

Supplementary materials

**Application Convenient and Energy-saving Mechano-optics of Er³⁺-
doped X₂O₂S (X=Y/Lu/Gd) for thermometry**

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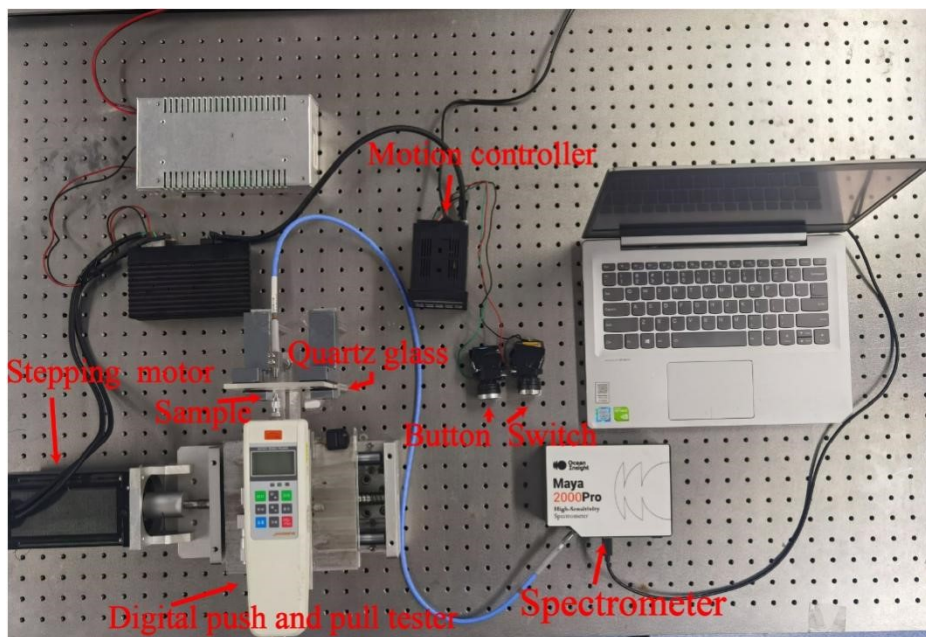


Figure S1. Practical experimental setup of ML measurement.

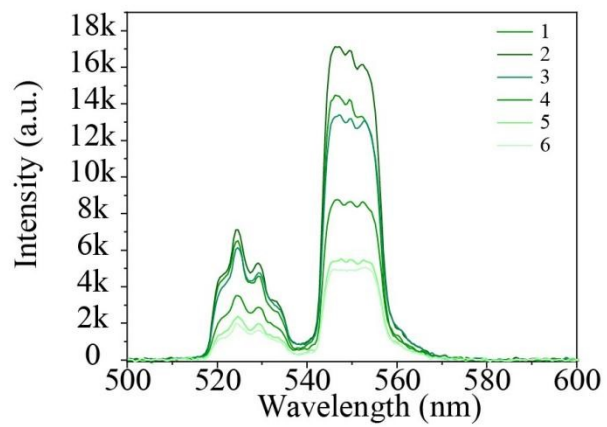


Figure S2. ML spectra of Y₂O₂S:xEr³⁺ (x=1%, 2%, 3%, 4%, 5%, and 6%) under the same external force stimulation.

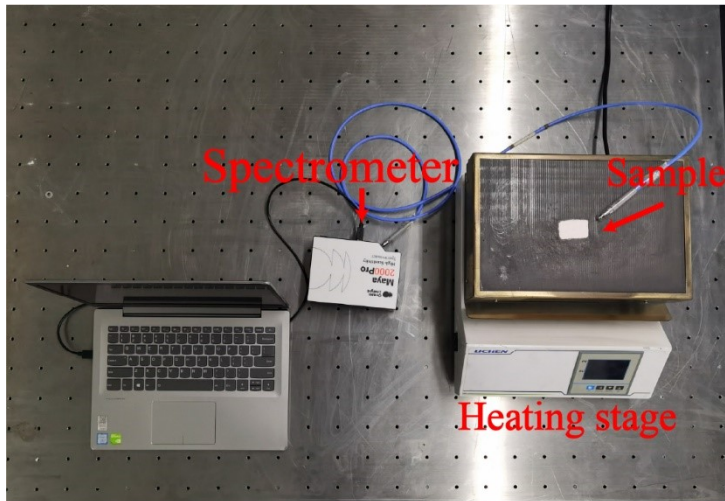


Figure S3. Practical experimental setup of ML measurement at different temperatures.

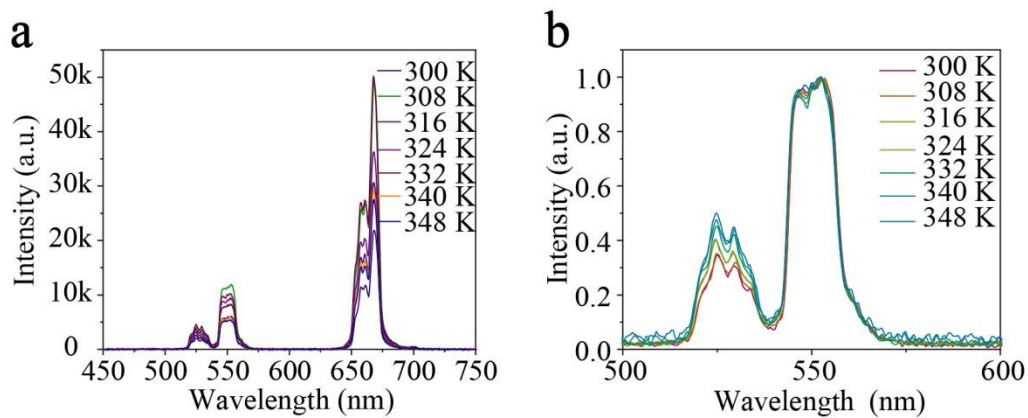


Figure S4. (a) Original and (b) normalized ML spectra of $\text{Y}_2\text{O}_2\text{S}:2\%\text{Er}^{3+}$ at different temperatures from 300 to 348 K.

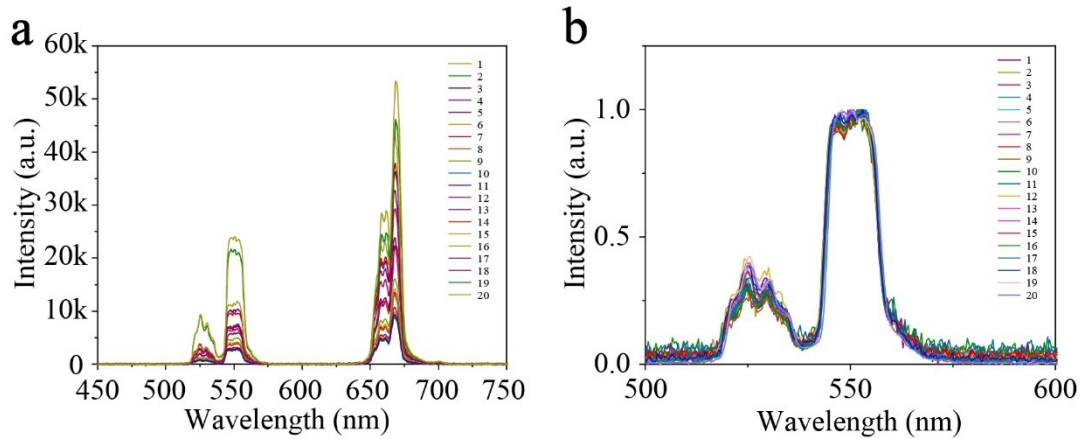


Figure S5. (a) Original and (b) normalized ML spectra of $Y_2O_2S:2\%Er^{3+}$ phosphors under stimulation of different external force.

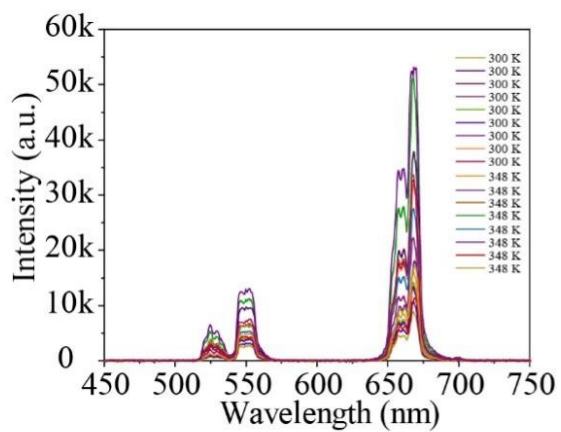


Figure S6. ML spectra of Y₂O₂S:2%Er³⁺ phosphors at 300 K and 348 K during the heating-cooling test.

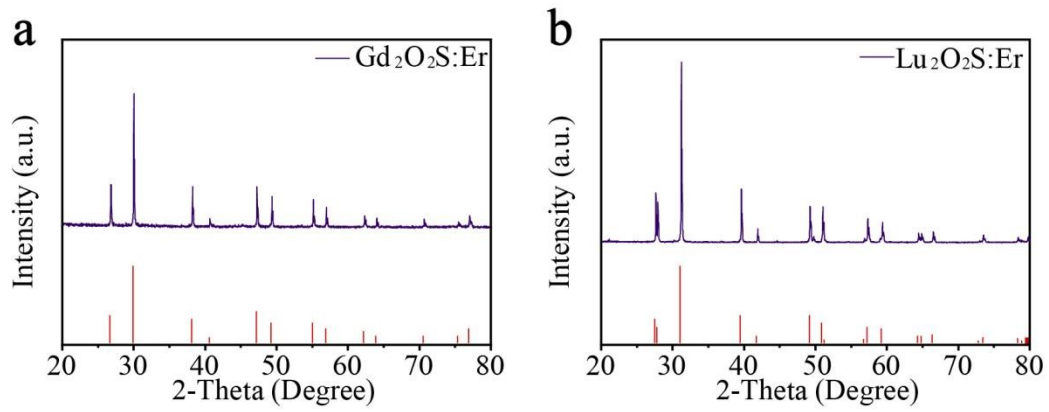


Figure S7. XRD results of **(a)** $\text{Gd}_2\text{O}_2\text{S}:\text{2\%Er}^{3+}$ and **(b)** $\text{Lu}_2\text{O}_2\text{S}:\text{2\%Er}^{3+}$.

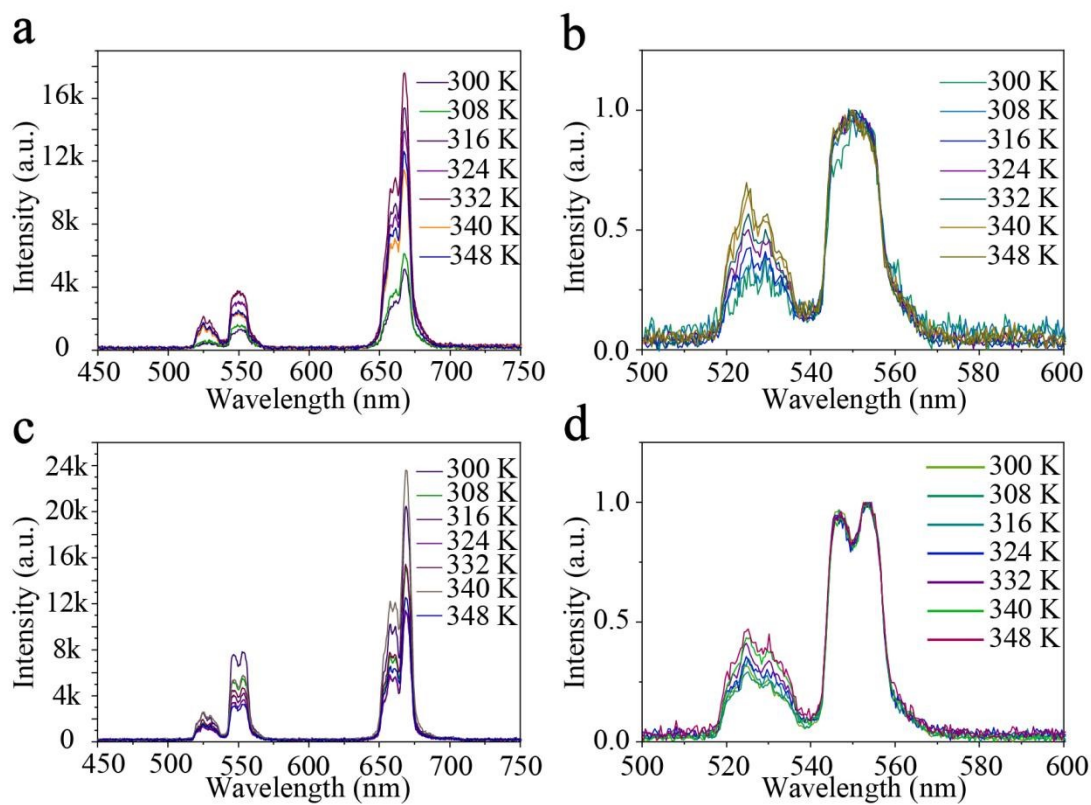


Figure S8. (a) Original and (b) normalized ML spectra of Gd₂O₂S:2%Er³⁺ at different temperatures from 300 to 348 K. (c) Original and (d) normalized ML spectra of Lu₂O₂S:2%Er³⁺ at different temperatures from 300 to 348 K.