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

Supporting Information

Organic Solvent-Assisted Synthesis of $K_3SiF_7:Mn^{4+}$ Red Phosphor with Improved Morphology and Stability

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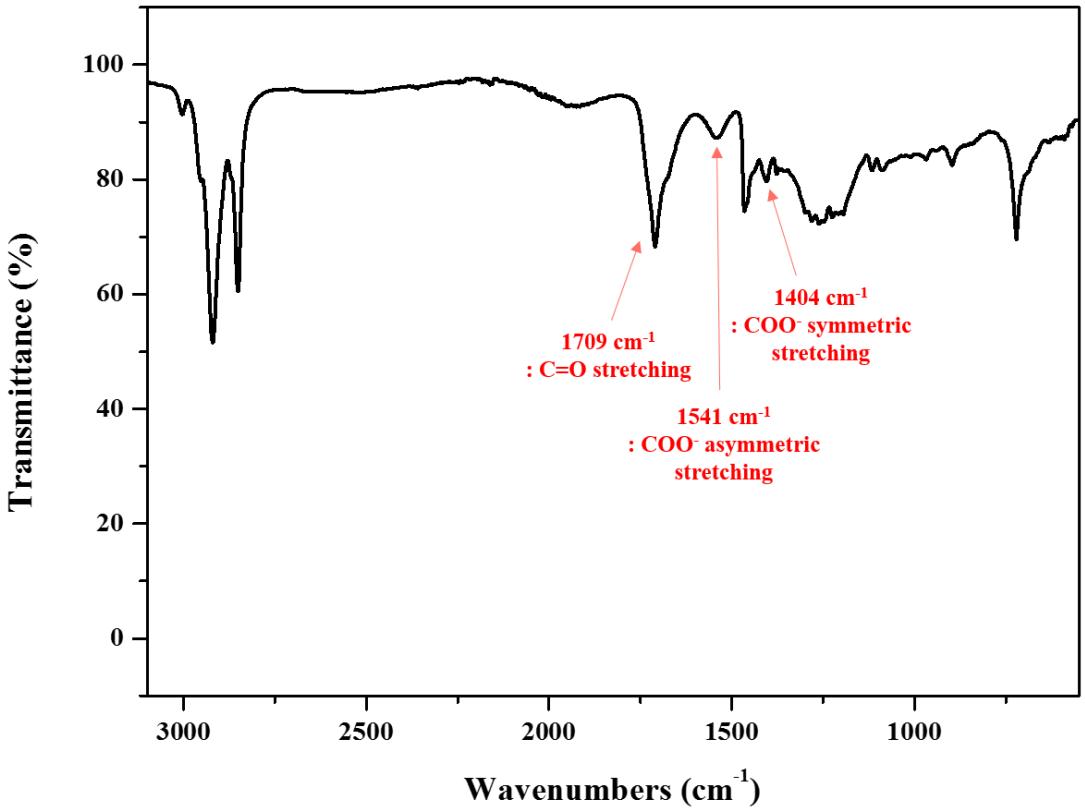

Figure S1. IR spectrum of KHF_2 in oleic acid after heating at 225℃ for 2h.

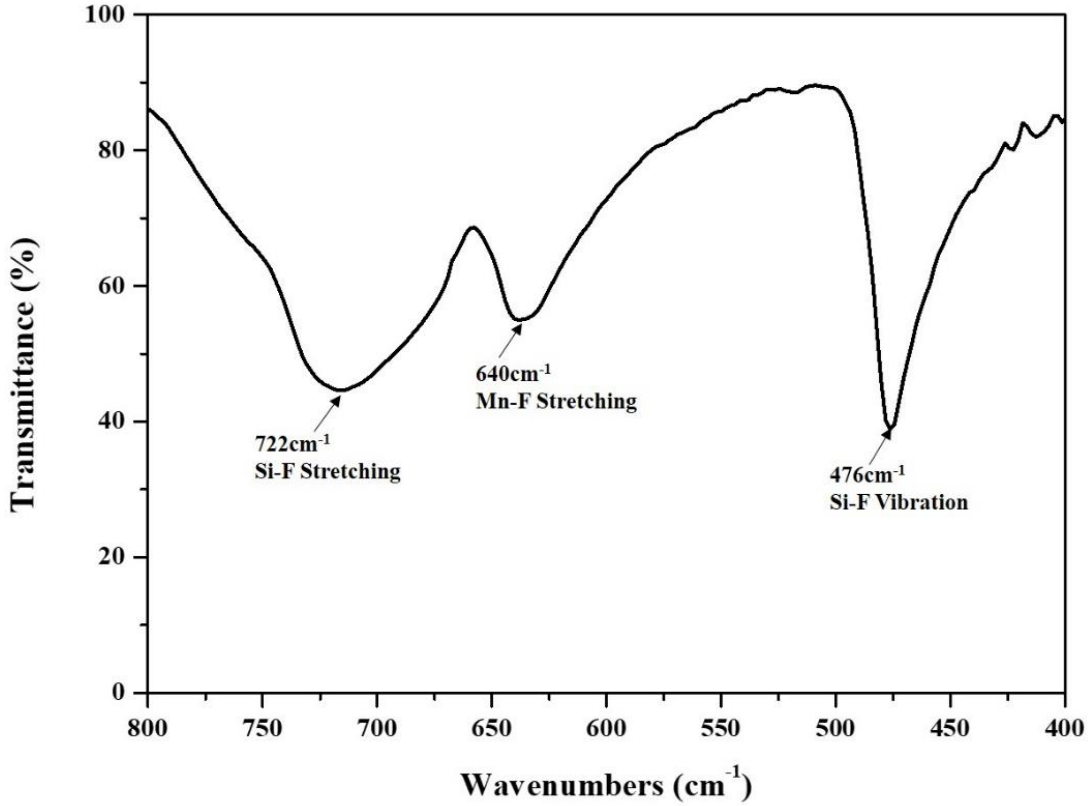

Figure S2. IR spectrum of $K_2SiF_6:Mn^{4+}$ phosphor.

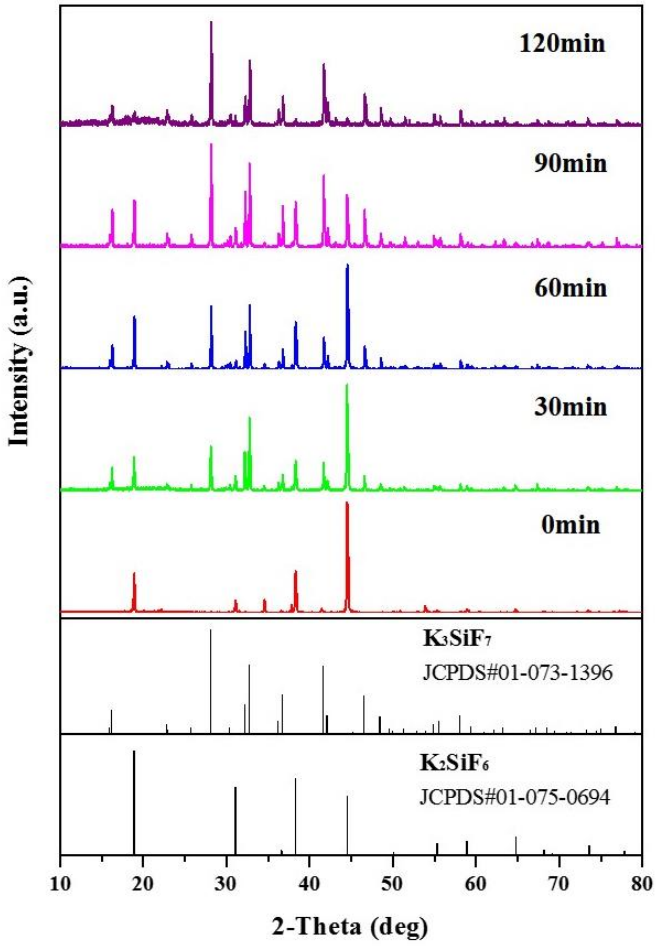

Figure S3. XRD patterns of K_3SiF_7:Mn^{4+} synthesized using oleylamine with reaction time.

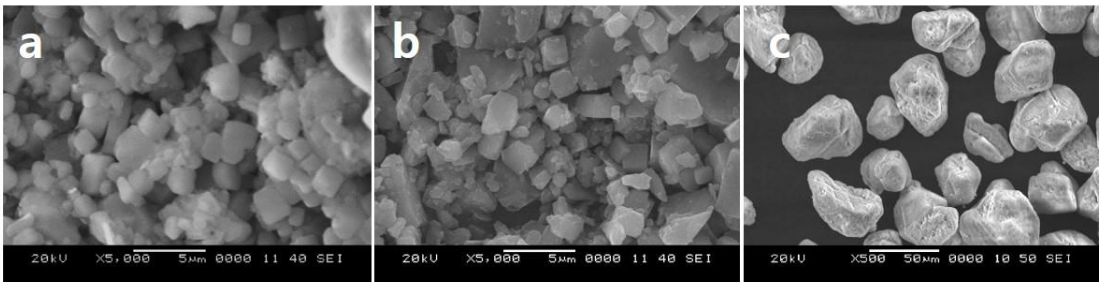

Figure S4. SEM image of K_3SiF_7:Mn^{4+} synthesized through (a,b) organic solvent-assisted synthesis and (c) the solid-state reaction (SSR). (a) is for trioctylphosphine oxide (TOPO) and (b) is for oleylamine.

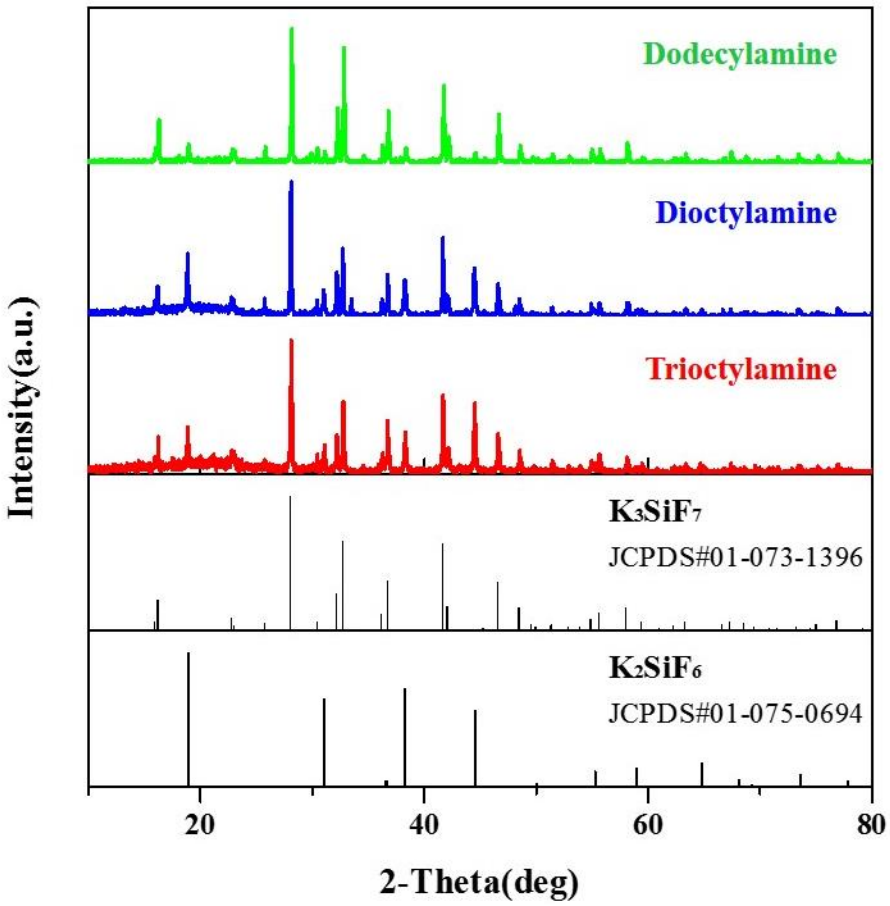

Figure S5. XRD patterns of K_3SiF_7:Mn^{4+} synthesized using various amines.

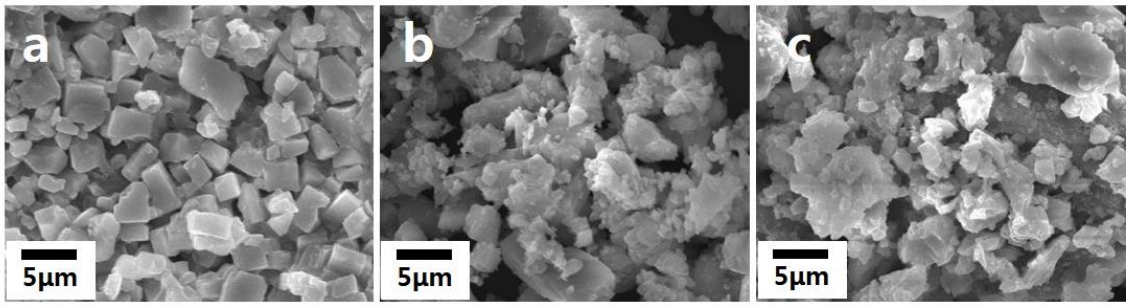

Figure S6. SEM images of $K_3SiF_7:Mn^{4+}$ synthesized using (a) dodecylamine, (b) dioctylamine, and (c) trioctylamine.

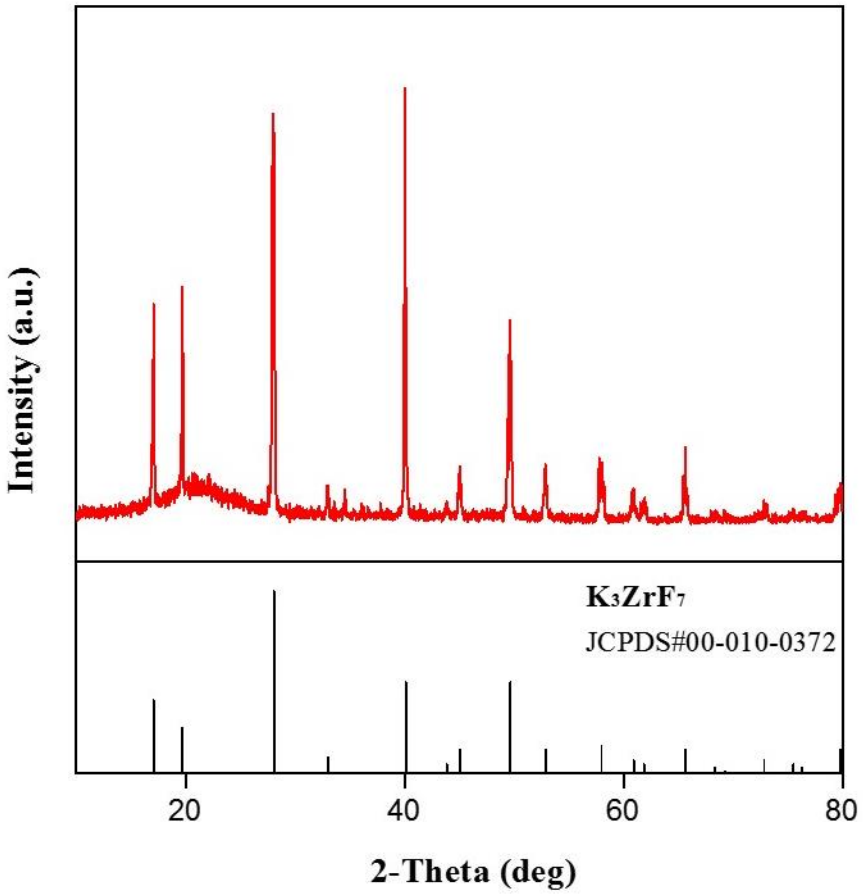

Figure S7. XRD pattern of $K_3ZrF_7:Mn^{4+}$ synthesized using oleylamine.

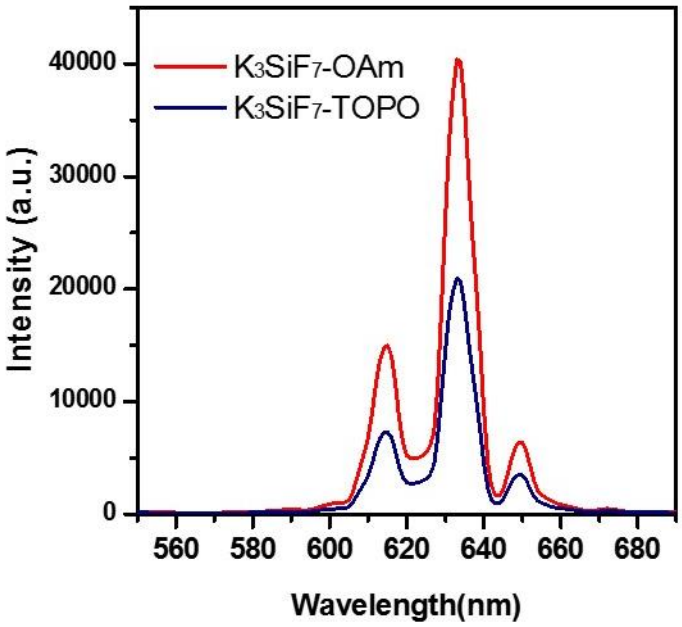

Figure S8. The emission spectra of $K_3SiF_7:Mn^{4+}$ phosphor synthesized using oleylamine (red line) and trioctylphosphine oxide (TOPO) (blue line).

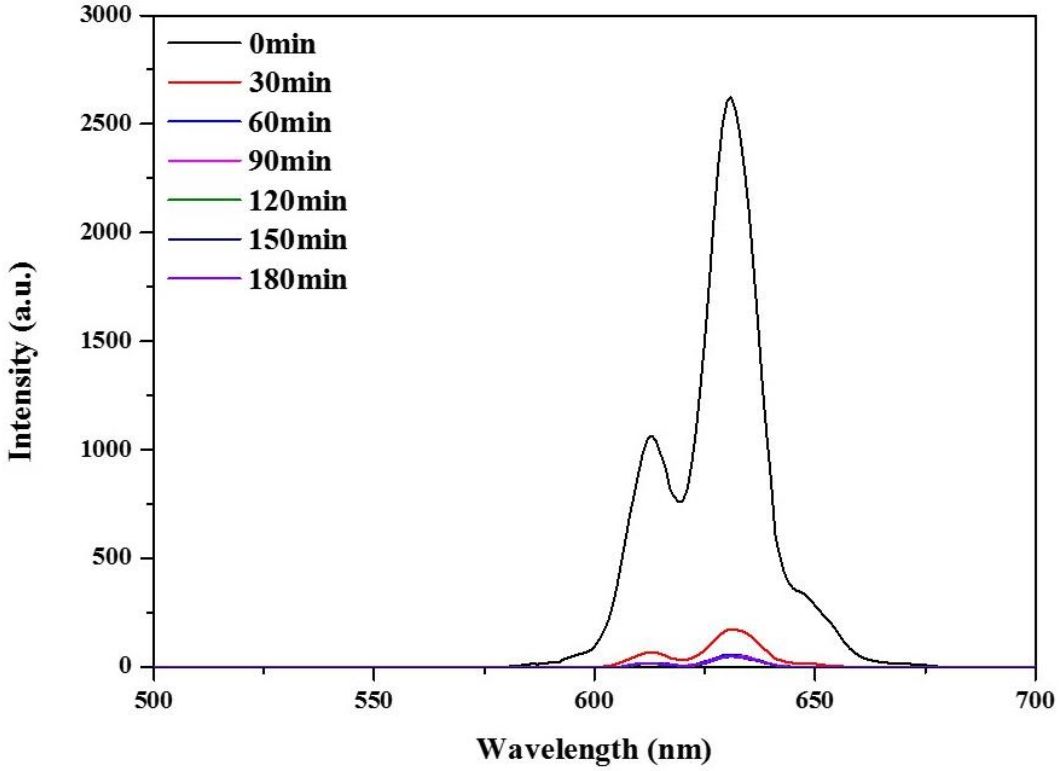

Figure S9. PL spectra of K_3SiF_7:Mn^{4+} phosphor synthesized through the solid state reaction (SSR) with exposure time at high temperature (85 ºC) and high humidity (85%) HTHH conditions.

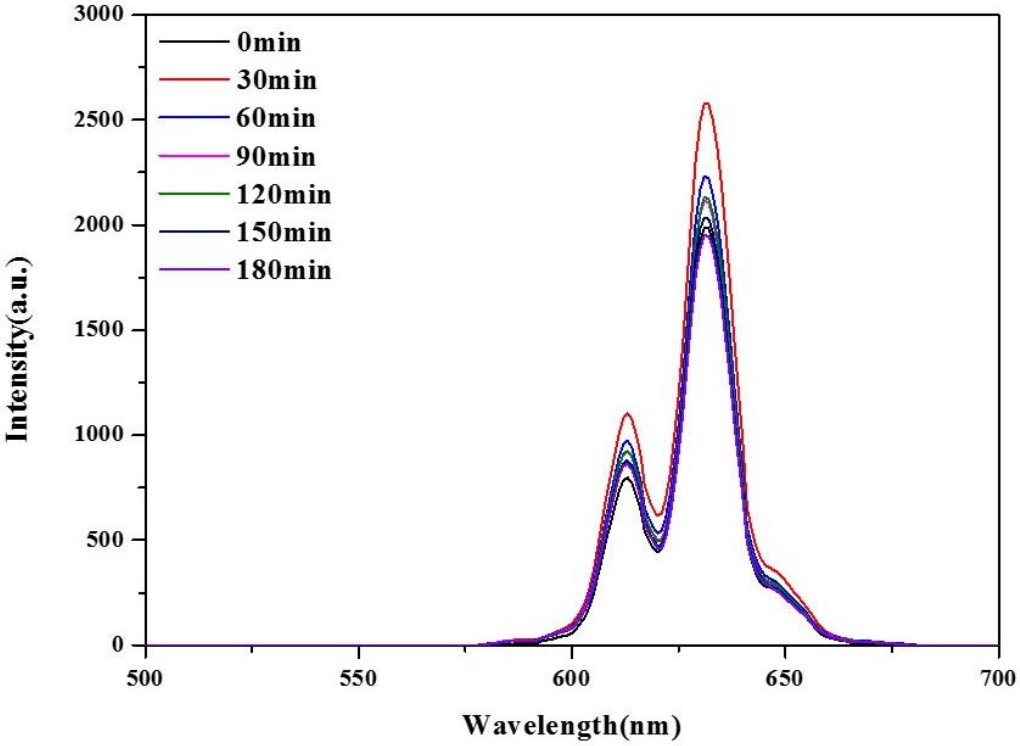

Figure S10. PL spectra of $K_3SiF_7:Mn^{4+}$ phosphor synthesized using oleylamine with exposure time at high temperature (85 ^oC) and high humidity (85%) HTHH conditions.

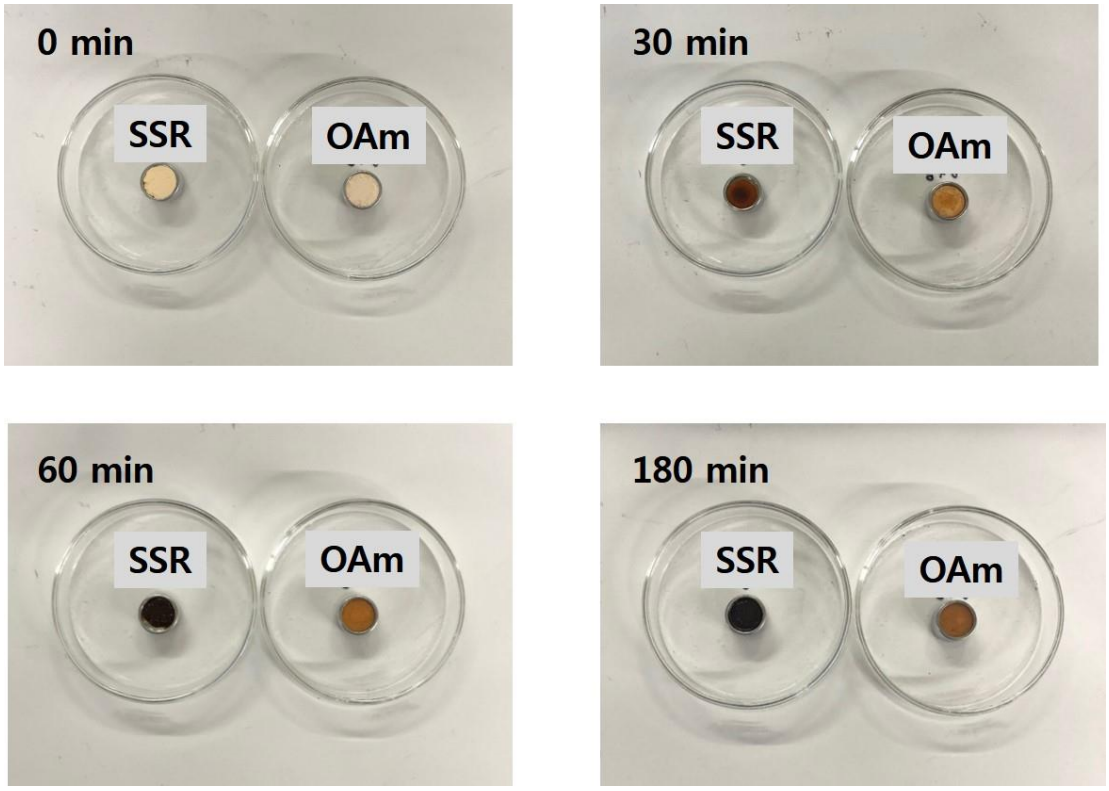

Figure S11. Pictures of $K_3SiF_7:Mn^{4+}$ phosphors after exposure to high temperature (85 ^oC) and high humidity (85%) HTHH conditions.

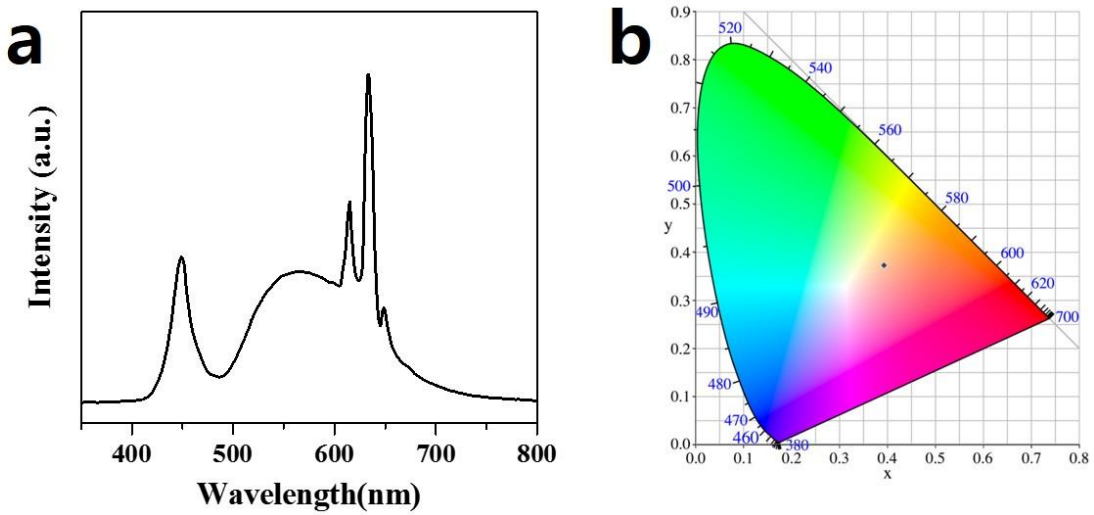

Figure S12. (a) Electroluminescence spectrum of ternary WLED device based on $K_3SiF_7:Mn^{4+}$ and $Y_3Al_5O_{12}:Ce^{3+}$ phosphors under a 60 mA current excitation. (b) The chromaticity coordinates of ternary WLED device based on $K_3SiF_7:Mn^{4+}$ and $Y_3Al_5O_{12}:Ce^{3+}$ phosphors and NTSC.

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