

Electronic Supplementary Information

Color-Tunable $\text{Al}_6\text{Si}_2\text{O}_{13}:\text{Eu}^{2+},\text{Mn}^{2+}$ Phosphor with High Color Rendering Index Based on Energy Transfer for Warm White LED

Bo Yan^a, Gui-Gen Wang^{a,b*}, Long-Fei Liu^a,

You-Xiao Chen^a, Jie-Cai Han^{a,c}

^a *Shenzhen Key Laboratory for Advanced Materials, Shenzhen Graduate School, Harbin Institute of Technology, Shenzhen 518055, P.R.China*

^b *Centre for Programmable Materials, School of Materials Science and Engineering, Nanyang Technological University, Singapore 639798, Singapore*

^c *Center for Composite Materials, Harbin Institute of Technology, Harbin 150080, P.R.China*

* Corresponding author (G.G. Wang). Tel: +86-755-26629471, fax: +86-755-26033504.
E-mail: wangguigen@hit.edu.cn

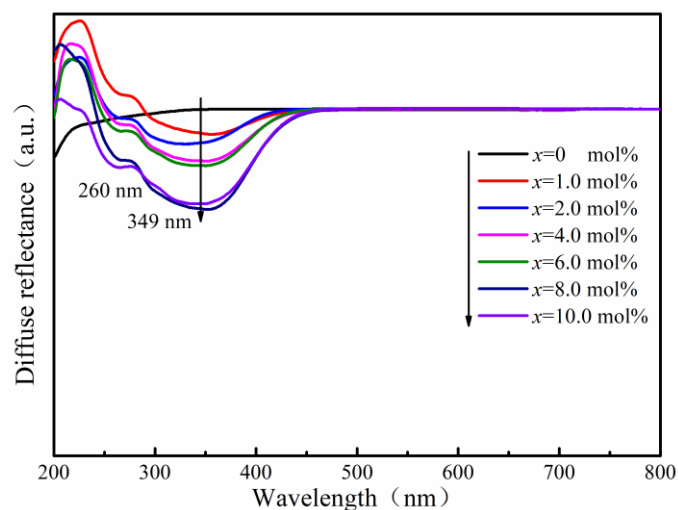


Figure S1. Diffuse reflection spectra of $\text{Al}_6\text{Si}_2\text{O}_{13}:x\%\text{Eu}^{2+}$ phosphors ($x=1.0, 2.0, 4.0, 6.0, 8.0, 10.0$).

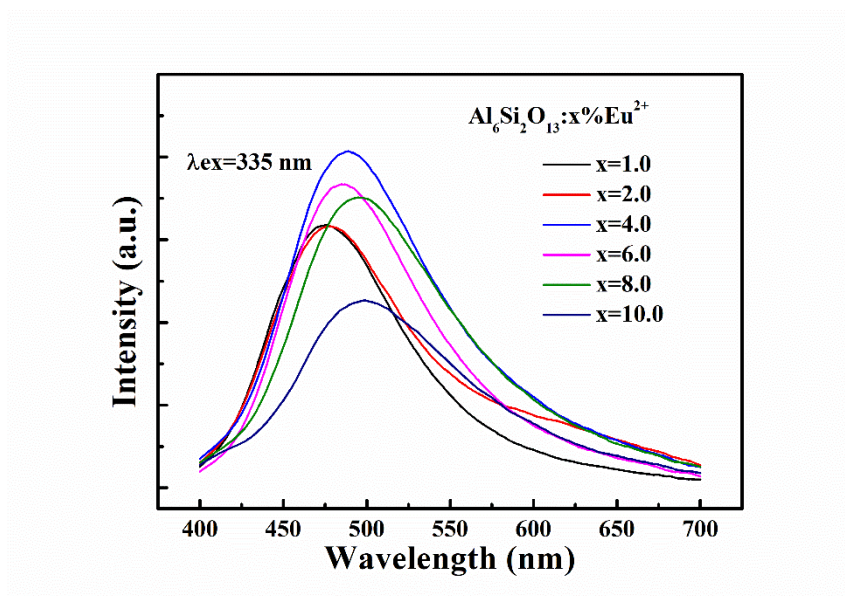


Figure S2. PL spectra of $\text{Al}_6\text{Si}_2\text{O}_{13}:x\%\text{Eu}^{2+}$ phosphors ($x=1.0, 2.0, 4.0, 6.0, 8.0, 10.0$) under excitation at 335 nm.

Table S1. Fitting results of luminescence decay curves for $\text{Al}_6\text{Si}_2\text{O}_{13}:2\%\text{Eu}^{2+},y\%\text{Mn}^{2+}$ phosphors.

$\text{Al}_6\text{Si}_2\text{O}_{13}:2\%\text{Eu}^{2+},y\%\text{Mn}^{2+}$	Fitting parameters				Lifetime τ (μs)
	A_1	A_2	τ_1	τ_2	
y=0	2468.949	2301.199	0.5095	1.4987	1.23
y=0.3	2508.218	1883.681	0.3929	1.3663	1.10
y=0.6	2635.657	1734.295	0.2819	1.2158	0.97
y=0.9	2730.769	1466.817	0.2748	1.1871	0.91

Table S2. Full set of 15 CRIs and the average CRI (Ra) values of as-prepared $\text{Al}_6\text{Si}_2\text{O}_{13}:2\%\text{Eu}^{2+},0.6\%\text{Mn}^{2+}$ phosphor.

R1	R2	R3	R4	R5	R6	R7	R8
95	93	90	93	94	90	92	94
R9	R10	R11	R12	R13	R14	R15	Ra
97	82	94	86	94	94	97	92.4