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## Electronic Supplementary Information (ESI) Improved photoluminescence behaviour of Eu<sup>3+</sup> activated CaMoO<sub>4</sub> Nanoparticles via Zn<sup>2+</sup> incorporation

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Fig.S1 TEM image of ASP CaMoO<sub>4</sub>:Eu (a)  $Zn^{2+}$  free and (b) 2 at.%  $Zn^{2+}$  ion.



Fig.S2 XPS spectrum comprising of core BE levels of Ca, Mo, O, Eu/Zn



Fig.S3 De-convoluted Gaussian fitting of Ca2p peaks in XPS spectrum.



Fig.S4 De-convoluted Gaussian fitting of Mo3d peaks in XPS spectrum.



Fig.S5 XPS spectra of Eu<sup>3+</sup> ion with Zn<sup>2+</sup> (0, 2 and 10 at.%) concentration for 900 °C annealed samples in CaMoO<sub>4</sub>:Eu.



Fig.S6 De-convoluted peaks fitting of O1s XPS spectrum.



Fig.S7 Excitation spectra of Zn (0, 2, and 10 at.%) co-doped CaMoO<sub>4</sub>:Eu nanophosphors annealed at 900 °C samples at 615 nm emission wavelength.



Fig.S8 Emission spectra of  $Zn^{2+}$  (0, 2, 5, 7 and 10 at.%) co-doped CaMoO<sub>4</sub>:Eu for ASP samples at 395 nm excitation wavelength.



Fig. S9 Emission spectra of Zn<sup>2+</sup> (0, 2, 5, 7 and 10 at.%) doped CaMoO<sub>4</sub>:Eu under 395 nm excitation annealed at 900 °C samples.

Samples	Zn <sup>2+</sup> (at.%)	Cell Parameters		Cell	Crystal
		a = b(Å)	c(Å)	(Å <sup>3</sup> )	(nm)
JCPDS					
29-0351					
	0	5.227	11.456	313.07	23.7
	2	5.230	11.462	313.56	27.2
As-prepared	5	5.224	11.487	313.51	32.1
	7	5.227	11.472	313.46	36.0
	10	5.226	11.471	313.45	37.4
	0	5.229	11.441	312.90	26.0
	2	5.229	11.442	312.95	30.4
Annealed at	5	5.230	11.440	312.89	36.3
900 °C	7	5.224	11.448	312.53	40.3
	10	5.225	11.448	312.61	48.4

Table S1: Lattice parameters of Zn<sup>2+</sup> co-doped CaMoO<sub>4</sub>:Eu for ASP and 900 °C annealed samples

**Table S2** CIE values for  $Zn^{2+}$  ( $Zn^{2+} = 0, 2, 5, 7, 10$  at.%) co-doped CaMoO<sub>4</sub>:Eu<sup>3+</sup> nanophosphors under 266 and 395 nm excitation wavelengths.

at.%)					CIE		
				Coordinates			
		As-prepared			Annealed (900 °C)		
	No	X	Y	No	X	Y	
0	al	0.54	0.35	xl	0.58	0.36	
2	a2	0.53	0.36	x2	0.64	0.35	
5	a3	0.57	0.34	x3	0.65	0.34	
7	a4	0.56	0.33	x4	0.64	0.35	
10	a5	0.58	0.34	x5	0.64	0.35	
0	b1	0.56	0.35	y1	0.59	0.36	
2	b2	0.55	0.34	y2	0.61	0.36	
5	b3	0.54	0.33	y3	0.62	0.36	
7	b4	0.53	0.35	y4	0.62	0.36	
10	b5	0.56	0.32	y5	0.60	0.35	
	0 2 5 7 10 0 2 5 7 10	No   0 a1   2 a2   5 a3   7 a4   10 a5   0 b1   2 b2   5 b3   7 b4   10 b5	No X   0 a1 0.54   2 a2 0.53   5 a3 0.57   7 a4 0.56   10 a5 0.58   0 b1 0.56   2 b2 0.55   5 b3 0.54   7 b4 0.53   10 b5 0.56	No X Y   0 a1 0.54 0.35   2 a2 0.53 0.36   5 a3 0.57 0.34   7 a4 0.56 0.33   10 a5 0.58 0.34   0 b1 0.56 0.35   2 b2 0.55 0.34   5 b3 0.54 0.33   7 b4 0.53 0.35   10 b5 0.56 0.32	As-preparedNoXYNo0a1 $0.54$ $0.35$ x12a2 $0.53$ $0.36$ x25a3 $0.57$ $0.34$ x37a4 $0.56$ $0.33$ x410a5 $0.58$ $0.34$ x50b1 $0.56$ $0.35$ y12b2 $0.55$ $0.34$ y25b3 $0.54$ $0.33$ y37b4 $0.53$ $0.35$ y410b5 $0.56$ $0.32$ y5	CoorAs-preparedAnnealedNoXYNoX0a1 $0.54$ $0.35$ x1 $0.58$ 2a2 $0.53$ $0.36$ x2 $0.64$ 5a3 $0.57$ $0.34$ x3 $0.65$ 7a4 $0.56$ $0.33$ x4 $0.64$ 10a5 $0.58$ $0.34$ x5 $0.64$ 0b1 $0.56$ $0.35$ y1 $0.59$ 2b2 $0.55$ $0.34$ y2 $0.61$ 5b3 $0.54$ $0.33$ y3 $0.62$ 7b4 $0.53$ $0.35$ y4 $0.62$ 10b5 $0.56$ $0.32$ y5 $0.60$	