Electronic Supplementary Information for:

Lanthanide directed self-assembly synthesis and photophysical evaluation of chiral Eu(III) luminescent "half-helicates"

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Synthesis

Ligands **3** or **4** (35 mg, 0.10 mmol) in 5 mL MeCN had solid $Eu(CF_3SO_3)_3$ (20 mg, 0.03 mmol) added and the resulting solutions were heated at 95°C under microwave irradiation for 10 minutes. The resulting clear yellow solutions were subjected to vapour diffusion of diethyl ether yielding off-white solids.

3_3.Eu_1: obtained as an off-white solid, 24 mg (72%); HR-MALDI-MS: 1133.2395 ($[Eu(\mathbf{3})_3 \cdot Na]^+$ requires 1133.2358). δ_H (400 MHz, CD_3CN), 10.64, 10.08, 8.35, 7.59, 7.46, 6.86, 5.97, 5.29, 4.53, 4.38, 4.11, 1.31. IR(neat): 3290, 3095, 2989, 1619 (C=O), 1590, 1560, 1439, 1380, 1276, 1240, 1225, 1165, 1029, 934, 847, 800, 755, 730, 662 cm^{-1}.

4_3.Eu_1: Obtained as an off-white solid, 27 mg (82%). HR-MALDI-MS: 1133.2393 ($[Eu(\mathbf{4})_3 \cdot Na]^+$ requires 1133.2358). δ_H (400 MHz, CD_3CN) 10.66, 10.11, 8.36, 7.59, 7.47, 6.86, 6.22, 5.92, 5.28, 4.67, 4.36, 4.11, 1.32. IR(neat): 3299, 3093, 1621 (C=O), 1592, 1561, 1440, 1398, 1277, 1241, 1225, 1164, 1029, 935, 847, 800, 757, 731, 662 cm^{-1}.

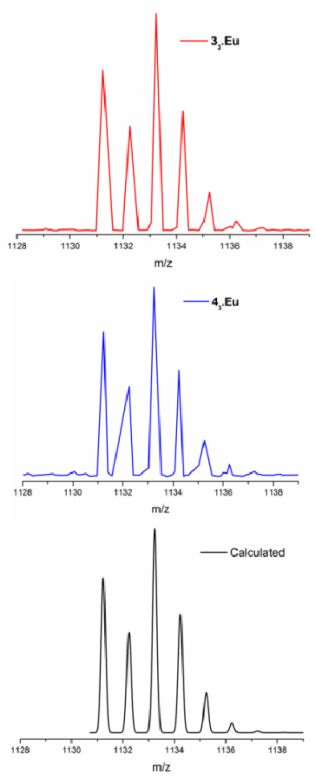

Figure S1: Obeserved mass spectra for **3_3.Eu** (top), **4_3.Eu** (middle) and calculated mass spectrum for **L_3.Eu** (bottom).

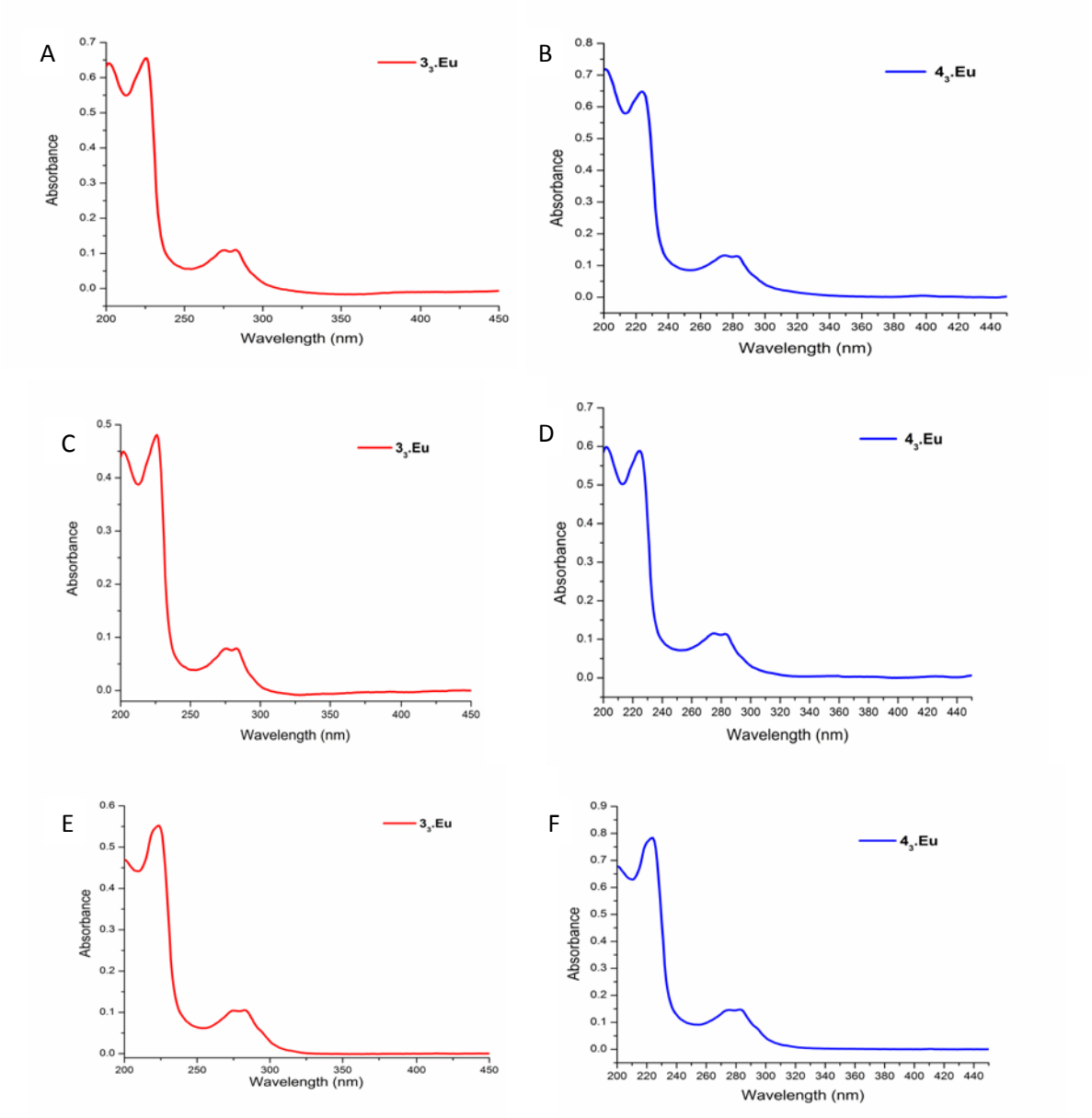

Figure S2: Absorption spectra of **3_3.Eu** and **4_3.Eu** in D_2O (A & B), H_2O (C & D) and CH_3CN (E & F).

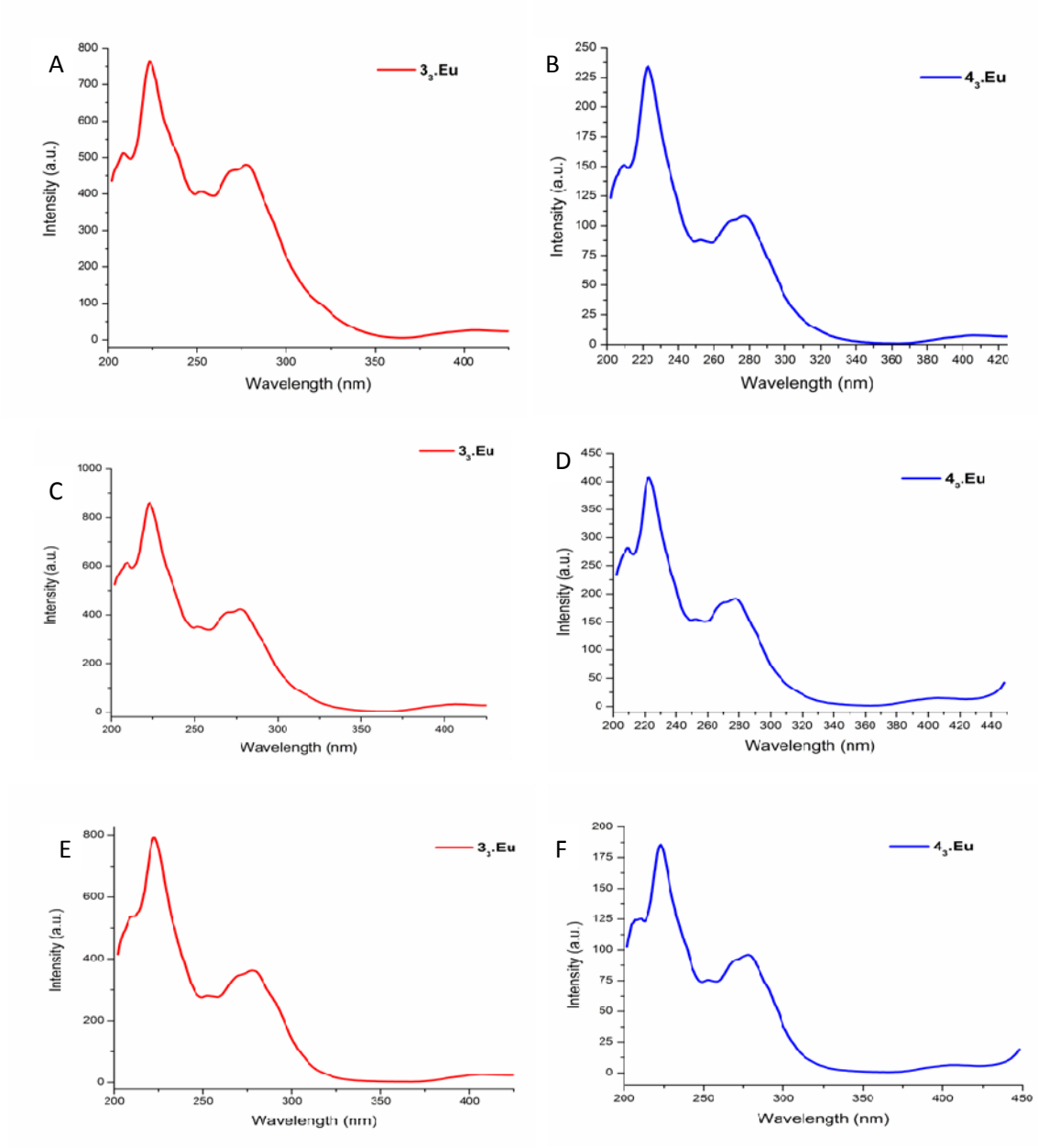

Figure S3: Excitation spectra (Emission at 615 nm) of **3_3.Eu** and **4_3.Eu** in D_2O (A & B), H_2O (C & D) and CH_3CN (E & F).

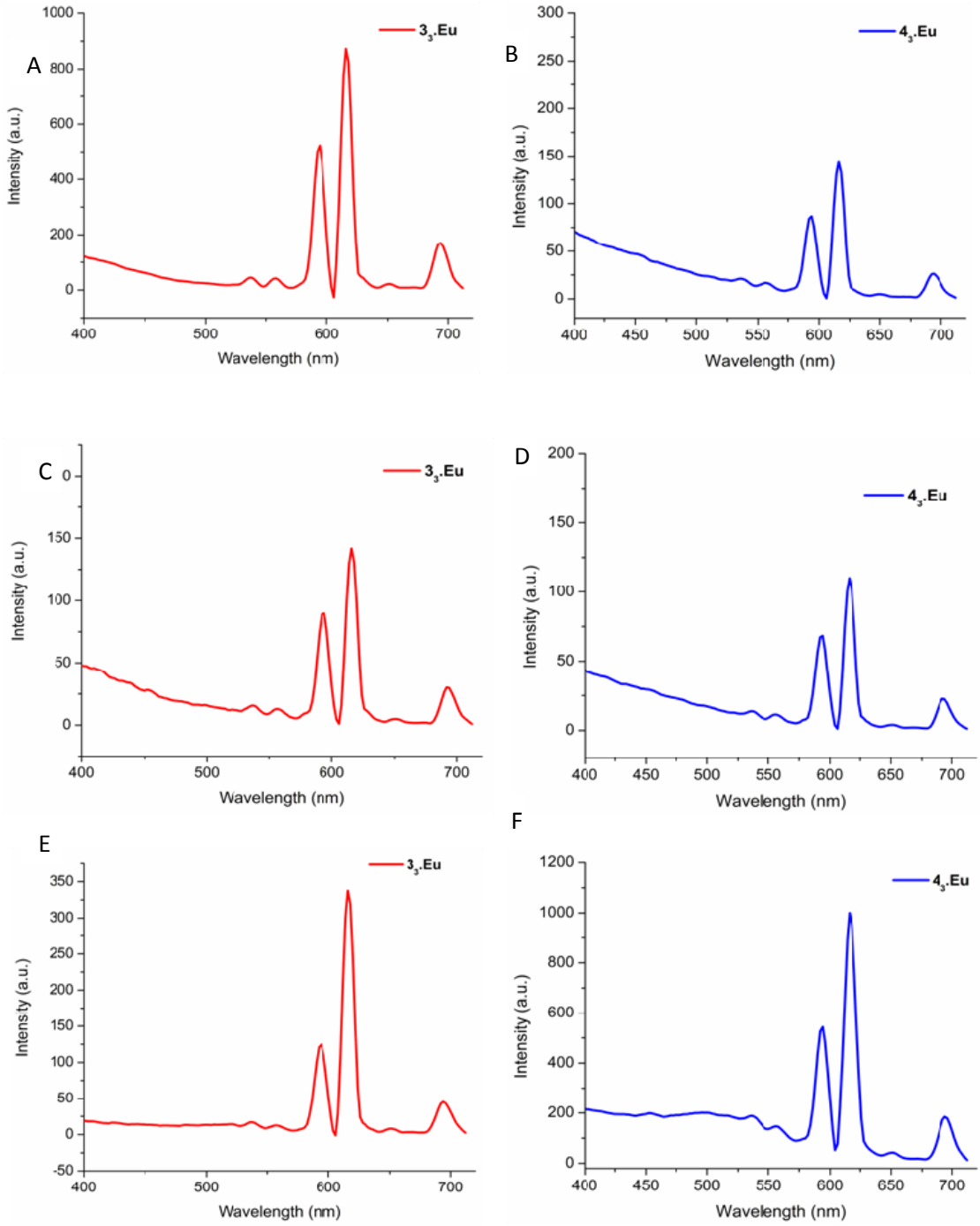

Figure S4: Fluorescence emission spectra of **3_3.Eu** and **4_3.Eu** in D_2O (A & B), H_2O (C & D) and CH_3CN (E & F).

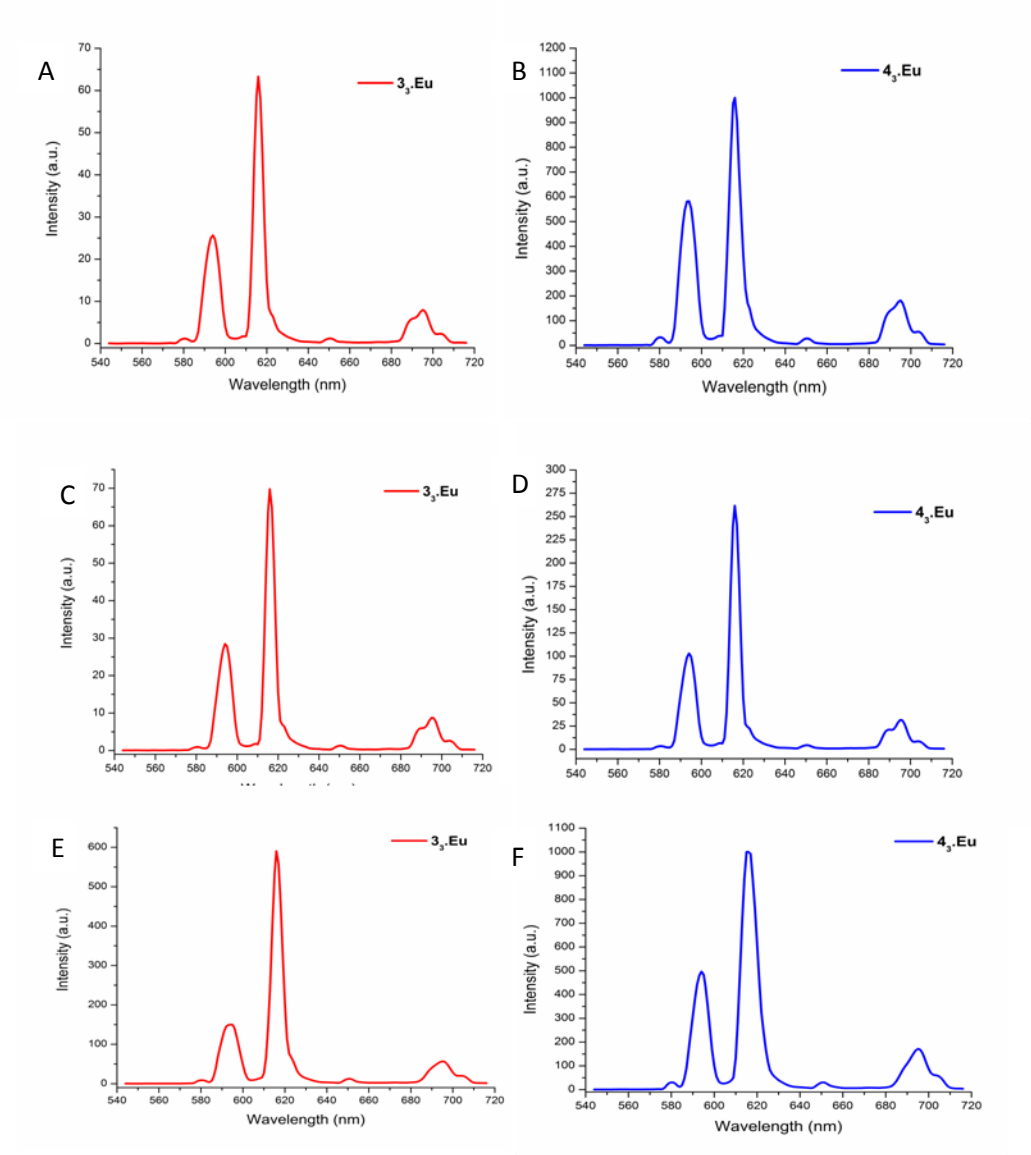

Figure S5: Phosphorescence emission spectra (excitation at 281 nm) of **3_3.Eu** and **4_3.Eu** in D_2O (A & B), H_2O (C & D) and CH_3CN (E & F).

Lifetime graphs

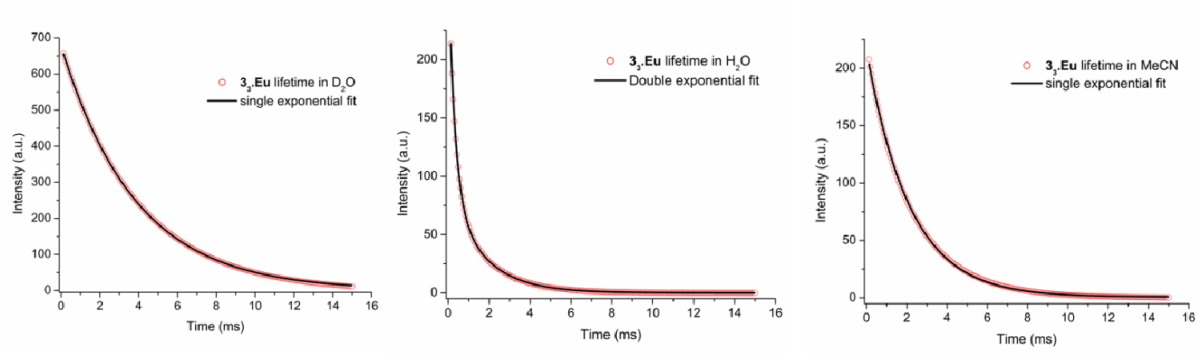

Figure S6: Lifetimes of **3_3.Eu** in D_2O, H_2O and CH_3CN and their corresponding fits.

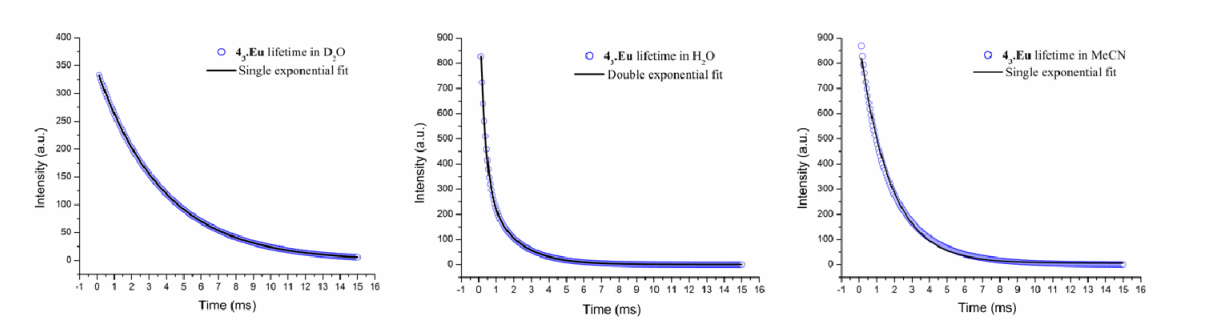

Figure S7: Lifetimes of **4_3.Eu** in D_2O, H_2O and CH_3CN and their corresponding fits.

Table 1: Summary of lifetimes and hydration states for **3_3.Eu** and **4_3.Eu** (made as solids ([a]) and *in situ* ([b]))

	τ_{MeCN}	τ_{D2O}	τ_{H2O} % population		*q*
3_3.Eu[a]	2.162	3.907	1.683	0.308	0.1
			70%	30%	
4_3.Eu[a]	1.772	3.777	1.672	0.309	0.1
			71%	29%	
3_3.Eu[b]	0.917	2.760	1.683	0.304	0
			67%	33%	
4_3.Eu[b]	0.892	3.395	1.665	0.306	0.11
			64%	36%	

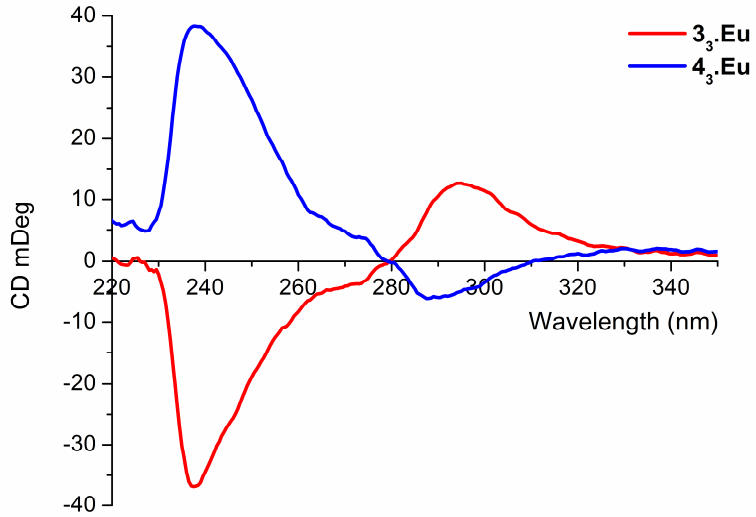

Figure S8: CD spectra of complexes **3_3.Eu** (red) and **4_3.Eu** (blue) in CH_3CN.

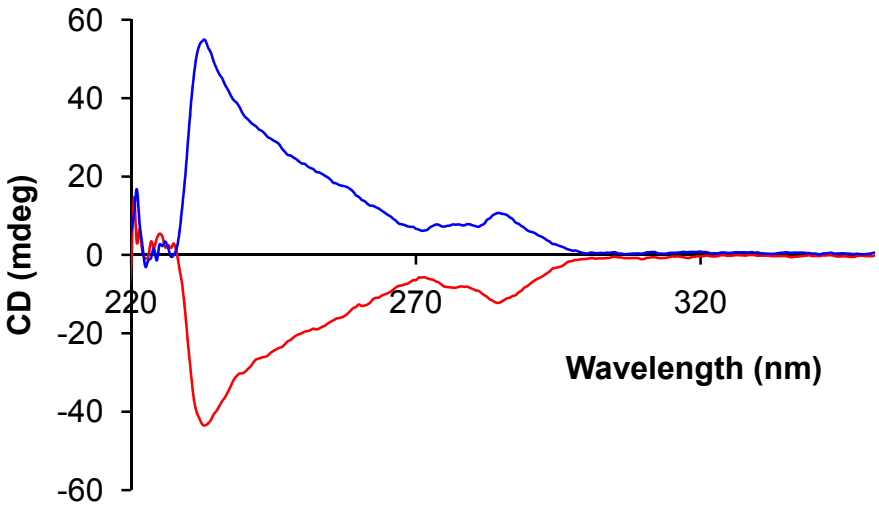

Figure S9: CD spectra of ligands **3** and **4** in CH_3CN.

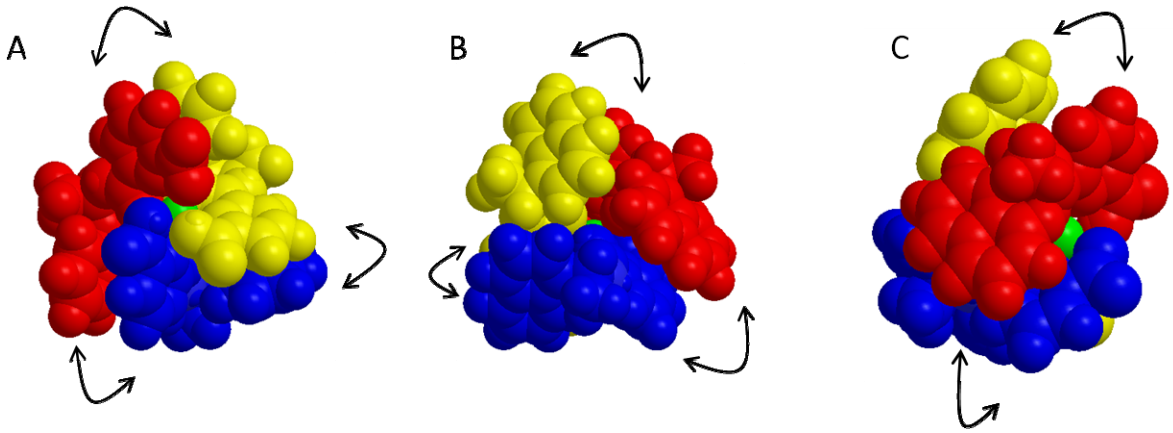

Figure S10: MM2 calculations showing the most stable species of **L_3.Eu** with three different views: A = view of carboxylate plane, B = view of naphthyl plane and C = view of lateral plane. Arrows denote π-π stacking.

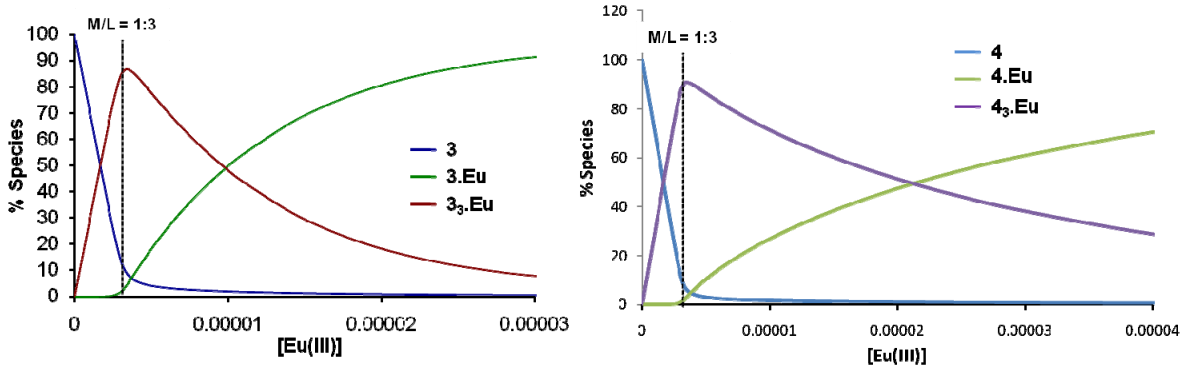

Figure S11: Speciation-distribution diagrams obtained from the titration of **3** (left) and **4** (right) with $Eu(CF_3SO_3)_3$.

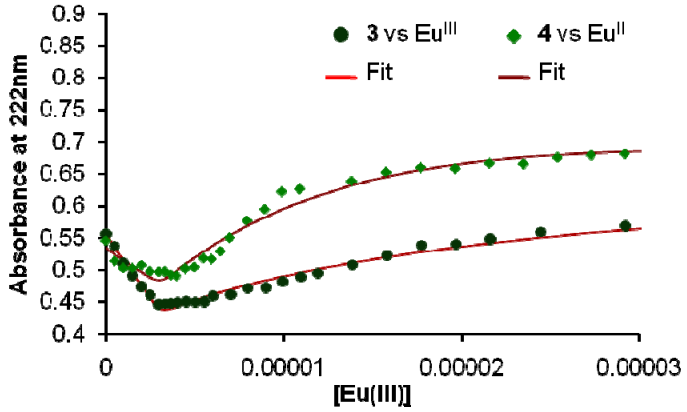

Figure S12: Experimental binding isotherms for the changes in the absorbance spectra upon titrating **3** and **4** with $Eu(SO_3CF_3)_3$ in CH_3CN at room temperature and their corresponding fit by means of SPECFIT.