Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

Multifunctionalities of near-infrared upconversion luminescence, optical temperature sensing and long persistent luminescence in $La_3Ga_5GeO_{14}$: Cr^{3+}, Yb^{3+}, Er^{3+} and their potential coupling

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To verify thermal stability of this system, UC luminescence spectra of other samples with different Cr^{3+} contents at various temperatures were carried out. The results are shown in Fig.S1.

The recovery of UC emission of a typical sample in the heating and cooling process is demonstrated in Fig. S2.

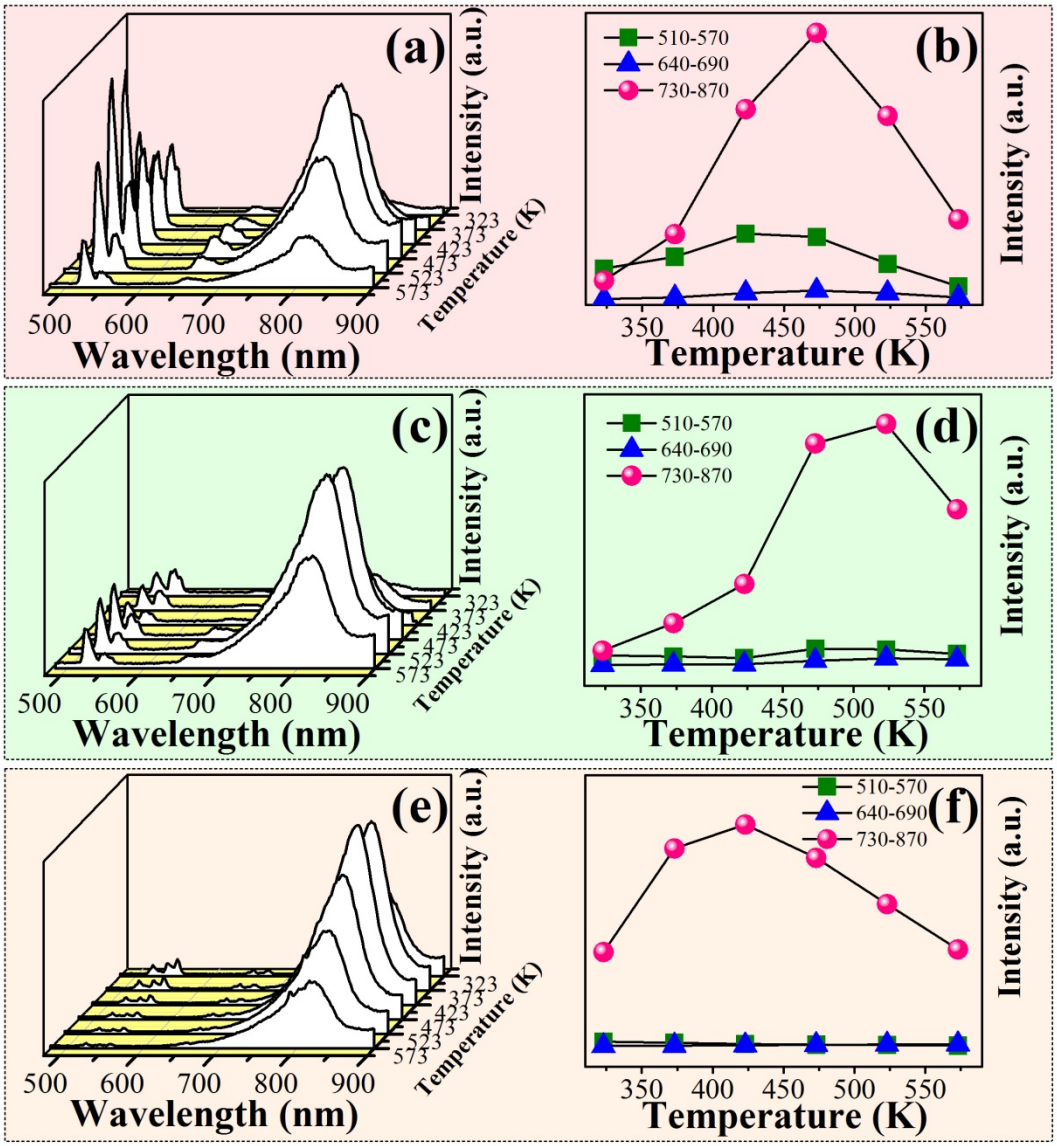

Fig. S1 UC Luminescence spectra and integrated intensity of LGG: xCr^{3+}, $0.12Yb^{3+}$, $0.06Er^{3+}$ (for a and b,x=0.04; for c and d,x=0.1; for e and f, x=0.3)

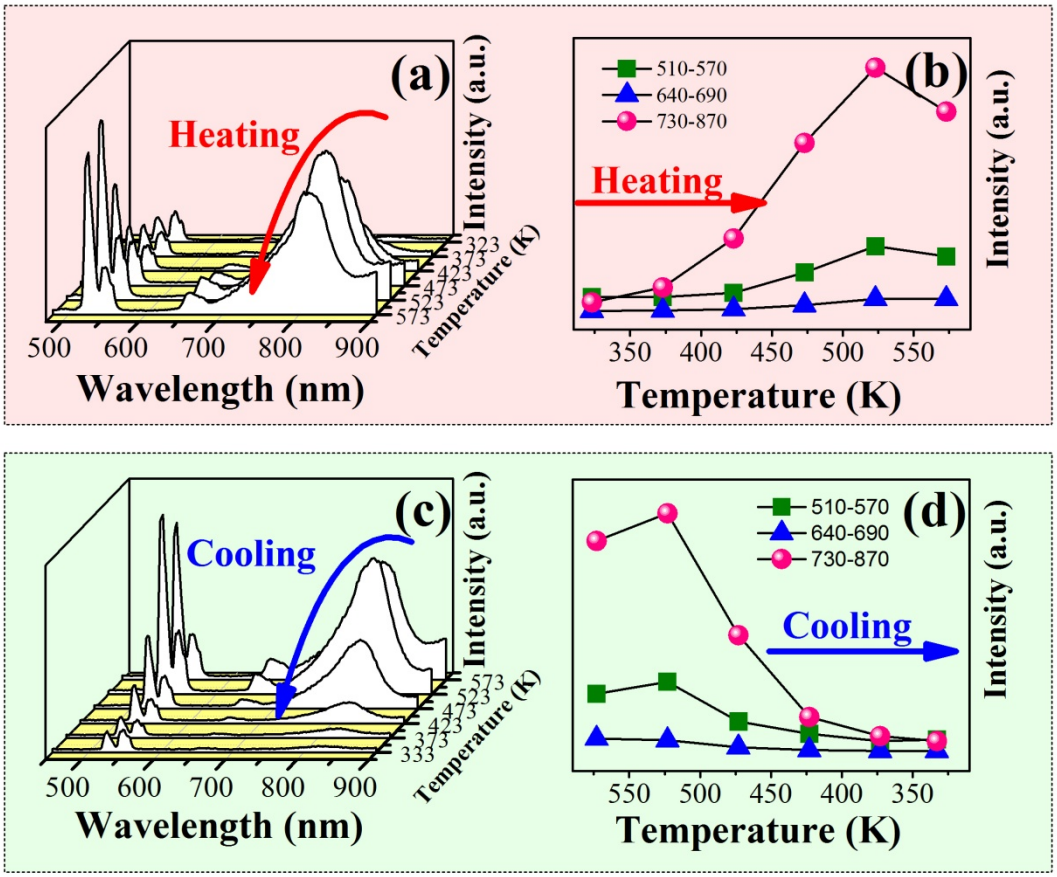

Fig. S2 Temperature dependent UC emission spectra of LGG: $0.06Cr^{3+}$,$0.12Yb^{3+}$,$0.06Er^{3+}$during heating (a) and cooling (c); (b) and (d) represent the corresponding integrated UC emission intensity of LGG: $0.06Cr^{3+}$, $0.12Yb^{3+}$, $0.06Er^{3+}$at different temperatures during heating and cooling, respectively.