Design and tuning of Cr^{3+}-doped near-infrared phosphors for multifunctional applications via crystal field engineering

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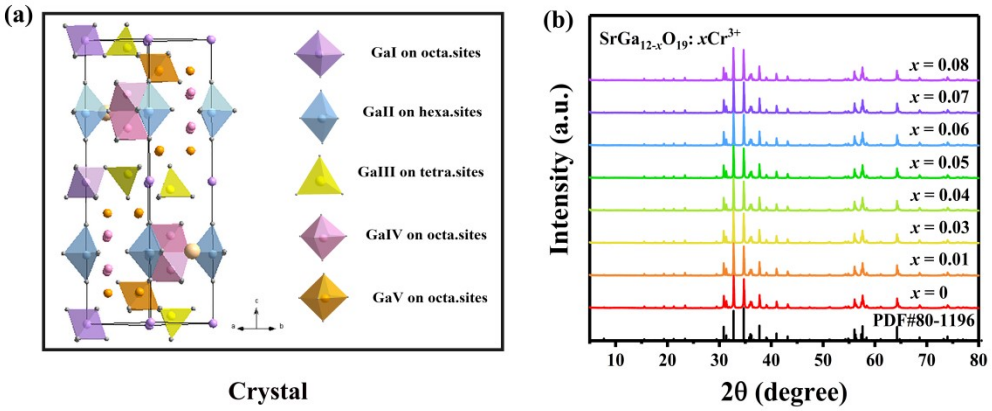

Figure S1 (a) Crystal structure of $SrGa_{12}O_{19}$. (b) XRD patterns of SGO: x Cr^{3+} ($0 \leq x \leq 0.08$) samples and standard data of SGO phase (PDF No. 80-1196).

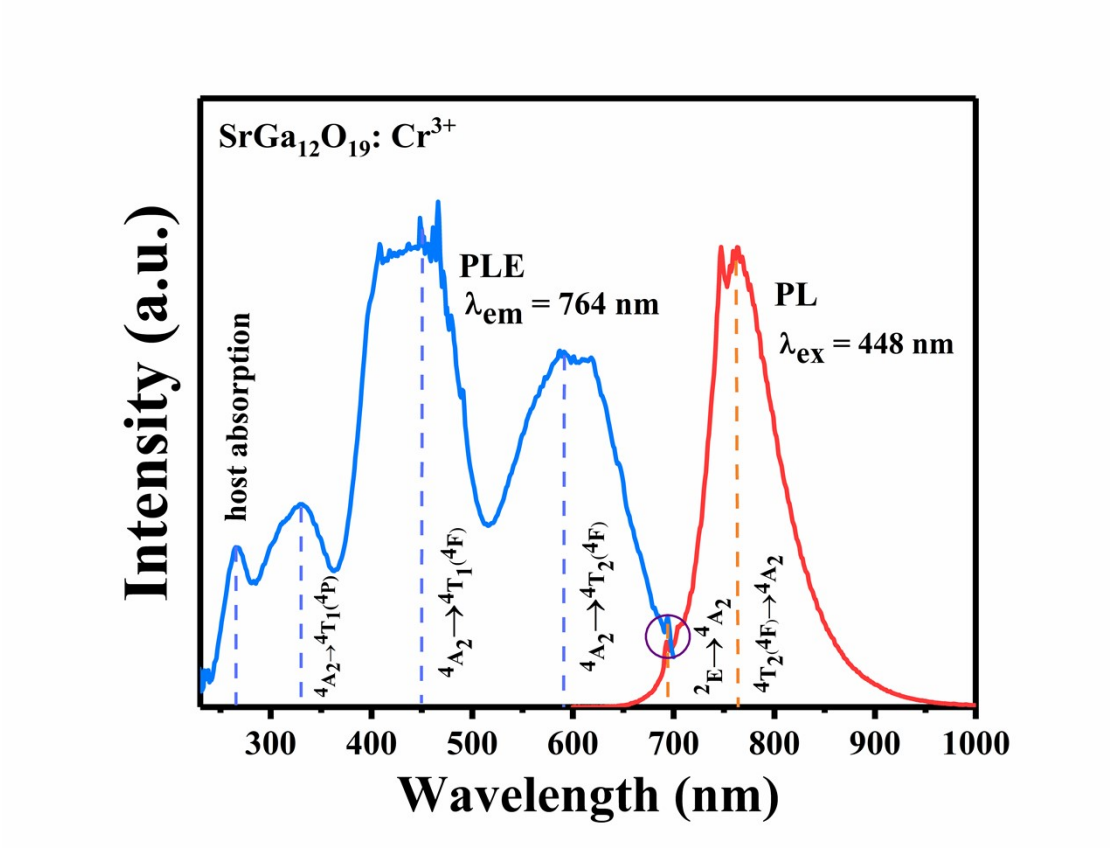

Figure S2 PL and PLE spectra of SGO: Cr^{3+}.

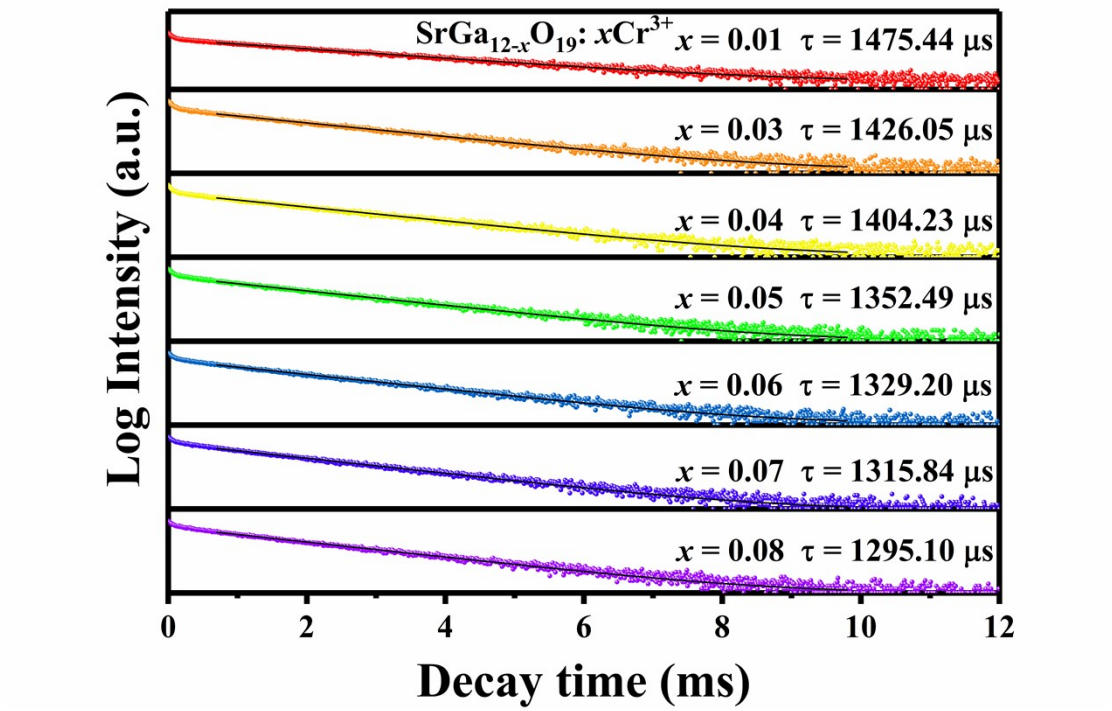

Figure S3 Decay curves of SGO: xCr^{3+} ($0 \leq x \leq 0.08$).

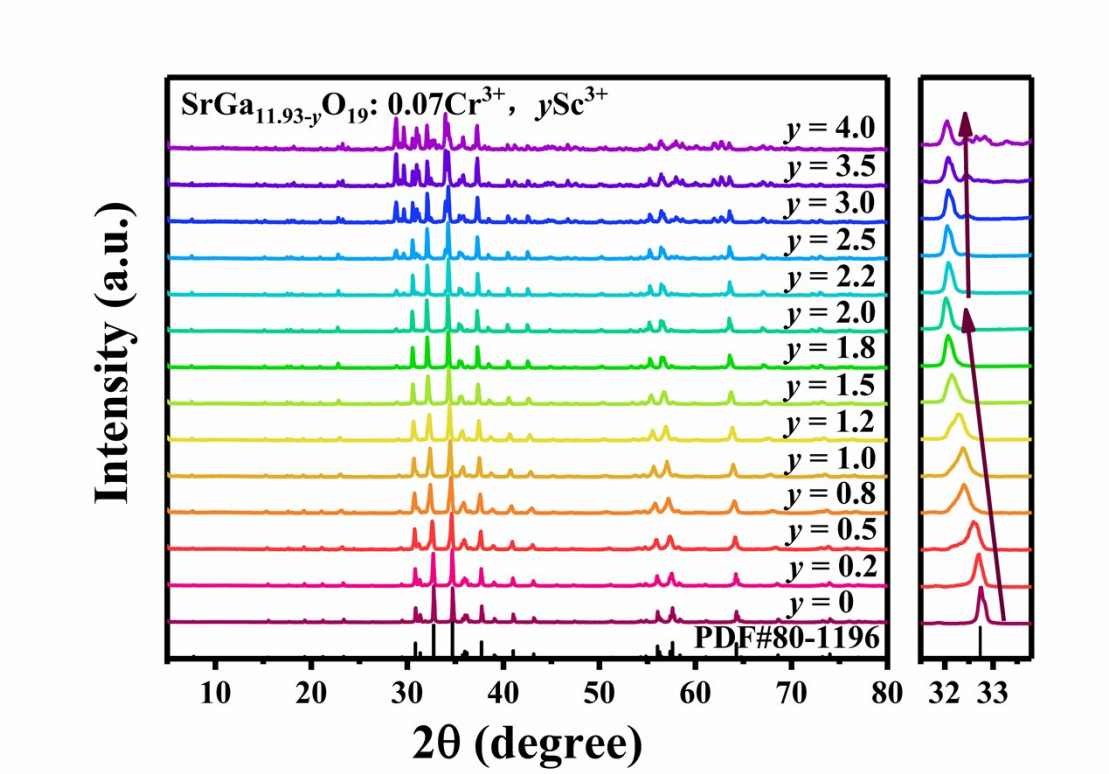

Figure S4 XRD patterns of SGO: $0.07Cr^{3+}$, ySc^{3+} ($0 \leq y \leq 4.0$) samples and standard data of SGO phase (PDF No. 80-1196).

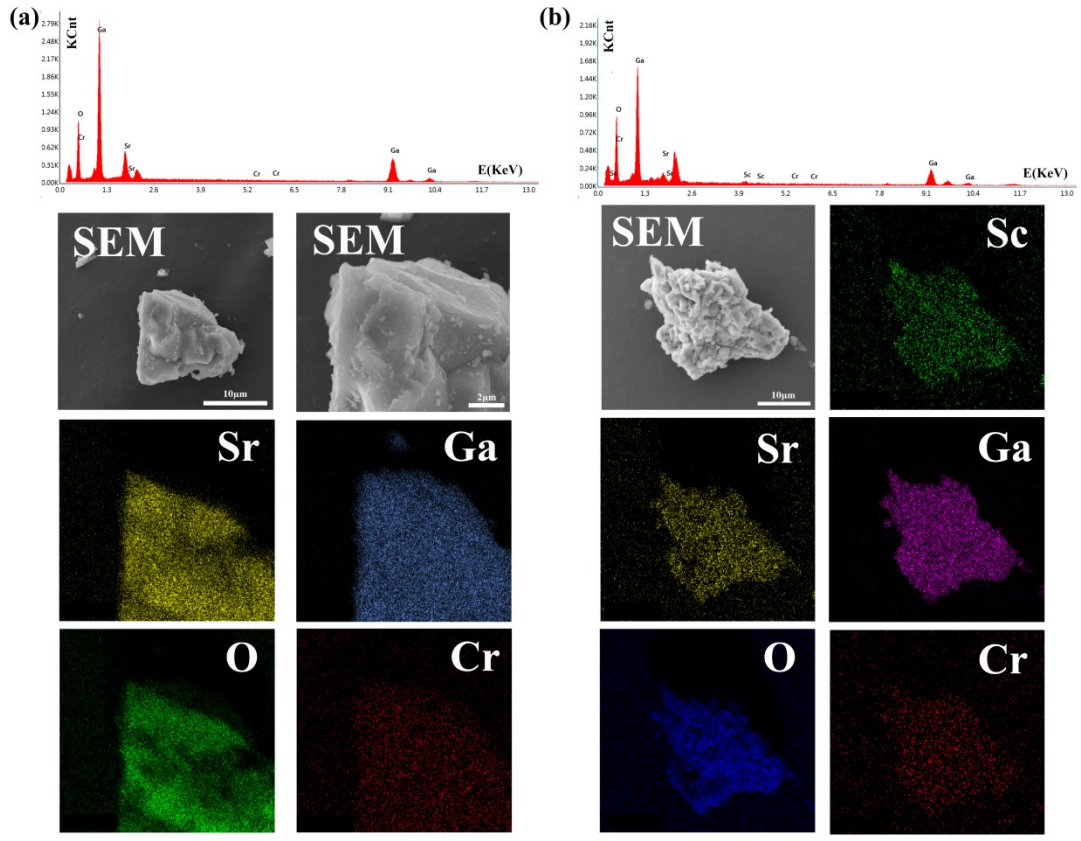

Figure S5. (a) EDS pattern, SEM images and Elemental mapping for SGO: $0.07Cr^{3+}$.

(b) EDS pattern, SEM image and Elemental mapping for SGO: 0.07Cr^{3+}, 0.8Sc^{3+}.

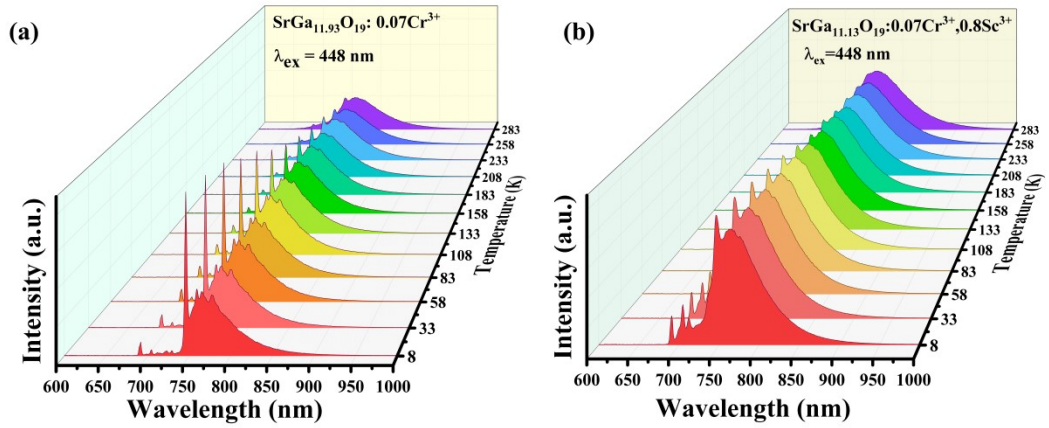

Figure S6 (a) PL spectra at 8 K-283 K for SGO: 0.07Cr^{3+}. (b) PL spectra at 8 K-283 K for SGO: 0.07Cr^{3+}, 0.8Sc^{3+}.

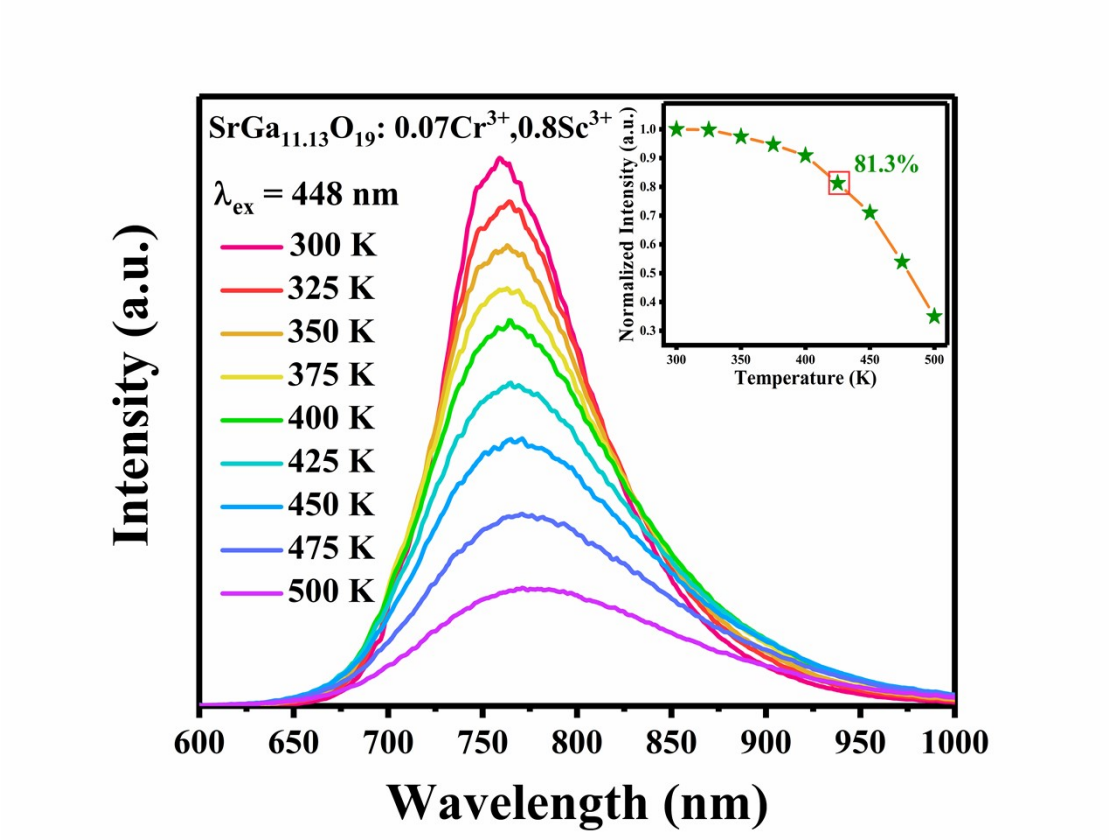

Figure S7 Temperature-dependent PL spectra of SGO: 0.07Cr^{3+}, 0.8Sc^{3+}.

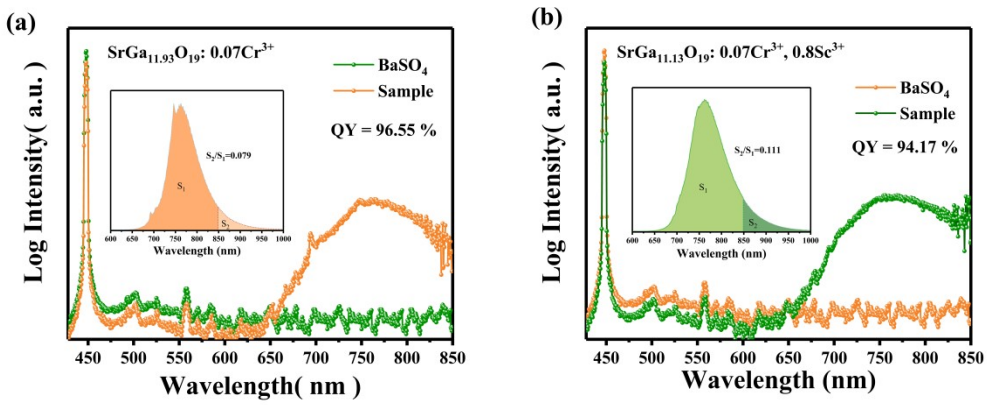

Figure S8 The quantum efficiency spectra of (a) SGO: $0.07Cr^{3+}$ (b) SGO: $0.07Cr^{3+}$, $0.8Sc^{3+}$.