Supporting Information

Enhanced luminescence and tunable color in $[Eu^{2+}, Si^{4+}]/Mn^{2+}$ doped $K_2BaCa(PO_4)_2$ based on charge compensation and energy transfer

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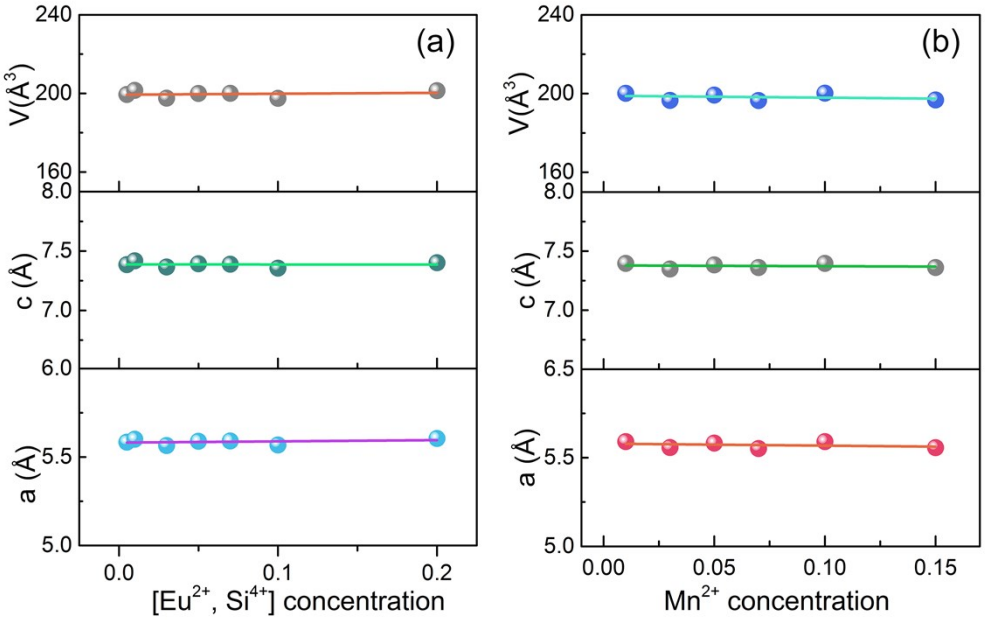

Figure S1. The cell parameters ($a = b$, c, V) of (a) KBCPO: x[Eu^{2+}, Si^{4+}] (x = 0.005-0.2) and (b) KBCPO: 0.03[Eu^{2+},Si^{4+}], zMn^{2+} (z = 0.01-0.15) samples.

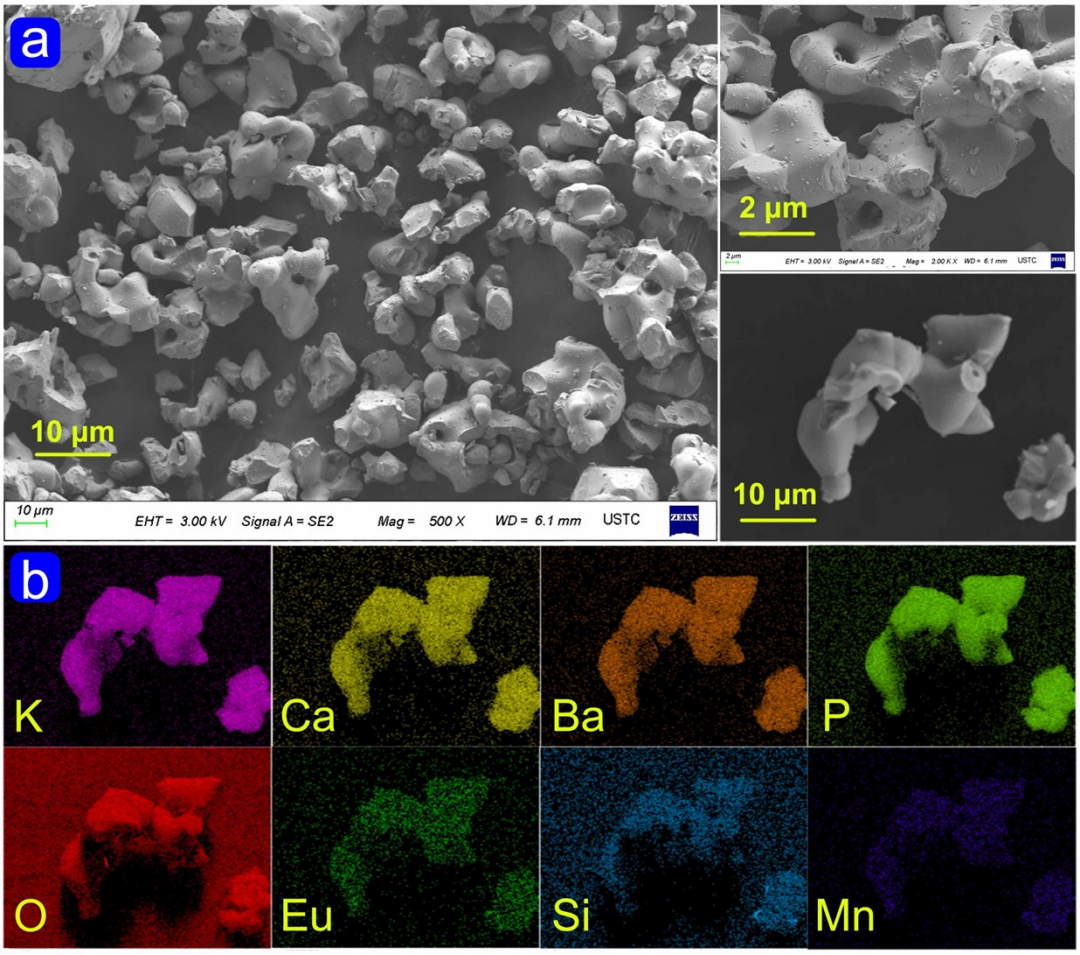

Figure S2. (a) SEM results under different measurement scales and (b) the EDS elemental mapping images of sample KBCPO: 0.03[Eu^{2+}, Si^{4+}], 0.05Mn^{2+}.

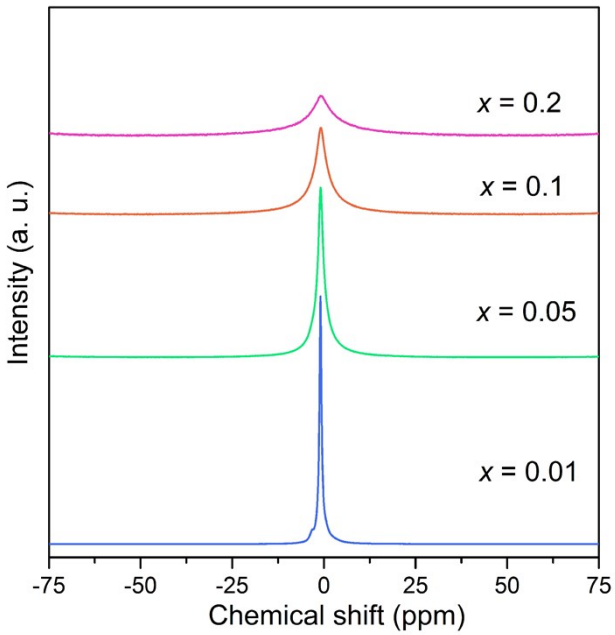

Figure S3. The ^{31}P solid-state NMR spectra of KBCPO: x [Eu^{2+}, Si^{4+}] (x = 0.01, 0.05, 0.1 and 0.2) samples.

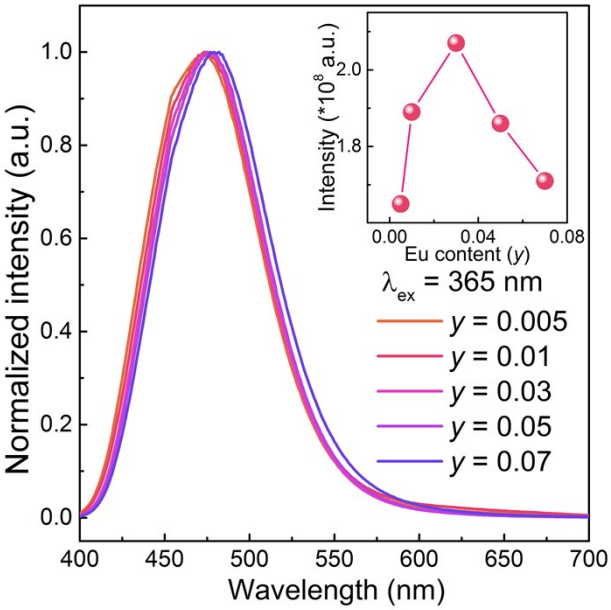

Figure S4. The normalized PL spectra of KBCPO: yEu^{2+} (y = 0.005-0.07) samples under 365 nm excitation. The inset presents the emission intensity of KBCPO: yEu^{2+} with various Eu^{2+} concentration.

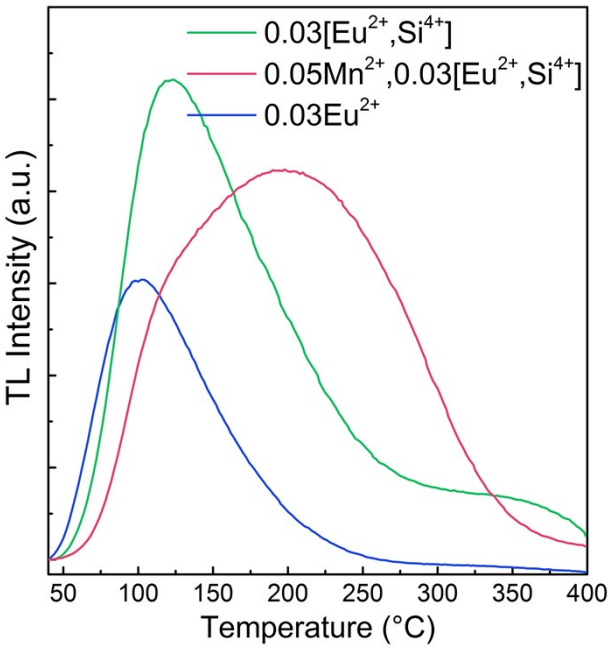

Figure S5. TL curves of the KBCPO: 0.03[Eu^{2+}, Si^{4+}], KBCPO: 0.03[Eu^{2+}, Si^{4+}],0.05Mn^{2+} and KBCPO: 0.03Eu^{2+} samples.

Table S1. Refinement and crystallographic parameters of KBCPO: 0.03[Eu^{2+}, Si^{4+}] and KBCPO: 0.03[Eu^{2+}, Si^{4+}],0.05Mn^{2+}.

	KBCPO: 0.03[Eu^{2+}, Si^{4+}]	KBCPO: 0.03[Eu^{2+}, Si^{4+}],0.05Mn^{2+}
Space group	*P*-3m1	*P*-3m1
a (Å)	5.62611(5)	5.61314(18)
c (Å)	7.44474(9)	7.42509(24)
V (Å3)	204.078(30)	202.602(17)
Z	1	1
2θ-interval (deg)	10-100	10-100
R_{wp} (%)	9.48	9.41
R_p (%)	6.50	6.77
χ^2	2.534	2.267

Table S2. CIE coordinates of KBCPO:0.03[Eu^{2+}, Si^{4+}], *z*Mn^{2+} (z = 0.01-0.15) samples excited at 365 nm.

KBCPO: 0.03[Eu^{2+}, Si^{4+}], zMn^{2+}	CIE (x, y)
0.01	(0.1709, 0.2570)
0.03	(0.2074, 0.2964)
0.05	(0.2372, 0.3308)
0.07	(0.2730, 0.3712)
0.10	(0.3038, 0.4048)
0.15	(0.3439, 0.4471)