

Highly Efficient Green Phosphor $\text{Ca}_4\text{La}(\text{PO}_4)_3\text{O}:\text{Eu}^{2+},\text{Tb}^{3+}$ For white LEDs

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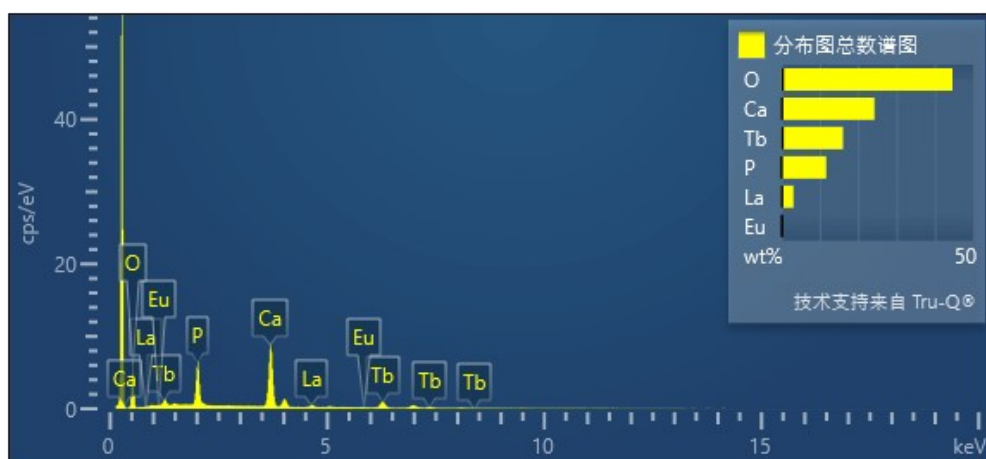
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Table S1 Atomic positions, occupancies, and atomic displacement parameters of CLPO:0.02Eu²⁺.

atom	site	x	y	z	occ	uiso
Ca1	4f	0.33333	0.66667	0.00085	0.998	0.021
Eu1	4f	0.33333	0.66667	0.00085	0.002	0.021
Ca2	6h	0.00808	0.24839	0.25000	0.664	0.015
Eu2	6h	0.01218	0.25801	0.25000	0.003	0.015
Eu3	6h	0.01505	0.22636	0.25000	0.330	0.014
La1	6h	0.01505	0.22636	0.25000	0.003	0.014
P1	6h	0.40470	0.37460	0.25000	1.000	0.019
O1	6h	0.33460	0.49130	0.25000	1.000	0.014
O2	6h	0.59370	0.46960	0.25000	1.000	0.020
O3	12i	0.34690	0.26360	0.07150	1.000	0.022
O4	4e	0.00000	0.00000	0.20480	0.500	0.021

Table S2. Atomic positions, occupancies, and atomic displacement parameters of CLPO:0.02Eu²⁺,0.7Tb³⁺.

atom	site	x	y	z	occ	uiso
Ca1	4f	0.33333	0.66667	-0.00160	0.998	0.015
Eu1	4f	0.33333	0.66667	-0.00160	0.002	0.015
Ca2	6h	0.00855	0.24823	0.25000	0.664	0.007
Eu2	6h	0.00855	0.24823	0.25000	0.003	0.007
Eu3	6h	0.01235	0.23133	0.25000	0.003	0.022
La1	6h	0.01235	0.23133	0.25000	0.099	0.022
Tb1	6h	0.01235	0.23133	0.25000	0.231	0.022
P1	6h	0.40470	0.37460	0.25000	1.000	0.011
O1	6h	0.33460	0.49130	0.25000	1.000	0.008
O2	6h	0.59370	0.46860	0.25000	1.000	0.009
O3	12i	0.34690	0.26360	0.07150	1.000	0.003
O4	4e	0.00000	0.00000	0.20480	0.500	1.000

**Figure S1** EDS spectra and mass ratio of elements of CLPO:0.02Eu²⁺,0.7Tb³⁺

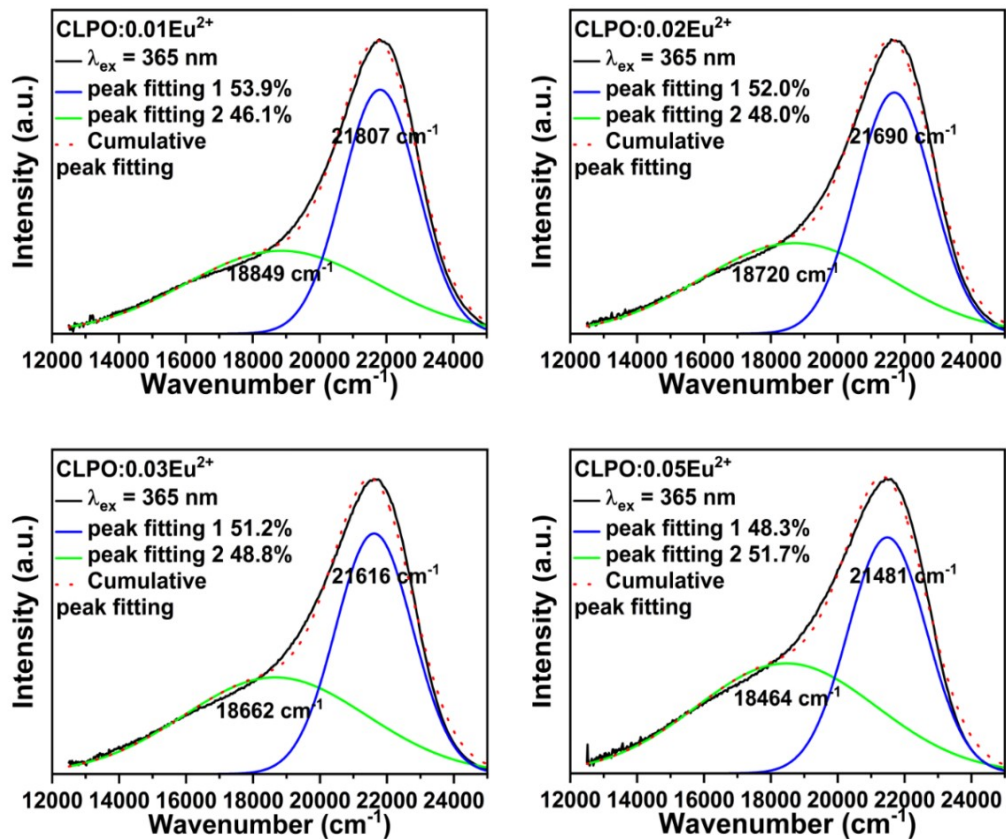


Figure S2 Gaussian peak splitting in the emission spectra of CLPO: $x\text{Eu}^{2+}$ ($x = 0.01-0.05$).

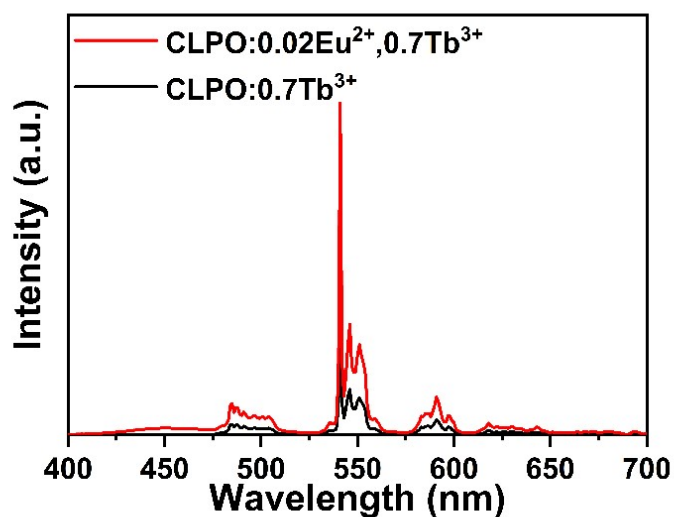


Figure S3 Emission spectra of CLPO:0.02 $\text{Eu}^{2+}, 0.7\text{Tb}^{3+}$ and CLPO:0.7 Tb^{3+} under 365 nm light excitation at the same conditions.

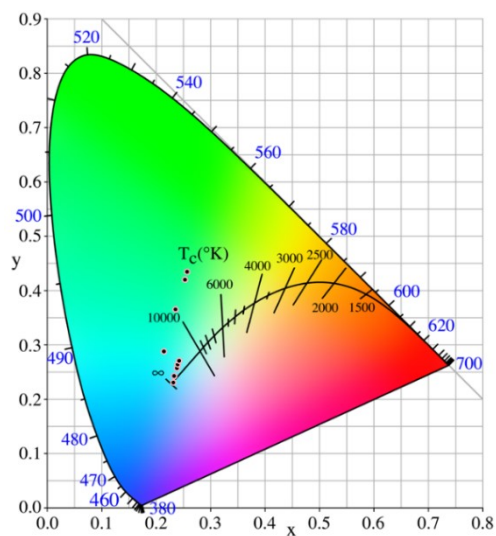


Figure S4 Change in color coordinates.

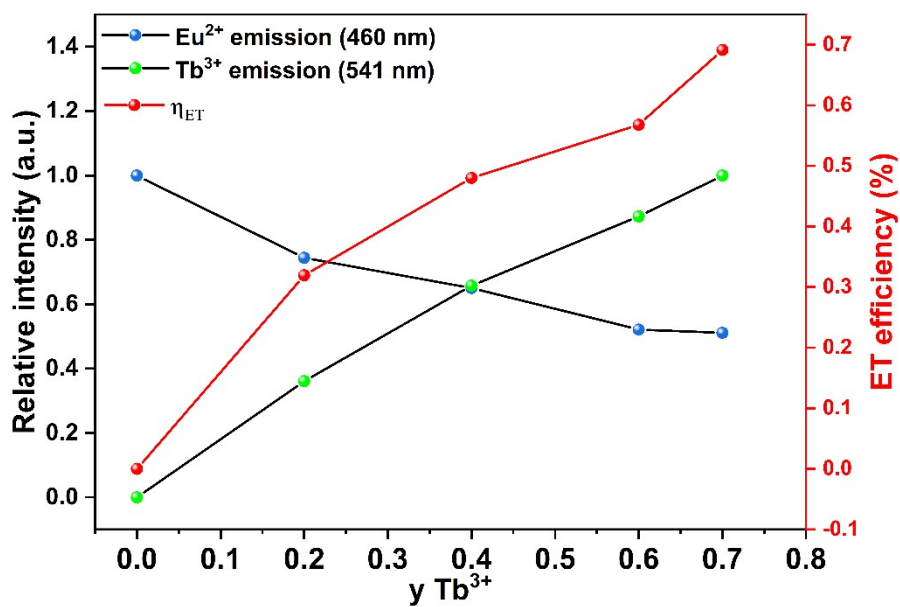


Figure S5 Relative emission intensity of Eu²⁺ and Tb³⁺ and the energy transfer efficiency η_{ET} as a function of Tb³⁺ concentration.

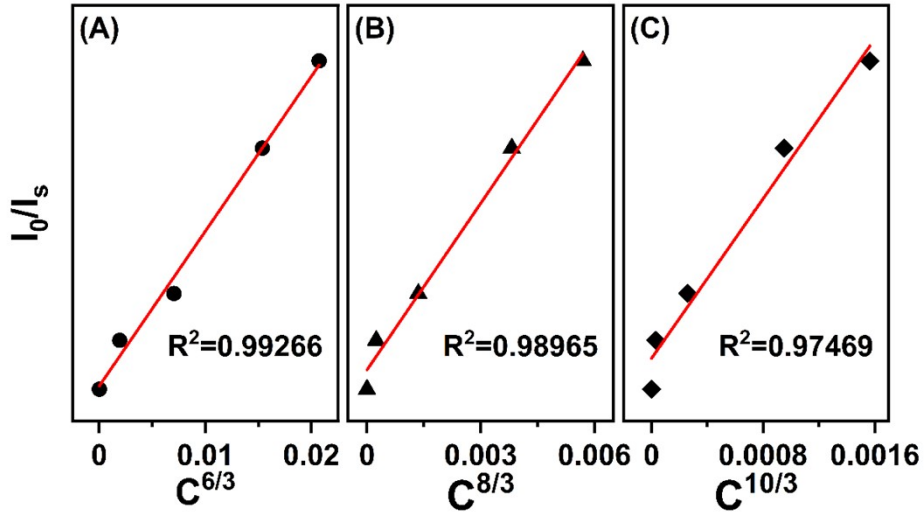


Figure S6 Plots of I_0/I_s versus $C^{n/3}$ ($n = 6, 8$ and 10).

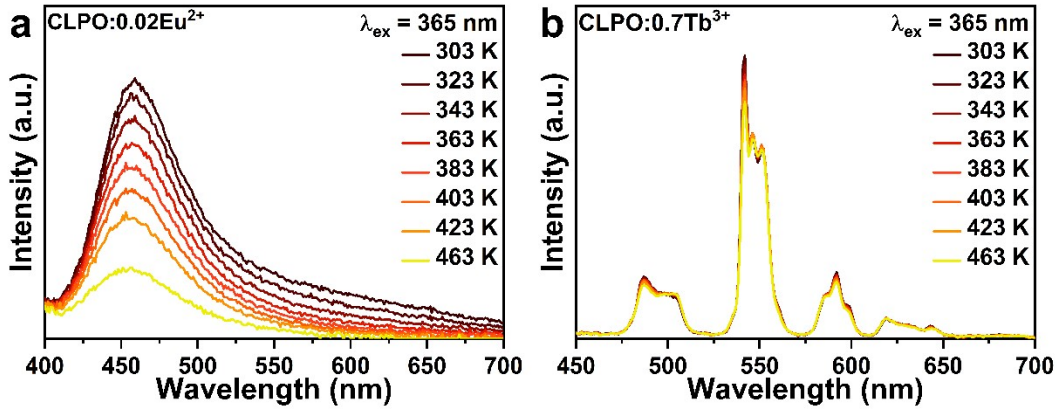


Figure S7 Temperature-dependent emission spectra of CLPO:0.02Eu²⁺ (a) and CLPO:0.7Tb³⁺ (b) ($\lambda_{ex} = 365$ nm).

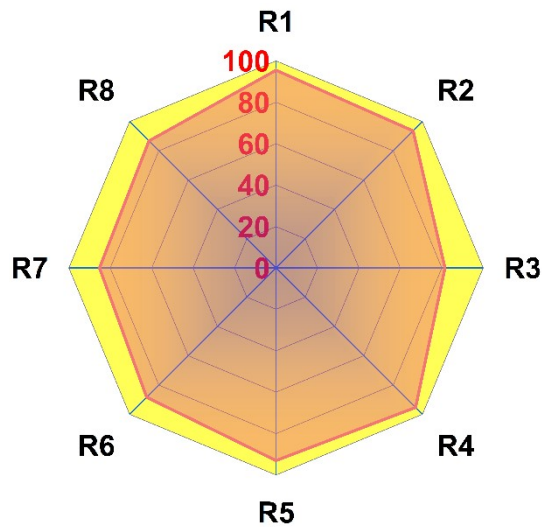


Figure S8. R1-R8 of WLED