

Supplementary material

**Multifaceted Insight into the Cation-Disordered Self-Activated
Luminescence of $\text{Zn}_3\text{V}_2\text{O}_8$ Compositions for
Lighting and Pigment Applications**

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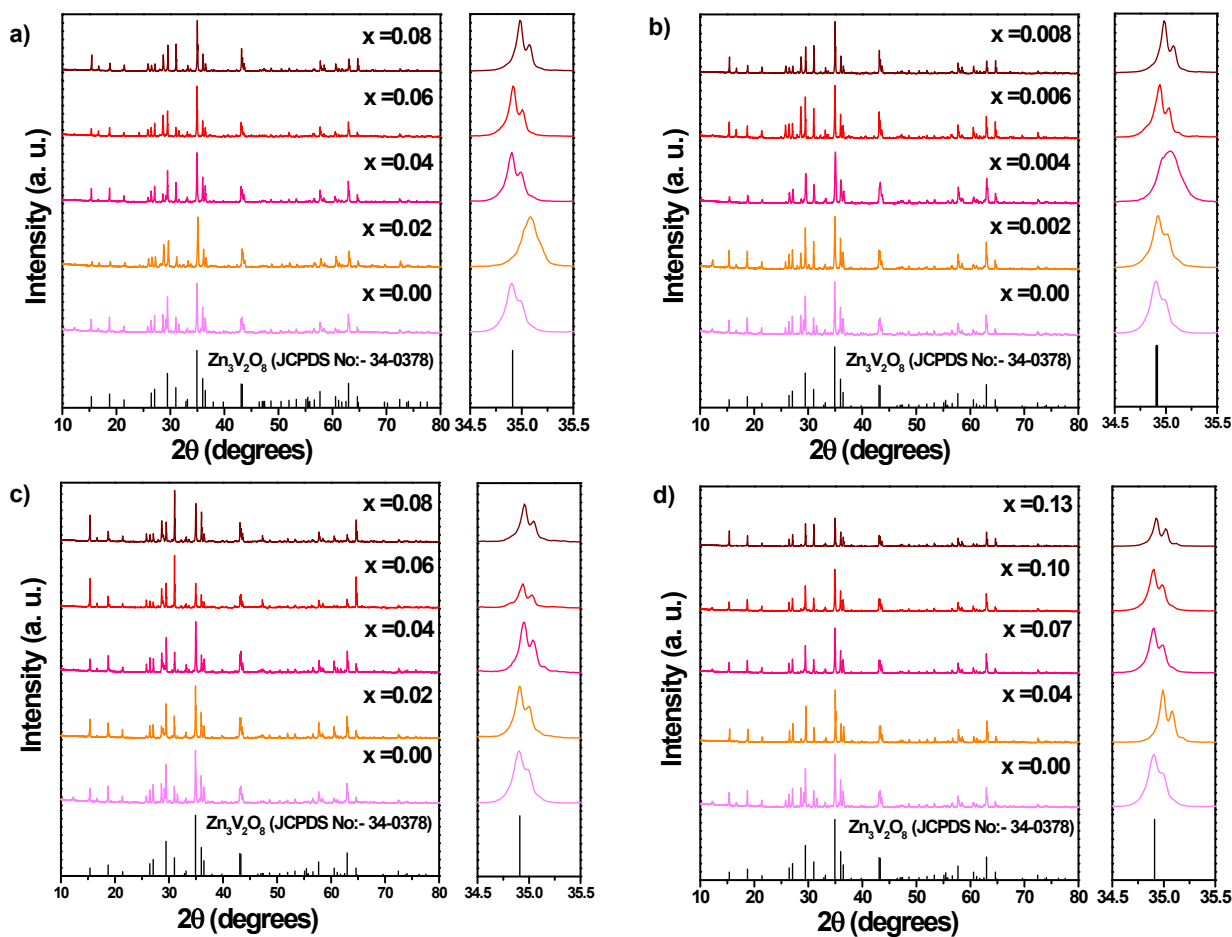


Fig. S1. XRD patterns of series of (a) $\text{Zn}_{3-x}\text{In}_x\text{V}_2\text{O}_8$ ($0.02 \leq x \leq 0.08$), (b) $\text{Zn}_{3-x}\text{Y}_x\text{V}_2\text{O}_8$ ($0.002 \leq x \leq 0.008$), (c) $\text{Zn}_{3-x}\text{Bi}_x\text{V}_2\text{O}_8$ ($0.02 \leq x \leq 0.08$), (d) $\text{Zn}_{3-x}\text{K}_x\text{V}_2\text{O}_8$ ($0.04 \leq x \leq 0.13$) phosphors.

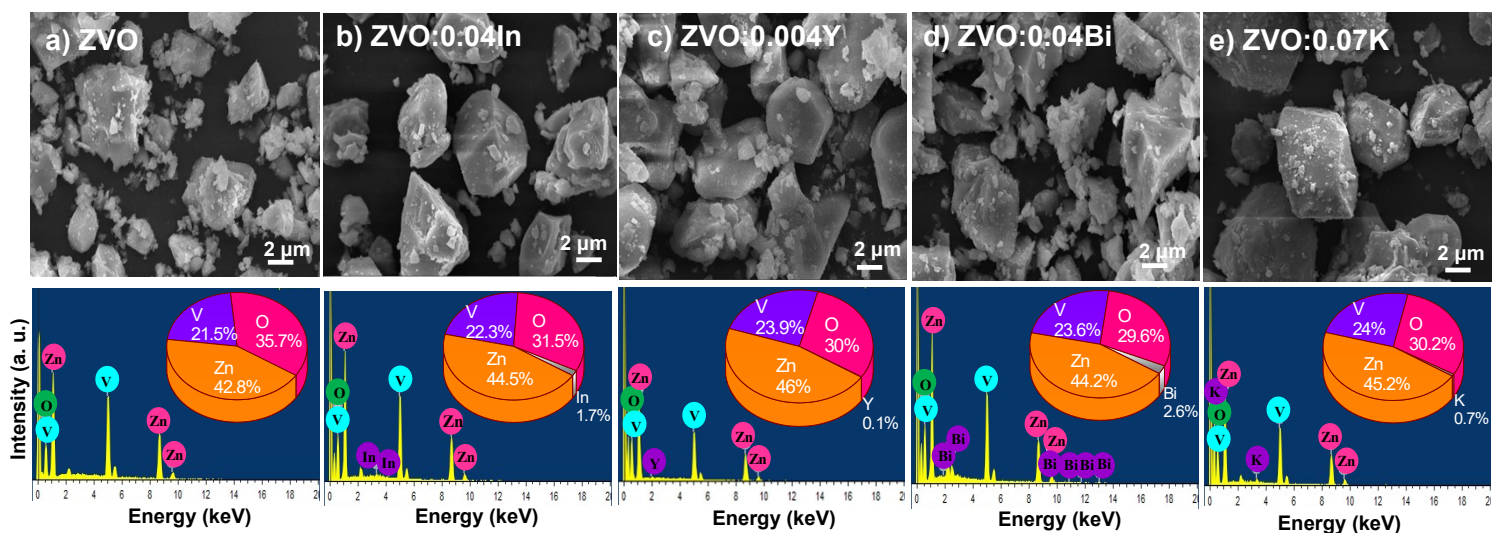


Fig. S2. SEM micrographs and EDX spectra for (a) ZVO, (b) ZVO: 0.04In, (c) ZVO: 0.004Y, (d) ZVO: 0.04Bi, (e) ZVO: 0.07K phosphors with corresponding elemental wt. % distribution in the insets.

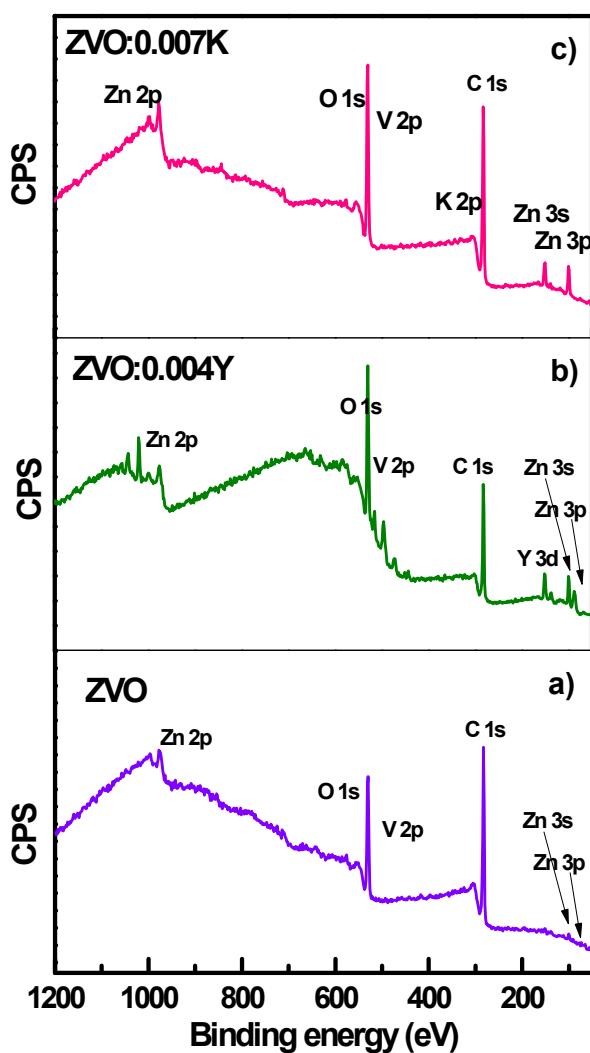


Fig. S3. XPS survey spectra of (a) ZVO, (b) ZVO: 0.004Y, (c) ZVO: 0.07K phosphors.

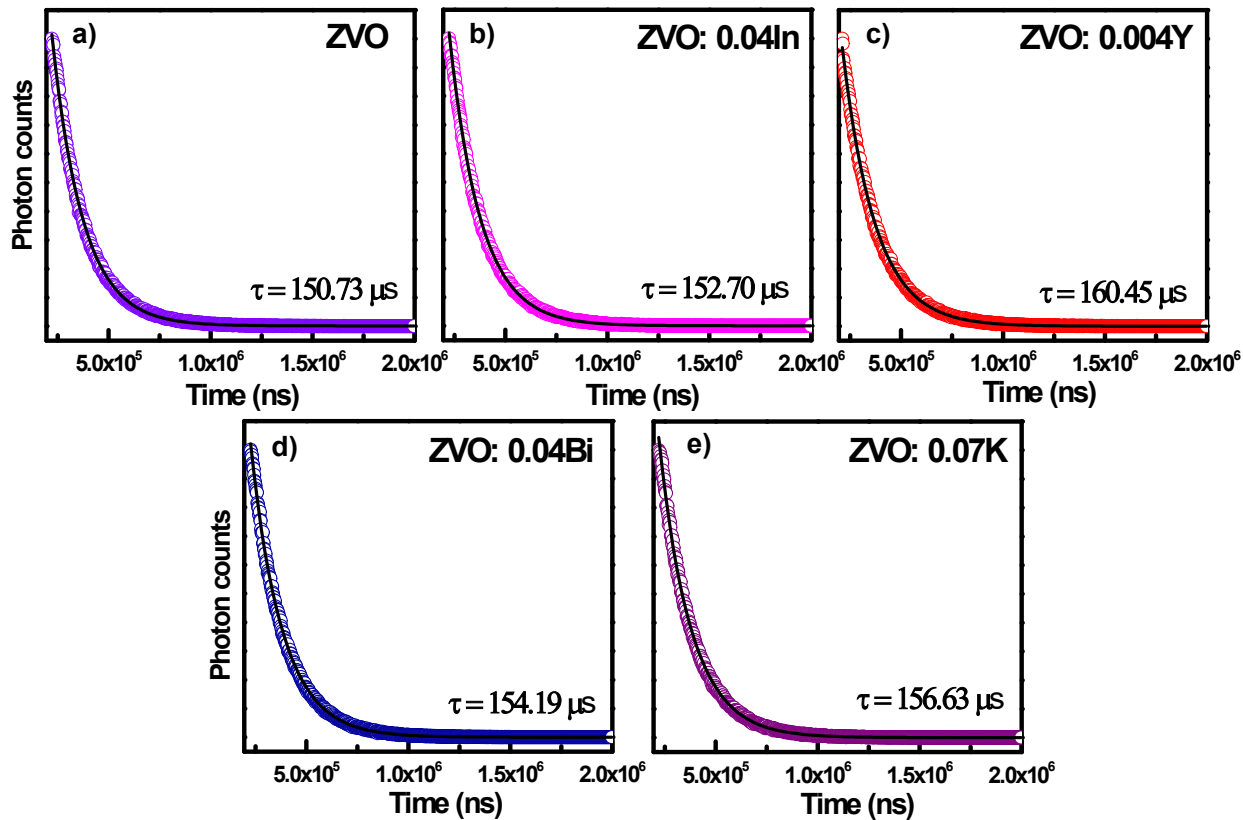


Fig. S4. PL decay curves of (a) ZVO, (b) ZVO: 0.04In, (c) ZVO: 0.004Y, (d) ZVO: 0.04Bi, (e) ZVO: 0.07K phosphors recorded upon 360 nm excitation and 550 nm emission.

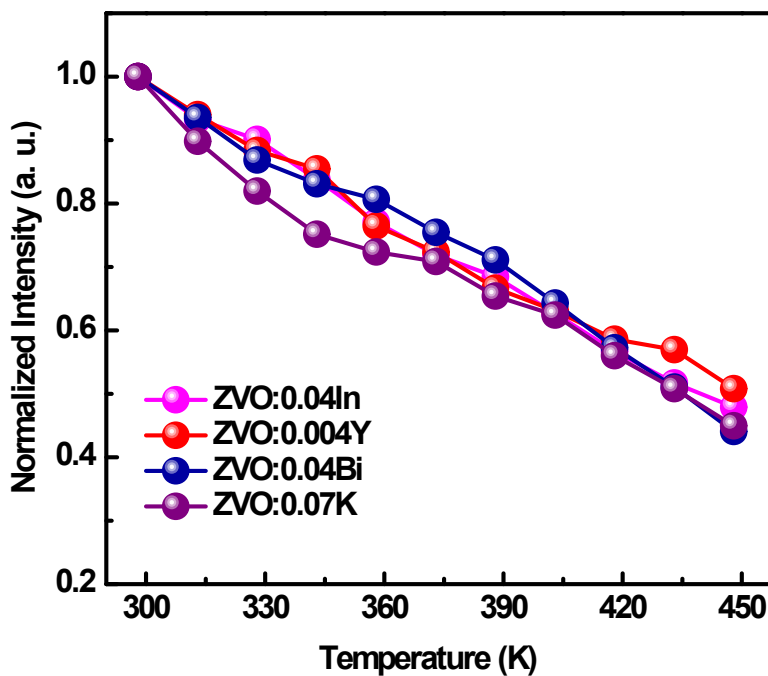


Fig. S5. Normalized PL emission intensity vs temperature plot of ZVO, ZVO: 0.04In, ZVO: 0.004Y, ZVO: 0.04Bi, ZVO: 0.07K phosphors.

Table S1. Refined atomic coordinates of (a) ZVO, (b) ZVO: 0.04In, (c) ZVO: 0.004Y, (d) ZVO: 0.04Bi, (e) ZVO: 0.07K phosphors from the refinement data.

Sample	Atom	Site	x	y	z	Occupancy
ZVO	Zn1	4a	0	0	0	1
	Zn2	8e	0.25	0.1361	0.25	1
	V	8f	0	0.3784	0.1204	1
	O1	8f	0	0.2479	0.2343	1
	O2	8f	0	0.9993	0.2405	1
	O3	16g	0.226	0.3827	0.0047	1
ZVO: 0.04In	Zn1	4a	0	0	0	0.9867
	In1	4a	0	0	0	0.0134
	Zn2	8e	0.25	0.13523	0.25	1
	V	8f	0	0.37801	0.12464	1
	O1	8f	0	0.25125	0.22774	1
	O2	8f	0	0.99681	0.2405	1
	O3	16g	0.22342	0.38111	0.0067	1
ZVO: 0.004Y	Zn1	4a	0	0	0	0.9987
	Y1	4a	0	0	0	0.0013
	Zn2	8e	0.25	0.13718	0.25	1
	V	8f	0	0.37635	0.12526	1
	O1	8f	0	0.25980	0.23167	1
	O2	8f	0	0.99410	0.2405	1
	O3	16g	0.21418	0.37709	0.00789	1
ZVO: 0.04Bi	Zn1	4a	0	0	0	0.9867
	Bi1	4a	0	0	0	0.0134
	Zn2	8e	0.25	0.13639	0.25	1
	V	8f	0	0.38072	0.12687	1
	O1	8f	0	0.25366	0.23758	1
	O2	8f	0	0.99751	0.2410	1
	O3	16g	0.21782	0.38247	0.0080	1
ZVO: 0.07K	Zn1	4a	0	0	0	0.9767
	K1	4a	0	0	0	0.0234
	Zn2	8e	0.25	0.13551	0.25	1
	V	8f	0	0.37768	0.12412	1
	O1	8f	0	0.25337	0.22809	1
	O2	8f	0	0.99835	0.24406	1
	O3	16g	0.21969	0.38033	0.00490	1

