Supporting Information:

T-11. C1 D + + + + - +	1 1		$(\mathbf{N} \mathbf{O}) = \mathbf{I}$	20 11 0
Table ST Representative	bond lengths (A)	and angles ()	for $Pr_4(NO_3)_{12}$ ·L 3	$\cdot 3C_4H_{10}O$

-										
	Pr(1)-O(5) 2.292(19)		Pr(1)-O(15)	2.305(17)	Pr(1)	-O(7) 2.31(2)	2)		Pr(1)-O(6)	2.39(2)
	Pr(1)-O(13) 2.409(17)		Pr(1)-O(9)	2.431(19)	Pr(1)	-O(10) 2.486	5(17)		Pr(1)-O(16) 2.613(16)
	Pr(1)-O(12) 2.649(17)		Pr(2)-O(19)	#1 2.25(2)	Pr(2)	-O(19)#2 2.2	5(2)		Pr(2)-O(19) 2.25(2)
	Pr(2)-O(8)#2 2.35(2)		Pr(2)-O(8)	2.35(2)	Pr(2)	-O(8)#1 2.35	(2)		Pr(2)-O(18)#2 2.349(18)
	Pr(2)-O(18)#1 2.349(18))	Pr(2)-O(18)	2.349(18)						
	O(5)-Pr(1)-O(15)	120.0	0(6)	O(5)-Pr(1)-O(7)	7	8.1(7))	(O(15)-Pr(1))-O(7)	91.0(6)
	O(5)-Pr(1)-O(6)	82.9	9(6)	O(15)-Pr(1)-O(6)	1	53.7(6)	(O(7)-Pr(1)-	O(6)	80.8(6)
	O(5)-Pr(1)-O(13)	150.	5(6)	O(15)-Pr(1)-O(13)		80.5(6)	(O(7)-Pr(1)-	O(13)	125.5(6)
	O(6)-Pr(1)-O(13)	84.	0(6)	O(5)-Pr(1)-O(9)		90.8(7)	(O(15)-Pr(1))-O(9)	68.2(6)
	O(7)-Pr(1)-O(9)	147.	6(6)	O(6)-Pr(1)-O(9)		128.4(6)	(O(13)-Pr(1))-O(9)	77.0(6)
	O(5)-Pr(1)-O(10)	78.	2(7)	O(15)-Pr(1)-O(10)		118.9(7)	(O(7)-Pr(1)-	O(10)	148.5(6)
	O(6)-Pr(1)-O(10)	75.	9(6)	O(13)-Pr(1)-O(10)		73.0(6)	(O(9)-Pr(1)-	O(10)	52.7(4)
	O(5)-Pr(1)-O(16)	67.	7(6)	O(15)-Pr(1)-O(16)		52.5(4)	(O(7)-Pr(1)-	O(16)	75.9(7)
	O(6)-Pr(1)-O(16)	145	.5(6)	O(13)-Pr(1)-O(16)		130.4(6)	(O(9)-Pr(1)-	O(16)	71.7(6)
	O(10)-Pr(1)-O(16)	113	.1(6)	O(5)-Pr(1)-O(12)		146.4(7)	(O(15)-Pr(1))-O(12)	79.5(6)
	O(7)-Pr(1)-O(12)	74.	3(6)	O(6)-Pr(1)-O(12)		74.2(6)	(O(13)-Pr(1))-O(12)	51.2(4)
	O(9)-Pr(1)-O(12)	122.	7(6)	O(10)-Pr(1)-O(12)		118.2(6)	(O(16)-Pr(1))-O(12)	122.0(6)
	O(19)#1-Pr(2)-O(19)#2	67.	6(8)	O(19)#1-Pr(2)-O(1	9)	67.6(8)	(O(19)#2-Pr	(2)-O(19)	67.6(8)
	O(19)#1-Pr(2)-O(8)#2	94.	6(6)	O(19)#2-Pr(2)-O(8	3)#2	125.0(6)	(O(19)-Pr(2))-O(8)#2	153.6(6)
	O(19)#1-Pr(2)-O(8)	153.	6(6)	O(19)#2-Pr(2)-O(8	3)	94.5(6)	(O(19)-Pr(2))-O(8)	125.0(6)
	O(8)#2-Pr(2)-O(8)	79.	6(7)	O(19)#1-Pr(2)-O(8	8)#1	125.0(6)	(O(19)#2-Pr	(2)-O(8)#1	153.6(6)
	O(19)-Pr(2)-O(8)#1	94	.6(6)	O(8)#2-Pr(2)-O(8)	#1	79.6(7)	(O(8)-Pr(2)-	O(8)#1	79.6(7)
	O(19)#1-Pr(2)-O(18)#2	76	.8(7)	O(19)#2-Pr(2)-O(1	8)#2	55.9(5)	(O(19)-Pr(2))-O(18)#2	121.2(7)
	O(8)#2-Pr(2)-O(18)#2	69	.7(6)	O(8)-Pr(2)-O(18)#	2	77.0(7)	(O(8)#1-Pr(2	2)-O(18)#2	144.1(6)
	O(19)#1-Pr(2)-O(18)#1	55	.9(5)	O(19)#2-Pr(2)-O(1	8)#1	121.2(7)	(O(19)-Pr(2))-O(18)#1	76.8(7)
	O(8)#2-Pr(2)-O(18)#1	77.	0(6)	O(8)-Pr(2)-O(18)#	1	144.1(6)	(O(8)#1-Pr(2	2)-O(18)#1	69.7(6)
	O(18)#2-Pr(2)-O(18)#1	118	8.6(2)	O(19)#1-Pr(2)-O(1	8)	121.2(7)	(O(19)#2-Pr	·(2)-O(18)	76.8(7)
	O(19)-Pr(2)-O(18)	55	.9(5)	O(8)#2-Pr(2)-O(18	3)	144.1(6)	(O(8)-Pr(2)-	O(18)	69.7(6)
	O(8)#1-Pr(2)-O(18)	77	.0(6)	O(18)#2-Pr(2)-O(1	8)	118.6(2)	(O(18)#1-Pr	(2)-O(18)	118.6(2)
-	C + +	- f			1	4 4	<i>μ</i> 1		- #2	1

Symmetry transformations used to generate equivalent atoms: #1 -x+y+1,-x+1,z #2 -y+1,x-y,z

Table S2 Representative bond lengths (Å) and angles (°) for $Eu_4(NO_3)_{12}$ · L^I_3 · $6C_4H_{10}O$

Eu(1)-O(5) 2.336(16)	Eu(1)-O(6)	2.338(13)	Eu(1)-O(7)	2.345(16)	Eu(1)-O(12	2) 2.473(17)
Eu(1)-O(10) 2.478(15)	Eu(1)-O(13)	2.489(17)	Eu(1)-O(16)	2.493(16)	Eu(1)-O(1	5) 2.504(16)
Eu(1)-O(9) 2.524(19)	Eu(2)-O(8)#1	1 2.356(12)	Eu(2)-O(8)	2.356(12)	Eu(2)-O(8))#2 2.356(12)
Eu(2)-O(19)#2 2.433(18)	Eu(2)-O(19)#	#1 2.433(19)	Eu(2)-O(19)	2.433(18)	Eu(2)-O(18	8)#1 2.438(14)
Eu(2)-O(18)#2 2.438(14)	Eu(2)-O(18)	2.438(14)				
O(5)-Eu(1)-O(6) 85.8	B(5) C	O(5)-Eu(1)-O(7)	85.9(6)	O(6)-Eu(1)-O(7)	85.8(6)
O(5)-Eu(1)-O(12) 153	.1(6) 0	O(6)-Eu(1)-O(12)	78.7(6)	O(7)-Eu(1)-O(12)	71.2(5)
O(5)-Eu(1)-O(10) 77.	8(6)	O(6)-Eu(1)-O(10)	70.8(5)	O(7)-Eu(1)-O(10)	152.1(6)
O(12)-Eu(1)-O(10) 116	5.7(5)	O(5)-Eu(1)-O(13)	148.6(6)	O(6)-Eu(1)-O(13)	84.5(7)
O(7)-Eu(1)-O(13) 123	.0(6)	O(12)-Eu(1)-O(13)	51.8(4)	O(10)-Eu(1)-O(13)	70.8(6)
O(5)-Eu(1)-O(16) 71.	7(5) 0	O(6)-Eu(1)-O(16)	152.9(5)	O(7)-Eu(1)-O(16)	77.9(6)
O(12)-Eu(1)-O(16) 115	5.2(5)	O(10)-Eu(1)-O(16)	117.0(5)	O(13)-Eu(1) - O(16)	122.5(6)

O(5)-Eu(1)-O(15) 123.4(5)	O(6)-Eu(1)-O(15) 148.2(6)	O(7)-Eu(1)-O(15) 84.5(6)
O(12)-Eu(1)-O(15) 69.5(6)	O(10)-Eu(1)-O(15) 123.4(6)	O(13)-Eu(1)-O(15) 75.7(6)
O(16)-Eu(1)-O(15) 51.8(4)	O(5)-Eu(1)-O(9) 82.6(7)	O(6)-Eu(1)-O(9) 121.9(5)
O(7)-Eu(1)-O(9) 148.8(6)	O(12)-Eu(1)-O(9) 124.3(6)	O(10)-Eu(1)-O(9) 51.1(4)
O(13)-Eu(1)-O(9) 77.4(6)	O(16)-Eu(1)-O(9) 71.0(6)	O(15)-Eu(1)-O(9) 78.0(6)
O(8)#1-Eu(2)-O(8) 85.3(7)	O(8)#1-Eu(2)-O(8)#2 85.3(7)	O(8)-Eu(2)-O(8)#2 85.3(7)
O(8)#1-Eu(2)-O(19)#2 85.0(7)	O(8)-Eu(2)-O(19)#2 148.1(5)	O(8)#2-Eu(2)-O(19)#2 124.0(5)
O(8)#1-Eu(2)-O(19)#1 124.0(5)	O(8)-Eu(2)-O(19)#1 85.0(7)	O(8)#2-Eu(2)-O(19)#1 148.1(5)
O(19)#2-Eu(2)-O(19)#1 75.4(9)	O(8)#1-Eu(2)-O(19) 148.1(5)	O(8)-Eu(2)-O(19) 124.0(5)
O(8)#2-Eu(2)-O(19) 85.0(7)	O(19)#2-Eu(2)-O(19) 75.4(9)	O(19)#1-Eu(2)-O(19) 75.4(9)
O(8)#1-Eu(2)-O(18)#1 71.3(5)	O(8)-Eu(2)-O(18)#1 80.5(6)	O(8)#2-Eu(2)-O(18)#1 153.4(6)
O(19)#2-Eu(2)-O(18)#1 67.6(6)	O(19)#1-Eu(2)-O(18)#1 52.8(4)	O(19)-Eu(2)-O(18)#1 121.5(8)
O(8)#1-Eu(2)-O(18)#2 80.5(6)	O(8)-Eu(2)-O(18)#2 153.4(6)	O(8)#2-Eu(2)-O(18)#2 71.3(5)
O(19)#2-Eu(2)-O(18)#2 52.8(4)	O(19)#1-Eu(2)-O(18)#2 121.5(8)	O(19)-Eu(2)-O(18)#2 67.6(6)
O(18)#1-Eu(2)-O(18)#2 115.4(3)	O(8)#1-Eu(2)-O(18) 153.4(6)	O(8)-Eu(2)-O(18) 71.3(5)
O(8)#2-Eu(2)-O(18) 80.5(6)	O(19)#2-Eu(2)-O(18) 121.5(8)	O(19)#1-Eu(2)-O(18) 67.6(6)
O(19)-Eu(2)-O(18) 52.8(4)	O(18)#1-Eu(2)-O(18) 115.4(3)	O(18)#2-Eu(2)-O(18) 115.4(3)
Symmetry transformations up	sed to generate equivalent atoms:	#1 - x + y + 1 - x + 1 z = #2 - y + 1 x - y z

Symmetry transformations used to generate equivalent atoms: #1 -x+y+1,-x+1,z #2 -y+1,x-y,z

Table S3 Representative bond lengths (Å) and angles (°) for $Tb_4(NO_3)_{12} \cdot L^I_3 \cdot 6C_4 H_{10}O$

Tb(1)-O(6) 2.298(7)	Tb(1)-O(5)	2.329(7)	Tb(1)-O(7)	2.325(6)	Tb(1)-O(13) 2.428(7)
Tb(1)-O(12) 2.418(7)	Tb(1)-O(9)	2.498(7)	Tb(1)-O(15)	2.467(9)	Tb(1)-O(16) 2.462(7)
Tb(1)-O(10) 2.481(8)	Tb(2)-O(8)#1	2.341(6)	Tb(2)-O(8)	2.341(6)	Tb(2)-O(8)	\$2 2.341(6)
Tb(2)-O(19)#2 2.439(8)	Tb(2)-O(19)#	\$1 2.439(8)	Tb(2)-O(19)	2.439(8)	Tb(2)-O(18)#1 2.432(8)
Tb(2)-O(18)#2 2.432(8)	Tb(2)-O(18)	2.432(8)				
O(6)-Tb(1)-O(5) 84.1(2	2) C	O(6)-Tb(1)-O(7)	83.5(3)	O(5)-Tb(1))-O(7)	84.4(2)
O(6)-Tb(1)-O(13) 86.8((3) C	O(5)-Tb(1)-O(13)	147.6(3)	O(7)-Tb(1))-O(13)	125.3(2)
O(6)-Tb(1)-O(12) 77.3((3) C	O(5)-Tb(1)-O(12)	151.5(2)	O(7)-Tb(1)	-O(12)	72.2(2)
O(13)-Tb(1)-O(12) 53.1((2) C	O(6)-Tb(1)-O(9)	123.4(2)	O(5)-Tb(1))-O(9)	85.7(2)
O(7)-Tb(1)-O(9) 150.2(2	2) C	O(13)-Tb(1)-O(9)	73.6(2)	O(12)-Tb(2	1)-O(9)	122.6(2)
O(6)-Tb(1)-O(15) 147.6	(2) C	O(5)-Tb(1)-O(15)	125.2(2)	O(7)-Tb(1)	-O(15)	85.8(3)
O(13)-Tb(1)-O(15) 74.7	(3) C	O(12)-Tb(1)-O(15)	70.3(3)	O(9)-Tb(1)	-O(15)	77.1(3)
O(6)-Tb(1)-O(16) 151.75	(17) C	O(5)-Tb(1)-O(16)	72.6(2)	O(7)-Tb(1)	-O(16)	78.6(2)
O(13)-Tb(1)-O(16) 121.4	4(3) C	O(12)-Tb(1)-O(16)	116.8(3)	O(9)-Tb(1)	-O(16)	71.6(2)
O(15)-Tb(1)-O(16) 52.55	(19) C	O(6)-Tb(1)-O(10)	71.8(2)	O(5)-Tb(1)	-O(10)	78.2(2)
O(7)-Tb(1)-O(10) 150.9((3) C	O(13)-Tb(1)-O(10)	69.5(3)	O(12)-Tb(2	1)-O(10)	115.3(2)
O(9)-Tb(1)-O(10) 51.6(2	2) C	O(15)-Tb(1)-O(10)	123.3(2)	O(16)-Tb(2	1)-O(10)	117.2(2)
O(8)#1-Tb(2)-O(8) 86.0	(2) C	O(8)#1-Tb(2)-O(8)	#2 86.0(2)	O(8)-Tb(2))-O(8)#2	86.0(2)
O(8)#1-Tb(2)-O(19)#2 85	.6(2) C	O(8)-Tb(2)-O(19)#	2 148.1(2)	O(8)#2-Tb	(2)-O(19)#2	124.0(2)
O(8)#1-Tb(2)-O(19)#1 124	4.0(2) C	O(8)-Tb(2)-O(19)#	1 85.6(2)	O(8)#2-Tb	(2)-O(19)#1	148.1(2)
O(19)#2-Tb(2)-O(19)#1 73	3.9(3) C	D(8)#1-Tb(2)-O(19) 148.1(2)	O(8)-Tb(2))-O(19)	124.0(2)
O(8)#2-Tb(2)-O(19) 85.6	5(2) C	D(19)#2-Tb(2)-O(1	9) 73.9(3)	O(19)#1-T	b(2)-O(19)	73.9(3)
O(8)#1-Tb(2)-O(18)#1 71	.5(2) C	O(8)-Tb(2)-O(18)#	1 77.9(2)	O(8)#2-Tb	(2)-O(18)#1	153.0(2)
O(19)#2-Tb(2)-O(18)#1 70).2(2) C	D(19)#1-Tb(2)-O(1	8)#1 52.6(2)	O(19)-Tb(2	2)-O(18)#1	121.4(2)
O(8)#1-Tb(2)-O(18)#2 77	.9(2) C	O(8)-Tb(2)-O(18)#	2 153.0(2)	O(8)#2-Tb	(2)-O(18)#2	71.5(2)
O(19)#2-Tb(2)-O(18)#2 52	2.6(2)	D(19)#1-Tb(2)-O(1	8)#2 121.4(2)	O(19)-Tb(2	2)-O(18)#2	70.2(2)
O(18)#1-Tb(2)-O(18)#2 16.	21(10) C	O(8)#1-Tb(2)-O(18	3) 153.0(2)	O(8)-Tb(2))-O(18)	71.5(2)
O(8)#2-Tb(2)-O(18) 77.9	9(2) C	D(19)#2-Tb(2)-O(1	8) 121.4(2)	O(19)#1-T	b(2)-O(18)	70.2(2)

O(19)-Tb(2)-O(18)	52.6(2)	O(18)#1-Tb(2)-O(18) 116.21(10)	O(18)#2-Tb(2)-O(18) 116.21(10)

Symmetry transformations used to generate equivalent atoms:

#1 -x+y+1,-x+1,z #2 -y+1,x-y,z

Table S4 Representative bond lengths	(Å) and angles (°) for $Er_4(NO_3)_{12}$ ·L	$^{I}_{3} \cdot 3C_{4}H_{10}O$
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	E (1) B (2)		E (1) O (E)			
Er(1)-O(7) = 2.252(16)	Er(1)-O(6)	2.275(13)	Er(1)-O(5)	2.298(15)	Er(1)-O(15)	2.395(17)
Er(1)-O(13) 2.399(17)	Er(1)-O(12)	2.431(16)	Er(1)-O(9)	2.432(17)	Er(1)-O(16)	2.439(16)
Er(1)-O(10) 2.457(15)	Er(2)-O(8)#1	2.308(10)	Er(2)-O(8)	2.308(10)	Er(2)-O(8)#	2 2.308(11)
Er(2)-O(19)#2 .395(18)	Er(2)-O(19)#1	1 2.395(18)	Er(2)-O(19)	2.395(18)	Er(2)-O(18)	#1 2.420(16)
Er(2)-O(18)#2 .420(16)	Er(2)-O(18)	2.420(16)				
O(7)-Er(1)-O(6) 84.2(6)) O((7)-Er(1)-O(5)	84.1(6)	O(6)-Er(1))-O(5)	85.4(5)
O(7)-Er(1)-O(15) 85.2(6	5) O((6)-Er(1)-O(15)	148.1(6)	O(5)-Er(1))-O(15)	123.3(5)
O(7)-Er(1)-O(13) 126.1(6) O((6)-Er(1)-O(13)	87.3(7)	O(5)-Er(1))-O(13)	148.0(6)
O(15)-Er(1)-O(13) 74.9(6) O((7)-Er(1)-O(12)	72.7(6)	O(6)-Er(1))-O(12)	78.4(6)
O(5)-Er(1)-O(12) 152.8(6) O((15)-Er(1)-O(12)	69.6(6)	O(13)-Er(1)-O(12)	53.4(4)
O(7)-Er(1)-O(9) 148.0(6	5) O((6)-Er(1)-O(9)	124.1(5)	O(5)-Er(1))-O(9)	83.9(7)
O(15)-Er(1)-O(9) 76.9(6)) O((13)-Er(1)-O(9)	74.6(6)	O(12)-Er(1)-O(9)	123.3(6)
O(7)-Er(1)-O(16) 76.9(6)) O((6)-Er(1)-O(16)	150.2(6)	O(5)-Er(1))-O(16)	70.0(5)
O(15)-Er(1)-O(16) 53.3(4	4) O((13)-Er(1)-O(16)	122.5(6)	O(12)-Er(1)-O(16)	116.6(6)
O(9)-Er(1)-O(16) 71.1(6	5) O((7)-Er(1)-O(10)	150.6(6)	O(6)-Er(1))-O(10)	71.4(5)
O(5)-Er(1)-O(10) 77.8(5	j) O((15)-Er(1)-O(10)	124.2(6)	O(13)-Er(1)-O(10)	70.3(6)
O(12)-Er(1)-O(10) 116.5((5) O((9)-Er(1)-O(10)	52.7(4)	O(16)-Er(1)-O(10)	117.2(5)
O(8)#1-Er(2)-O(8) 86.9(6) O((8)#1-Er(2)-O(8)	#2 86.9(6)	O(8)-Er(2))-O(8)#2	86.9(6)
O(8)#1-Er(2)-O(19)#2 84.6	5(7) O	(8)-Er(2)-O(19)#	2 145.8(6)	O(8)#2-Er	(2)-O(19)#2	25.4(5)
O(8)#1-Er(2)-O(19)#1 125.	4(5) O((8)-Er(2)-O(19)#	1 84.6(7)	O(8)#2-Er	(2)-O(19)#1	145.8(6)
O(19)#2-Er(2)-O(19)#1 73.	8(9) O((8)#1-Er(2)-O(19) 145.8(6)	O(8)-Er(2))-O(19)	125.4(5)
O(8)#2-Er(2)-O(19) 84.6((7) O((19)#2-Er(2)-O(1	9) 73.8(9)	O(19)#1-E	Er(2)-O(19)	73.8(9)
O(8)#1-Er(2)-O(18)#1 72.2	2(5) O((8)-Er(2)-O(18)#	1 76.2(6)	O(8)#2-Er	(2)-O(18)#1	153.6(6)
O(19)#2-Er(2)-O(18)#1 69.	7(7) O	(19)#1-Er(2)-O(1	8)#1 53.4(4)) O(19)-Er(2	2)-O(18)#1	121.7(7)
O(8)#1-Er(2)-O(18)#2 76.2	2(6) O((8)-Er(2)-O(18)#	2 153.6(6)	O(8)#2-Er	(2)-O(18)#2	72.2(5)
O(19)#2-Er(2)-O(18)#2 53.	4(4) O((19)#1-Er(2)-O(1	8)#2 121.7(7	^r) O(19)-Er(2	2)-O(18)#2	69.7(7)
O(18)#1-Er(2)-O(18)#2 116	.4(3) O((8)#1-Er(2)-O(18	3) 153.6(6)	O(8)-Er(2))-O(18)	72.2(5)
O(8)#2-Er(2)-O(18) 76.2((6) O((19)#2-Er(2)-O(1	8) 121.7(7)	O(19)#1-E	Er(2)-O(18)	69.7(7)
O(19)-Er(2)-O(18) 53.4(4	4) O((18)#1-Er(2)-O(1	8) 116.4(3)	O(18)#2-E	Er(2)-O(18)	116.4(3)
Symmetry transform	nations used to g	generate equivale	nt atoms:	#1 -x+y+1,-x+1	,z #2 -y+1	x-y,z

Table S5 Representative bond lengths (Å) and angles (°) for $Nd_2(NO_3)_6 \cdot L^{II}_2 \cdot 2H_2O$

Nd(1)-O(2) 2.373(3)	Nd(1)-O(4)	2.380(3)	Nd(1)-O(18)	2.417(3)	Nd(1)-O(1	3) 2.497(4)
Nd(1)-O(16) 2.497(4)	Nd(1)-O(15)	2.500(4)	Nd(1)-O(10)	2.518(3)	Nd(1)-O(1	2) 2.525(4)
Nd(1)-O(9) 2.641(3)						
O(2)-Nd(1)-O(4) 83.2	24(12) O((2)-Nd(1)-O(18)	79.49(13)	O(4)-Nd(1))-O(18)	74.89(12)
O(2)-Nd(1)-O(13) 87.0	01(15) O((4)-Nd(1)-O(13)	159.92(14)	O(18)-Nd(1) - O(13)	120.48(15)
O(2)-Nd(1)-O(16) 77.2	29(16) O((4)-Nd(1)-O(16)	88.07(16)	O(18)-Nd(1) - O(16)	152.60(18)
O(13)-Nd(1)-O(16) 72.	.65(18) O((2)-Nd(1)-O(15)	123.45(13)	O(4)-Nd(1))-O(15)	76.93(13)
O(18)-Nd(1)-O(15) 140	0.78(14) O((13)-Nd(1)-O(15)	94.13(17)	O(16)-Nd(1)-O(15)	49.98(15)
O(2)-Nd(1)-O(10) 151.	.18(13) O((4)-Nd(1)-O(10)	75.72(11)	O(18)-Nd(1) - O(10)	76.19(12)
O(13)-Nd(1)-O(10) 118	3.70(13) O((16)-Nd(1)-O(10)	120.74(15)	O(15)-Nd(1) - O(10)	70.80(14)
O(2)-Nd(1)-O(12) 89.5	56(13) O((4)-Nd(1)-O(12)	145.97(15)	O(18)-Nd(1)-O(12)	71.10(15)
O(13)-Nd(1)-O(12) 50.	.95(16) O((16)-Nd(1)-O(12)	122.74(19)	O(15)-Nd(1)-O(12)	132.71(15)

O(10)-Nd(1)-O(12)	96.91(14)	O(2)-Nd(1)-O(9)	155.30(12)	O(4)-Nd(1)-O(9)	121.37(11)
O(18)-Nd(1)-O(9)	103.60(13)	O(13)-Nd(1)-O(9)	70.16(13)	O(16)-Nd(1)-O(9)	103.58(17)
O(15)-Nd(1)-O(9)	69.31(13)	O(10)-Nd(1)-O(9)	48.71(11)	O(12)-Nd(1)-O(9)	68.97(12)

Table S6 Representative bond lengths (Å) and angles (°) for $[Tb_2(NO_3)_6 \cdot L^{II}_2 \cdot 2H_2O]H_2O$

Tb(1)-O(4) 2.303(5) Tb(1)-O(2) 2.317(5)	Tb(1)-O(18)	2.354(5)	Tb(1)-O((16) 2.441(6)
Tb(1)-O(15) 2.448(7	7) Tb(1)-O(1	0) 2.450(6)	Tb(1)-O(13)	2.450(5)	Tb(1)-O((9) 2.460(6)
Tb(1)-O(12) 2.636(6	5)					
O(4)-Tb(1)-O(2)	84.2(2)	O(4)-Tb(1)-O(18)	79.0(2)	O(2)-Tb	(1)-O(18)	75.90(19)
O(4)-Tb(1)-O(16)	125.2(2)	O(2)-Tb(1)-O(16)	78.2(2)	O(18)-T	b(1)-O(16)	142.2(2)
O(4)-Tb(1)-O(15)	75.8(3)	O(2)-Tb(1)-O(15)	85.9(2)	O(18)-T	b(1)-O(15)	150.2(3)
O(16)-Tb(1)-O(15)	51.6(2)	O(4)-Tb(1)-O(10)	86.1(2)	O(2)-Tb	(1) - O(10)	157.3(2)
O(18)-Tb(1)-O(10)	122.2(2)	O(16)-Tb(1)-O(10) 90.8(3)	O(15)-T	b(1)-O(10)	71.9(3)
O(4)-Tb(1)-O(13)	152.0(2)	O(2)-Tb(1)-O(13)	76.32(19)	O(18)-T	b(1)-O(13)	76.9(2)
O(16)-Tb(1)-O(13)	70.5(2)	O(15)-Tb(1)-O(13	6) 121.8(2)	O(10)-T	b(1)-O(13)	118.9(2)
O(4)-Tb(1)-O(9)	88.3(2)	O(2)-Tb(1)-O(9)	148.0(2)	O(18)-T	b(1)-O(9)	72.1(2)
O(16)-Tb(1)-O(9)	130.0(2)	O(15)-Tb(1)-O(9)	122.3(3)	O(10)-T	b(1)-O(9)	51.7(3)
O(13)-Tb(1)-O(9)	97.5(2)	O(4)-Tb(1)-O(12)	152.9(2)	O(2)-Tb	(1)-O(12)	122.86(19)
O(18)-Tb(1)-O(12)	104.8(2)	O(16)-Tb(1)-O(12	2) 67.7(2)	O(15)-T	b(1)-O(12)	104.9(3)
O(10)-Tb(1)-O(12)	69.0(2)	O(13)-Tb(1)-O(12	2) 49.99(19)	O(9)-Tb	(1)-O(12)	68.2(2)

Table S7 Representative bond lengths (Å) and angles (°) for $[Dy_2(NO_3)_6 \cdot L^{II}_2 \cdot 2H_2O]H_2O$

Dy(1)-O(7)#1 2.291(6) Dy(1)-O(5)) 2.298(8)	Dy(1)-O(18)	2.349(7)	Dy(1)-O(10) 2.424(8)
Dy(1)-O(9) 2.430(8)	Dy(1)-O(1	6) 2.430(8)	Dy(1)-O(12)	2.443(7)	Dy(1)-O(15) 2.452(8)
Dy(1)-O(13) 2.623(7)						
O(7)#1-Dy(1)-O(5)	84.8(3)	O(7)#1-Dy(1)-O(1	18) 76.1(3)	O(5)-Dy	(1)-O(18)	80.1(3)
O(7)#1-Dy(1)-O(10)	78.6(3)	O(5)-Dy(1)-O(10)	124.6(3)	O(18)-D	y(1)-O(10)	142.5(3)
O(7)#1-Dy(1)-O(9)	85.0(3)	O(5)-Dy(1)-O(9)	74.2(3)	O(18)-D	y(1)-O(9)	149.3(3)
O(10)-Dy(1)-O(9)	52.1(3)	O(7)#1-Dy(1)-O(1	16) 157.2(3)	O(5)-Dy	(1)-O(16)	85.8(3)
O(18)-Dy(1)-O(16)	122.5(3)	O(10)-Dy(1)-O(16	6) 89.8(3)	O(9)-Dy	(1)-O(16)	72.5(3)
O(7)#1-Dy(1)-O(12)	76.3(3)	O(5)-Dy(1)-O(12)	152.6(3)	O(18)-D	y(1)-O(12)	76.3(3)
O(10)-Dy(1)-O(12)	71.0(3)	O(9)-Dy(1)-O(12)	122.7(3)	O(16)-D	y(1)-O(12)	118.7(3)
O(7)#1-Dy(1)-O(15)	148.2(3)	O(5)-Dy(1)-O(15)	87.9(3)	O(18)-D	y(1)-O(15)	72.2(3)
O(10)-Dy(1)-O(15)	129.6(3)	O(9)-Dy(1)-O(15)	122.5(3)	O(16)-D	y(1)-O(15)	51.7(3)
O(12)-Dy(1)-O(15)	97.8(3)	O(7)#1-Dy(1)-O(1	13) 122.4(3)	O(5)-Dy	(1)-O(13)	152.7(3)
O(18)-Dy(1)-O(13)	103.6(3)	O(10)-Dy(1)-O(13	3) 68.1(3)	O(9)-Dy	(1)-O(13)	107.0(3)
O(16)-Dy(1)-O(13)	69.3(3)	O(12)-Dy(1)-O(13	3) 49.4(2)	O(15)-D	y(1)-O(13)	68.2(3)

Table S8 Representative bond lengths (Å) and angles (°) for $Er(NO_3)_3 \cdot L^{II} \cdot 2H_2O$

Er1-O(18) 2.305(2	3) $Er1-O(12)$	2.412(3)	Er(1)-O(11)	2.421(4)	Er(1)-O(15)	2.426(3)
Er(1)-O(2) 2.302((3) $Er(1)-O(9)$	2.432(3)	Er(1)-O(14)	2.446(3)	Er(1)-O(17)	2.470(3)
Er(1)-O(8) 2.281((3)					
O(8)-Er(1)-O(2)	80.61(10)	O(8)-Er(1)-O(18)	81.96(13)	O(2)-Er(1))-O(18) 8	0.19(12)
O(8)-Er(1)-O(12)	84.09(11)	O(2)-Er(1)-O(12)	129.97(11)	O(18)-Er(1)-O(12) 1-	43.78(14)
O(8)-Er(1)-O(11)	129.77(12)	O(2)-Er(1)-O(11)	144.86(13)	O(18)-Er(1)-O(11) 8	86.71(13)
O(12)-Er(1)-O(11)	76.98(13)	O(8)-Er(1)-O(15)	150.45(10)	O(2)-Er(1))-O(15) 8	5.48(10)
O(18)-Er(1)-O(15)	121.23(13)	O(12)-Er(1)-O(15)	85.13(11)	O(11)-Er(2	1)-O(15) 7	3.73(12)
O(8)-Er(1)-O(9)	77.74(11)	O(2)-Er(1)-O(9)	147.21(10)	O(14)-Er(1)-O(17) 1	21.87(10)

O(18)-Er(1)-O(9)	72.67(13)	O(12)-Er(1)-O(9)	71.77(11)	O(11)-Er(1)-O(9)	52.24(12)
O(15)-Er(1)-O(9)	124.28(11)	O(8)-Er(1)-O(14)	74.81(10)	O(2)-Er(1)-O(14)	77.59(11)
O(18)-Er(1)-O(14)	150.03(12)	O(12)-Er(1)-O(14)	52.42(11)	O(11)-Er(1)-O(14)	122.75(13)
O(15)-Er(1)-O(14)	76.81(10)	O(9)-Er(1)-O(14)	119.20(11)	O(8)-Er(1)-O(17)	144.01(10)
O(2)-Er(1)-O(17)	73.55(11)	O(18)-Er(1)-O(17)	69.43(12)	O(12)-Er(1)-O(17)	131.81(11)
O(11)-Er(1)-O(17)	71.33(13)	O(15)-Er(1)-O(17)	51.85(10)	O(9)-Er(1)-O(17)	112.16(11)



Fig. S1 Phosphorescence spectra of Gd^{III} complex of ligand L^I in methanol-ethyl acetate solution at 77K.



Fig. S2 Phosphorescence spectra of Gd^{III} complex of ligand L^{II} in methanol-ethyl acetate solution at 77K.



Fig. S3 The room-temperature solid-state phosphorescence lifetime of Eu^{III} complex of ligand L^I.



Fig. S4 The room-temperature solid-state phosphorescence lifetime of Tb^{III} complex of ligand L^I.



Fig. S5 The room-temperature solid-state phosphorescence lifetime of Eu^{III} complex of ligand L^{II}.



Fig. S6 The room-temperature solid-state phosphorescence lifetime of Tb^{III} complex of ligand L^{II}.