

Synthesis and Mechanism Exploration of Europium-Doped LiYF_4 Micro-octahedron Phosphors with Multilevel Interiors

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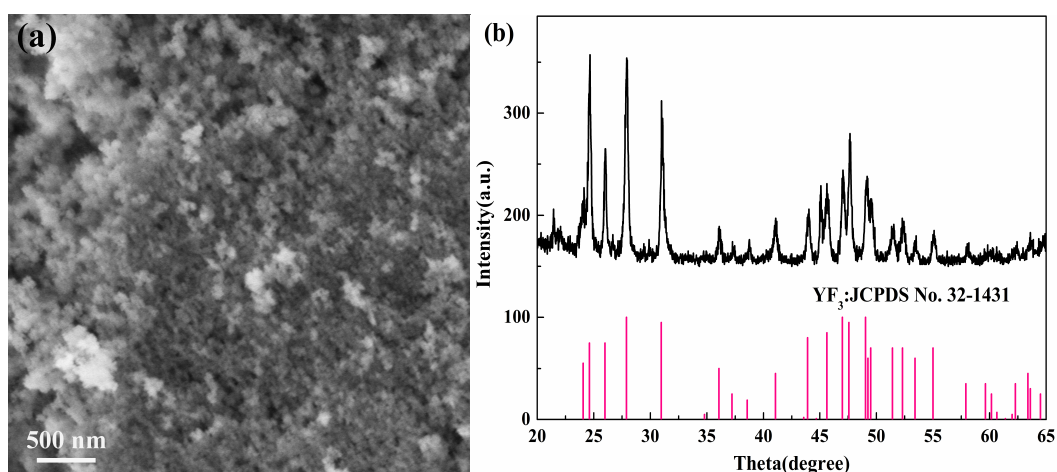


Figure S1. SEM image and XRD pattern of resulting $\text{YF}_3:\text{Eu}$ nanoparticles prepared at a designed reaction temperature of 120 °C for 24 h. The standard data of tetragonal-phase LiYF_4 (JCPDS file number 17-0874) as reference.

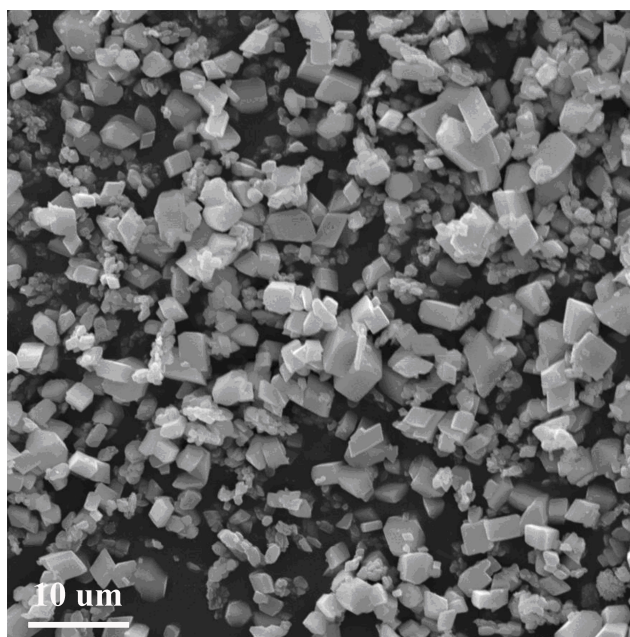


Figure S2. SEM image of resulting $\text{LiYF}_4\text{:Eu}$ micro-particles prepared in absence NH_4F in precursor solution.

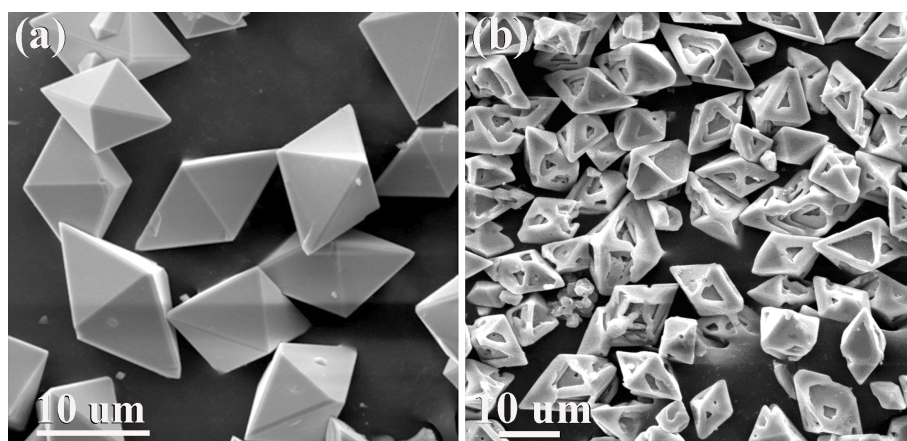


Figure S3. SEM images of resulting $\text{LiYF}_4\text{:Eu}$ micro-particles prepared with (a) and without (b) EDTA, respectively.

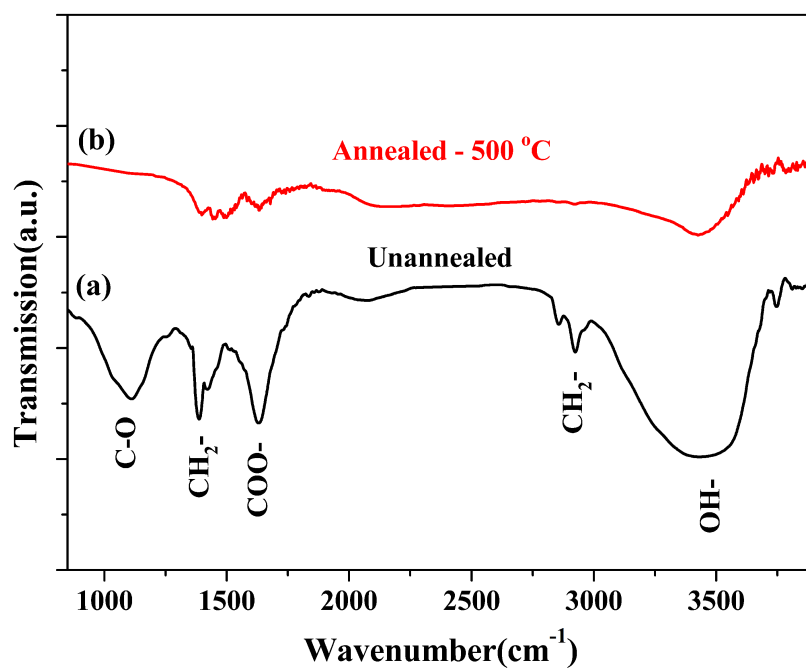


Figure S4. FTIR spectra of tetragonal $\text{LiYF}_4\text{:}2\% \text{ Eu}$ samples with and without annealing at $500\text{ }^\circ\text{C}$ for 2 h.

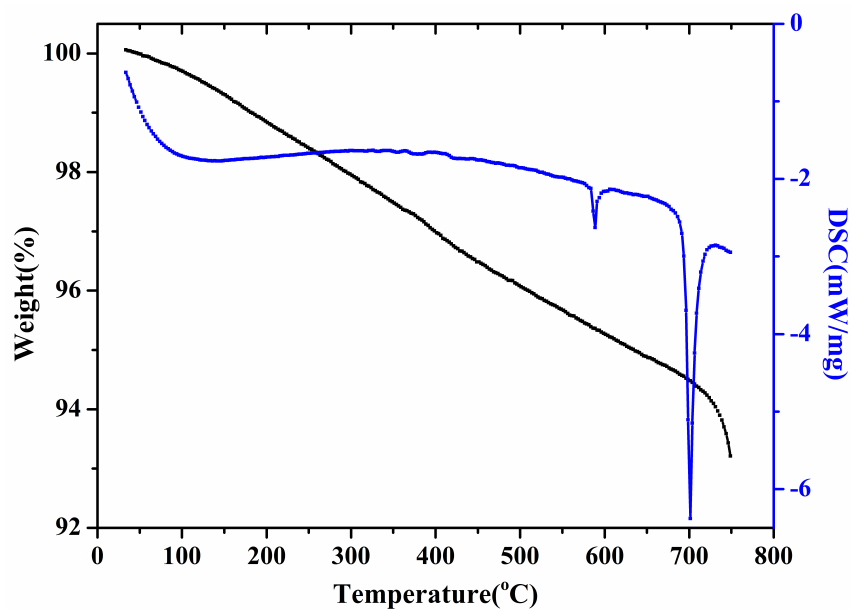


Figure S5 TG-DSC curves of $\text{LiYF}_4\text{:}(2\text{ mol}\% \text{ Eu})$ microcrystals prepared at a reaction temperature of $200\text{ }^\circ\text{C}$ for 36 hrs.

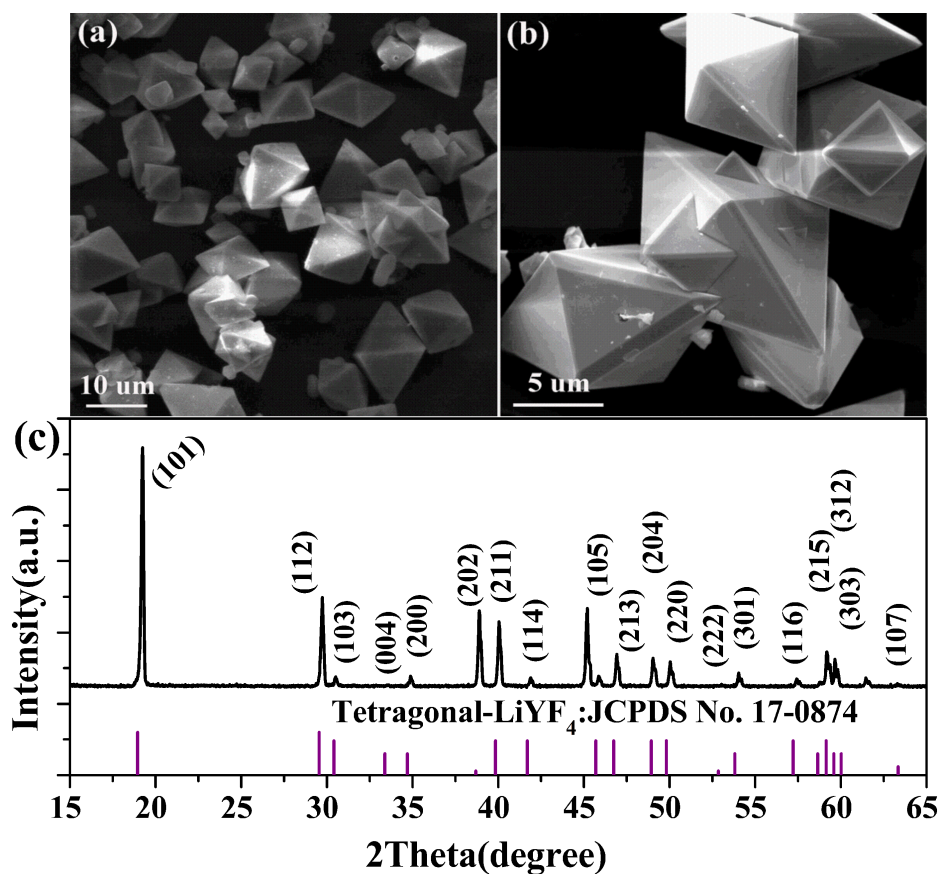


Figure S6. Low magnification and high-magnification SEM images and XRD pattern of the resulting $\text{LiYF}_4\text{:Eu}$ micro-particles prepared with untraditional hydrothermal route.

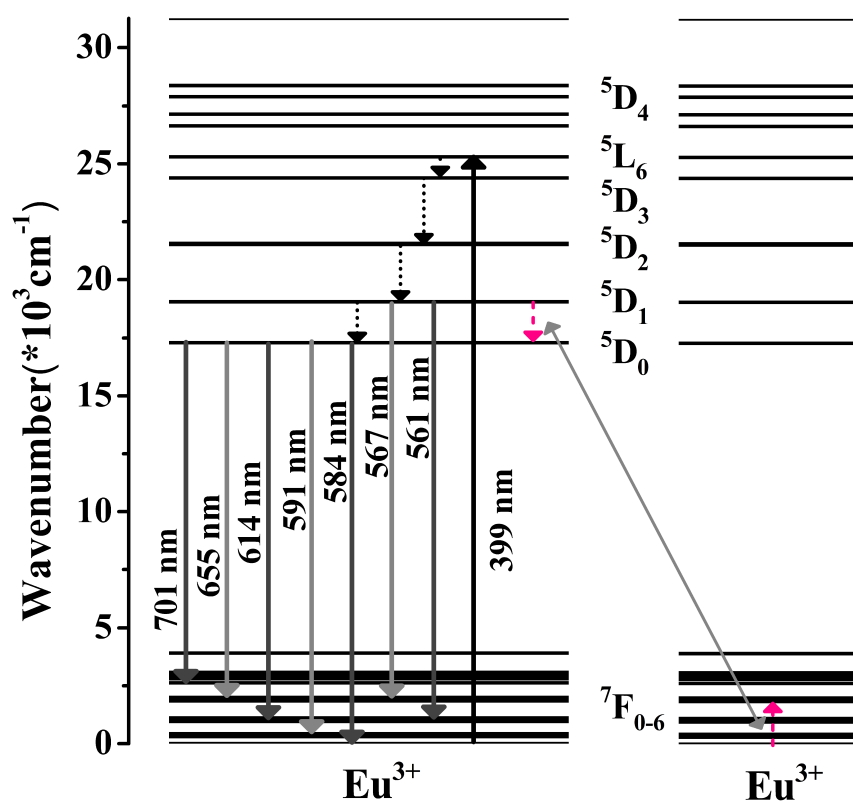


Figure S7. Schematic energy levels of Eu^{3+} ions describing the luminescence of Eu^{3+} .

The dashed arrows denote multiphonon nonradiative transitions, the straight ones denote radiative transitions, and double-headed arrow denotes cross-relaxation.