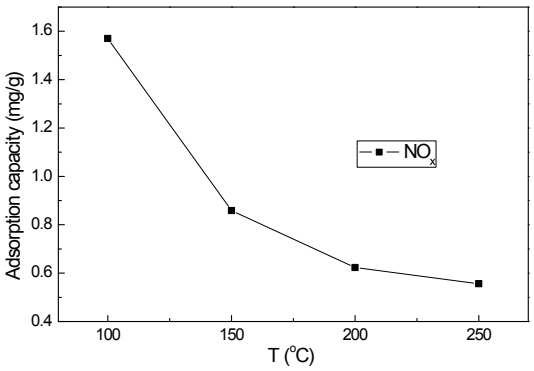
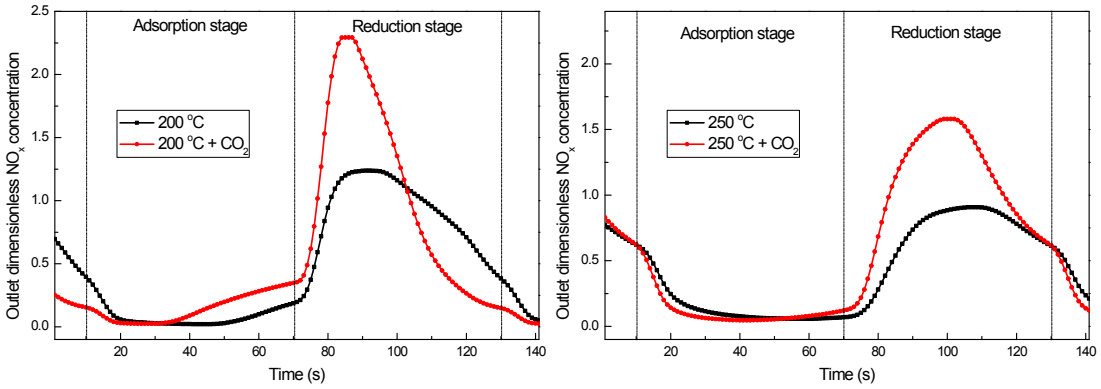
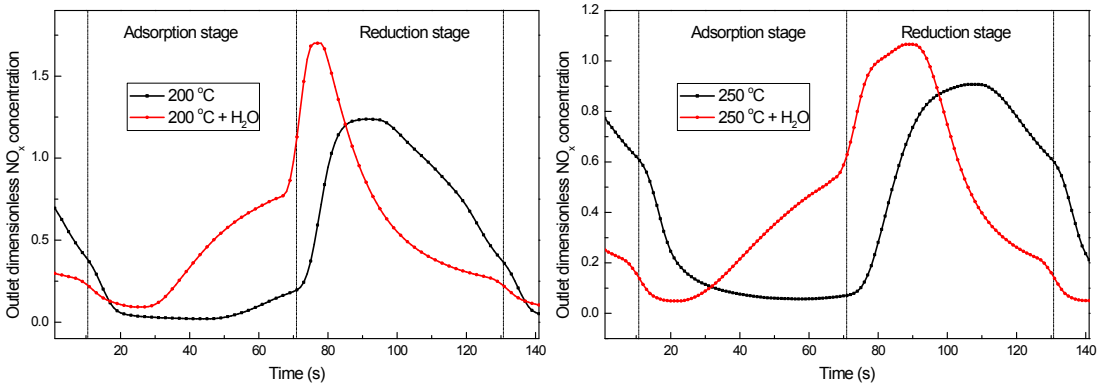


**Fig. S3** Dimensionless outlet $NO_x$ concentration in the simulated rotary reactor. ((a) T = 200 °C, (b) T = 250 °C)




(a) (b)

**Fig. S4** Dimensionless outlet $NO_x$ concentration in the simulated rotary reactor. ((a) T = 200 °C, (b) T = 250 °C)




(a) (b)

**Table S1** $NO_x$ adsorption capacity of catalysts under different conditions in 800 s

| Conditions | Adsorption capacity (mg/g) |
|---|---|
| Baseline group | 0.660 |
| 15 % $CO_2$ | 0.580 |
| 5 % $H_2O$ | 0.516 |
| 10 % $H_2O$ | 0.330 |
| 10 % $H_2O$ + 15 % $CO_2$ | 0.290 |

**Table S2** The influence of $CO_2$ on the NO adsorption and reduction efficiencies

| | NO adsorption efficiency | | NO reduction efficiency | |
|---|---|---|---|---|
| | no $CO_2$ | adding $CO_2$ | no $CO_2$ | adding $CO_2$ |
| 150 °C | 87.0% | 59.7% | 4.4% | 3.4% |
| 200 °C | 93.4% | 87.6% | 19.9% | 1.2% |
| 250 °C | 88.6% | 90.8% | 32.8% | 4.0% |

**Table S3** NO adsorption and reduction efficiencies of catalyst under wet condition

| | NO adsorption efficiency | | NO reduction efficiency | |
|---|---|---|---|---|
| | no $H_2O$ | adding $H_2O$ | no $H_2O$ | adding $H_2O$ |
| 150 °C | 87.0% | 39.6% | 4.4% | 0.1% |
| 200 °C | 93.4% | 65.9% | 19.9% | 4.8% |
| 250 °C | 88.6% | 78.2% | 32.8% | 24.8% |

**Table S4** Influence of $SO_2$ on NO adsorption and reduction efficiencies

| | NO adsorption efficiency | | NO reduction efficiency | |
|---|---|---|---|---|
| | no $SO_2$ | adding $SO_2$ 45 min | no $SO_2$ | adding $SO_2$ 45 min |
| 150 °C | 87.0% | 37.3% | 4.4% | 4.2% |
| 200 °C | 93.4% | 34.9% | 19.9% | 10.2% |
| 250 °C | 88.6% | 39.5% | 32.8% | 11.8% |