Supporting Information

For NJ-ART-01-2015-000168

Photoluminescence and white-light emitting in two series of heteronuclear Pb(II)-Ln(III) complexes

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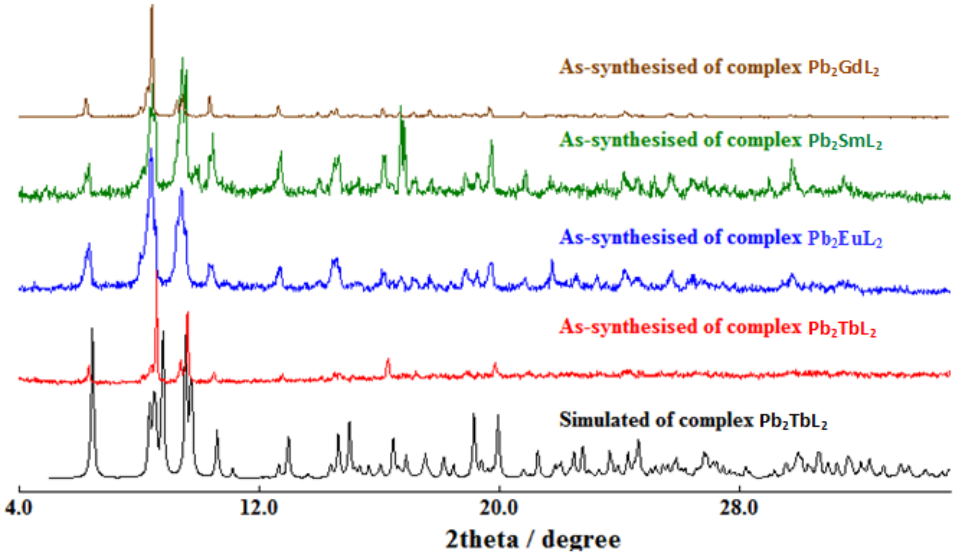


Fig. **S1** PXRD patterns of **Pb_2LnL_2** complexes

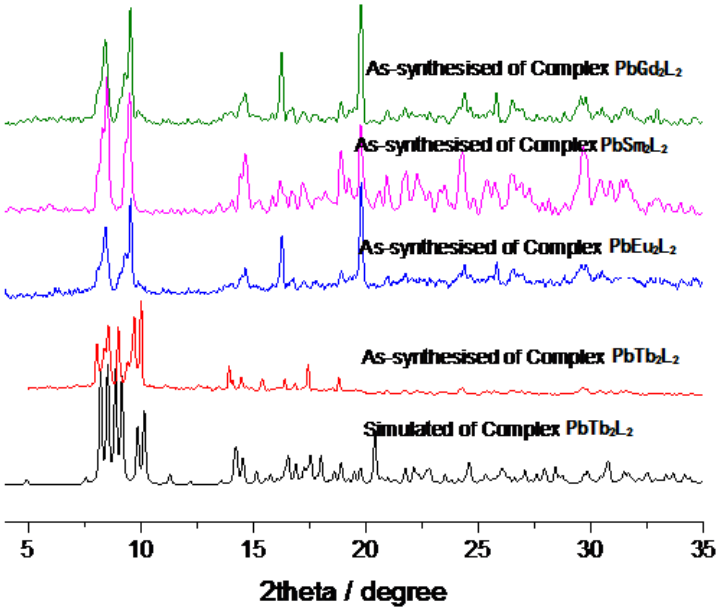


Fig. S**2** PXRD patterns of **$PbLn_2L_2$** complexes

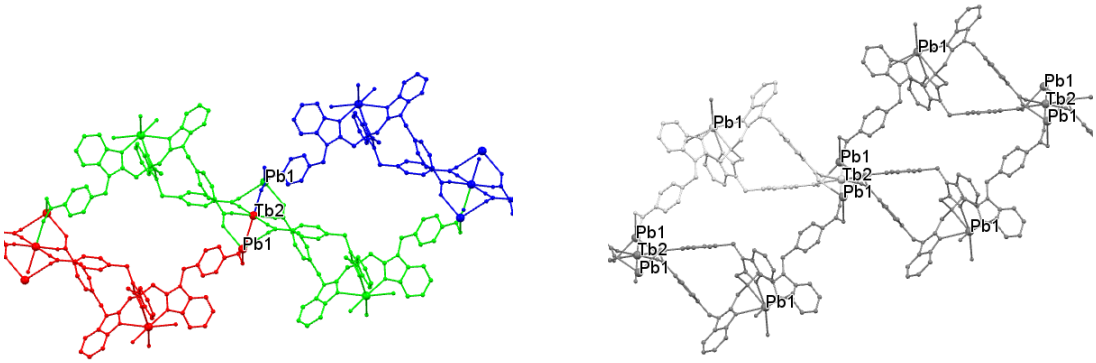


Fig. S3 Loop-and-chain structure in complex **Pb_2TbL_2** view along different directions.

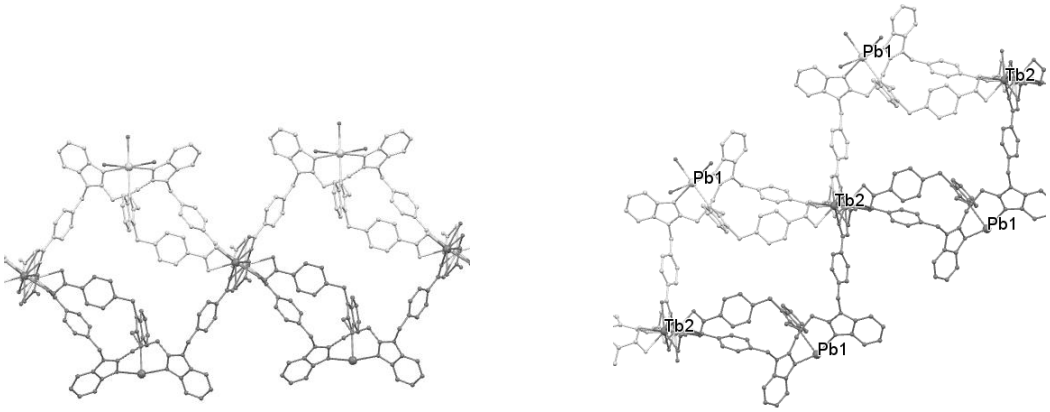
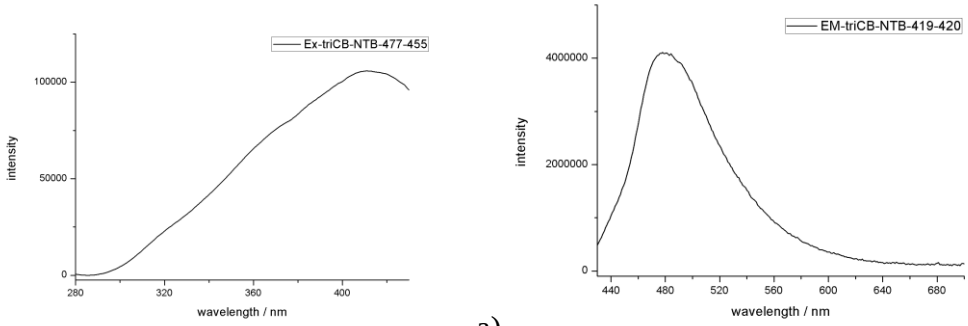


Fig. S4 Loop-and-chain structure in complex **$PbTb_2L_2$** view along different directions.



a) b)

Fig. S5 Excitation (a) and emission (b) spectra of the ligand triCB-NTB (H_3L).

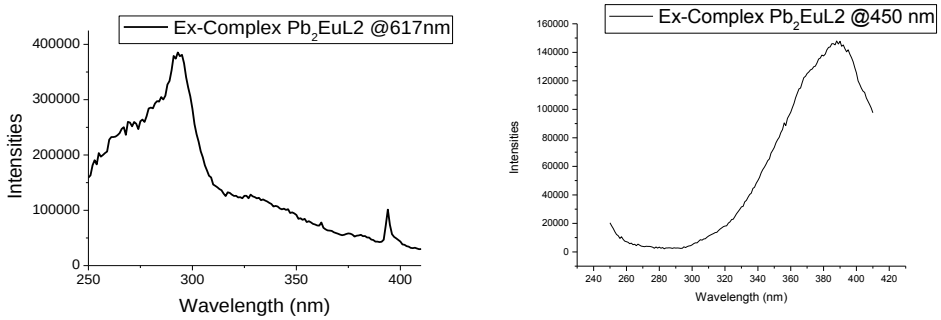


Fig. S6 Excitation spectra of complex **Pb_2EuL_2**.

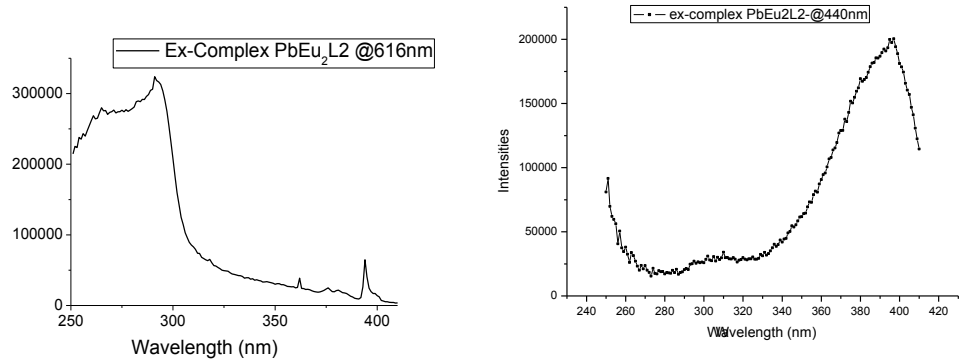


Fig. S7 Excitation spectra of complex **$PbEu_2L_2$.**

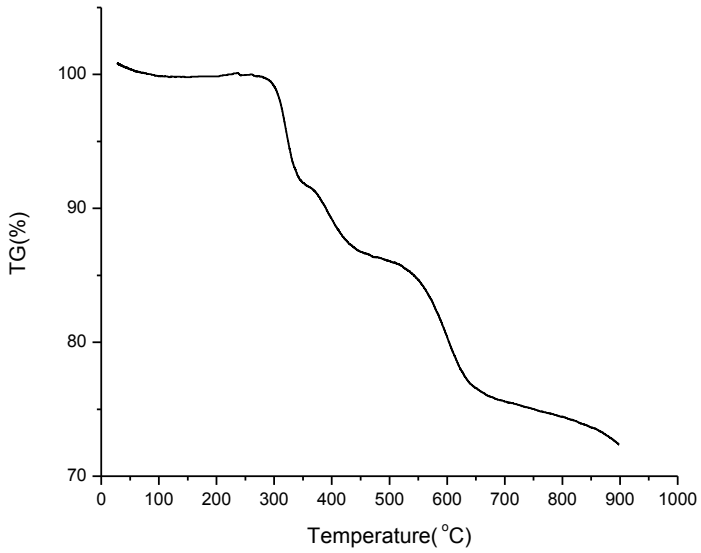


Fig. S8 TG curve of complex **Pb_2EuL_2.**

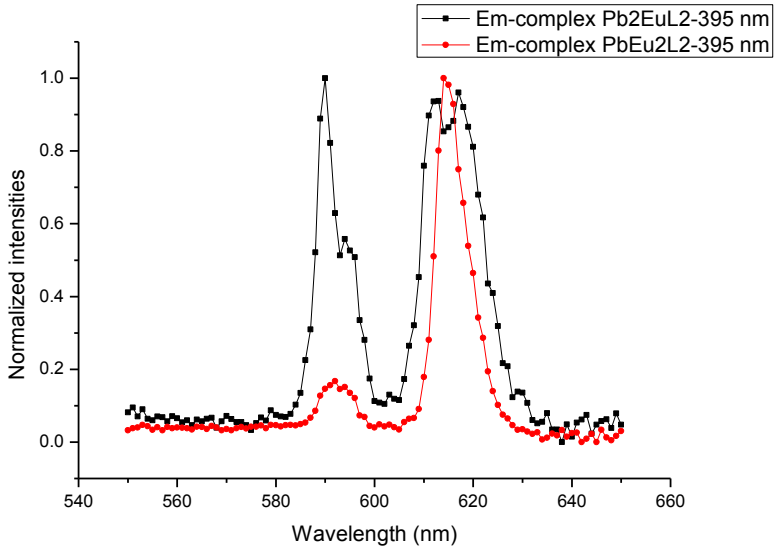


Fig. S9 Comparison between the emission spectra of complexes **Pb_2EuL_2** and **$PbEu_2L_2$** at the excitation of 395 nm.

Table S**1** Selected bond lengths and angles for the complexes.

Complex **Pb_2TbL_2**

Atom	Atom	Length/Å	Atom	Atom	Length/Å
N15	$Pb1^1$	2.812(4)	Pb1	$N20^6$	2.501(4)
N16	$Pb1^1$	2.800(5)	Pb1	$O6^2$	2.628(4)
O1	Tb2	2.247(4)	O5	Tb2	2.227(5)
O2	Pb1	2.503(4)	Tb2	$O4^4$	2.255(5)
O3	$Pb1^2$	2.627(4)			

Atom	Atom	Atom	Angle/°	Atom	Atom	Atom	Angle/°
O1	Tb2	$O1^2$	180.00(17)	$O4^5$	Tb2	O5	89.2(2)
$O1^2$	Tb2	O5	88.77(16)	$O4^4$	Tb2	$O5^2$	89.2(2)
$O1^2$	Tb2	$O5^2$	91.23(16)	$O4^5$	Tb2	$O5^2$	90.8(2)
O1	Tb2	$O5^2$	88.77(16)	$O4^4$	Tb2	$O3^5$	180.0(2)
O1	Tb2	O5	91.23(16)	$N15^6$	Pb1	$N16^6$	91.03(16)
O5	Tb2	$O5^2$	180.0	$N15^6$	Pb1	O13	73.71(16)
$O4^4$	Tb2	O1	87.69(19)	$N15^6$	Pb1	$O3^2$	76.59(15)
$O4^5$	Tb2	$O1^2$	87.69(19)	$N16^6$	Pb1	$O3^2$	167.00(15)
$O4^5$	Tb2	O1	92.31(19)	O2	Pb1	$N16^6$	81.27(15)
$O4^4$	Tb2	$O1^2$	92.31(19)	O2	Pb1	$O3^2$	98.72(15)
$O4^4$	Tb2	O5	90.8(2)				

^{1}1/2-X,1/2+Y,1/2-Z; ^{2}-X,1-Y,1-Z; ^{3}+X,+Y,-1+Z; ^{4}-X,1-Y,-Z; ^{5}+X,+Y,1+Z;

[6]1/2-X,-1/2+Y,1/2-Z

Complex Pb_2EuL_2

Atom	Atom	Length/Å	Atom	Atom	Length/Å
N5	Pb1[1]	2.493(4)	Eu2	O3[4]	2.239(5)
N8	Pb1[1]	2.601(5)	Eu2	O3[5]	2.239(5)
O1	Eu2	2.283(4)	Pb1	N5[6]	2.493(4)
O2	Pb1	2.506(4)	Pb1	N8[6]	2.601(5)
O6	Pb1[2]	2.628(4)	Pb1	O6[2]	2.628(4)
O5	Eu2	2.284(5)	Eu2	O1[2]	2.283(4)
O3	Eu2[3]	2.239(5)	Eu2	O5[2]	2.284(5)

Atom	Atom	Atom	Angle/°	Atom	Atom	Atom	Angle/°
O1	Eu2	O1[2]	180.00(17)	O3[5]	Eu2	O5	89.2(2)
O1[2]	Eu2	O5	88.77(16)	O3[4]	Eu2	O5[2]	89.2(2)
O1[2]	Eu2	O5[2]	91.23(16)	O3[5]	Eu2	O5[2]	90.8(2)
O1	Eu2	O5[2]	88.77(16)	O3[4]	Eu2	O3[5]	180.0(2)
O1	Eu2	O5	91.23(16)	N5[6]	Pb1	N8[6]	91.03(16)
O5	Eu2	O5[2]	180.0	N5[6]	Pb1	O2	73.71(16)
O3[4]	Eu2	O1	87.69(19)	N5[6]	Pb1	O6[2]	76.59(15)
O3[5]	Eu2	O1[2]	87.69(19)	N8[6]	Pb1	O6[2]	167.00(15)
O3[5]	Eu2	O1	92.31(19)	O2	Pb1	N8[6]	81.27(15)
O3[4]	Eu2	O1[2]	92.31(19)	O2	Pb1	O6[2]	98.72(15)
O3[4]	Eu2	O5	90.8(2)				

[1]1/2-X,1/2+Y,1/2-Z; [2]-X,1-Y,1-Z; [3]+X,+Y,-1+Z; [4]-X,1-Y,-Z; [5]+X,+Y,1+Z;
[6]1/2-X,-1/2+Y,1/2-Z

Complex $PbTb_2L_2$

Atom	Atom	Length/Å	Atom	Atom	Length/Å
N5	Pb1	2.662(5)	O8	Tb2	2.348(5)
N8	Pb1	2.712(5)	O3	Tb2[2]	2.365(4)
N11	Pb1	2.804(5)	Tb2	O6[1]	2.367(4)
Pb1	N5[5]	2.662(5)	Tb2	O2[1]	2.382(4)
Pb1	N8[5]	2.710(5)	Tb2	O7[4]	2.413(4)
Pb1	N11[5]	2.678(5)	Tb2	O9[2]	2.548(4)
			Tb2	O4[2]	2.513(5)
O1	Tb2	2.416(4)	Tb2	O3[2]	2.603(4)

Atom	Atom	Atom	Angle/°	Atom	Atom	Atom	Angle/°
O6[1]	Tb2	N10	104.7(4)	O4[2]	Tb2	O6[1]	131.80(15)
O6[1]	Tb2	O5[1]	51.64(14)	O4[2]	Tb2	O5[1]	140.80(17)

O6[1]	Tb2	O8	137.2(2)	O4[2]	Tb2	O8	69.2(2)
O6[1]	Tb2	O3[2]	81.81(15)	O4[2]	Tb2	O3[2]	52.47(16)
O7	Tb2	N10	29.5(4)	O1	Tb2	N10	70.2(4)
O7	Tb2	O6[1]	75.57(18)	O1	Tb2	O6[1]	93.16(16)
O7	Tb2	O5[1]	114.35(17)	O1	Tb2	O7	76.32(18)
O7	Tb2	O8	62.5(2)	O1	Tb2	O5[4]	75.51(16)
O7	Tb2	O4[2]	102.1(2)	O1	Tb2	O5[1]	71.47(15)
O7	Tb2	O3[2]	74.64(17)	O1	Tb2	O8	69.69(19)
O5[1]	Tb2	N10	132.9(4)	O1	Tb2	O2[2]	136.69(16)
O5[4]	Tb2	N10	119.6(4)	O1	Tb2	O4[2]	133.85(16)
O5[4]	Tb2	O6[1]	125.59(15)	O1	Tb2	O3[2]	150.87(16)
O5[4]	Tb2	O7	145.39(17)	O3[2]	Tb2	N10	83.3(4)
O5[4]	Tb2	O5[1]	74.66(15)	O3[2]	Tb2	O5[1]	123.48(14)
O5[4]	Tb2	O8	88.9(2)	N5[5]	Pb1	N5	180.0
O5[4]	Tb2	O2[2]	75.38(15)	N5	Pb1	N8[5]	79.24(15)
O5[4]	Tb2	O4[2]	83.56(17)	N5[5]	Pb1	N8[5]	100.76(16)
O5[4]	Tb2	O3[2]	130.27(15)	N5[5]	Pb1	N8	79.24(15)
O8	Tb2	N10	33.0(4)	N5	Pb1	N8	100.76(16)
O8	Tb2	O5[1]	140.51(17)	N5[5]	Pb1	N11	84.02(15)
O8	Tb2	O3[2]	94.66(19)	N5	Pb1	N11	95.98(15)
O2[2]	Tb2	N10	153.1(4)	N5[5]	Pb1	N11[5]	95.98(15)
O2[2]	Tb2	O6[1]	78.71(16)	N5	Pb1	N11[5]	84.02(15)
O2[2]	Tb2	O7	139.11(18)	N8[5]	Pb1	N8	180.0
O2[2]	Tb2	O5[1]	70.35(14)	N11[5]	Pb1	N8	80.50(15)
O2[2]	Tb2	O8	140.3(2)	N11[5]	Pb1	N8[5]	99.50(15)
O2[2]	Tb2	O4[2]	72.84(17)	N11	Pb1	N8[5]	80.50(15)
O2[2]	Tb2	O3[2]	70.64(15)	N11	Pb1	N8	99.50(15)
O4[2]	Tb2	N10	86.2(4)	N11	Pb1	N11[5]	180.0

[1]-X,2-Y,4-Z; [2]-1-X,3-Y,4-Z; [3]1+X,-1+Y,+Z; [4]-1+X,1+Y,+Z; [5]-X,2-Y,3-Z