Supporting Information

Stabilize Divalent Eu^{2+} in Fluorosilicate Glass-ceramics via Lattice Site Substitution

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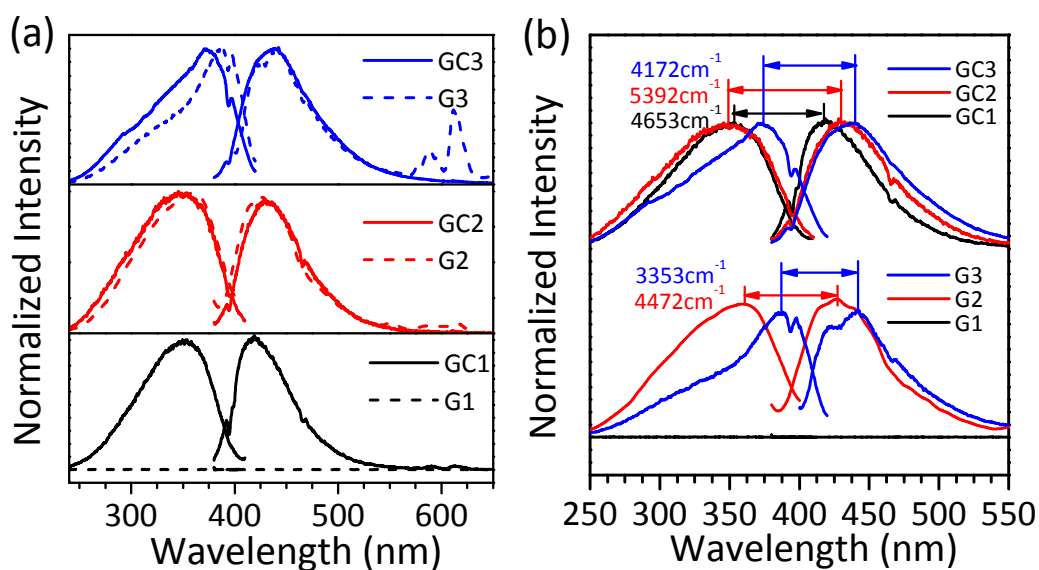*† Corresponding author. Email: Qiaoxus@zju.edu.cn*

Figure S1 (a) Comparison between PL spectra of the glass and glass ceramics samples. The divergence of stokes shift between glass and glass ceramics samples is due to the Eu^{2+}-coordination difference between amorphous and crystalline environment. **(b)** Comparison between PL spectra of Eu2+ doped glasses and glass-ceramics containing MF2 (M = Ca, Sr, Ba) nanocrystals. The stokes shift of Eu^{2+} in the glass-ceramics differs with the precipitation of different nanocrystals due to the coordination environmental difference in MF2 (M = Ca, Sr, Ba) nanocrystals.
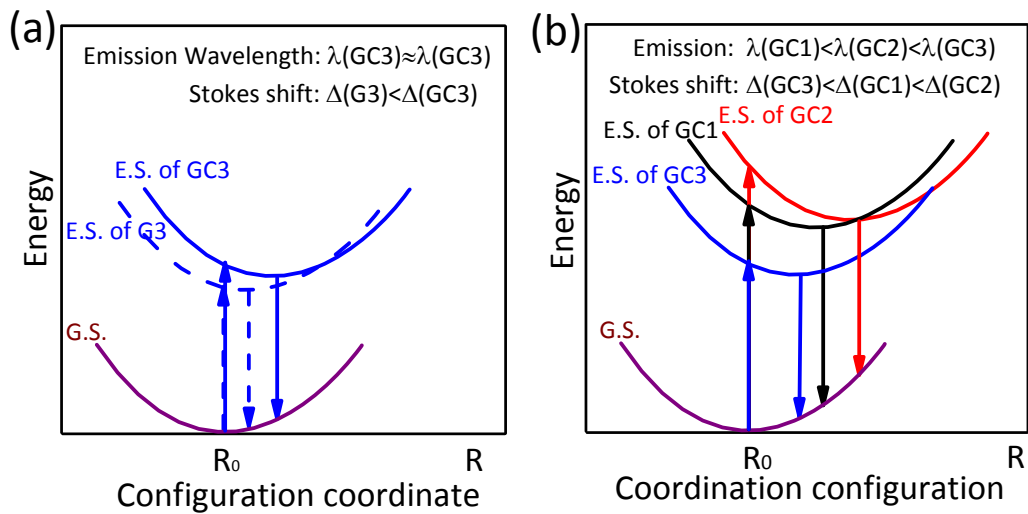
Figure S2 Simplified energy diagrams with configuration coordinate. It revealed that (a) For G3 and GC3, $\lambda ex(G3) < \lambda ex(GC3)$, $\lambda em(G3) \approx \lambda em(GC3)$, $\Delta stokes(G3) < \Delta stokes(GC3)$. (b) For GC1-3, $\lambda ex(GC2) < \lambda ex(GC1) < \lambda ex(GC3)$, $\lambda em(G1) < \lambda em(GC2) < \lambda em(GC3)$, $\Delta stokes(G3) < \Delta stokes(GC1) < \Delta stokes(GC2)$.
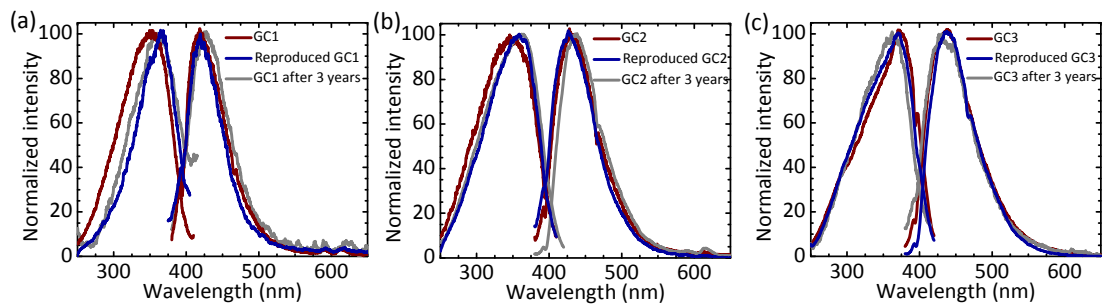

Figure S3 The reproducibility and luminescence stability of Eu2+ doping glass ceramics samples prepared by lattice substitution. (a)PL spectra of GC1, reproduced GC1 and GC1 after 3 years. (b)PL spectra of GC2 reproduced GC2 and GC2 after 3 year. (c)PL spectra of GC3, reproduced GC3 and GC3 after 3 years.