Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Supporting Information

Cu Oxide Deposited on Shape-Controlled Ceria Nanocrystals for CO Oxidation: Influence of Interface-Driven Oxidation States on Catalytic Activity

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Nano shaped CuO_x/CeO_2:

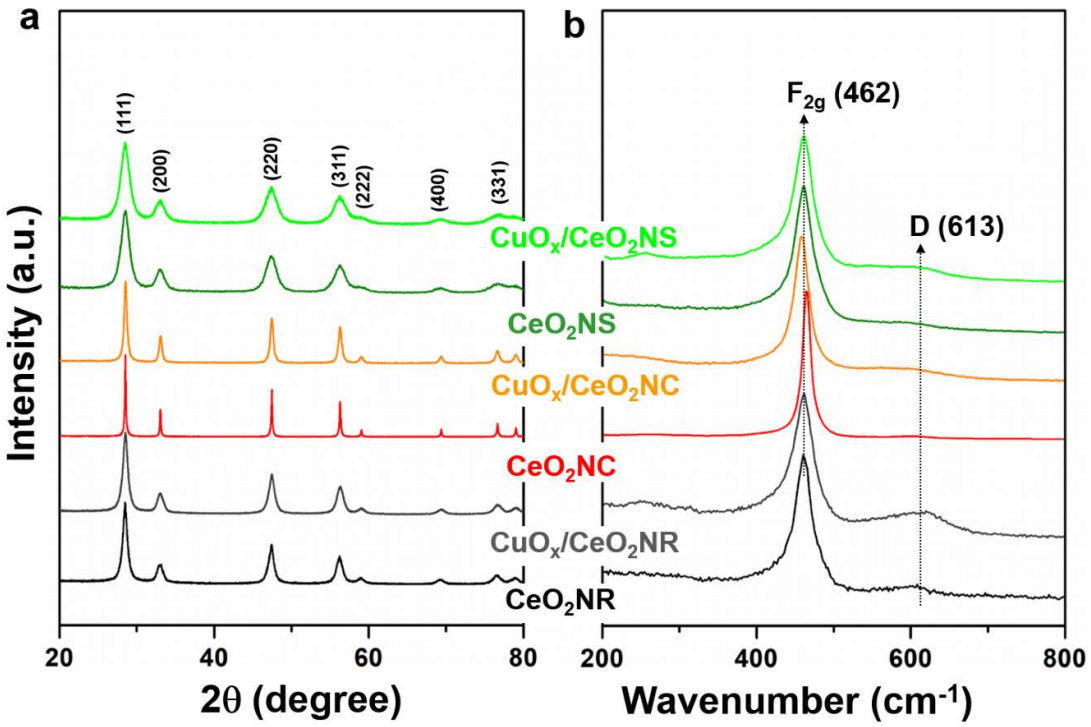

Fig. S1 a) XRD and b) Raman spectra of nano shaped CeO_2 and CuO_x/CeO_2 catalysts.

CeO_2 Morphology	CeO_2	CuO_x/CeO_2
Nano rod (NR)	0.087±0.003	0.233±0.03
Nano cube (NC)	0.020±0.002	0.072±0.001
Nano sphere (NS)	0.025±0.001	0.086±0.003

Table S1 Concentration of defects in the various samples calculated through Raman spectroscopy ($I(D)/I(F_{2g})$).

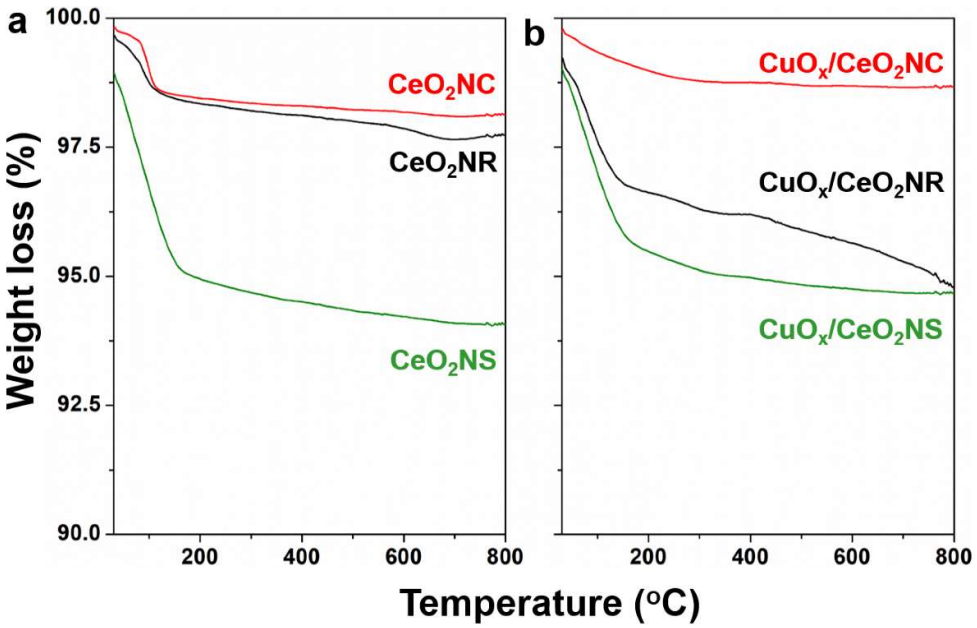

Fig. S2 TGA analysis of nano-shaped a) CeO_2 and b) CuO_x/CeO_2 catalysts.

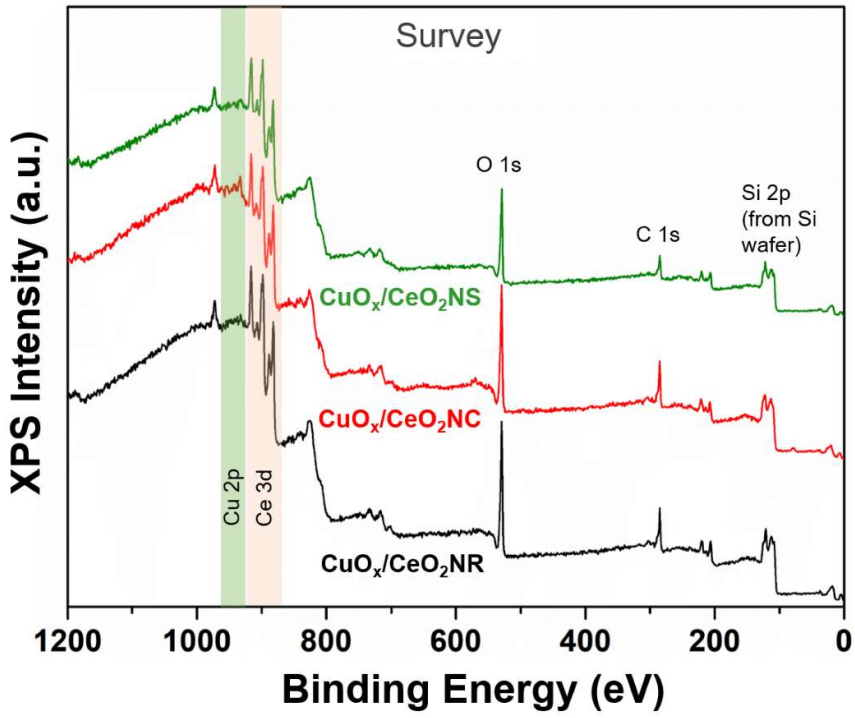

Fig. S3 XPS survey spectra of nano-shaped CuO_x/CeO_2 catalysts.

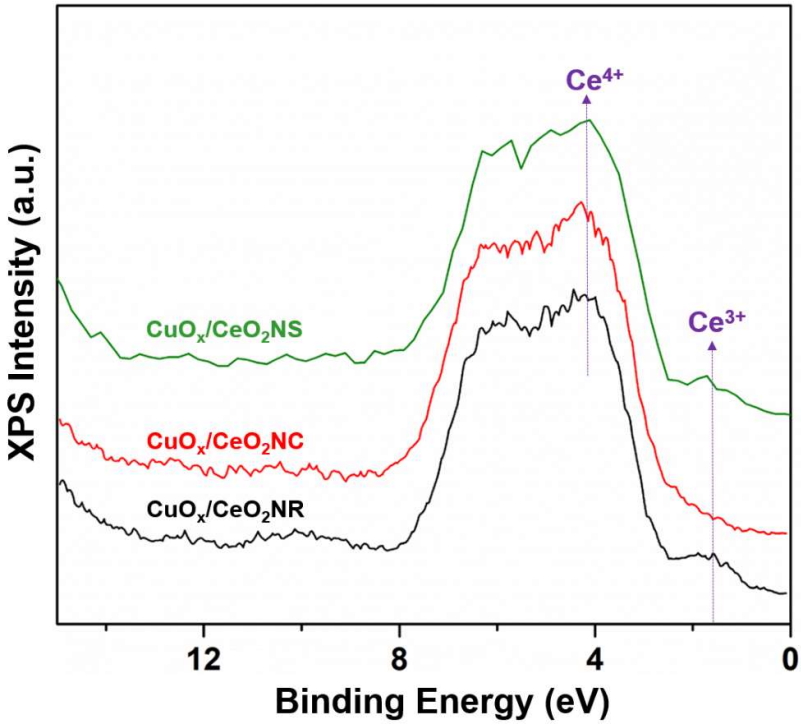

Fig. S4 X-ray valence band spectra of nano-shaped CuO_x/CeO_2 catalysts.

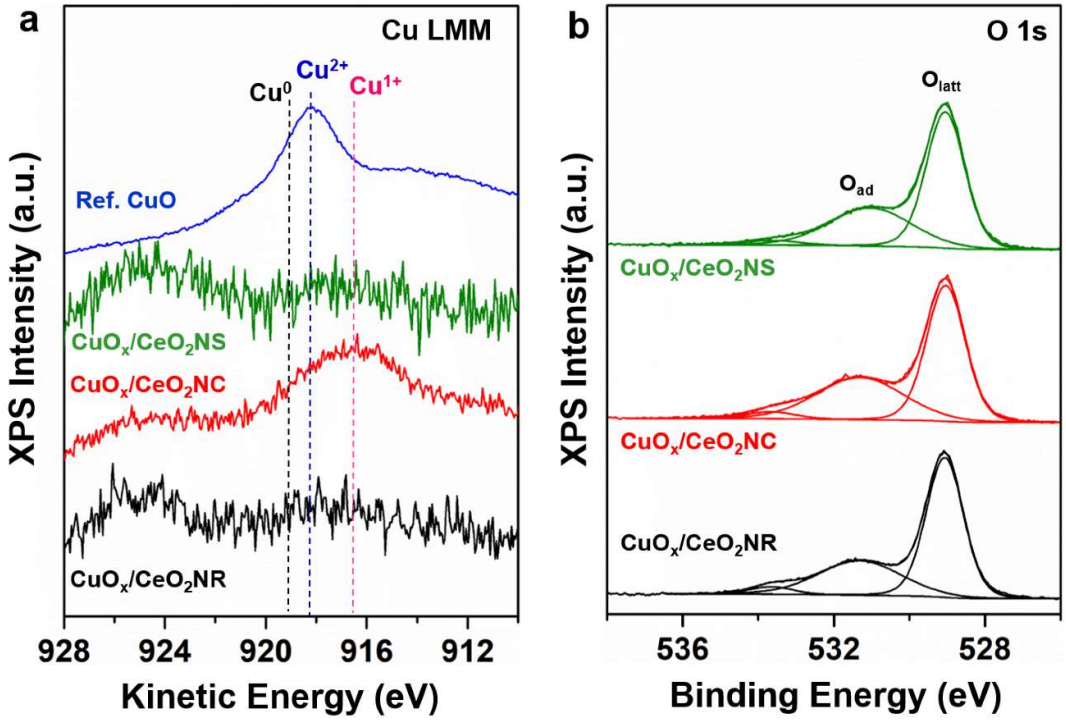

Fig. S5 a) Cu LMM and b) O 1s spectra of CuO_x/CeO_2 catalysts.

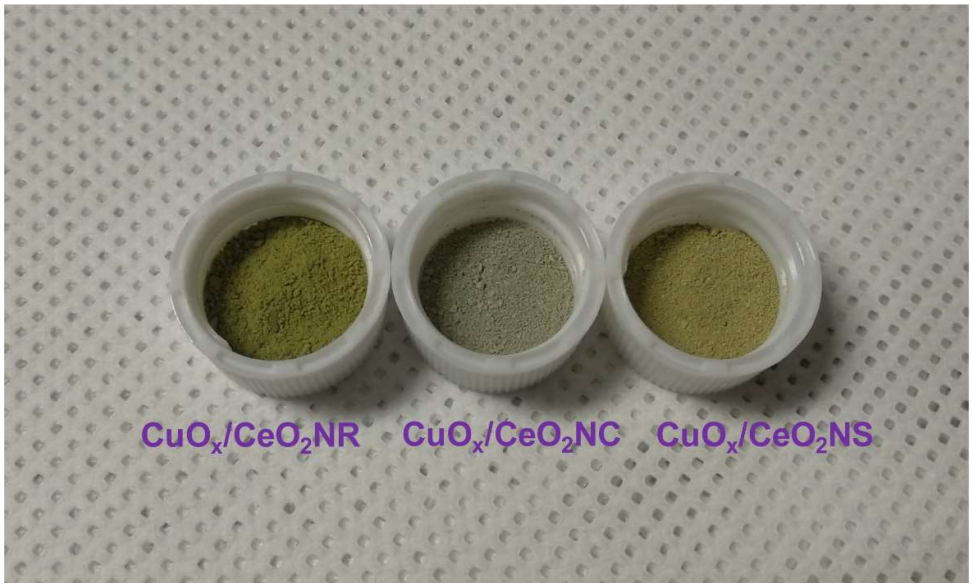

Fig. S6 Photographs of the CuO_x/CeO_2NR, CuO_x/CeO_2NC, CuO_x/CeO_2NS catalysts.

Sample name	**CuOx/CeO_2 TPR-I (μ.mol/g)**	**CuOx/CeO_2 TPR-II (μ.mol/g)**	**CeO_2 TPR-II (μ.mol/g)**	**Cu dispersion (%)**
CuOx/CeO_2NR	1441	363.7	159.3	31.9
CuOx/CeO_2NC	836	256.4	85.5	45.5
CuOx/CeO_2NS	1233	532.6	335.8	43.8

Table S2 Sequential H_2-TPR-I, N_2O passivation and H_2-TPR-II of CeO_2 and CuO_x/CeO_2 catalyst.

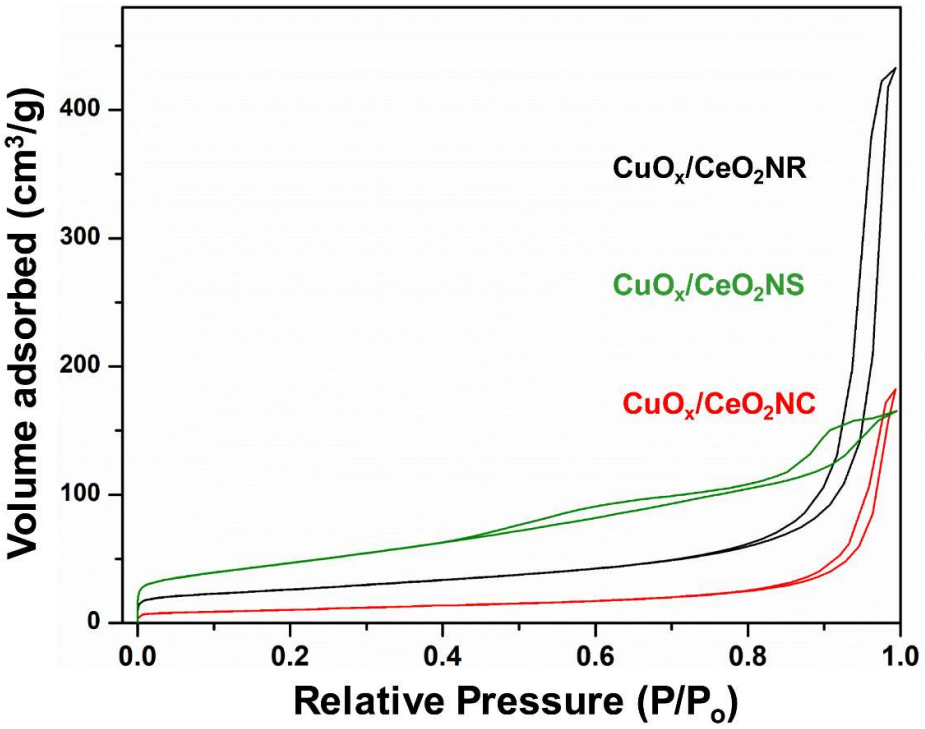

Fig. S7 N_2 adsorption-desorption isotherms of nano-shaped CuO_x/CeO_2 catalysts.

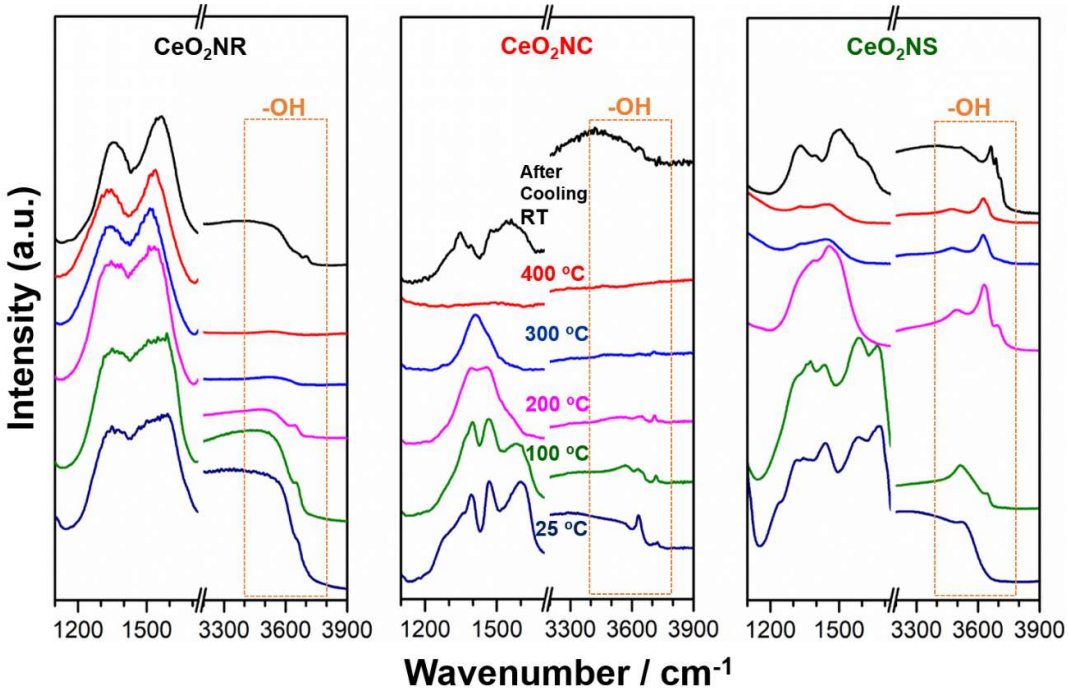

Fig. S8 In-situ DRIFT analysis of nano-shaped CeO_2 with 20 % O_2: 80 % He treatment at various temperatures.

Nano-shaped 8 wt. % CuO_x/CeO_2:

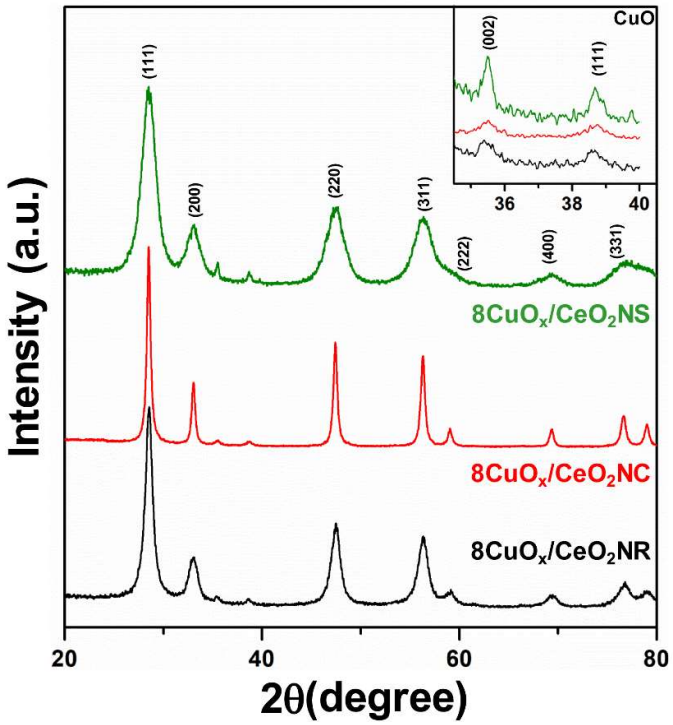

Fig. S9 XRD spectra of nano-shaped 8 wt. % CuO_x/CeO_2 catalysts.

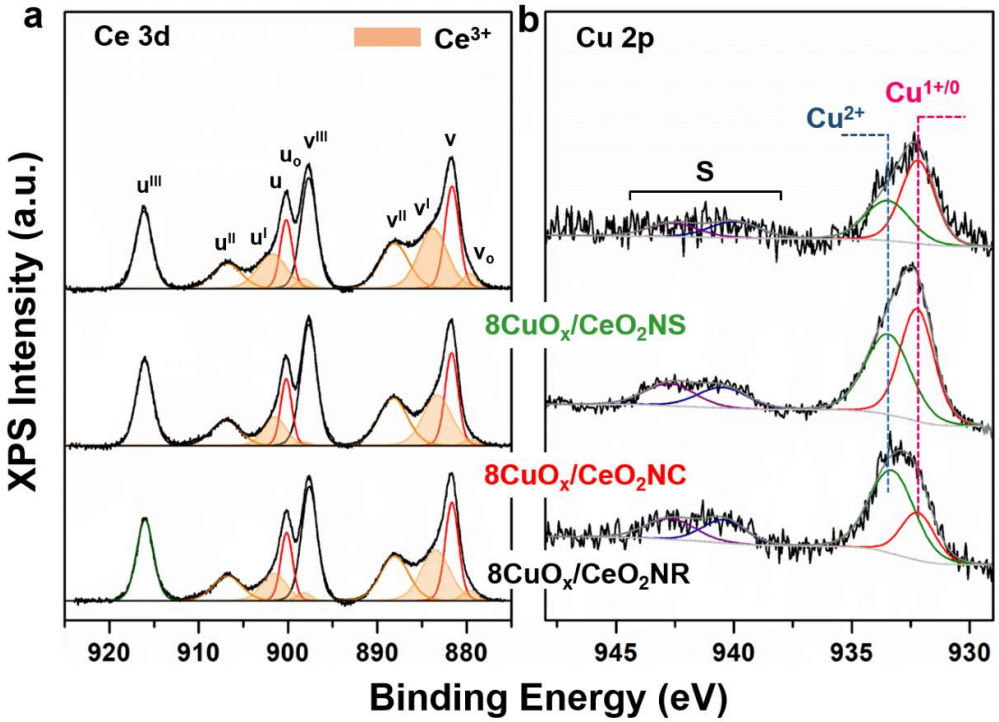

Fig. S10 XPS spectra of nano-shaped 8 wt. % CuO_x/CeO_2 catalysts (a) Ce 3d, (b) Cu 2p.

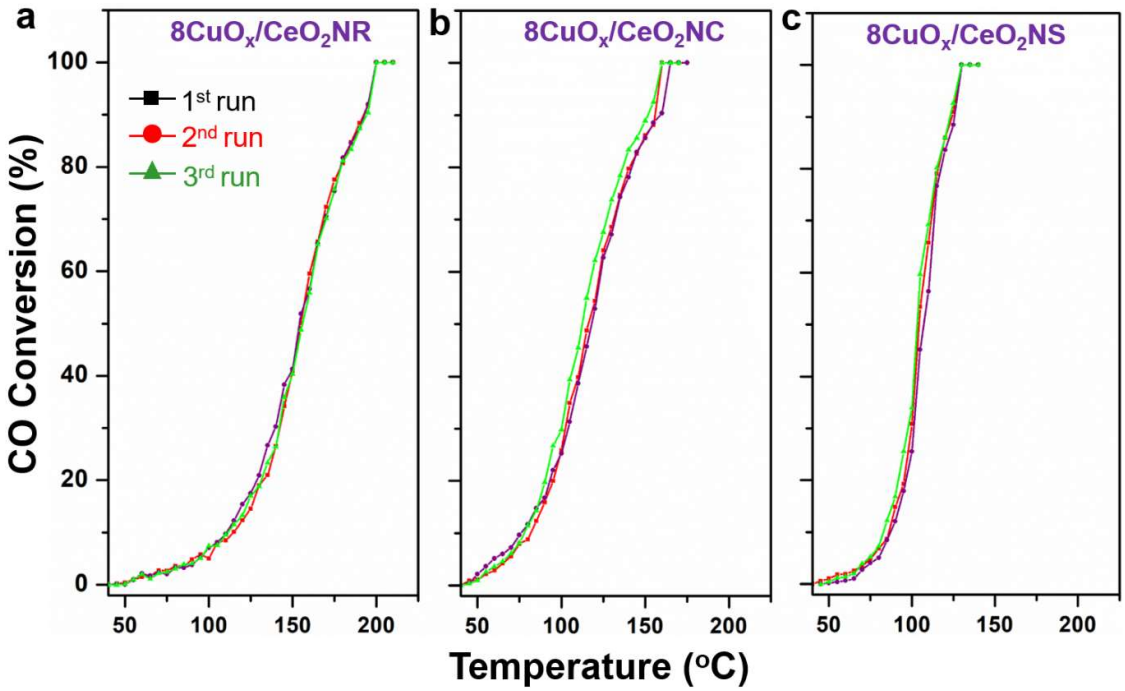

Fig. S11 CO conversion as a function of temperature of nano-shaped 8 wt. % CuO_x/CeO_2 catalysts. (a) $8CuO_x/CeO_2$NR (b) $8CuO_x/CeO_2$NC (c) $8CuO_x/CeO_2$NS.