Supporting information (SI)

Construct Ce(OH)$_4$ nanostructures from 1D to 3D by mechanical force-driven method

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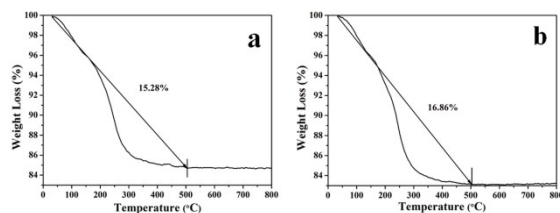[b]Shandong Experiment High School, Jinan, 250001, P. R. China

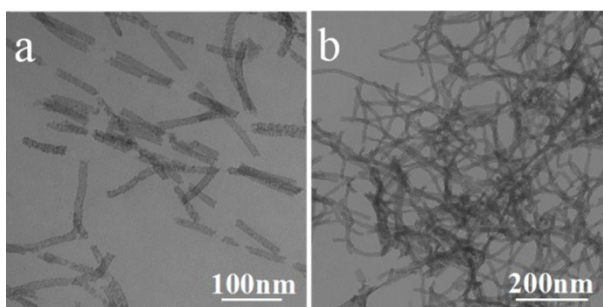**Fig. S1 TGA curves of (a) Ce(OH)4-NR, (b) Ce(OH)$_4$-NF.**

Fig. S2 TEM images of Ce(OH)$_4$-NR obtained with different amounts of tert-butylamine (a) 3ml, (b) 1 ml.
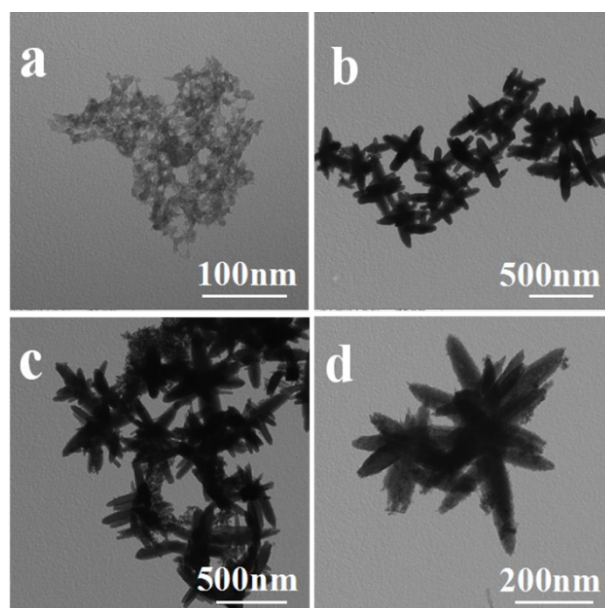
Fig. S3 TEM images of Ce(OH)$_4$-NF obtained at different solvothermal stages (a) after adding tert-butylamine, (b) 50 min, (c) 5h, (d) 8h.
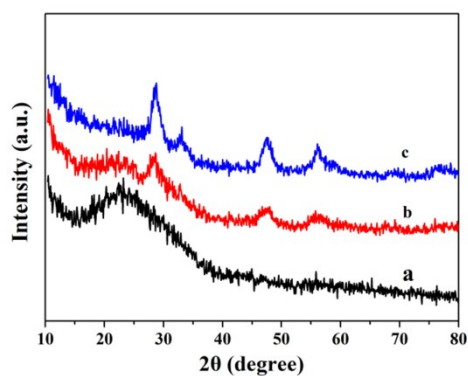

Fig. S4 XRD patterns of Ce(OH)$_4$-NF obtained at different solvothermal stages (a) after adding tert-butylamine, (b) 50 min, (c) 5h, (d) 8h.
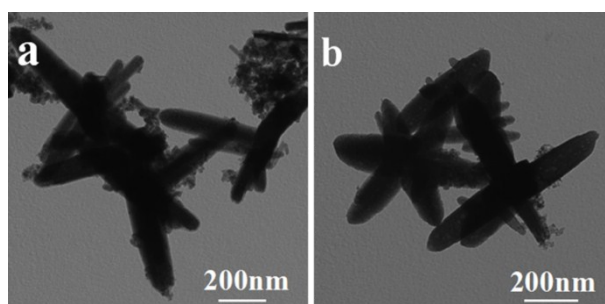
Fig. S5 TEM images of Ce(OH)$_4$ obtained under different stirring condition: (a) without any stirring, (b) under mild stirring condition.
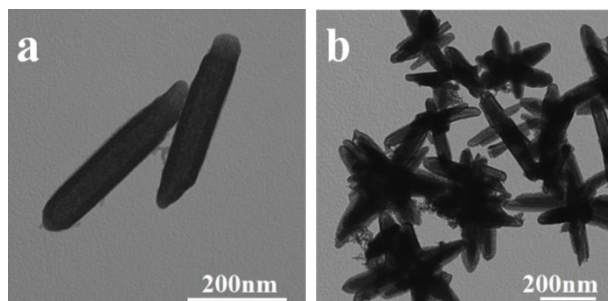

Fig. S6 TEM images of as-prepared CeO$_2$ hollow structures: (a) overview of the CeO$_2$ hollow nanorods, (b) overview of the CeO$_2$ hollow nanoflowers.

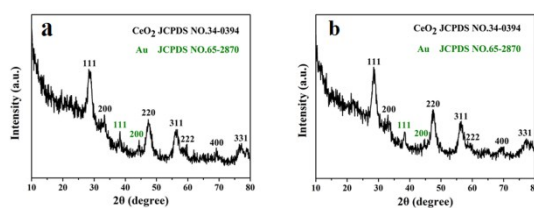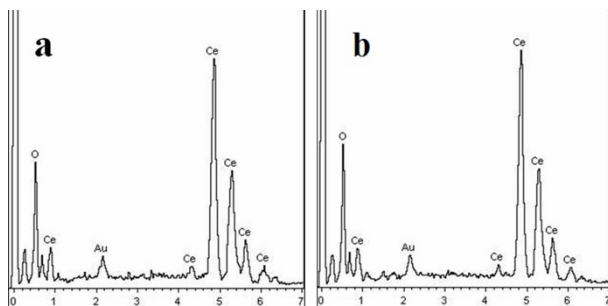**Fig. S7 XRD patterns of (a) Au/CeO$_2$-NR, (b) Au/CeO$_2$-NF.**

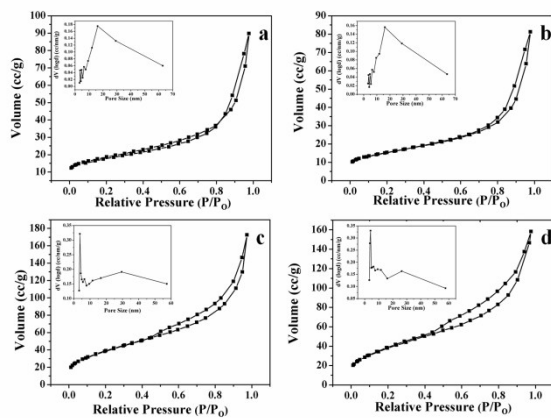**Fig. S8 EDS patterns of (a) Au/CeO$_2$-NR, (b) Au/CeO$_2$-NF.**

Fig. S9 N$_2$ adsorption-desorption isotherms of (a) CeO$_2$-NR, (b) CeO$_2$-NF, (c) Au/CeO$_2$-NR, (d) Au/CeO$_2$-NF. Inset images are the corresponding BJH pore size distribution curve.

Table S1

N$_2$ adsorption-desorption characterization of different samples

Samples	Commercial CeO$_2$	CeO$_2$-NR	CeO$_2$-NF	Au/CeO$_2$-NR	Au/CeO$_2$-NF
S$_{BET}$(m$^2 \cdot$g^{-1})	8.500	66.380	54.893	145.250	148.463
V$_{BJH}$(cm$^3 \cdot$g^{-1})	--	0.123	0.113	0.236	0.215
D$_{BJH}$(nm)	--	3.699	3.748	3.808	4.200