Electronic Supplementary Material (ESI) for Photochemical & Photobiological Sciences.

Supporting Information

for

Temperature-dependent Luminescent Properties of Lanthanide(III) β-diketonate Complexes-doped Laponite

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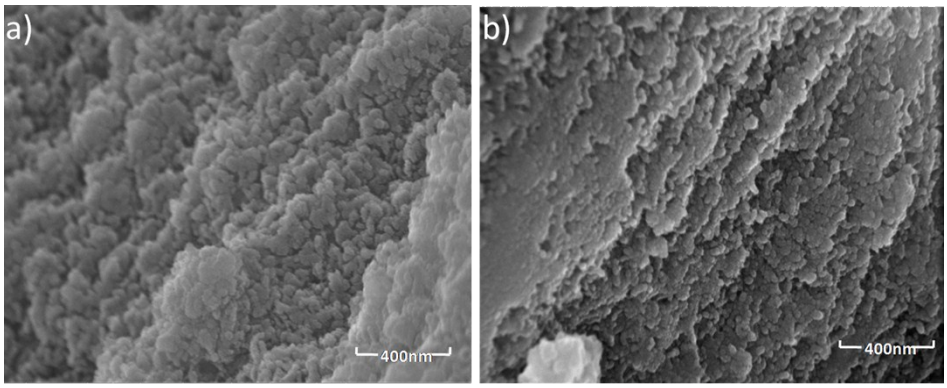

Figure S1. The scanning electron micrographs for a) (Eu-HFA)@LA and b) (Tb-HFA)@LA. (The scale bar is 400nm)

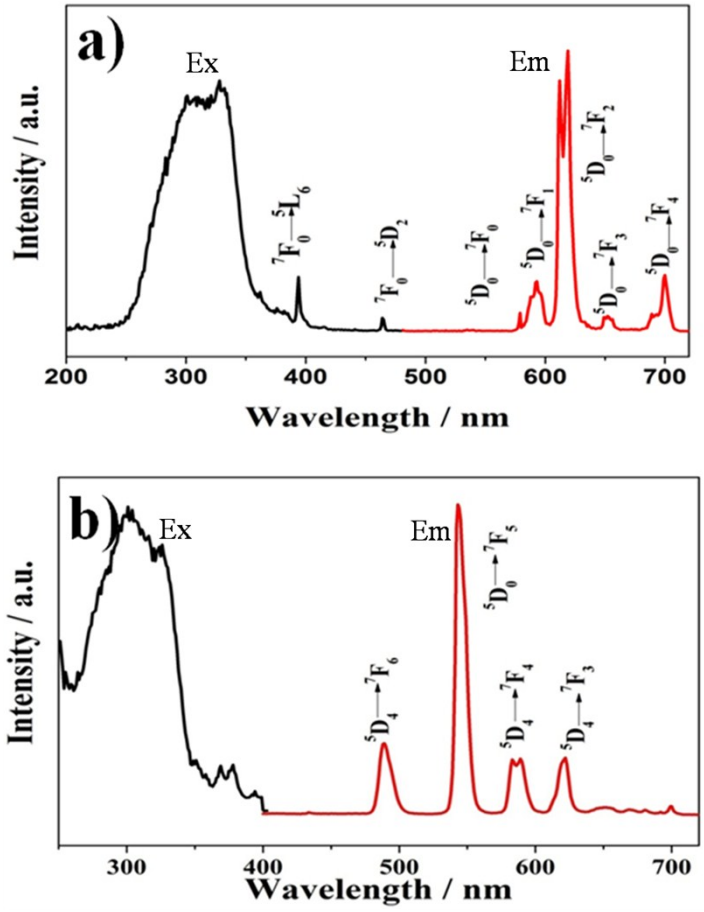

Figure S2. Excitation spectra (black line) monitored at 612 nm and Emission spectra (red line) excited at 328 nm of a) (Eu-HFA)@LA, Excitation spectra (black line) monitored at 544 nm and Emission spectra (red line) excited at 301 nm of b) (Tb-HFA)@LA.

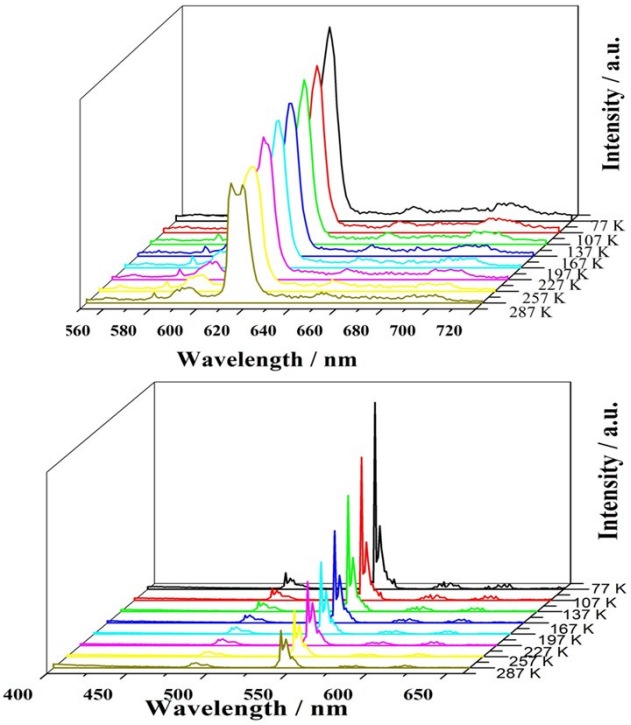

Figure S3. Photoluminescence spectra of a) (Eu-HFA)@LA and b) (Tb-HFA)@LA over the temperature range from 77K to 287K.

Table S1. The temperature-dependent $\eta_{Tb\rightarrow Eu}$ of (Tb-HFA)@LA and (Eu_1Tb_{99}-HFA)@LA from 77K to 287K.

T/K	77	107	137	167	197	227	257	287
$\eta_{Tb\rightarrow Eu}$	0.0437	0.0005	0.0248	0.0589	0.0142	0.0696	0.287	0.475

Table S2. The temperature-dependent decay time of (Tb-HFA)@LA and (Eu_1Tb_{99}-HFA)@LA from 77K to 287K.

T/K	77	107	137	167	197	227	257	287
$\tau_{LA\text{-}Tb\text{-}HFA}$	0.59	0.58	0.59	0.59	0.56	0.44	0.21	0.09
$\tau_{LA\text{-}Eu1Tb99\text{-}HFA}$	0.57	0.58	0.58	0.55	0.55	0.41	0.15	0.05

Table S3. Several photoluminescent data of (Eu-HFA)@LA.

τ (ms)	K_{exp} (ms^{-1})	K_r (ms^{-1})	n_w
0.35	2.86	0.47	2.31

Table S4. The photoluminescence quantum yields of (Eu-HFA)@LA, (Tb-HFA)@LA and (Eu_1Tb_{99}-HFA)@LA.

	(Eu-HFA)@LA	(Tb-HFA)@LA	(Eu_1Tb_{99}-HFA)@LA
Φ	23%	28%	26%

The quantum yield of the resulting hybrid materials can be up to 23% for (Eu-HFA)@LA, 28% for (Tb-HFA)@LA and 26% for (Eu_1Tb_{99}-HFA)@LA in solid state, respectively, as determined by using the integrating sphere.

The empirical formula suggested by Supkowski and Horrocks,[1] Equation (1) and (2) can thus be used to calculate n_w including Eu^{3+} and Tb^{3+}-containing organic-inorganic hybrids.

$$n_{w(Eu)}=1.05(\tau_{H2O}^{-1}-\tau_{D2O}^{-1}) \quad (1)$$

$$n_{w(Tb)}=4.2(\tau_{H2O}^{-1}-\tau_{D2O}^{-1}) \quad (2)$$

Therefore, the n_w can be assumed to be 2.31 for (Eu-HFA)@LA and 2.2 for (Tb-HFA)@LA.

1 Carlos LD, Ferreira RA, Bermudez VdZ, Ribeiro SJ, Lanthanide‐containing light‐emitting organic‐inorganic hybrids: A bet on the future, *Adv. Mater.,* 2009, **21**, 509-534.