Electronic Supporting Information

Effects of Er\textsuperscript{3+} Spatial Distribution on Luminescent Properties and Temperature Sensing of Upconverting Core-Shell Nanocrystals with High Er\textsuperscript{3+} Content

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Figure S1 TEM images of xYb: NaEr_{1-x}F_{4} NCs: (a) x=0, (b) x=0.2, (c) x=0.4, (d) x=0.6, (e) x=0.8, (f) x=0.99.
The synthetic procedure for cubic 60Yb: NaErF₄ NCs is provided as follows. Firstly, a total amount of 0.8 mmol rare earth chlorides, including ErCl₃·6H₂O (0.32 mmol) and YbCl₃·6H₂O (0.48 mmol), were added in a 100 mL three-necked bottle containing 8 mL OA and 12 mL ODE, which was heated at 150 °C for 60 min to form a clear solution. Subsequently, the transparent solution was cooled to room temperature naturally. Afterwards, the 5 mL methanol solution containing NH₄F (3 mmol) and NaOH (1 mmol) was introduced into the resulted solution with stirring for 50 min to evaporate the methanol. Finally, the temperature was quickly elevated to 280 °C under N₂ atmosphere and hold for 60 min. The as-prepared solution was cooled down to room temperature and the NCs were precipitated by addition of ethanol, collected by centrifugation (10000 r/min, 5 min), washed with the help of ethanol and chloroform, and re-dispersed in 3 mL cyclohexane.

Figure S2 TEM image of cubic 60Yb: NaErF₄ NCs
Figure S3  Normalized UC emission spectra for $^{60}$Yb: NaErF$_4$ core NCs and $^{60}$Yb: NaErF$_4$@NaYF$_4$ core-shell NCs under 980 nm laser excitation.