Supporting Information

**Photoluminescence of (La,Eu)2O2SO4 red-emitting phosphors derived from layered hydroxide**

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**FIG. S1**. The calculated lattice spacing *d*111 (a) and *d*002 (b) of the LRHs.

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**FIG. S2.** (a) Fluorescence decay kinetics of the 617 nm emission for the (La0.95Eu0.05)2O2SO4 red phosphors calcined at different temperatures (excitation: 284 nm) in single-exponential mode; (b) The semi-log (log *I* –*t*) plots of the decay data. The calcination temperature, derived fluorescence lifetime (τ), and the Chi-square (χ2) factor of exponential fitting are indicted in the fig. S2 (a). For the lifetime, the number in bracket represents standard deviation. The experimental data are in black and the results of exponential fitting are in red.

**TABLE SI.** Lattice constants and crystallite sizes of (La1-*x*Eu*x*)2O2SO4 red phosphors.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| sample | constant *a* (nm) | constant *b* (nm) | constant *c* (nm) | crystallite size (nm) |
| *x*=0.01 | 1.4307(0.0210) | 0.4270(0.0029) | 0.8358(0.0153) | 48 |
| *x*=0.03 | 1.4276(0.0219) | 0.4264(0.0030) | 0.8348(0.0160) | 49 |
| *x*=0.05 | 1.4273(0.0240) | 0.4263(0.0033) | 0.8343(0.0175) | 45 |
| *x*=0.07 | 1.4246(0.0268) | 0.4255(0.0037) | 0.8332(0.0196) | 49 |
| *x*=0.09 | 1.4224(0.0314) | 0.4252(0.0048) | 0.8320(0.0234) | 47 |



**FIG. S3.** Lattice constants of the (La1-*x*Eu*x*)2O2SO4 solid solutions, as a function of the Eu3+ content (the *x* value).

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**FIG. S4.** PLE spectra of the (La1-*x*Eu*x*)2O2SO4 red phosphors calcined at 1200 oC. The spectra are obtained by monitoring the 617 nm emission.

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**FIG. S5.** (a) Fluorescence decay kinetics of the 617 nm emission for the (La1-*x*Eu*x*)2O2SO4 red phosphors calcined at 1200 oC with holding time of 1 h in single-exponential mode; (b) The semi-log (log *I* –*t*) plots of the decay data. The *x* value, derived fluorescence lifetime (τ), and the Chi-square (χ2) factor of exponential fitting are indicted in the fig. S5 (a). For the lifetime, the number in bracket represents standard deviation. The experimental data are in black and the results of exponential fitting are in red.