Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Materials

Regulating trap distribution to achieve high-contrast mechanoluminescence with extended saturation threshold through co-doping Nd^{3+} in CaZnOS: Bi^{3+}, Li^{+}

Jiayong Yuan[a], Yunling Yang[a], Xuechun Yang[a], Yuting Fan[a], Ting Li[b], Meng Huang[a], Fan Zhang[c], Qianli Li[a], Jingtai Zhao[d], Zhijun Zhang[a,*]

[a] School of Materials Science and Engineering, Shanghai University, Shanghai 200072, China

[b] School of Materials Science and Engineering, Guilin University of Technology, Guangxi 541000, China

[c] Department of Chemistry, State Key Laboratory of Molecular Engineering of Polymers and iChem, Shanghai Key Laboratory of Molecular Catalysis and Innovative Materials, Fudan University, Shanghai 200433, China

[d] School of Materials Science and Engineering, Guilin University of Electronic Technology, Guilin 541004, China

*Corresponding author: zhangzhijun@shu.edu.cn (Z. Zhang)

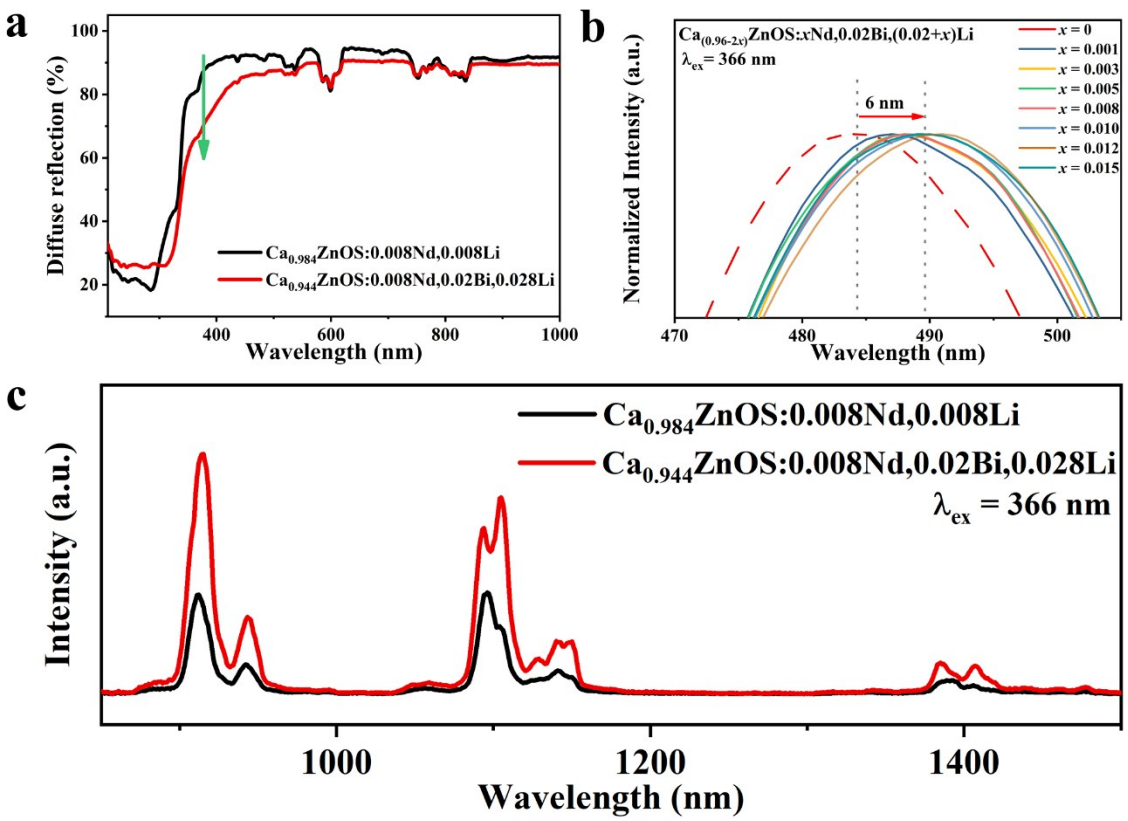

Figure S1. (a) Diffuse reflection spectra of CZOS: 0.008Nd, Li and CZOS: 0.008Nd, Bi, Li. (b) Normalized PL intensity of Bi^{3+} in CZOS: *x* Nd, Bi, Li (λ_{ex} = 366 nm). (c) PL spectra of Nd^{3+} in CZOS: 0.008Nd, Li and CZOS: 0.008Nd, Bi, Li (λ_{ex} = 366 nm).

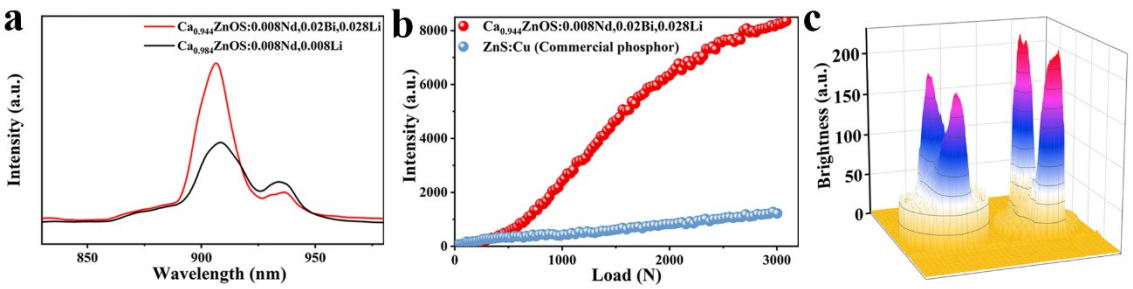

Figure S2. (a) Comparison of NIR-ML from Nd^{3+} between CZOS: 0.008Nd, Bi, Li and CZOS: 0.008Nd, Li. (b) Comparison of vis-ML between CZOS: 0.008Nd, Bi, Li and commercial phosphors ZnS: Cu. (c) 3D brightness distribution curves of CZOS: Bi, Li and CZOS: 0.001Nd, Bi, Li when load = 1500 N.

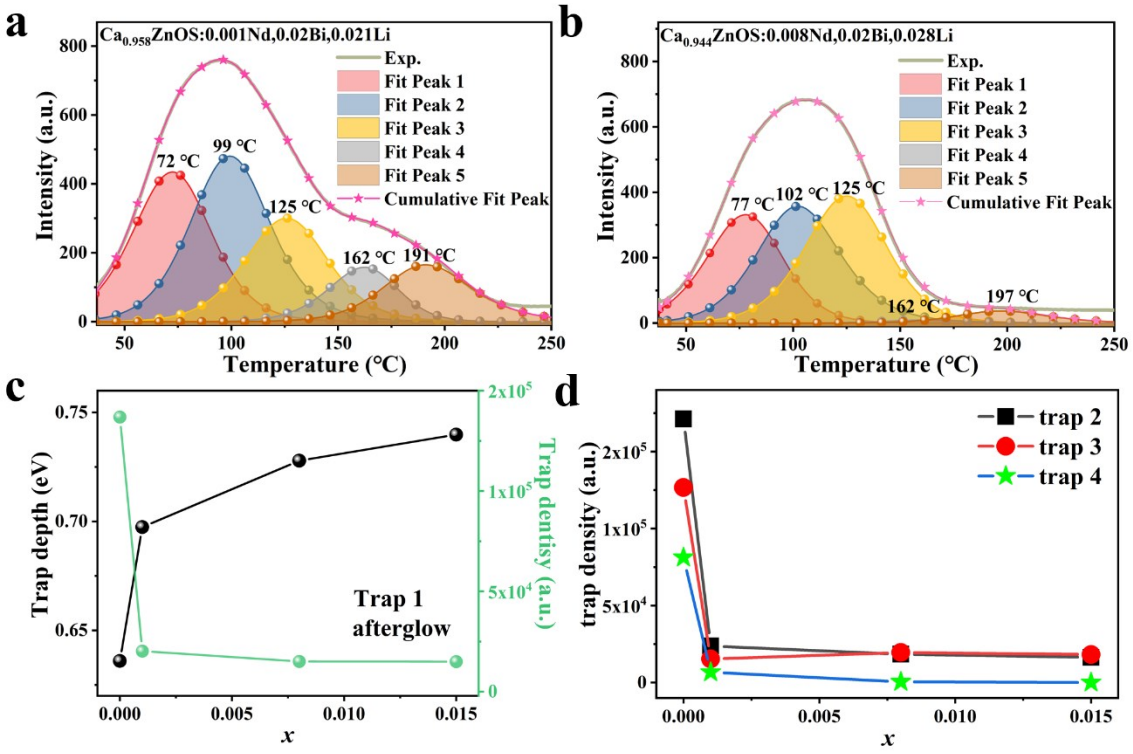

Figure S3. (a-b) The ThL spectra of CZOS: *x* Nd, Bi, Li (*x* = 0.001, 0.008) phosphors and the fitting results at 484 nm wavelength. (c) The depth and density of trap 1 with different Nd^{3+} co-doping concentration. (d) The comparison of trap density of trap 2-4 with different Nd^{3+} co-doping concentration.

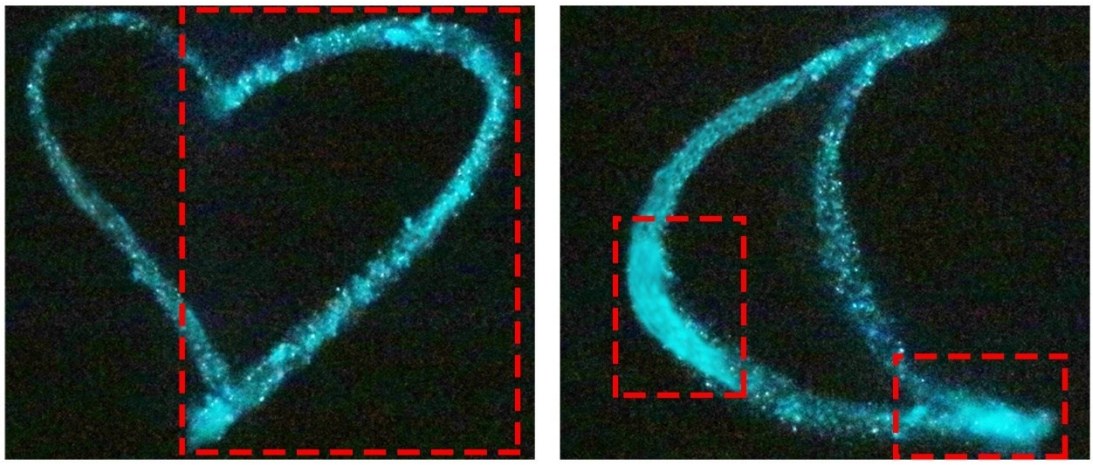

Figure S4 The ML image of handwriting by writing “heart” and “star”.

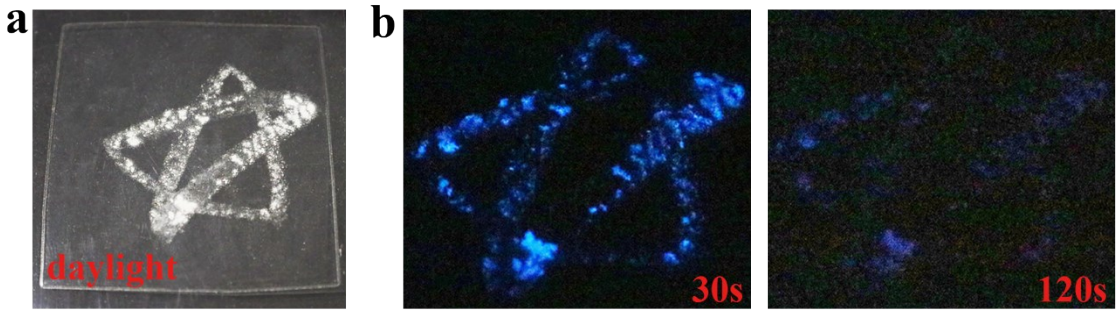

Figure S5. (a) The photograph of handwriting card written with ML pencil and sealed with PET and EVA. (b) The AG image of handwriting card after stopping UV lamp at 30 and 120 s.

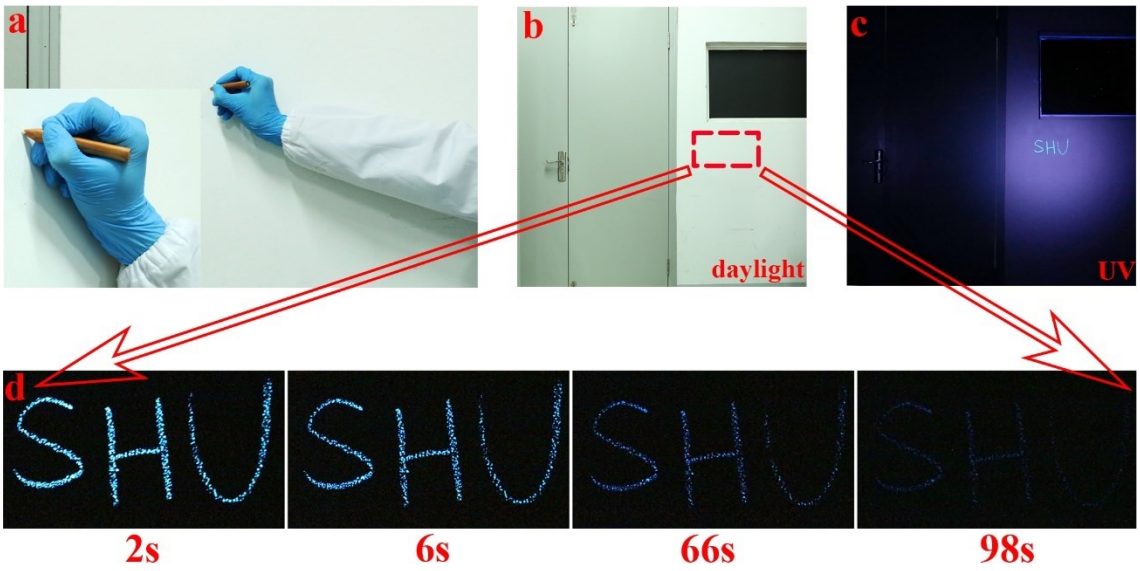

Figure S6. (a) The photograph of writing on the wall with ML pencil. (b-c) The handwriting in the daylight and with UV lamp irradiation, respectively. (d) The AG images after UV lamp stopping at 2, 6, 66 and 98 s.

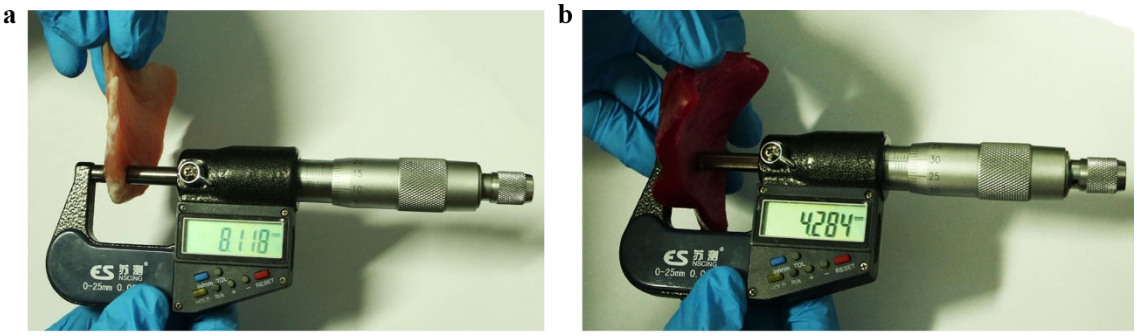

Figure S7. The photograph of the thickness of pork (a) and pericarp from pitaya (b).

Figure S8. The partial enlarged photograph of pericarp from pitaya. The white “vein” corresponds to the transfusion tissue.