

Correlating Doping with Stability and Color Rendition of Red Phosphors

Shuqin Chang^a, Jipeng Fu^{a,b*}, Kaina Wang^b, Xuan Sun^{a,b}, Yingying Ma^a, Guangcan Bai^c,

Guoquan Liu^c, Yonggang Wang^a, and Mingxue Tang^{a*}

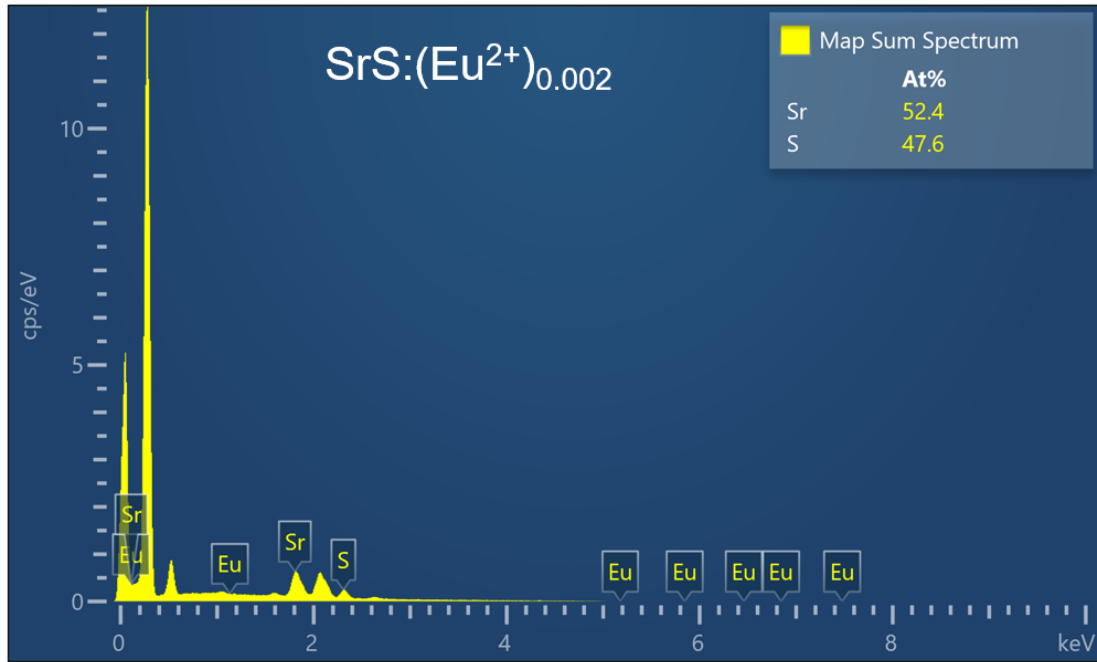


Figure S1. The average atomic ratio of SrS:(Eu²⁺)_{0.002}.

Table S1. FWHM, CIE chromaticity coordinate values (CIE-x, CIE-y), CCT and color purity of SrS:(Eu²⁺)_n.

Sample	FWHM (nm)	CIE-x	CIE-y	CCT (K)	Color purity (%)
n = 0.0005	78.0	0.6271	0.3723	1992	100.01
n = 0.001	76.8	0.6316	0.3679	2080	100.02
n = 0.002	76.5	0.6357	0.3639	2173	99.94
n = 0.005	76.3	0.6445	0.3551	2429	100.07
n = 0.01	76.2	0.6517	0.3480	2696	99.9
n = 0.02	75.0	0.6584	0.3413	3002	99.77
n = 0.03	75.4	0.6571	0.3425	2942	100.42
n = 0.05	74.5	0.6589	0.3408	3028	99.92

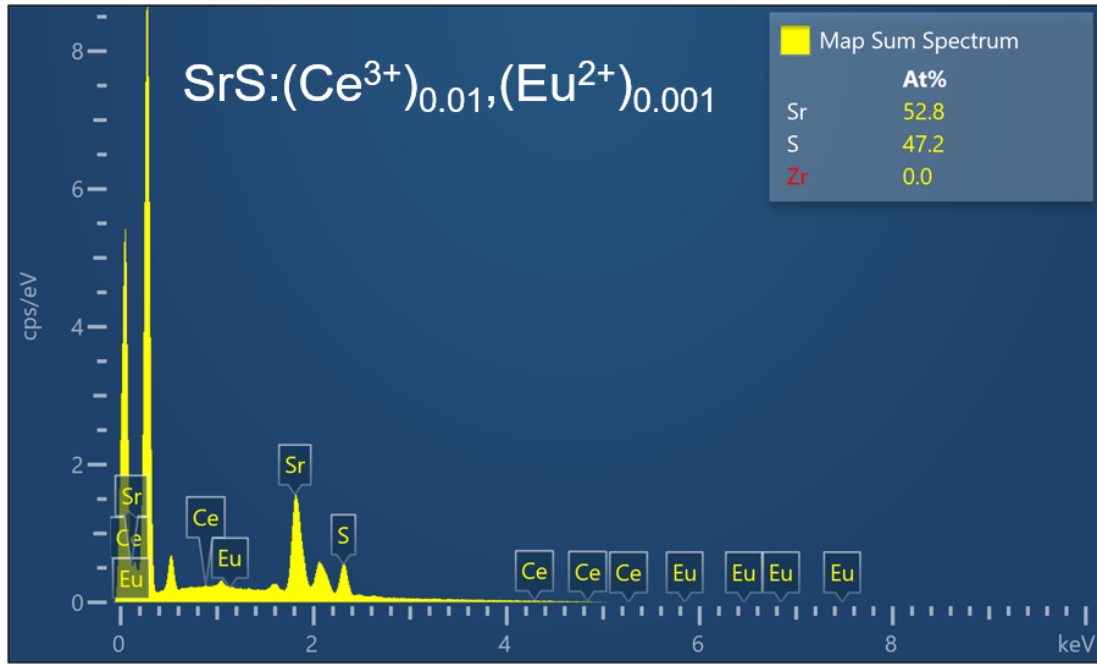


Figure S2. The average atomic ratio of SrS:(Ce³⁺)_{0.01},(Eu²⁺)_{0.001}.

Table S2. FWHM, CIE chromaticity coordinate values (CIE-x, CIE-y), CCT and color purity of SrS:(Ce³⁺)_{0.01},(Eu²⁺)_n.

Sample	FWHM (nm)	CIE-x	CIE-y	CCT (K)	Color purity (%)
n = 0.0001	83.5	0.5045	0.4022	2139	72.81
n = 0.0005	78.8	0.5918	0.385	1764	92.71
n = 0.001	78.0	0.6194	0.3742	1925	98.83
n = 0.005	83.5	0.6393	0.3598	2277	99.74
n = 0.01	75.8	0.6464	0.3531	2497	99.46
n = 0.1	83.5	0.6559	0.3426	2920	100.05

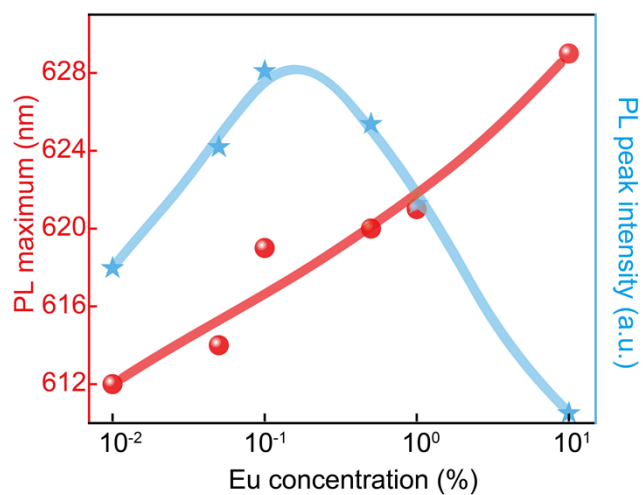


Figure S3. Dependence of PL maximum position and PL peak intensity on Eu²⁺ concentration of SrS:(Ce³⁺)_{0.01}(Eu²⁺)_n, respectively. The curves in (e) are guided by eye.

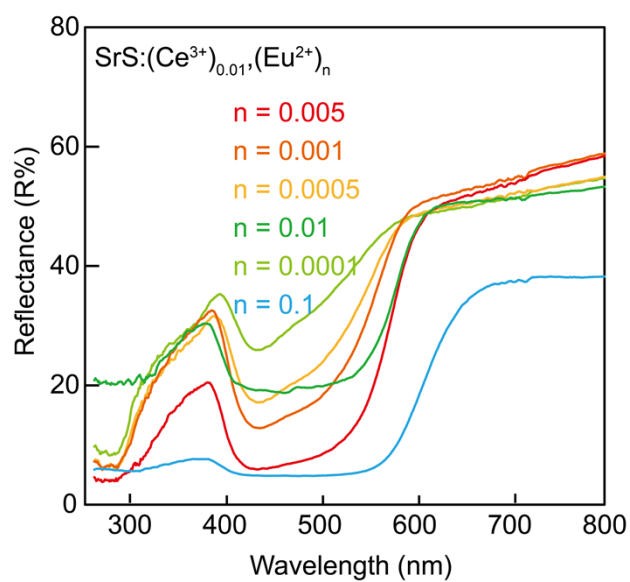


Figure S4. Diffuse reflection spectra of SrS:(Ce³⁺)_{0.01}(Eu²⁺)_n.

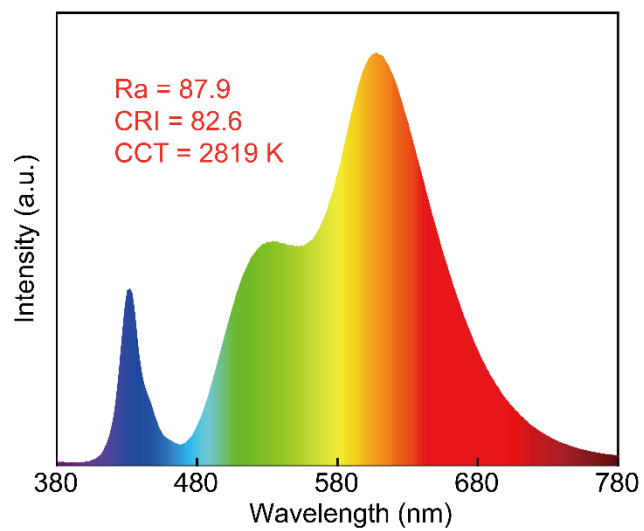


Figure S5. Electroluminescence spectrum of SrS:(Eu²⁺)_{0.05} phosphor-based wLED under a current of 99.94 mA and a voltage of 2.821 V.