Supporting Information

A single-band ratiometric luminescent thermometer based on tetrafluorides operating entirely in the infrared region

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KEYWORDS excited state absorption, SBR approach, luminescence thermometry, fluoride, neodymium

Figure S1. Shift of Bragg reflections towards lower angles for high concentrations of Nd³⁺ ions in NaYF₄ (a) and NaGdF₄ (b) host. At the top of figure b) a pattern for NaYF₄ is also shown,
allowing comparison of the shift of Bragg reflections in the NaGdF$_4$ matrix relative to those in the NaYF$_4$ counterpart.

Figure S2. The hydrodynamic size distribution of representative NaYF$_4$ (a-f) and NaGdF$_4$: (g-l) doped with different Nd$^{3+}$ concentration ranging from 0.1% to 50% determined from DLS measurement.
Figure S3. Nd$^{3+}$ ions concentration impact on excitation spectra monitored at 1058 nm (a), emission spectra upon 793 nm excitation (b), the kinetics at 123 K of the excited $^4F_{3/2}$ state (c) and average decay time of $^4F_{3/2}$ level at 123K (d) in NaGdF$_4$ host.
Figure S4. The comparison of the emission spectra upon 793 nm excitation for NaYF$_4$:Nd$^{3+}$.

Figure S5. Decay curve and fit curve of the ExpDec2 function of an example NaYF$_4$:2%Nd$^{3+}$ sample. The table shows the parameter values used to calculate the average time with the double-exponential function according to Equation 1.
Equation in the two-exponential ExpDec2 model:

\[ y = A_1 \cdot e^{-\frac{x}{\lambda_1}} + A_2 \cdot e^{-\frac{x}{\lambda_2}} + y_0 \]  

(eq. S1)

Figure S6. Dependence of unit cell volume on the concentration of Nd\(^{3+}\) ions in the host NaYF\(_4\) (a) and NaGdF\(_4\) (b)
Figure S7. The temperature resolution of Nd$^{3+}$-doped NaYF$_4$ and NaGdF$_4$ based LTs (a and b, respectively).