

Supporting information

Investigation of the luminescent properties and energy transfer mechanisms in Gd_3TaO_7 : Bi^{3+} , Eu^{3+} phosphors for their potential application in full-spectrum w-LEDs.

Zhicheng Liao^a, Liting Qiu^b, Qian Zhang^b, Xiantao Wei^c, Yonghu Chen^{*b}, Min Yin^{*b}

^a CAS Key Laboratory of Microscale Magnetic Resonance, and School of Physical Sciences, University of Science and Technology of China, Hefei 230026, China

^b Key Laboratory of Strongly-Coupled Quantum Matter Physics, Chinese Academy of Sciences, School of Physical Sciences, University of Science and Technology of China, Hefei 230026, PR China

^c Physics Experiment Teaching Center, School of Physical Sciences, University of Science and Technology of China, Hefei 230026, PR China

*** Corresponding authors.**

E-mail addresses: yhuchen@ustc.edu.cn (Y. Chen), yinmin@ustc.edu.cn (M. Yin)

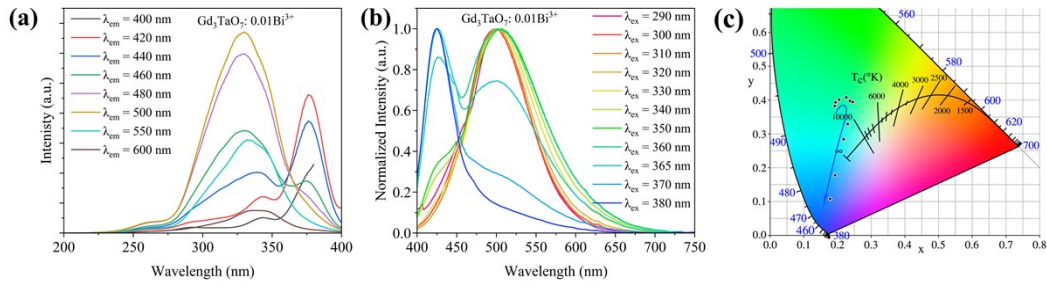


Fig. S1 (a) Excitation spectra of $\text{Gd}_3\text{TaO}_7: 0.01\text{Bi}^{3+}$ with monitoring wavelengths ranging from 400 nm to 600 nm (b) Normalized emission spectra of $\text{Gd}_3\text{TaO}_7: 0.01\text{Bi}^{3+}$ under excitation wavelengths ranging from 300 nm to 380 nm, (c) The color coordinates of $\text{Gd}_3\text{TaO}_7: 0.01\text{Bi}^{3+}$ change with excitation wavelengths in the range of 300 – 380 nm.

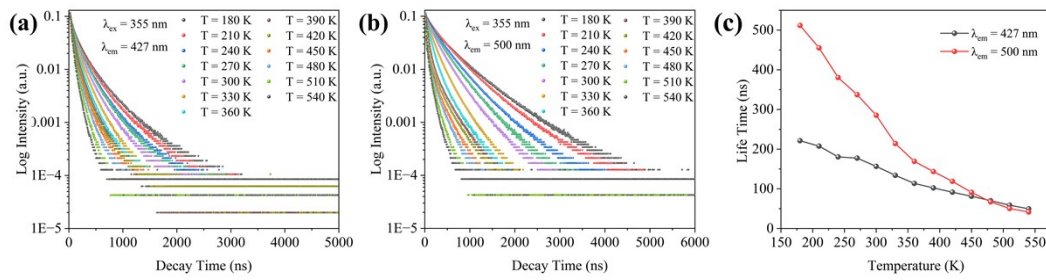


Fig. S2 Fluorescence decay curves of $\text{Gd}_3\text{TaO}_7: 0.01\text{Bi}^{3+}$ monitored at 427 nm (a) and 500 nm (b) in the temperature range of 180 – 540 K, (c) The temperature dependence of the life time of $\text{Gd}_3\text{TaO}_7: 0.01\text{Bi}^{3+}$ monitored at 427 nm and 500 nm.

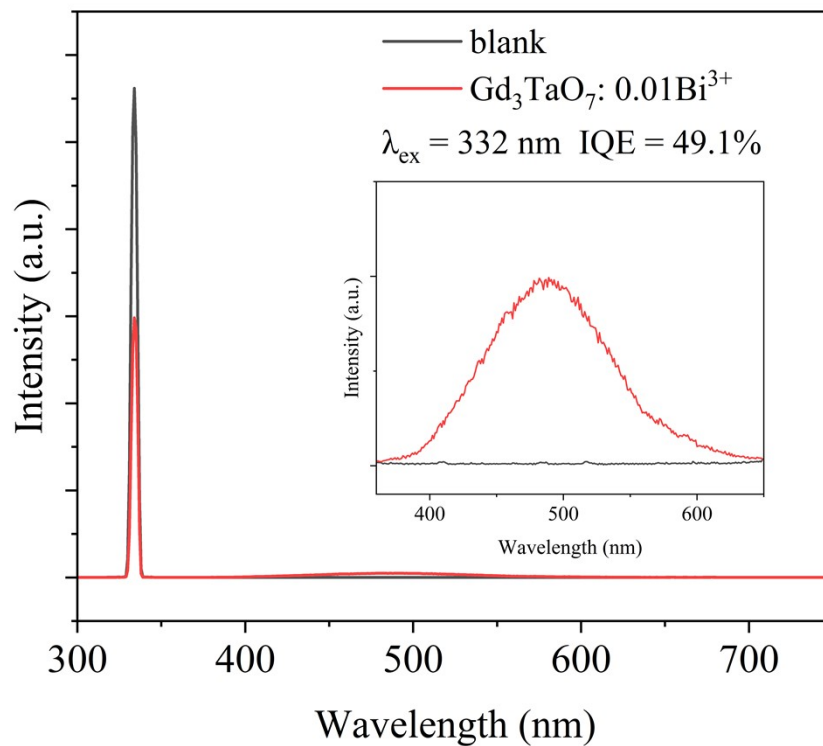


Fig. S3 IQE-based PL spectrum of $\text{Gd}_3\text{TaO}_7: 0.01\text{Bi}^{3+}$.

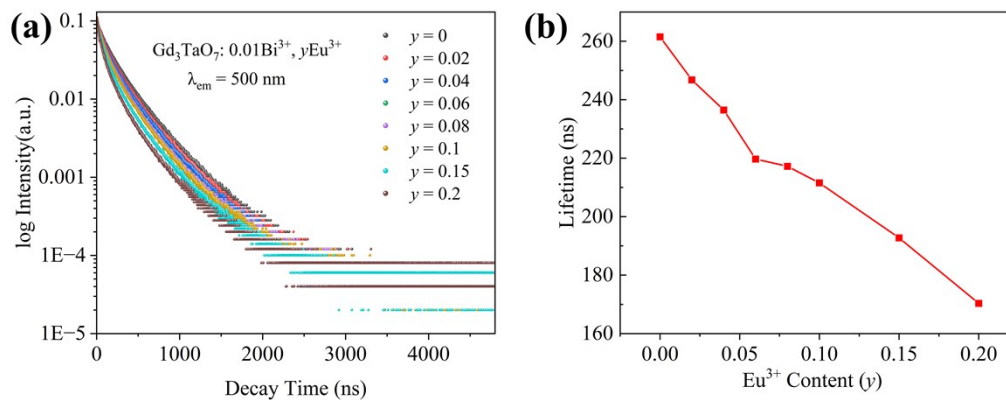


Fig. S4 (a) Room Temperature fluorescence decay curves of $\text{Gd}_3\text{TaO}_7: 0.01\text{Bi}^{3+}, y\text{Eu}^{3+}$ ($y = 0 - 0.2$) monitored at 500 nm, (b) The dependence of lifetime of $\text{Gd}_3\text{TaO}_7: 0.01\text{Bi}^{3+}, y\text{Eu}^{3+}$ with Eu^{3+} concentration monitored at 500 nm.

Table. S1 Refinement and crystallographic parameters of Gd_3TaO_7 and $\text{Gd}_3\text{TaO}_7: 0.01\text{Bi}^{3+}$

□	Gd ₃ TaO ₇	Gd ₃ TaO ₇ : 0.01Bi ³⁺
Space Group	C2221	C2221
a (Å)	10.6270	10.6303
b (Å)	7.5200	7.5237
c (Å)	7.5396	7.5429
$\alpha=\beta=\gamma$ (°)	90	90
V (Å ³)	602.5232	603.2696
R _p (%)	9.57	9.37
R _{wp} (%)	10.8	10.6
χ^2	2.32	2.23