Electronic Supplementary Information

Promotional effect of Fe and Ce co-doping on the V_2O_5 – WO₃/TiO₂ catalyst for SCR of NO_x with high K and Pb resistance

Xianfang Yi^{a,b}, Jinxiu Wang*^{a,b}, Yuqiu Liu^{a,b}, Yanting Chen^a, Jinsheng Chen*^{a,b}

^a Center for Excellence in Regional Atmospheric Environment, and Key Lab of Urban

Environment and Health, Institute of Urban Environment, Chinese Academy of

Sciences, Xiamen 361021, P.R. China

^b University of Chinese Academy of Sciences, Beijing 100049, P.R. China

Corresponding Author

* Jinxiu Wang, Tel./Fax: +86 592 6190548, Email: jxwang@iue.ac.cn

* Jinsheng Chen, Tel./Fax: +86 592 6190765, Email: jschen@iue.ac.cn

The modified V₂O₅-WO₃-TiO₂ catalysts with different amounts of cerium and ferric oxides were prepared with the same method in main body. The prepared xCeO_x-V₂O₅-WO₃/TiO₂ were abbreviated to xCeVWTi, in which x represented the varied molar ratios of Ce to V. The prepared yFeO_x-CeO_x-V₂O₅-WO₃/TiO₂ with Ce to V molar ratio = 1.5 were abbreviated to yFeCeVWTi, and y was Fe to V molar ratio. In the main text, 1.5 CeVWTi and 0.05FeCeVWTi were further abbreviated to CeVWTi and FeCeVWTi.



Fig. S1 NO_x conversion and N₂ selectivity of (A and A1) xCeVWTi and (B and B1) yFeCeVWTi catalysts in GHSV = 110,000 mL·g⁻¹·h⁻¹.



Fig. S2 N₂ selectivity of fresh catalysts in GHSV = 110,000 mL·g⁻¹·h⁻¹.

The K₂O poisoned catalysts were prepared with KNO₃ aqueous solutions by the same method in main body. The molar ratio of K/V was 1.0. Herein, K-poisoned catalysts were abbreviated to VWTi-K, CeVWTi-K and FeCeVWTi-K, respectively.



Fig. S3 (A) NO_x conversion and (B) N₂ selectivity of K-poisoned catalysts in GHSV = 60,000 mL·g⁻¹·h⁻¹.



Fig. S4 N₂ selectivity of (A)fresh and (B)K-Pb poisoned catalysts in GHSV = 60,000 $mL\cdot g^{-1}\cdot h^{-1}$.

Table S1 The molar ratios of doped elements calculated by XRF over samples

Samples	Fe/V	Ce/V	K/V	Pb/V
CeVWTi	_	1.66	_	_
FeCeVWTi	0.05	1.61	_	_
VWTi-K-Pb	_	_	0.35	0.43
CeVWTi-K-Pb	_	1.61	0.39	0.45
FeCeVWTi-K-Pb	0.05	1.72	0.37	0.44

Table S2 BET surface area (S_{BET}), total pore volume (V_P) and average pore radius (r_A) over samples

Sample	S _{BET} (m ² /g)	V _P (cm ³ /g)	r _A (nm)
VWTi	54.0	0.29	10.6
FeCeVWTi	51.4	0.24	9.2
VWTi-K-Pb	52.2	0.26	10.0
FeCeVWTi-K-Pb	50.5	0.25	10.0



Fig. S5 The XPS spectrum of Fe 2p of the (A) fresh and (B) poisoned catalysts.



Fig. S6 ${\rm H_2}\text{-}{\rm TPR}$ of the CeVWTi catalyst.



Fig. S7 *In situ* DRIFTS of the transient reactions between NO + O_2 and preadsorbed NH₃ over (A and A1) VWTi-K-Pb and (B and B1) FeCeVWTi-K-Pb at 300°C with time.



Fig. S8 In situ DRIFTS of the transient reactions between NH_3 and preadsorbed NO + O_2 over (A and A1) VWTi-K-Pb and (B and B1) FeCeVWTi-K-Pb at 300°C with time.