Engineering the NiO/CeO_2 interface to enhance the catalytic performance for CO oxidation

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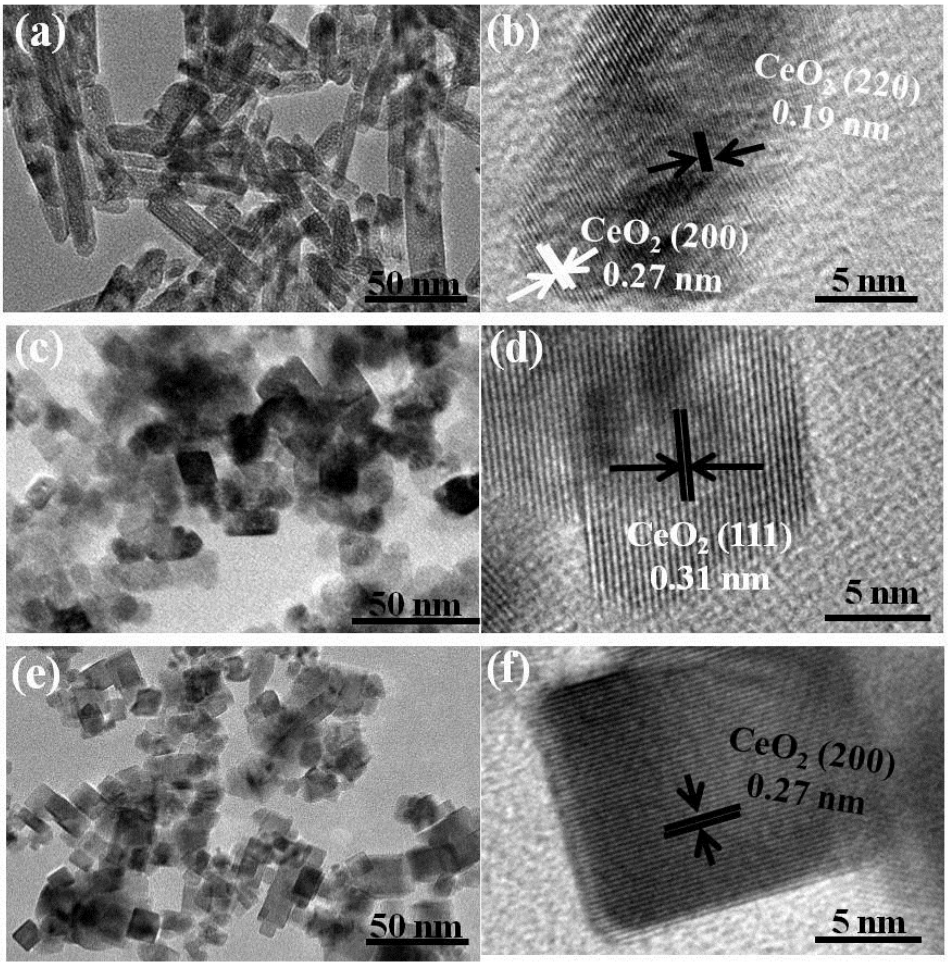

Figure S1. TEM and HRTEM images of CeO_2 (a, b) nanorod; (c, d) nanooctahedron; (e, f) nanocube.

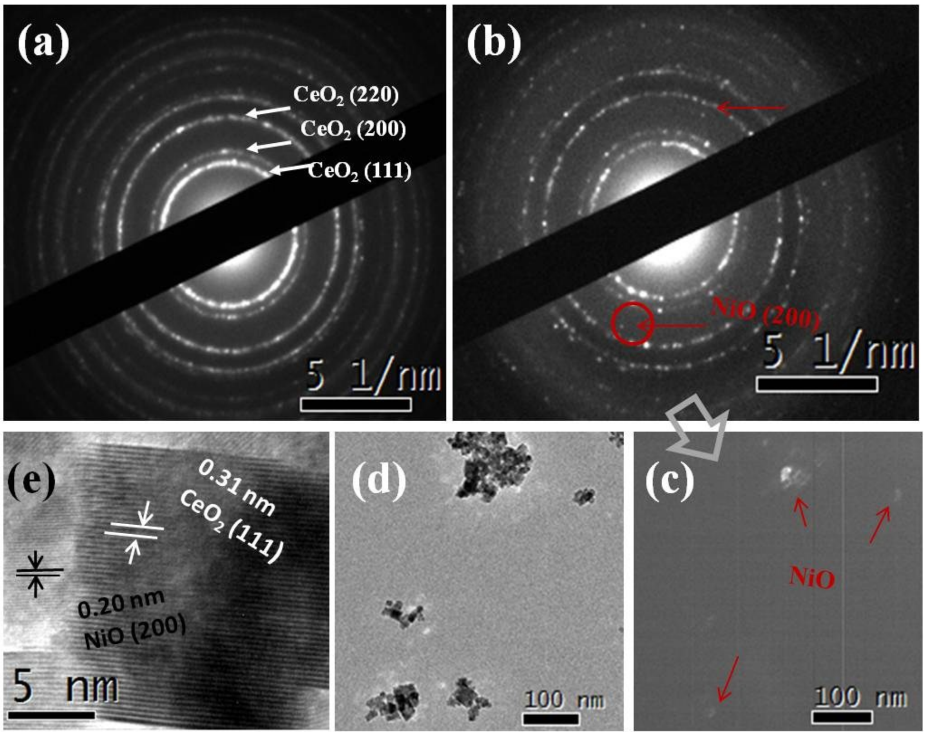

Figure S2. Electron diffraction patterns of (a) CeO_2 octahedron, (b) Ni/CeO_2 octahedron; (c) the corresponding dark field image of white spot in the red circle; (d) the corresponding bright field image; (e) the HRTEM image of Ni/CeO_2 octahedron.

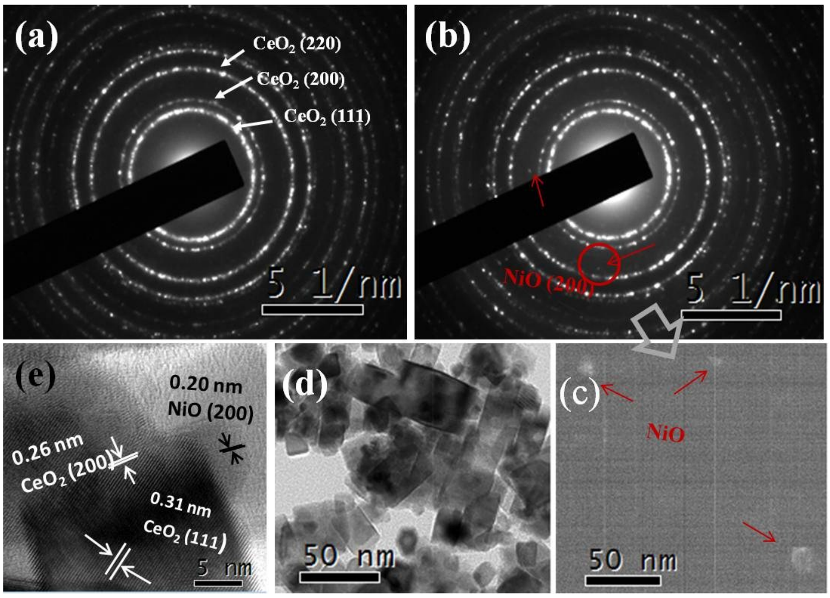

Figure S3. Electron diffraction patterns of (a) CeO_2 cube, (b) Ni/CeO_2 cube; (c) the corresponding dark field image of white spot in the red circle; (d) the corresponding bright field image; (e) the HRTEM image of Ni/CeO_2 cube.

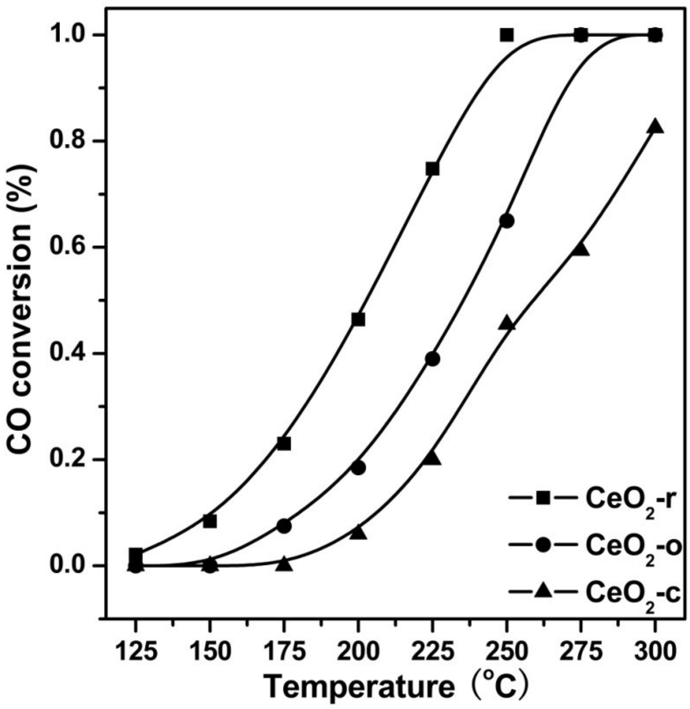

Figure S4. CO conversion over CeO_2 catalysts with different shapes.

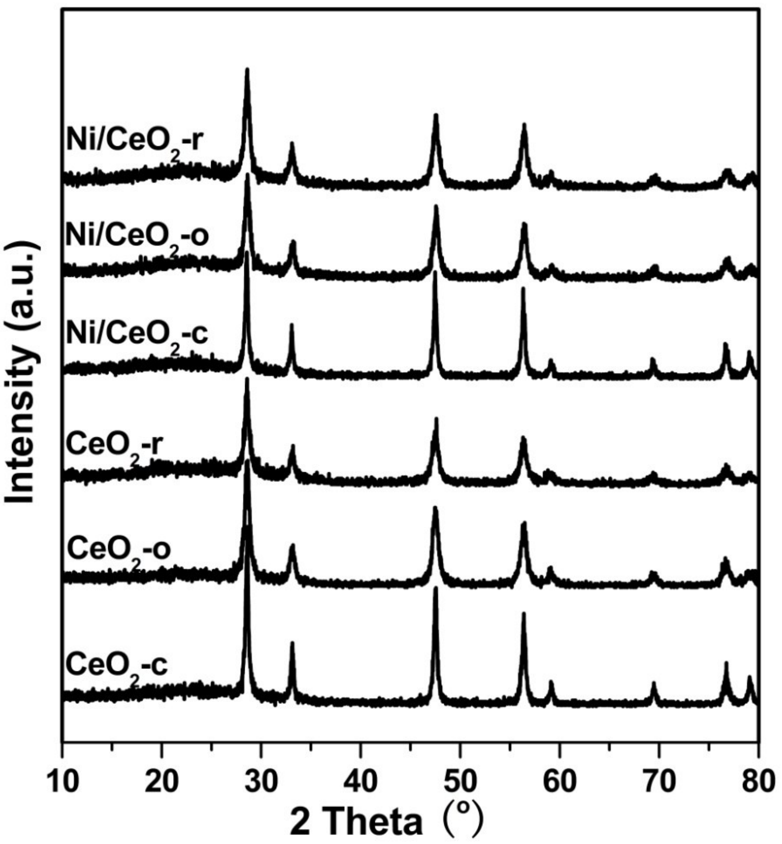

Figure S5. XRD patterns of Ni/CeO_2 and CeO_2 samples with different shapes.

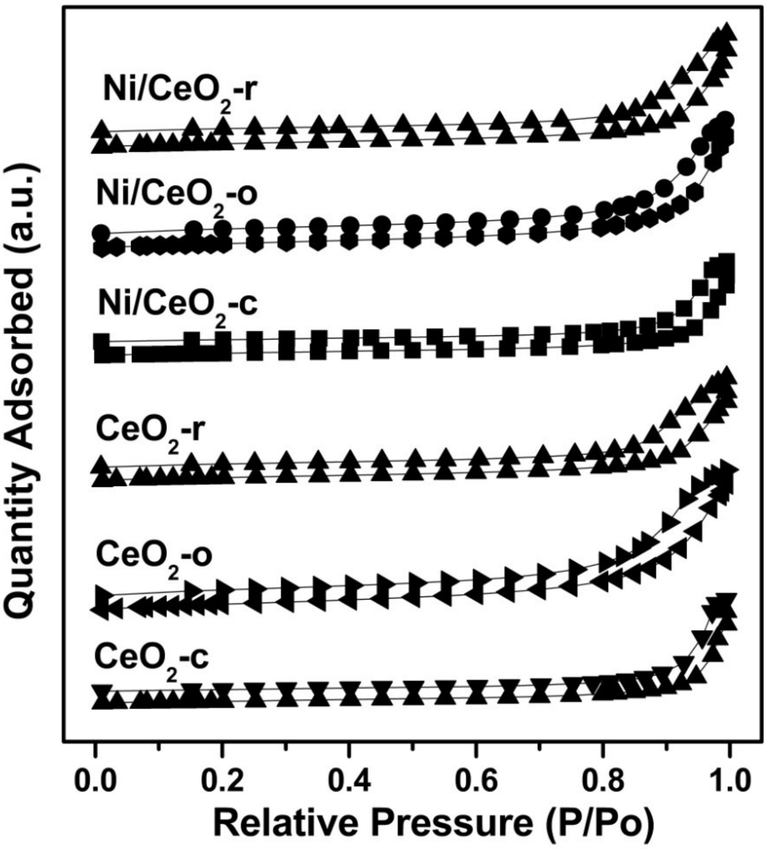

Figure S6. N_2 adsorption–desorption isotherms of Ni/CeO_2 and CeO_2 samples with different shapes.

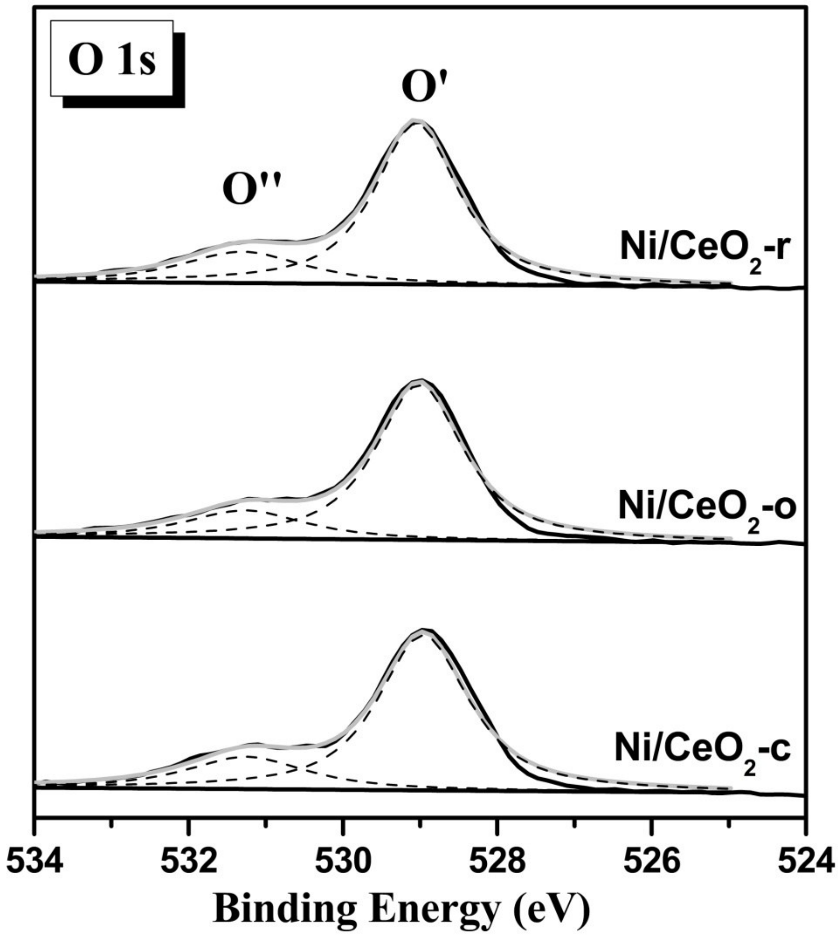

Figure S7. XPS spectra of O 1s over Ni/CeO_2 catalysts with different shapes.

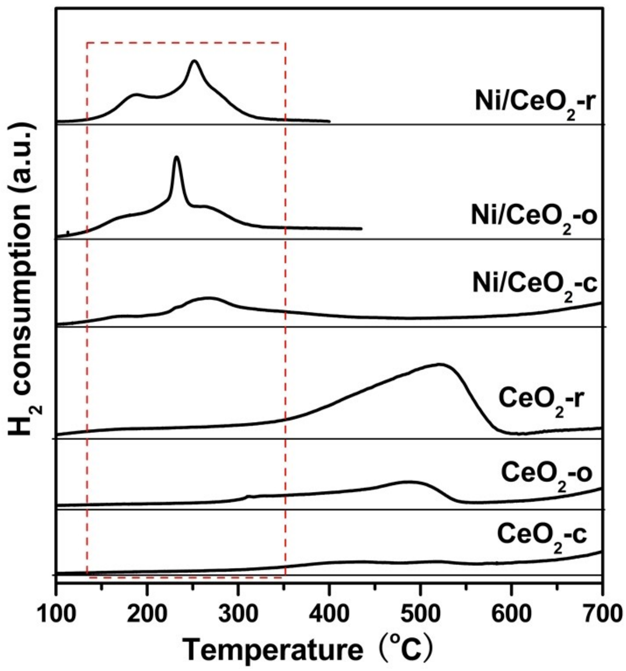

Figure S8. H_2-TPR profiles of Ni/CeO_2 and CeO_2 with different shapes.

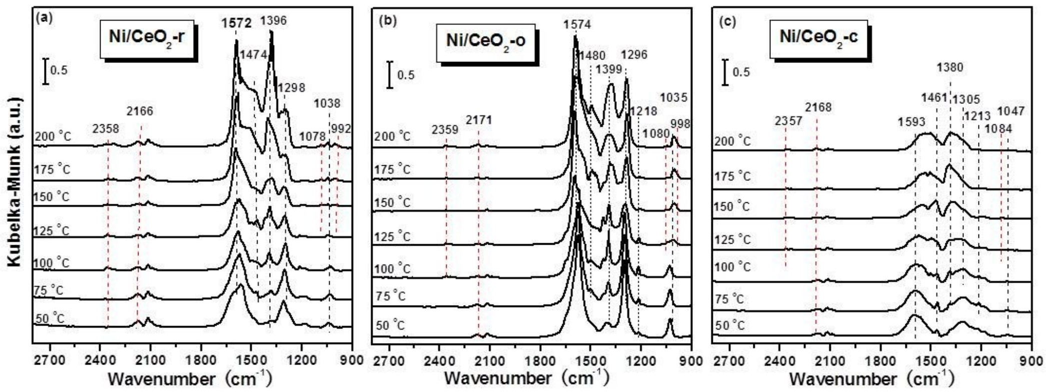

Figure S9. *In-situ* CO-adsorption DRIFTS of Ni/CeO_2 catalysts with different shapes.

Table S1. Surface area, crystallite size, lattice parameter, $I_{605+1172}/I_{460}$ in Raman spectra and turnover frequency (TOF_{CO}) at 120 °C of Ni/CeO_2 and CeO_2 samples, respectively.

Samples	S_{BET} (m^2/g)	Grain size (nm)	Lattice parameter (Å)	$I_{605+1172}/I_{460}$	TOF_{CO}[a] (h^{-1})
Ni/CeO_2-r	64	12.8	5.4052	0.32	35.2
Ni/CeO_2-o	84	16.6	5.4050	0.21	10.1
Ni/CeO_2-c	30	24.8	5.4011	0.12	0.5
CeO_2-r	66	11.5	5.4133	0.054	
CeO_2-o	85	12.9	5.4064	0.051	
CeO_2-c	32	24.6	5.4022	0.046	

a: $TOF_{CO} = P \cdot Sv \cdot C_{CO} \cdot X_{CO} / R \cdot T \cdot C_{Ni}$, in which P was the atmospheric pressure, C_{CO} was the molar CO concentration at the inlet, Sv was the space velocity, X was the CO conversion and C_{Ni} was the molar concentration of surface Ni atoms determined by XPS.