Electronic Supplementary Information for

Syntheses and luminescence of $La_{1-x}Eu_x[B_8O_{11}(OH)_5]$ and β-$La_{1-x}Eu_xB_5O_9$ ($0 \leq x \leq 0.135$)

Xiaorui Sun,[a] Wenliang Gao,[a] Rihong Cong,[a] Tao Yang[a*]*

[a]College of Chemistry and Chemical Engineering, Chongqing University, Chongqing

400044, P. R. China

*Correspondence authors, email: congrihong@cqu.edu.cn, taoyang@cqu.edu.cn; Tel:

+86-23-65105065.

Table S1 Unit cell parameters (in the space group $P2_1/n$) of $La_{1-x}Eu_x[B_8O_{11}(OH)_5]$ ($0.01 \leq x \leq 0.135$) obtained from Le Bail fitting of the whole powder XRD patterns.

x in $La_{1-x}Eu_x[B_8O_{11}(OH)_5]$	a (Å)	b (Å)	c (Å)	β (°)	V(Å³)
0	9.923	14.325	8.040	89.90	1142.9
0.010	9.924	14.326	8.040	89.89	1143.0
0.025	9.914	14.322	8.028	89.77	1140.0
0.040	9.910	14.316	8.026	89.79	1138.7
0.055	9.909	14.310	8.012	89.90	1136.1
0.070	9.908	14.302	8.009	89.87	1134.9
0.085	9.905	14.282	8.004	89.82	1132.2
0.100	9.902	14.273	8.000	89.90	1130.7
0.135	9.895	14.246	7.986	89.86	1125.7

Table S2 Unit cell parameters (in the space group $P2_1/c$) of β-$La_{1-x}Eu_xB_5O_9$ ($0.01 \leq x \leq 0.135$) obtained from Le Bail fitting of the whole powder XRD patterns.

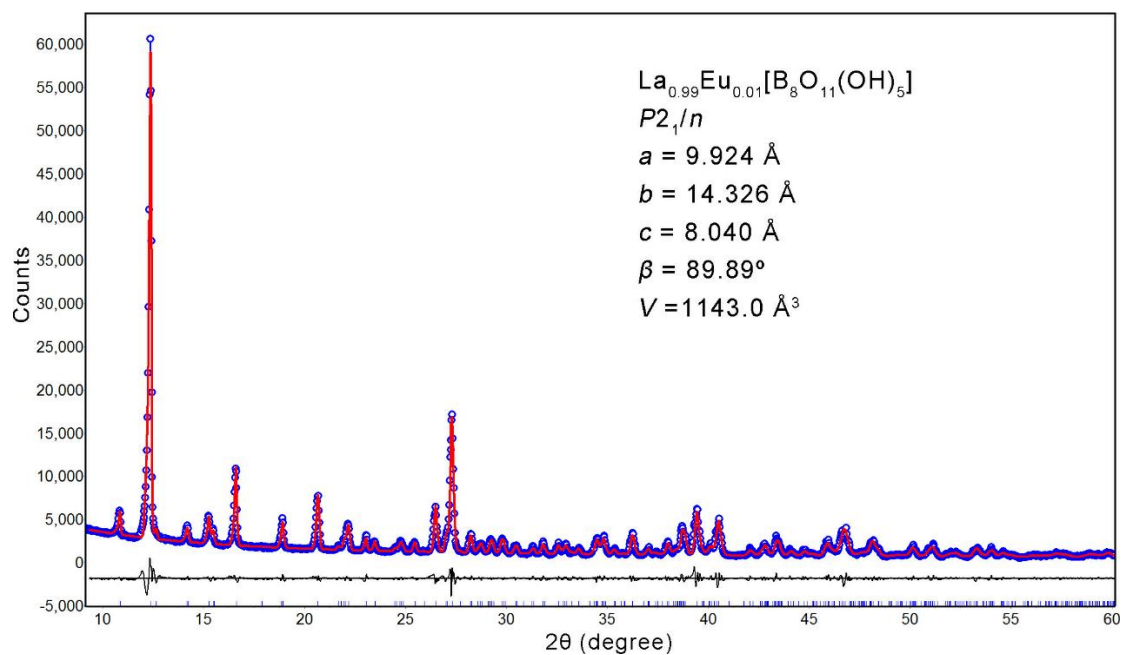| x in β-$La_{1-x}Eu_xB_5O_9$	a (Å)	b (Å)	c (Å)	β (°)	V (Å³)
0.01	6.445	11.695	8.177	105.18	594.8
0.01	6.444	11.693	8.175	105.17	594.6
0.025	6.443	11.689	8.173	105.18	594.0
0.04	6.441	11.684	8.170	105.19	593.3
0.055	6.440	11.682	8.170	105.20	593.1
0.07	6.439	11.680	8.168	105.20	592.9
0.085	6.438	11.677	8.166	105.20	592.5
0.1	6.437	11.675	8.165	105.21	592.1
0.135	6.435	11.670	8.162	105.21	591.4

Fig. S1 A representative of Le Bail fitting for as-prepared $La_{0.99}Eu_{0.01}[B_8O_{11}(OH)_5]$. The blue symbol ○ represents observed data and the red solid line is the calculated pattern; the blue marks below the diffraction patterns are the expected reflection positions, and the difference curve is also shown as black curves at the bottom.
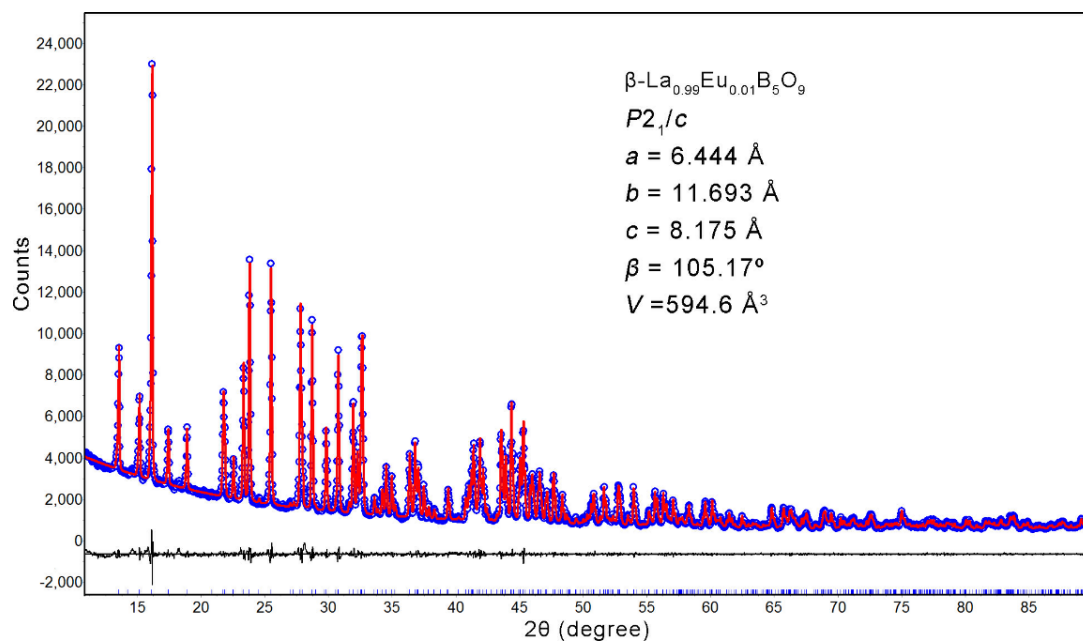

Fig. S2 A representative of Le Bail fitting for as-prepared β-$La_{0.99}Eu_{0.01}B_5O_9$.
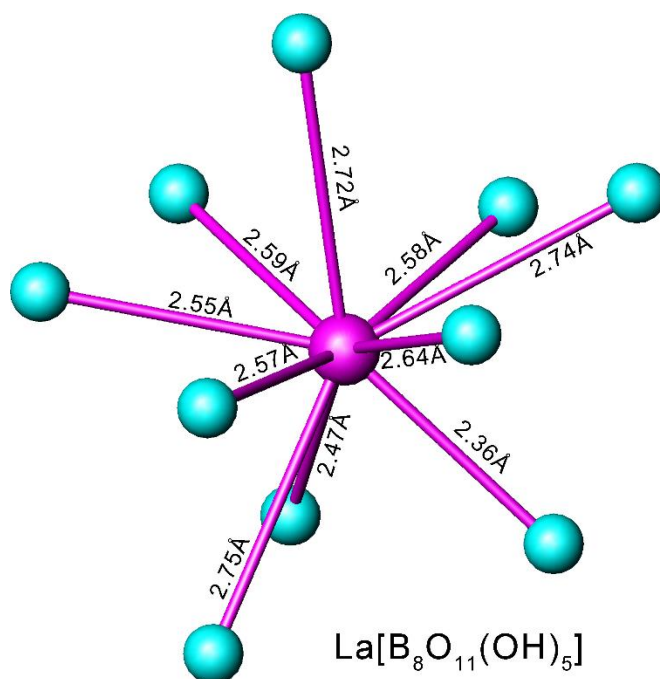
Fig. S3 The coordination environment of La^{3+} in $La[B_8O_{11}(OH)_5]$, purple and cyan spheres represent La and O, respectively. Bond distances are all highlighted.

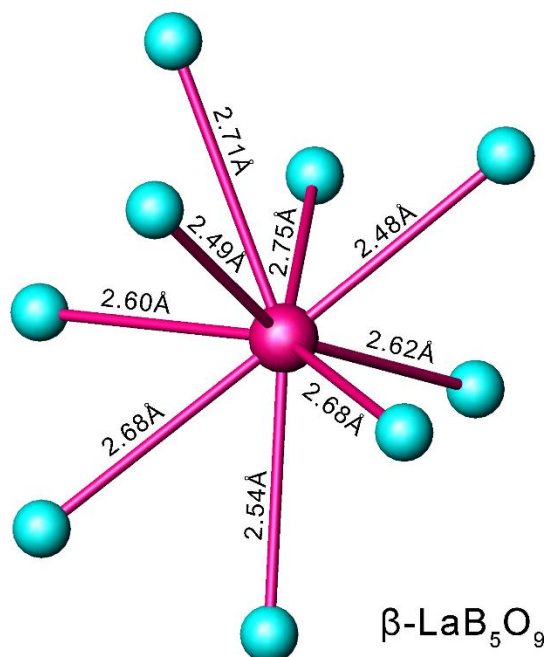

Fig. S4 The coordination environment of La^{3+} in $\beta\text{-}LaB_5O_9$. Red and cyan spheres represent La and O, respectively. Bond distances are all highlighted.