Electronic Supplementary Information

Tuning into single-band red upconversion luminescence in Yb^{3+}/Ho^{3+} activated nano-glass-ceramics through Ce^{3+} doping

Daqin Chen [a,b,*], Yang Zhou [a], Zhongyi Wan [a], Zhenguo Ji [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, PR China

Corresponding authors:

E-Mail: dqchen@hdu.edu.cn (D. Q. Chen); phuang@fjirsm.ac.cn (P. Huang)

Experimental details of synthesizing Yb/Ho/Ce: YF_3 nanoparticles: In a typical procedure, 40 mL ethanol solution (0.0125 mol/L) containing $Ln(NO_3)_3{\cdot}6H_2O$ (Ln=Y, Yb, Ho, Ce) was mixed with oleic acid (25 mL), and oleylamine (5 mL) under thorough stirring. Then, 1mL NH_4F (3.0 mol/L) aqueous solution was dropwise added to the mixture. After vigorous stirring at room temperature for about 30 min, the colloidal solution were transferred into a 100 mL Teflon-lined autoclave, sealed and heated at 230 °C for 12 h. The final products were collected, washed several times with ethanol/cyclohexane, and purified by centrifugation. The as-prepared lanthanide-doped YF_3 nanocrystals can be easily dispersed in various nonpolar organic solvents such as hexane.

Figure S1

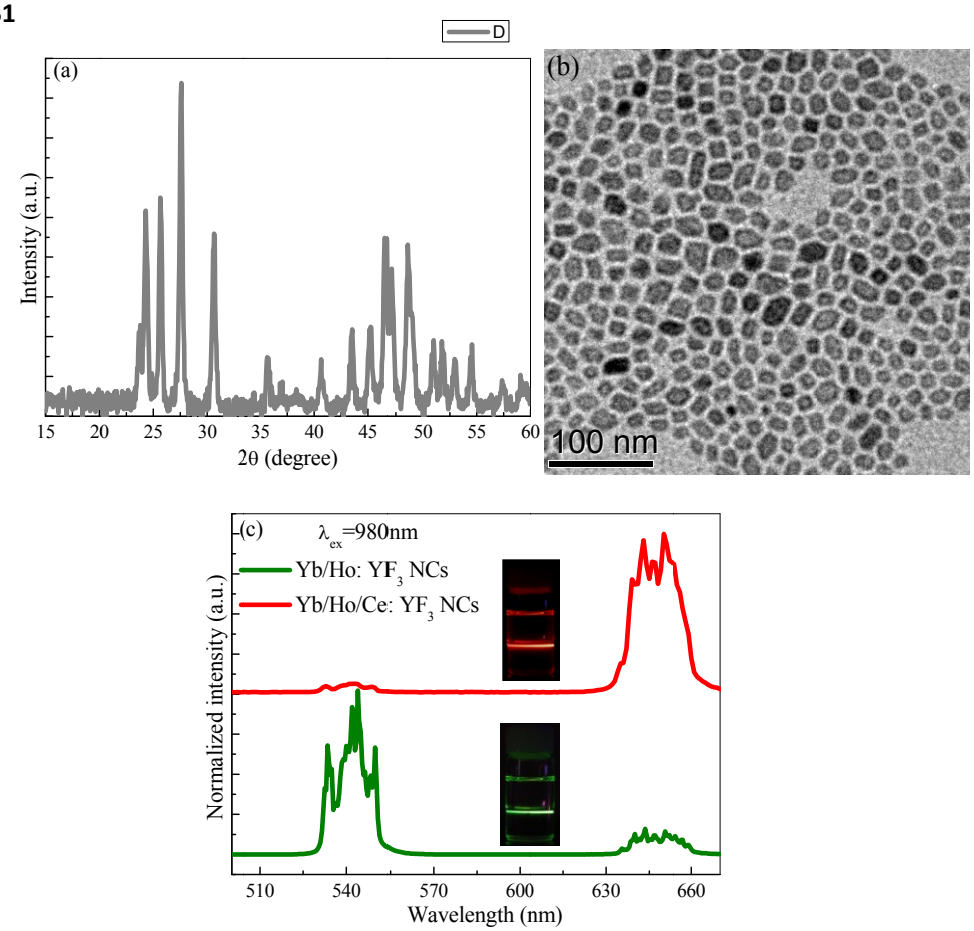

Figure S1 (a) XRD pattern of the Yb/Ho/Ce (10/1/10 mol%): YF_3 nanocrystals. (b) TEM micrograph of the corresponding sample. (c) Upconversion emission spectra of the Yb/Ho co-doped and Yb/Ho/Ce tri-doped YF_3 nanocrystals. Insets are the upconversion luminescent photographs of the corresponding samples dispersed in hexane solutions under 980 nm laser excitation.