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Electronic Supplementary Information

High performance of broad-exciting and narrow-emitting green phosphor $NaAl_{11}O_{17}:Eu^{2+}$, Mn^{2+} for backlight displays

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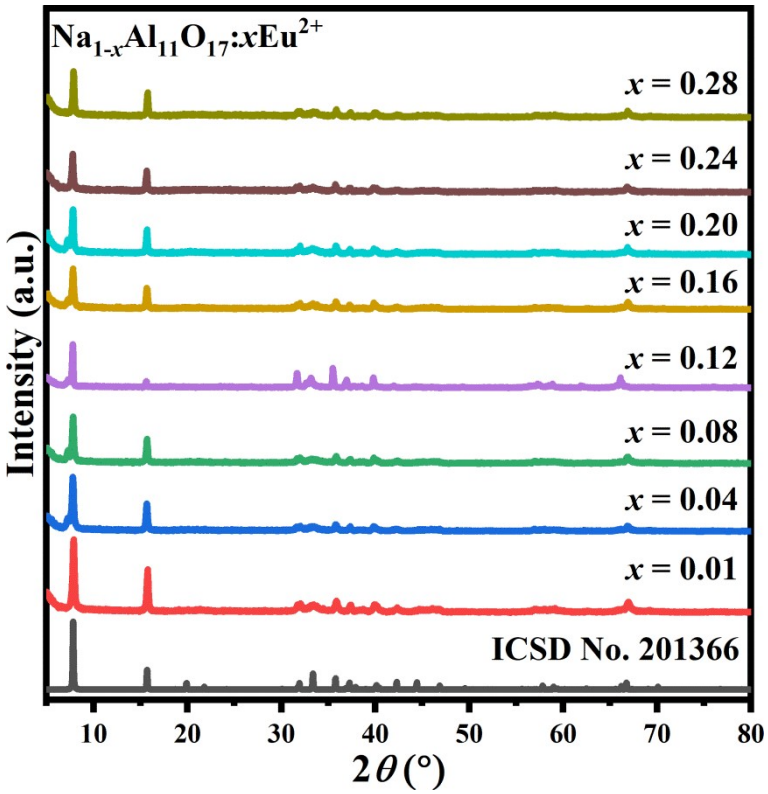

Figure S1 XRD patterns of $Na_{1-x}Al_{11}O_{17}$:xEu^{2+} (x = 0.01 - 0.28).

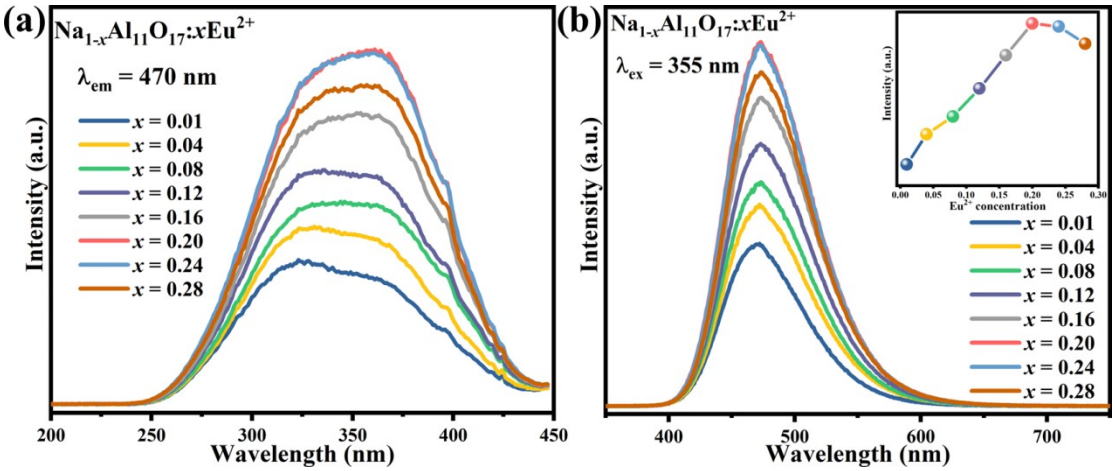

Figure S2 (a) Excitation (λ_{em} = 470 nm) spectra of $Na_{1-x}Al_{11}O_{17}:xEu^{2+}$ (x = 0.01 - 0.28) samples. (b) Emission (λ_{ex} = 355 nm) spectra of $Na_{1-x}Al_{11}O_{17}:xEu^{2+}$ (x = 0.01 - 0.28) samples, the inset is the variation of emission intensity of Eu as a function of the Eu^{2+} concentration.

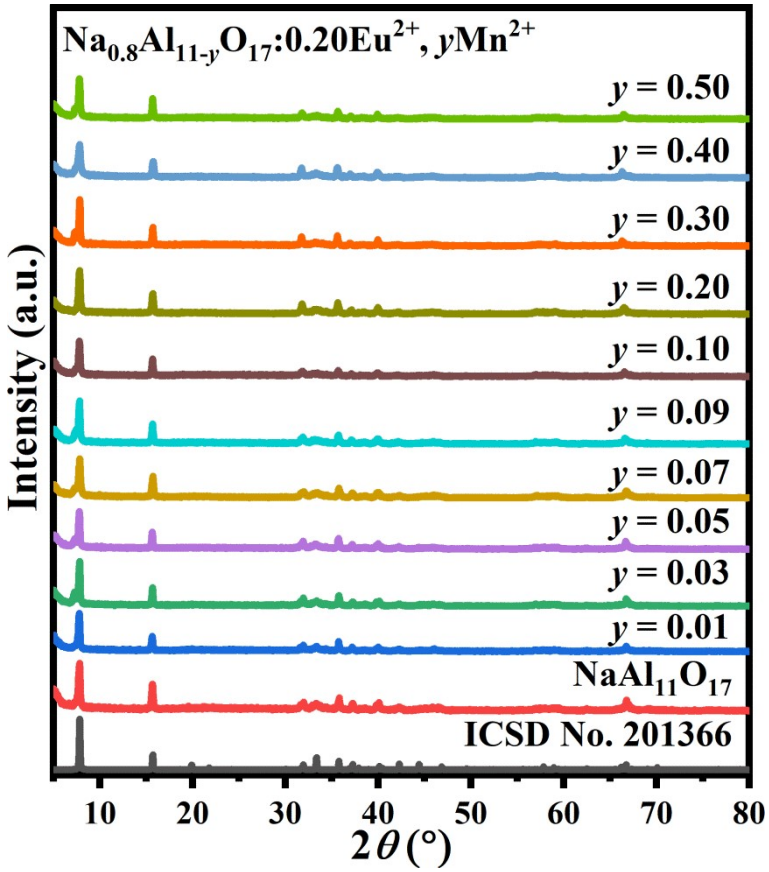

Figure S3 XRD patterns of $Na_{0.8}Al_{11-y}O_{17}$:0.20Eu^{2+}, yMn^{2+} (y = 0.01 - 0.50).

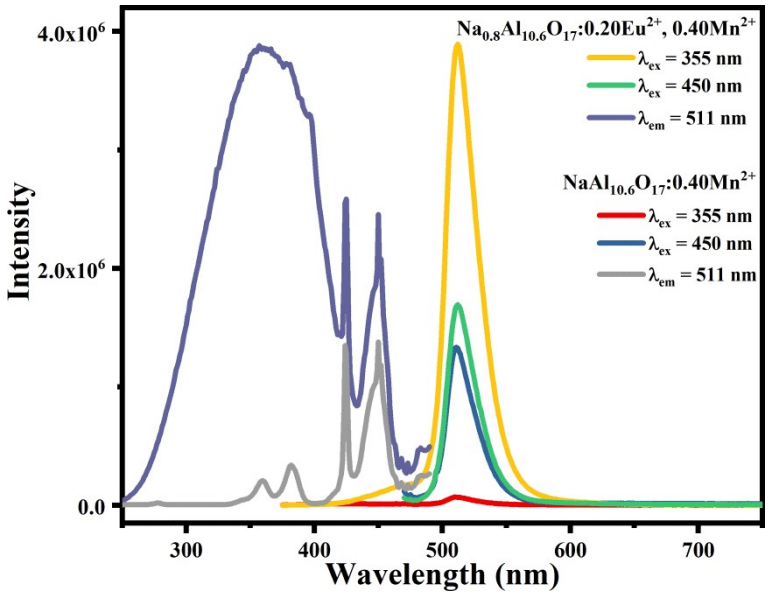

Figure S4 Emission (λ_{ex} = 355, 450 nm) and excitation (λ_{em} = 511 nm) spectra of $NaAl_{10.6}O_{17}$:0.40Mn^{2+} and $Na_{0.8}Al_{10.6}O_{17}$:0.20Eu^{2+}, 0.40Mn^{2+}.

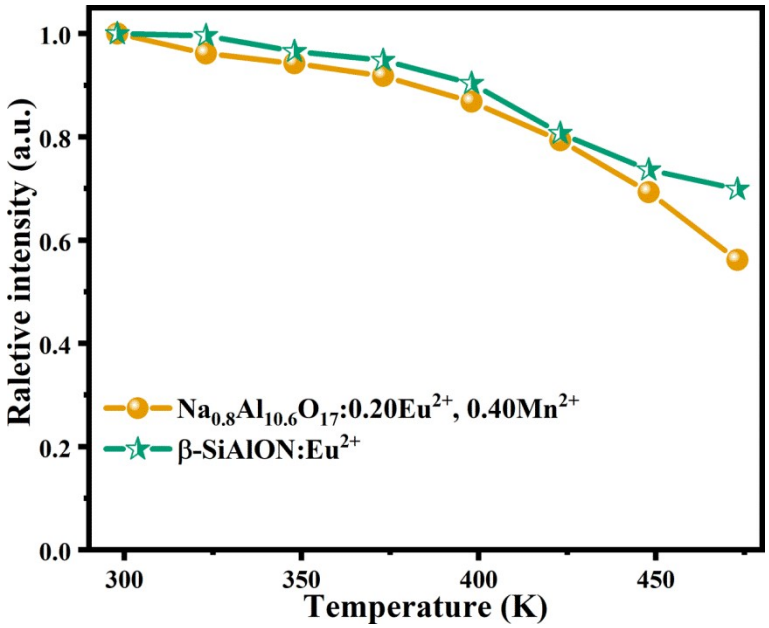

Figure S5 Temperature-dependent emission intensities of $Na_{0.8}Al_{10.6}O_{17}$:0.20Eu^{2+}, 0.40Mn^{2+} and commercial β-SiAlON:Eu^{2+} phosphors.

Table S1. Photoluminescence properties, TQ behavior, IQE and CG (NTSC) in CIE 1931 system of several green phosphors for backlight display applications.

Phosphors	PL (nm)			TQ	IQE	CG (NTSC)	Ref.
	Emission peak	FWHM	Excitation peak				
β-sialon:Eu^{2+}	540	55	405	81% (473 K)	71%	96	9
$RbLi(Li_3SiO_4)_2$:Eu^{2+}	530	42	460	92% (473 K)	80%	107	15
$CsPbBr_3$	523	20	-	62% (373 K)	63%	102	14
$BaZnAl_{10}O_{17}$:Mn^{2+}	516	31	450	88% (473 K)	86%	110	16
$Sr_2MgAl_{22}O_{36}$:Mn^{2+}	518	26	450	80% (473 K)	75%	127	17
$MgAl_2O_4$:Mn^{2+}	525	35	450	92% (473 K)	45%	116	11
$LaZnAl_{11}O_{19}$:Eu^{2+}, Mn^{2+}	515	26	350	80% (423 K)	88%	123	20
$Sr_4Al_{14}O_{25}$:Ce, Tb	544	10	348	80% (423 K)	47%	85	38
$NaAl_{11}O_{17}$:Eu^{2+}, Mn^{2+}	511	27	355	79% (423 K)	87%	110	This work