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## Supplementary Material

Figure S1 UV-vis spectra of (a)1 mmol L<sup>-1</sup> KNO<sub>3</sub> (b) oxidation products for catalytic

ozonation diluted by a certain amount of water

Figure S2 two feasible technological processes based on the two conditions

Figure S3 Recycle catalytic performance of  $CoMn_2O_4/air$ . Ozone dose: 2.8 mg L<sup>-1</sup>, catalyst dose: 0.2 g

Figure S4 (a) XRD patterns and (b) FT-IR spectra of fresh and used CoMn<sub>2</sub>O<sub>4</sub>/air catalysts

Figure S5 SEM image of Co<sub>3</sub>O<sub>4</sub>(a, b) and Mn<sub>2</sub>O<sub>3</sub>(c, d)

**Table S1** Material balance summary for NOx



**Figure S1** UV-vis spectra of (a)1 mmol L<sup>-1</sup> KNO<sub>3</sub> (b) oxidation products for catalytic ozonation diluted by a certain amount of water



a: catalytic ozonation b: desulfurization and denitration(absorption) c: chimney



a: ammonia desulfurization(absorption) b: catalytic ozonation c: denitration(absorption) d: chimney

## Figure S2 two feasible technological processes based on the two conditions



Figure S3 Recycle catalytic performance of  $CoMn_2O_4/air$ . Ozone dose: 2.8 mg L<sup>-1</sup>, catalyst dose: 0.2 g



Figure S4 (a) XRD patterns and (b) FT-IR spectra of fresh and used CoMn<sub>2</sub>O<sub>4</sub>/air catalysts



Figure S5 SEM image of  $Co_3O_4(a, b)$  and  $Mn_2O_3(c, d)$ 

Category	CoMn <sub>2</sub> O <sub>4</sub> /CO	Co <sub>3</sub> O <sub>4</sub>	Mn <sub>2</sub> O <sub>3</sub>
Time t, min	500	500	500
Gas flow Q, mL min <sup>-1</sup>	200	200	200
Solution volume V <sub>L</sub> , mL	200	200	200
C <sub>in</sub> (NO <sub>X</sub> ), ppm	450	455	442
C <sub>out</sub> (NO <sub>X</sub> ), ppm	81	95	132
C(NO <sub>2</sub> <sup>-</sup> ) actual value, mg L <sup>-1</sup>	0	0	0
C(NO <sub>3</sub> <sup>-</sup> ) actual value, mg L <sup>-1</sup>	480	464	407
C(NO <sub>3</sub> <sup>-</sup> ) calculation value, mg L <sup>-1</sup>	511	498	442
$C(NO_3^-)$ error, %	6.1	6.8	7.9

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