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Electronic Supplementary Information

A Narrow-band Ultra-bright Green Phosphor for LED-based Applications

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Table S1. Rietveld refinement data of the crystal structure of SMBO: $0.05Ce^{3+}$.

Atom	Wyckoff position	*x*	*y*	*z*	*Occ.*	U_{iso} (Å)
Sr	4i	0.28789(3)	0	0.81269(1)	0.95	0.0171(5)
Mg	2d	0.5	0	0.5	1	0.0256 (7)
B	4i	0.05238(5)	0	0.24429(4)	1	0.0125(6)
O_1	8j	-0.02582(9)	-0.2400(6)	0.22773(6)	1	0.0198(6)
O_2	4i	0.22108(7)	0	0.30943(5)	1	0.0556(4)
Ce	4i	0.28789(3)	0	0.81269(1)	0.05	0.0181(6)

Table S2. Rietveld refinement data of the crystal structure of SMBO: $0.05Ce^{3+}$, $0.05Tb^{3+}$.

Atom	Wyckoff position	*x*	*y*	*z*	*Occ.*	U_{iso} (Å)
Sr	4i	0.289500	0	0.817000	0.9	0.01
Mg	2d	0.5	0	0.5	1	0.0229(7)
B	4i	0.04755(7)	0	0.23873(1)	1	0.0149(1)
O_1	8j	-0.02759(0)	-0.23842(7)	0.23148(4)	1	0.0111(1)
O_2	4i	0.22502(1)	0	0.31181(1)	1	0.0398(1)
Ce	4i	0.289500	0	0.817000	0.05	0.01
Tb	4i	0.289500	0	0.817000	0.05	0.01

Table 3. CIE Chromaticity Coordinates for SMBO: 0.05Ce^{3+}, *y*Tb^{3+} samples

Sample number	Tb^{3+} concentration *y*	CIE coordinates (*x*, *y*)
1	0	(0.1621, 0.0404)
2	0.01	(0.2017, 0.2716)
3	0.03	(0.2190, 0.3725)
4	0.05	(0.2268, 0.4136)
5	0.07	(0.2240, 0.4061)
6	0.10	(0.2151, 0.3683)

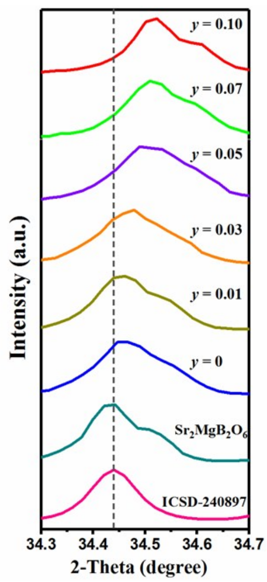

Fig. S1. Magnified XRD patterns of SMBO and SMBO:0.05Ce^{3+}, *y*Tb^{3+}（*y* = 0 – 0.10）.

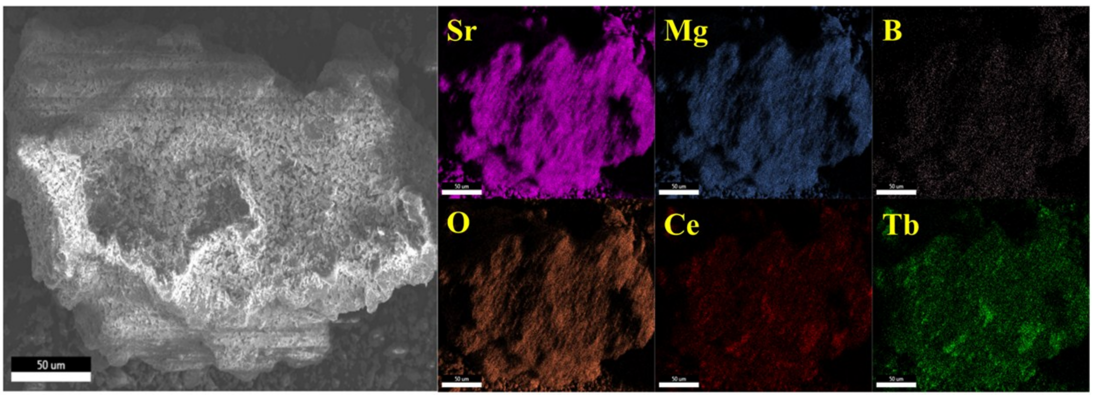

Fig. S2. Elements mapping of SMBO: $0.05Ce^{3+}$, $0.05Tb^{3+}$.

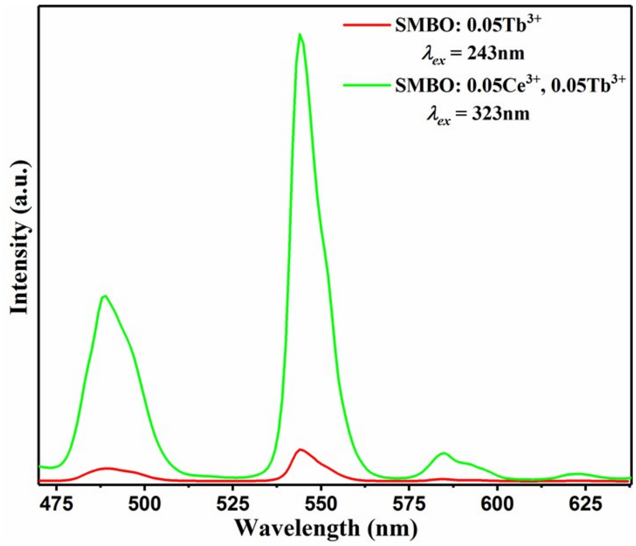

Fig. S3. Comparison of Tb^{3+} emission intensity with and without $0.05Ce^{3+}$.

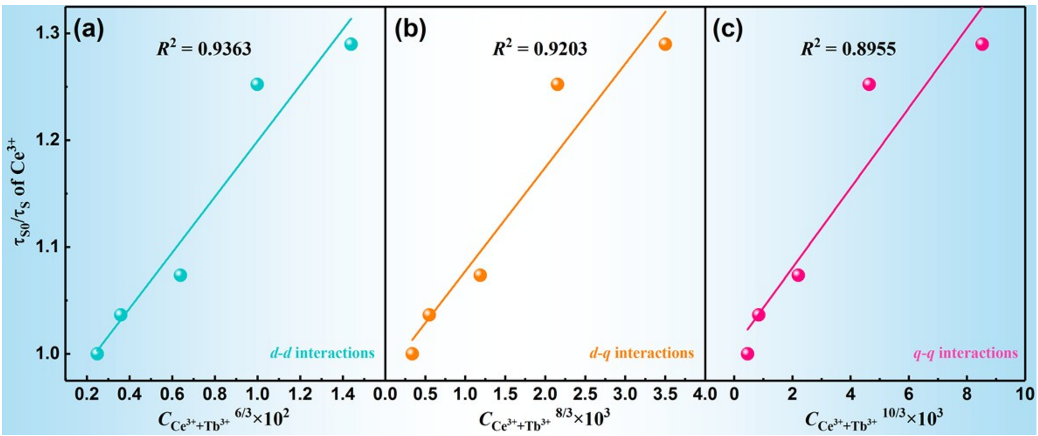

Fig. S4. Dependence of τ_{so} / τ_s of Ce^{3+} in SMBO:$0.05Ce^{3+}$, yTb^{3+} on Tb^{3+} concentration

(a) $C^{6/3}$, (b) $C^{8/3}$, and (c) $C^{10/3}$.

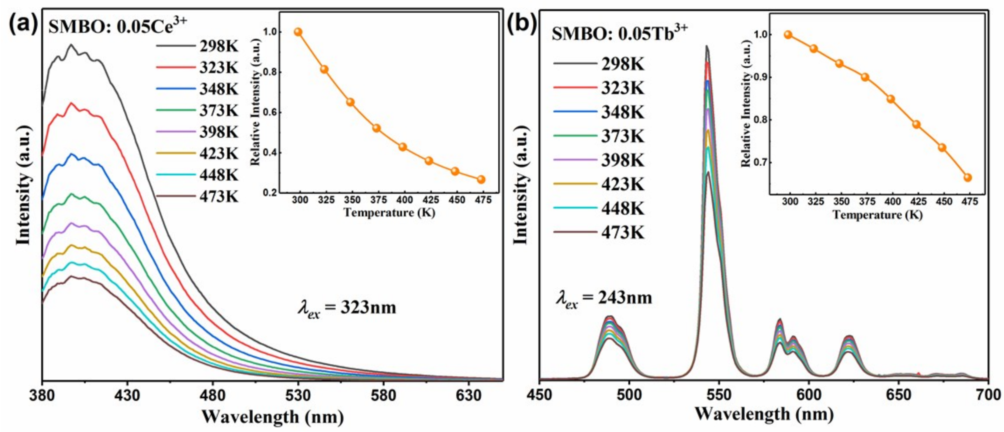

Fig. S5. Thermal quenching behavior of emission spectra for (a) SMBO: $0.05Ce^{3+}$, and

(b) SMBO: $0.05Tb^{3+}$. The insets represent the relative integrated intensity.

Since the test wavelength of the thermal quenching analysis equipment can only start from 380 nm, the temperature-dependent emission spectrum of SMBO: $0.05Ce^{3+}$ before 380 nm cannot be obtained, but this does not affect the overall trend of change.

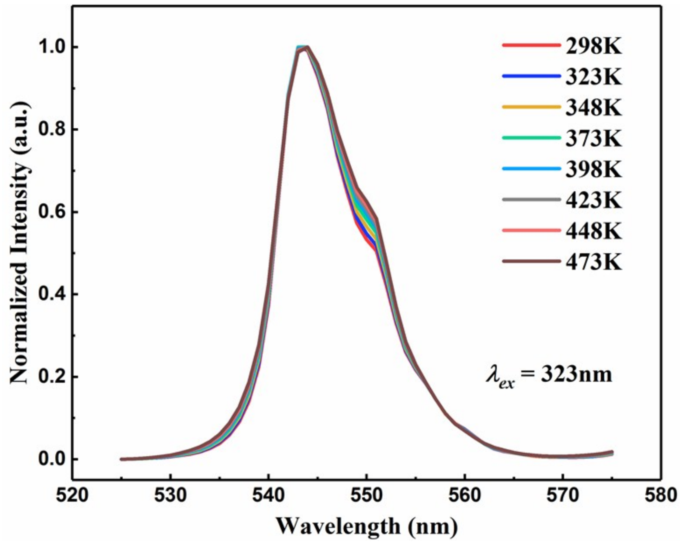

Fig. S6. The normalized emission spectra of SMBO: $0.05Ce^{3+}$, $0.05Tb^{3+}$sample at 544 nm under different temperature.

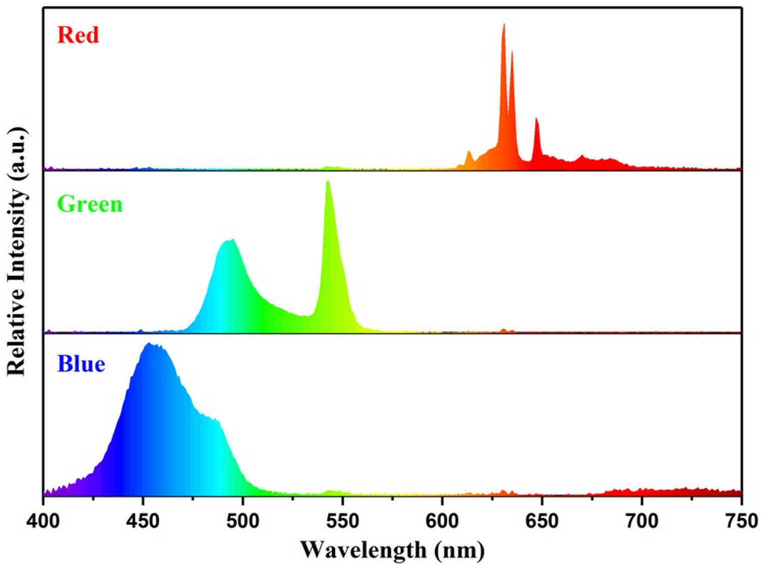

Fig. S7. Spectra of the output light of the as-fabricated white LED after passing through the corresponding RGB CFs.

Obviously, the blue light from Tb^{3+} and part of BAM: Eu^{2+} cannot be effectively filtered due to the limitations of the current traditional green CF. If an ideal green CF is developed to completely eliminated crosstalk, the green emission will be as narrow as that of the LED chip.