Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Hydrothermal Conversion of Layered Hydroxide Nanosheets into $(Y_{0.95}Eu_{0.05})PO_4$ and $(Y_{0.96-x}Tb_{0.04}Eu_x)PO_4$ (x = 0-0.10) Nanocrystals for Red and Color-Tailorable Emissions

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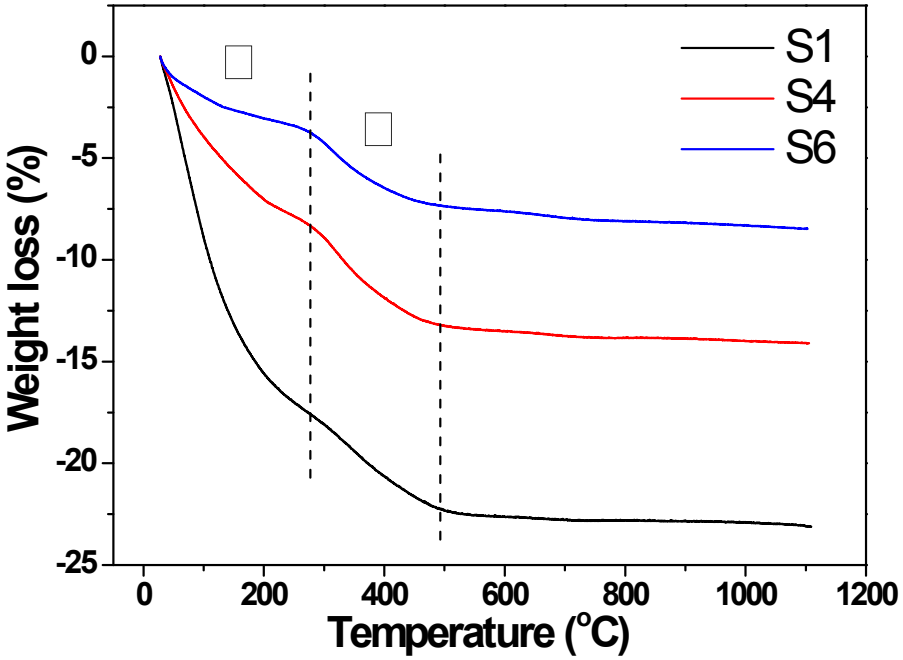

Fig. S1 TG profiles of samples S1, S4 and S6.

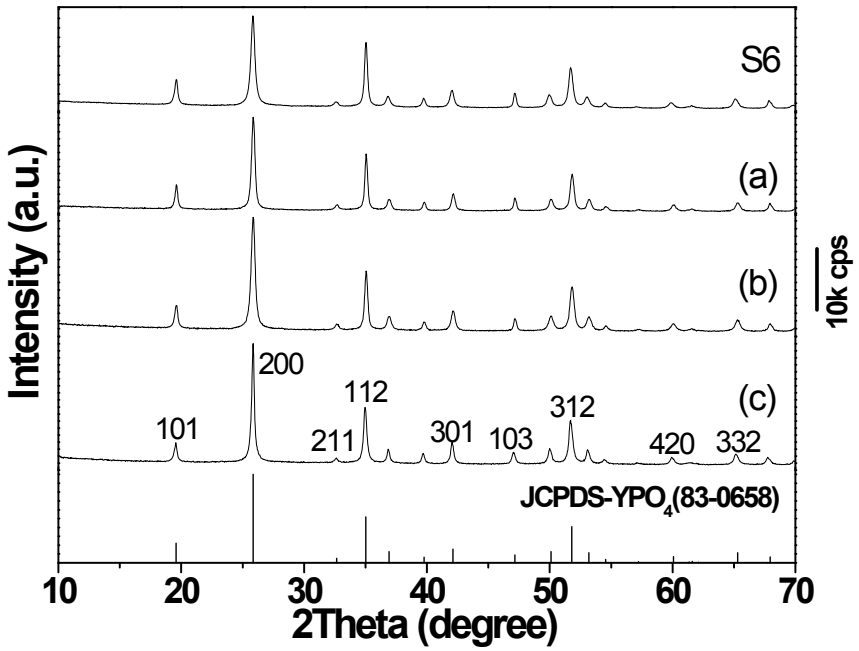

Fig. S2 XRD patterns of S6 and its products calcined at (a) 800, (b) 900 and (c) 1000 °C for 2 h under O_2 gas flowing at 200 mL min^{-1}.

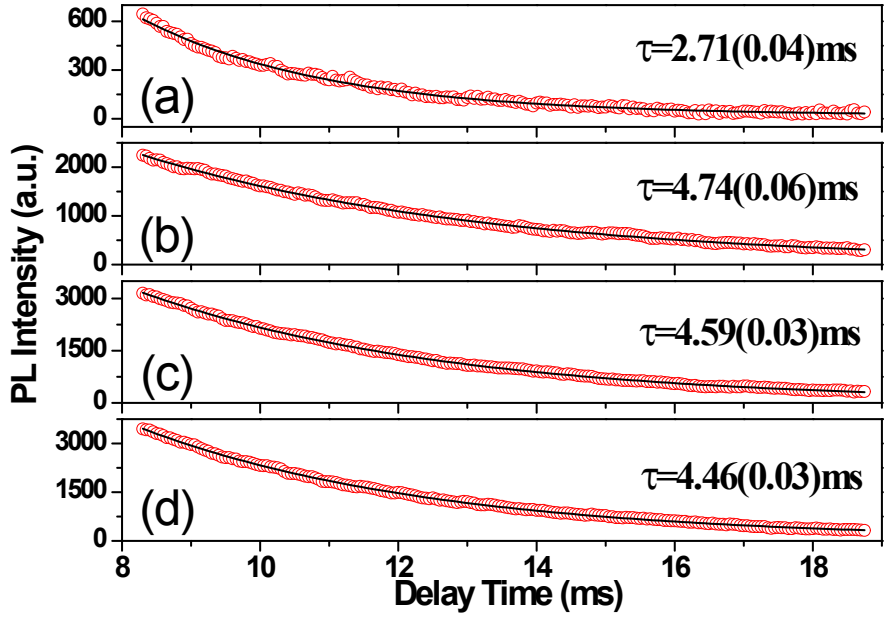

Fig. S3 Fluorescence decay curves (red) and the results of exponential fitting (black) for the 593-nm emission of S6 (a) and the products calcined from S6 at (b) 800, (c) 900 and (d) 1000 °C.

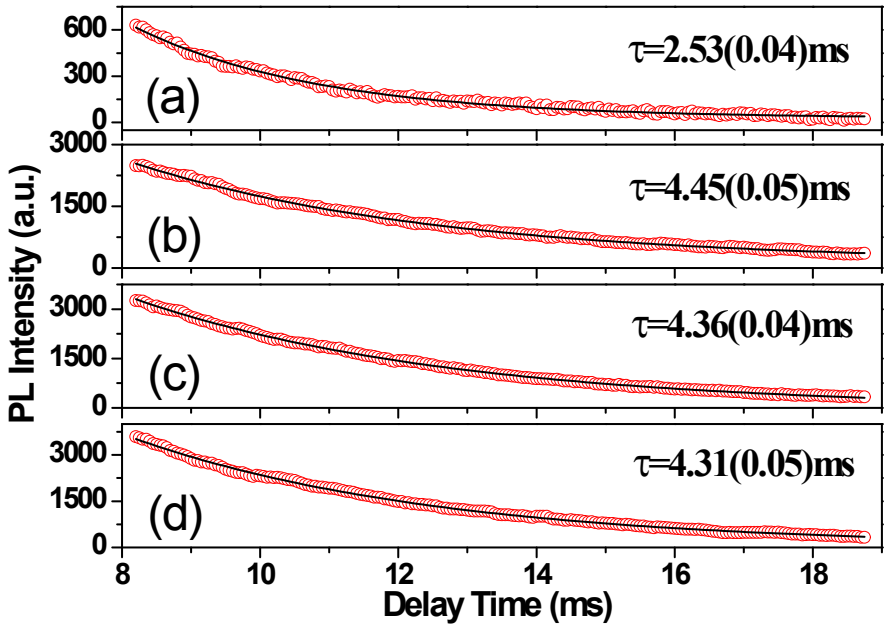

Fig. S4 Fluorescence decay curves (red) and the results of exponential fitting (black) for the 618-nm emission of S6 (a) and the products calcined from S6 at (b) 800, (c) 900 and (d) 1000 °C.

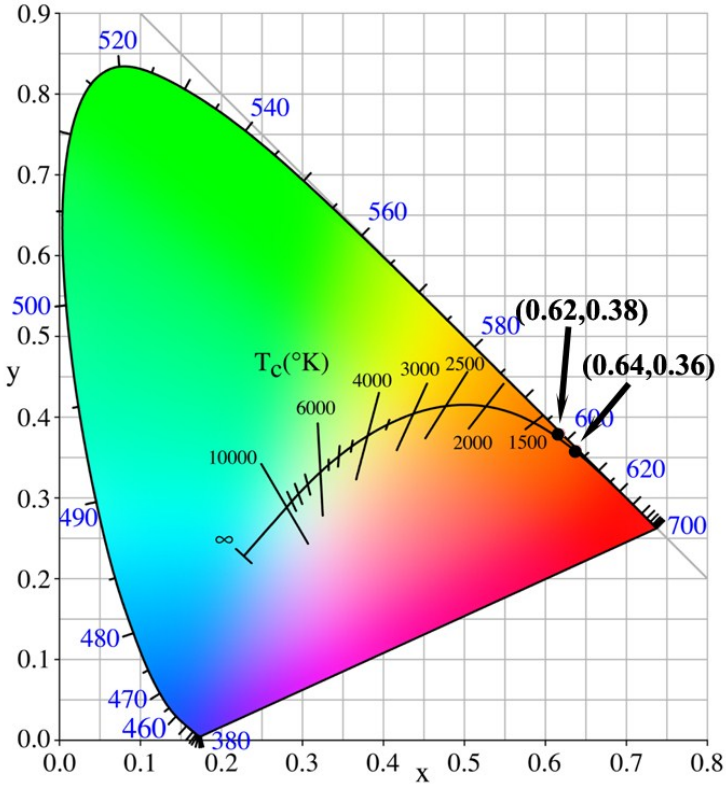

Fig. S5 CIE chromaticity diagram for the $(Y_{0.95}Eu_{0.05})PO_4$ phosphors.

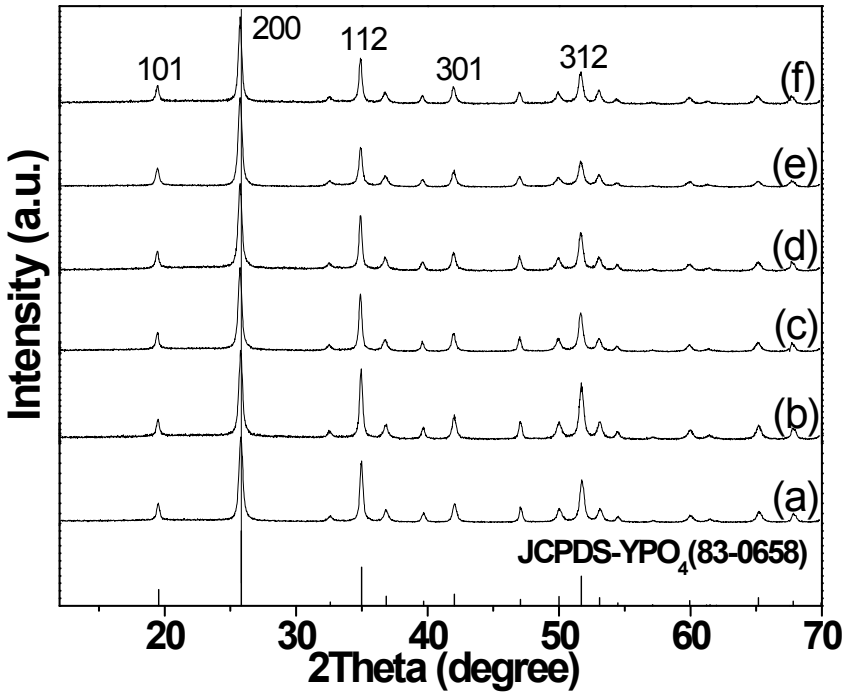

Fig. S6 XRD patterns of the $(Y_{0.96-x}Tb_{0.04}Eu_x)PO_4$ phosphors calcined at 900 °C for 2 h under flowing H_2 (200 mL min^{-1}), with (a) $x = 0$, (b) $x = 0.02$, (c) $x = 0.04$, (d) $x = 0.06$, (e) $x = 0.08$ and (f) $x = 0.10$.

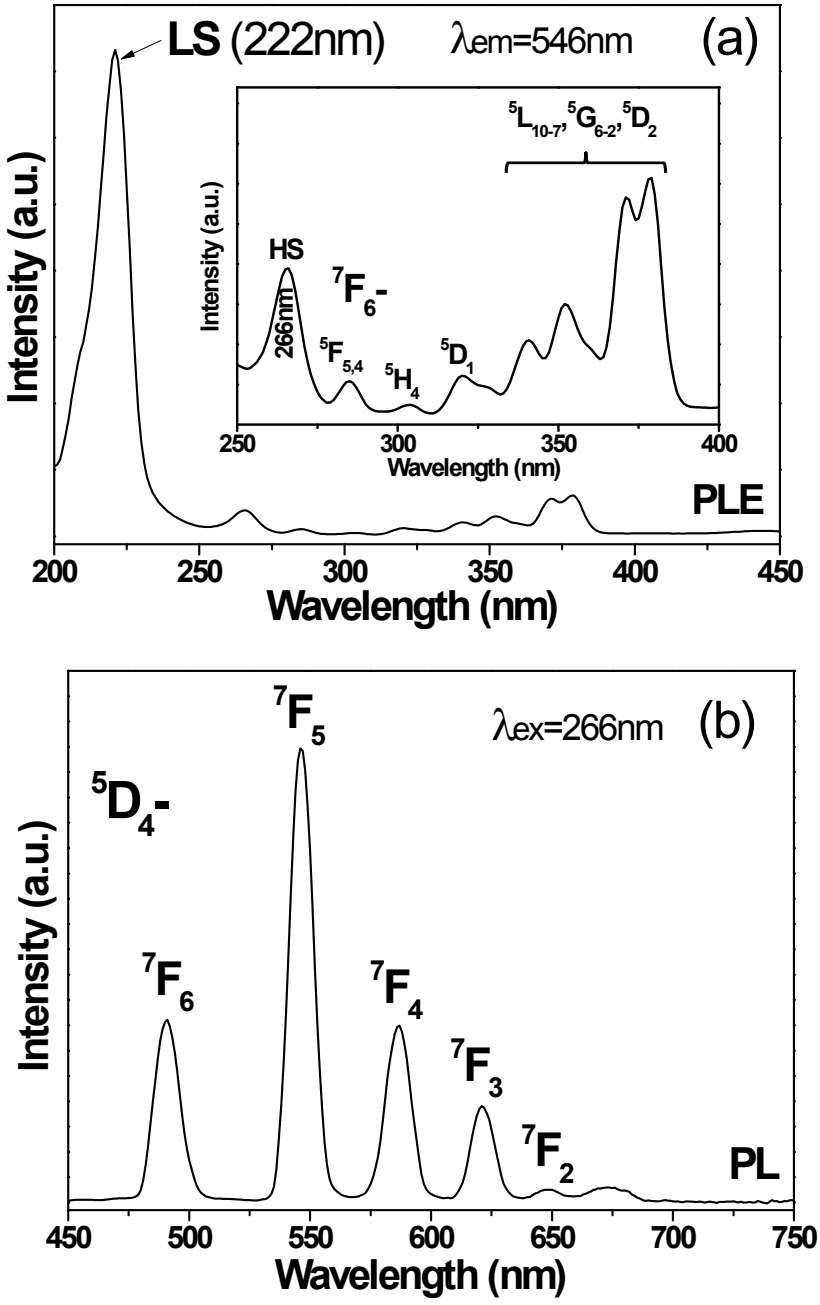

Fig. S7 PLE (a) and PL (b) spectra of the $(Y_{0.96}Tb_{0.04})PO_4$ phosphor calcined at 900 °C. The inset in (a) is an amplified show of the Tb^{3+} transitions in the 250-400 nm region.

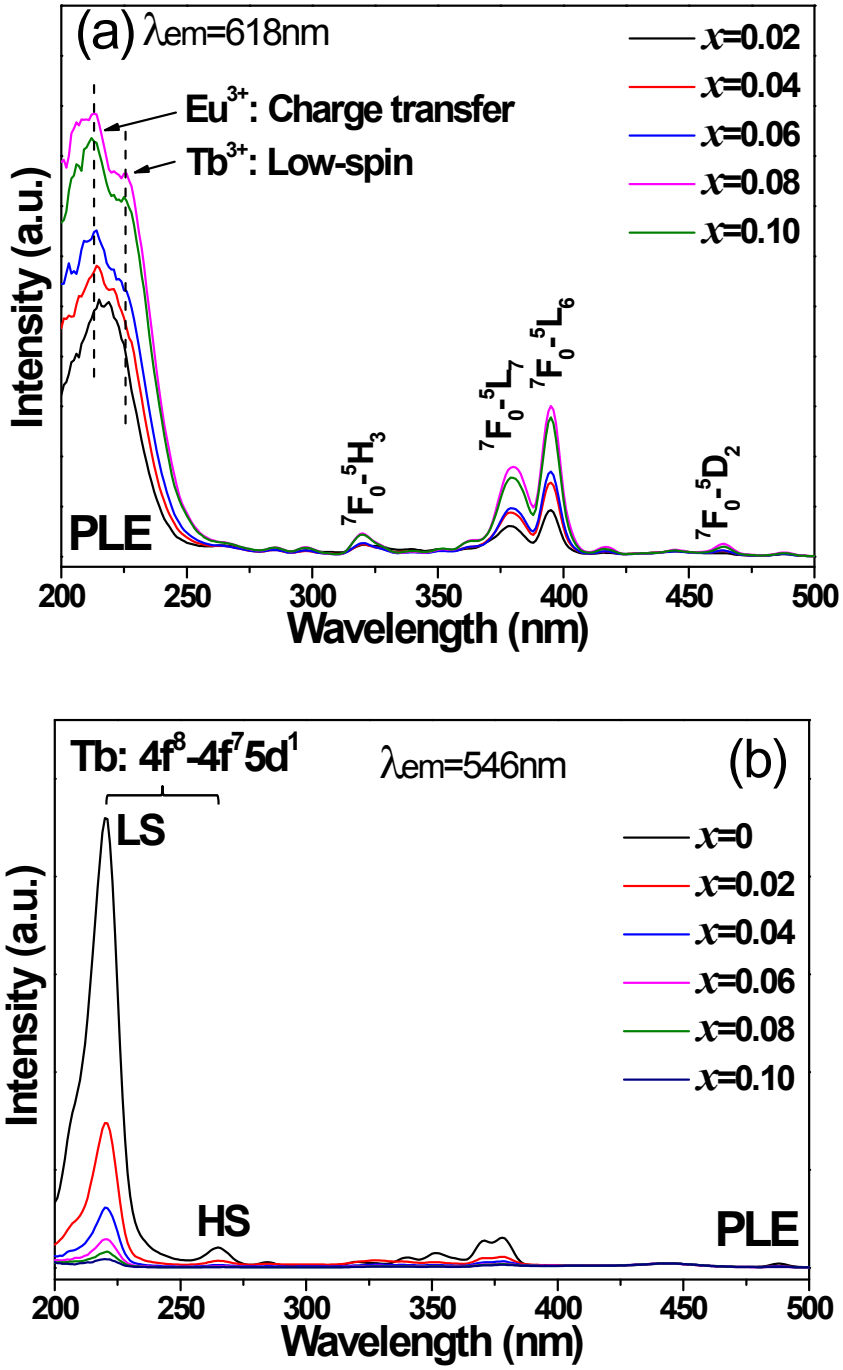

Fig. S8 Photoluminescence excitation (PLE) spectra of the $(Y_{0.96-x}Tb_{0.04}Eu_x)PO_4$ phosphors calcined at 900 °C, with (a) and (b) for the 618 nm red emission of Eu^{3+} and the 546 nm green emission of Tb^{3+}, respectively.

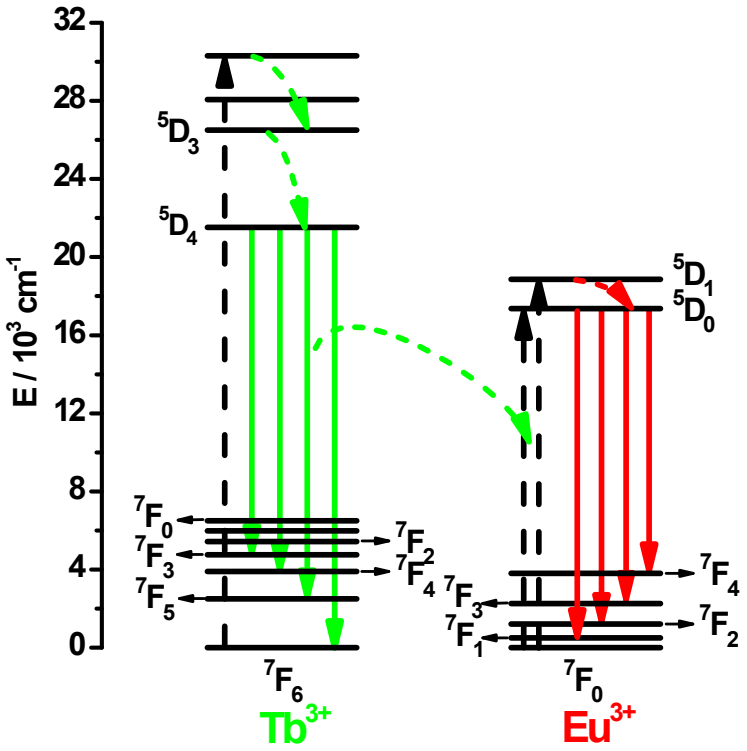

Fig. S9 A schematic model for the energy transfer from Tb^{3+} to Eu^{3+}.

Table S1 lattice constants *a* and *c* and cell volume *V* of the $(Y_{0.96-x}Tb_{0.04}Eu_x)PO_4$ solid solutions calcined at 900 °C.

x	0	0.02	0.04	0.06	0.08	0.10
2θ for 200/°	25.80	25.78	25.75	25.73	25.72	25.70
2θ for 101/°	19.51	19.50	19.47	19.46	19.46	19.44
a/Å	6.902	6.906	6.915	6.919	6.922	6.927
c/ Å	6.042	6.045	6.053	6.056	6.057	6.064
$V/10^{-3}$ nm^3	287.83	288.30	289.44	289.92	290.22	290.97

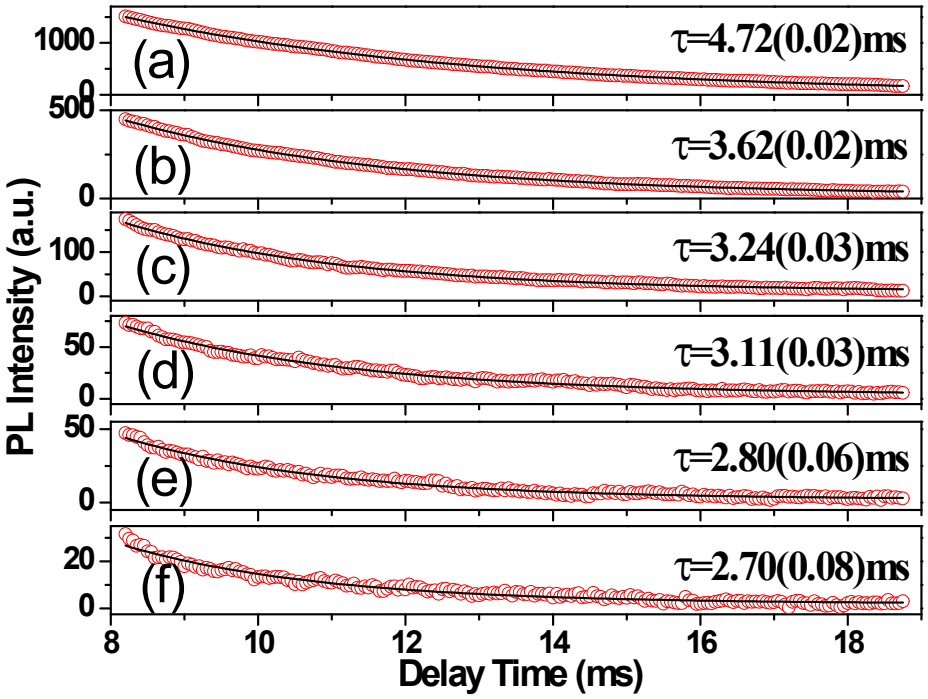

Fig. S10 Fluorescence decay kinetics (red) and the results of exponential fitting (black) for the 546-nm emission of Tb^{3+} in $(Y_{0.96-x}Tb_{0.04}Eu_x)PO_4$, with (a) $x = 0$, (b) $x = 0.02$, (c) $x = 0.04$, (d) $x = 0.06$, (e) $x = 0.08$ and (f) $x = 0.10$.

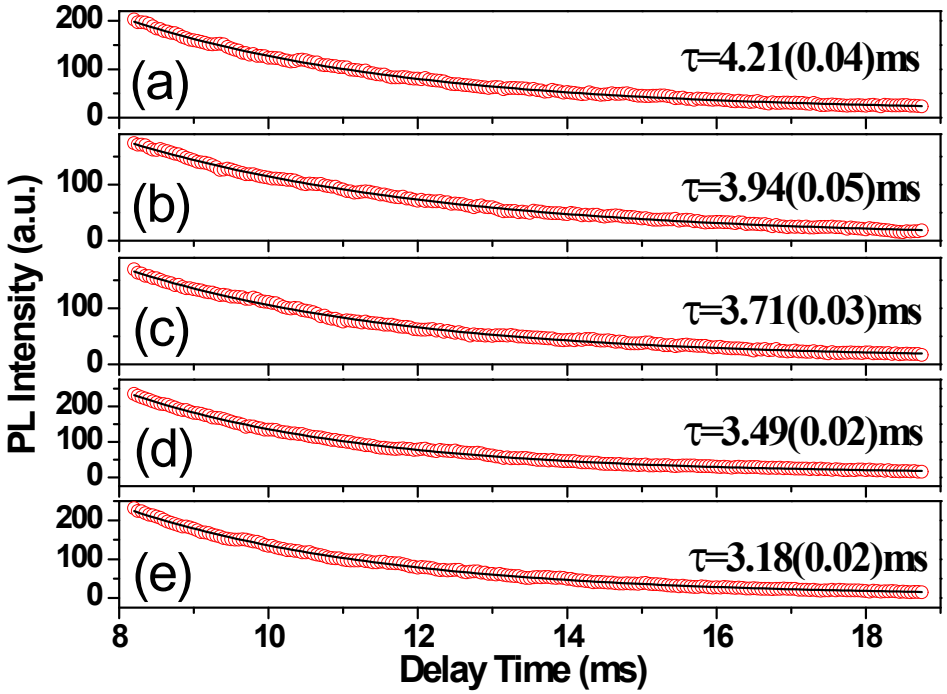

Fig. S11 Fluorescence decay kinetics (red) and the results of exponential fitting (black) for the 618-nm emission of Eu^{3+} in $(Y_{0.96-x}Tb_{0.04}Eu_x)PO_4$, with (a) $x = 0.02$, (b) $x = 0.04$, (c) $x = 0.06$, (d) $x = 0.08$ and (e) $x = 0.10$.