

Fig. S1(a) XRD patterns of BMPO: $x\text{Ce}^{3+}$ and BMPO(ICSD#59253). (b) XRD patterns of BMPO: $y\text{Eu}^{2+}$ and BMPO(ICSD#59253). (c) XRD patterns of BMPO: $0.05\text{Ce}^{3+}, x\text{Eu}^{2+}$ and BMPO(ICSD#59253).

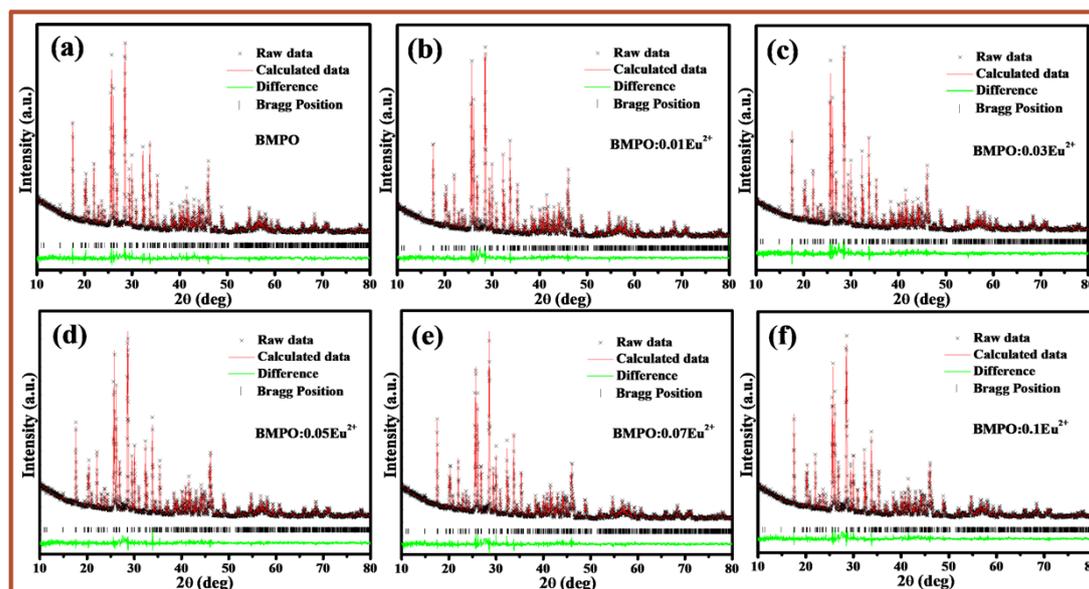


Fig. S2(a-f) Rietveld refinement results of BMPO: $y\text{Eu}^{2+}$ ($y=0, 0.01, 0.03, 0.05, 0.07, 0.1$).

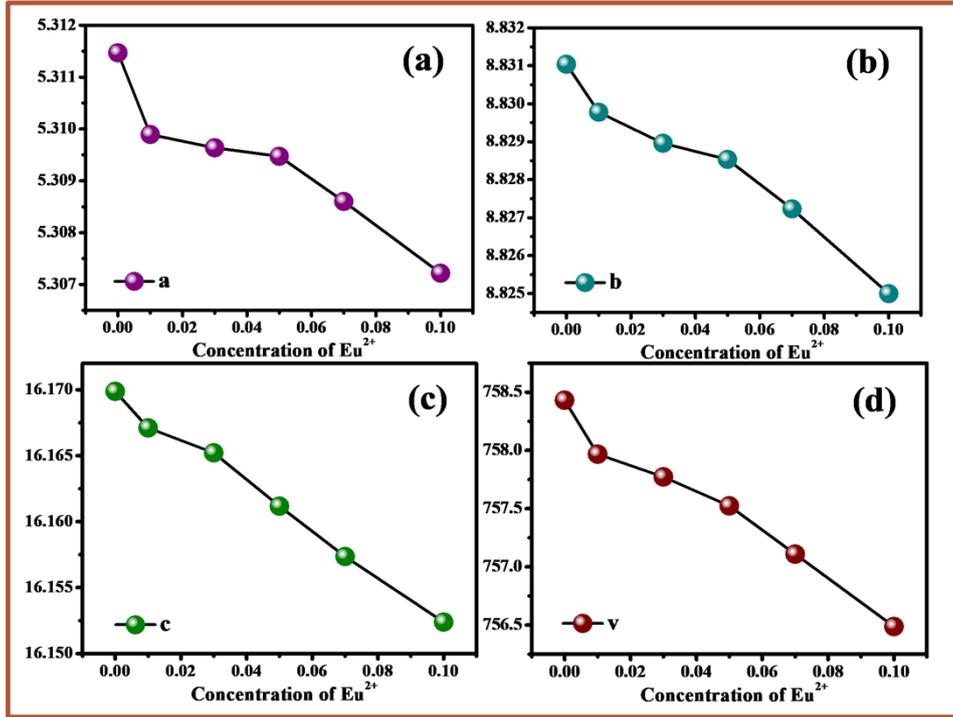


Fig. S3(a-d) Evolution of lattice parameters a, b, c and the unit cell volume V of $\text{Ba}_2\text{Mg}(\text{PO}_4)_2:y\text{Eu}^{2+}$ ($y=0, 0.01, 0.03, 0.05, 0.07, 0.1$).

Table S1 The refined parameters of $\text{Ba}_2\text{Mg}(\text{PO}_4)_2$ and standard card of $\text{Ba}_2\text{Mg}(\text{PO}_4)_2$ (ICSD #59253)

	$\text{Ba}_2\text{Mg}(\text{PO}_4)_2$ (ICSD #59253)	$\text{Ba}_2\text{Mg}(\text{PO}_4)_2$
Space group	P121/n1	P121/n1
Symmetry	Monoclinic	Monoclinic
a(Å)	5.294	5.311
b(Å)	8.837	8.831
c(Å)	16.1430	16.16
V(Å ³)	755.18	758.43
α (deg)	90	90
β (deg)	90	90
γ (deg)	90	90
Z	4	4
R _p	-	6.71%
R _{wp}	-	8.90%
χ^2	-	1.916

Table S2 The refined parameters of Ba₂Mg(PO₄)₂: yEu²⁺(y=0, 0.01, 0.03, 0.05, 0.07, 0.1)

	y = 0	y = 0.01	y = 0.03	y = 0.05	y = 0.07	y = 0.1
Space group	P121/n1	P121/n1	P121/n1	P121/n1	P121/n1	P121/n1
χ^2	1.916	1.943	1.935	1.540	1.657	1.864
R _p	6.71%	6.29%	6.45%	5.86%	6.07%	6.3%
R _{wp}	8.90%	8.78%	8.85%	7.96%	8.16%	8.53%
α (deg)	90	90	90	90	90	90
β (deg)	90	90	90	90	90	90
a(Å)	5.311469	5.309893	5.309635	5.309472	5.308600	5.307217
b(Å)	8.831038	8.829777	8.828957	8.828533	8.827232	8.824997
c(Å)	16.169868	16.167109	16.165216	16.161179	16.157356	16.152388
V(Å ³)	758.431	757.968	757.772	757.524	757.109	756.487