Supporting Information

Insight into the emission-tuning and luminescence thermal quenching investigations in $NaLa_{1-x}Gd_xCa_4W_2O_{12}:Mn^{4+}$ phosphors via the ionic couple substitution of $Na^{+}+Ln^{3+}$ (Ln = La, Gd) for $2Ca^{2+}$ in $Ca_6W_2O_{12}:Mn^{4+}$ for plant-cultivation LED application

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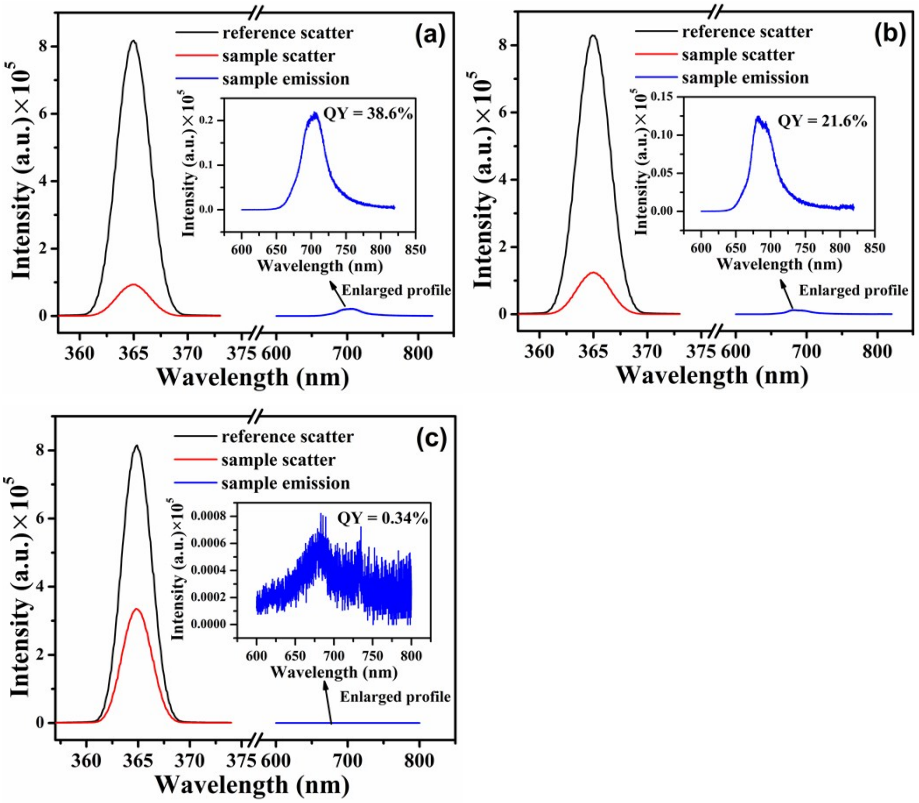

Fig. S1 The reference, sample absorption and sample emission for calculating quantum yield (QY) for NLCWO:0.01Mn^{4+} (a), NGCWO:0.01Mn^{4+} (b) and CWO:0.01Mn^{4+} (c) samples under 365 nm excitation.

Table S1 Detailed crystallographic data of refinement parameters for the CWO, NLCWO, and NGCWO samples.

Sample	CWO	NLCWO	NGCWO
Space group	*P121/c1*	*P121/c1*	*P121/c1*
Symmetry	monoclinic	monoclinic	monoclinic
a, Å	5.5467(3)	5.5783(4)	5.5416(4)
b, Å	5.8033(2)	5.8143(3)	5.7924(3)
c, Å	9.7243(5)	9.7889(5)	9.7592(7)
V, Å^3	257.65(2)	260.95(2)	257.47(3)
Z	2	2	2
α= γ,°	90	90	90
β	124.6	124.7	124.7
2θ-interval,°	5-90	5-90	5-90
R_{wp}/%	12.56%	12.78	11.32
R_p/%	9.63%	9.92	8.87
χ^2	1.887	1.663	1.407