

Broad near-ultraviolet and blue excitation band induced dazzling red emissions in Eu³⁺-activated Gd₂MoO₆ phosphors for white light-emitting diodes

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Table S1. Structural parameters of Gd₂MoO₆:0.30Eu³⁺ nanophosphors based on the Rietveld XRD refinement.

Sample	Gd ₂ MoO ₆ :0.30Eu ³⁺
Phase structure	Monoclinic
Space group	I2/a(15)
<i>a</i>	15.68645 (Å)
<i>b</i>	11.18177 (Å)
<i>c</i>	5.41992 (Å)
<i>V</i>	950.55 (Å ³)
<i>R</i> _p	5.31%
<i>R</i> _{wp}	4.22%
χ^2	1.47

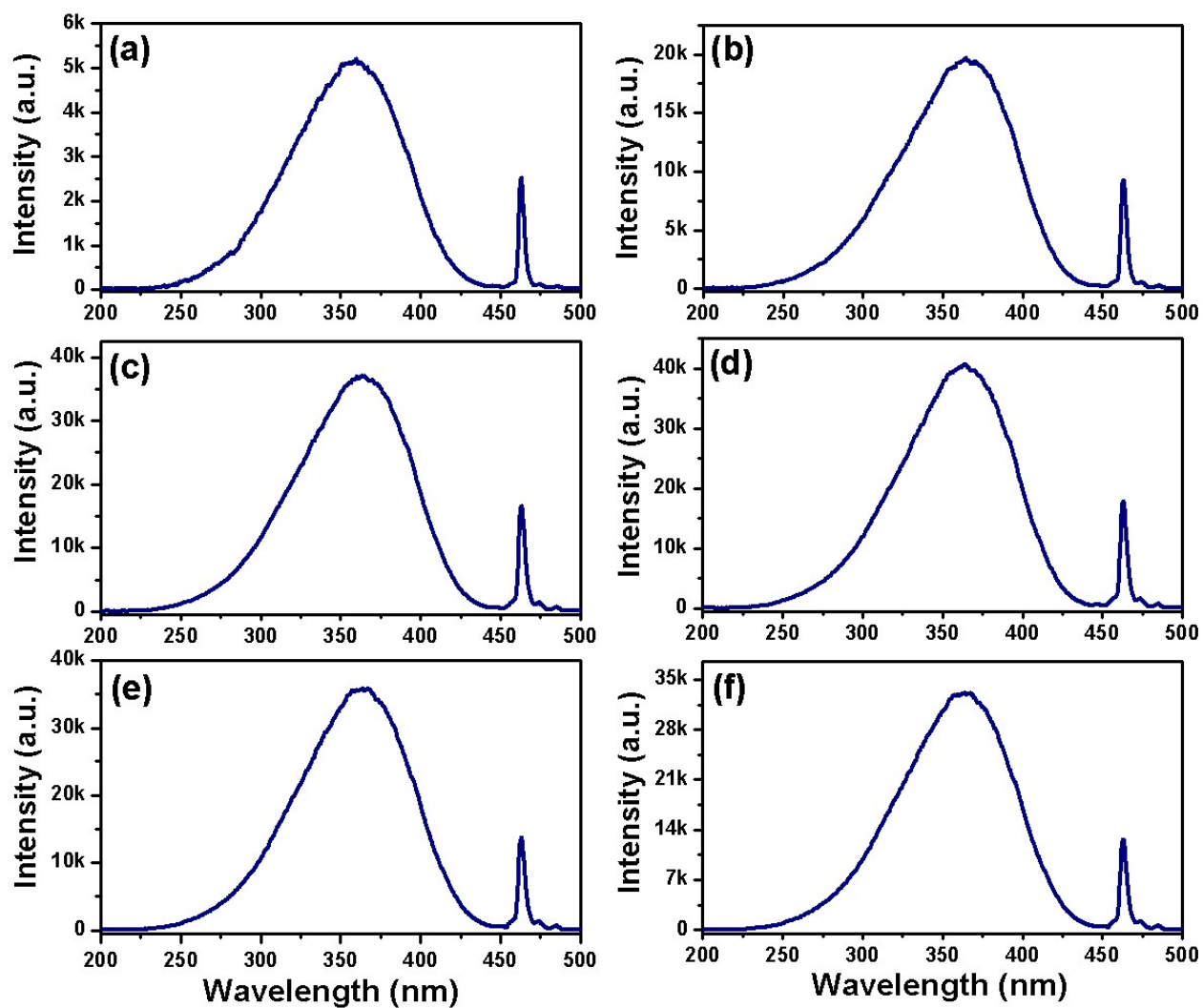


Figure S1. PLE spectra of $\text{Gd}_2\text{MoO}_6:2x\text{Eu}^{3+}$ (a) $x = 0.01$, (b) $x = 0.05$, (c) $x = 0.10$, (d) $x = 0.15$, (e) $x = 0.20$ and (f) $x = 0.30$ phosphors monitored at 610 nm.

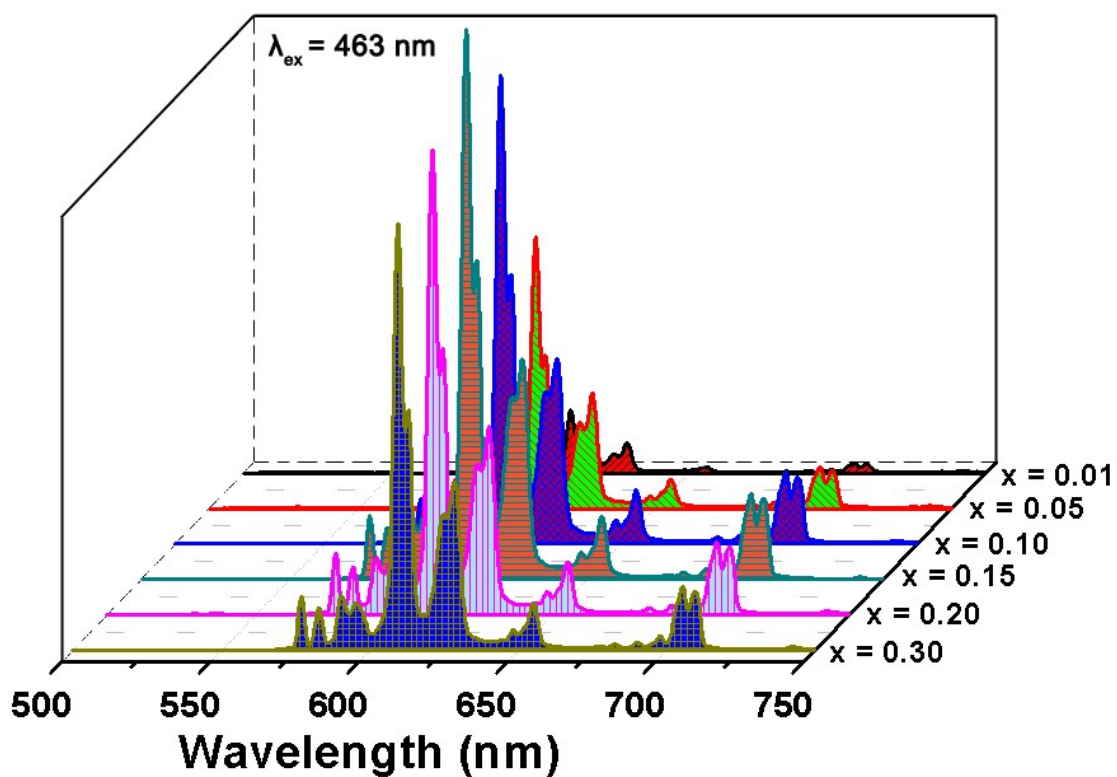


Figure S2. PL spectra of Eu³⁺-activated Gd₂MoO₆ phosphors as a function of Eu³⁺ ion concentration upon 463 nm light excitation.

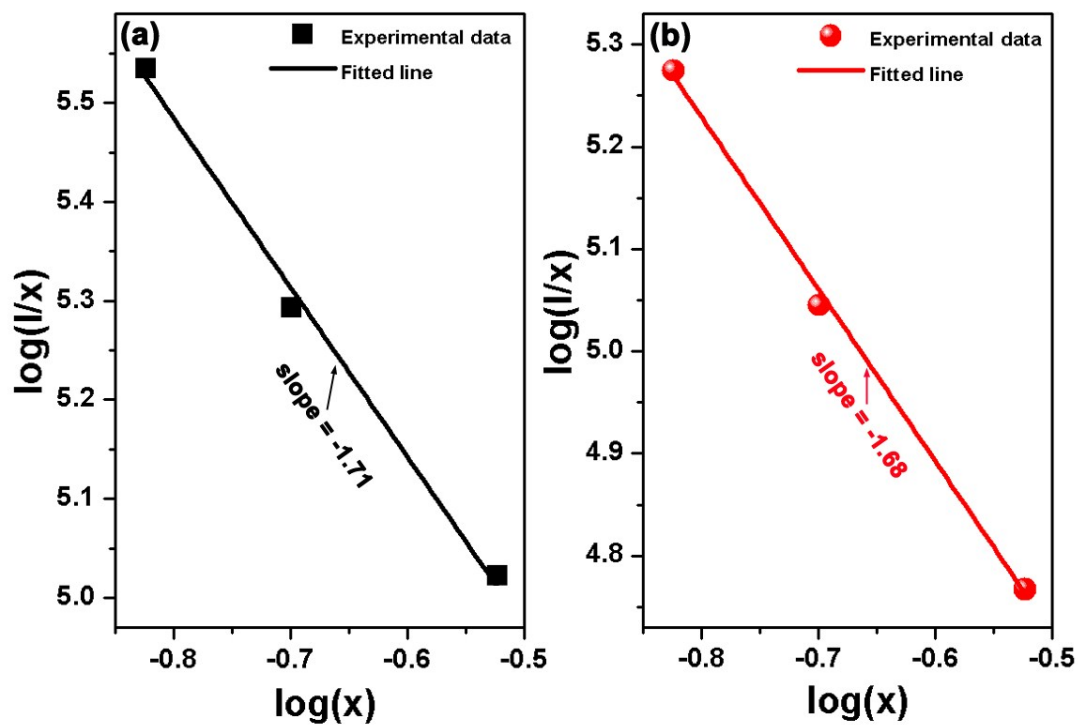


Figure S3. Plots of $\log(I/x)$ vs. $\log(x)$ for the ${}^7F_2 \rightarrow {}^5D_0$ transition of Eu^{3+} ions in $\text{Gd}_2\text{MoO}_6:2x\text{Eu}^{3+}$ phosphors (a) excited at 360 nm and (b) excited at 463 nm.

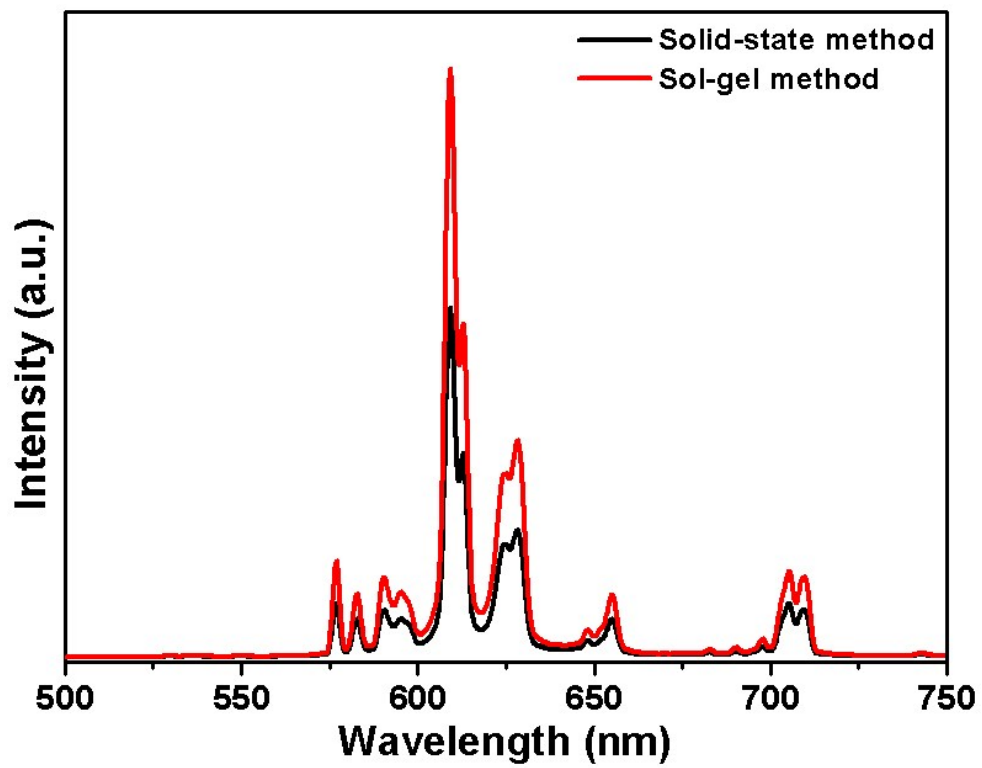


Figure S4. PL spectra of $\text{Gd}_2\text{MoO}_6:0.30\text{Eu}^{3+}$ phosphors prepared by solid-state reaction method and sol-gel route under the excitation of 360 nm.

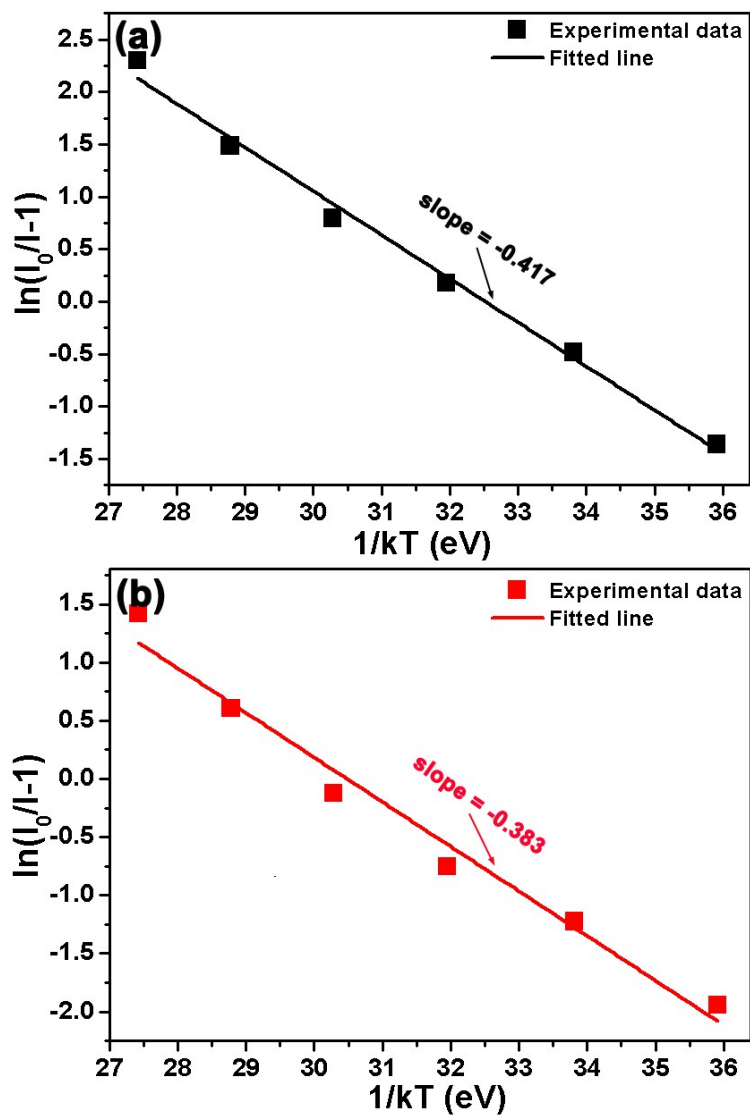


Figure S5. Plots of $\ln(I_0/I-1)$ vs. $1/T$ for the thermal quenching of the $Gd_2MoO_6:2xEu^{3+}$ phosphors excited at (a) 360 nm and (b) 463 nm.

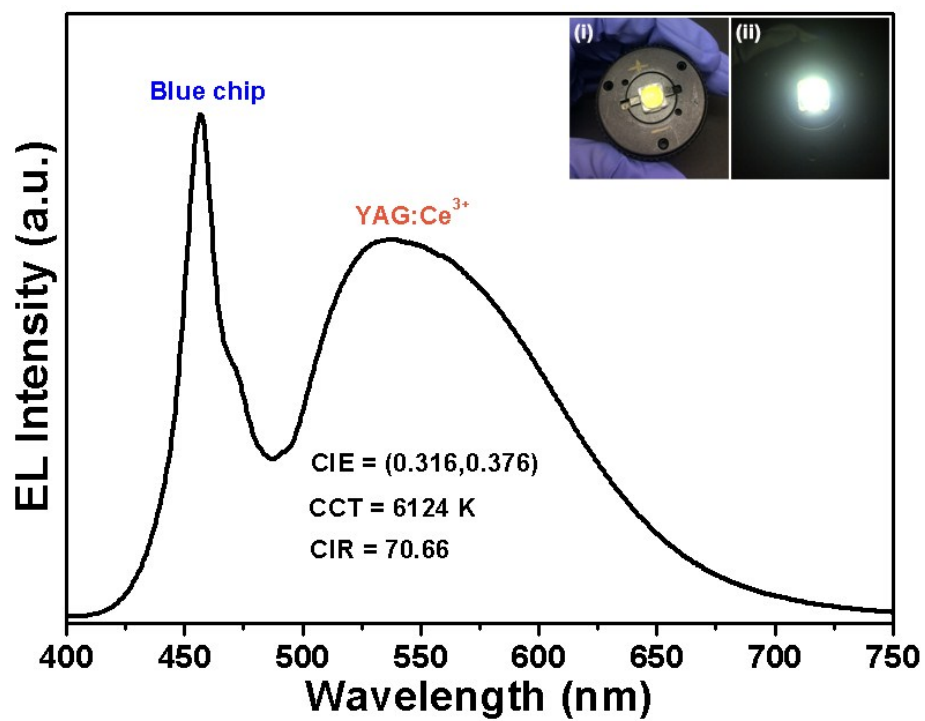


Figure S6. EL spectrum of fabricated WLEDs device by using the InGaN blue LED chip with commercial yellow-emitting YAG:Ce³⁺ phosphors under 50 mA of forward bias current. Inset shows the digital images of the fabricated WLED device with and without power input.

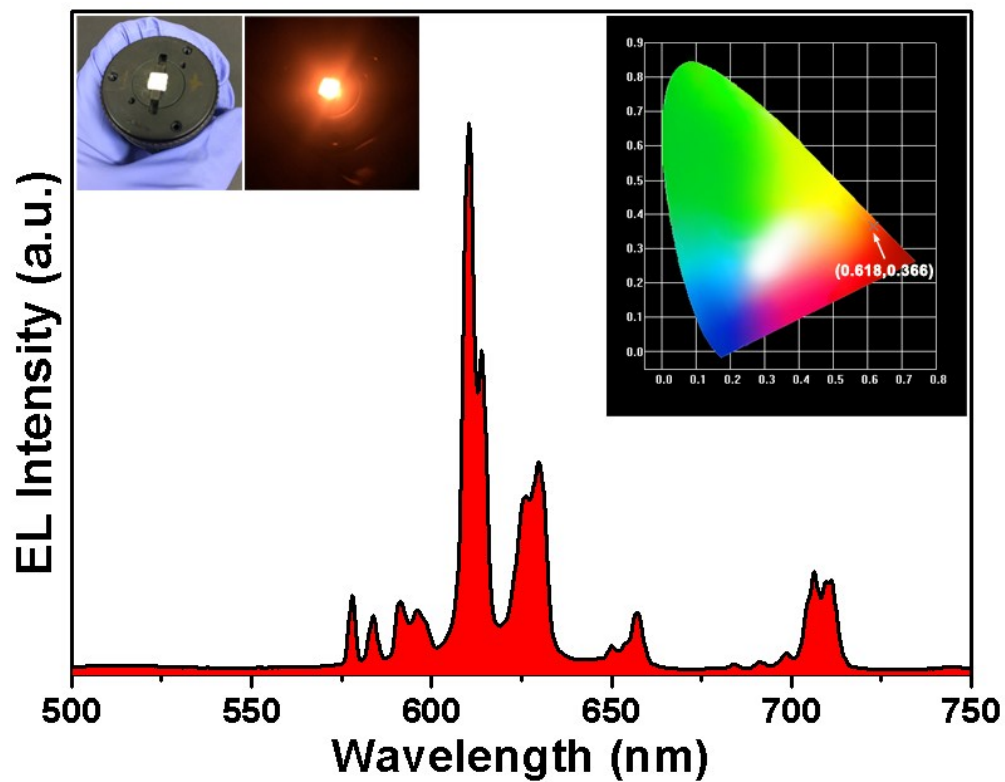


Figure S7. EL spectrum of red-emitting LED device utilizing the $\text{Gd}_2\text{MoO}_6:0.30\text{Eu}^{3+}$ phosphors and 375 nm InGaN chip under 50 mA of forward bias current. Inset shows the CIE chromaticity diagram as well as the luminescent image of the fabricated device.