

Supplementary Information

Table S1 Structure parameter of $\text{Na}_{1.75}\text{Al}_{1.75}\text{Si}_{0.25}\text{O}_4:\text{Eu}^{2+}$ phosphor, the number of Na site and site-symmetry for given coordination number (CN) with various x values

x	Na site	Site -symmetry		CN
0.25	4	Na1-Na4	1	10
0.35	3	Na1-Na2	2	10
		Na3	1	12
0.55	8	Na1- Na4	3	9
		Na5- Na8	1	8

Table S2 Gaussian component of $\text{Na}_{1.75}\text{Al}_{1.75}\text{Si}_{0.25}\text{O}_4:\text{Eu}^{2+}$ phosphor ($x = 0.25$) with various Eu^{2+} concentration.

Eu^{2+} concentration	Eu1		Eu2		Eu3		Eu4	
	$\lambda_{\text{centered}}$ (nm)	I_{relative}	$\lambda_{\text{centered}}$ (nm)	I_{relative}	$\lambda_{\text{centered}}$ (nm)	I_{relative}	$\lambda_{\text{centered}}$ (nm)	I_{relative}
0.01	466	0.65	502	0.61	555	0.21	602	0.14
0.02	461	0.50	490	0.52	533	0.33	603	0.22
0.03	467	0.60	501	0.46	561	0.43	637	0.25
0.04	467	0.65	505	0.45	564	0.52	644	0.28
0.05	470	0.61	510	0.57	580	0.49	652	0.30
0.06	463	0.45	507	0.51	564	0.65	647	0.27

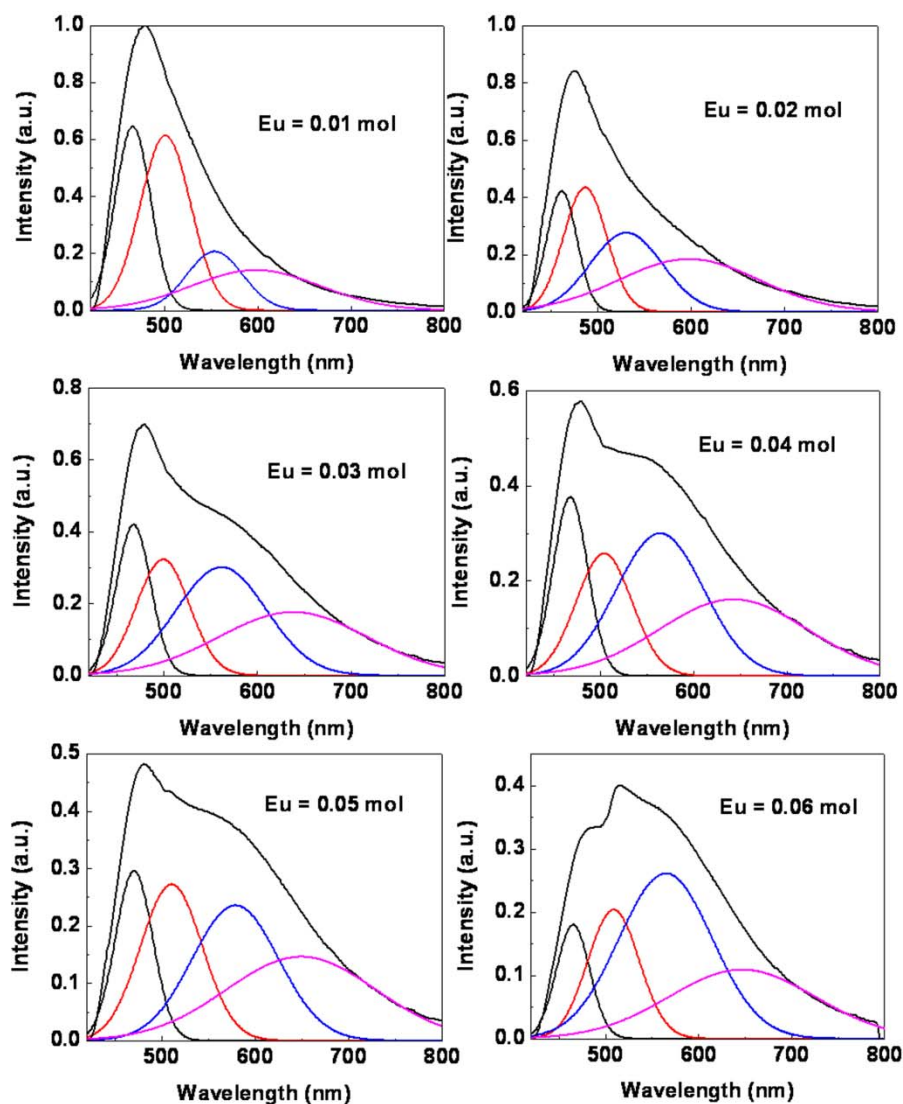


Figure S1 Relative emission spectra and Gaussian components of $\text{Na}_{1.75}\text{Al}_{1.75}\text{Si}_{0.25}\text{O}_4:\text{Eu}^{2+}$ phosphor as a function of Eu^{2+} concentration from 0.01 mol to 0.06 mol.

The reason for asymmetric emission band of $\text{Na}_{1.75}\text{Al}_{1.75}\text{Si}_{0.25}\text{O}_4:\text{Eu}^{2+}$ phosphor can be explained by relative intensity among the four Gaussian components (Eu1 –Eu4). There are four substitutional sites of Na^+ ion for Eu^{2+} ion. As shown in Fig. S1 the each deconvoluted Gaussian components indicates the transition of Eu^{2+} in $\text{Na}_{1.75}\text{Al}_{1.75}\text{Si}_{0.25}\text{O}_4:\text{Eu}^{2+}$ phosphor. By substitution of Na^+ sites with Eu^{2+} ion (with increasing Eu^{2+} concentration), the relative intensity among the four Gaussian components changed as shown in Fig. S1 and the central wavelength ($\lambda_{\text{centered}}$) and relative intensity (I_{relative}) with Eu^{2+} concentration was indicated in Table S2. With increasing Eu^{2+} concentration, the intensities originated from Eu3 and Eu4 increased relatively and it affected change of emission shape.