

Supporting information

Table S1. Recently reported green LLP phosphors and their LLP performances.

Phosphors	LLP emission (nm)	LLP duration (h)	references
$\text{Li}_2\text{CaGeO}_4:\text{Tb}^{3+}$	543	1	19
$\text{Ca}_{14}\text{Mg}_2(\text{SiO}_4)_8:\text{Eu}^{2+},\text{Dy}^{3+}$	523	1	20
$\text{Y}_3\text{Sc}_2\text{Ga}_3\text{AlO}_{12}:\text{Ce}^{3+}$	495	1-2	21
$\text{YTaO}_4:\text{Tb}^{3+}$	543	2	22
$\text{Zn}_2\text{GeO}_4:\text{Mn}^{2+}$	528	2	23
$\text{ZnS}:\text{Cu}^+$	530	3	24-25
$\text{Ca}_2\text{SnO}_4:\text{Tb}^{3+}$	545	3	26
$\text{CaS}:\text{Sm}^{3+}$	569	3	27
$\text{CaSnO}_3:\text{Tb}^{3+}$	543	4	28
$\text{CaZnGe}_2\text{O}_6:\text{Tb}^{3+}$	552	4	29
$\text{Mg}_2\text{SnO}_4:\text{Mn}^{2+}$	500	5	30
$\text{Ca}_8\text{Mg}(\text{SiO}_4)_4\text{C}_{12}:\text{Eu}^{2+},\text{Nd}^{3+}$	504	5	31
$\text{CdSiO}_3:\text{Tb}^{3+}$	540	5	6
$\text{SrAl}_2\text{O}_4:\text{Ce}^{3+},\text{Mn}^{2+}$	515	5	32
$\text{CaAl}_2\text{O}_4:\text{Ce}^{3+},\text{Mn}^{2+}/\text{Ce}^{3+},\text{Tb}^{3+}$	525 / 543	10	33-34
$\text{Zn}_{11}\text{B}_8\text{Si}_5\text{O}_{33}:\text{Mn}^{2+}$	525	12	35
$\text{Lu}_2\text{O}_3:\text{Tb}^{3+},\text{Ca}^{2+}$	543	15	4
$\text{Zn}_2\text{SiO}_4:\text{Mn}^{2+},\text{Yb}^{3+}$	523	30	This work

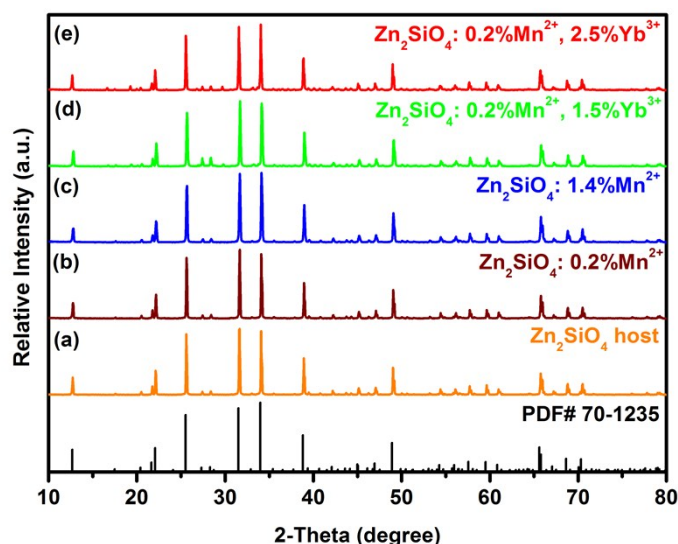


Figure S1. The X-ray diffraction patterns of (a) Zn_2SiO_4 host, (b), (c) $\text{Zn}_2\text{SiO}_4:\text{Mn}^{2+}$ (d), (e), $\text{Zn}_2\text{SiO}_4:\text{Mn}^{2+},\text{Yb}^{3+}$, and the JCPDS card.

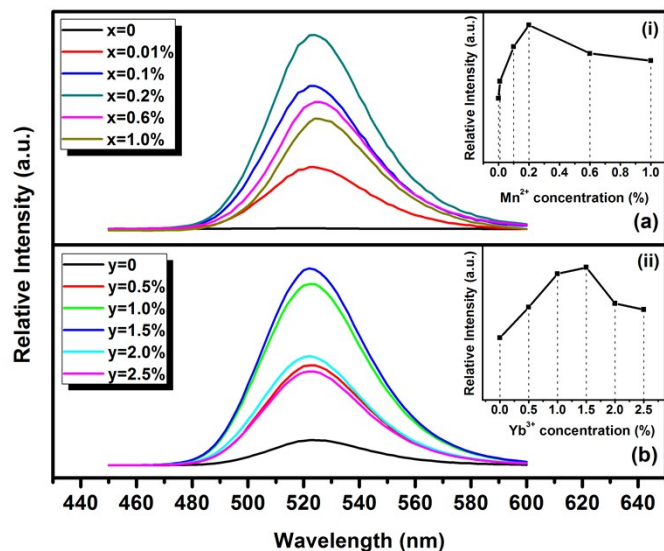


Figure S2. (a) The LLP emission spectra of $\text{Zn}_2\text{SiO}_4:\text{xMn}^{2+}$ ($x = 0, 0.01\%, 0.1\%, 0.2\%, 0.6\%$, and 1.0%). (b) The LLP emission spectra of $\text{Zn}_2\text{SiO}_4:0.2\%\text{Mn}^{2+}, \text{yYb}^{3+}$ ($y = 0, 0.5\%, 1.0\%, 1.5\%, 2.0\%$, and 2.5%). Both recorded at 30 s after UV irradiation for 60 s.

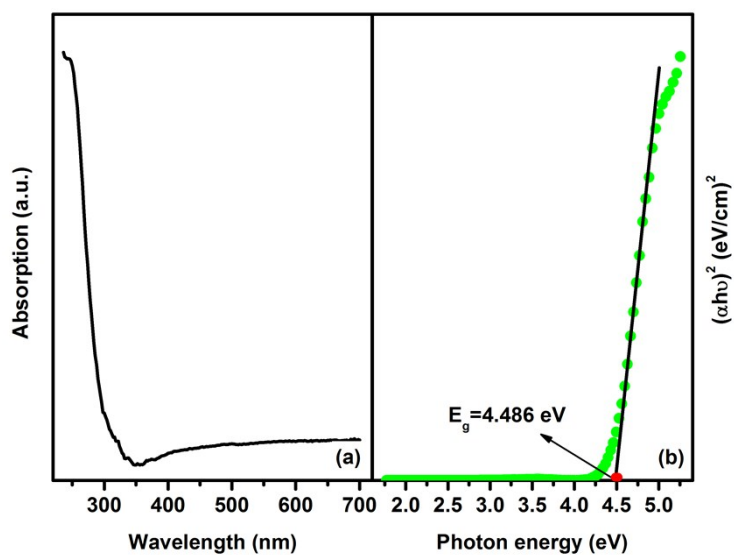


Figure S3. (a) The UV–Vis absorption spectra of Zn_2SiO_4 host. (b) Plot of $(\alpha h\nu)^2$ vs photon energy.