

Supporting Information for Publication

**Low-temperature selective catalytic reduction of NO by CO in the presence of O₂ over
Cu:Ce catalysts supported by multi-walled carbon nanotubes**

Zahra Gholami^{*}, Guohua Luo^{*}

Beijing Key Laboratory of Green Chemical Reaction Engineering and Technology, Department
of Chemical Engineering, Tsinghua University, Beijing 100084, China

*Corresponding author

Tel: +86 10 62788994, Fax: +86 10 62772051, E-mail: luoguoh@tsinghua.edu.cn,

zgholami80@tsinghua.edu.cn

Table S1. EDS and XRF analysis results and textural properties of CNT and Cu:Ce catalysts supported on CNT.

Catalyst	Metal (At.%)							Surface area (m ² /g)	Pore volume (cm ³ /g)
	Cu	Ce	C	O	^a Cu:Ce	^b Cu:Ce	^c Cu:Ce		
CNT	0	0	96.68	3.32	-	-	-	179.6	1.76
Cu1:Ce3/CNT	0.62	1.46	94.74	3.18	1:3	1:2.4	1:2.6	168.2	1.07
Cu1:Ce1/CNT	0.59	0.69	96.06	2.66	1:1	1:1.2	1:1.1	153.8	0.99
Cu3:Ce1/CNT	1.28	0.64	94.25	3.83	3:1	2:1	3:1	146.9	0.90

^aCu:Ce ratio according to the nominal composition, ^bCu:Ce molar ratio determined by EDS,

^cCu:Ce molar ratio determined by XRF.

Table S2. Catalytic activity of different catalyst for reduction of NO by CO at 220 °C.

Catalyst	Feed gas	Space velocity	NO conversion (%)	Ref.
CuO/(CuO + CeO ₂)	5% NO 10% CO	24000 (ml/g.h)	86	1
CuO/CeO ₂ (1)/TiO ₂ (60)	5% NO 10% CO	24000 (ml/g.h)	50	44
CuO/CeO ₂ (1)/TiO ₂ (60)	5% NO 5% CO	18000 (ml/g.h)	50	45
CuO–V ₂ O ₅ /γ-Al ₂ O ₃	5% NO 10% CO	24000 (ml/g.h)	20	67
CuO/CeO ₂ (rods)	5% NO 10% CO	15000 (ml/g.h)	73	68
CuO/ZrO ₂	5% NO 10% CO	12000 (ml/g.h)	45	69
Cu _{0.15} /Mn	5% NO 10% CO	24000 (ml/g.h)	95	70
CuO–CoO/γ-Al ₂ O ₃	2.5% NO 5% CO	24000 (1/h)	48	71
CuO/Ce _{1-x} Zr _x O ₂ /Al ₂ O ₃	5% NO 10% CO	12000 (1/h)	50	72
CuOCeO ₂ /γ-Al ₂ O ₃	5% NO 10% CO	24000 (ml/g.h)	10	73
Cu/Ce _{0.25} Zr _{0.75} O ₂	3000ppm NO 3000 ppm CO	50000 (1/h)	68	13
Cu-Al hydrotalcite	1% NO 1% CO	35000 (1/h)	70	74
Fe/Co/ASC	1000ppm NO 5000 ppm CO	20000 (1/h)	83	20
Cr–Cu/CeO ₂ Cu/Mn=0.569	0.15% NO 0.15% CO	4300 (1/h)	48	75
Cu–Fe/CNT	5% NO 10% CO	60000 (1/h)	70	31
CuO/OMS-2	2.5% NO 2.8% CO	12000 (ml/g.h)	92	76
Fe/Co/ASC	800 ppm NO 2000 ppm CO	20000 (1/h)	90	77
Cu ₃ :Ce1/CNT	250 ppm NO 5000 ppm CO	12600 (1/h) 90000 (ml/g.h)	96	Present work
Cu ₃ :Ce1/CNT	250 ppm NO 4000 ppm CO	12600 (1/h) 90000 (ml/g.h)	96	Present work
Cu ₃ :Ce1/CNT	250 ppm NO 3000 ppm CO	12600 (1/h) 90000 (ml/g.h)	96	Present work
Cu ₃ :Ce1/CNT	250 ppm NO 2000 ppm CO	12600 (1/h) 90000 (ml/g.h)	95	Present work
Cu ₃ :Ce1/CNT	250 ppm NO 1000 ppm CO	12600 (1/h) 90000 (ml/g.h)	97	Present work

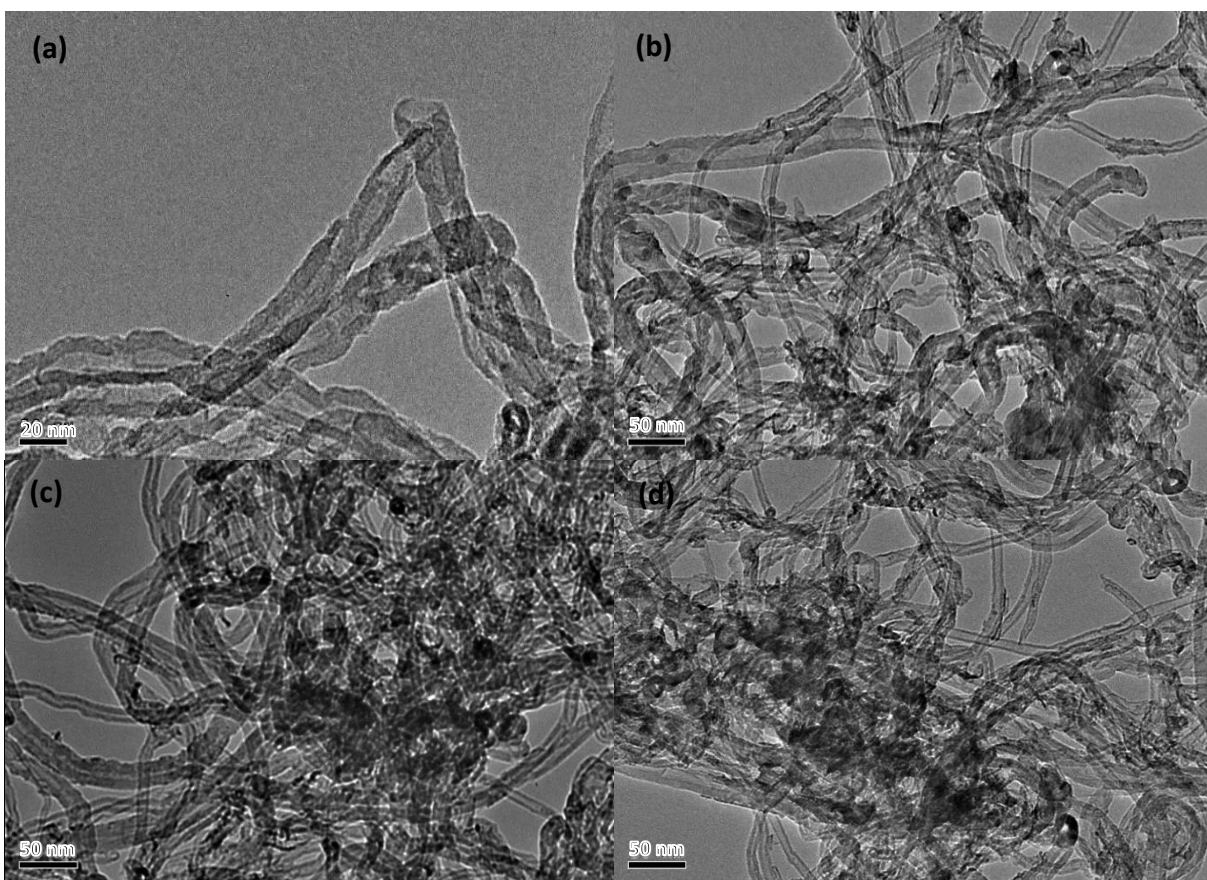


Figure S1. TEM images of (a) acid treated CNT, (b) Cu1:Ce3/CNT, (c) Cu1:Ce1/CNT, (d) Cu3:Ce1/CNT

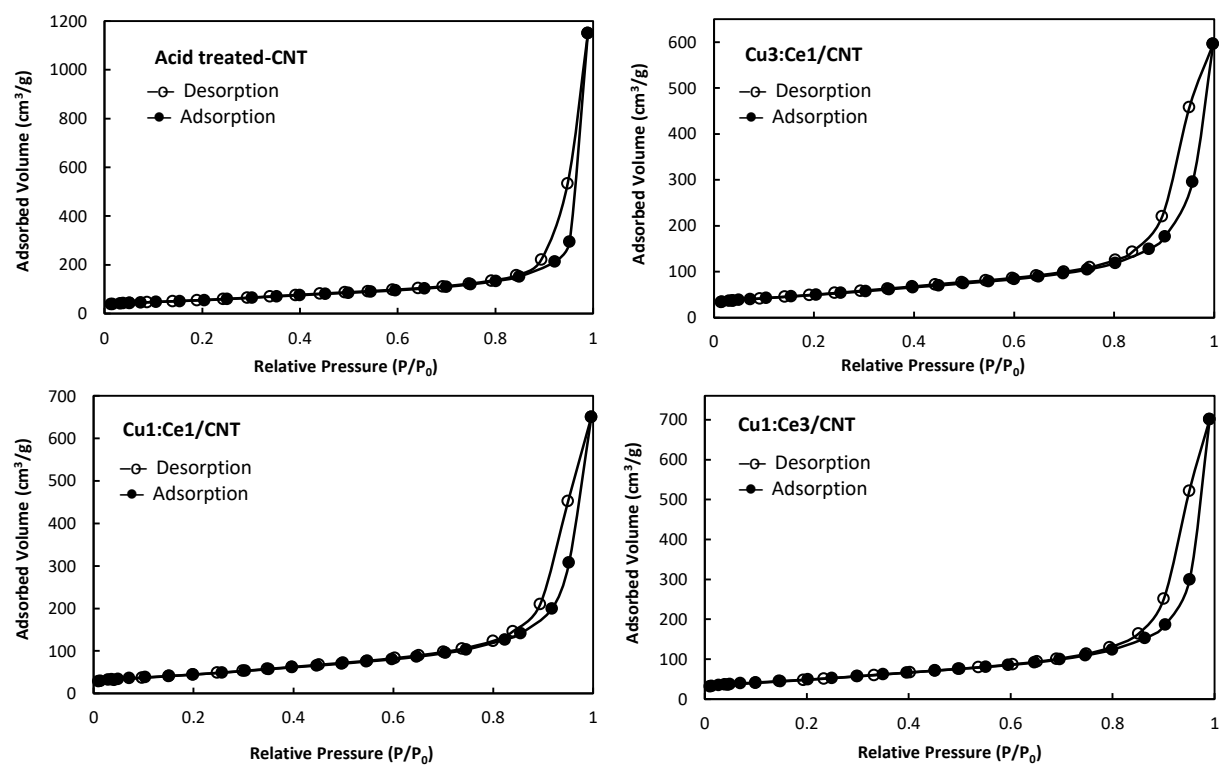


Figure S2. Nitrogen adsorption–desorption isotherms of CNT and Cu:Ce/CNT catalysts.