Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

NIR *Persistent Luminescence* of Phosphor $Zn_{1.3}Ga_{1.4}Sn_{0.3}O_4$: Yb^{3+}, Er^{3+}, Cr^{3+} with Excitation of 980 nm Laser

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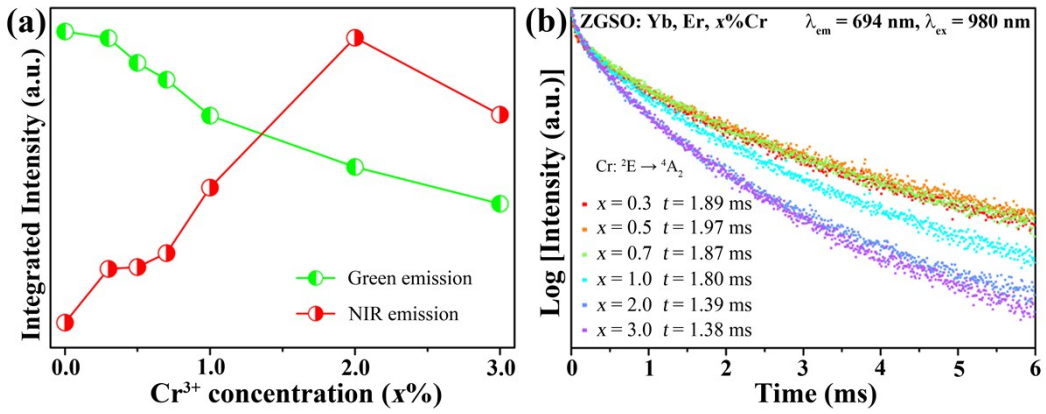

Figure S1. (a) the integrated intensity of green/NIR emission band of ZGSO: Yb, Er, x%Cr (x = 0-3.0); (b) decay curves of Cr^{3+}: ^2E (λ_{em} = 694 nm) state in ZGSO: Yb, Er, x%Cr (x = 0-3.0) samples under the 980 nm laser excitation.

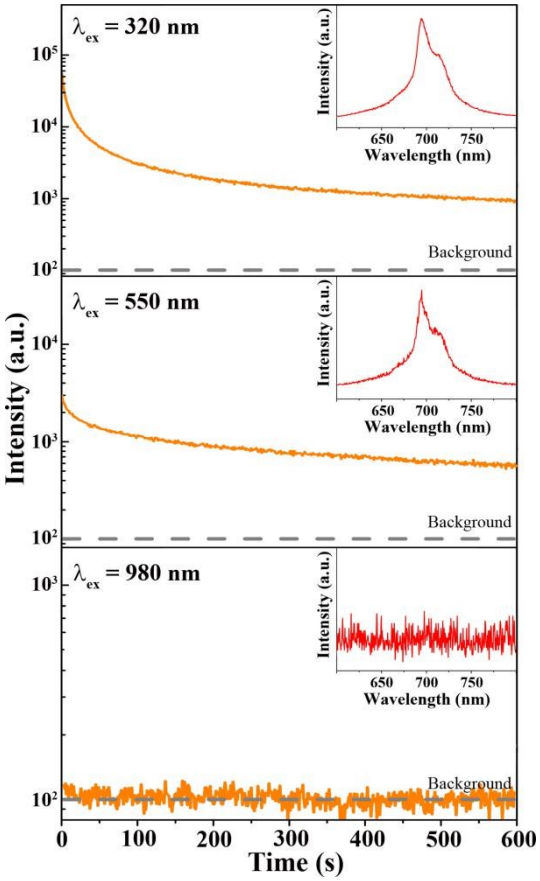

Figure S2. *PersL* intensity decay curves of 694 nm transition in ZGSO: Cr phosphor *at 10s after ceasing* irradiation for 10 min with 320, 550 and 980 nm light. The inset provides the corresponding *PersL* spectrum of sample at 30 s after 10 minutes of irradiation.

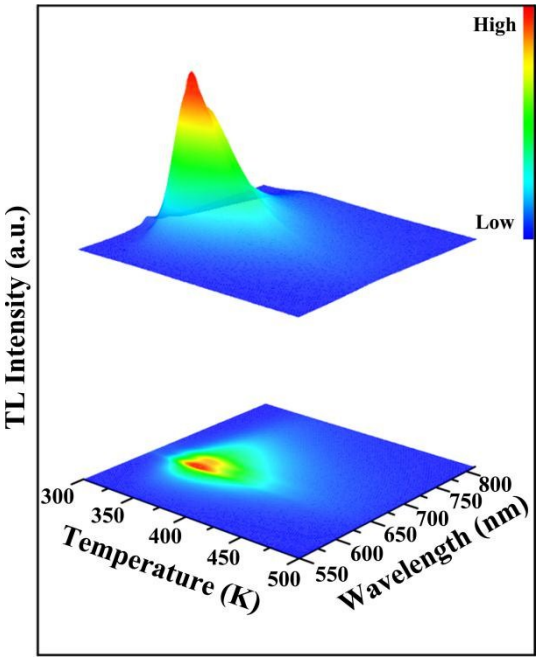

Figure S3. The *three*-dimensional and *corresponding contour mapping* TL spectra of ZGSO: Cr phosphor after irradiated by 254 nm UV light for 10 min;

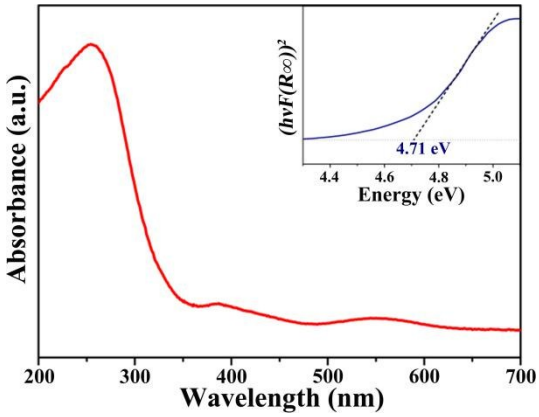

Figure S4. Diffuse absorption spectrum and (inset) the corresponding $(hvF(R_\infty))^2$-hv plot of $Zn_{1.3}Ga_{1.4}Sn_{0.3}O_4$: Cr, Yb, Er phosphor. The optical band-gap (E_g) of $Zn_{1.3}Ga_{1.4}Sn_{0.3}O_4$: Cr, Yb, Er can be estimated by the Kubelka-Munk formula: $a = -Lg(R)$ and $F(R_\infty) = S \times (1 - R)^2 / (2 \times R)$ as well as $(hv \times F(R_\infty))^2 = A \times (hv - E_g)$, where a, R and S are the absorption, reflection and diffusion coefficients, respectively, A denotes proportional constant. According to the intercepts of the blue dashed straight line, the value of E_g is calculated to be 4.71 eV.