

Electronic Supplementary Information

New Phenomena of Photo-luminescence and Persistent Luminescence of Eu^{2+} , Tb^{3+} Codoped $\text{Ca}_6\text{BaP}_4\text{O}_{17}$ Phosphor under High Hydrostatic Pressure

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Experimental Section

The sample for investigations was $\text{Ca}_6\text{BaP}_4\text{O}_{17}:\text{Eu}^{2+},\text{Tb}^{3+}$ (CBPO:Eu,Tb), in which the doping concentration of Eu^{2+} ions is 2% and that of Tb^{3+} ions is 1.5%. The specific preparation process can be found in Ref. 1. The specific proportion of each element were measured under the inductively coupled plasma optical emission spectrometry (ICPOES, PQ 9000), as shown in Table S1. It can be seen that the element ratios (Ca/Ba and Eu/Tb) are relatively accurate and the doping concentration of Eu and Tb elements measured by ICPOES is lower than the expected value, which may be caused by the low doping concentration. The photo luminescence (PL) and persistent luminescence (PersL) spectra at high pressure were collected from the State Key Laboratory of Superhard Materials of Jilin university. All in-situ high pressure experiments are performed in a symmetric diamond-anvil cell (DAC) apparatus at room temperature. In this case, the pressure transmitting medium is silicon oil with a viscosity of 10 cSt produced by Dow Corning Corporation. The excitation wavelength of all the luminescence measurements is 355 nm. During the PersL spectrum measurement, the excitation time and time interval were 150 ms. The PersL decay time is the total time when the PersL cannot be detected by the instrument after the

light source is turned off. In addition, the Powder X-ray diffraction (XRD) measurement at high pressure was performed by Rigaku MicroMax-007HF X-ray diffractometer ($\lambda_{\text{Mo}}=0.7103 \text{ \AA}$) at the Institute for Solid State Physics (ISSP), University of Tokyo. The pressure transmitting medium is methanol and ethanol in a ratio of 3:1.

Table S1 ICPOES elemental analysis of $\text{Ca}_6\text{BaP}_4\text{O}_{17}:2\%\text{Eu}^{2+}, 1.5\%\text{Tb}^{3+}$

	Ca	Ba	Eu	Tb
wt%	60.54	35.8	0.33	0.25
mol%	1.5	0.26	0.00217	0.00157
Composition	Ca/Ba=6:1.04 Eu/Tb=2:1.447			

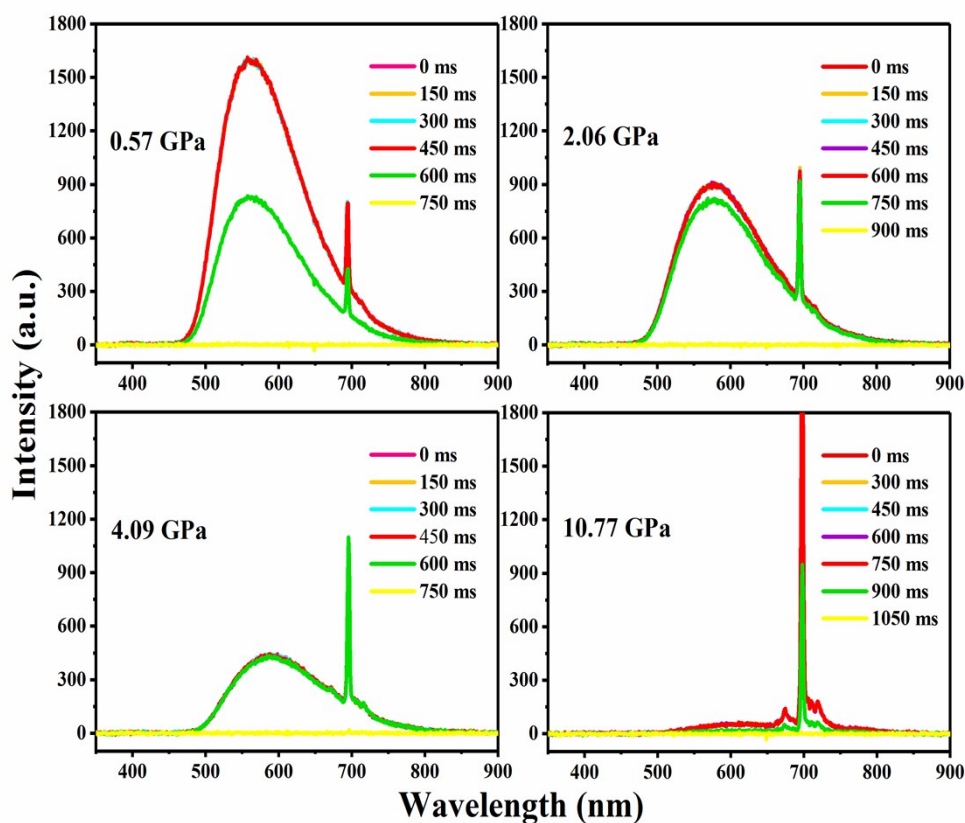


Fig. S1 In situ PersL spectra as a function of pressure in the range of 0.57 and 10.77 GPa.

References

- 1 H.J. Guo, Y.H. Wang, W.B. Chen, W. Zeng, S.C. Han, G. Li, Y.Y. Li, *J. Mater. Chem. C.*, 2015, **3**, 11212-11218.