

## **Supplementary Information**

### **Trap distribution tailoring guided design of a super-long persistent phosphor $\text{Ba}_2\text{SiO}_4\text{:Eu}^{2+}, \text{Ho}^{3+}$ and photostimulable luminescence for optical information storage**

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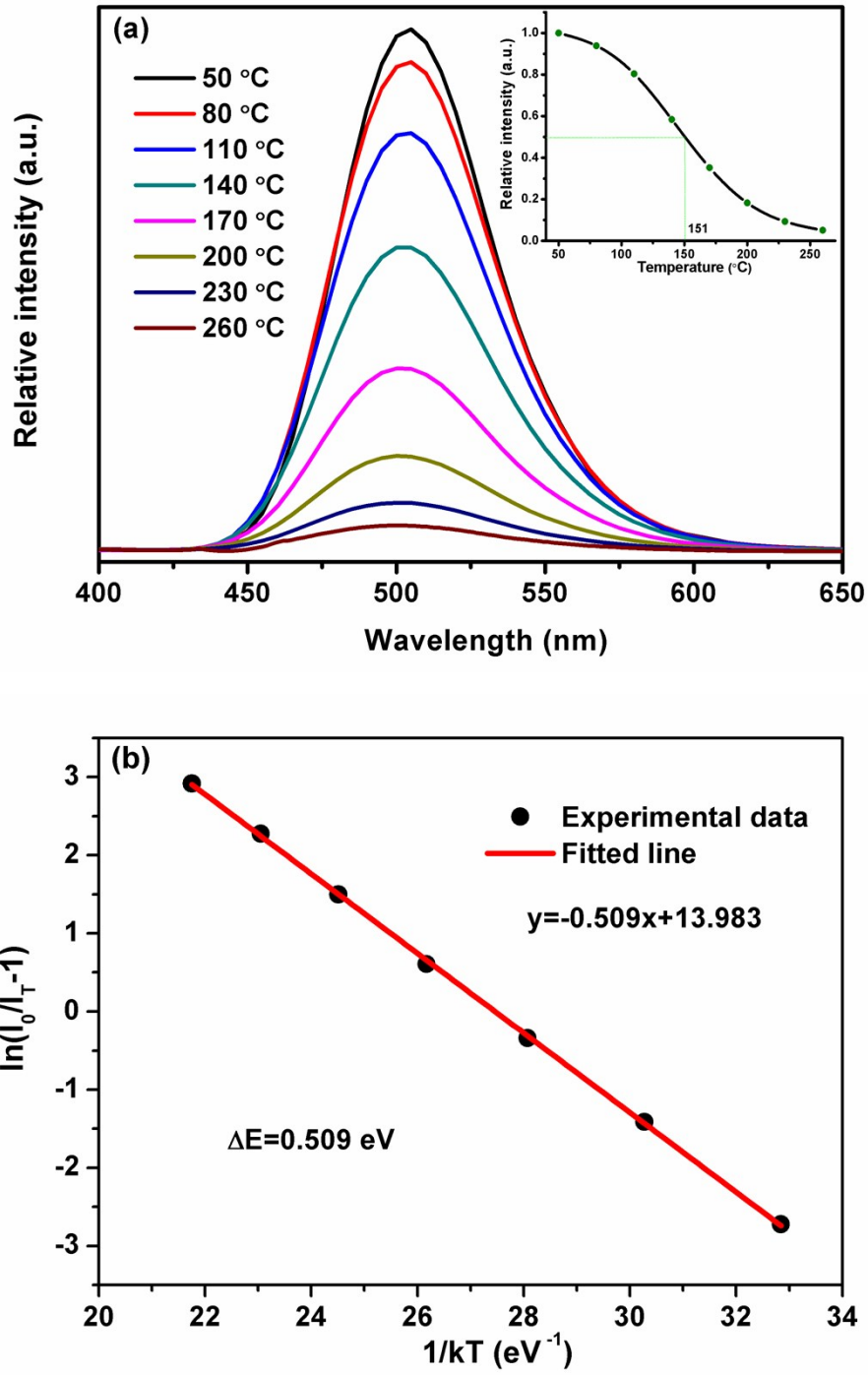
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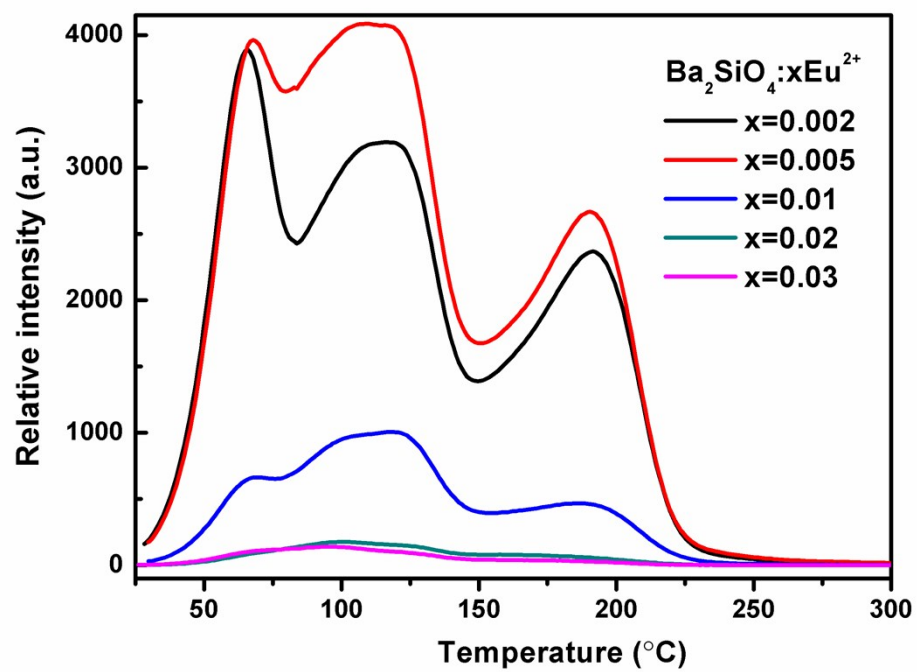
**Table S1.** Refined structure parameters of Ba<sub>2</sub>SiO<sub>4</sub>:0.005Eu<sup>2+</sup> derived from the

Rietveld refinement of X-ray diffraction data.

| Atom                                                                                                                                                                                                                 | Wyckoff<br>position | x      | y      | z      | Frac   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------|--------|--------|--------|
| <b>Ba1</b>                                                                                                                                                                                                           | 4c                  | 0.2500 | 0.0864 | 0.1610 | 1.0000 |
| <b>Ba2</b>                                                                                                                                                                                                           | 4c                  | 0.2500 | 0.6945 | 0.0081 | 1.0000 |
| <b>Si</b>                                                                                                                                                                                                            | 4c                  | 0.2500 | 0.4200 | 0.2282 | 1.0000 |
| <b>O1</b>                                                                                                                                                                                                            | 4c                  | 0.2500 | 0.5705 | 0.3097 | 1.0000 |
| <b>O2</b>                                                                                                                                                                                                            | 8d                  | 0.0195 | 0.3479 | 0.3051 | 1.0000 |
| <b>O3</b>                                                                                                                                                                                                            | 4c                  | 0.2500 | 0.4159 | 0.0130 | 1.0000 |
| Cell parameters: a = 5.805 Å, b = 10.204 Å, c = 7.497 Å, V = 444.064 Å <sup>3</sup> , Z = 4;<br>space group: pmcn (no.62); Reliability factors: R <sub>wp</sub> = 9.89%, R <sub>p</sub> = 9.51% and $\chi^2$ = 1.407 |                     |        |        |        |        |



**Fig. S1** (a) Emission spectra of  $\text{Ba}_2\text{SiO}_4:0.005\text{Eu}^{2+}, 0.01\text{Ho}^{3+}$  at temperature between 50 and 260 °C. Inset: the temperature dependence of the relative emission intensity of  $\text{Ba}_2\text{SiO}_4:0.005\text{Eu}^{2+}, 0.01\text{Ho}^{3+}$ ; (b) relationship of  $\ln(I_0/I_T - 1)$  versus  $1/kT$  for  $\text{Ba}_2\text{SiO}_4:0.005\text{Eu}^{2+}, 0.01\text{Ho}^{3+}$  based on Eq. (2).



**Fig. S2** TL spectra of  $\text{Ba}_2\text{SiO}_4:\text{xEu}^{2+}$  ( $x = 0.002\text{-}0.03$ ) phosphors.