SUPPORTING INFORMATION

Understanding the Power of Luminescence Ratiometric Thermal History Indicators driven by Phase Transitions: The case of Eu^{3+} doped $LaVO_4$

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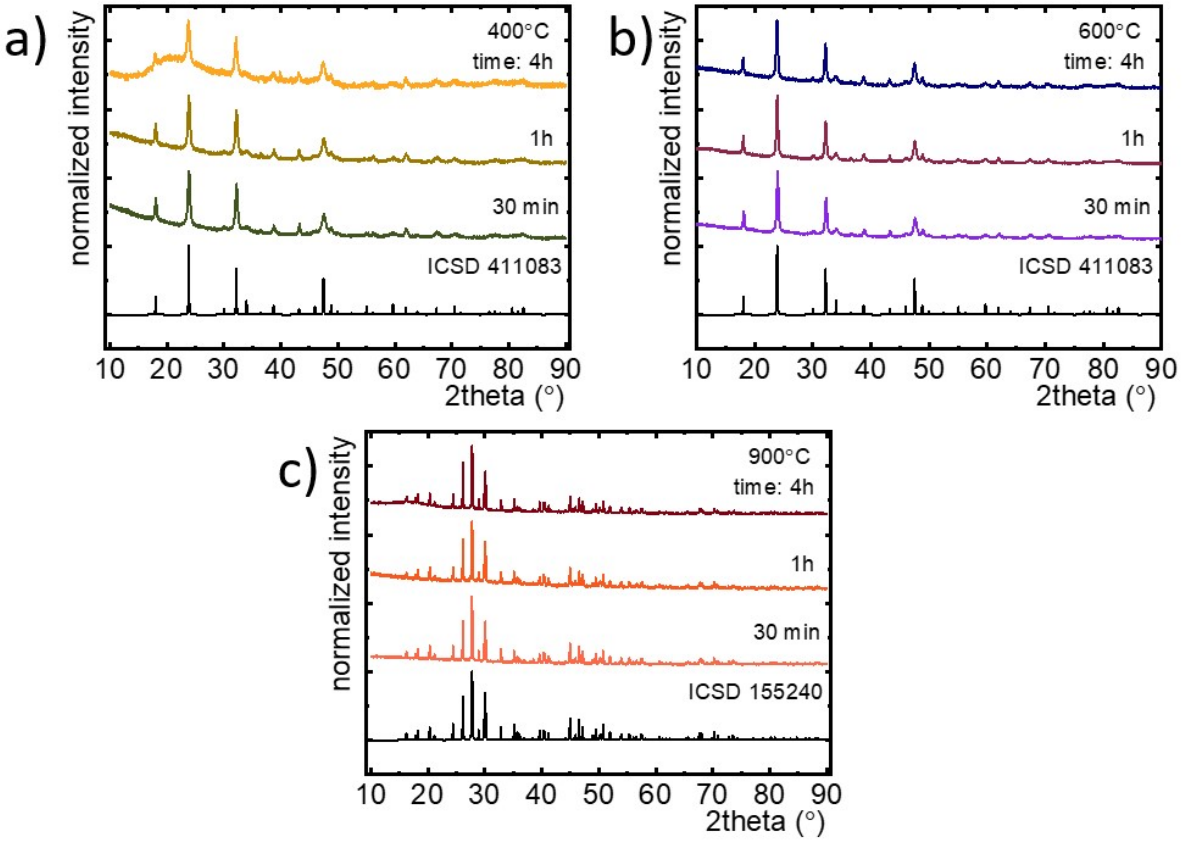

Figure S1. The comparison of XRD patterns for $LaVO_4$:1%Eu^{3+} annealed at: 400°C -a), 600°C -b) and 900°C -c) as a function of time.

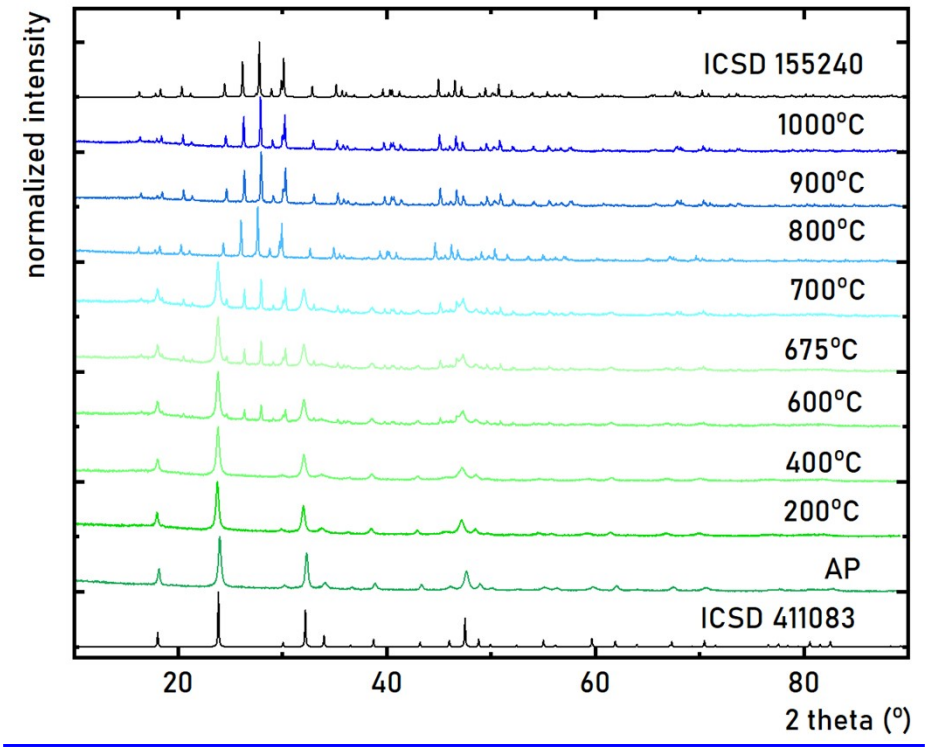

Figure S2. The XRD patterns of $LaVO_4$:1%Eu^{3+} annealed at different temperatures.

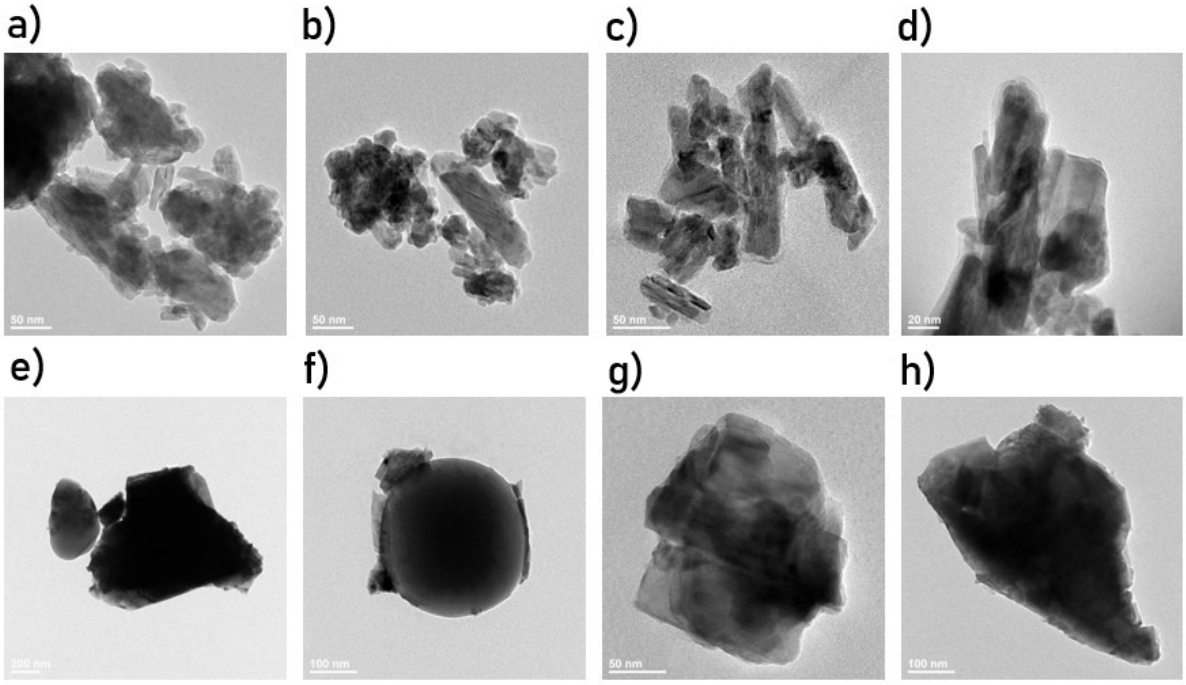

Figure S3. The TEM images of the $LaVO_4$:Eu^{3+} annealed at 400°C-a-d; and at 800°C e-h).

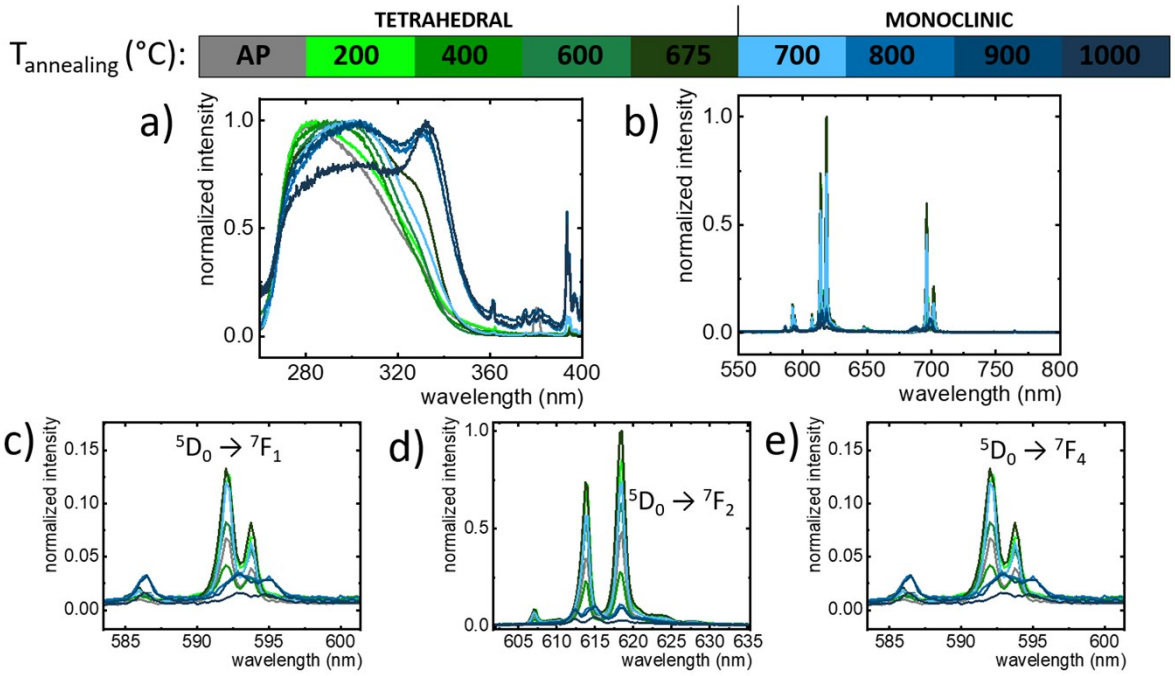

Figure S4. The comparison of excitation spectra upon monitoring the emission at 618 nm – a) and emission spectra upon excitation at 266 nm – b) as a function of annealing temperature for tetrahedral and monoclinic $LaVO_4$:1%Eu^{3+} nanocrystals; magnified view of particular emission bands of Eu^{3+} ions: $^5D_0 \rightarrow {}^5F_1$ – c), $^5D_0 \rightarrow {}^5F_2$ – d) and $^5D_0 \rightarrow {}^5F_4$ – e) obtained at RT.

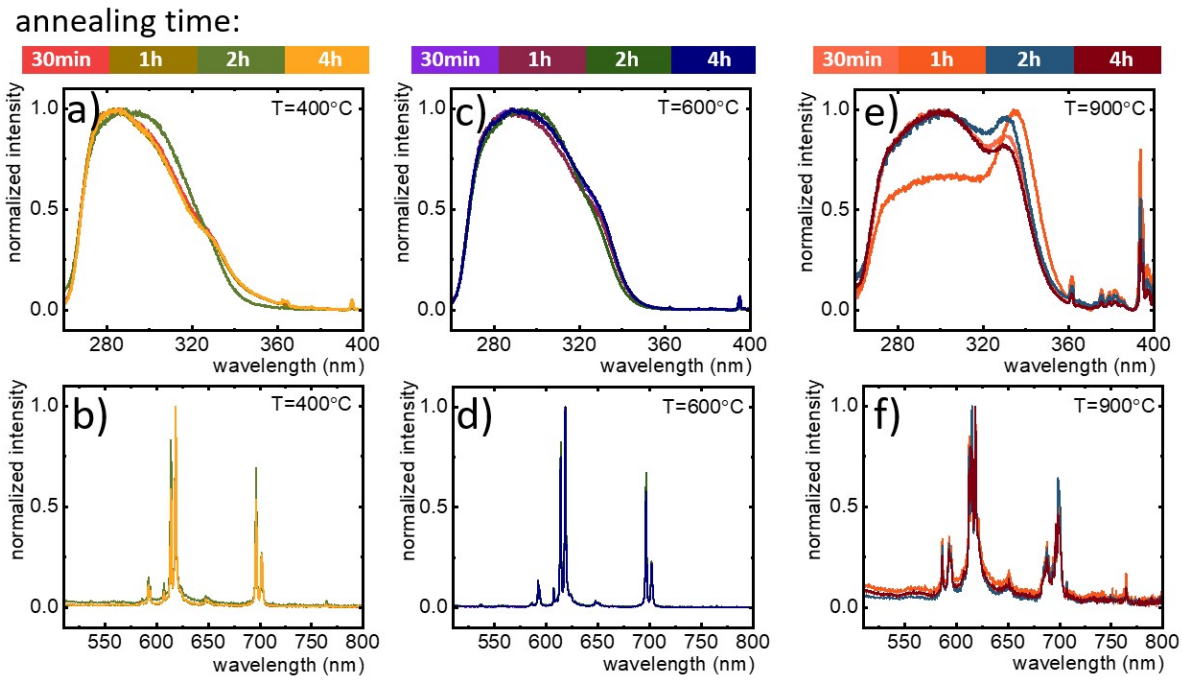

Figure S5. The comparison of excitation spectra upon monitoring the emission at 618 nm – a, c, e) and emission spectra upon excitation at 266 nm – b, d, f) as a function of annealing time for Eu^{3+}-doped $LaVO_4$ nanocrystals annealed at 400°C, 600°C and 900°C obtained at RT.

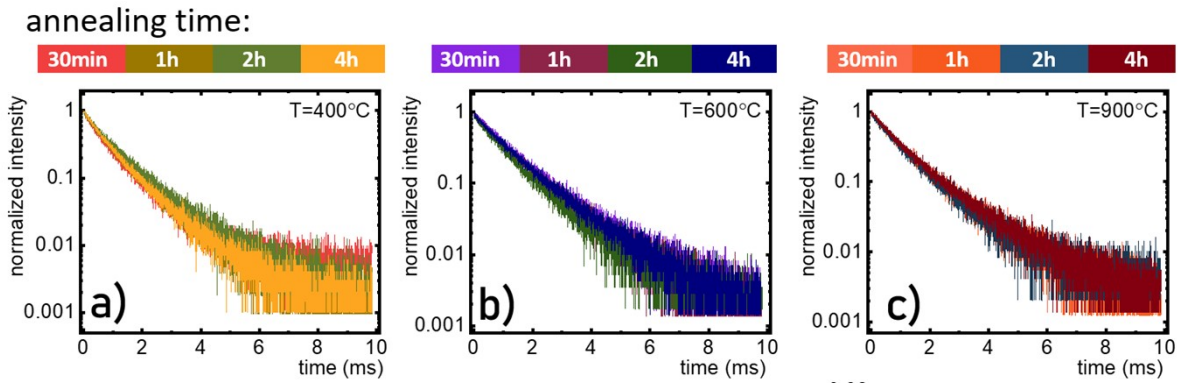

Figure S6. Luminescence decay curve from $^5D_0$ state of Eu^{3+} ions in $LaVO_4$:Eu^{3+} annealed at 400°C-a), 600°C-b) and 900°C-c) for different time.

The LIR vs annealing temperature dependence presented in Figure 3c can be fitted using the following polynomial function:

$$LIR = 14.83 - 0.062T + 2.51 \cdot 10^{-4} T^2 - 3.61 \cdot 10^{-7} T^3 + 1.62 \cdot 10^{-10} T^4 \quad \text{(S1)}$$

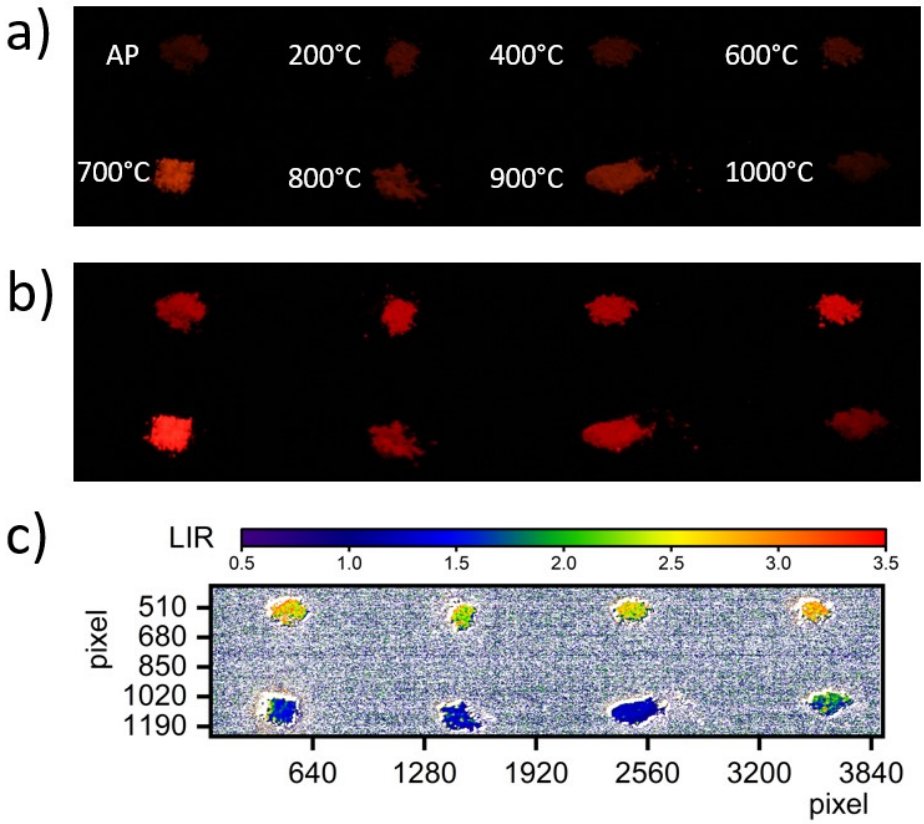

Figure S7. The photographs of the series of $LaVO_4$:1% Eu^{3+} nanocrystals AP and annealed at 200°C, 400°C, 600°C, 700°C, 800°C, 900°C, 1000°C taken with the use of 590 nm – a) and 620 nm – b) bandpass filters, the map of LIR distribution – c).

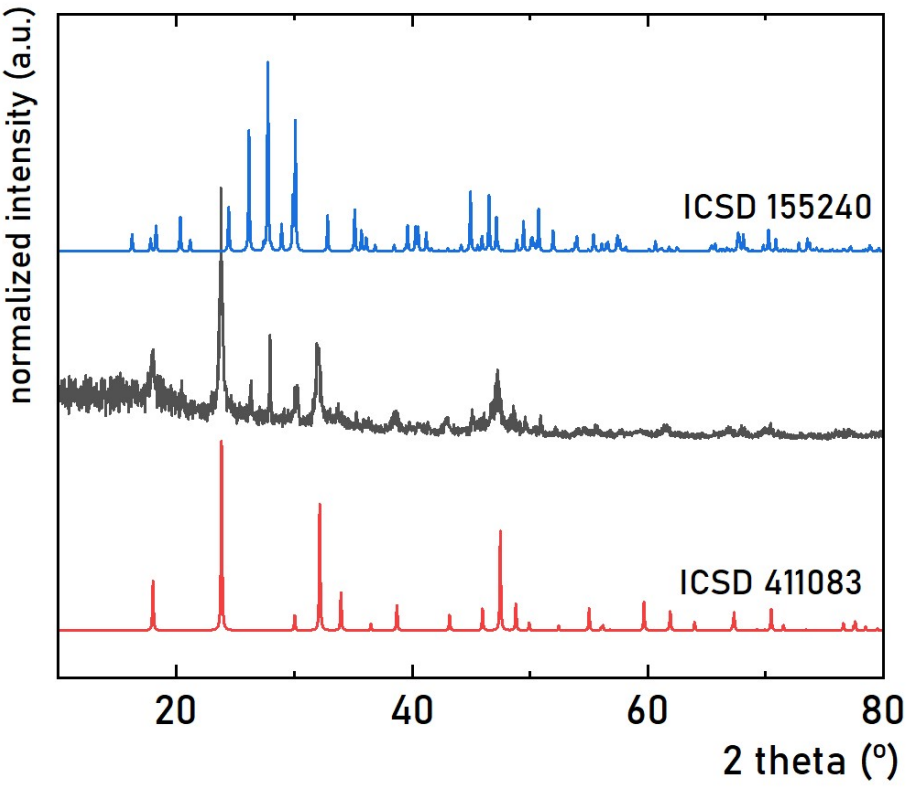

Figure S8. The XRD patter of $LaVO_4$:1% Eu^{3+} annealed at 600°C for 5 minutes.