Supporting Information

Electrophoretic Deposition and Characterization of Transparent Nanocomposite Films of $YVO_4:Bi^{3+},Eu^{3+}$ Nanophosphor and Silicone-Modified Acrylic Resin

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Details of preparation procedure of $YVO_4:Bi^{3+},Eu^{3+}$ nanoparticles

Yttrium acetate tetrahydrate (84.94 mmol) and europium(III) acetate tetrahydrate (53.70 mmol) were dissolved in deionized water (150.00 g). A mixture of deionized water (78.90 g) and sodium citrate dihydrate (53.94 mmol), and a mixture of ethylene glycol (22.50 g) and bismuth(III) nitrate pentahydrate (10.50 mmol) were added to the Y-Eu solution, resulting in a white suspension of a citrate precursor. In another vessel, sodium orthovanadate(V) trihydrate (134.11 mmol) was dissolved in 150.00 g aqueous solution of sodium hydroxide at pH 12.5. Then this solution was added to the white suspension, and the mixture was adjusted to be pH 9.0 by adding an aqueous solution of sodium hydroxide and aged at 85 ℃ for 1 h. After cooling to room temperature, a paste collected from the aged colloidal solution by centrifugation at 12,000 rpm for 60 min was diluted with deionized water, and then subsequent hydrothermal treatment at 130 ℃ for 6 h was carried out using an autoclave. After cooling and centrifugation of the resulting colloidal solution at 12,000 rpm for 1 h, the final nanophosphor paste (37.6 wt%) was obtained by washing with deionized water and centrifuging at 12,000 rpm for 1 h twice. TEM image of the nanophosphor is shown in Figure S1.

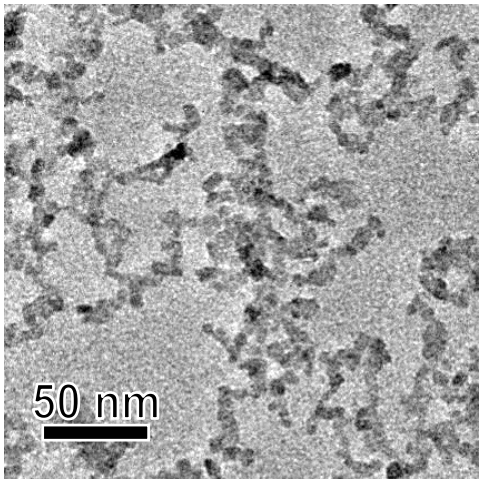

Figure S1. TEM image of YVO_4:Bi^{3+}, Eu^{3+} nanoparticles. The sample was prepared by drying a drop of colloidal solution on a copper microgrid.

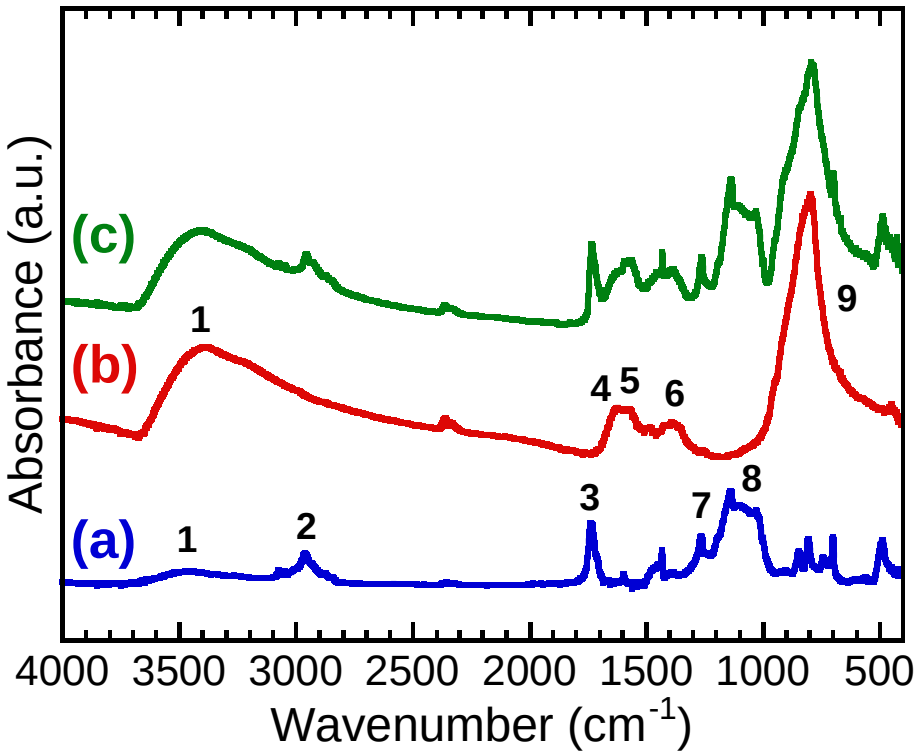

Figure S2. FT-IR spectra of (a) silicone-modified acrylic resin film, (b) $YVO_4:Bi^{3+},Eu^{3+}$ nanoparticle film, and (c) nanocomposite film. Deposition time for the films was 5 min. The absorption peaks are assigned in Table S1.

Table S1. Assignments of the FT-IR absorption peaks.

No.	Peak position (cm^{-1})			Assignment	Ref.
	Resin	$YVO_4:Bi^{3+},Eu^{3+}$	Nanocomposite film		
1	~3450	~3400	~3400	ν(O−H)	[S1]
2	3100–2800		3100–2800	ν(C−H)	[S1]
3	1736		1732	ν(C=O)	[S1]
4		1624	~1630	δ(O−H) of H_2O	[S1]
5		1577	1571	$\nu_{as}(COO^-)$	[S2]
6		1388	1389	$\nu_{s}(COO^-)$	[S2]
7	1263		1263	ν(Si−C)	[S1]
8	1200–1000		1200–1000	ν(Si−O)	[S1]
9		797	790	ν(V−O)	[S2]

ν = stretching; δ = deformation

as = asymmetric; s =symmetric

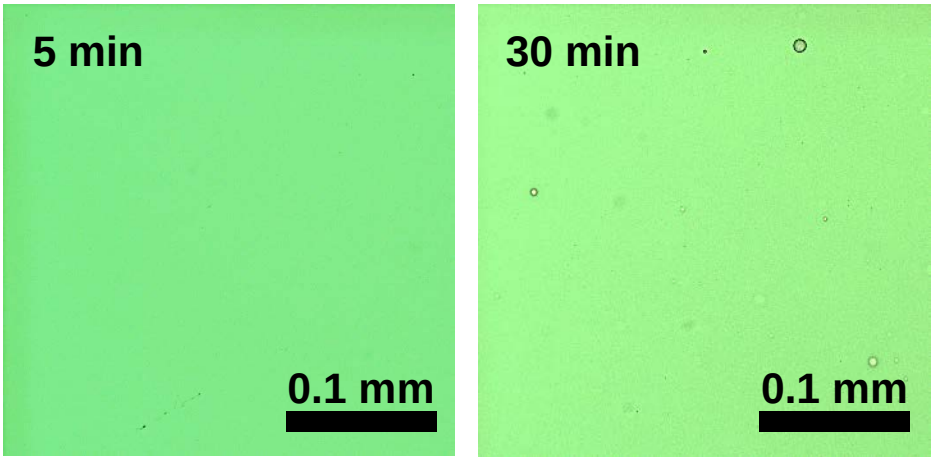

Figure S3. Optical microscope images of nanocomposite films deposited for 5 and 30 min. Their thicknesses were 6 and 20 μm, respectively.

REFERENCES

(S1) Colthup, N. B.; Daly, L. H.; Wiberley, S. E. *Introduction to Infrared and Raman Spectroscopy 3rd ed.*; Academic Press; New York, 1990; pp 360, 361, 387, 388, 390, 429.

(S2) Huignard, A.; Buissette, V.; Laurent, G.; Gacoin, T.; Boilot, J. -P. Synthesis and Characterizations of YVO_4:Eu Colloids. *Chem. Mater.* **2002**, *14*, 2264–2269.