Supporting Information

From structural phase transition to highly sensitive lifetime based luminescent thermometer: multifaceted modification of thermometric performance in $Y_{0.9-x}Nd_xYb_{0.1}PO_4$ nanocrystals

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Luminescence decay profiles were fitted using the double-exponential function:

$$I(t) = A_1 \cdot e^{\frac{-t}{t_1}} + A_2 \cdot e^{\frac{-t}{t_2}} + y_0 \qquad (1)$$

The average lifetime was calculated as follows:

$$\tau_{avr} = \frac{A_1\tau_1^2 + A_2\tau_2^2}{A_1\tau_1 + A_2\tau_2} \qquad (2)$$

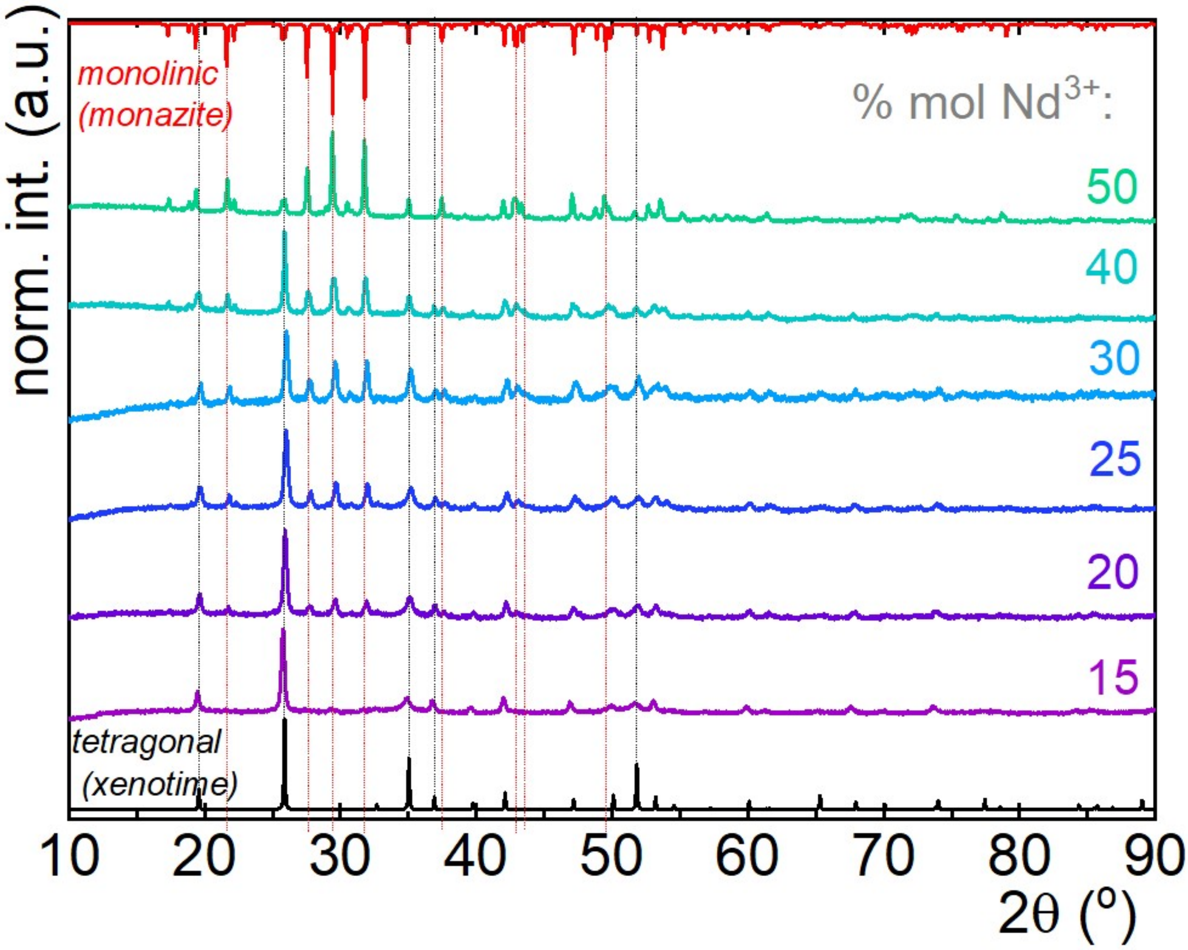

Figure S1. The XRD patterns of $Y_{0.9-x}Nd_xYb_{0.1}PO_4$ where x: 0.15, 0.2, 0.25, 0.30, 0.40, 0.50.

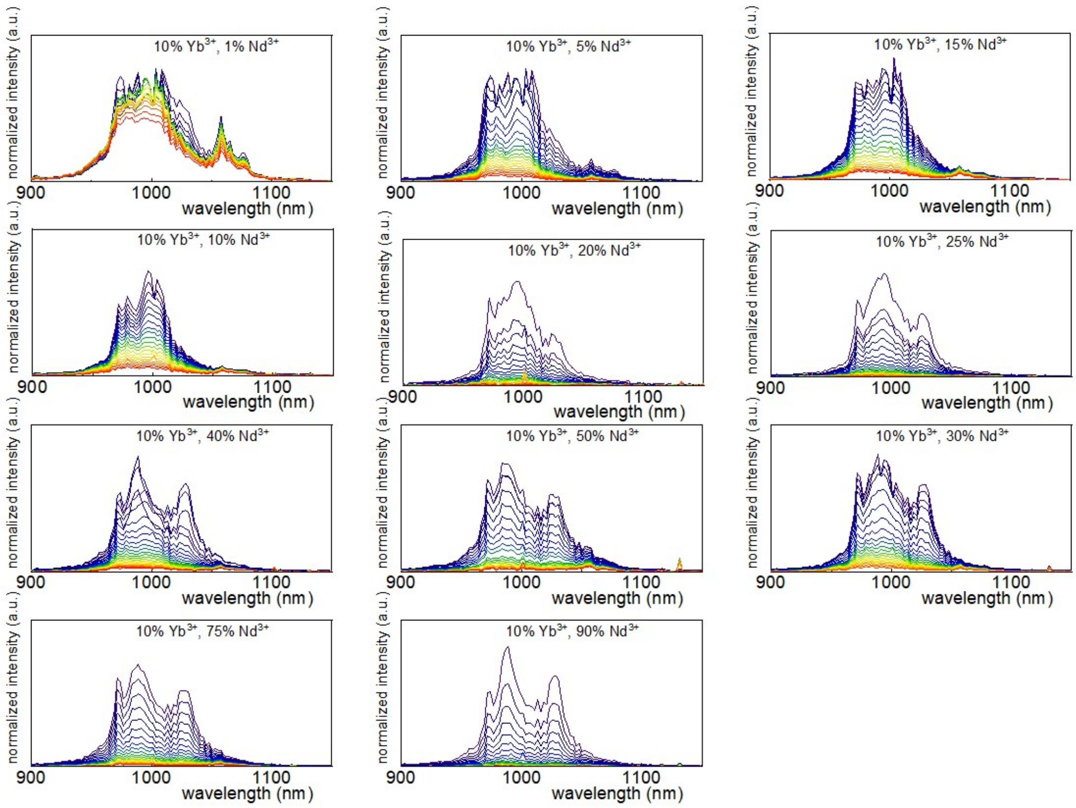

Figure S2. The thermal evolution of emission of $Y_{0.9-x}Nd_xYb_{0.1}PO_4$ upon 808 nm excitation line measured in the temperature range of 123-563K.

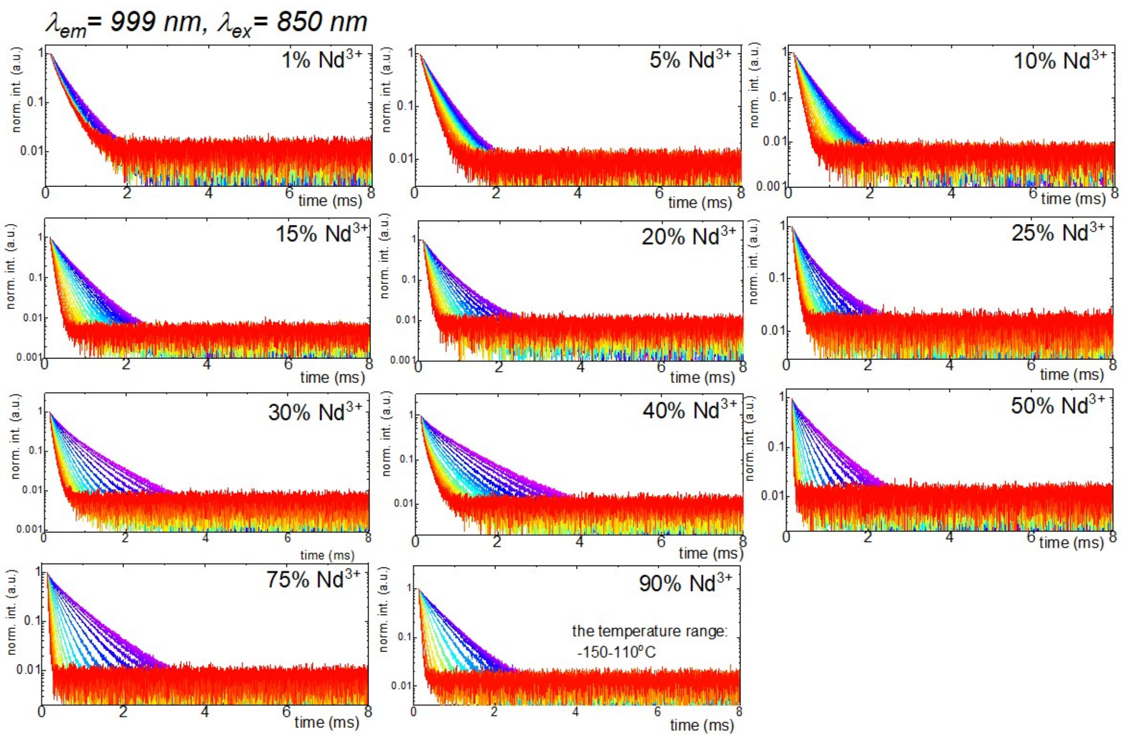

Figure S3. The thermal evolution of decay profiles of $Y_{0.9-x}Nd_xYb_{0.1}PO_4$ upon λ_{ex}= 808 nm (λ_{em}= 999 nm) measured in the temperature range of 123-563K.

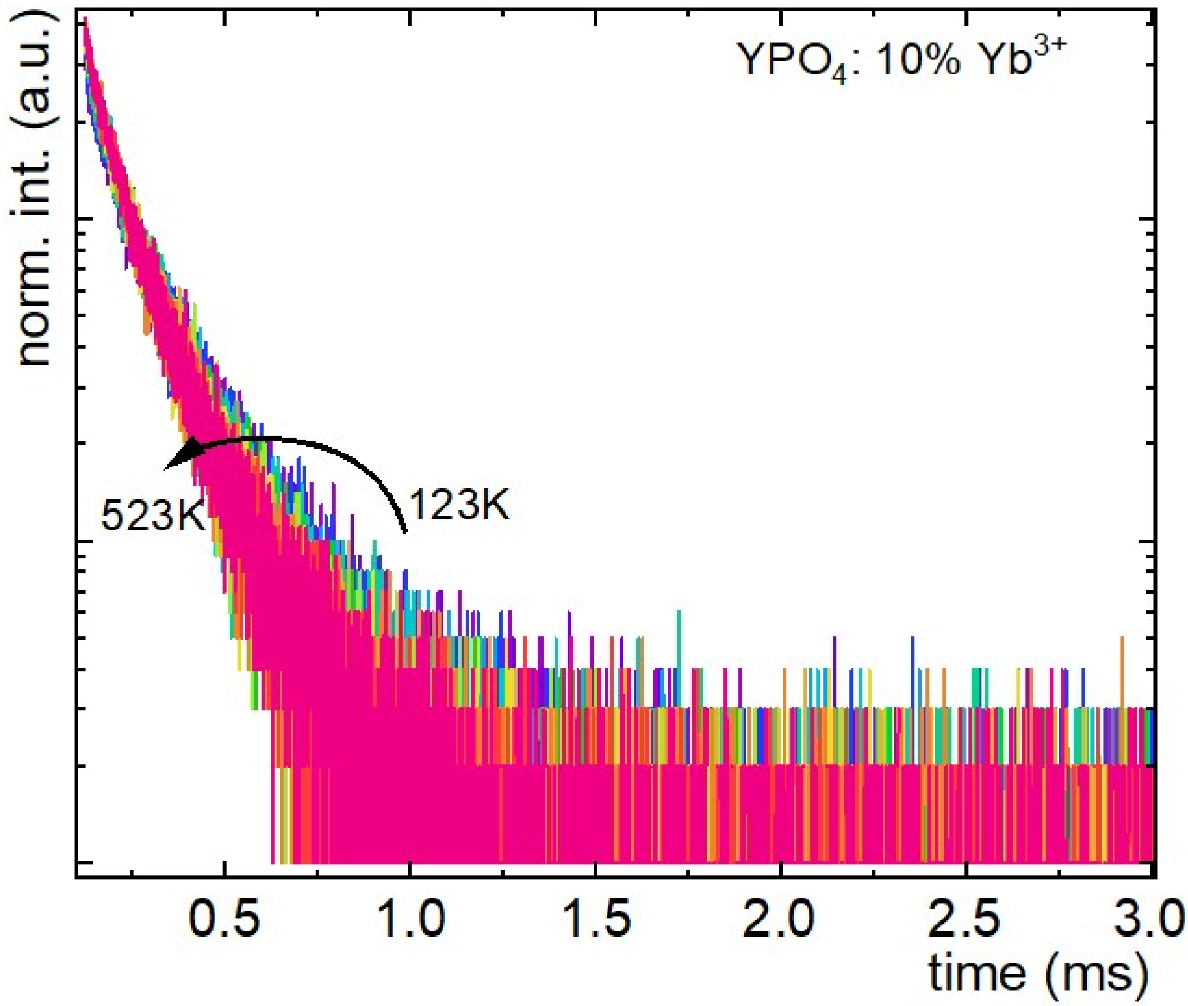

Figure S4. The thermal evolution of luminescence decay profile of Yb^{3+} ions in $Y_{0.9}Yb_{0.1}PO_4$ nanocrystals.

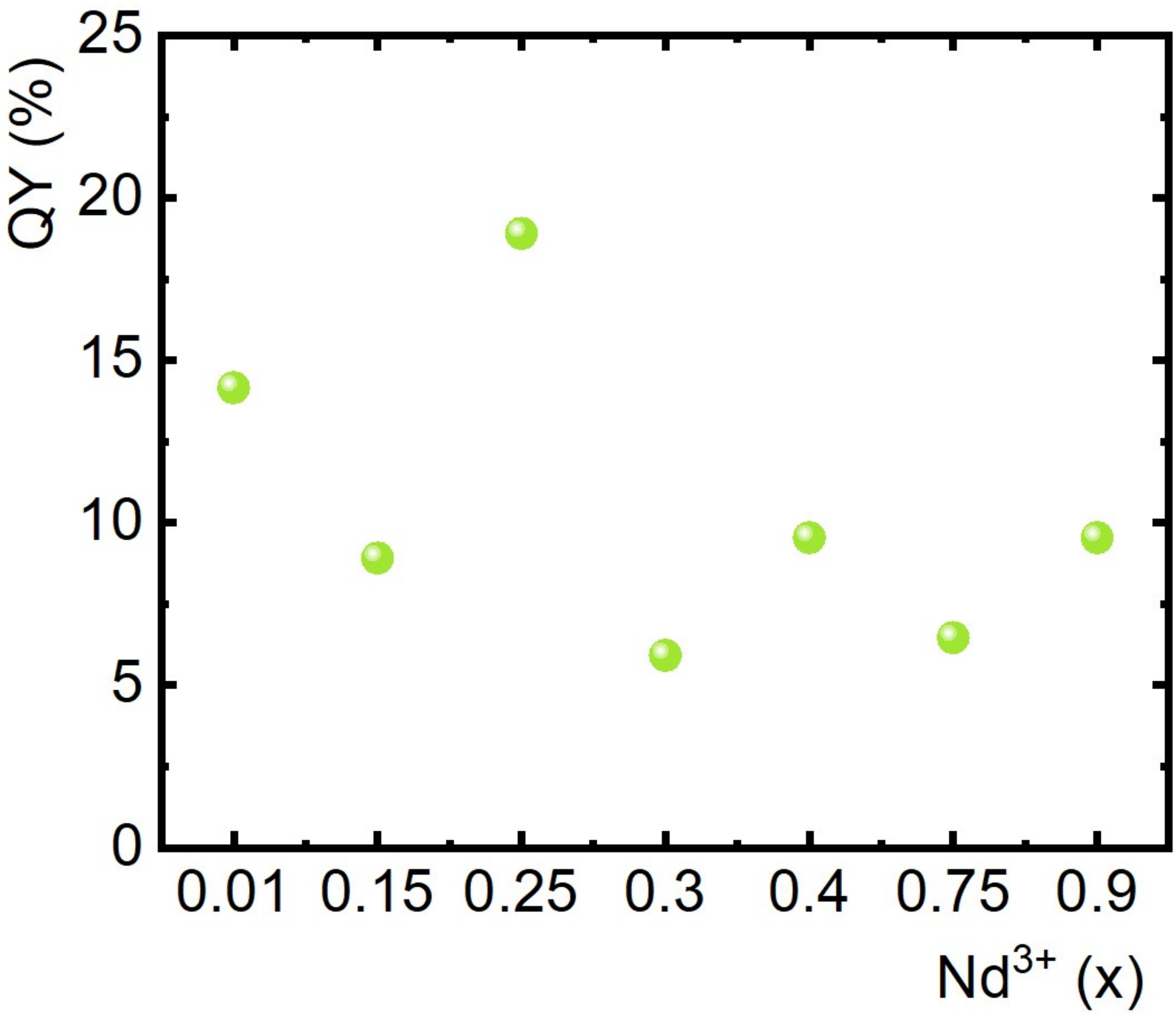

Figure S5. The luminescence quantum efficiency (QY) measured for $Y_{0.9-x}Nd_xYb_{0.1}PO_4$ upon λ_{ex}= 808 nm as a function of Nd^{3+} concentration.

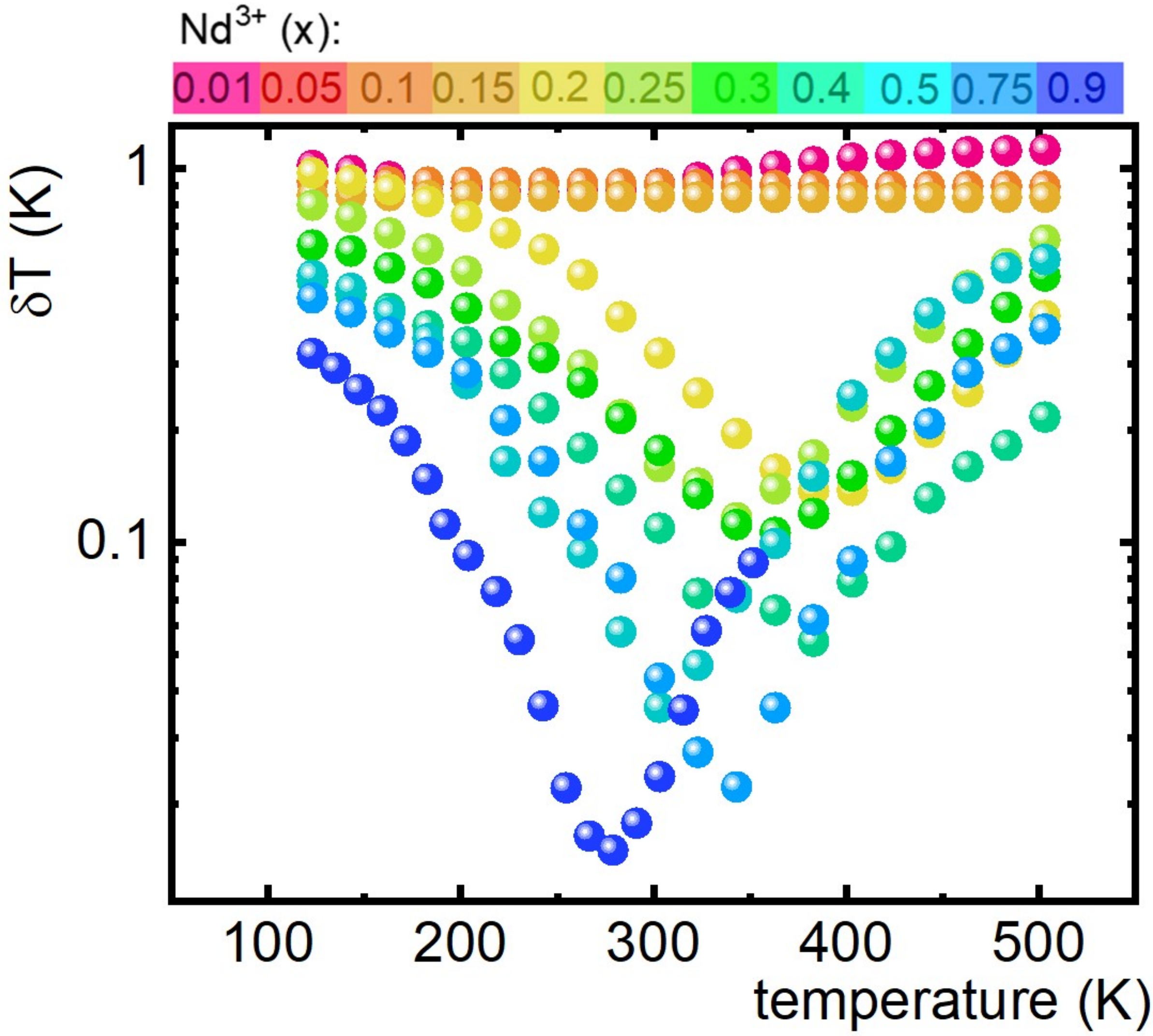

Figure S6. The temperature resolution of luminescent thermometers based on $Y_{0.9-x}Nd_xYb_{0.1}PO_4$ nanocrystals.