Supplementary Information

Preorganized helical chirality controlled homochiral self-assembly and circularly polarized luminescence in a quadruple-stranded Eu2L4 helicate

Guoying Han, Yanyan Zhou, Yuan Yao, Zhenyu Cheng, Ting Gao, Hongfeng Li,* and Pengfei Yan*

Key Laboratory of Functional Inorganic Material Chemistry, Ministry of Education, P. R. China; School of Chemistry and Materials Science, Heilongjiang University, Harbin 150080, P. R. China.

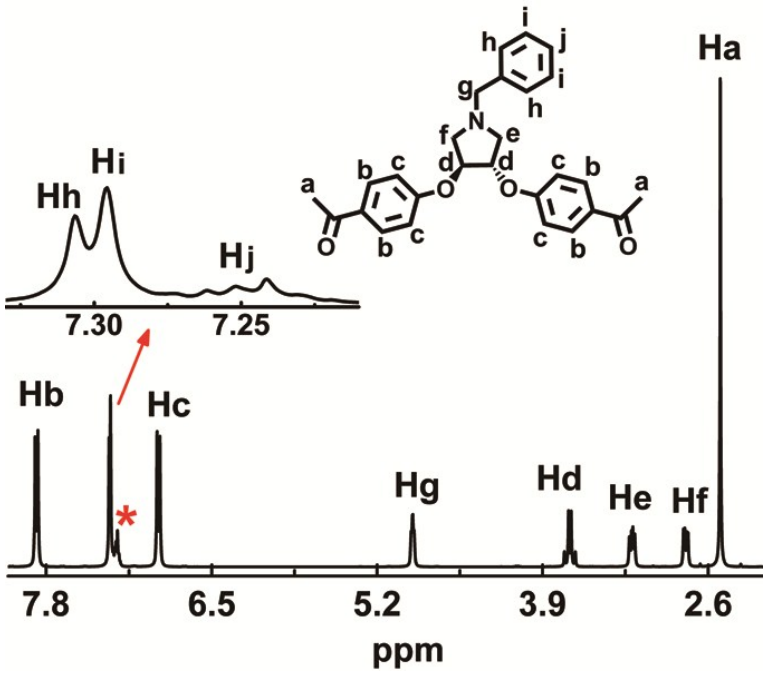

Figure S1. ^{1}H NMR spectrum of (S,S)-**4**a in $CDCl_3$.

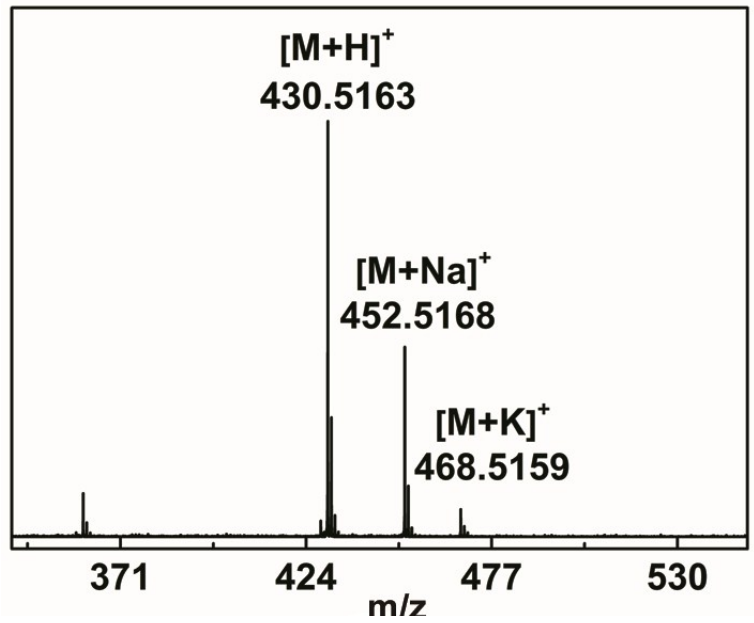

Figure S2. ESI-TOF-MS of (S,S)-**4**a

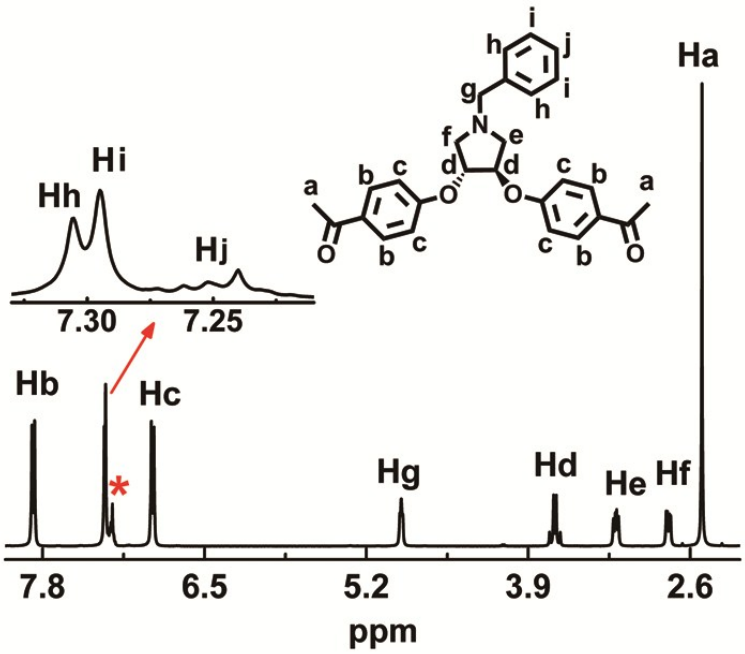

Figure S3. ^{1}H NMR spectrum of (R,R)-**4**a in $CDCl_3$.

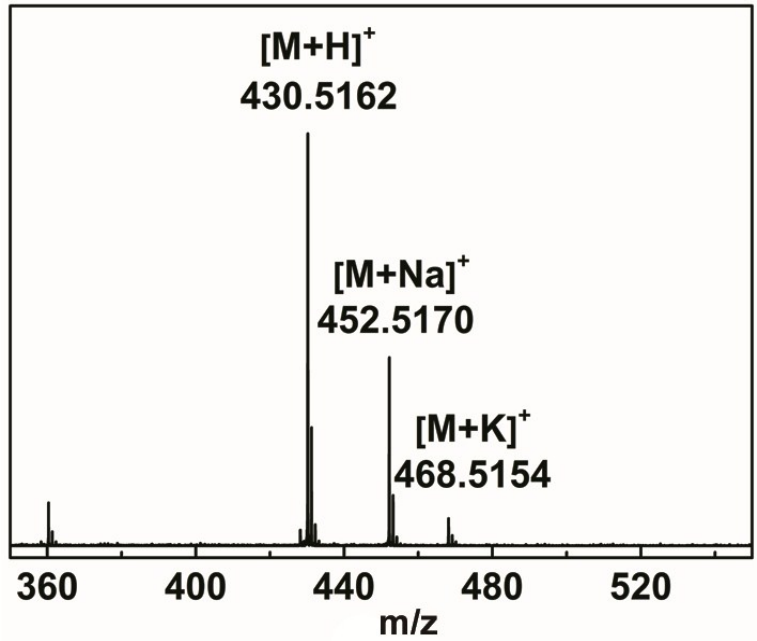

Figure S4. ESI-TOF-MS of (R,R)-**4**a.

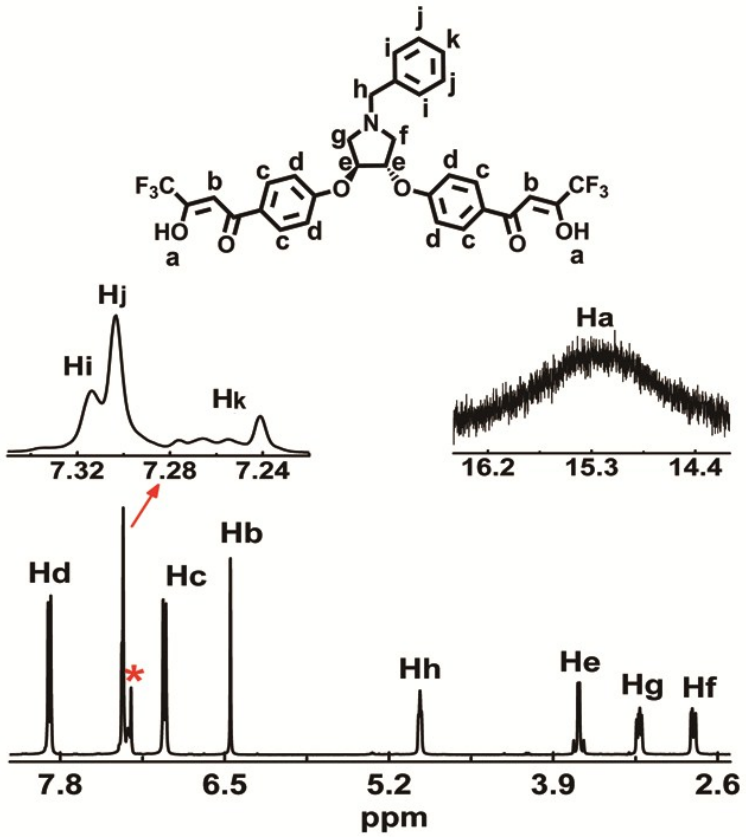

Figure S5. ^{1}H NMR spectrum of $\mathbf{L}^{\mathbf{SS}}$ in $CDCl_3$.

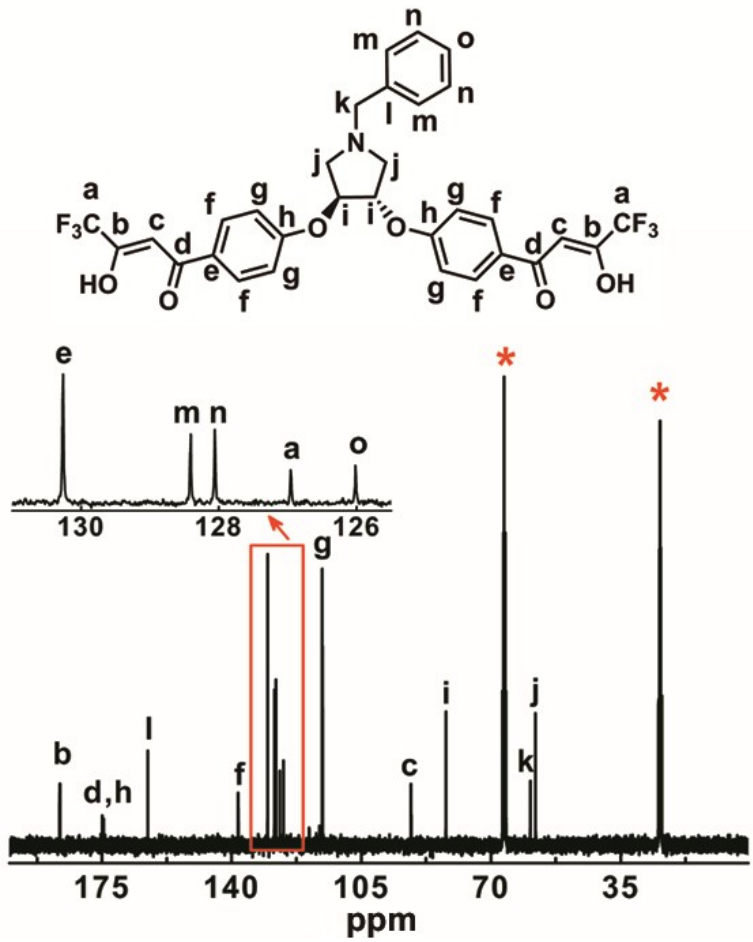

Figure S6. ^{13}C NMR spectrum of $\mathbf{L}^{SS}$ in THF-d_8.

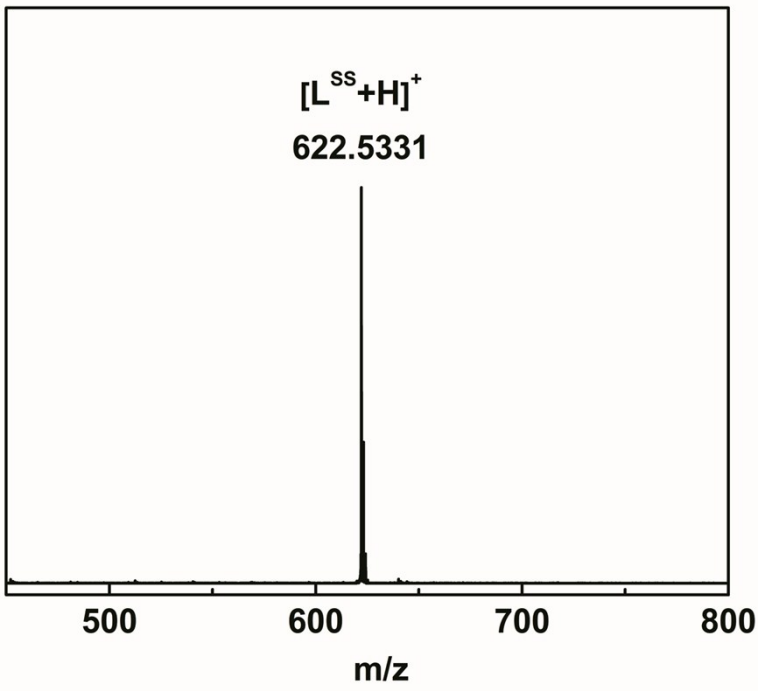

Figure S7. ESI-TOF-MS of $\mathbf{L}^{SS}$.

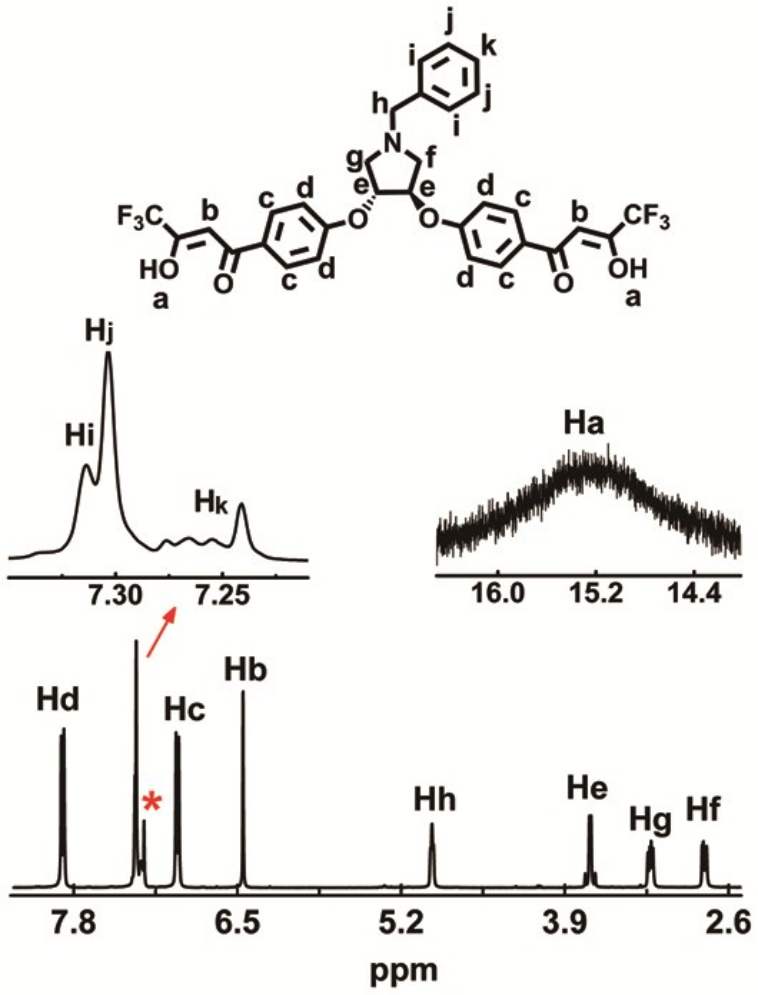

Figure S8. ^{1}H NMR spectrum of $\mathbf{L^{RR}}$ in $CDCl_3$.

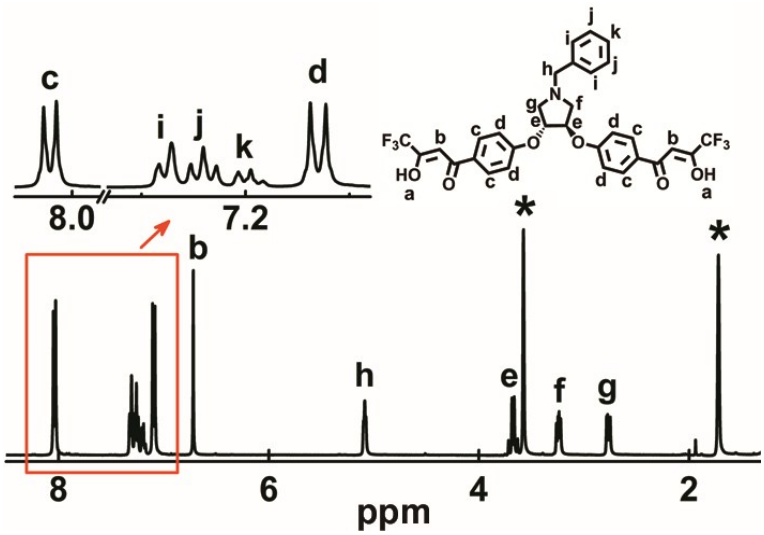

Figure S9. ^{1}H NMR spectrum of $\mathbf{L^{RR}}$ in THF-d_8.

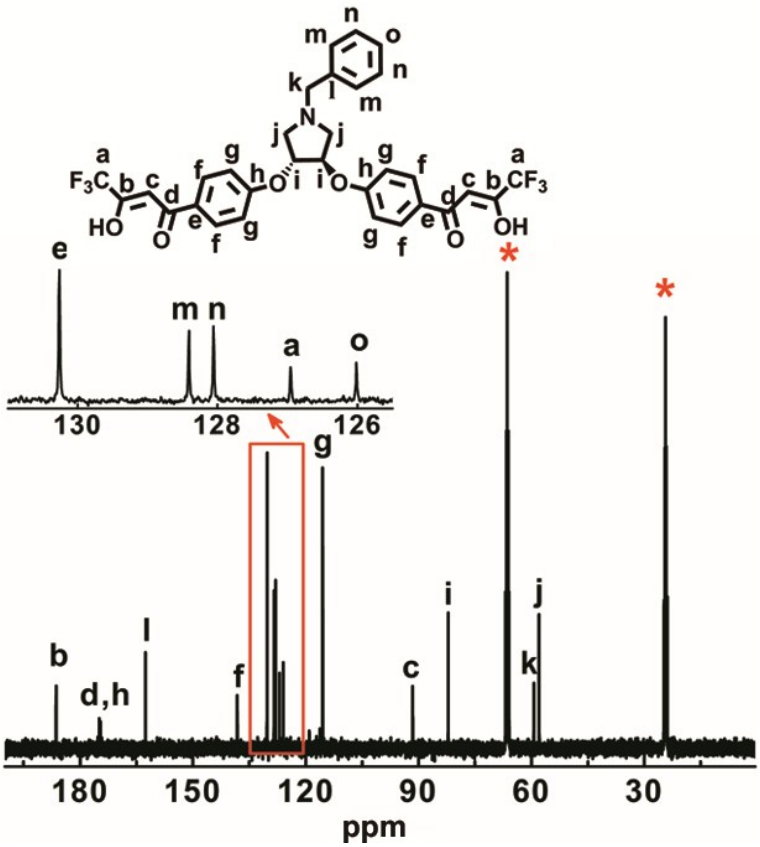

Figure S10. ^{13}C NMR spectrum of $\mathbf{L^{RR}}$ in THF-d_8.

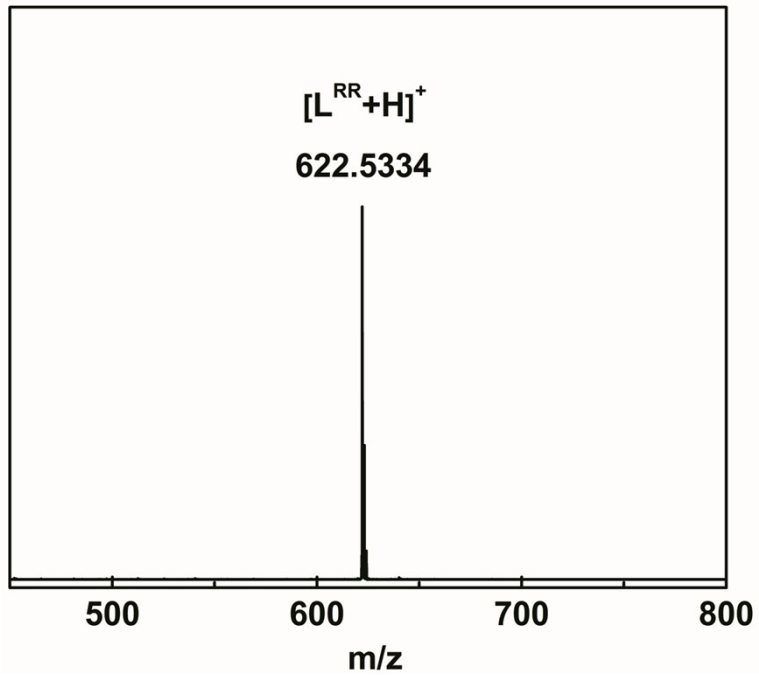

Figure S11. ESI-TOF-MS of $\mathbf{L^{RR}}$.

Table S1. Crystal data of the ligands $L^{SS}$and L^{RR}.

	L^{SS}	L^{RR}
CCDC Number	1972802	1972801
formula	C_{31} H_{25} F_6 N O_6	C_{31} H_{25} F_6 N O_6
Mr	621.52	621.52
cryst syst	orthorhombic	orthorhombic
space group	$P2_12_12_1$	$P2_12_12_1$
a (Å)	9.103(5)	9.105(5)
b (Å)	11.578(5)	11.571(5)
c (Å)	27.425(5)	27.397(5)
α (deg)	90	90
β (deg)	90	90
γ (deg)	90	90
V (Å^3)	2890(2)	2886(2)
Z	4	4
ρ (g cm^3)	1.424	1.430
μ (mm^{-1})	0.124	0.124
F (000)	1272.0	1280.0
R_1,[$I>2\sigma(I)$]	0.0600	0.0608
wR_2,[$I>2\sigma(I)$]	0.1513	0.1594
R_1, (all data)	0.1087	0.0987
wR_2, (all date)	0.1888	0.1962
GOF on F^2	1.022	1.049

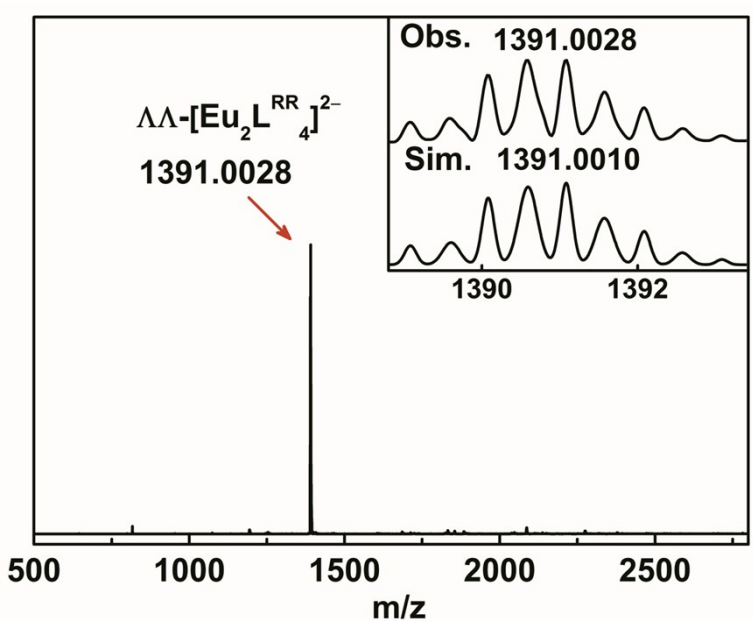

Figure S12. ESI-TOF-MS of ΛΛ-$(Eu_2\mathbf{L}^{\mathbf{RR}}{}_4)^{2-}$.

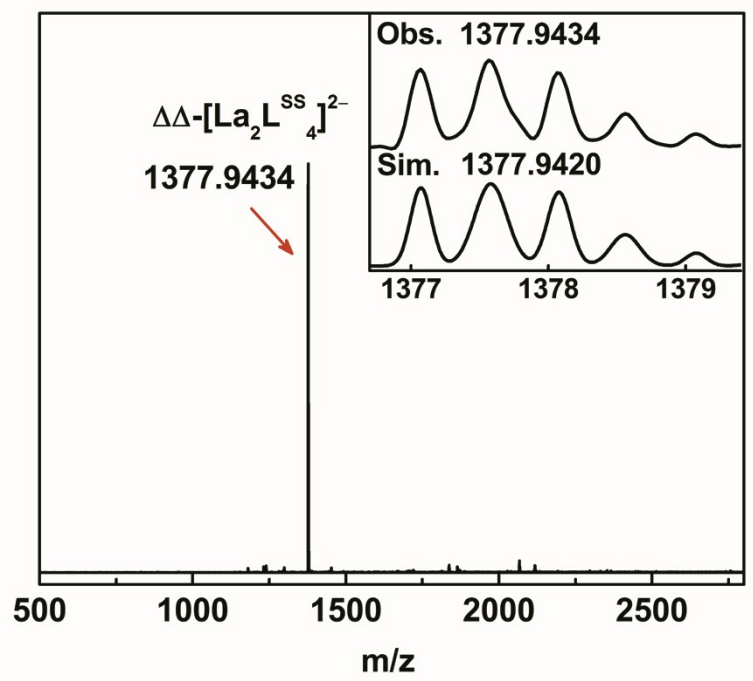

Figure S13. ESI-TOF-MS of ΔΔ-$(La_2\mathbf{L}^{\mathbf{SS}}{}_4)^{2-}$.

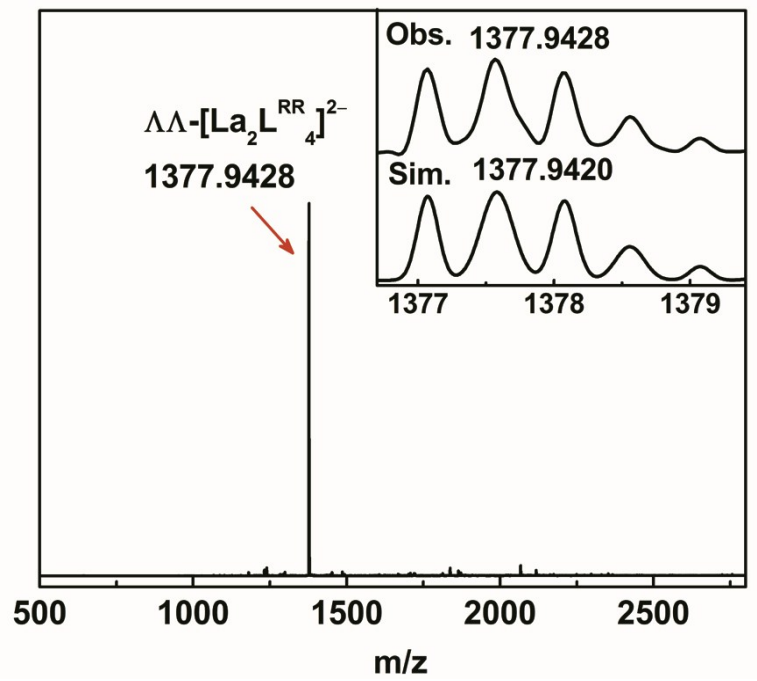

Figure S14. ESI-TOF-MS of ΛΛ-$(La_2\mathbf{L}^{\mathbf{RR}}{}_4)^{2-}$.

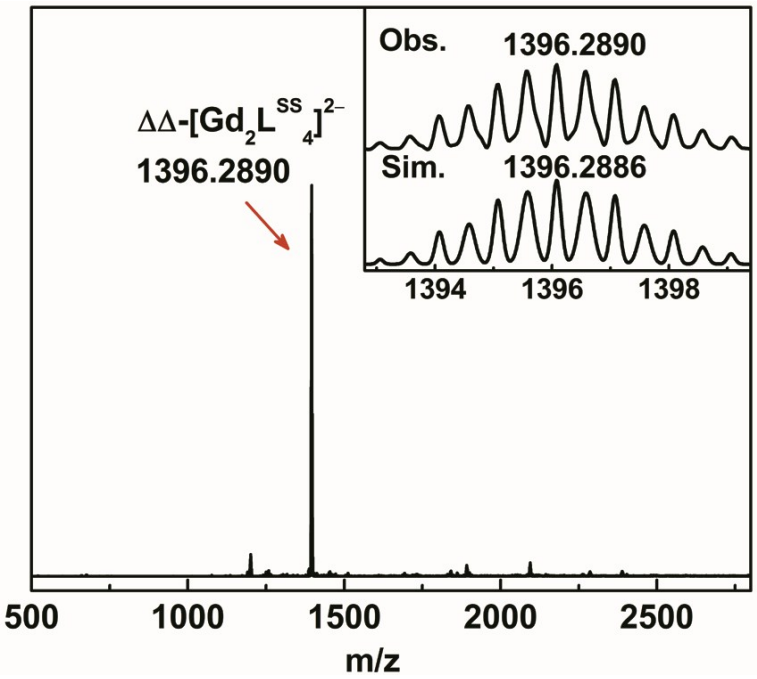

Figure S15. ESI-TOF-MS of ΔΔ-$(Gd_2\mathbf{L}^{\mathbf{SS}}{}_4)^{2-}$.

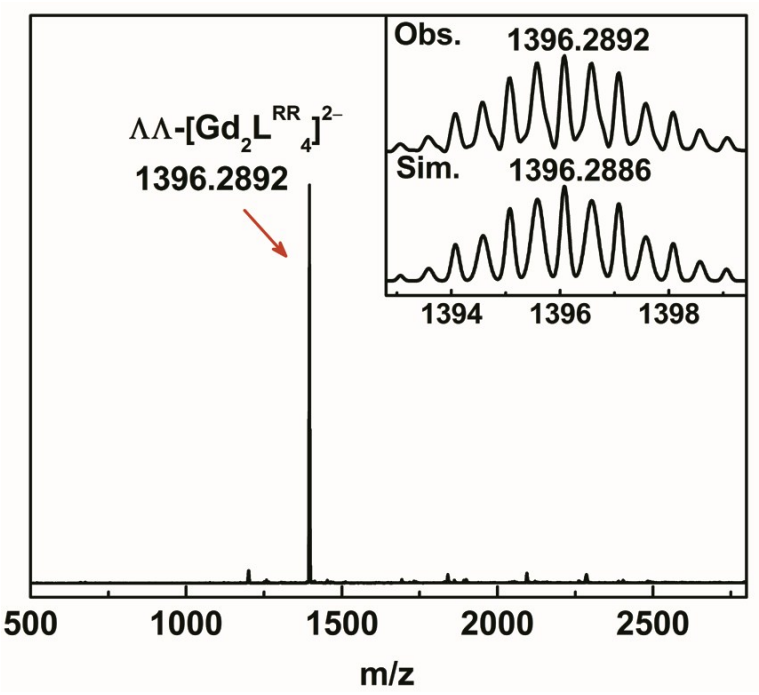

Figure S16. ESI-TOF-MS of ΛΛ-$(Gd_2\mathbf{L}^{\mathbf{RR}}{}_4)^{2-}$.

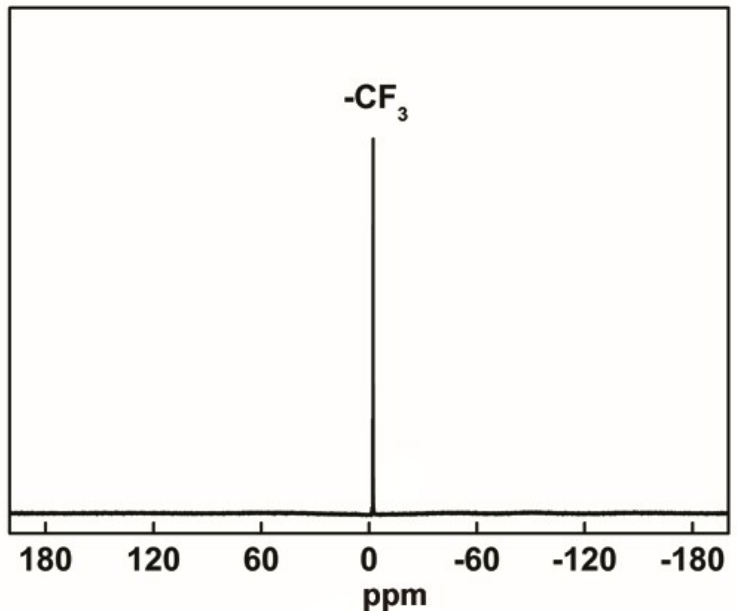

Figure S17. ^{19}F NMR spectrum of ΔΔ-$(HNEt_3)_2(Eu_2\mathbf{L}^{\mathbf{SS}}{}_4)$ in THF-d_8.

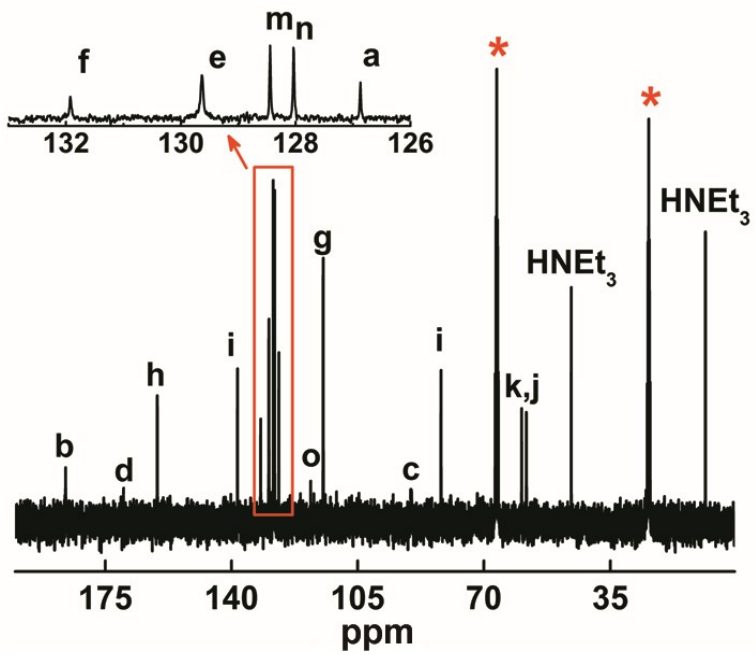

Figure S18. ^{13}C NMR spectrum of ΔΔ-$(HNEt_3)_2(La_2\mathbf{L}^{SS}_4)$ in THF-d_8.

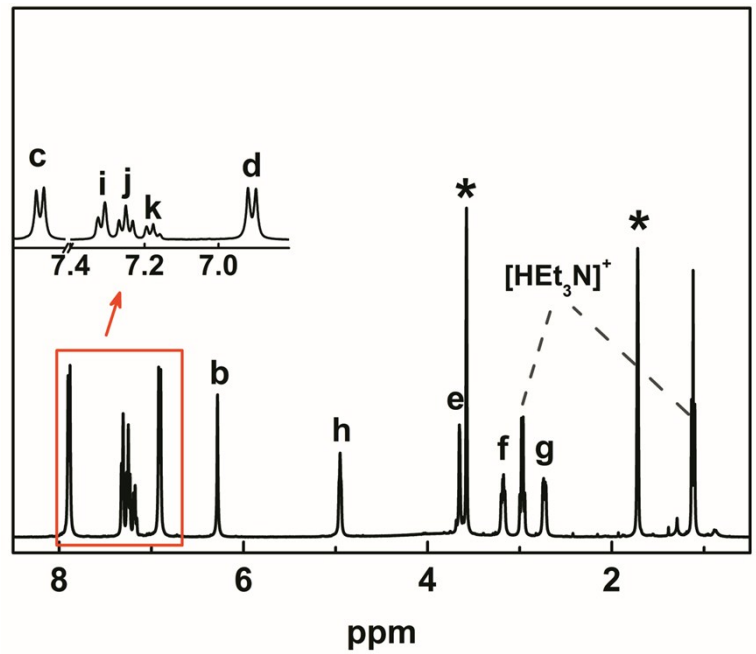

Figure S19. ^{1}H NMR spectrum of ΛΛ-$(HNEt_3)_2(La_2\mathbf{L}^{RR}_4)$ in THF-d_8.

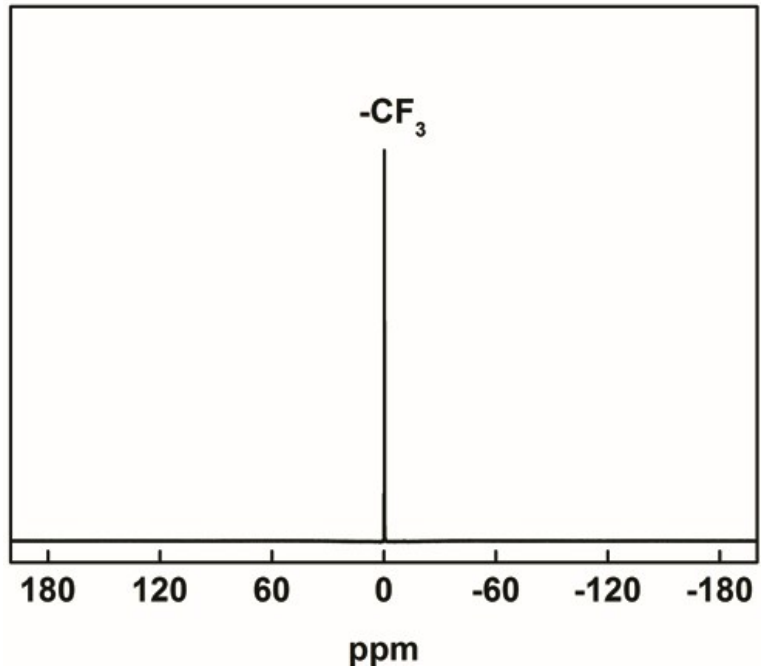

Figure S20. ^{19}F NMR spectrum of ΛΛ-$(HNEt_3)_2(La_2\mathbf{L}^{\mathbf{RR}}_4)$ in THF-d_8.

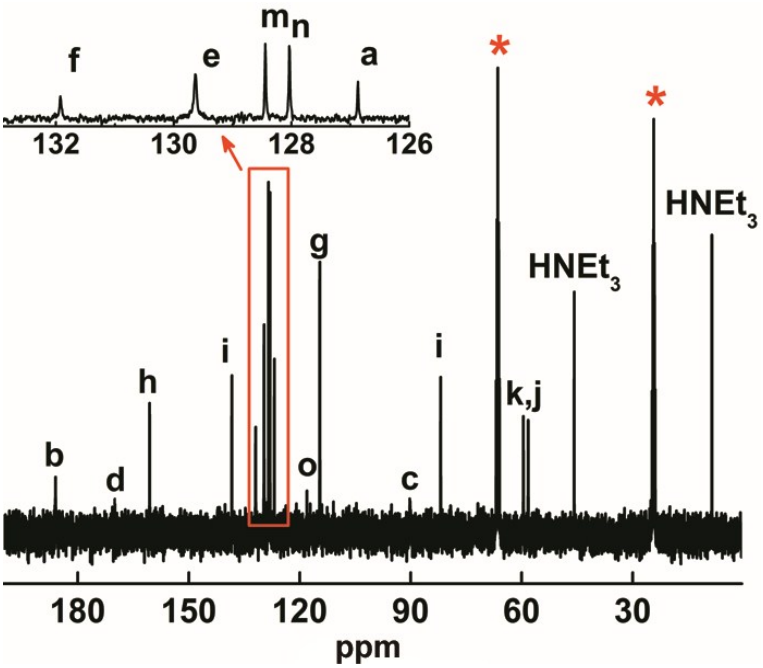

Figure S21. ^{13}C NMR spectrum of ΛΛ-$(HNEt_3)_2(La_2\mathbf{L}^{\mathbf{RR}}_4)$ in THF-d_8.

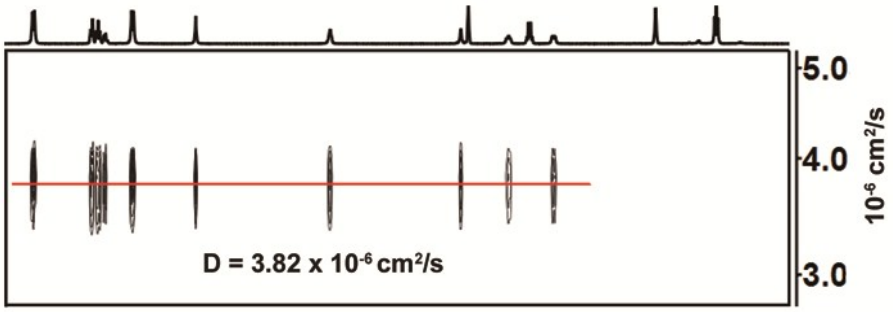

Figure S22. ^{1}H DOSY spectrum of ΛΛ-$(HNEt_3)_2(La_2\mathbf{L}^{\mathbf{RR}}{}_4)$in THF-$d_8$.

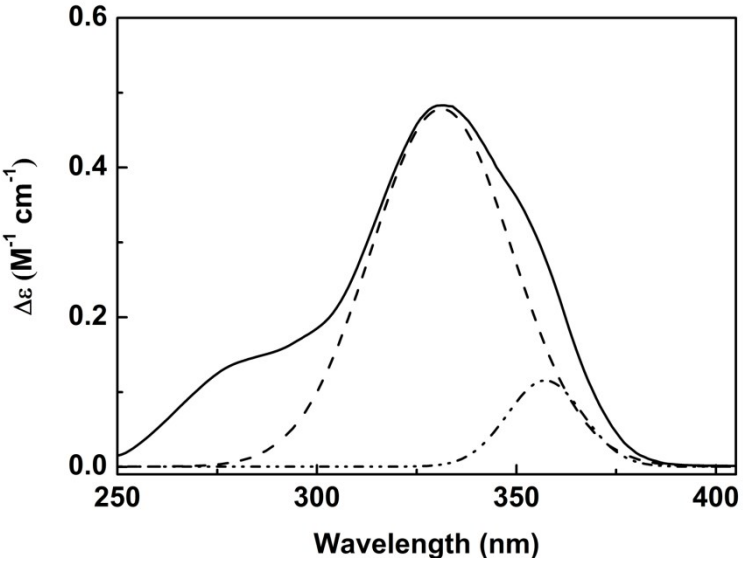

Figure S23. The experimental absorption spectrum of ΔΔ-$Eu_2\mathbf{L}^{\mathbf{SS}}{}_4$ (solid line) and the deconvoluted Gaussian curves (dashed lines) that correspond to transitions to two excitonic states.

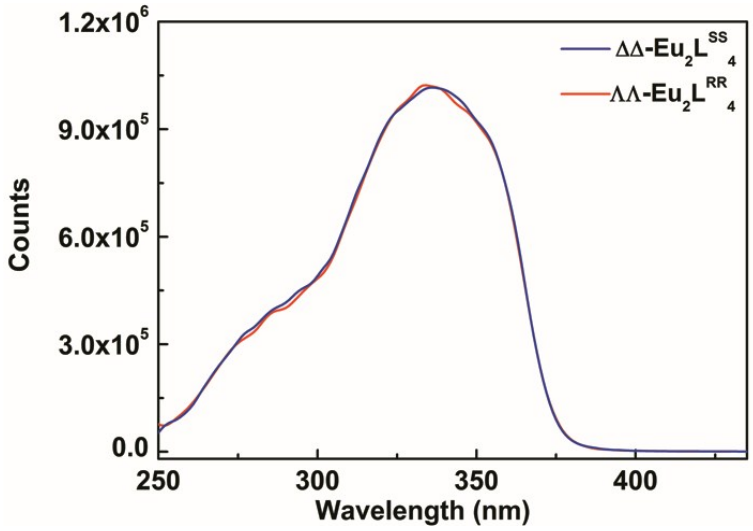

Figure S24. Excitation spectra of ΔΔ-$Eu_2\mathbf{L}^{\mathbf{SS}}{}_4$ (blue line) and ΛΛ-$Eu_2\mathbf{L}^{\mathbf{RR}}{}_4$ (red line) recorded by monitoring the emission band of Eu^{3+} ions at 613 nm in THF (1.0×10^{-5} M).

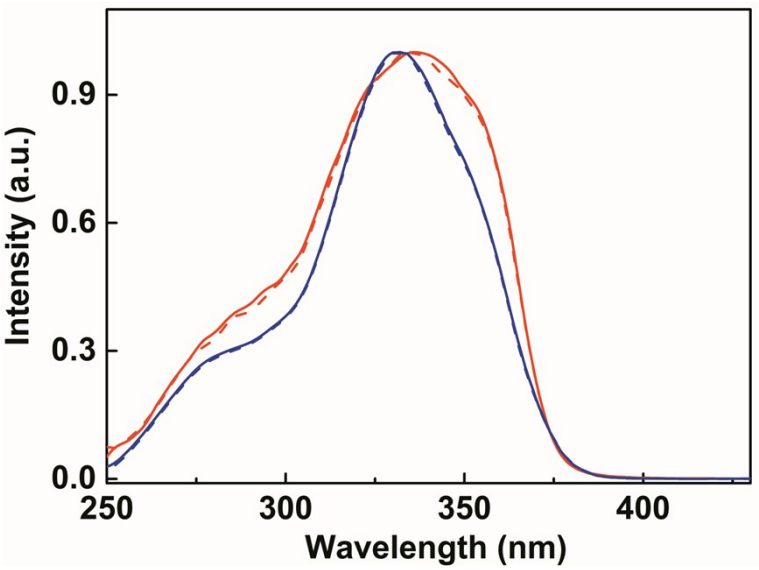

Figure S25. Normalization absorption (blue line, 2.5×10^{-6} M) and excitation spectra (red line, 1.0×10^{-5} M) of helicates in THF.

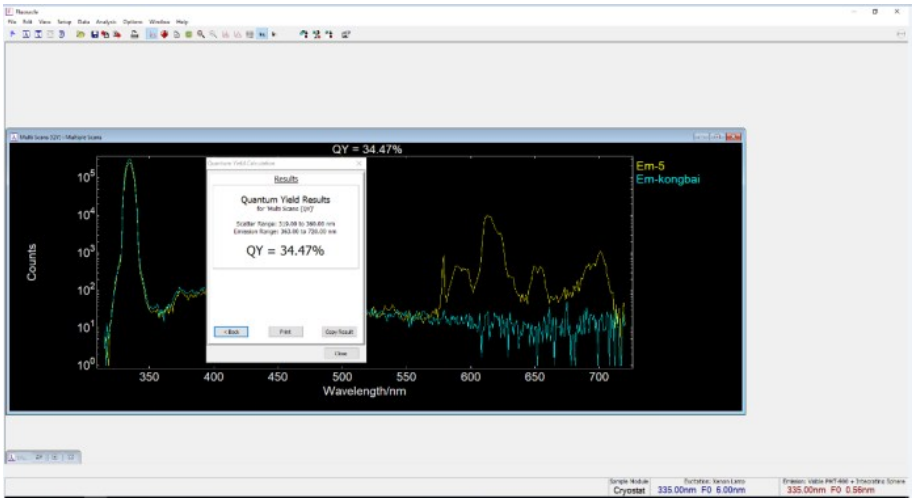

Figure S26. The screenshot of the luminescence quantum yield measurement of ΔΔ-$Eu_2\mathbf{L}^{\mathbf{SS}}_4$.

Figure S27. The screenshot of the luminescence quantum yield measurement of ΛΛ-$Eu_2\mathbf{L}^{\mathbf{RR}}_4$.

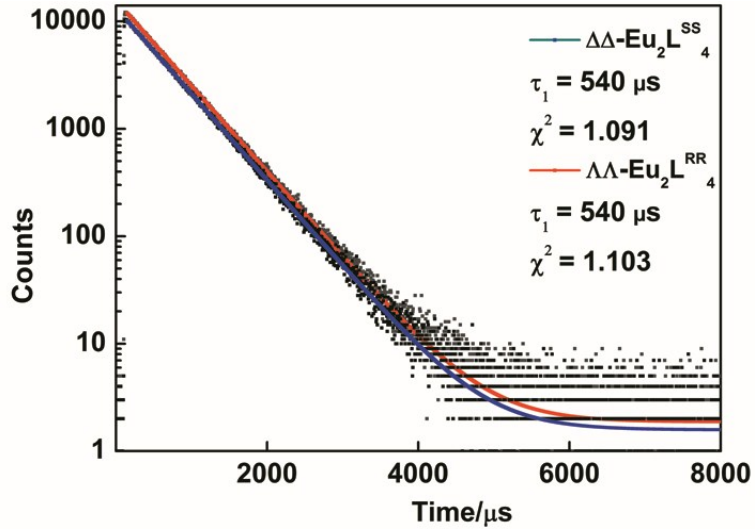

Figure S28. Luminescence decay curves of ΔΔ-$Eu_2\mathbf{L}^{\mathbf{SS}}_4$ (blue line) and ΛΛ-$Eu_2\mathbf{L}^{\mathbf{RR}}_4$ (red line) in THF monitored at 613nm.

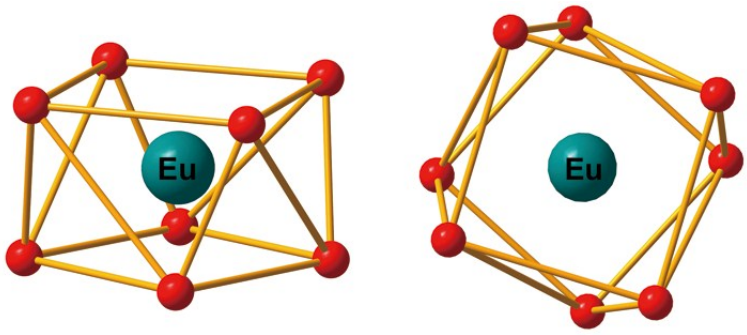

Figure S29. Side view (left) and top view (right) of the coordination polyhedra of ΔΔ-$Eu_2\mathbf{L}^{\mathbf{SS}}_4$.

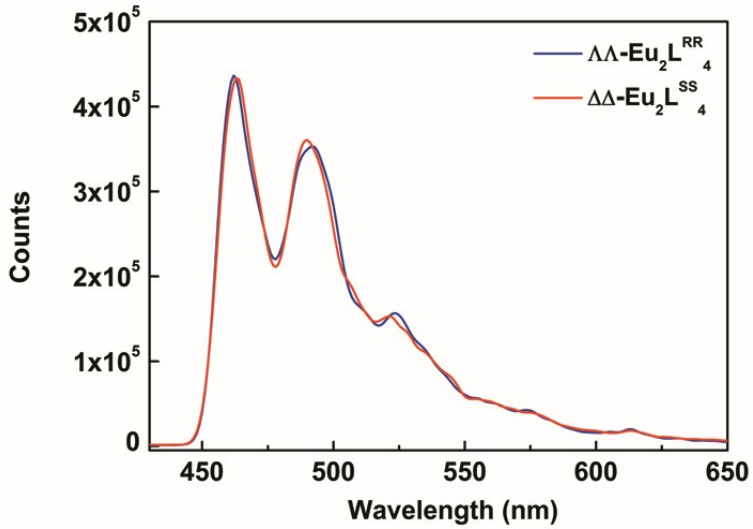

Figure S30. Phosphorescence spectra of ΔΔ-$Eu_2\mathbf{L}^{SS}_4$ (red line) and ΛΛ-$Eu_2\mathbf{L}^{RR}_4$ (blue line) in THF at 77 K.