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Supplementary Materials for

Specific Reactivity of 4d and 5d Transition Metals Supported over CeO_2 for Ammonia Oxidation

Yitong Guo [a], Lei Ma *[a], Zhisong Liu [a], Zihao Li [a], Huazhen Chang [b], Xiaoran Zhao, [c] Naiqiang Yan [a]

[a] *School of Environmental Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, China*

[b] *School of Environment and Natural Resources, Renmin University of China, Beijing 100872, China*

[c] *Shanghai Key Laboratory of Advanced High-temperature Materials and Precision Forming, State Key Laboratory of Metal Matrix Composites, School of Materials Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, China.*

*Correspondence to leima8@sjtu.edu.cn

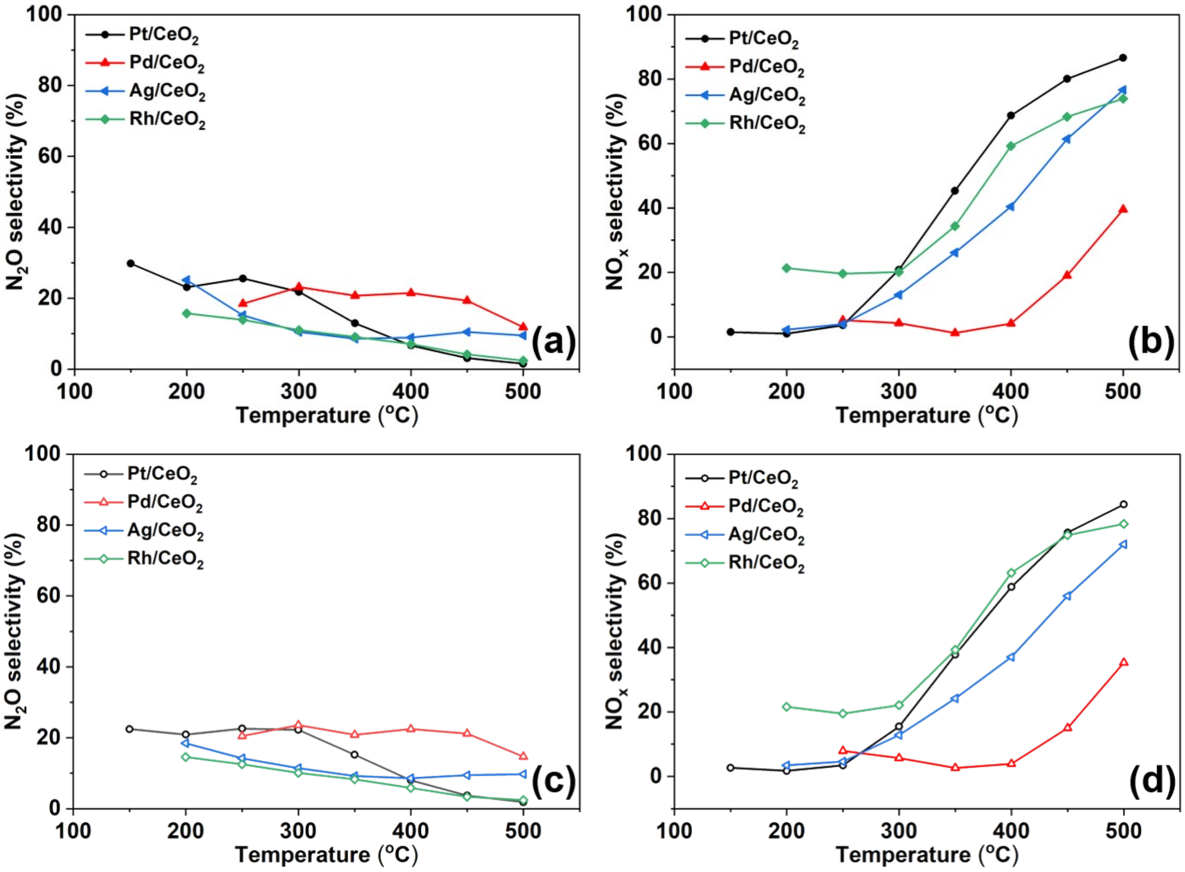

Figure S1. The N_2O selectivity (a, c) and NO_x selectivity (b, d) during selective catalytic of oxidation over prepared catalysts. Reaction conditions: 500 ppm NH_3, 12% O_2, balance N_2, and WHSV = 240, 000 mL g^{-1} h^{-1} (a, b) or 400, 000 mL g^{-1} h^{-1} (c, d).

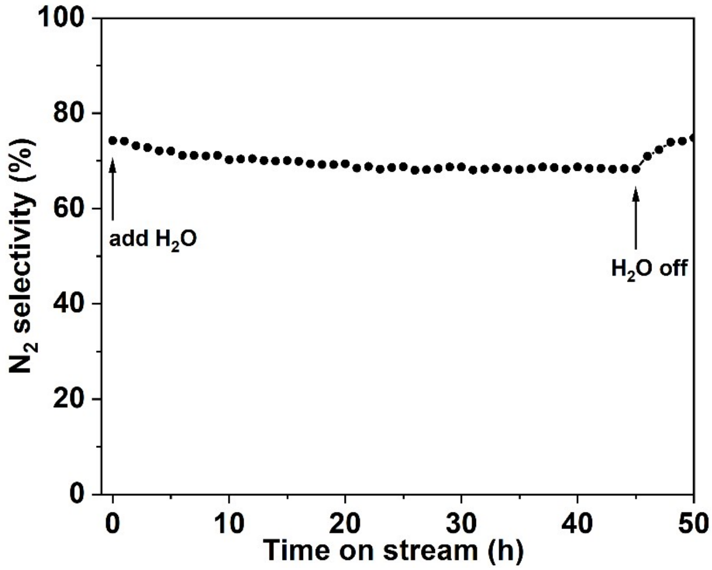

Figure S2. The N_2 selectivity during stability test on Pt/CeO_2 with H_2O at 250 ^oC. Reaction conditions: 500 ppm NH_3, 12% O_2, 5% H_2O balance N_2, and WHSV = 240, 000 mL g^{-1} h^{-1}.

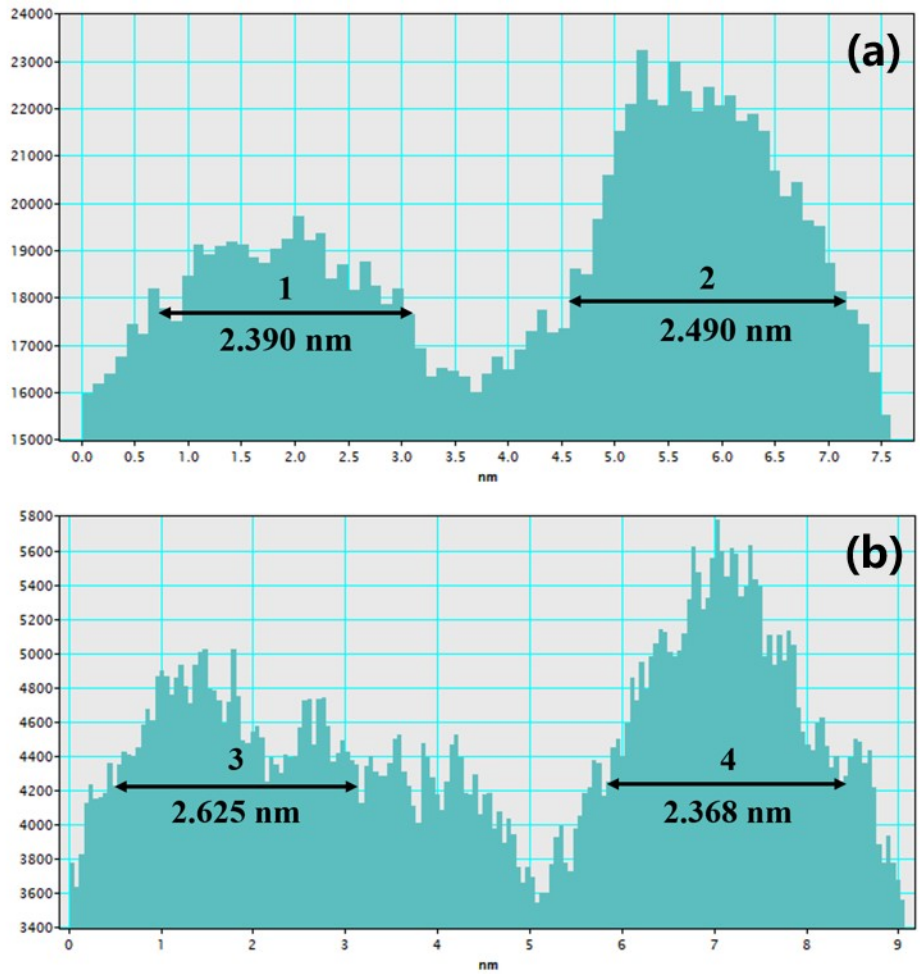

Figure S3. (a) Intensity profile of Pt clusters over Pt/CeO_2 in positions 1 and 2. (b) Intensity profile of Pt clusters over Pt/CeO_2 in positions 3 and 4.

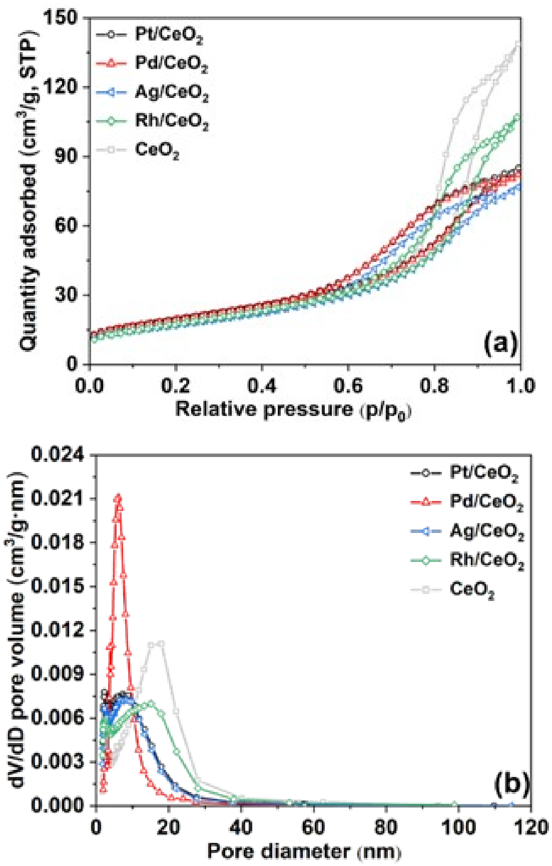

Figure S4. N_2 adsorption-desorption isotherms (a) and pore size distributions (b) of prepared catalysts.

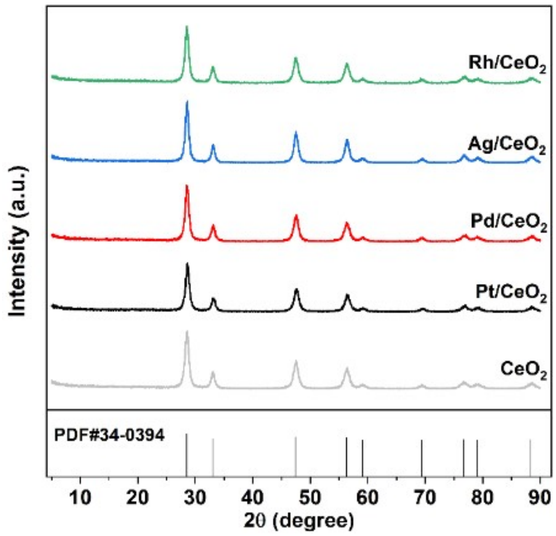

Figure S5. XRD patterns of prepared catalysts.

Table S1. Comparison of catalytic oxidation performance of different NH_3-SCO catalysts in the literatures.

Catalysts	NH_3 conversion (%)	N_2 selectivity (%)	Reaction conditions	Reference
Al_2O_3-Pt	100 (300℃)	56 (300℃)	5000 ppm NH_3, 12% O_2, balance He, WHSV = 24, 000 mL g^{-1} h^{-1}	1
TiO_2-Cu-Rh	100 (400℃)	69 (400℃)	5000 ppm NH_3, 12% O_2, balance He, WHSV = 24, 000 mL g^{-1} h^{-1}	1
ZrO_2-Cu-Pt	100 (325℃)	85 (325℃)	5000 ppm NH_3, 12% O_2, balance He, WHSV = 24, 000 mL g^{-1} h^{-1}	1
Cu-Mg-Al-600-Pt	100 (366℃)	86 (366℃)	5000 ppm NH_3, 2.5% O_2, balance He, WHSV = 48, 000 mL g^{-1} h^{-1}	2
Fe_2O_3-TiO_2	65 (350℃)	78 (350℃)	1000 ppm NH_3, 2% O_2, balance He, WHSV = 150, 000 mL g^{-1} h^{-1}	3
Mn-SiO_2	100 (335℃)	30 (335℃)	2000 ppm NH_3, 2.5% O_2, balance He, GHSV = 24, 000 h^{-1}	4
Ir/Ce-Zr	99 (400℃)	60 (400℃)	110 ppm NH_3, 4% O_2, balance N_2, WHSV = 500, 000 mL g^{-1} h^{-1}	5
Ag/SiO_2	100 (300℃)	62 (300℃)	1000 ppm NH_3, 10% O_2, balance He, WHSV = 30, 000 mL g^{-1} h^{-1}	6
V-Ce-Ti	96 (300℃)	90 (300℃)	200 ppm NH_3, 8% O_2, balance N_2, GHSV = 60, 000 h^{-1}	7
Cu-Ag/Al_2O_3	100 (375℃)	94 (375℃)	5000 ppm NH_3, 2.5% O_2, balance Ar, WHSV = 24, 000 mL g^{-1} h^{-1}	8
Pt/CeO_2	90 (230℃)	76 (230℃)	500 ppm NH_3, 12% O_2, balance N_2, WHSV = 240, 000 mL g^{-1} h^{-1}	This study

Table S2. Quantitative results of hydrogen consumption and peak area in H_2-TPR profiles.

Samples	Gaussian sub-peaks			Total hydrogen consumption (mmol/g_{cat})	
	Peak No.	Center (°C)	Peak Area	Actual[a]	Theoretical[b]
CeO_2	III	399	112178.2	0.288	2.905[(1)]
		471	178252.8		
		525	200628.9		
	IV	608	16549.4	0.447	
		798	602676.1		
		896	143364.9		
Pt/CeO_2	I	84	16290.3	0.362	0.031[(2)]
		119	63503.1		
		178	487953.7		
		229	151577.6		
	III	364	145509.7	0.183	2.888[(1)]
		427	217428.1		
	IV	531	81332.1	0.492	
		680	146349.1		
		803	750105		
Pd/CeO_2	I	62	-6307.1		
	II	129	84946.0	0.079	0.071[(3)]
		180	7669.8		
		221	58057.4		
	III	350	246854.4	0.339	2.883[(1)]
		428	400863.7		
	IV	609	138333.0	0.686	
		823	1171487		
Ag/CeO_2	I	100	147009.3	0.215	-[(4)]
		144	170951.1		
		210	64320.1		
		248	21778.5		
	III	342	6778.2	0.004	2.883[(1)]
	IV	484	25415.8	0.477	
		580	40269.6		
		809	831874.1		
Rh/CeO_2	I	77	62714.6	0.160	0.285[(5)]
		99	39494.1		
		149	97794.1		
		224	99959.9		
	III	304	81946.1	0.063	2.876[(1)]
		408	35560.8		
	IV	635	41599.4	0.421	
		788	747589.1		

[a] The actual hydrogen consumption was calculated based on the peak area of the Gaussian sub-peaks.

[b] The theoretical hydrogen consumption of M/CeO_2 was calculated based on the ICP-OES results. The relevant chemical equations are as follows:

(1) $2CeO_2 + H_2 \rightarrow Ce_2O_3 + H_2O$,

(2) $PtO + H_2 \rightarrow Pt + H_2O$,

(3) $PdO + H_2 \rightarrow Pd + H_2O$,

(4) Ag^0 was not reduced by H_2,

(5) $Rh_2O_3 + 3H_2 \rightarrow 2Rh + 3H_2O$.

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