

[†Electronic supplementary information \(ESI\)](#)

**Synthesis, up/down conversion luminescence properties of
 $\text{Na}_{0.5}\text{R}_{0.5}\text{MoO}_4\text{:Ln}^{3+}$ ($\text{R}^{3+} = \text{La, Gd}$), ($\text{Ln}^{3+} = \text{Eu, Tb, Dy, Yb/Er}$) thin
phosphor films grown by pulsed laser deposition**

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Note added after first publication: This Supplementary Information file replaces the one originally published on 26th November 2014 due to some errors in Fig. S4(c) and Table S1.

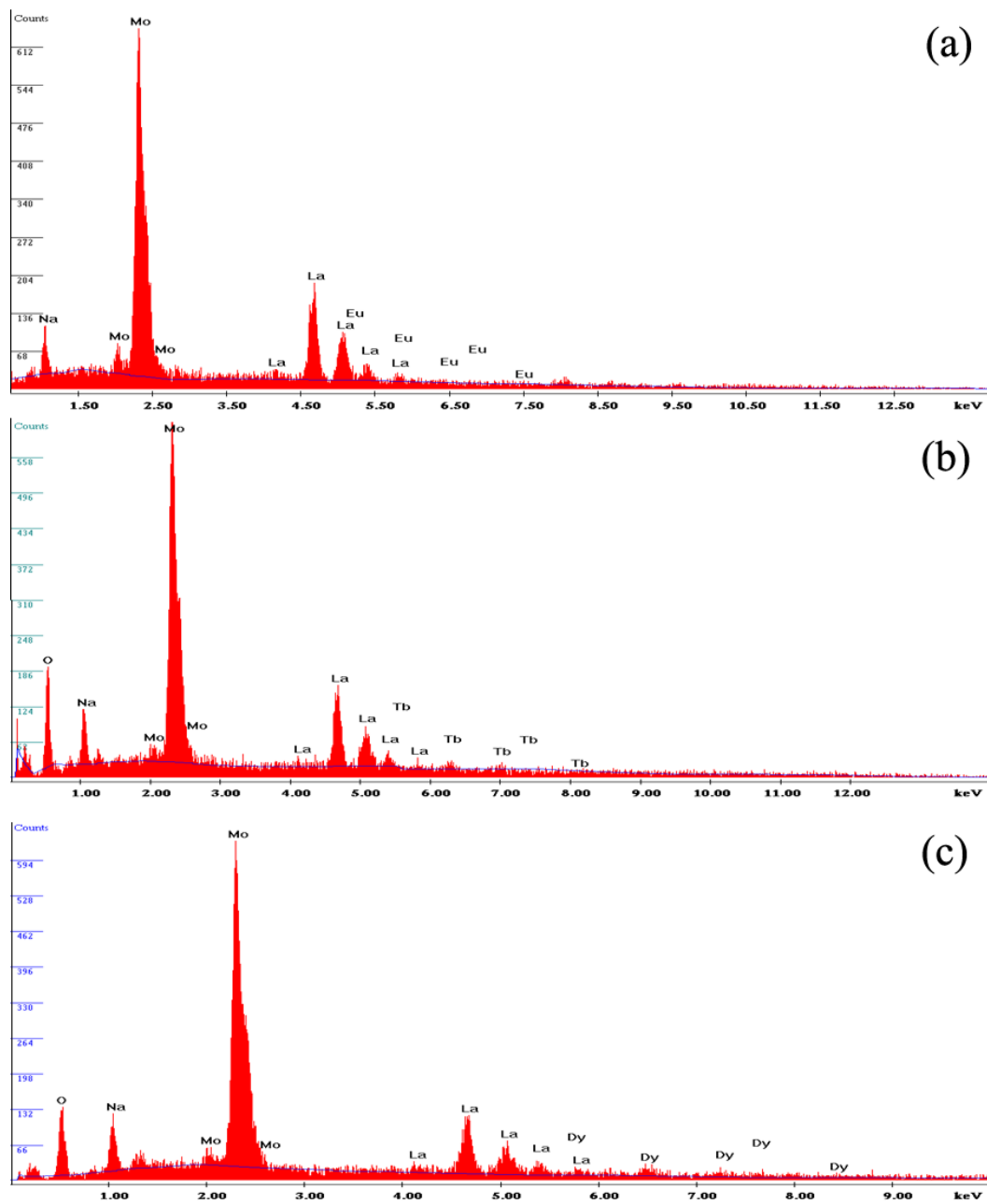


Fig. S1 EDX spectra of (a) Eu³⁺, (b) Tb³⁺, (d) Dy³⁺ doped (Na_{0.5}La_{0.5})MoO₄ thin films.

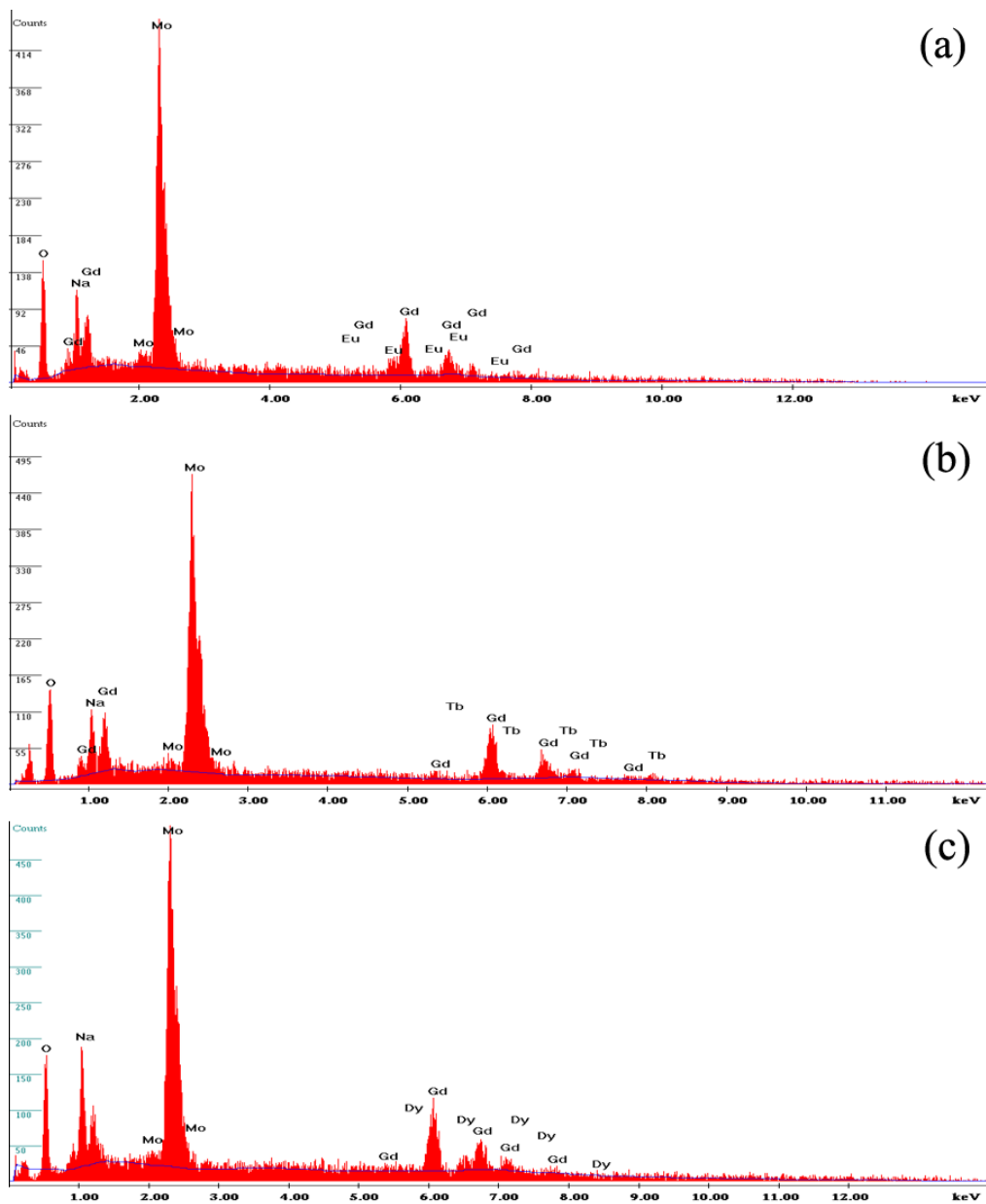


Fig. S2 EDX spectra of (a) Eu^{3+} , (b) Tb^{3+} , (d) Dy^{3+} doped $(\text{Na}_{0.5}\text{Gd}_{0.5})\text{MoO}_4$ thin films.

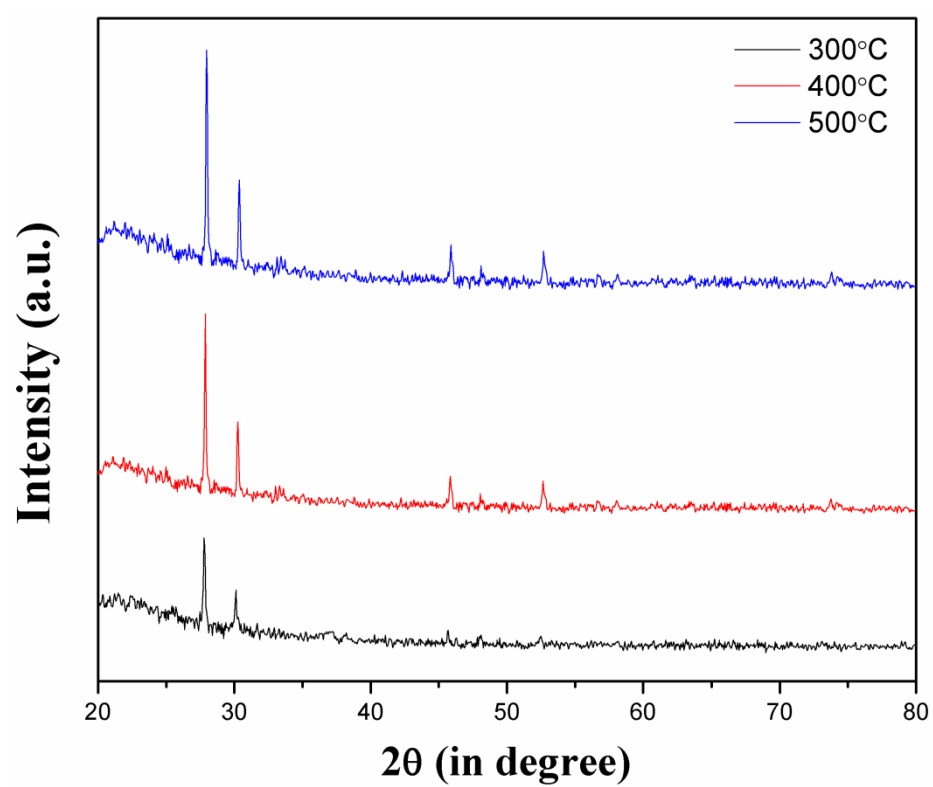


Fig. S3 XRD patterns of $(\text{Na}_{0.5}\text{La}_{0.5})\text{MoO}_4:\text{Eu}^{3+}$ thin films deposited at different substrate temperature.

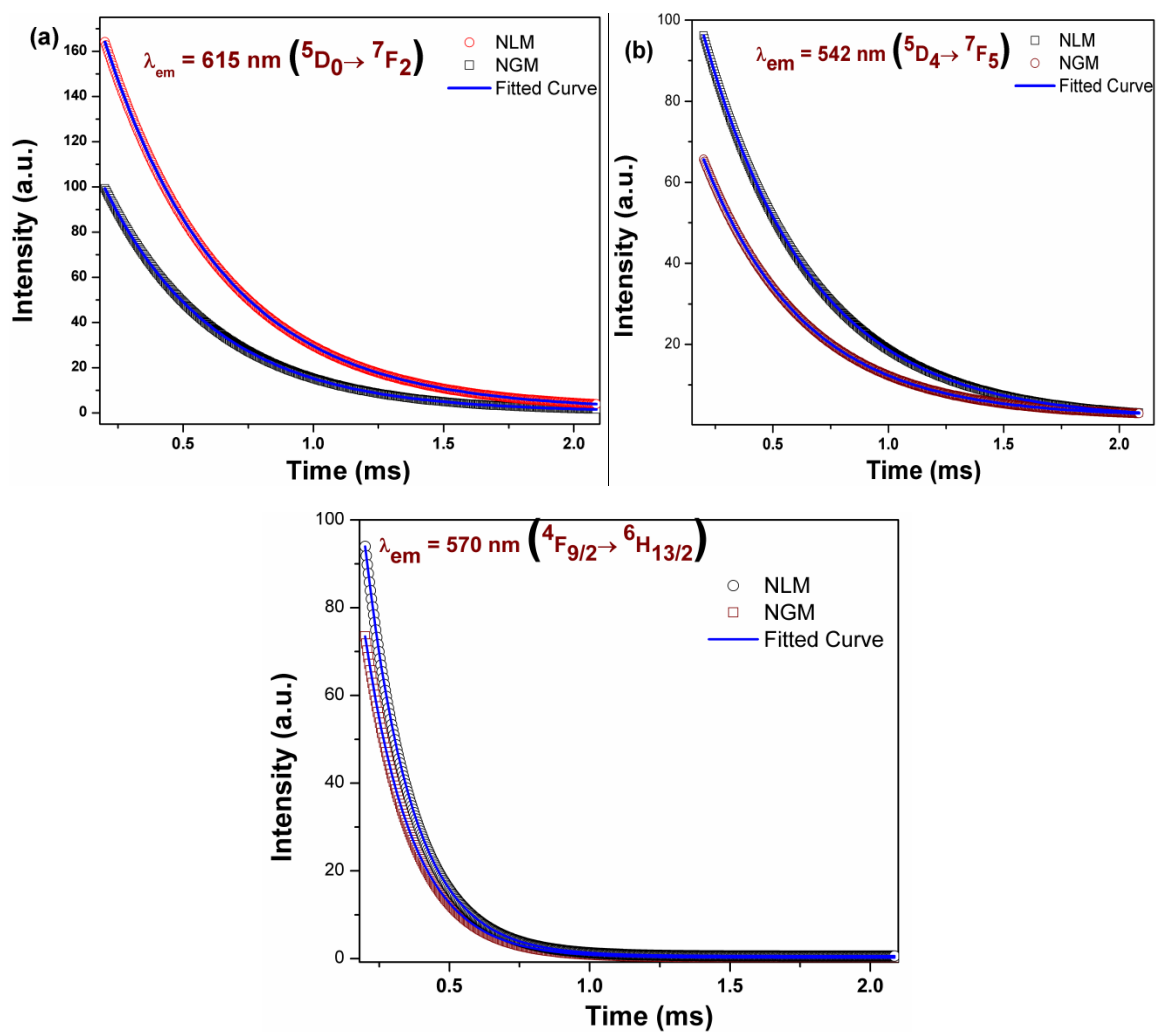


Fig. S4 Luminescence decay time profile for the major transition in (a) Eu^{3+} , (b) Tb^{3+} , (c) Dy^{3+} doped $(\text{Na}_{0.5}\text{La}_{0.5})\text{MoO}_4$ and $(\text{Na}_{0.5}\text{Gd}_{0.5})\text{MoO}_4$, respectively.

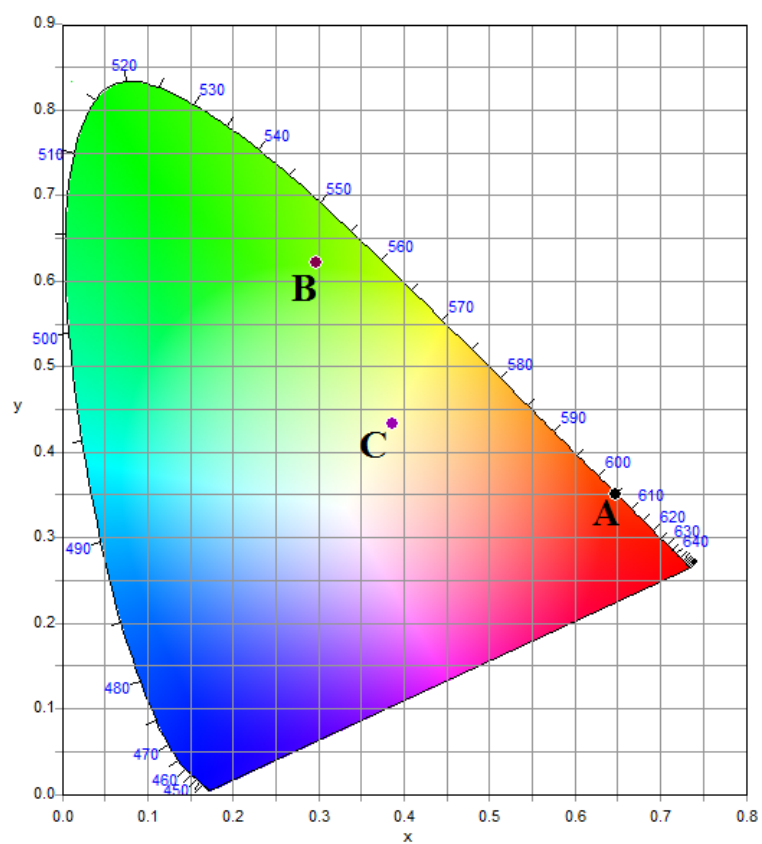


Fig. S5 CIE colour coordinates of $(\text{Na}_{0.5}\text{La}_{0.5})\text{MoO}_4$ doped with (A) Eu^{3+} , (B) Tb^{3+} , (C) Dy^{3+} thin films, respectively.

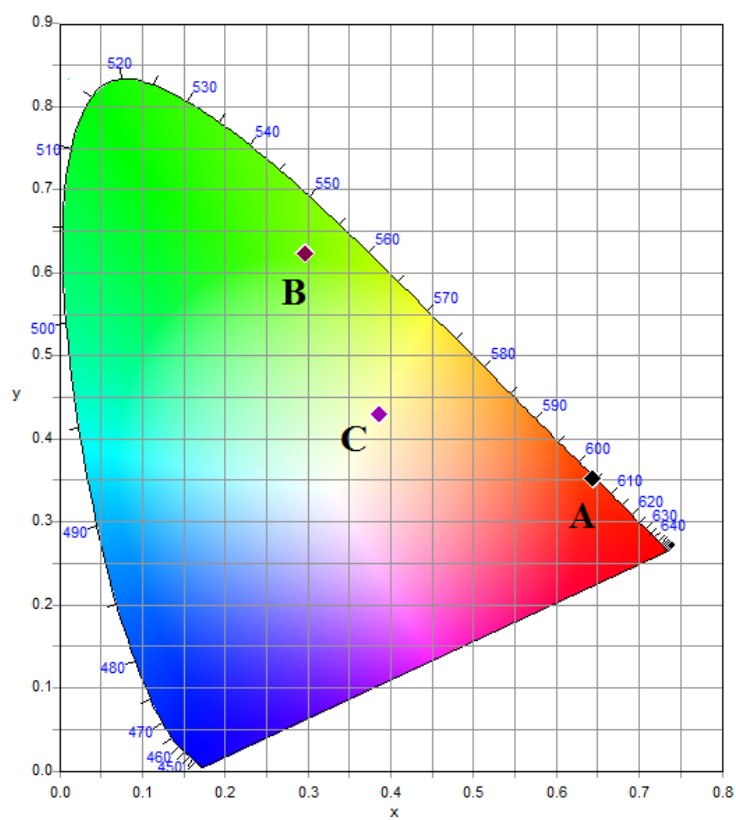


Fig. S6 CIE colour coordinates of $(\text{Na}_{0.5}\text{Gd}_{0.5})\text{MoO}_4$ doped with (A) Eu^{3+} , (B) Tb^{3+} , (C) Dy^{3+} thin films, respectively.

Table 1: Photometric characteristics of (Na_{0.5}R_{0.5})MoO₄:Ln³⁺ thin phosphor films

Thin Phosphor film	Doping ion (Ln ³⁺)	CCT (K)	CRI	Colour coordinates		LER (lm W ⁻¹)	τ Value
				x	Y		
(Na _{0.5} La _{0.5})MoO ₄ :Ln ³⁺	Eu ³⁺	1046	50	0.648	0.351	286	0.423 (ms)
	Tb ³⁺	N/A	9	0.298	0.622	312	0.419 (ms)
	Dy ³⁺	4198	19	0.387	0.433	421	0.177 (ms)
	Yb ³⁺ /Er ³⁺	N/A	22	0.184	0.779	448	8.5 (μ s)
(Na _{0.5} Gd _{0.5})MoO ₄ :Ln ³⁺	Eu ³⁺	1053	47	0.645	0.352	281	0.424 (ms)
	Tb ³⁺	N/A	8	0.297	0.624	300	0.417 (ms)
	Dy ³⁺	4012	17	0.386	0.429	407	0.172 (ms)
	Yb ³⁺ /Er ³⁺	N/A	21	0.183	0.776	445	8.1 (μ s)