Supporting information

Optimizing and adjusting photoluminescence of Mn⁴⁺ doped fluoride

phosphors via forming composite particles

Yiwen Zhu,^a Shuo Yuan,^a Lin Huang,^d Yong Liu,^d Xinyue Li,^a Jiasong Zhong,^a Yifan Chen,^{ac} Daqin Chen^{*ab} and Jing Wang^{*d}

 ^aCollege of Materials & Environmental Engineering, Hangzhou Dianzi University, Hangzhou, 310018, P. R. China. E-mail: dqchen@hdu.edu.cn.
^bCollege of Physics and Energy, Fujian Normal University, Fuzhou, 350117, P. R. China.
^cState Key Lab of Silicon Materials, Department of Materials Science and Engineering, Zhejiang University, Hangzhou 310027, P. R. China.
^dSchool of Chemistry, School of Materials Science and Engineering, Sun Yat-sen

University, No. 135, Xingang Xi Road, Guangzhou, 510275, P. R. China. E-mail: <u>ceswj@mail.sysu.edu.cn</u>.



Figure S1. XRD pattern of K₂Li_{0.99}Na_{0.01}AlF₆.



Figure S2. Contrast of XRD patterns of two kinds of hosts. The colorful lines are mixture phases $K_2Li_{1-x}Na_xAlF_6$ (x = 0.05, 0.1, 0.2, 0.3) and the black lines are mixtures (1-y $K_2LiAlF_6 + y K_2NaAlF_6$) (y = 5 %, 10 %, 20 %, 30 %).



Figure S3. (a) HAADF-STEM image, (b) EDS image and (c) EELS

image acquired by point 1 of A3 sample.



Figure S4. Diffuse reflectance spectra of A1-A4, B1-B4 and KLAF.



Figure S5. ESR spectra of A1-A4 and B1-B4.