

Electronic Supplementary Information (ESI)

**Controllable optical tuning and improvement in Li^+ , Eu^{3+} -codoped
 $\text{BaSc}_2\text{O}_4\text{:Bi}^{3+}$ based on energy transfer and charge compensation**

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Table S1. Bond distances between the Ba atoms and O atoms in BaSc₂O₄:5%Bi³⁺ sample.

Ba1-O _i		Ba2-O _i	
Bond	Length (Å)	Bond	Length (Å)
Ba1-O1	2.6878	Ba2-O1	2.8441
Ba1-O1	3.1358	Ba2-O2	2.9441
Ba1-O2	3.1445	Ba2-O2	2.8756
Ba1-O2	3.1445	Ba2-O3	2.8366
Ba1-O2	2.6640	Ba2-O3	2.9558
Ba1-O2	2.6640	Ba2-O4	2.7830
Ba1-O3	2.8883	Ba2-O4	2.9891
Ba1-O3	2.8883	Ba2-O5	2.6181
Ba1-O4	3.1816	Ba2-O5	3.2212
Ba1-O4	3.1816	Ba2-O6	3.3807
Ba1-O5	3.0660	Ba2-O6	3.8119
Ba1-O5	3.0660	Ba2-O7	3.3325
Average Ba1-O	2.9760	Average Ba2-O	3.0494

Table S2. Bond distances between the Sc atoms and O atoms in BaSc₂O₄:5%Bi³⁺ sample.

Sc1-O _i		Sc2-O _i		Sc3-O _i	
Bond	Length(Å)	Bond	Length(Å)	Bond	Length (Å)
Sc1-O1	2.0822	Sc2-O3	2.5751	Sc3-O3	1.7961
Sc1-O2	1.5262	Sc2-O4	2.1361	Sc3-O4	2.0262
Sc1-O2	2.6161	Sc2-O5	2.1939	Sc3-O5	2.1931
Sc1-O3	2.4681	Sc2-O6	2.2301	Sc3-O6	2.3662
Sc1-O4	2.2081	Sc2-O6	1.9161	Sc3-O6	2.1841
Sc1-O5	1.9792	Sc2-O7	2.0701	Sc3-O7	2.6702
Average Sc1-O	2.1467	Average Sc2-O	2.1869	Average Sc3-O	2.2060

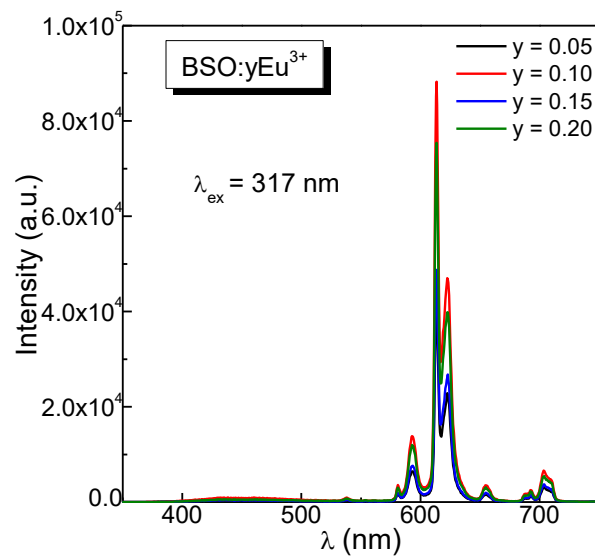


Figure S1. The PL spectra of BSO:yEu³⁺ ($y = 0.05$ - 0.20) samples under excitation at 317 nm.

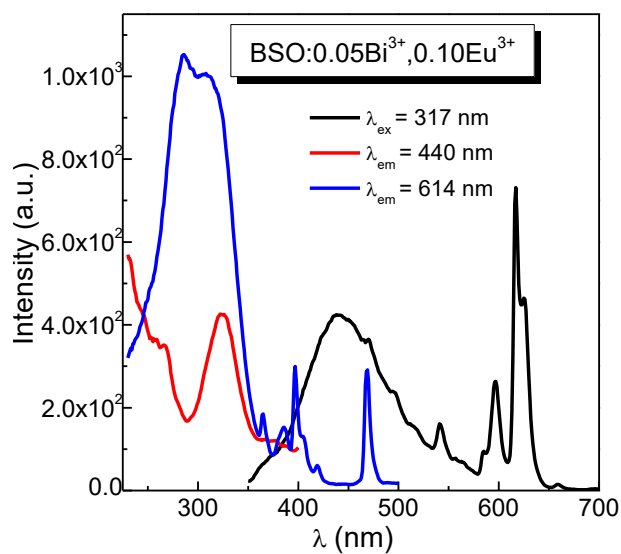


Figure S2. The PL and PLE spectra of BSO:0.05Bi³⁺,0.10Eu³⁺ sample.