

## Supporting information

### Gelatin-Mediated Hydrothermal Synthesis of Apple-Like $\text{LaCO}_3\text{OH}$ Hierarchical Nanostructures and Tunable White-Light Emission

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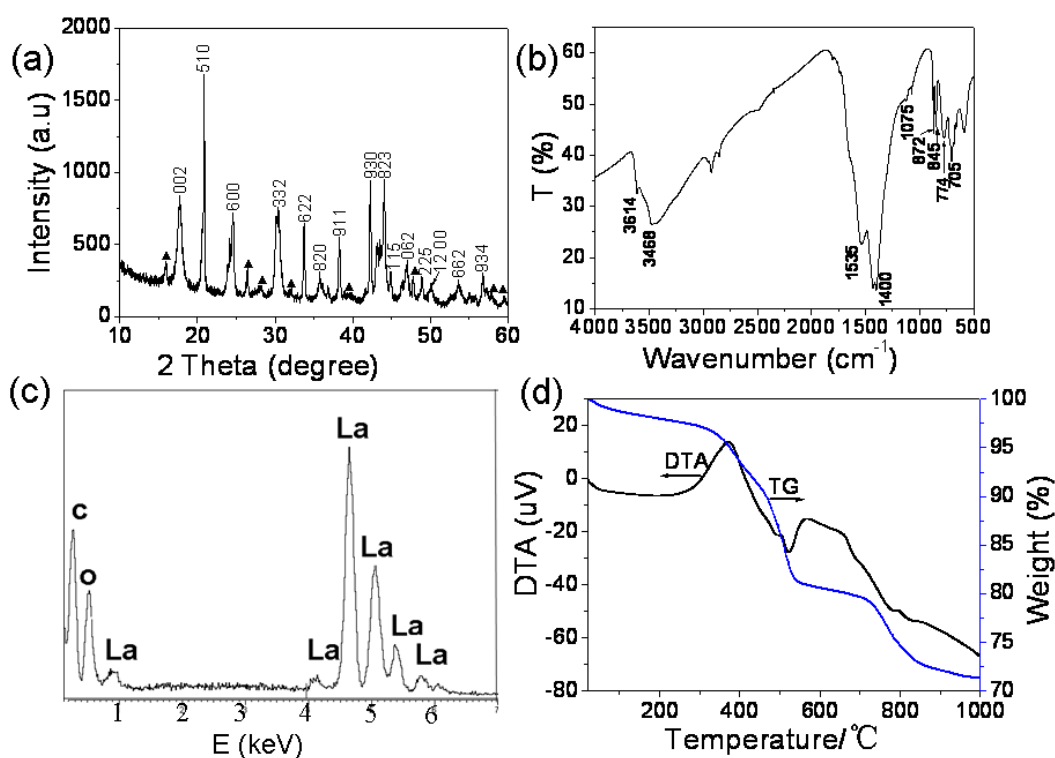


Fig. S1 (a) XRD, (b) FTIR, (c) EDS and (d) TG-DTA patterns of sample 1. The dark triangles refer to the  $\text{La}(\text{OH})_3$  peak.

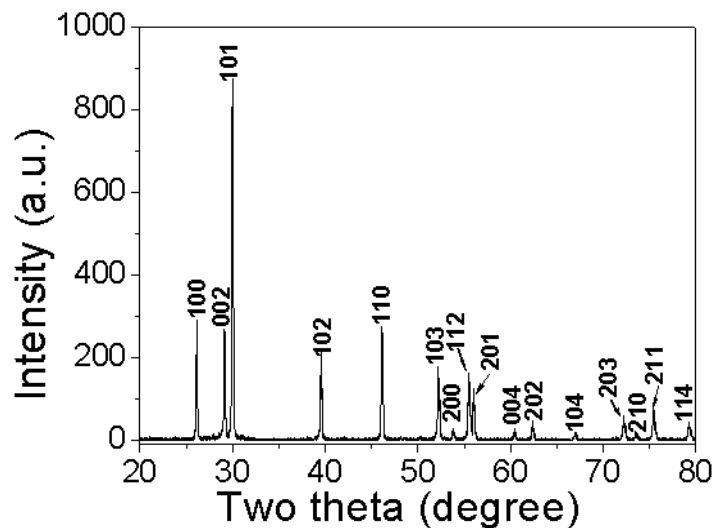


Fig. S2 XRD pattern of the product obtained after calcining sample 1 at 900 °C for 4 h.

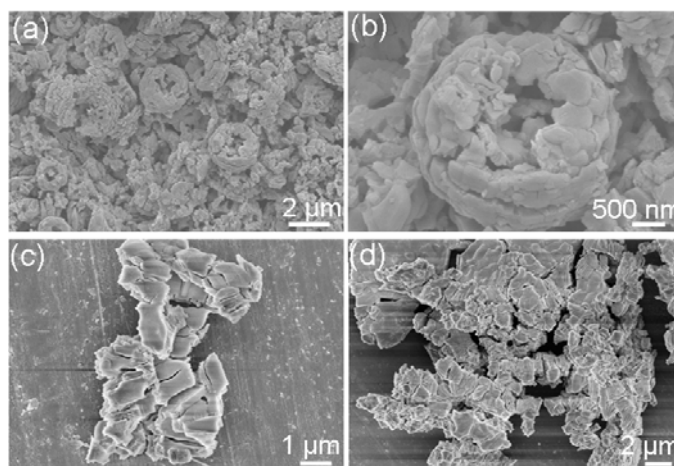


Fig. S3 SEM photos of the products obtained after calcining sample 1 at 900 °C for 4 h at different heating rate. (a) and (b) 1 °C/min ; (c) 5 °C/min ; (d) 10 °C/min.

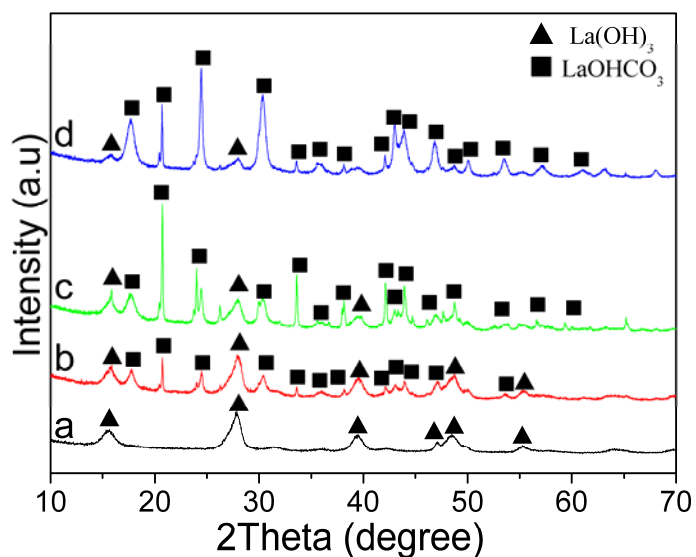


Fig. S4 XRD patterns of the samples prepared after different reaction time. (a) 1 h; (b) 3 h; (c) 24 h; (d) 72 h.

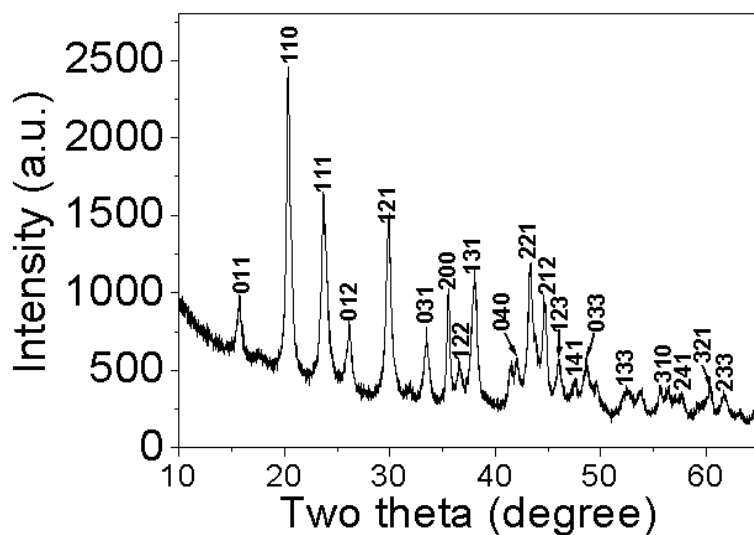


Fig. S5 XRD pattern of the sample prepared without the addition of KOH.

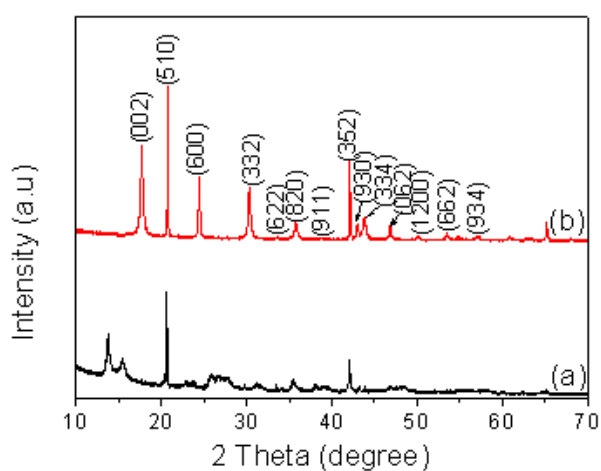


Fig. S6 XRD pattern of the product prepared at (a) 120 °C and (b) 220 °C for 48 h.

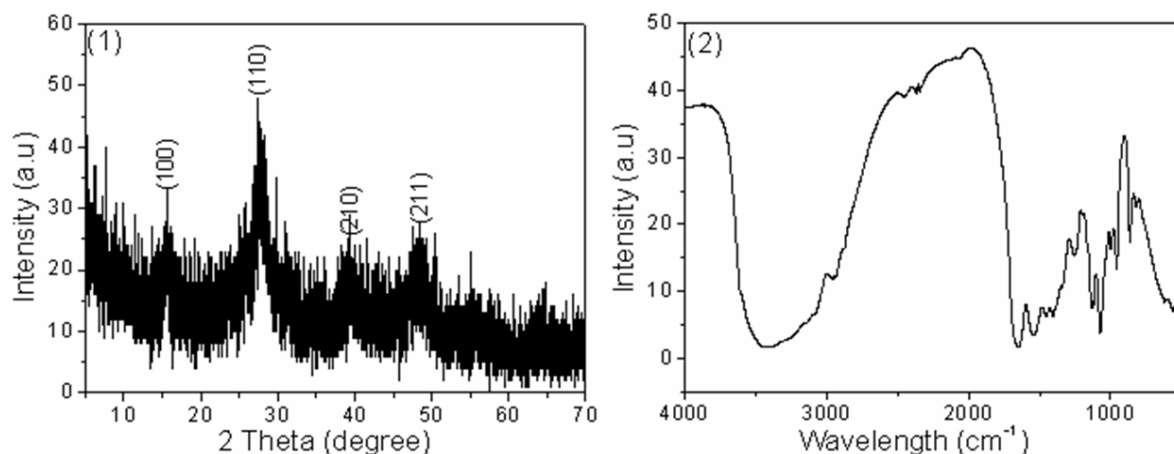


Fig. S7 (1) XRD and (2) IR of the precipitate obtained before hydrothermal treatment.

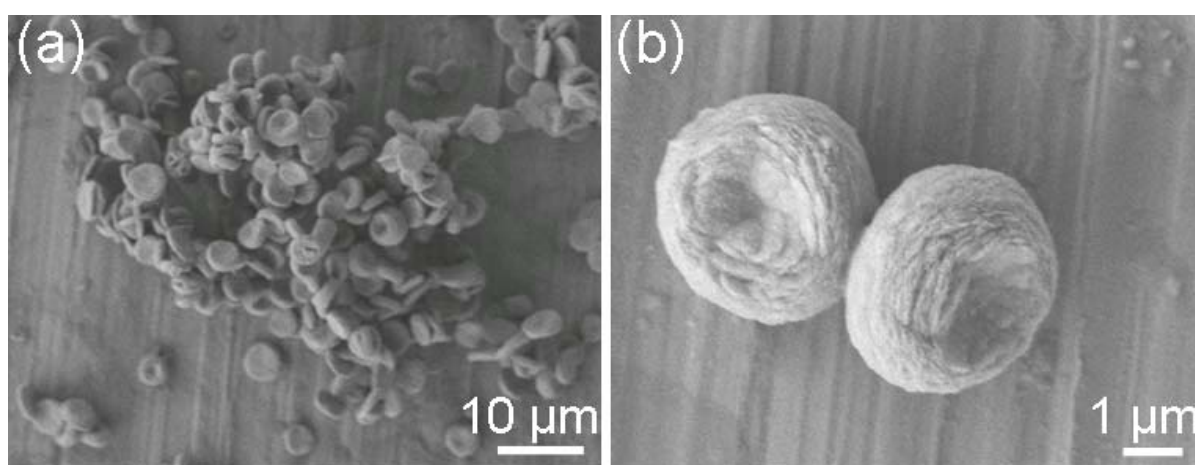


Fig. S8 SEM photos of the La(OH)CO<sub>3</sub> : Tb<sup>3+</sup> (5%) hierarchical nanostructures.

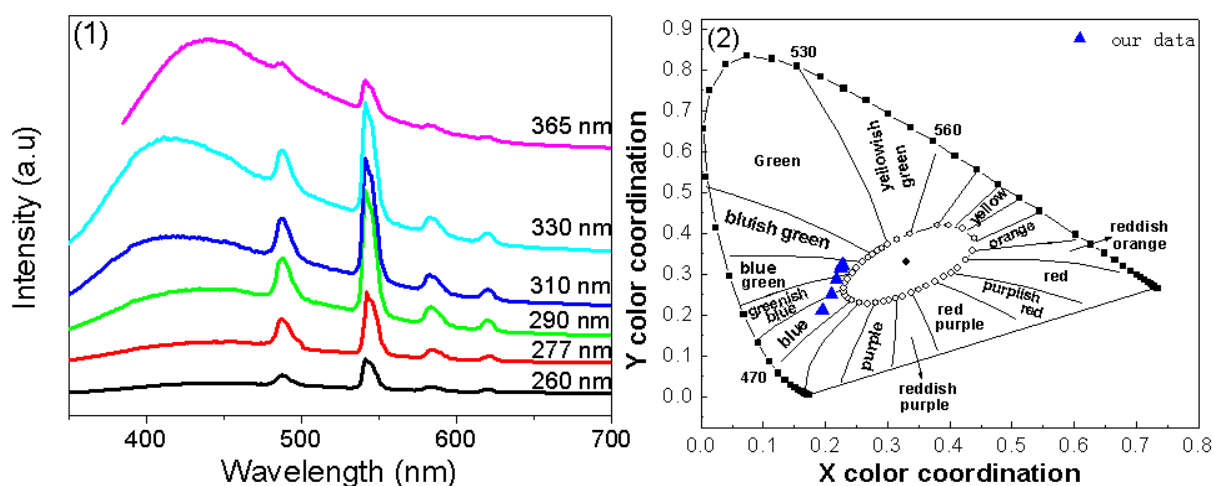


Fig. S9 (1) Emission spectra and (2) CIE chromaticity diagram of the as-prepared apple-like La(OH)CO<sub>3</sub> : Tb<sup>3+</sup> (5%) hierarchical nanostructures excited with different wavelengths.

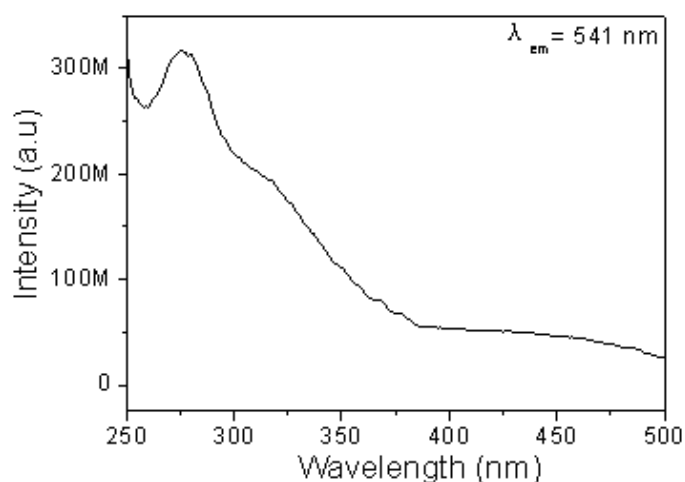


Fig. S10 Excitation spectrum of La(OH)CO<sub>3</sub> : Tb<sup>3+</sup> (5%) hierarchical nanostructures.

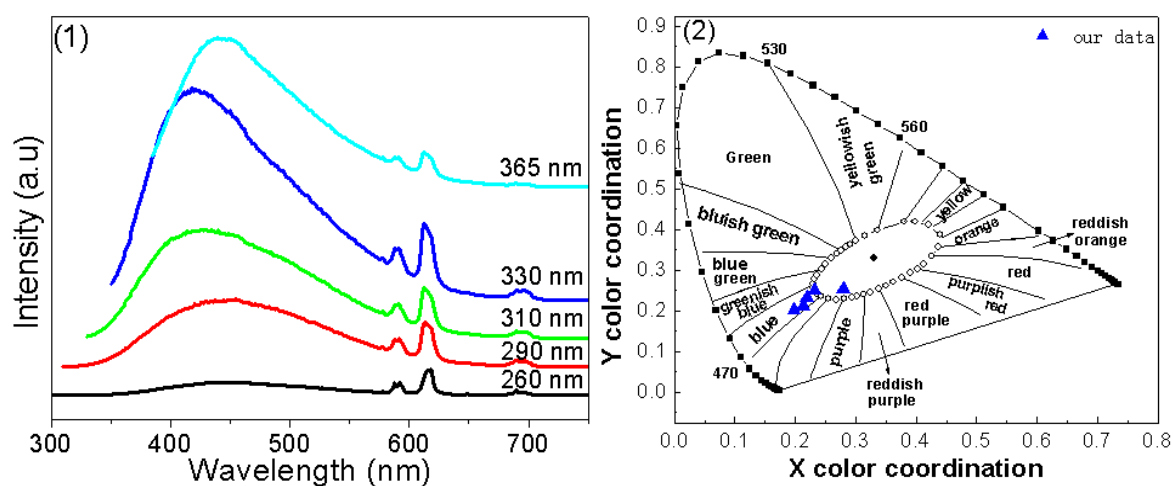


Fig. S11 Emission spectra and (2) CIE chromaticity diagram of the as-prepared apple-like La(OH)CO<sub>3</sub> : Eu<sup>3+</sup> (5%) hierarchical nanostructures excited with different wavelengths.

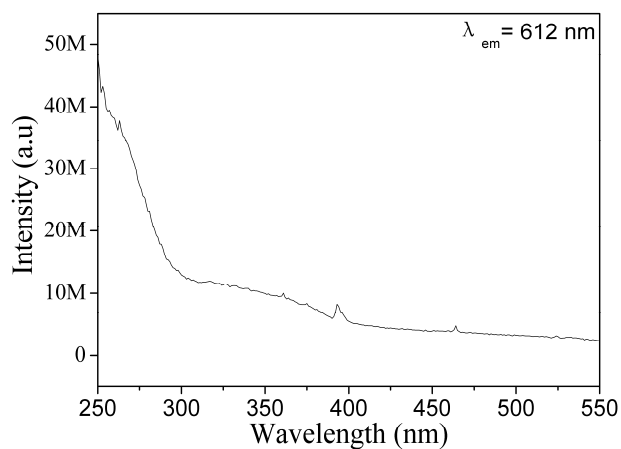


Fig. S12 Excitation spectra of La(OH)CO<sub>3</sub> : Eu<sup>3+</sup> (5%) hierarchical nanostructures.

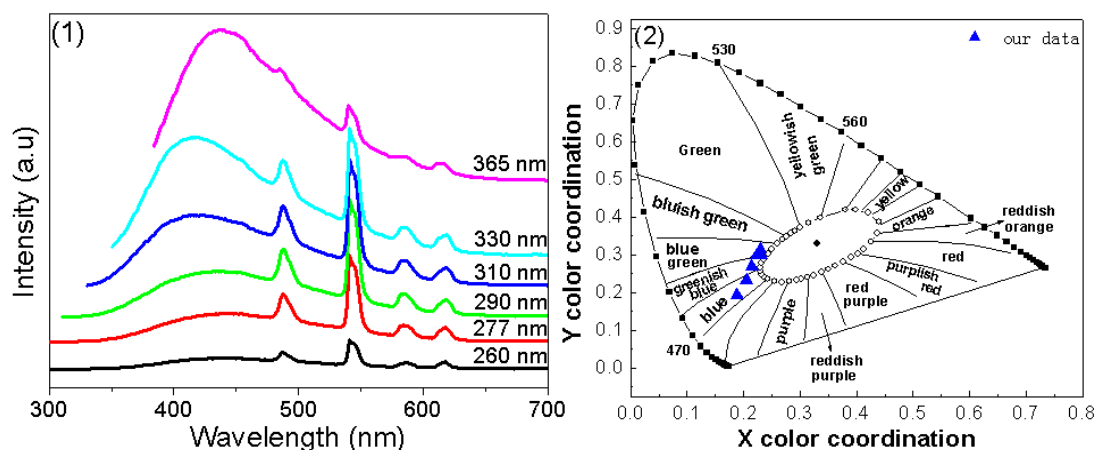


Fig. S13 (1) Emission spectra and (2) CIE chromaticity diagram of the as-prepared apple-like  $\text{La(OH)CO}_3: \text{Tb}^{3+}(5\%), \text{Eu}^{3+}(1\%)$  hierarchical nanostructures excited with different wavelengths.

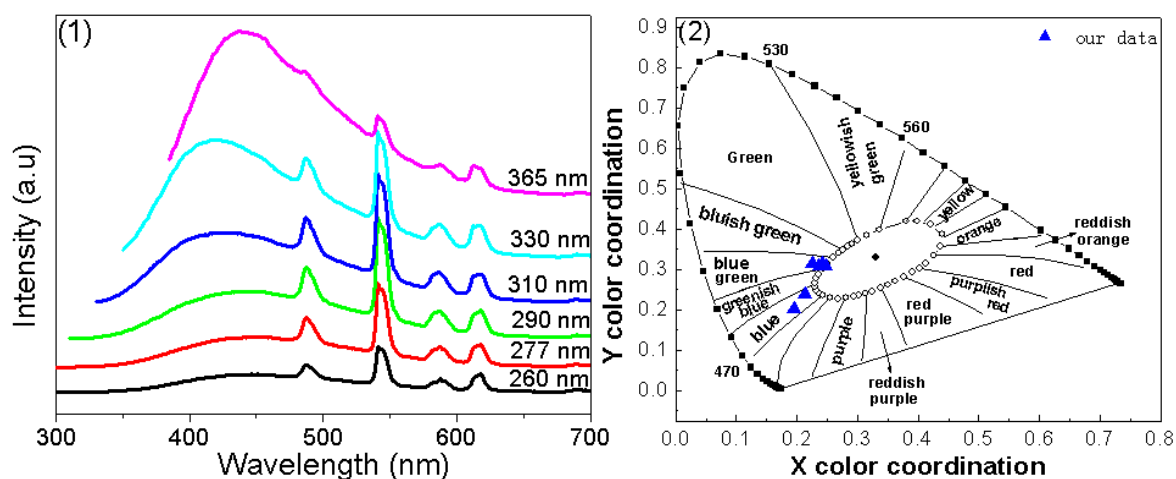


Fig. S14 (1) Emission spectra and (2) CIE chromaticity diagram of the as-prepared apple-like  $\text{La(OH)CO}_3: \text{Tb}^{3+}(5\%), \text{Eu}^{3+}(2.5\%)$  hierarchical nanostructures excited with different wavelengths.

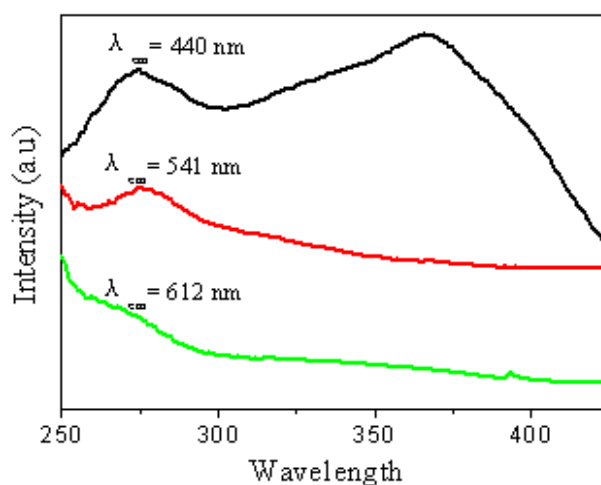


Fig. S15 Excitation spectra of  $\text{La(OH)CO}_3: \text{Tb}^{3+}(5\%), \text{Eu}^{3+}(5\%)$  hierarchical nanostructures detected at different wavelengths.