Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

A novel double-perovskite Gd_2ZnTiO_6: Mn^{4+} red phosphor for UV-based w-LEDs: structure and luminescent properties

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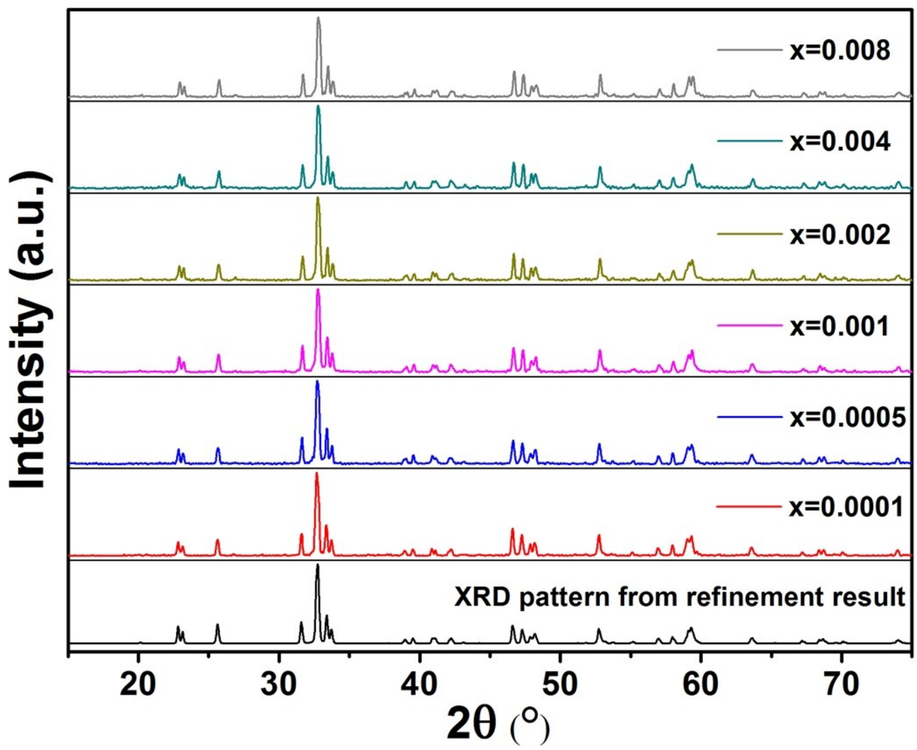

Figure S1. XRD patterns of GZT: xMn^{4+} samples and the refinement result for GZT: $0.002Mn^{4+}$.

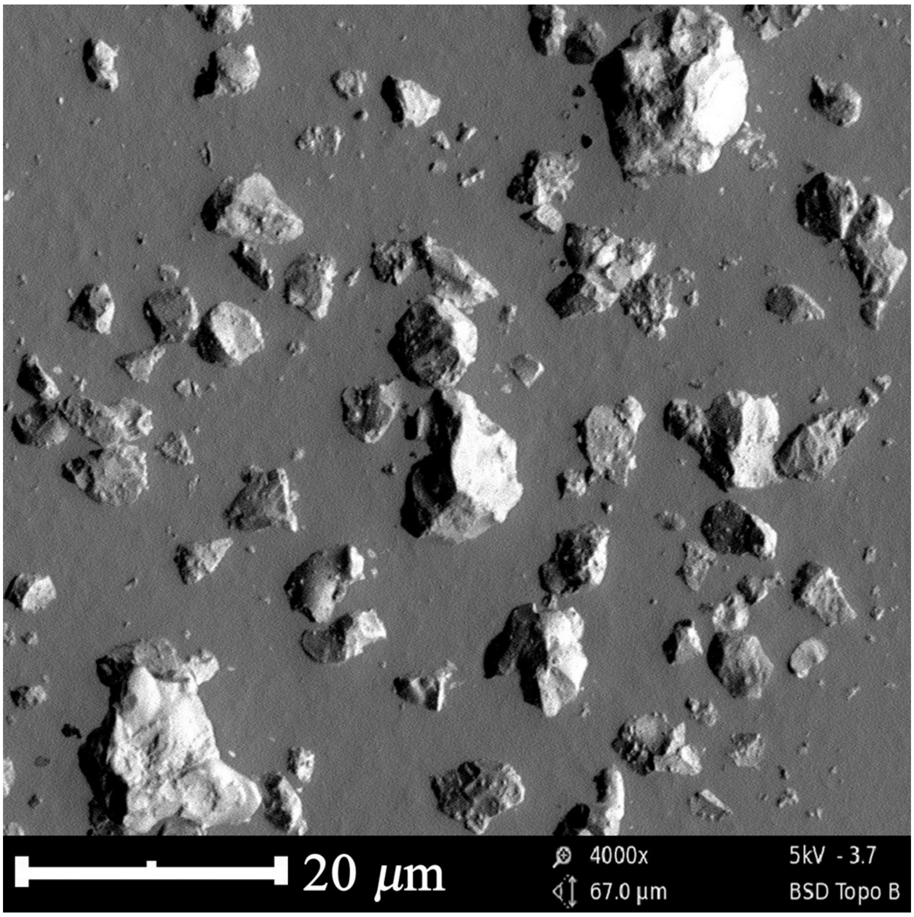

Figure S2. SEM image of GZT: $0.002Mn^{4+}$ phosphor sample.

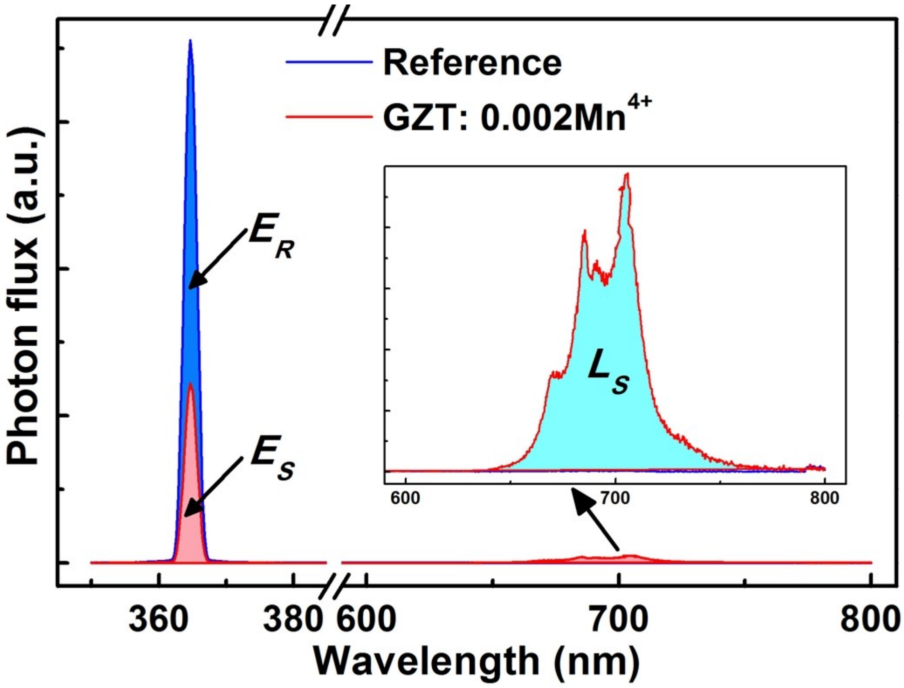

Figure S3. PL spectra of GZT:0.002Mn^{4+} and reference sample recorded by a spectrofluorometer equipped with an integrating sphere for quantum efficiency and absorption efficiency calculations; the inset shows the magnified spectral region of 600–800 nm.

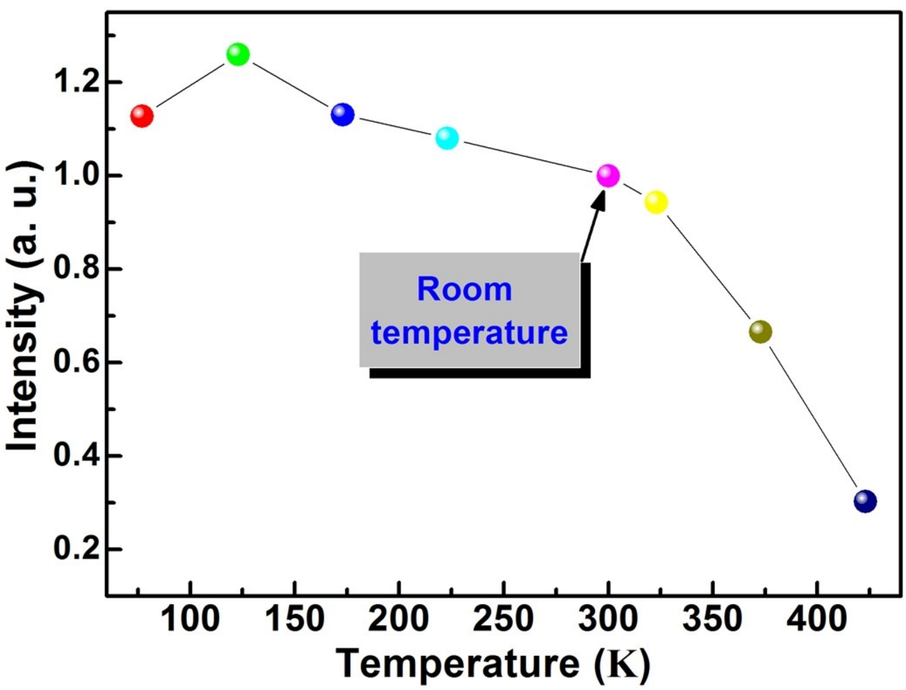

Figure S4. Integrated red PL intensity of GZT:0.002Mn^{4+} as a function of temperature

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Table S1. The crystal field splitting (D_q), Racah parameters (B, C), Nephelauxetic ratio (β) and ^{2}E energy level (E(^{2}E)) of Mn^{4+} ion in various hosts

Host	D_q, (cm^{-1})	B, (cm^{-1})	C, (cm^{-1})	β	E(^{2}E), (cm^{-1})	Reference
Na_2SiF_6	2174	775	3475	1.051	16210	1
Na_2SnF_6	2101	589	3873	1.033	16171	2
K_2MnF_6	2183	604	3821	1.029	16129	3
K_2TiF_6	2137	582	3778	1.011	15835	4
Cs_2GeF_6	2063	490	4056	1.033	16032	5
$BaSiF_6$	2141	568	3879	1.026	16050	6
MMG*	2380	700	3416	0.997	15576	7
$Y_2Sn_2O_7$	2100	700	3515	1.016	15563	8
$CaAl_{12}O_{19}$	2132	807	3088	0.999	15244	9-10
$SrMgAl_{10}O_{17}$	2237	791	3084	0.989	15152	11
$Sr_4Al_{14}O_{25}$	2222	680	3397	0.983	15361	12-14
Ba_2LaNbO_6	1780	670	3290	0.958	14679	15
$Y_3Ga_5O_{12}$	1922	699	3197	0.957	14859	16
$Mg_{14}Ge_5O_{24}$	2375	709	3263	0.974	15175	16
$CaZrO_3$	1850	754	3173	0.983	15054	17
Mg_2TiO_4	2096	700	3348	0.985	15267	18
$Ca_{14}Zn_6Al_{10}O_{35}$	2165	654	3054	0.906	14451	19-20
$LaAlO_3$	2123	695	2941	0.907	14034	21
$BaTiO_3$	1780	738	2820	0.913	13862	22
$SrTiO_3$	1818	719	2839	0.905	13827	23
Gd_2ZnTiO_6	1980	639	3132	0.913	14224	this work

MMG*=$3.5MgO\cdot 0.5MgF_2\cdot GeO_2$

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