Supporting Information

Crystal-plane effect of nanoscale CeO_2 on the catalytic performance of Ni/CeO_2 catalysts for methane dry reforming

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Table S1 The BET surface areas (S_{BET}), lattice parameter (a_0), crystalline size, and the microstrain (ε) of the CeO_2 nanomaterials.

Samples	S_{BET} (m^2/g)	$d_{(111)}$-spacing (nm)	Lattice parameter (nm)	Crystalline size (nm)	ε (%)
CeO_2-NRs	80.5	0.3113	0.5392	12.3	0.7417
CeO_2-NCs	25.8	0.3111	0.5388	16.9	0.4906
CeO_2-NOs	80.2	0.3117	0.5399	18.2	0.5225
CeO_2-NPs	82.8	0.3115	0.5395	12.7	0.3960

Table S2 Composition in various Ni/CeO_2 samples after reduction under H_2 at 700°C for 1 h.

Samples	Composition (wt%) [a]		The actual H_2 consumption (μmol/g)	Degree of Reduction (%)
	Ni	Ce		
Ni/CeO_2-NRs	4.56	29.70	614	79.0
Ni/CeO_2-NCs	4.81	32.54	484	59.1
Ni/CeO_2-NOs	4.47	28.60	475	61.1
Ni/CeO_2-NPs	4.74	33.18	392	48.5

[a] Ni and Ce contents were determined by ICP.

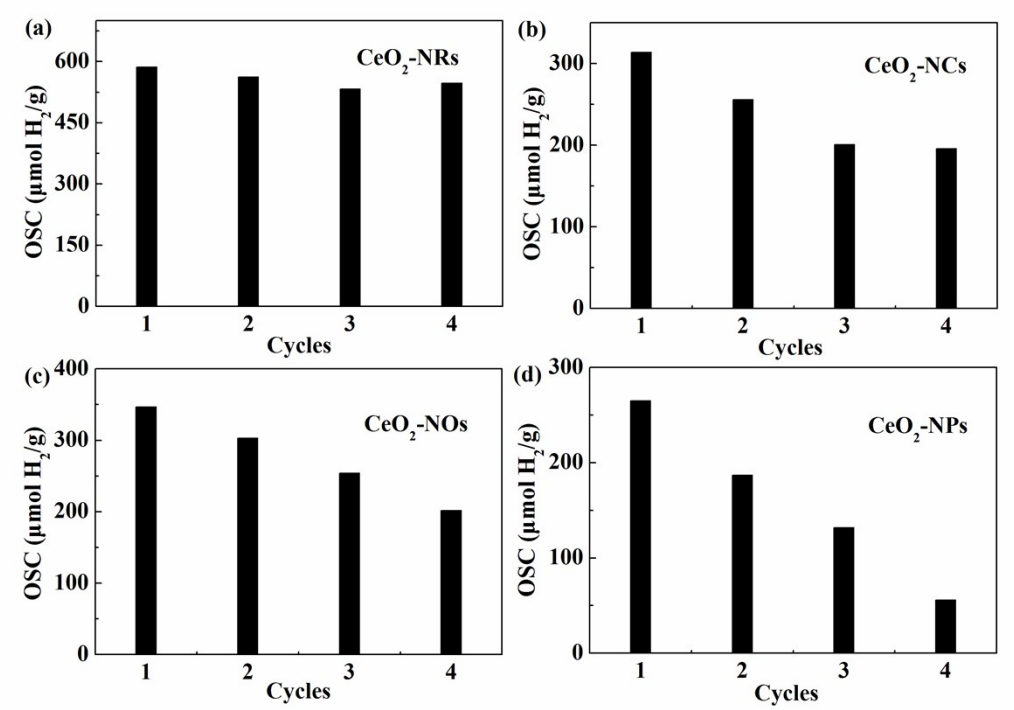

Fig. S1 The oxygen storage capacity (OSC) profiles of CeO_2-NRs, CeO_2-NCs, CeO_2-NOs and CeO_2-NPs.

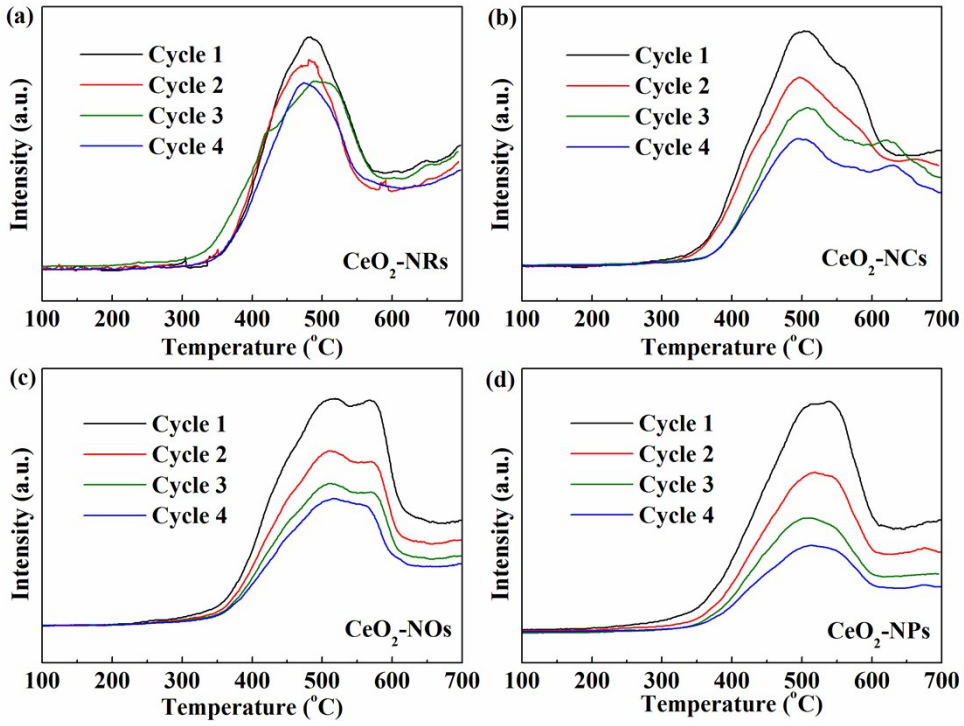

Fig. S2 H_2-TPR profiles of CeO_2 nanomaterials.

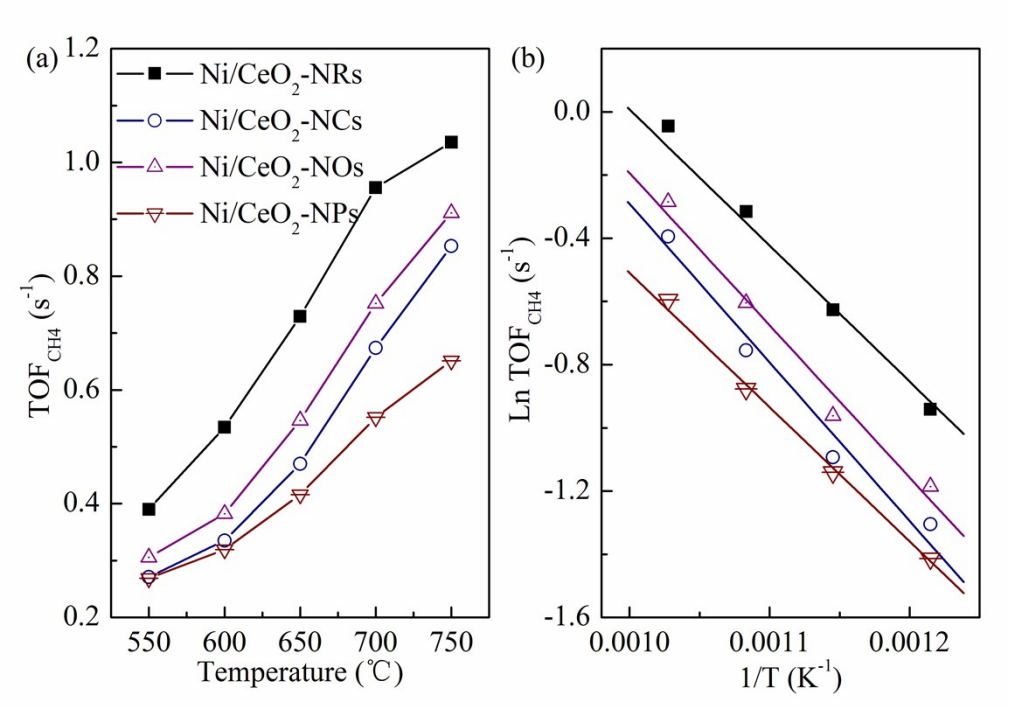

Fig. S3 (a) $TOFs_{CH4}$ and (b) the corresponding Arrhenius plots over Ni/CeO_2 catalysts.

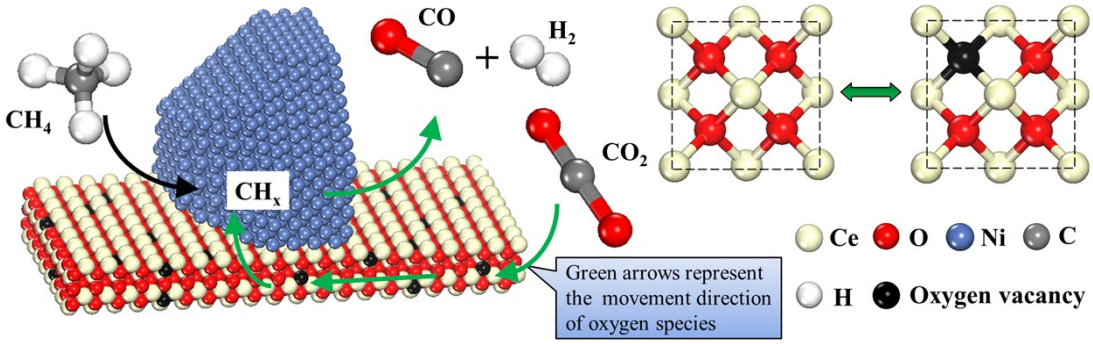

Fig. S4 Catalytic mechanism diagram for methane dry reforming reaction over Ni/CeO_2-NR catalyst.