

## Effect of different exposed crystal surface of CeO<sub>2</sub> loading on MnO<sub>2</sub>/X catalyst for NH<sub>3</sub>-SCR reaction

Shihao Wang <sup>a</sup>, Xiaodi Li <sup>a</sup>, Shan Ren <sup>a,\*</sup>, Xiangdong Xing <sup>b</sup>, Lin Chen <sup>a</sup>, Jie Yang <sup>a,c</sup>,

Manyi Liu <sup>a</sup>, Yixin Xie <sup>a</sup>

<sup>a</sup> College of Materials Science and Engineering, Chongqing University, Chongqing 400044,

China

<sup>b</sup> School of Metallurgical Engineering, Xi'an University of Architecture and Technology, Xi'an

710055, ShanXi, P.R. China

<sup>c</sup> Paul Scherrer Institut, CH-5232 Villigen PSI, Switzerland

\* Corresponding author email: shan.ren@cqu.edu.cn(S. Ren).

**Table S1** Comparison of NO<sub>x</sub> conversion with the literatures related with Mn-based catalysts

Catalysts	Reaction condition	NO <sub>x</sub> conversion	Reference
Mn-Ce <sub>NC</sub> /X	NO = NH <sub>3</sub> = 500 ppm, O <sub>2</sub> = 11 %, GHSV = 36000 h <sup>-1</sup> , flow rate 300 mL/min	85.9 % (@ 125 °C)	This work
Mn-Ce <sub>NP</sub> /X	NO = NH <sub>3</sub> = 500 ppm, O <sub>2</sub> = 11 %, GHSV = 36000 h <sup>-1</sup> , flow rate 300 mL/min	74.5 % (@125 °C)	This work
Mn-Ce <sub>NR</sub> /X	NO = NH <sub>3</sub> = 1000 ppm, O <sub>2</sub> = 11 %, GHSV = 36000 h <sup>-1</sup> ,	79.16 % (@ 125 °C)	This work

Catalysts	Reaction condition	NO <sub>x</sub> conversion	Reference
	flow rate 300 mL/min		
Mn/X	NO = NH <sub>3</sub> = 500 ppm, O <sub>2</sub> = 11 %, GHSV = 36000 h <sup>-1</sup> , flow rate 300 mL/min	81.4 % (@ 125 °C)	This work
MnO <sub>2</sub>	NO = NH <sub>3</sub> = 500 ppm, O <sub>2</sub> = 5 %, GHSV = 30000 h <sup>-1</sup> , flow rate 500 mL/min	65 % (@ 125 °C)	[1]
MnTiO <sub>x</sub>	NO = NH <sub>3</sub> = 1000 ppm O <sub>2</sub> = 5 %, GHSV = 30000 h <sup>-1</sup> , flow rate 500 mL/min	74 % (@ 125 °C)	[1]
Ho-Mn/TiO <sub>2</sub>	NO = NH <sub>3</sub> = 500 ppm, O <sub>2</sub> = 5 %, GHSV = 20000 h <sup>-1</sup> , flow rate 100 mL/min	84.5 % (@ 125 °C)	[2]
MnFeO <sub>x</sub>	NO = NH <sub>3</sub> = 500 ppm, O <sub>2</sub> = 5 %, GHSV = 36000 h <sup>-1</sup> , flow rate 500 mL/min	40 % (@ 125 °C)	[3]
MnDyO <sub>x</sub>	NO = NH <sub>3</sub> = 500 ppm, O <sub>2</sub> = 5 %, GHSV = 36000 h <sup>-1</sup> , flow rate 500 mL/min	62% (@ 300 °C)	[3]
MnGrO <sub>x</sub>	NO = NH <sub>3</sub> = 500 ppm, O <sub>2</sub> = 5 %, GHSV = 36000 h <sup>-1</sup> , flow rate 500 mL/min,	71 % (@ 125 °C)	[4]
MnEu/TiO <sub>2</sub>	NO = NH <sub>3</sub> = 600 ppm, O <sub>2</sub> = 5 %, GHSV = 108000 h <sup>-1</sup> , flow rate 500 mL/min,	79 % (@ 125 °C)	[5]
MnNi <sub>2</sub> O <sub>4</sub>	NO = NH <sub>3</sub> = 600 ppm,	60 %	[6]

<b>Catalysts</b>	<b>Reaction condition</b>	<b>NO<sub>x</sub> conversion</b>	<b>Reference</b>
	O <sub>2</sub> = 5 %, GHSV = 50000 h <sup>-1</sup> , flow rate 600 mL/min, NO = NH <sub>3</sub> = 500 ppm,	(@ 125 °C)  85 %	
MnxCo <sub>3-x</sub> O <sub>4</sub>	O <sub>2</sub> = 5 %, GHSV = 23000 h <sup>-1</sup> , flow rate 260 mL/min,	(@ 125 °C)	[7]

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