Supplementary materials

Nature of SiO_2 modification on the hydrothermal stability of V_2O_5/WO_3-TiO_2 NH_3-SCR catalyst: TiO_2 structure and vanadia species

Xuesong Liu,[*a,b,c] Hongfeng Chen,[d] Xiaodong Wu,[b**] Li Cao,[b] Peng Jiang,[a] Qifan Yu[a], Yue Ma [b]

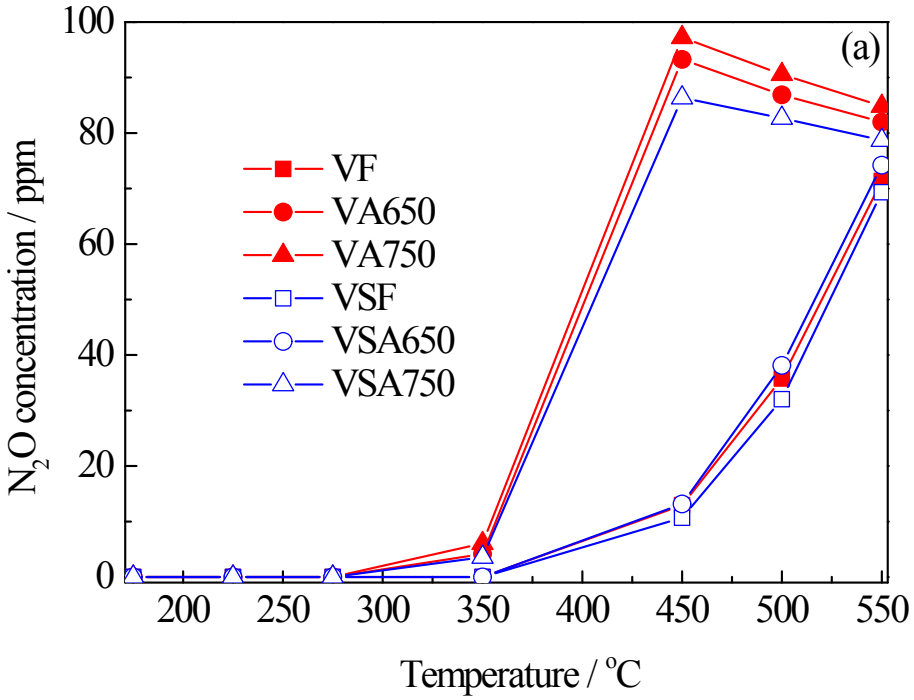
a College of Chemistry and Chemical Engineering, Shaoxing University, Zhejiang 312000, PR China

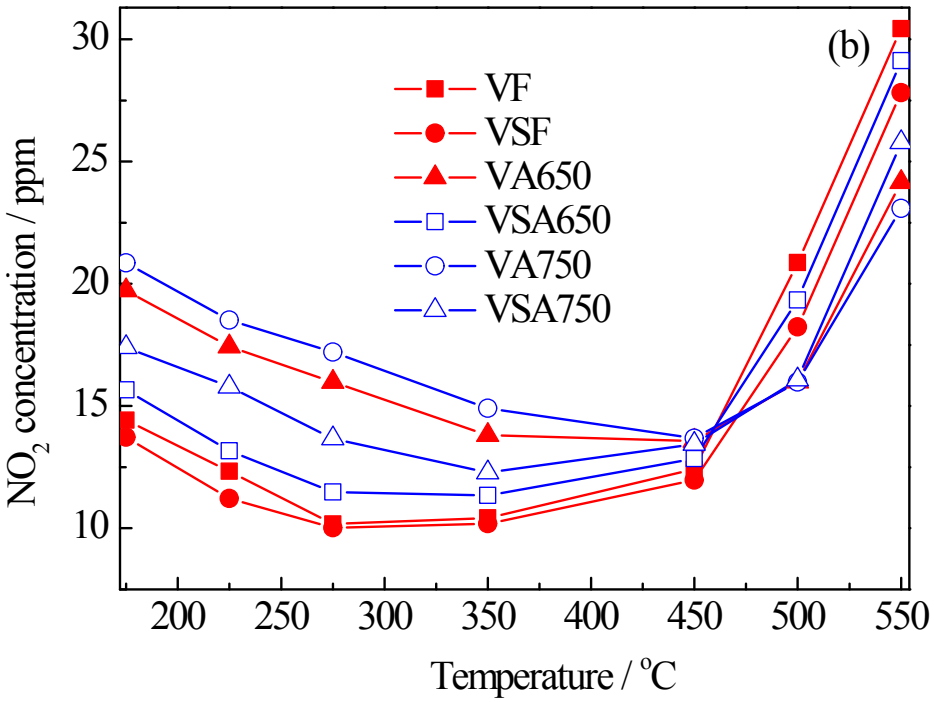
b Key Laboratory of Advanced Materials of Ministry of Education, School of Materials Science and Engineering, Tsinghua University, Beijing 100084, PR China

c Zhejiang Hailiang Eco. Mater. Co., Ltd., Zhuji, 311814, China

d Shaoxing Testing Institute of Quality and Technical Supervision, Shaoxing, 312000, Chnia

* Corresponding author. E-mail address: xuesongliu@usx.edu.cn (X. Liu); wuxiaodong@tsinghua.edu.cn (X. Wu)


(a)
VF
VA650
VA750
VSF
VSA650
VSA750
N_2O concentration / ppm
Temperature / °C
0
20
40
60
80
100
200
250
300
350
400
450
500
550


(b)
VF
VSF
VA650
VSA650
VA750
VSA750
NO_2 concentration / ppm
Temperature / °C
10
15
20
25
30
200
250
300
350
400
450
500
550

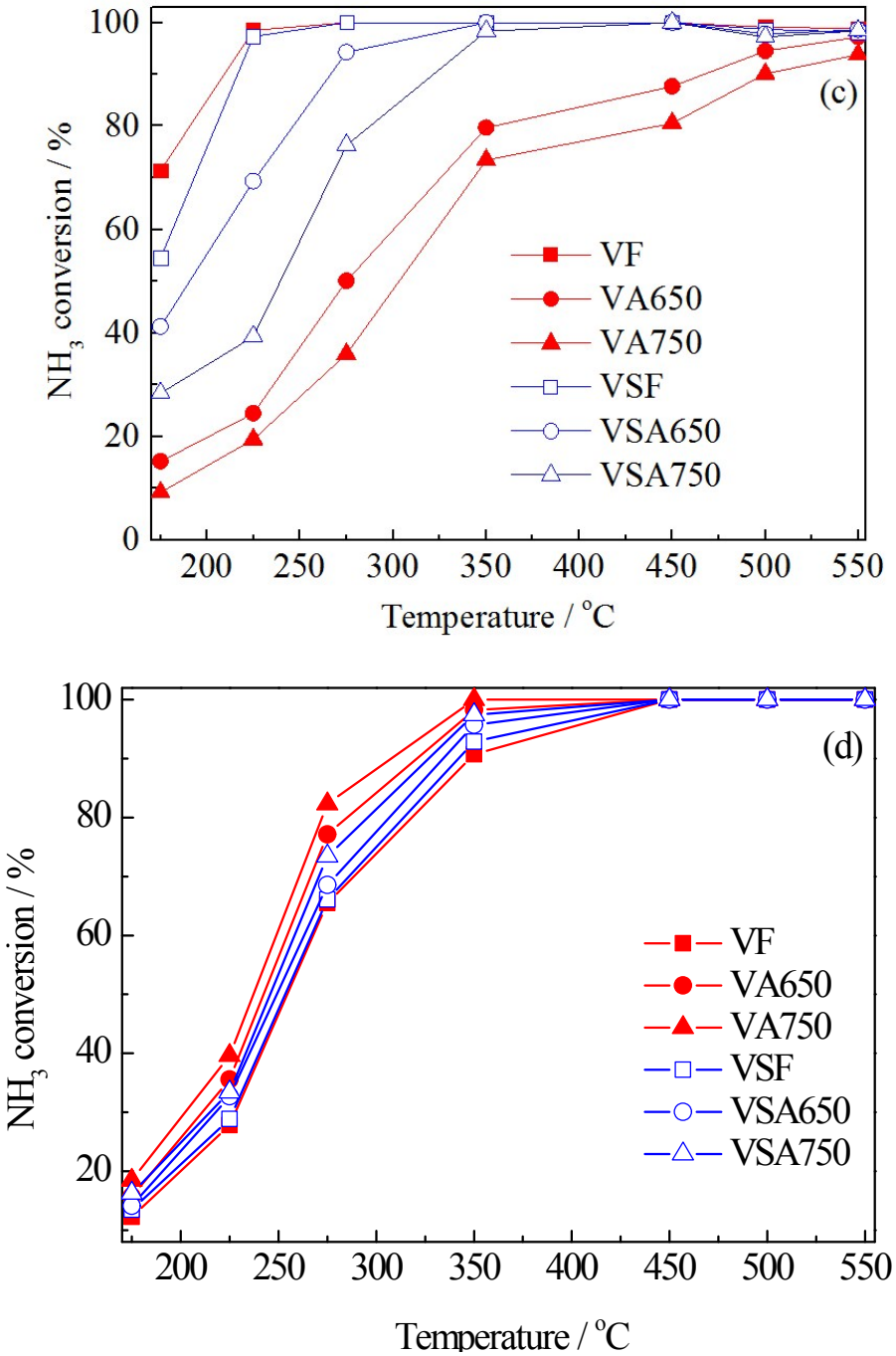


Fig. S1. (a) N_2O generation, (b) NO_2 generation and (c) NH_3 conversion of the catalysts for NH_3-SCR and (d) NH_3 conversion for NH_3 oxidation. Reaction conditions: 500 ppm NO (when used), 500 ppm NH_3, 5% O_2, 10% H_2O and N_2 in balance, GHSV = 100,000 h^{-1}.

The NH_3 conversion was calculated according to Eq. S1.

$$NH_3 \text{ conversion } (\%) = \frac{NH_{3in} - NH_{3out}}{NH_{3in}} \times 100 \qquad \text{(S1)}$$

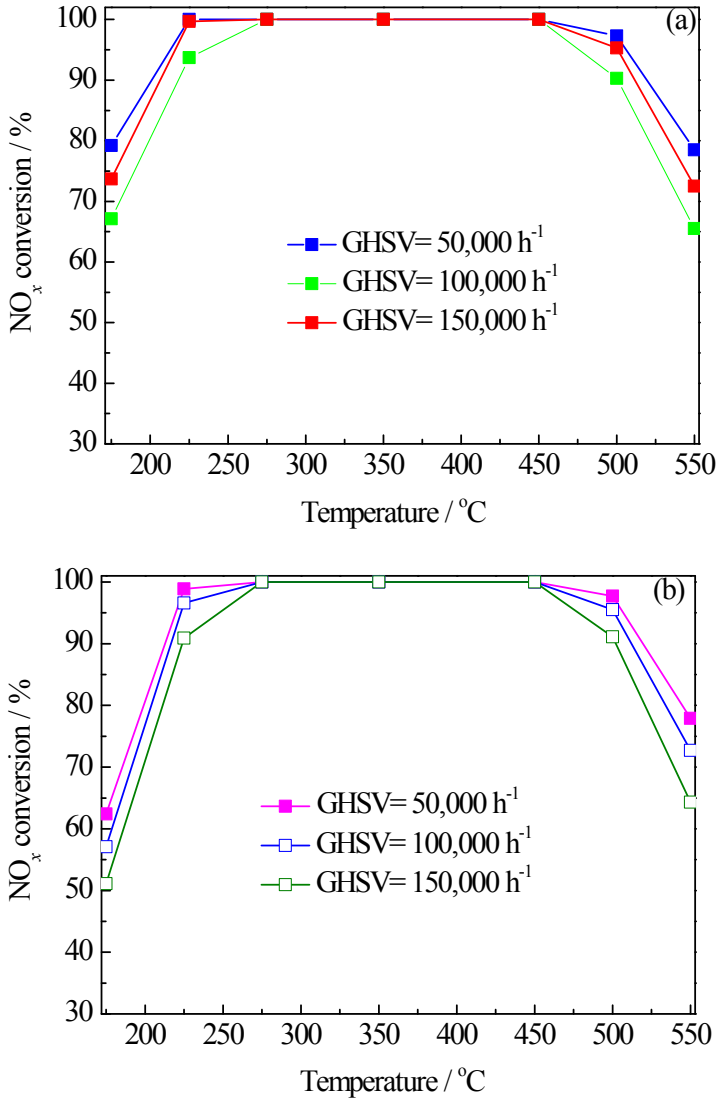


Fig. S2. Effect of GHSV on the NH_3-SCR activity of (a) VF and (b) VSF. Reaction conditions:

500 ppm NO, 500 ppm NH_3, 5% O_2, 10% H_2O and N_2 in balance.

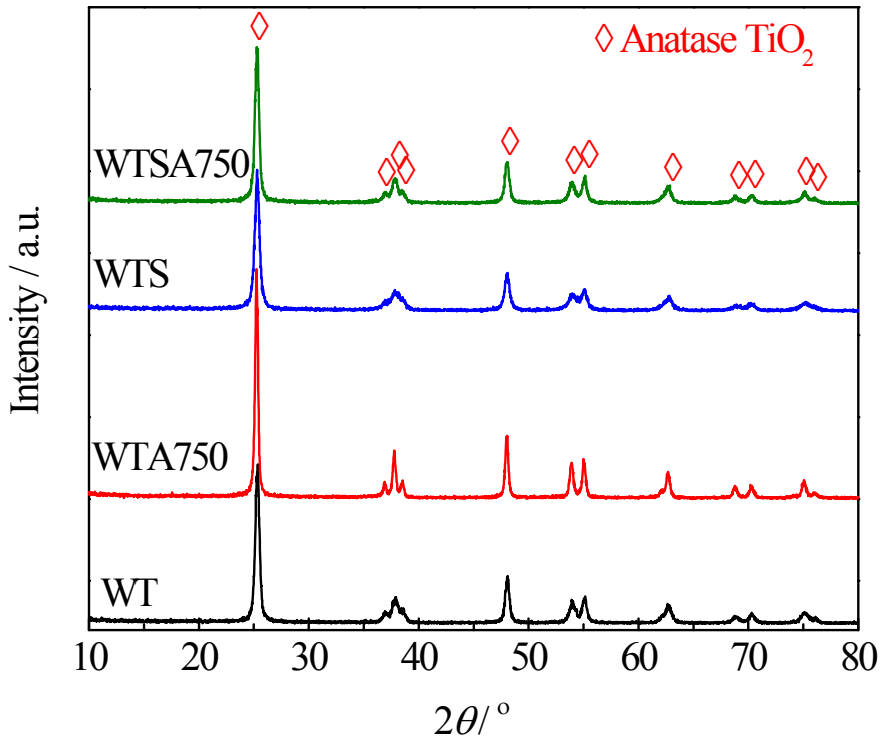


Fig. S3. XRD patterns of the fresh and aged supports.

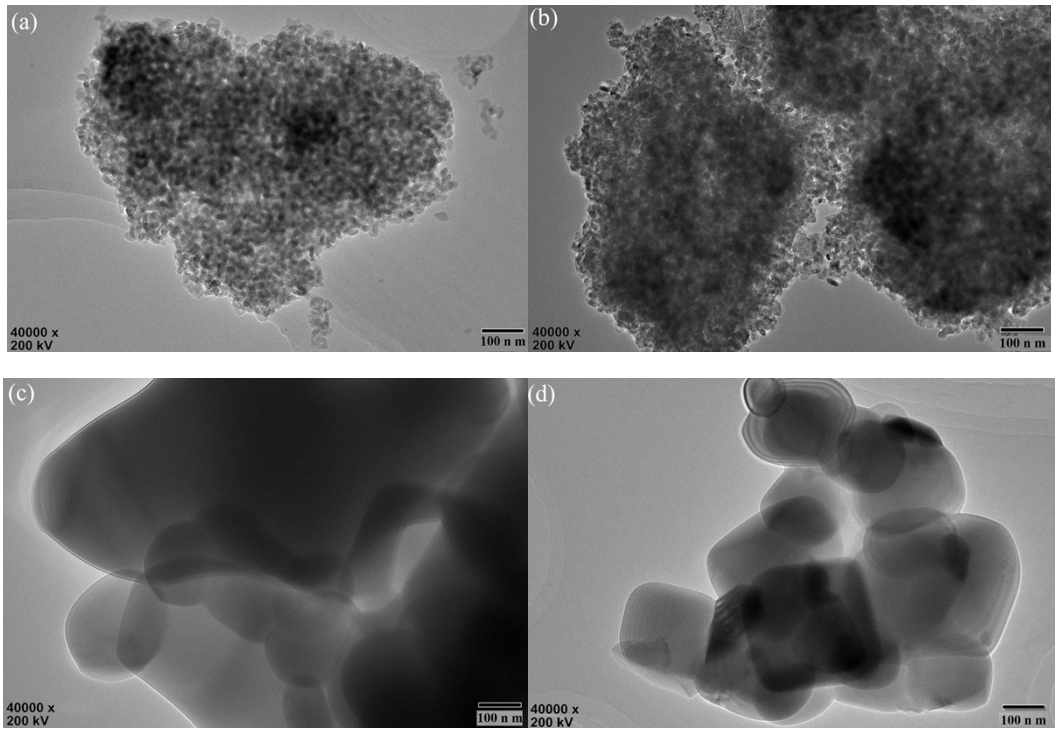


Fig. S4. TEM images of (a) VF, (b) VSF, (c) VA750 and (d) VSA750.

Table S1

Structural properties of the samples.

Sample	Phase composition / %		Anatase TiO_2 crystallite size / nm	S_{BET} / $m^2 \cdot g^{-1}$
	Anatase	Rutile		
WF	100	-	18.7	72
WSF	100	-	16.6	81
WA650	-	-	-	55
WSA650	-	-	-	73
WA750	100	-	26.3	49
WSA750	100	-	18.3	53