

Supporting Information

A strategy to enhance the up-conversion luminescence of nanospherical, rod-like and tube-like NaYF₄: Yb³⁺, Er³⁺ (Tm³⁺) through combining carbon dots

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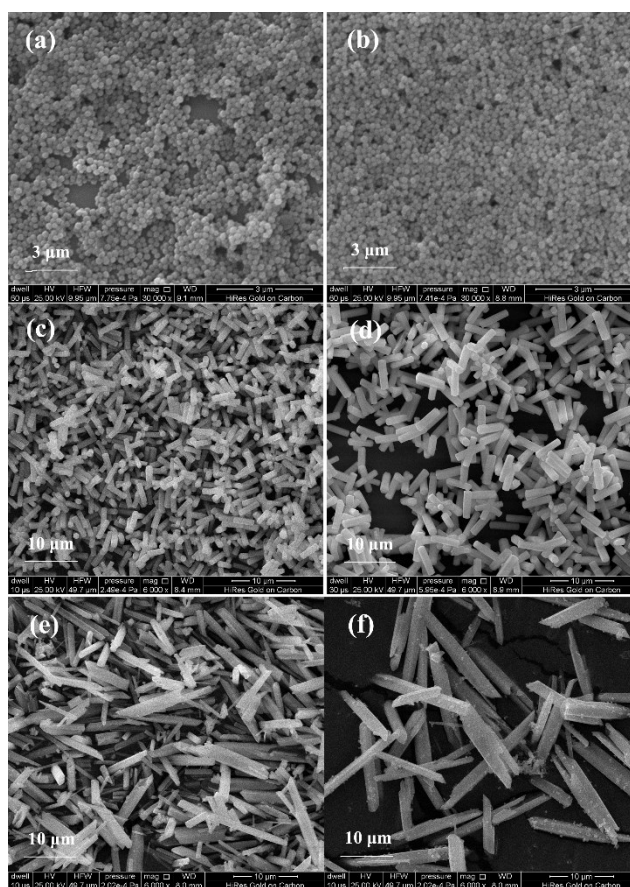


Fig. S1 SEM images of NaYF₄: Yb³⁺, Tm³⁺ (a, c, e) and CDs@NaYF₄: Yb³⁺, Tm³⁺ (b, d, f) with different morphologies: nanospheres (a, b), rod-like (c, d), tube-like (e, f).

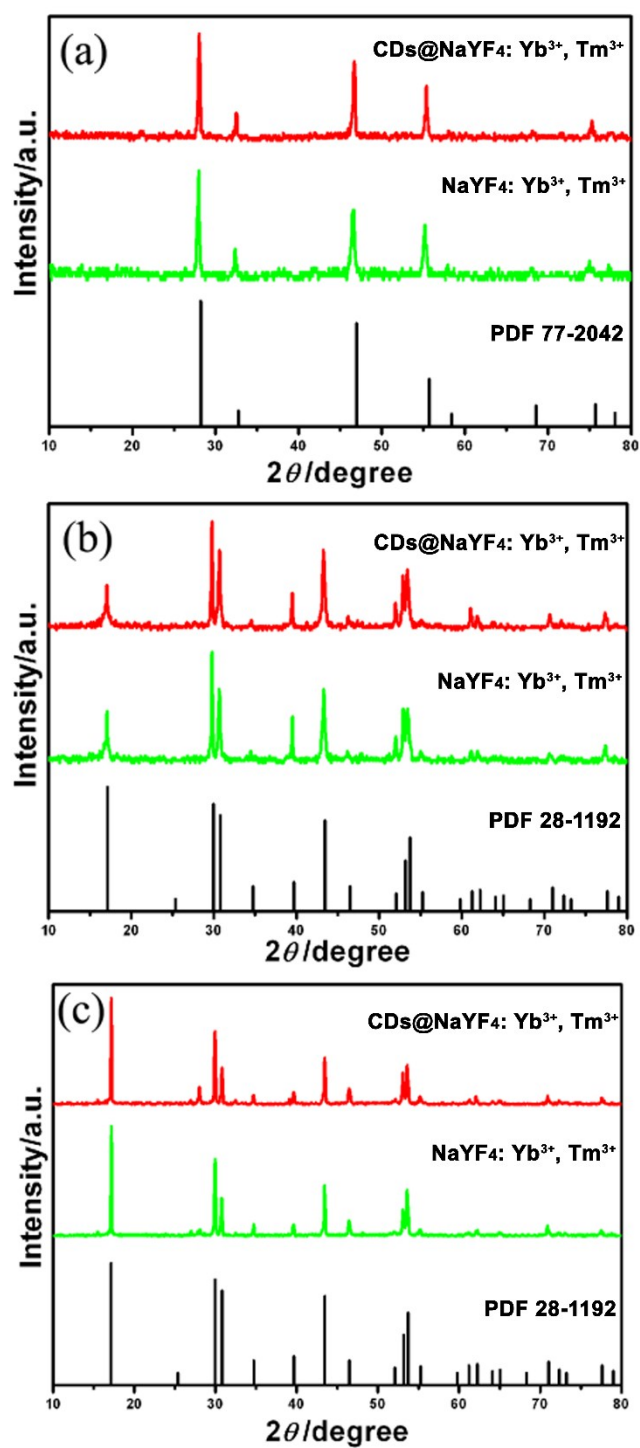


Fig. S2 XRD patterns of NaYF₄: Yb³⁺, Tm³⁺ and CDs@NaYF₄: Yb³⁺, Tm³⁺ with different morphologies: nanospheres (a), rod-like (b), tube-like (c).

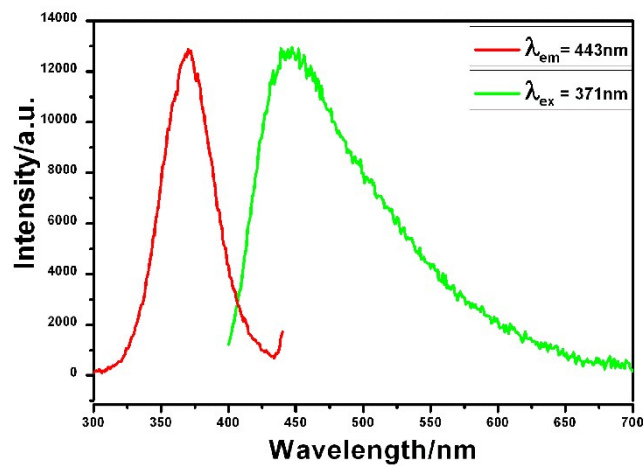


Fig. S3 Excitation (red line) and emission (green line) spectra of CDs.

The excitation spectrum of CDs monitored at 443 nm showed a broad band with maximum at 371 nm, and the emission spectrum showed a broad band with maximum at 443 nm under the excitation of 371 nm.