

Highly luminescent and triboluminescent coordination polymers assembled from lanthanide β -diketonates and aromatic bidentate *O*-donor ligands

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Supporting Information

7 pages

Characterization of [Gd(NO₃)₃(Q)] (Q = acbz, acetbz, dmtph)

[Gd(NO₃)₃(acbz)], C₁₀H₁₀GdN₃O₁₁ (505.45): calcd C 23.76, H 1.99, N 8.31, Gd 31.1; found C 23.98, H 2.13, N 8.41, Gd 31.2. IR data: $\tilde{\nu}$ = 3332s; 3225s; 2982w; 2316w; 1668s; 1659s; 1497s; 1464s; 1403s; 1356s; 1309s; 1289s; 1271s; 1121m; 1090m; 1041m; 1031s; 1013m; 956s; 874m; 848s; 838s; 830s; 815s; 753s cm⁻¹.

[Gd(NO₃)₃(acetbz)], C₁₀H₁₀GdN₃O₁₃ (537.45): calcd C 22.35, H 1.88, N 7.82, Gd 29.3; found C 22.41, H 2.00, N 7.88, Gd 29.3. IR data: $\tilde{\nu}$ = 3496w; 3361w; 3116w; 3074w; 3004w; 2322w; 1760s; 1748s; 1719s; 1504s; 1432m; 1416m; 1366s; 1288w; 1245s; 1210s; 1178vs; 1101w; 1040m; 1026s; 1015s; 970m; 939m; 919s; 878m; 852s; 812s; 753m cm⁻¹.

[Gd(NO₃)₃(dmtph)], C₁₀H₁₀GdN₃O₁₃ (537.45): calcd C 22.35, H 1.88, N 7.82, Gd 29.3; found C 22.13, H 1.85, N 7.73, Gd 29.2. IR data: $\tilde{\nu}$ = 3422m; 3018w; 2961m; 2844w; 1715s; 1678m; 1504m; 1447w; 1433s; 1408s; 1108m; 1386m; 1341m; 1306m; 1275s; 1260s; 1193s; 1107s; 1037m; 1017s; 953m; 877m; 815m; 755m; 726s cm⁻¹.

Table S 1. Integral intensities of ⁵D₀ → ⁷F_J (J = 0 – 4) and ⁵D₄ → ⁷F_J (J = 6 – 0) transitions for Eu^{III} and Tb^{III} complexes, respectively.

Compound	State	∫ ₀₋₀	∫ ₀₋₁	∫ ₀₋₂	∫ ₀₋₃	∫ ₀₋₄	∫ _{tot} /∫ ₀₋₁
[Eu(hfa) ₃ (H ₂ O) ₂]	Solid	0.2	1.0	14.3	0.4	1.7	17.6
[Eu(hfa) ₃ (acbz)]	Solid	0.3	1.0	21.1	0.6	2.8	25.8
	Thin film	0.2	1.0	11.3	0.4	2.5	15.4
[Eu(hfa) ₃ (acetbz)]	Solid	0.3	1.0	20.6	0.5	2.4	24.8
	Thin film	0.3	1.0	15.0	0.5	2.3	19.1
[Eu(hfa) ₃ (dmtph)]	Solid	0.01	1.0	24.5	0.6	2.3	28.4
	Thin film	0.02	1.0	17.6	0.5	1.8	20.9
		∫ ₄₋₆	∫ ₄₋₅	∫ ₄₋₄	∫ ₄₋₃	∫ _{4-2,1,0}	
[Tb(hfa) ₃ (H ₂ O) ₂] ^c	Solid	0.2	1.0	0.1	0.08	0.04	
[Tb(hfa) ₃ (acbz)]	Solid	0.2	1.0	0.1	0.07	0.03	
[Tb(hfa) ₃ (acetbz)]	Solid	0.2	1.0	0.1	0.08	0.02	
[Tb(hfa) ₃ (dmtph)]	Solid	0.2	1.0	0.1	0.07	0.02	

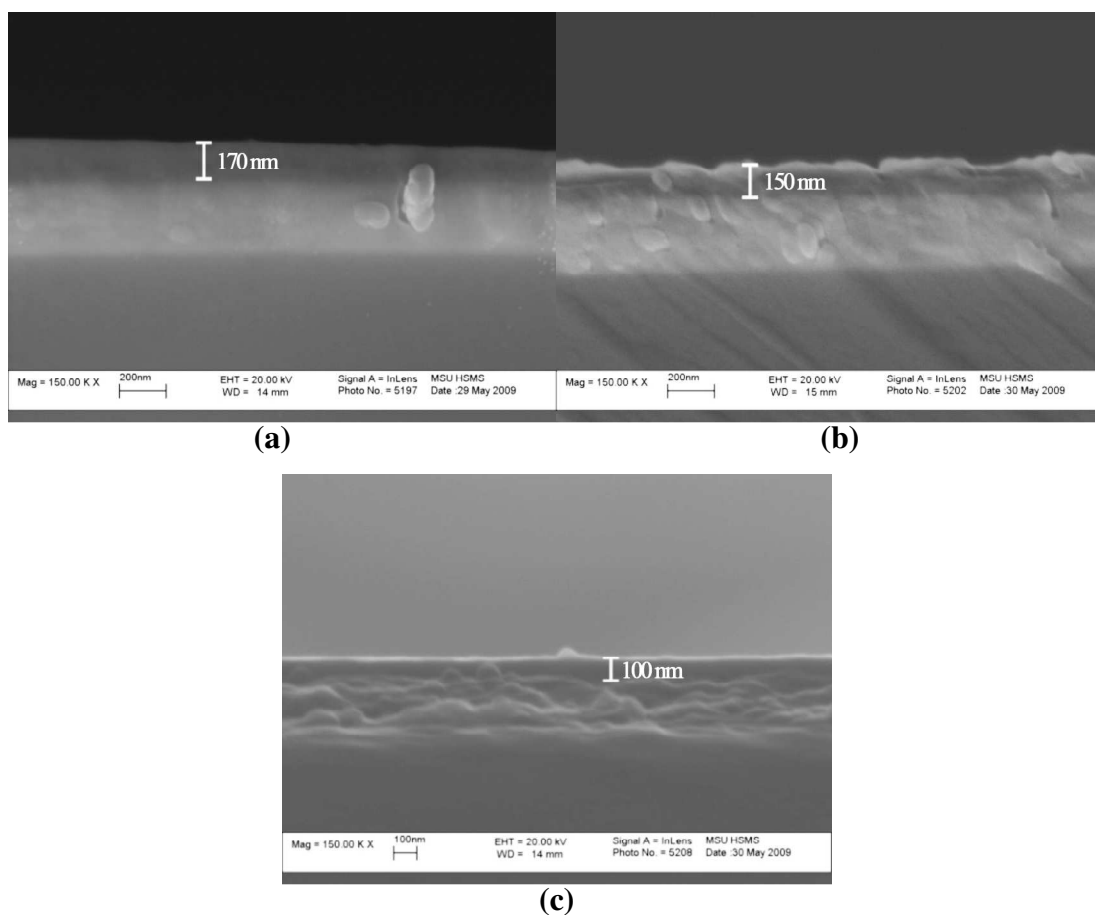


Figure S 1. SEM images of chips of the thin films: (a) $[\text{Eu}(\text{hfa})_3(\text{acbz})]$, (b) $[\text{Eu}(\text{hfa})_3(\text{acetbz})]$ and (c) $[\text{Eu}(\text{hfa})_3(\text{dmtph})]$.

Table S2. AFM images of [Eu(hfa)₃(acbz)] thin films and root mean-square roughness.

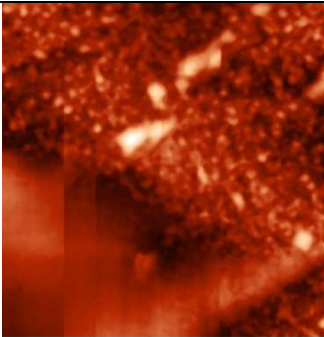
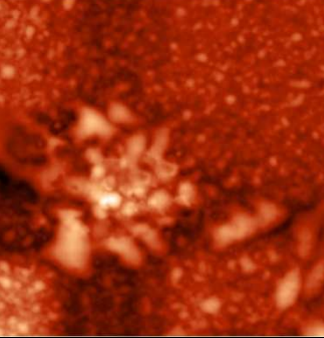
Surface morphology	Scanned area / $\mu\text{m}\times\mu\text{m}$	$\sqrt{\sigma_{z(x,y)}^2}$ / nm
	10×10	7
	10×10	12

Table S 3. AFM images of [Eu(hfa)₃(acetbz)] thin films and root mean-square roughness.

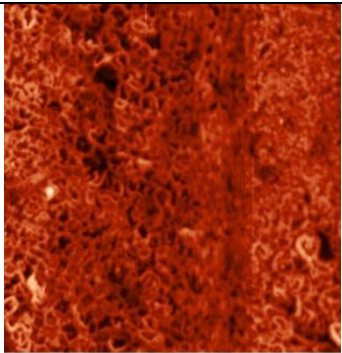
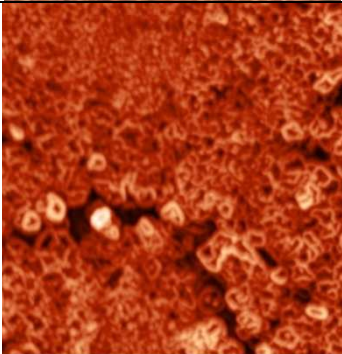
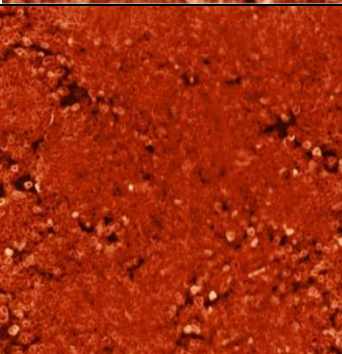
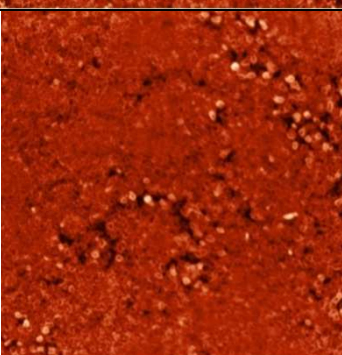
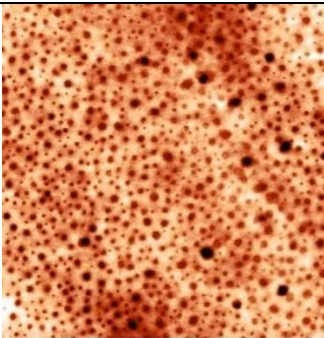
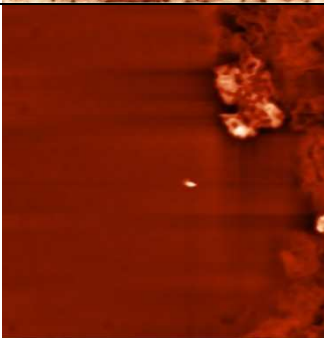
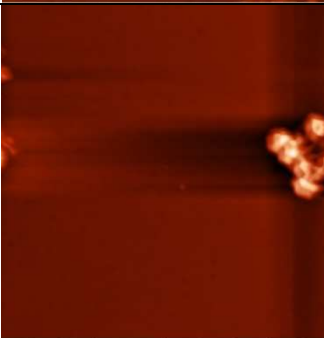
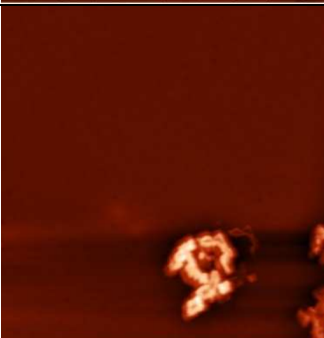
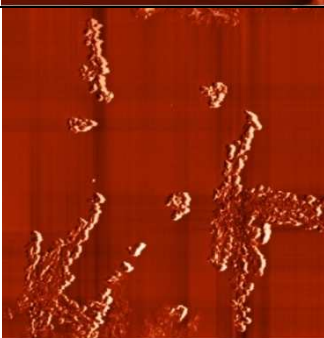
Surface morphology	Scanned area / $\mu\text{m}\times\mu\text{m}$	$\sqrt{\sigma_{Z(X,Y)}^2}$ / nm
	10×10	17
	10×10	17
	30×30	15
	30×30	15

Table S 4. AFM images of [Eu(hfa)₃(dmtph)] thin films and root mean-square roughness.

Surface morphology	Scanned area / $\mu\text{m}\times\mu\text{m}$	$\sqrt{\sigma_{Z(X,Y)}^2}$ / nm
	10×10	1
	10×10	12
	10×10	17
	10×10	24
	30×30	5

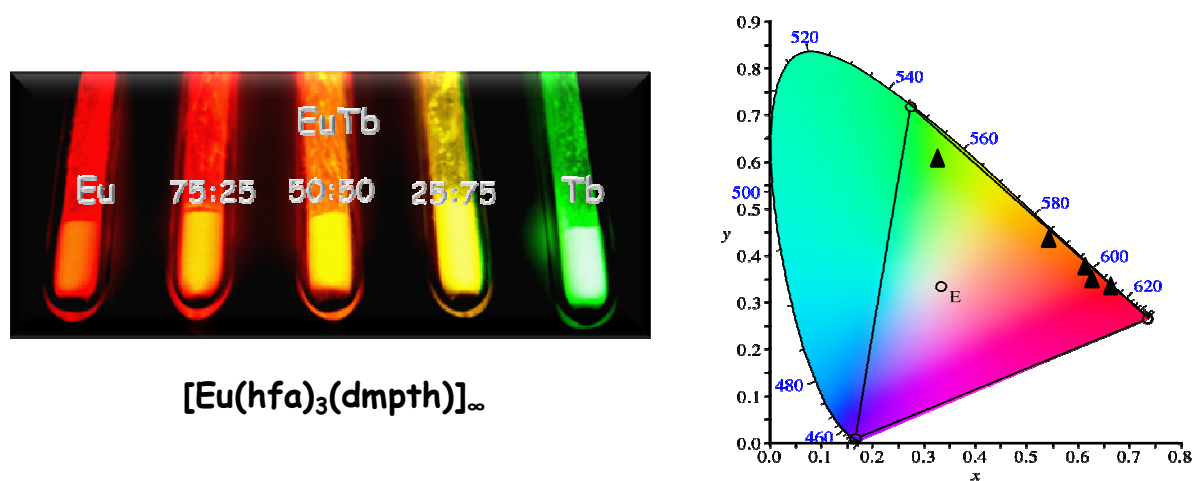


Figure S 2. (Left) Samples of $[\text{Ln}(\text{hfa})_3\text{dmpth}]_\infty$ ($\text{Ln} = \text{Eu}, \text{Tb}$) and various mixtures of them under UV excitation; (right) corresponding CIE 1931 trichromatic coordinates.