

## Supplementary Information

High-sensitivity and wide-temperature-range dual-mode optical thermometry under dual-wavelength excitation in novel double perovskite tellurate oxide

Zhaojie Wu, Li Li\*, Guang Tian, Yongjie Wang, Faling Ling, Zhongmin Cao, Sha Jiang, Guotao Xiang, Yanhong Li, Xianju Zhou\*\*

School of Science, Chongqing University of Posts and Telecommunications, Chongqing 400065, P. R. China

\* Corresponding author: [lilic@cqupt.edu.cn](mailto:lilic@cqupt.edu.cn) (L.Li); [zhouxj@cqupt.edu.cn](mailto:zhouxj@cqupt.edu.cn) (X. Zhou)

Table S1 Crystallographic and Rietveld refinement data of SrLaLiTeO<sub>6</sub>: 1.2%Mn<sup>4+</sup>, 0.7%Dy<sup>3+</sup> phosphor

Formula	SrLaLiTeO <sub>6</sub> : 1.2%Mn <sup>4+</sup> , 0.7%Dy <sup>3+</sup>
Space group	P2 <sub>1</sub> /n - monoclinic
Cell parameters	$a=5.606 \text{ \AA}$
	$b=5.620 \text{ \AA}$
	$c=7.930 \text{ \AA}$
Reliability factors	$\alpha=90^\circ, \beta=89.8315^\circ, \gamma=90^\circ$
	$R_{wp}=8.34\%$
	$R_p=5.71\%$
	$\chi^2=1.036$

Table S2 Atomic coordinates, cation and anion occupancies of SrLaLiTeO<sub>6</sub>: 1.2%Mn<sup>4+</sup>, 0.7%Dy<sup>3+</sup> phosphor

SrLaLiTeO <sub>6</sub> : 1.2%Mn <sup>4+</sup> , 0.7%Dy <sup>3+</sup>					
	x	y	z	Occupancy	$U_{\text{iso}}/\text{\AA}^2$
Sr	0.512	0.457	0.241	0.5	0.025
La/Dy	0.512	0.457	0.241	0.5	0.025
Li	0.5	0	0	1	0.025
Te/Mn	0	0.5	0	1	0.025
O1	0.302	0.305	-0.077	1	0.025
O3	0.191	0.776	-0.047	1	0.025
O4	0.419	0.982	0.248	1	0.02

Fig.S1 The diffuse reflection spectra of SLLT host, SLLT: 1.2% Mn<sup>4+</sup>, and SLLT: 1.2% Mn<sup>4+</sup>, 7% Dy<sup>3+</sup>.

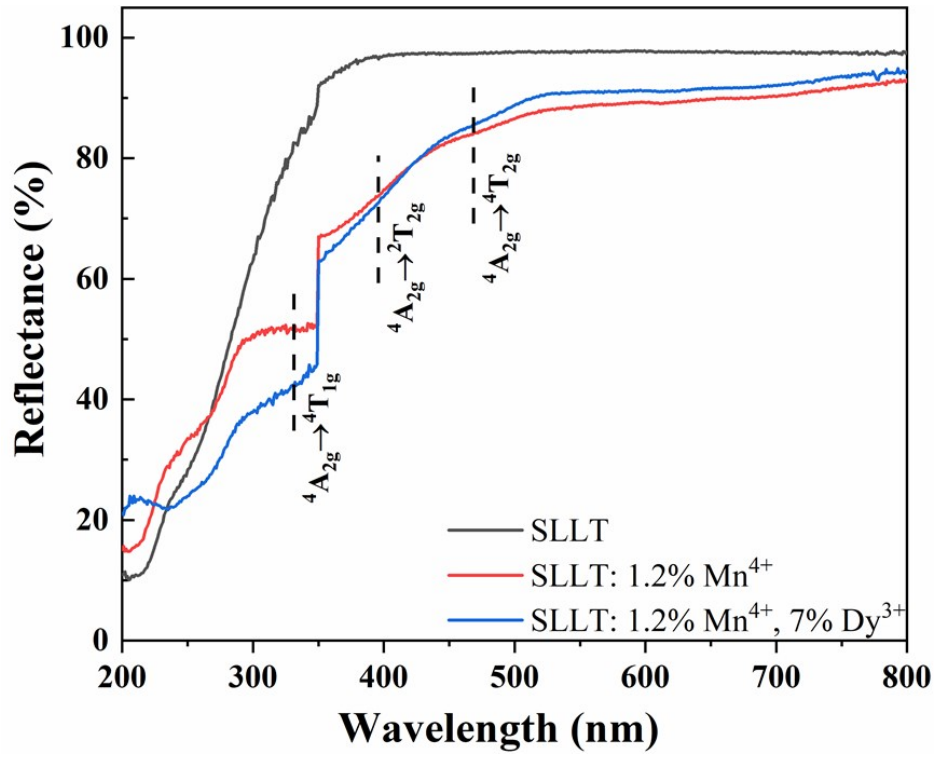


Fig.S2 The quenching mechanism of the  $Mn^{4+}$  in the SLLT host via configurational coordinate diagrams.

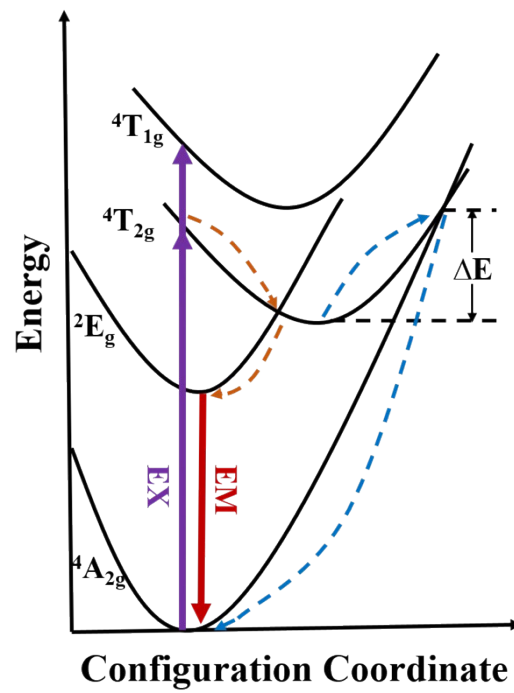


Fig. S3 The temperature resolution  $\delta T$  under 351nm (a) and 453nm excitation (c). The cycling measurement under 351nm (b) and 453nm excitation (d).

