

## Supporting Information

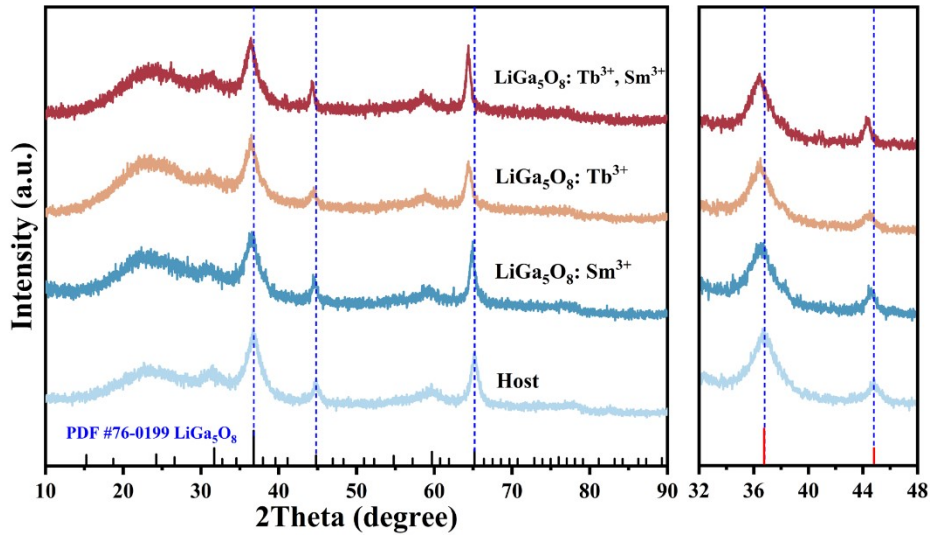
### **Multi-color afterglow of the $\text{LiGa}_5\text{O}_8$ : $\text{Tb}^{3+}/\text{Sm}^{3+}$ co-doped gallosilicate glass via energy transfer and trap sharing for optical anti-counterfeiting**

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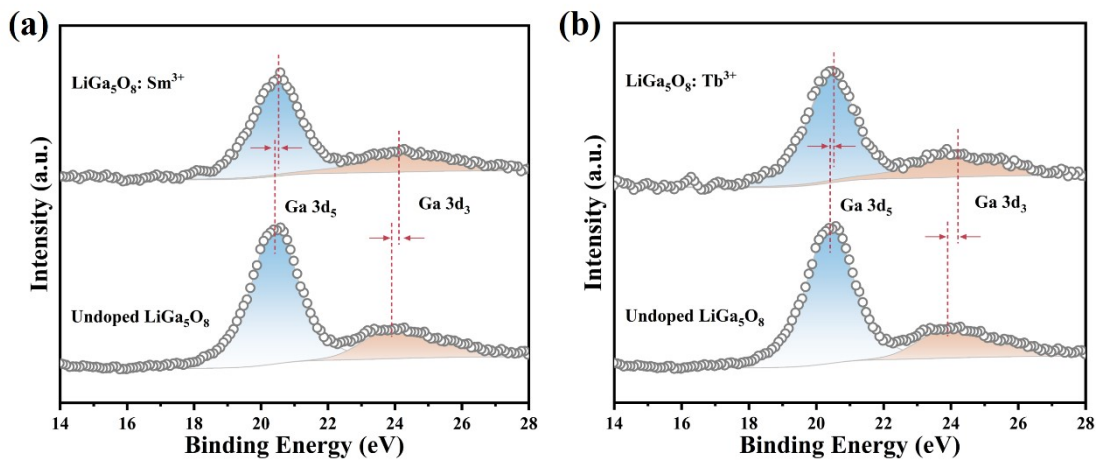
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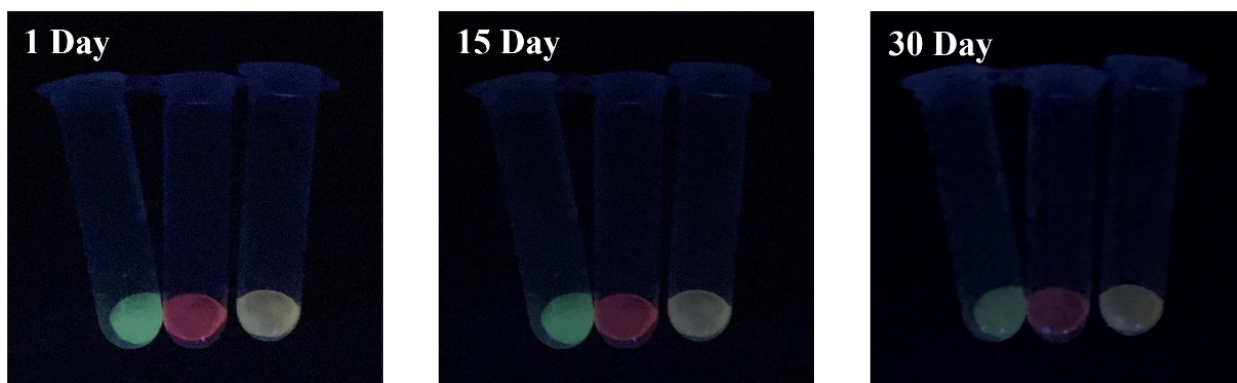
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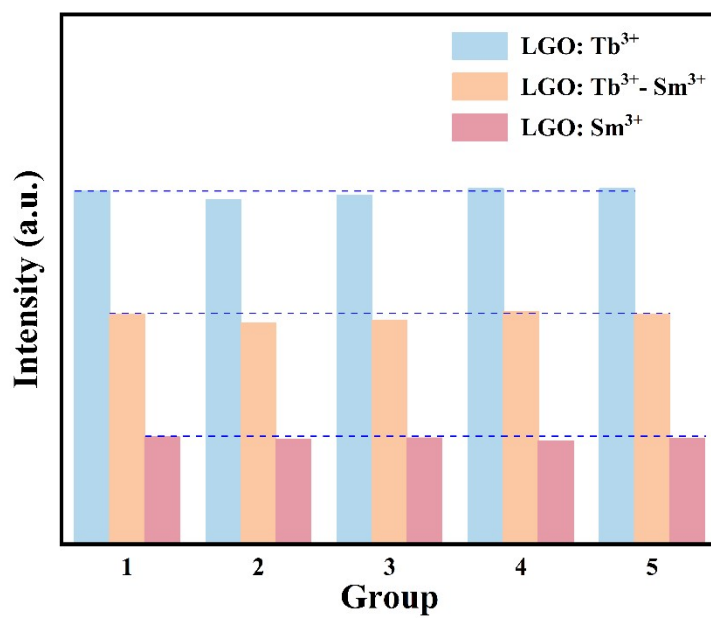
**Figure S1** The detailed XRD results of  $\text{LiGa}_5\text{O}_8: x\text{Tb}^{3+}, y\text{Sm}^{3+}$  samples in the range of  $32\text{-}48^\circ$



**Figure S2** (a) The high-resolution Ga 3d XPS spectra of undoped and  $\text{Sm}^{3+}$  singly-doped samples. (b) The high-resolution Ga 3d XPS spectra of undoped and  $\text{Tb}^{3+}$  singly-doped samples.



**Figure S3** Afterglow photographs of the three GCs samples in water for days



**Figure S4** Average afterglow intensity of the samples after a hundred heating cycles

**Table. S1** The Ga 3d binding energy of the four GCs samples.

No.	Type of samples	Ga 3d <sub>5</sub>	Ga 3d <sub>3</sub>
I	Undoped	20.35	23.84
II	Sm <sup>3+</sup> singly-doped	20.42	24.12
III	Tb <sup>3+</sup> singly-doped	20.40	24.21
IV	Tb <sup>3+</sup> -Sm <sup>3+</sup> doubly-doped	20.56	24.41