

Electronic Supplementary Information (ESI)

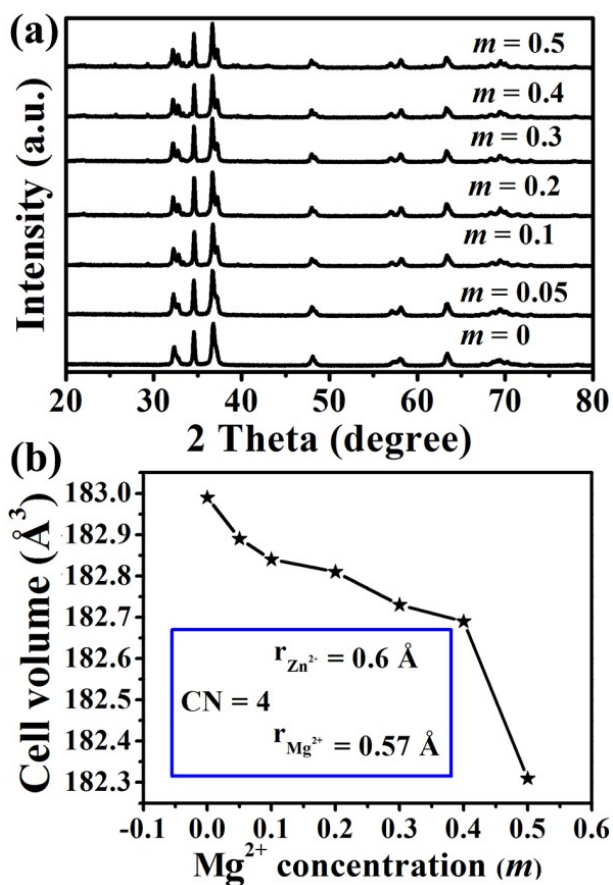


Figure S1 (a) XRD patterns of $\text{Zn}_{1-m}\text{Mg}_m\text{GeN}_2:0.02\text{Mn}^{2+}$; (b) cell volume variation with Mg^{2+} concentration in $\text{Zn}_{1-m}\text{Mg}_m\text{GeN}_2:0.02\text{Mn}^{2+}$.

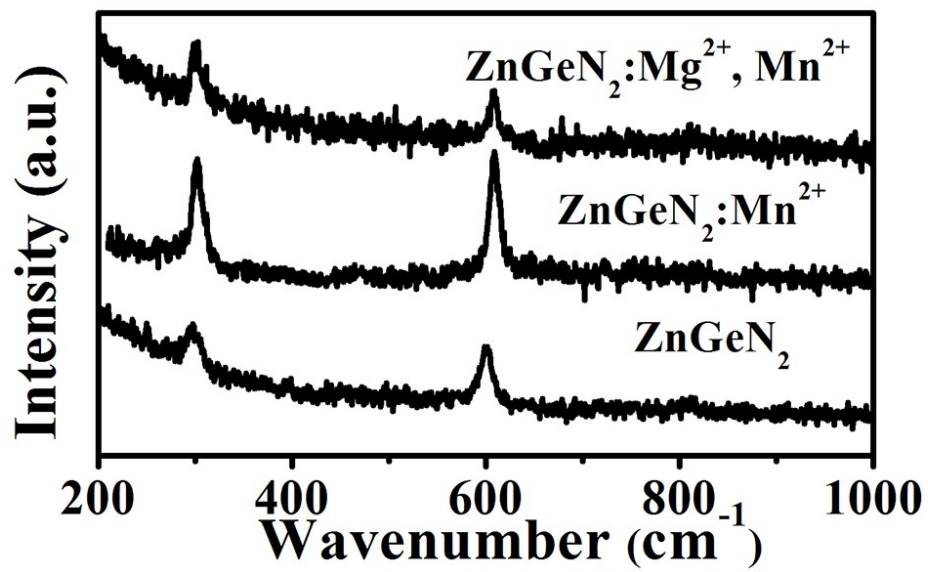


Figure S2 Raman spectra of ZnGeN₂, ZnGeN₂: Mn²⁺, and ZnGeN₂:Mg²⁺, Mn²⁺.

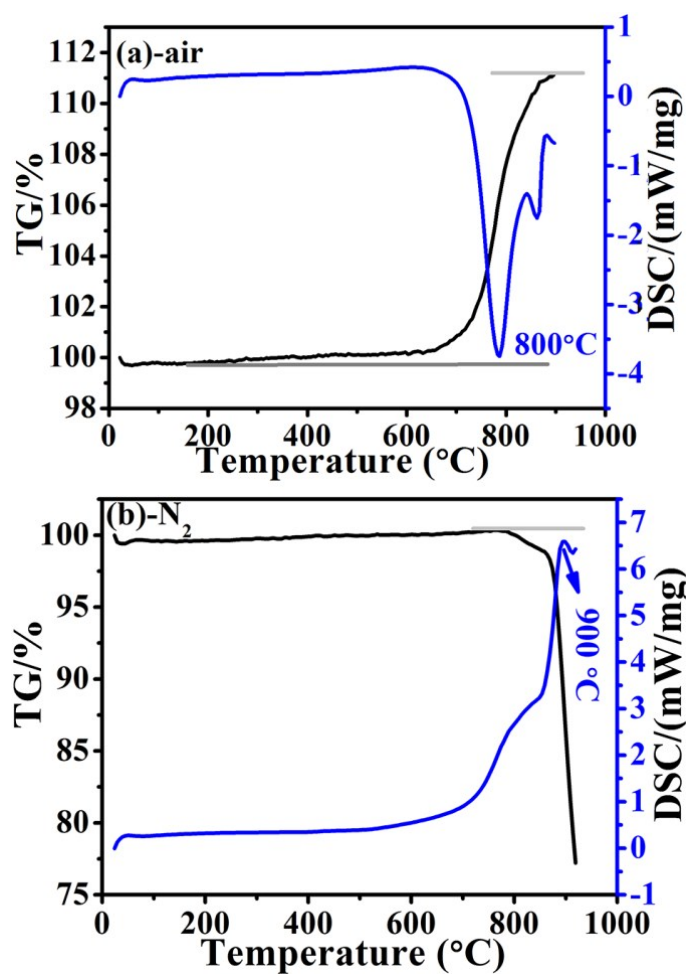


Figure S3 TG-DSC curves of the ZnGeN₂ sample in air (a) and N₂ (b) atmospheres.

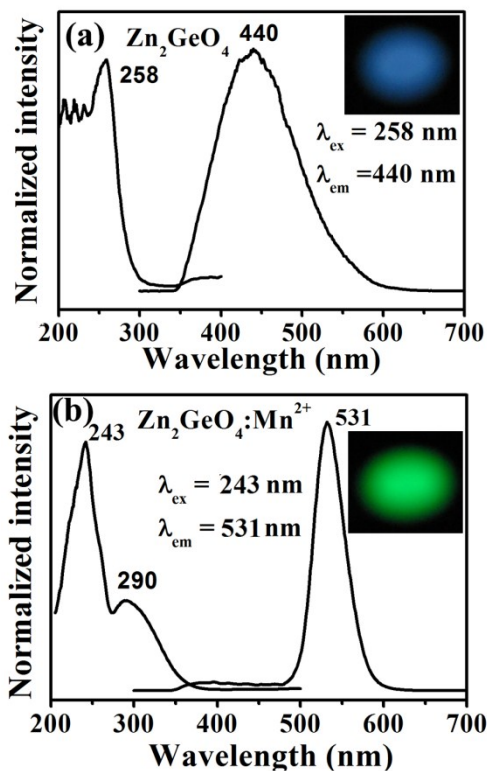


Figure S4 Photoluminescence excitation and emission spectra of hydrothermal product (a) Zn_2GeO_4 sample and (b) $\text{Zn}_2\text{GeO}_4:\text{Mn}^{2+}$ sample. The inset photographs represent the luminescence photographs of Zn_2GeO_4 and $\text{Zn}_2\text{GeO}_4:\text{Mn}^{2+}$ samples under UV lamp (254 nm) irradiation.

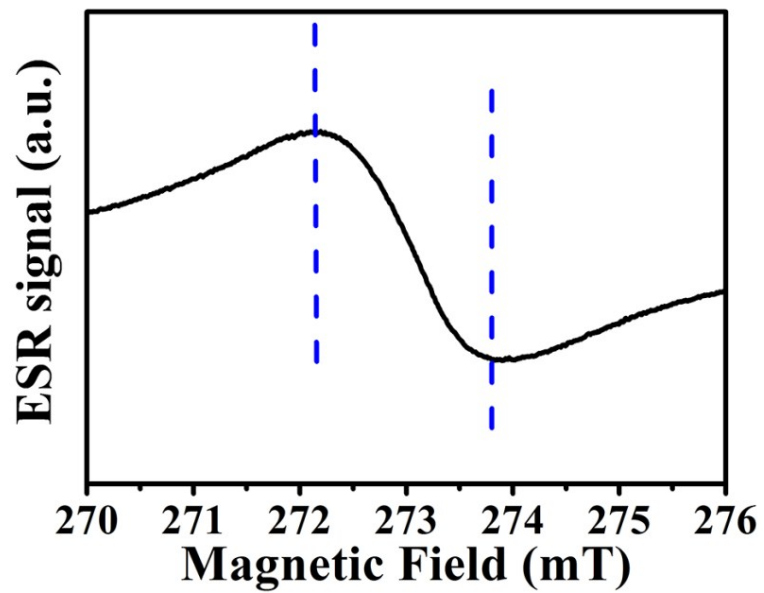


Figure S5 ESR spectrum of ZnGeN₂:Mn²⁺ phosphor measured at 300 K.

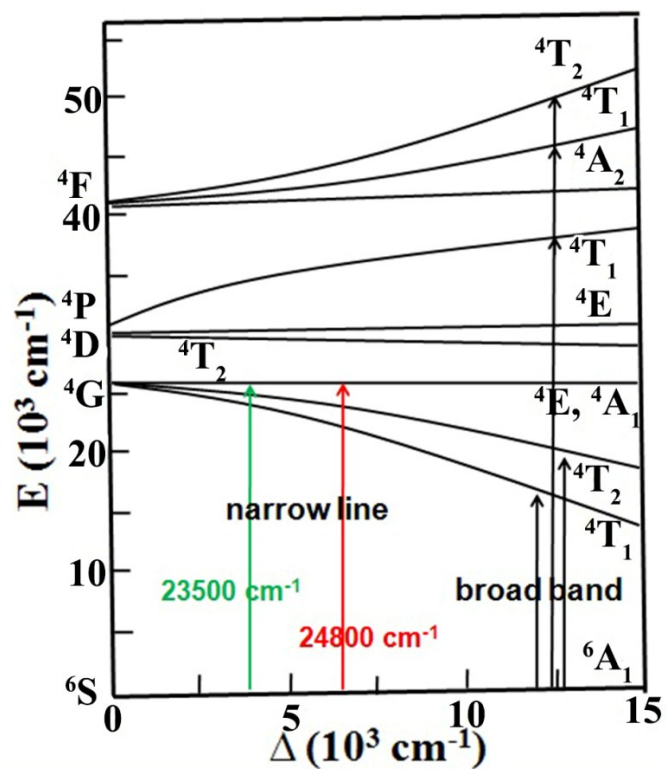


Figure S6 Tanabe–Sugano energy-level diagram for Mn²⁺.

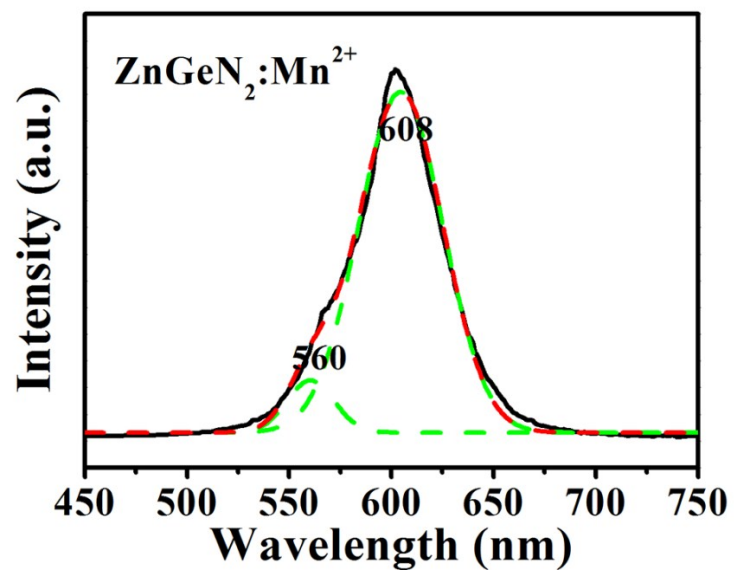


Figure S7 Observed (solid) and Gaussian fitting (dashed) emission spectrum for ZnGeN₂:Mn²⁺.

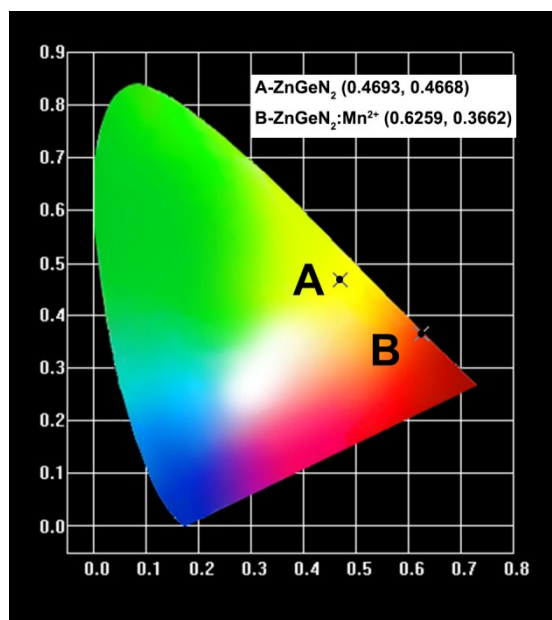


Figure S8 The CIE chromaticity diagram for ZnGeN₂ (A) and ZnGeN₂:Mn²⁺ (B) samples under 340 nm UV light excitation.

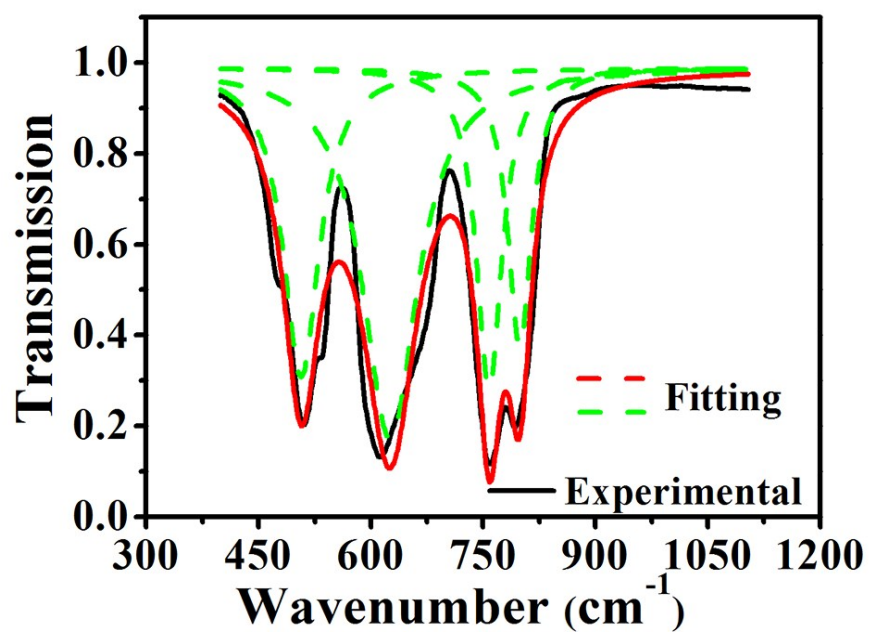


Figure S9 Experimental and Lorentz fitting infrared spectra of ZnGeN₂.

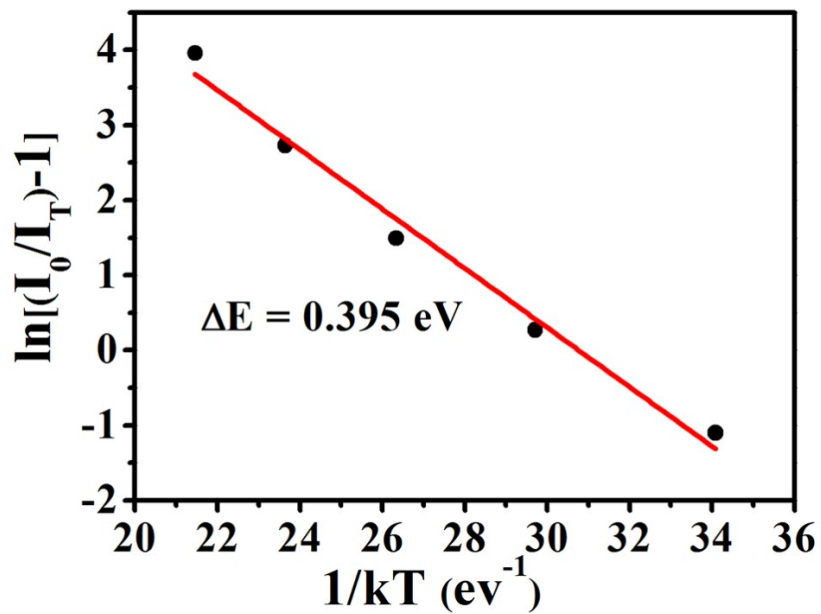


Figure S10 The plot of $\ln(I_0/I_T-1)$ vs. $1/kT$ of the $\text{ZnGeN}_2:\text{Mn}^{2+}$ phosphors.

Table S1 The fitting parameters for the IR-active modes of ZnGeN₂.

$\omega_j(\text{cm}^{-1})$	506	625	758	798	
S	0.68	0.82	0.71	0.61	$\varepsilon_0 = 1.2$
γ	59	88	41	38	