

Supporting Information

Synthesis of Er³⁺/Yb³⁺ codoped NaMnF₃ nanocubes with single-band red upconversion luminescence

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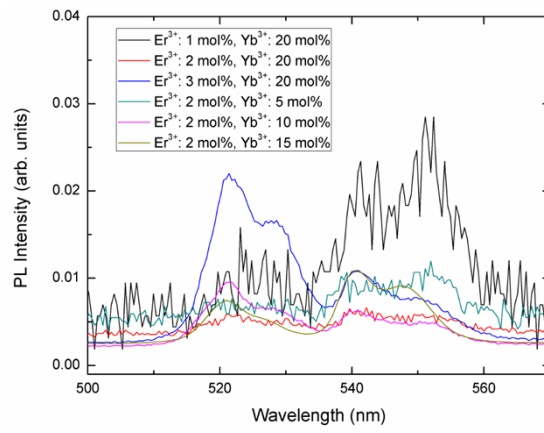


Fig. S1 Enlarged green spectral region of upconversion luminescence from NaMnF_3 nanocubes doped with various concentrations of $\text{Er}^{3+}/\text{Yb}^{3+}$ (1~3 : 5~20 mol%).

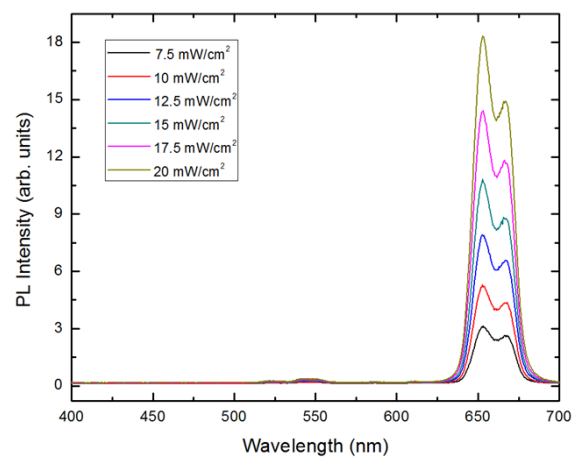


Fig. S2 Upconversion luminescence spectra of 2 mol% Er³⁺/20 mol% Yb³⁺ doped NaMnF₃ nanocubes under 980 nm excitation at the power density range of 7.5~30 mW/cm².

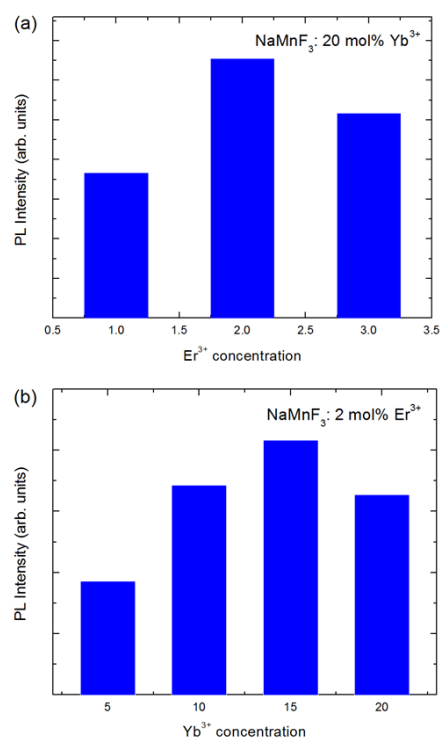


Fig. S3 Histograms of the red luminescence intensity of (a) Er³⁺ concentration-dependent and (b) Yb³⁺ concentration-dependent spectra in NaMnF₃ nanocubes.

Synthesis of hexagonal-phase NaYF₄ doped with 2 mol% Er³⁺ and 15 mol% Yb³⁺

ions: 1.66 mL of 0.2 M YbCl₃ • 6H₂O, 0.3 mL of 0.2 M YbCl₃ • 6H₂O and 0.04 mL of 0.2 M ErCl₃ • 6H₂O were sequentially added to 8 mL of 0.1 M EDTA under vigorous stirring. Then, 4 ml of 0.8 M NaF was dropwise added to the mixture. After continues stirring at room temperature for 10 min, the colloidal solution were transferred into a 20 mL Teflon-lined autoclave, sealed and heated at 200 °C for 20 h. The systems were then allowed to naturally cool to room temperature. The final products were collected by means of centrifugation, washed with ethanol and deionized water for several times to remove any possible remnants, and then dried in vacuum at 60 °C for 10 h to obtain the dried powders.

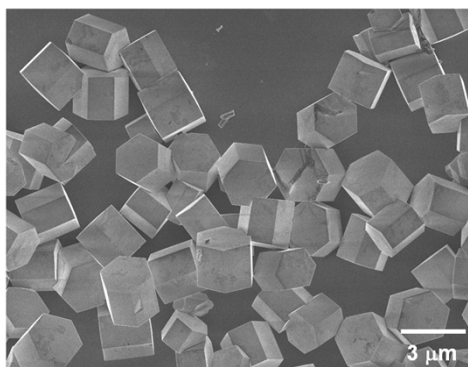


Fig. S4 SEM image of hexagonal-phase NaYF₄ doped with 2 mol% Er³⁺ and 15 mol% Yb³⁺ ions.