Supporting Information

Synthesis, structure and luminescence of two europium complexes of diphenylimidazophenanthrolines †

Ling-Fei Yang, Zhi-Peng Zhang, Yu-Lin Li, Shu-Ting Cai, Ze-Yan Li, Yi-Ran Shen, Zi-Ying Zhang, Jia-Yu Lin, Yong-Cong Ou,* and Jian-Zhong Wu*

School of Chemistry, South China Normal University, and GDMPA Key Laboratory for Process Control and Quality Evaluation of Chiral Pharmaceuticals, Guangzhou 510006, China. E-mail: wujzh@scnu.edu.cn, ouyongcong@m.scnu.edu.cn

Table S1 Coordination bond lengths (Å) and angles (°) for $[Eu_2(papip)_2(PhCH_2COO)_6]$

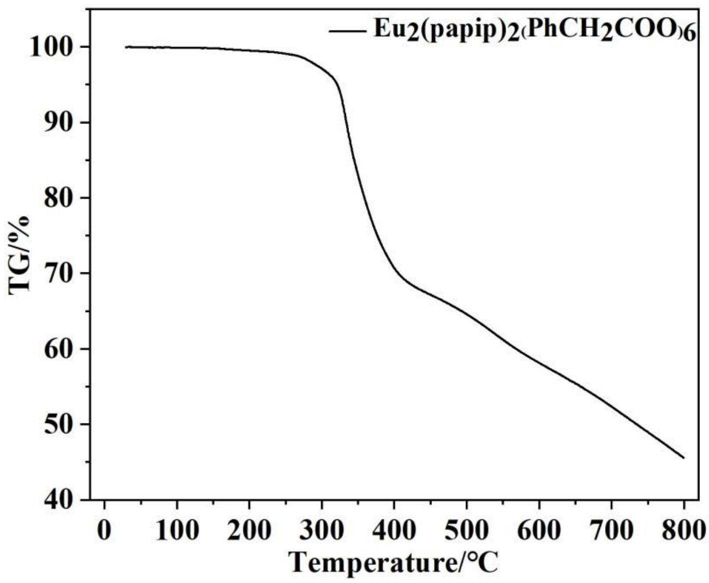
Eu1–N1	2.609(3)	Eu1–O4	2.672(3)
Eu1–N2	2.630(3)	Eu1–O4^i	2.368(3)
Eu1–O1	2.447(3)	Eu1–O5	2.348(3)
Eu1–O2	2.476(3)	Eu1–O6	2.381(2)
Eu1–O3	2.452(3)		
N1–Eu1–N2	62.30(10)	O4^i–Eu1–O2	78.83(10)
N1–Eu1–O4	120.49(10)	O4^i–Eu1–O3	125.09(9)
N2–Eu1–O4	110.48(9)	O4^i–Eu1–O4	75.09(11)
O1–Eu1–N1	87.50(11)	O4^i–Eu1–O6	76.51(9)
O1–Eu1–N2	70.57(11)	O5–Eu1–N1	137.56(9)
O1–Eu1–O2	53.03(9)	O5–Eu1–N2	75.70(9)
O1–Eu1–O3	142.82(10)	O5–Eu1–O1	84.05(10)
O1–Eu1–O4	149.77(10)	O5–Eu1–O2	130.04(11)
O2–Eu1–N1	71.82(11)	O5–Eu1–O3	87.98(10)
O2–Eu1–N2	106.80(10)	O5–Eu1–O4	74.57(9)
O2–Eu1–O4	142.05(9)	O5–Eu1–O4^i	67.73(9)
O3–Eu1–N1	74.32(10)	O5–Eu1–O6	135.06(8)
O3–Eu1–N2	72.27(10)	O6–Eu1–N1	80.81(9)
O3–Eu1–O2	141.34(10)	O6–Eu1–N2	138.94(10)
O3–Eu1–O4	50.29(8)	O6–Eu1–O1	128.15(10)
O4^i–Eu1–N1	146.54(10)	O6–Eu1–O2	75.42(9)
O4^i–Eu1–N2	144.54(10)	O6–Eu1–O3	81.32(10)
O4^i–Eu1–O1	87.50(11)	O6–Eu1–O4	72.05(9)

Table S2 Coordination bond lengths (Å) and angles (°) for $[Eu_2(phpip)_2(PhCH_2COO)_6]$

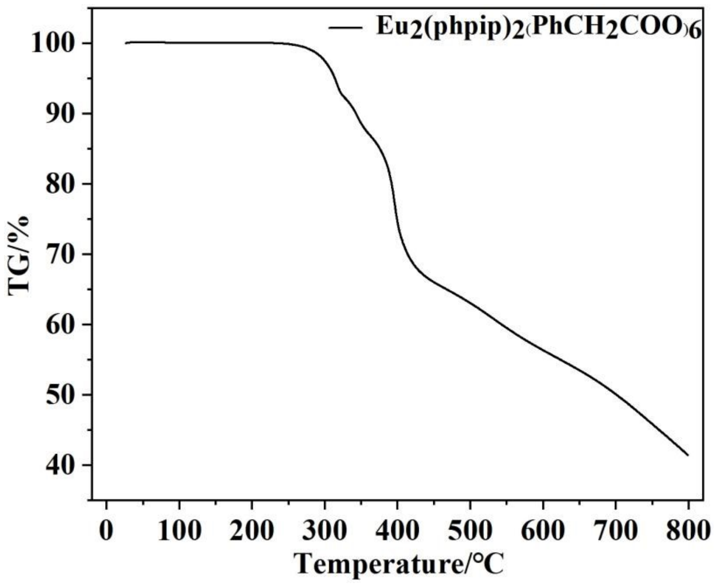
Eu1–N1	2.624(3)	Eu1–O4	2.715(3)
Eu1–N2	2.593(3)	Eu1–O4^i	2.383(3)
Eu1–O1	2.486(3)	Eu1–O5	2.346(3)
Eu1–O2	2.426(3)	Eu1–O6	2.365(3)
Eu1–O3	2.470(3)		
N1–Eu1–N2	62.51(10)	O4^i–Eu1–O2	49.65(9)
N1–Eu1–O4	114.64(10)	O4^i–Eu1–O3	124.46(10)
N2–Eu1–O4	116.6(1)	O4^i–Eu1–O4	78.52(10)
O1–Eu1–N1	103.14(11)	O4^i–Eu1–O6	70.73(9)
O1–Eu1–N2	72.44(10)	O5–Eu1–N1	137.7(1)
O1–Eu1–O2	53.07(10)	O5–Eu1–N2	78.78(10)
O1–Eu1–O3	144.85(10)	O5–Eu1–O1	79.02(10)
O1–Eu1–O4	79.44(10)	O5–Eu1–O2	130.59(11)
O2–Eu1–N1	72.69(11)	O5–Eu1–O3	82.2(1)
O2–Eu1–N2	95.47(11)	O5–Eu1–O4	76.71(9)
O2–Eu1–O4	147.14(10)	O5–Eu1–O4^i	67.05(9)
O3–Eu1–N1	72.28(10)	O5–Eu1–O6	133.28(9)
O3–Eu1–N2	74.93(10)	O6–Eu1–N1	78.52(10)
O3–Eu1–O2	144.14(10)	O6–Eu1–N2	140.03(10)
O3–Eu1–O4	49.65(9)	O6–Eu1–O1	128.53(10)
O4^i–Eu1–N1	145.57(10)	O6–Eu1–O2	80.23(11)
O4^i–Eu1–N2	145.59(10)	O6–Eu1–O3	85.55(10)
O4^i–Eu1–O1	79.44(10)	O6–Eu1–O4	73.78(10)

Table S3 Comparison of lifetimes and photoluminescence quantum yields of Eu complexes.

Complex	Lifetime (ms)	Quantum yield (%)	Reference
$[Eu_2(papip)_2(PhCH_2COO)_6]$	1.57	15.4	This work
$[Eu_2(phpip)_2(PhCH_2COO)_6]$	1.35	17.8	This work
$[Eu_2(ppip)_2(PhCOO)_6]$	1.11	84.2	[1]
$[Eu_2(pip)_2(PhCOO)_6]$	0.93	9.3	[2]
EuCPs	0.86	13.20	[3]
$Eu(TTA)_2PTSO$	0.598		[4]
$Eu(TTA)_3$ PHEN	0.976		[4]
$[Eu(keto)_3(H_2O)]$	0.69		[5]
$[Eu(tfaa)_3]_2bpm$	0.81	34	[6]
$[Eu(tfaa)_3H_2O]$	0.33	3	[6]
Eu-CP	0.94	61	[7]
$Eu(TTA)_3$-TPA-DPA-pCF_3	0.938	46.4	[8]
$Eu(TTA)_3$-TPA-DPA-mCF_3	0.909	19.2	[8]
$Eu(DBM)_3$ series	0.170-0.686	2.32-5.74	[9]
$Eu(TTA)_3$Phen-Fl-O-CBZ	0.28	5	[10]
$Eu_2(TTA)_6L1$	0.884	0.7	[11]
$Eu_2(TTA)_6L2$	0.991	10.2	[11]
$Eu(TTA)_3$Phen-Fl-CBZ	0.64	72.4	[12]
$Eu(TTA)_3$Phen-Fl-t-but CBZ	0.40	77.3	[12]
$Eu(TTA)_3$Phen-Fl-TPA-DPA	0.0755	0.5	[13]



(a)



(b)

Fig. S1 TGA spectra of [Eu_2(papip)$_2$($PhCH_2COO$)$_6$] (a) and [Eu_2(phpip)$_2$($PhCH_2COO$)$_6$] (b).

References

1. X. Lv, J.-Y. Huang, W.-Q. Huang, L.-F. Yang, Z.-P. Zhang, Y. Liang, B. Xu, G. Huang, Y.-C. Ou and J.-Z. Wu, *Inorg. Chem. Commun.*, 2023, **156**.
2. Z.-Y. Ruan, Y.-F. Lu, X. Lv, J.-Z. Wu, Y.-C. Ou and Y.-P. Cai, *CrystEngComm*, 2021, **23**, 3602-3608.
3. Y. Gong, J. Li, N. Wang and X. Li, *J. Solid State Chem.*, 2024, **330**, 124485.
4. F. R. G. e. Silva, J. F. S. Menezes, G. B. Rocha, S. Alves, H. F. Brito, R. L. Longo and O. L. Malta, *J. Alloys Compd.*, 2000, **303–304**, 364-370.
5. M. G. Lahoud, R. C. G. Frem, D. A. Gálico, G. Bannach, M. M. Nolasco, R. A. S. Ferreira and L. D. Carlos, *J. Lumin.*, 2016, **170**, 357-363.
6. R. Ilmi and K. Iftikhar, *Polyhedron*, 2015, **102**, 16-26.
7. X. Ma, X. Li, Y.-E. Cha and L.-P. Jin, *Cryst. Growth Des.*, 2012, **12**, 5227-5232.
8. S. Mund and S. Vaidyanathan, *J. Mater. Chem. C*, 2022, **10**, 7201-7215.
9. R. Devi, M. Rajendran, K. Singh, R. Pal and S. Vaidyanathan, *J. Mater. Chem. C*, 2021, **9**, 6618-6633.
10. B. Rajamouli and V. Sivakumar, *New J. Chem.*, 2017, **41**, 1017-1027.
11. R. Devi, R. Boddula, J. Tagare, A. B. Kajjam, K. Singh and S. Vaidyanathan, *J. Mater. Chem. C*, 2020, **8**, 11715-11726.
12. B. Rajamouli and V. Sivakumar, *ChemistrySelect*, 2017, **2**, 4138-4149.
13. R. Boddula, K. Singh, S. Giri and S. Vaidyanathan, *Inorg. Chem.*, 2017, **56**, 10127-10130.