

Supporting Information

Layered Rare-earth Hydroxide Nanocones with Facile Host Composition Modification and Anion-exchange Feature: Topotactic Transformation into Oxide Nanocones for Upconversion

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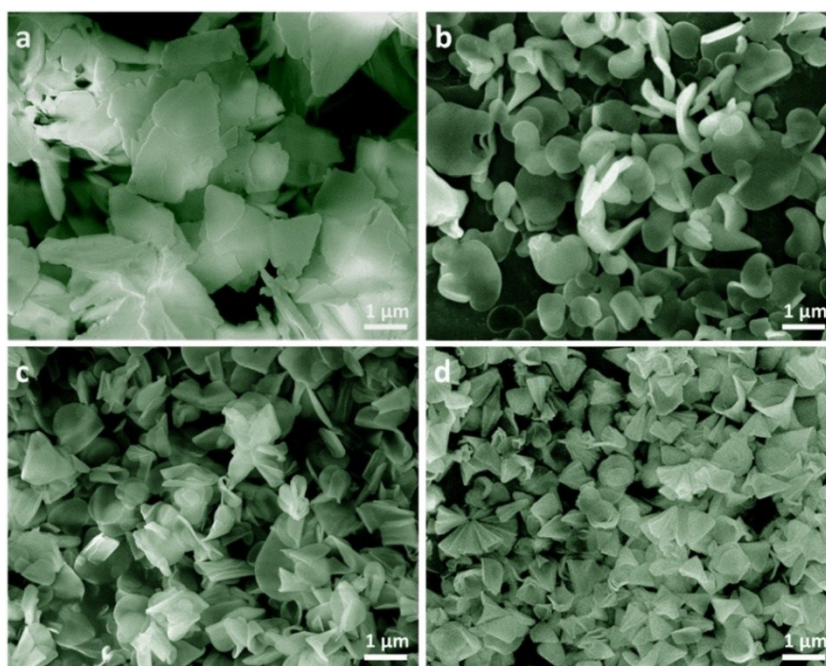


Figure S1 SEM images of as-prepared LYH obtained using different amounts of surfactants. (a) 0 mmol SDS; (b) 0.605 mmol SDS; (c) 1.21 mmol SDS; (d) 2.42 mmol SDS.

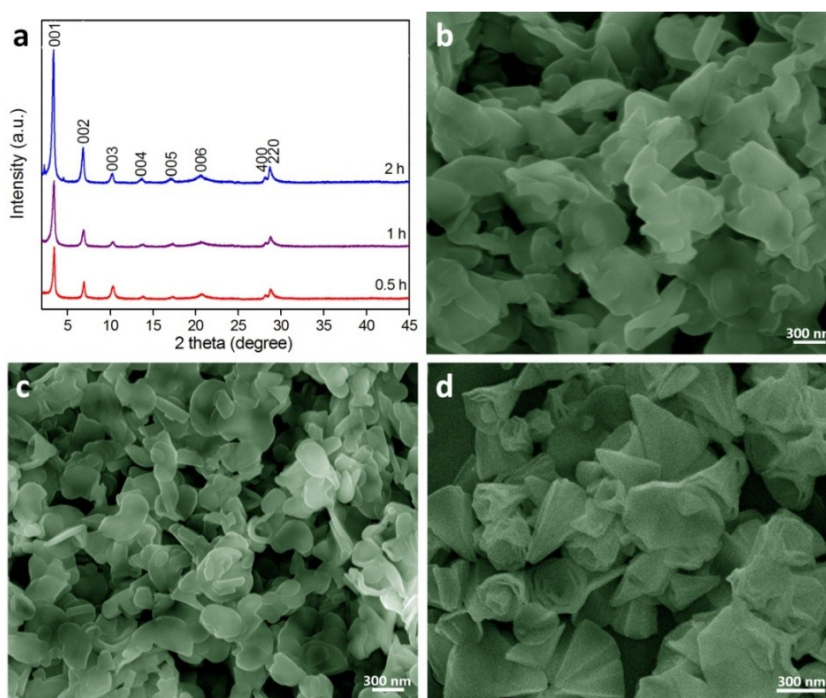


Figure S2 a) XRD patterns of DS^- -intercalated LYH obtained at 140 °C for different time. SEM images of as-prepared LYH obtained at 140 °C for different time: b) 0.5 h; c) 1 h; d) 2 h.

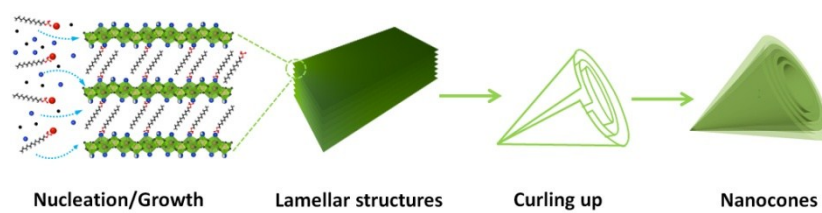


Figure S3 Schematic illustration of the formation mechanism of LYH NCs.

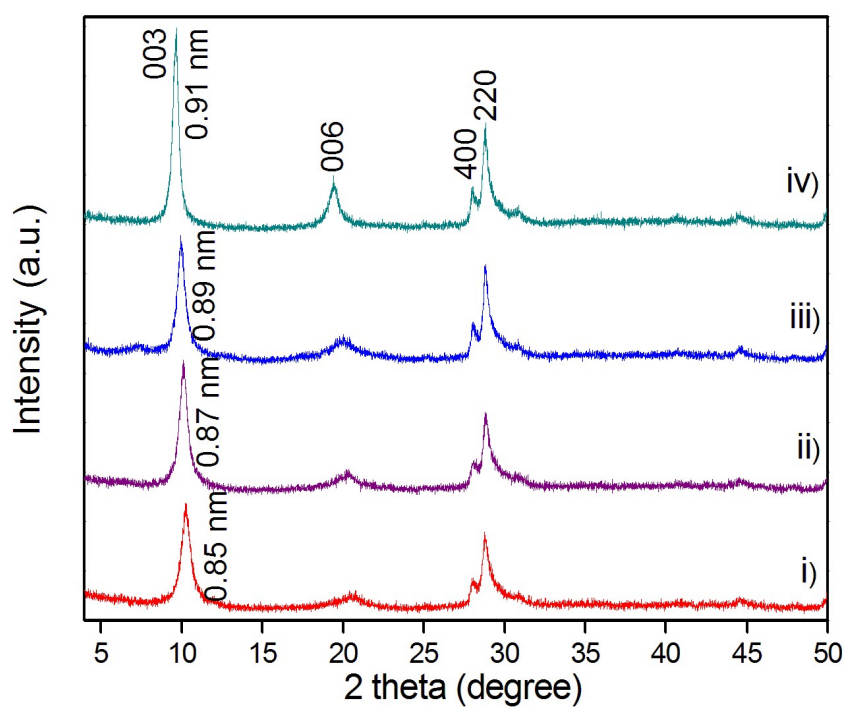


Figure S4 XRD patterns of LYH NCs in NaNO_3 solution with different relative humidity: i) 34 %, ii) 56 %, iii) 81 %, iv) 100 %.

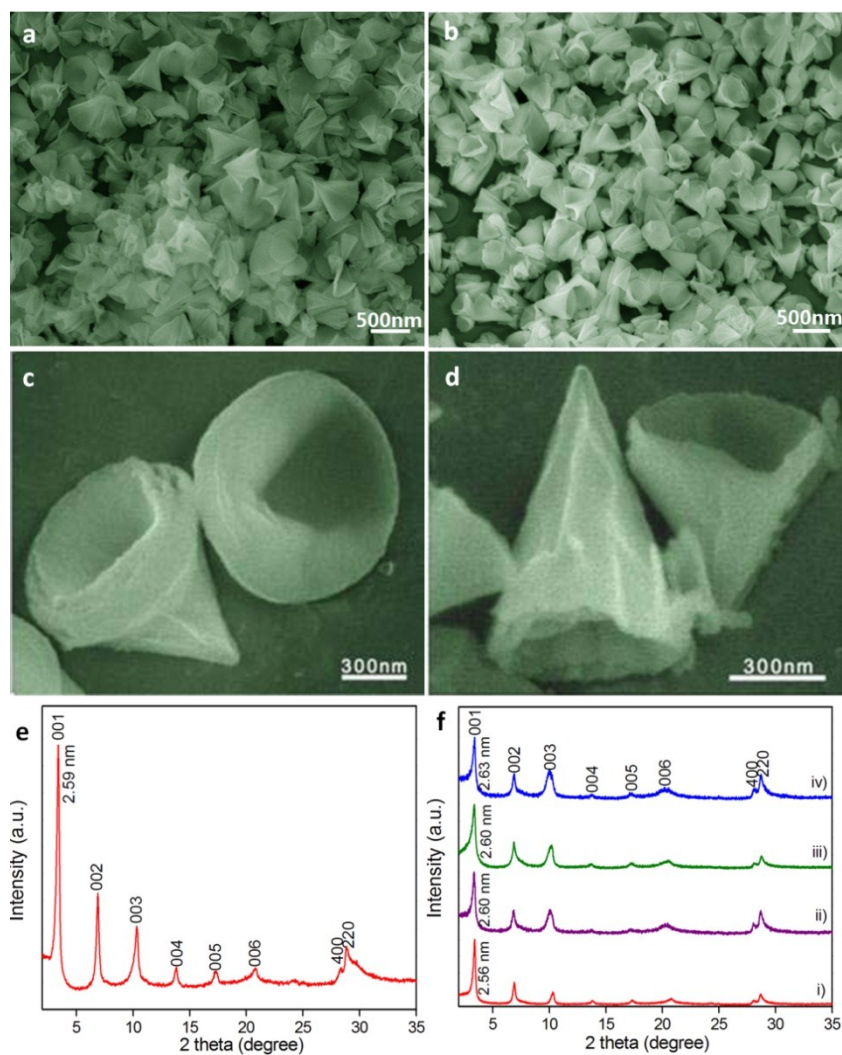


Figure S5 SEM images of LRH NCs: (a) $Y_{0.8}Tb_{0.2}$; (b) $Y_{0.6}Tb_{0.4}$; (c) Tb; (d) Er. (e) XRD pattern of layered Er hydroxide. (f) XRD patterns of layered Y-Er-Yb hydroxide at various ratios: i) $Y_{0.99}Er_{0.01}$; ii) $Y_{0.98}Er_{0.01}Yb_{0.01}$; iii) $Y_{0.94}Er_{0.01}Yb_{0.05}$; iv) $Y_{0.89}Er_{0.01}Yb_{0.10}$.

Table S1. The elements of Y, Yb and Er analyzed by ICP-OES.

Samples designed (mol%)	Elements	Y	Yb	Er
Y ₂ O ₃ :1%Yb/1%Er (98, 1, 1)	Measured (wt. %)	70.4	1.74	1.17
	Analyzed (mol%)	98.3	0.92	0.88
Y ₂ O ₃ :5%Yb/1%Er (94, 5, 1)	Measured (wt. %)	63.9	8.31	1.15
	Analyzed (mol%)	92.9	6.1	1
Y ₂ O ₃ :10%Yb/1%Er (89, 10, 1)	Measured (wt. %)	59.1	14.6	1.35
	Analyzed (mol%)	87.8	11.1	1.1