Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting Information

Highly sensitive optical ratiometric thermometry by exciting the Eu^{3+}/Tb^{3+}'s unusual absorption lines

Leipeng Li,[a] Xudong Qi,[a] Feng Qin,[b] Lu Li,[c] Hong Gao,[c] Yangdong Zheng,[a] and Zhiguo Zhang[a,b,*]

[a] School of Physics, Harbin Institute of Technology, Harbin 150001, P. R. China.

[b] Condensed Matter Science and Technology Institute, School of Instrumentation Science and Engineering, Harbin Institute of Technology, Harbin 150001, P. R. China.

[c] Key Laboratory for Photonic and Electronic Bandgap Materials, Ministry of Education, School of Physics and Electronic Engineering, Harbin Normal University, Harbin 150025, China.

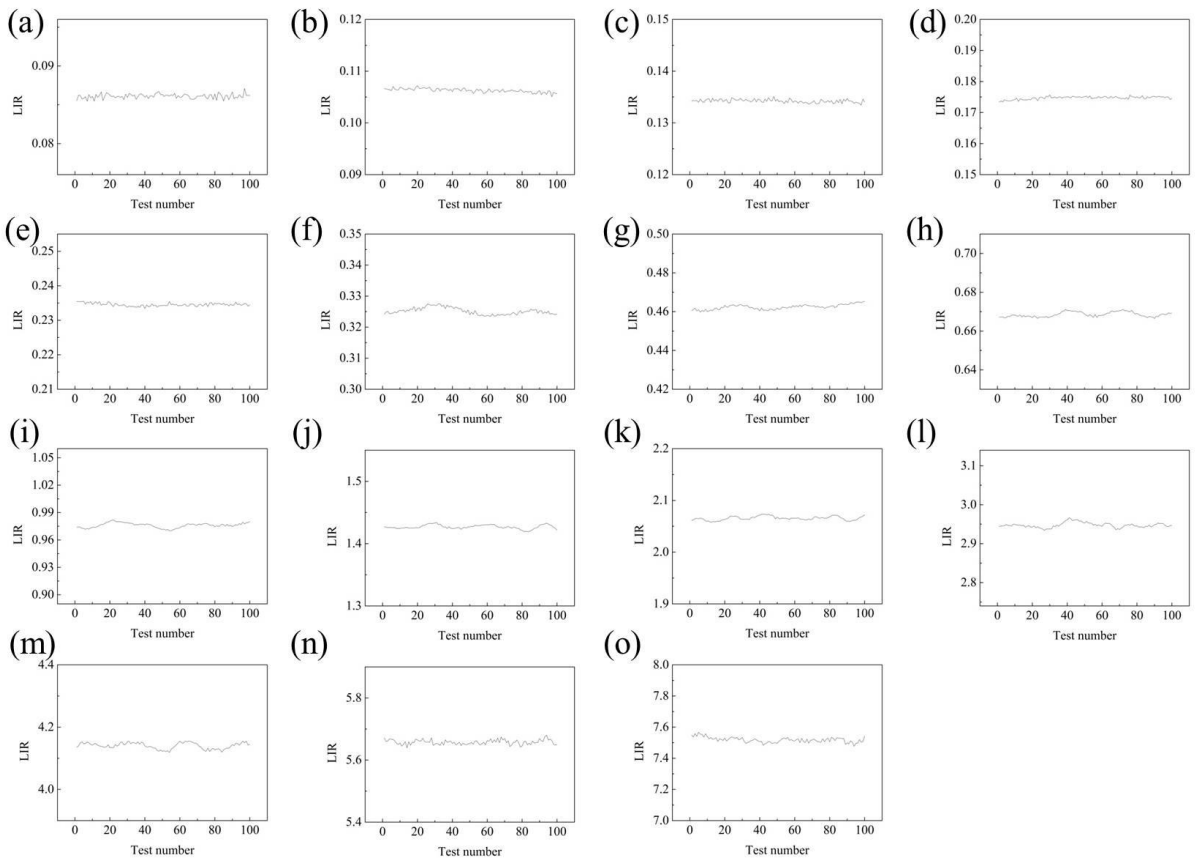

Figure S1. Consecutive measurement of LIR at (a)493K, (b)513K, (c)533K, (d)553K, (e)573K, (f)593K, (g)613K, (h)633K, (i)653K, (j)673K, (k)693K, (l)713K, (m)733K, (n)753K and (o)773K, respectively. At each selected temperature, there are 100 LIRs. These results were obtained at point 1 in our samples.

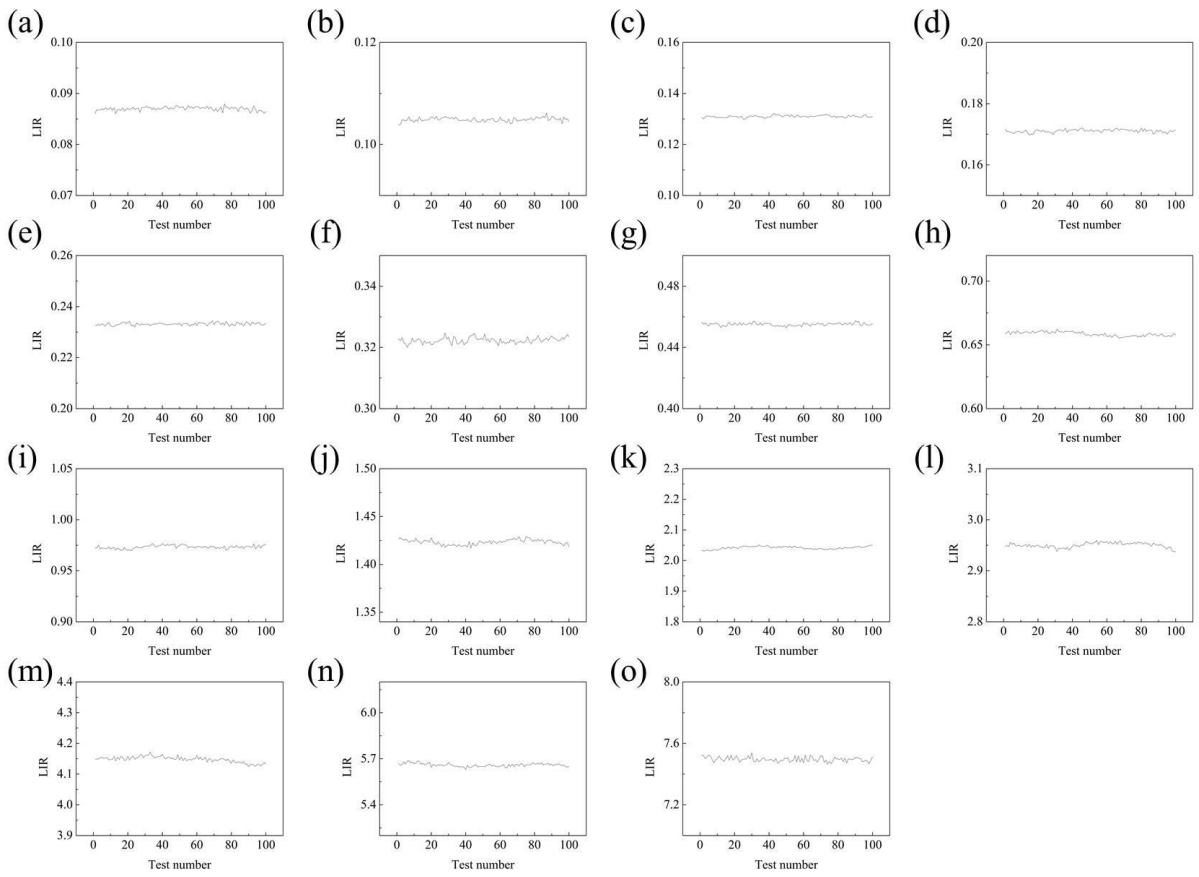

Figure S2. Consecutive measurement of LIR at (a)493K, (b)513K, (c)533K, (d)553K, (e)573K, (f)593K, (g)613K, (h)633K, (i)653K, (j)673K, (k)693K, (l)713K, (m)733K, (n)753K and (o)773K, respectively. At each selected temperature, there are 100 LIRs. These results were obtained at point 2 in our samples.

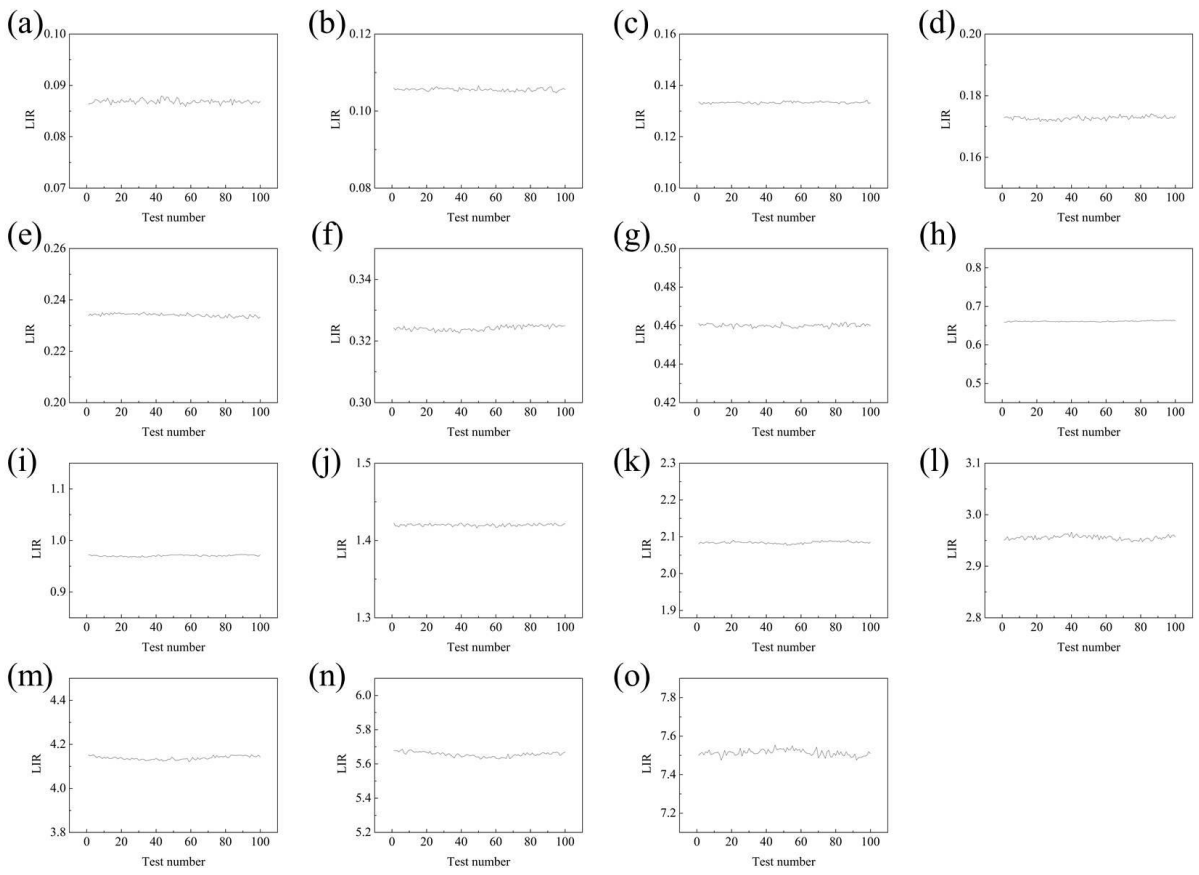

Figure S3. Consecutive measurement of LIR at (a)493K, (b)513K, (c)533K, (d)553K, (e)573K, (f)593K, (g)613K, (h)633K, (i)653K, (j)673K, (k)693K, (l)713K, (m)733K, (n)753K and (o)773K, respectively. At each selected temperature, there are 100 LIRs. These results were obtained at point 3 in our samples.

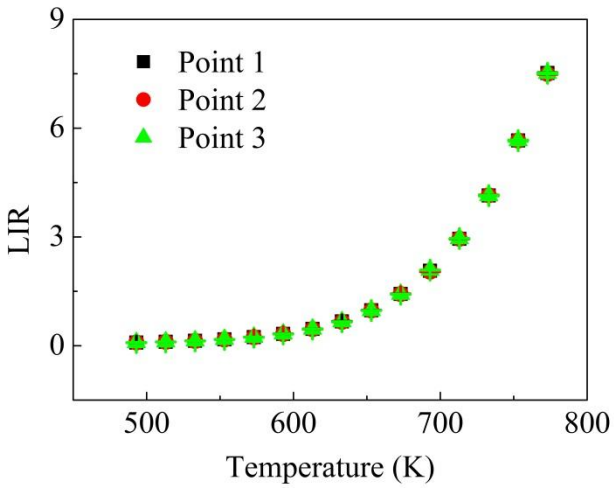

Figure S4. Comparison of consecutive measurement at point 1, point 2 and point 3 in our samples in the 493-773 K temperature range. This figure was obtained based on Figures S1-S3.

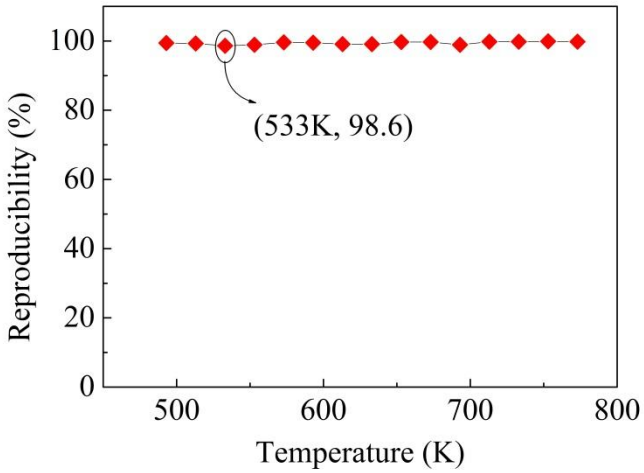

Figure S5. Reproducibility of the results in our work in the 493-773 K temperature range.

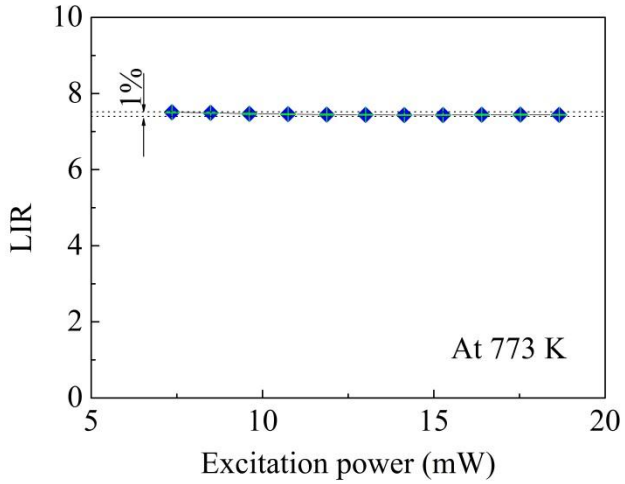

Figure S6. The LIR between the 545 and 614 nm emission bands as a function of excitation power at 773 K.

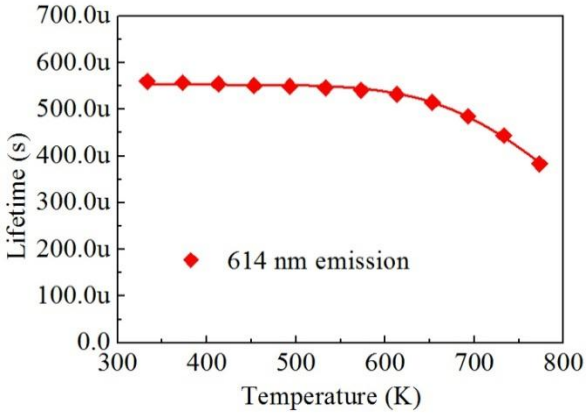

Figure S7. Lifetime of the 614 nm emission of the as-prepared phosphors as a function of temperature in the 333-773 K range.

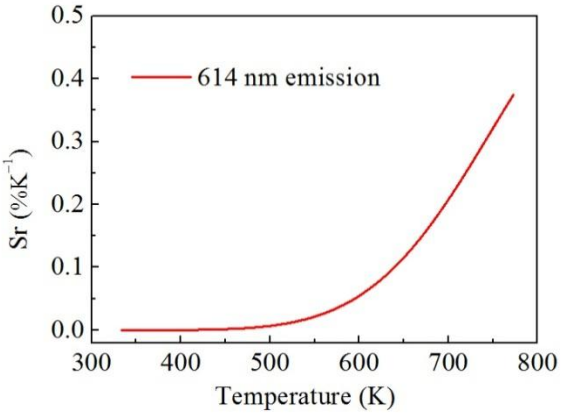

Figure S8. Relative sensitivity based on the lifetime of the 614 nm emission of the as-prepared phosphors as a function of temperature in the 333-773 K range.

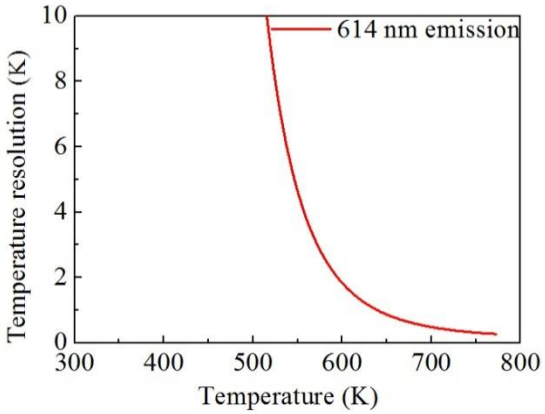

Figure S9. Temperature resolution based on the lifetime of the 614 nm emission of the as-prepared phosphors as a function of temperature in the 333-773 K range.