Electronic Supporting Information

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

Daqin Chen [a *], Min Xu [a], Mengfan Ma [a], Ping Huang [b,*]

[a] College of Materials & Environmental Engineering, Hangzhou Dianzi University, Hangzhou, 310018, P. R. China

[b] State Key Laboratory of Structural Chemistry, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou, Fujian 350002, P. R. China

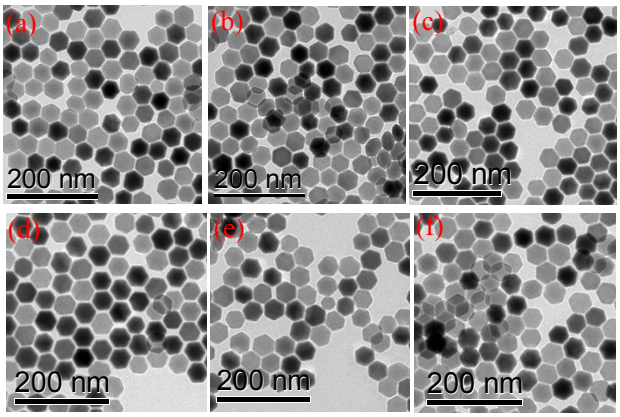

Figure S1 TEM images of xYb: $NaEr_{1-x}F_4$ NCs: (a) x=0, (b) x=0.2, (c) x=0.4, (d) x=0.6, (e) x=0.8, (f) x=0.99.

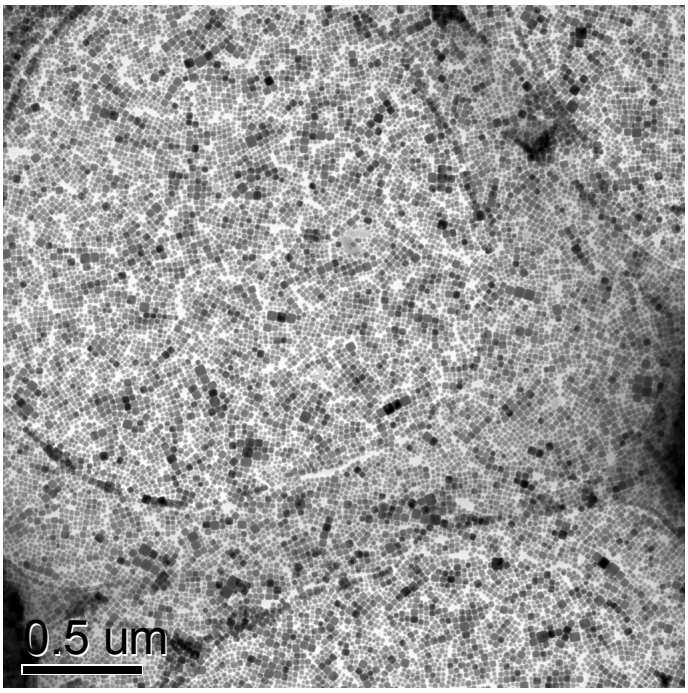

Figure S2 TEM image of cubic 60Yb: $NaErF_4$ NCs

The synthetic procedure for cubic 60Yb: $NaErF_4$ NCs is provided as follows. Firstly, a total amount of 0.8 mmol rare earth chlorides, including $ErCl_3 \cdot 6H_2O$ (0.32 mmol) and $YbCl_3 \cdot 6H_2O$ (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 ^oC 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 NH_4F (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 ^oC under N_2 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.

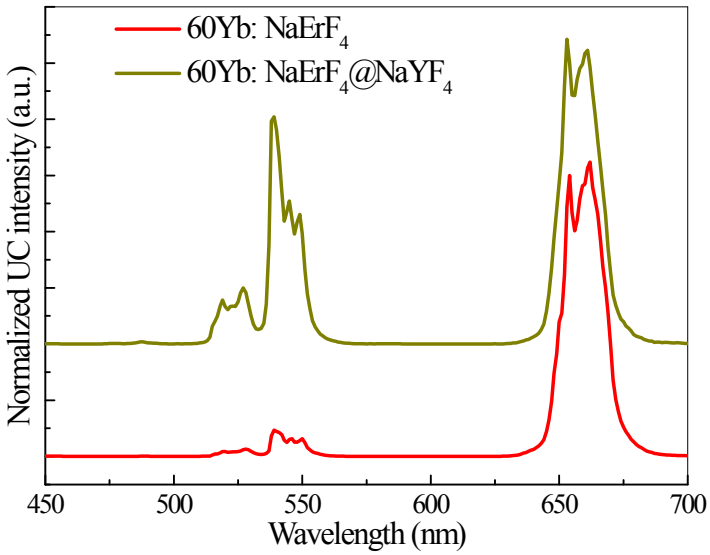

Figure S3 Normalized UC emission spectra for 60Yb: $NaErF_4$ core NCs and 60Yb: $NaErF_4$@$NaYF_4$ core-shell NCs under 980 nm laser excitation.