Supplementary material

Boltzmann-type cryogenic ratiometric thermometry based on Nd^{3+}-doped LuVO$_4$ phosphors

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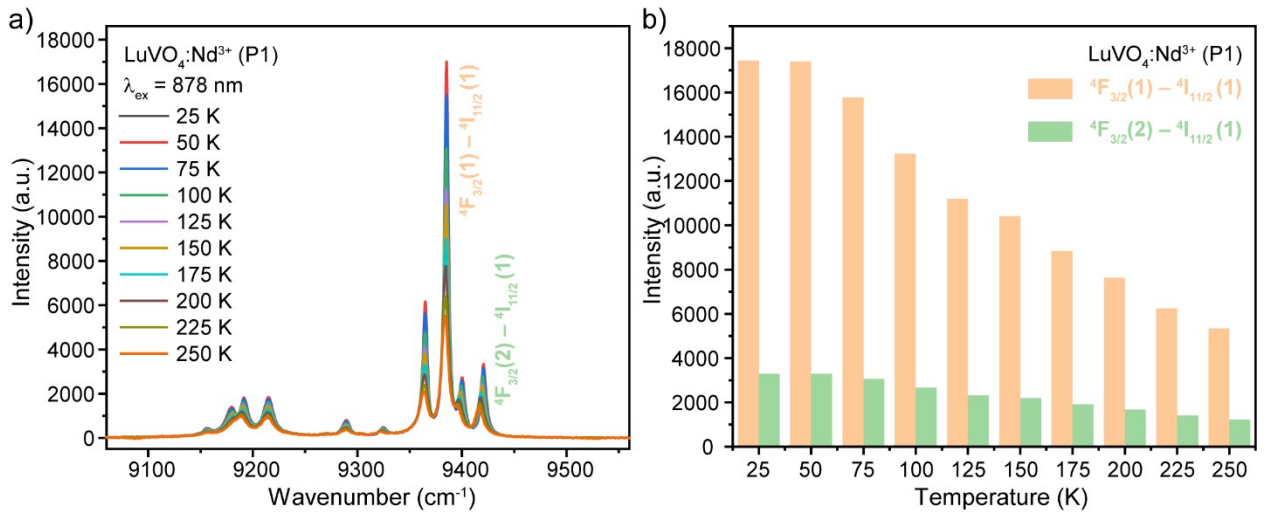
Figure S1. a) Emission spectra of LuVO$_4$:Nd^{3+} 1 at.% sample (P1) at different temperatures (λ_{ex} = 878 nm), b) temperature dependence of the peak emission intensities of $^4F_{3/2}(2) - {}^4I_{11/2}(1)$ and $^4F_{3/2}(1) - {}^4I_{11/2}(1)$ transitions.
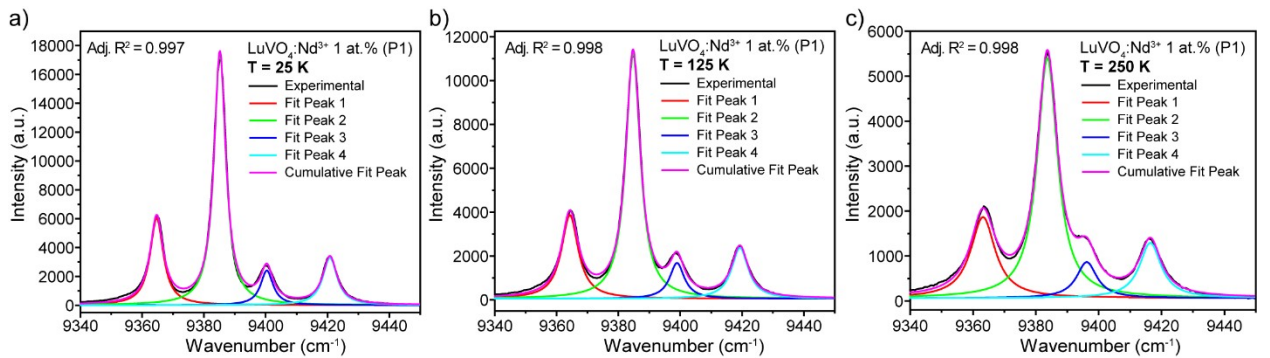

Figure S2. Deconvolution of emission spectra (λ_{ex} = 878 nm) of LuVO$_4$:Nd^{3+} 1 at.% sample (P1) at different temperatures: a) 25 K; b) 125 K; c) 250 K.
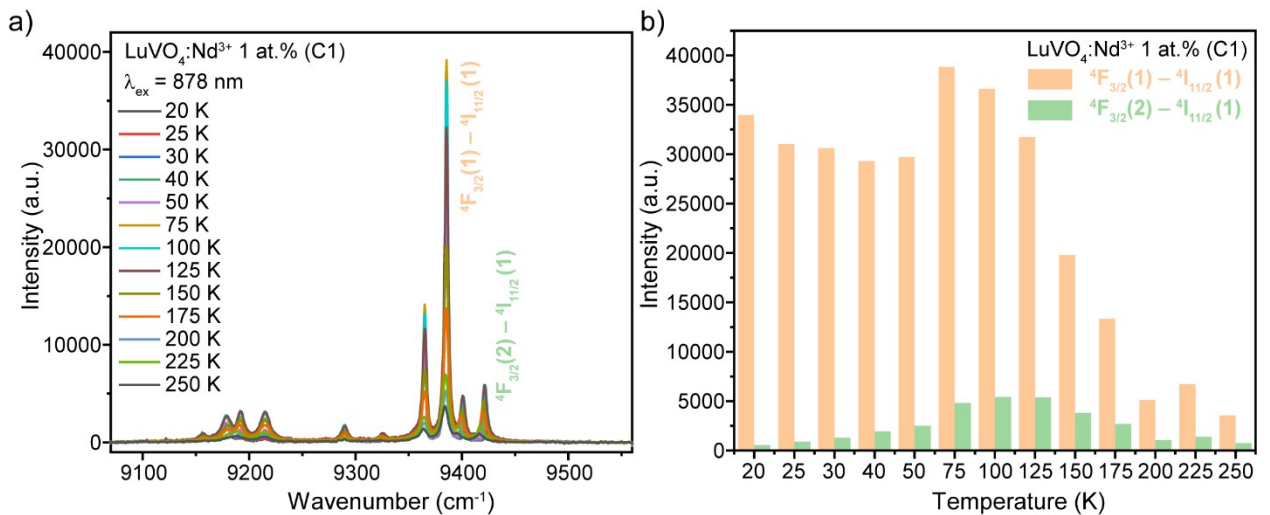

Figure S3. a) Emission spectra of LuVO$_4$:Nd^{3+} 1 at.% sample (C1) at different temperatures (λ_{ex} = 878 nm), b) temperature dependence of the peak emission intensities of $^4F_{3/2}(2) - {}^4I_{11/2}(1)$ and $^4F_{3/2}(1) - {}^4I_{11/2}(1)$ transitions.
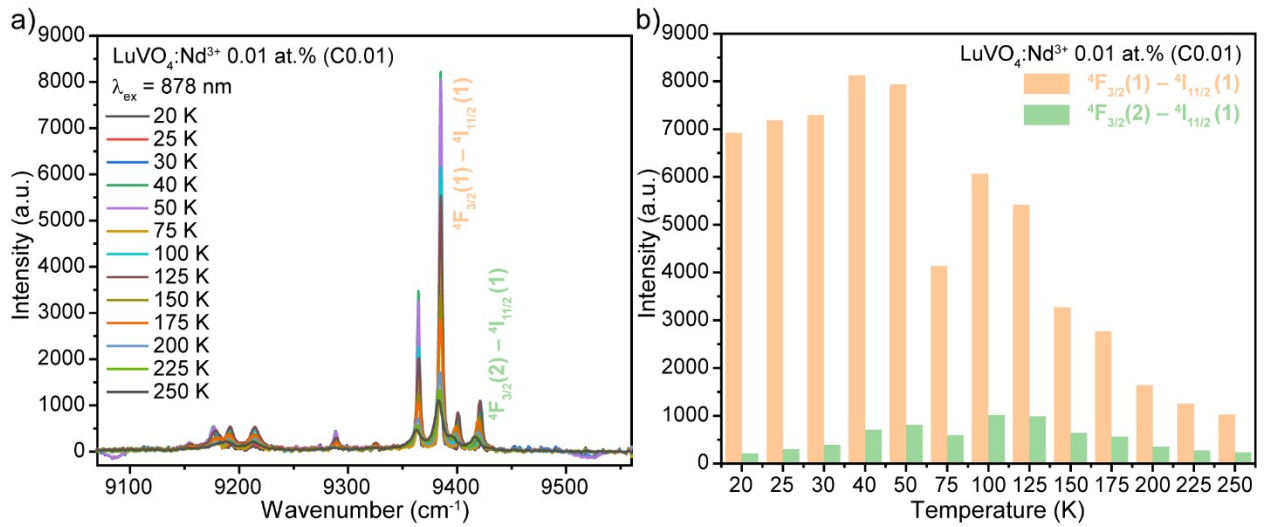
Figure S4. a) Emission spectra of LuVO$_4$:Nd^{3+} 0.01 at.% sample (C0.01) at different temperatures (λ_{ex} = 878 nm), b) temperature dependence of the peak emission intensities of $^4F_{3/2}(2) - {}^4I_{11/2}(1)$ and $^4F_{3/2}(1) - {}^4I_{11/2}(1)$ transitions.
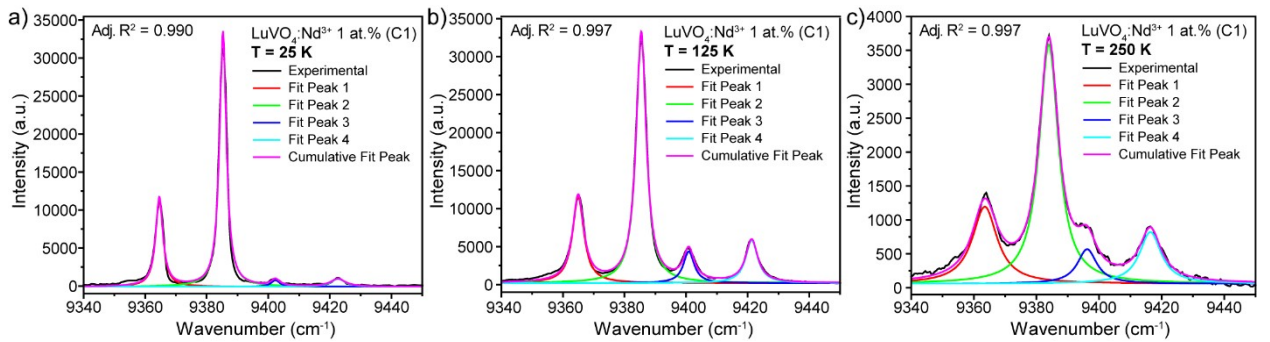

Figure S5. Deconvolution of emission spectra (λ_{ex} = 878 nm) of LuVO$_4$:Nd^{3+} 1 at.% sample (C1) at different temperatures: a) 25 K; b) 125 K; c) 250 K.
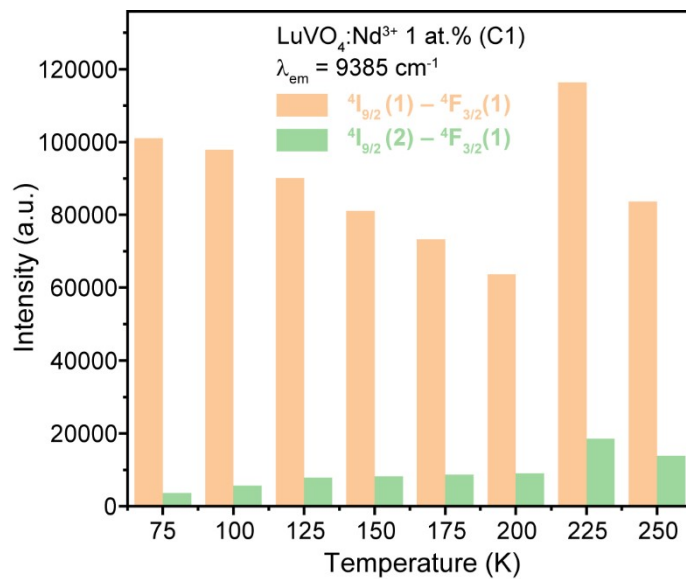

Figure S6. Temperature dependence of the peak emission intensities of $^4I_{9/2}(1) - {}^4F_{3/2}(1)$ and $^4I_{9/2}(2) - {}^4F_{3/2}(1)$ transitions.