Investigation on upconversion luminescence and optical temperature sensing behaviour for $Ba_2Gd_2Si_4O_{13}:Yb^{3+}$-$Er^{3+}$/$Ho^{3+}$/$Tm^{3+}$ phosphors

Jia Zhang[1,2,*], Xiumin Jiang[1], Zhenghe Hua[1,2]

[1]Physics department and Jiangsu Key Laboratory of Modern Measurement Technology and Intellige, Huaiyin Normal University, 111 West Chang Jiang Road, Huai'an 223300, China

[2]Jiangsu Key Laboratory for Chemistry of Low-Dimensional Materials, Huaiyin Normal University, 111 West Chang Jiang Road, Huai'an 223300, China

*Corresponding author.

E-mail address: zhangjianew@126.com

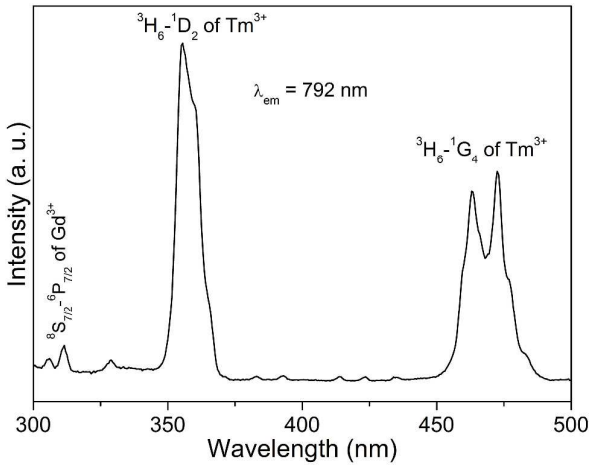

Figure S1 Excitation spectrum of BGS:0.2Yb^{3+},0.04Tm^{3+} monitored at 792 nm

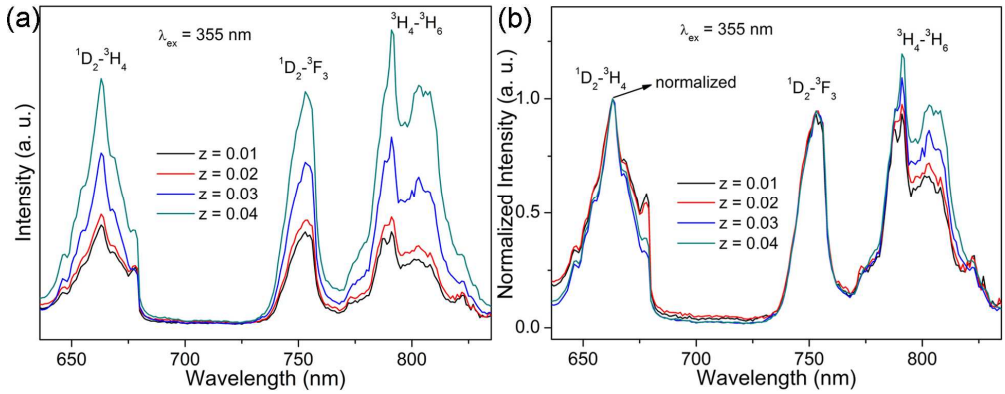

Figure S2 (a) Emission spectra of BGS:0.2Yb^{3+},zTm^{3+} ($0.01 \leq z \leq 0.04$) by exciting at 355 nm; (b) normalized (for 664 nm) emission spectra of BGS:0.2Yb^{3+},zTm^{3+} ($0.01 \leq z \leq 0.04$)

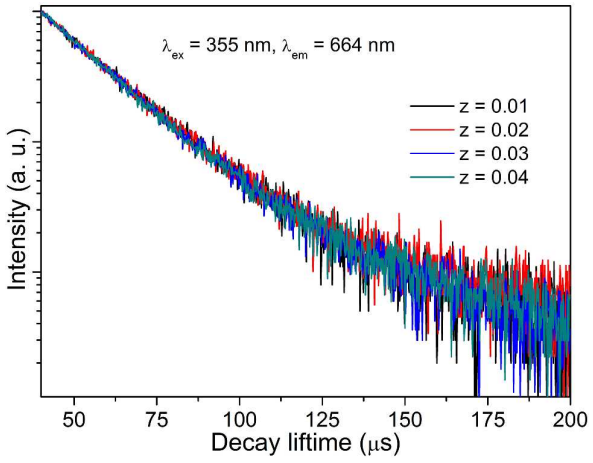

Figure S3 Decay curves of BGS:0.2Yb^{3+},zTm^{3+} ($0.01 \leq z \leq 0.04$)

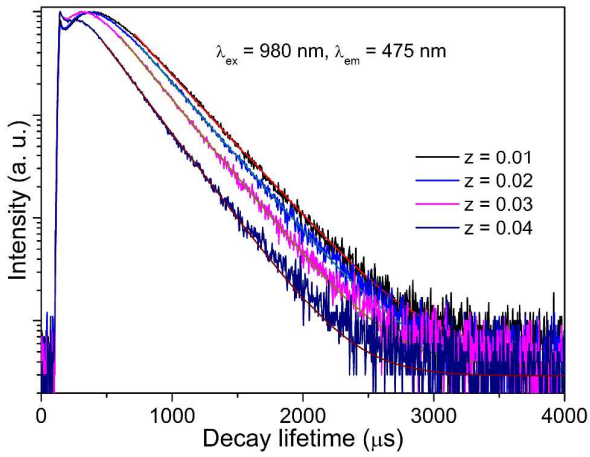

Figure S4 Decay curves of BGS:0.2Yb^{3+},zTm^{3+} ($0.01 \leq z \leq 0.04$)

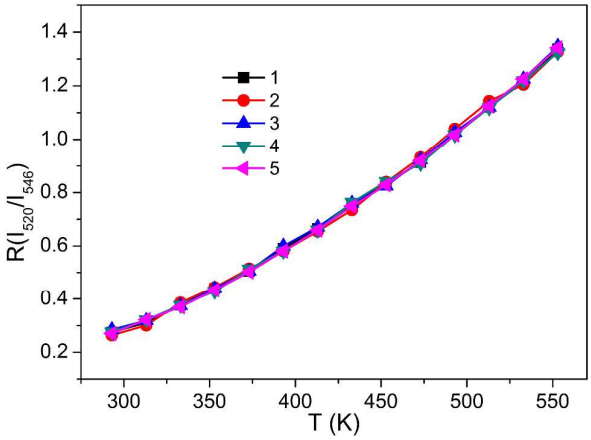

Figure S5 Dependence of $R(I_{520}/I_{546})$ for BGS:0.2Yb^{3+},0.02Er^{3+} on the absolute temperature by repeating measurement for five times