Electronic Supplementary Material (ESI) for Dalton Transactions.

Supporting Information for

Highly luminescent mixed-ligand bimetallic lanthanoid(III) complexes for photovoltaic applications†

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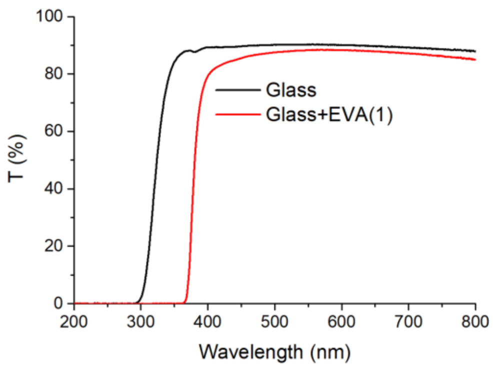


Fig. S1. Transmittance of the glass and glass covered with the down-shifting layer

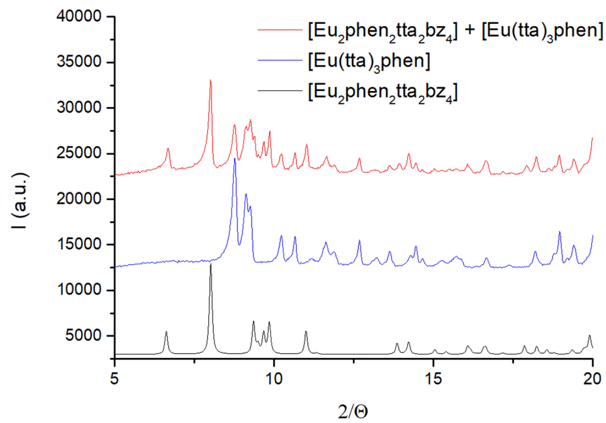


Fig. S2. Powder diffractogram of the crude product of the synthesis of **1** compared with that of $[Eu_2(bz)_4(tta)_2(phen)_2]$ and $[Eu(tta)_3(phen)]$

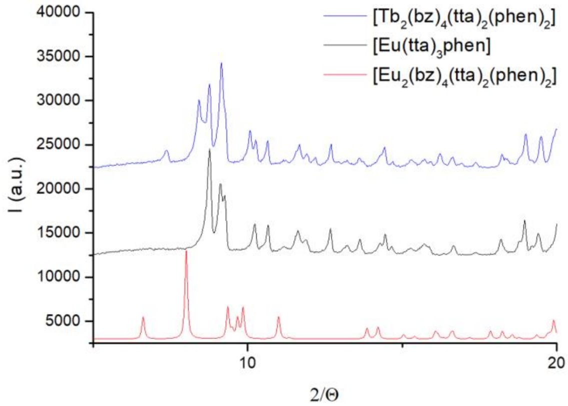
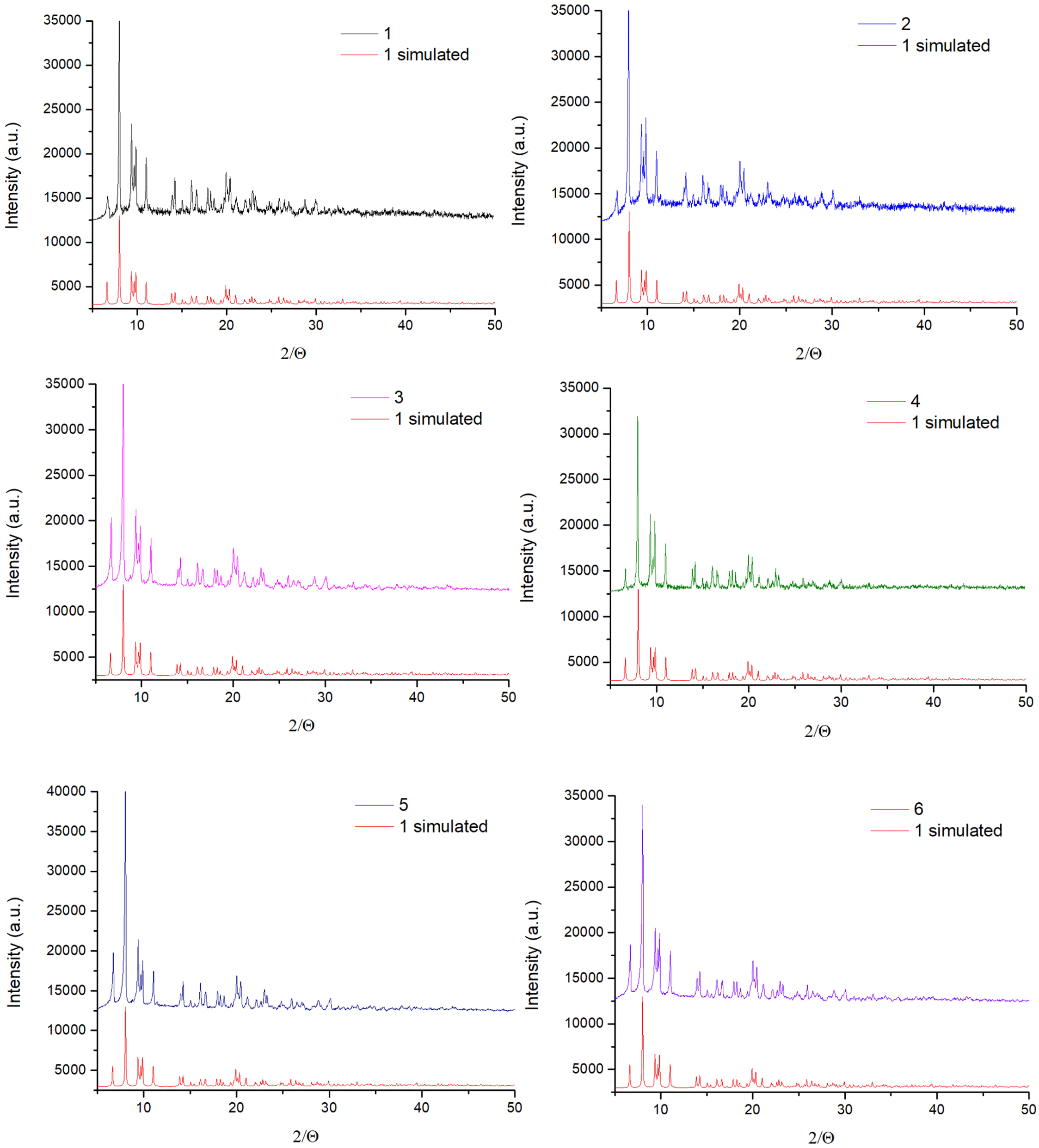


Fig. S3. Powder diffractogram of the crude product of the synthesis of the Tb2 compound compared with that of [Eu$_2$(bz)$_4$(tta)$_2$(phen)$_2$] and [Eu(tta)$_3$(phen)].



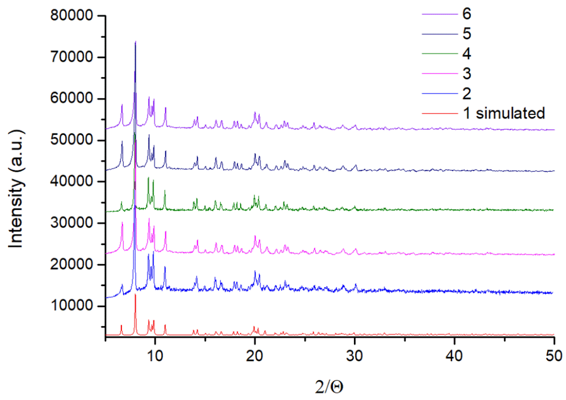


Fig. S4. Experimental powder diffractograms of **1-6** compared with the simulation of **1.**

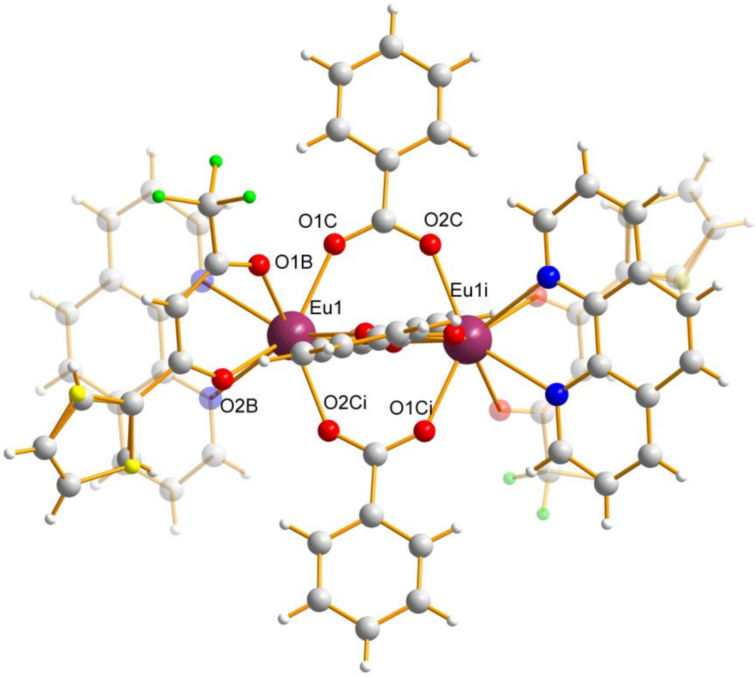


Fig. S5. Structure of **1** with backside atoms attenuated. (i) -*x*, -*y*+1, -*z*+1.

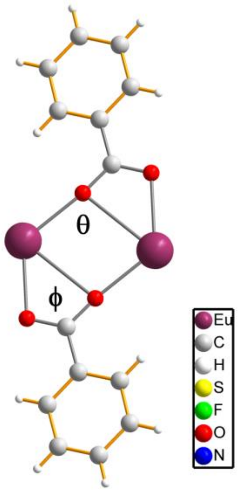
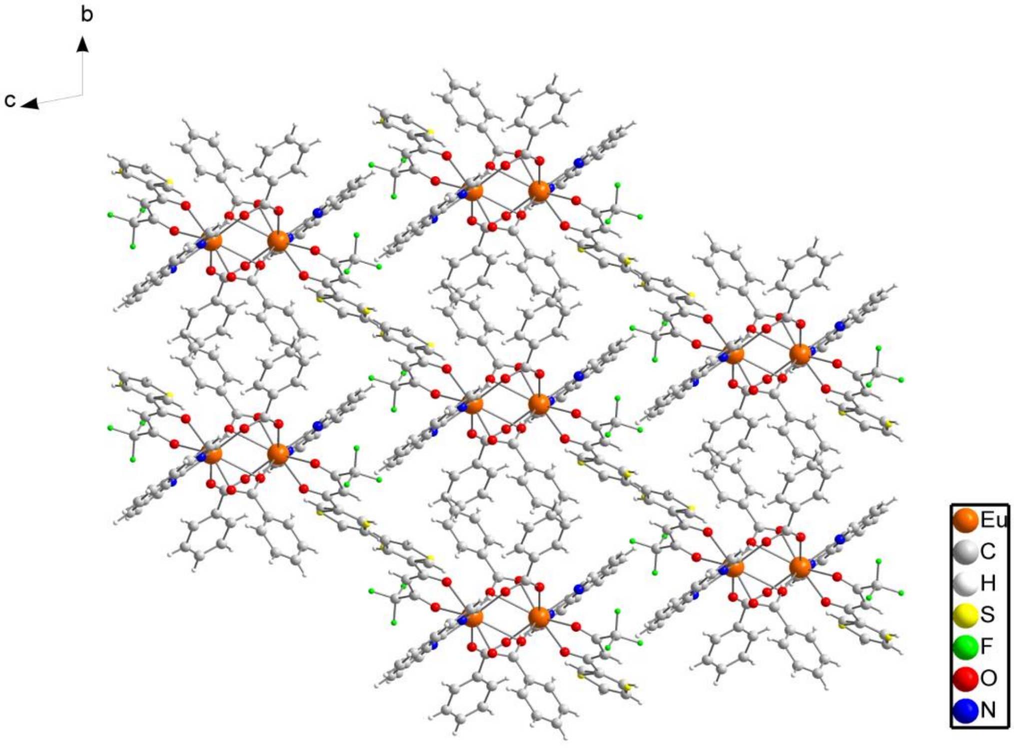
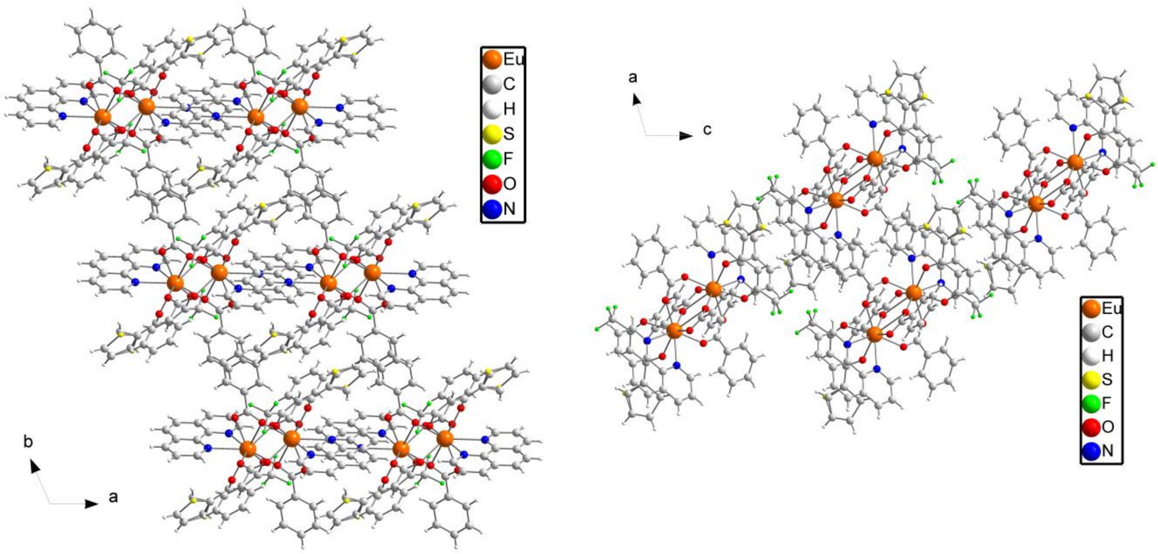


Fig. S6. The Eu-O-Eu and the Eu-O-C angles in the μ-O:κ^{2}O,O' bridges are designed as θ and φ parameters.



(a)



(b) (c)

Fig. S7. Packing diagrams of **1**: (a) bc plane, (b) ab plane, (c) ac plane.

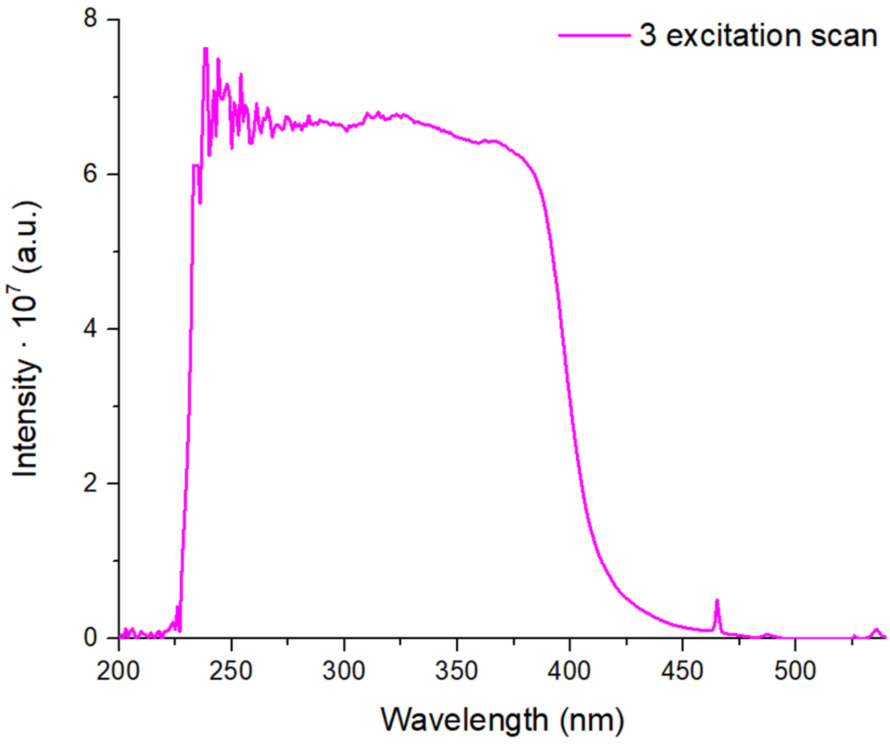


Fig. S8. Excitation spectrum of compound **3**

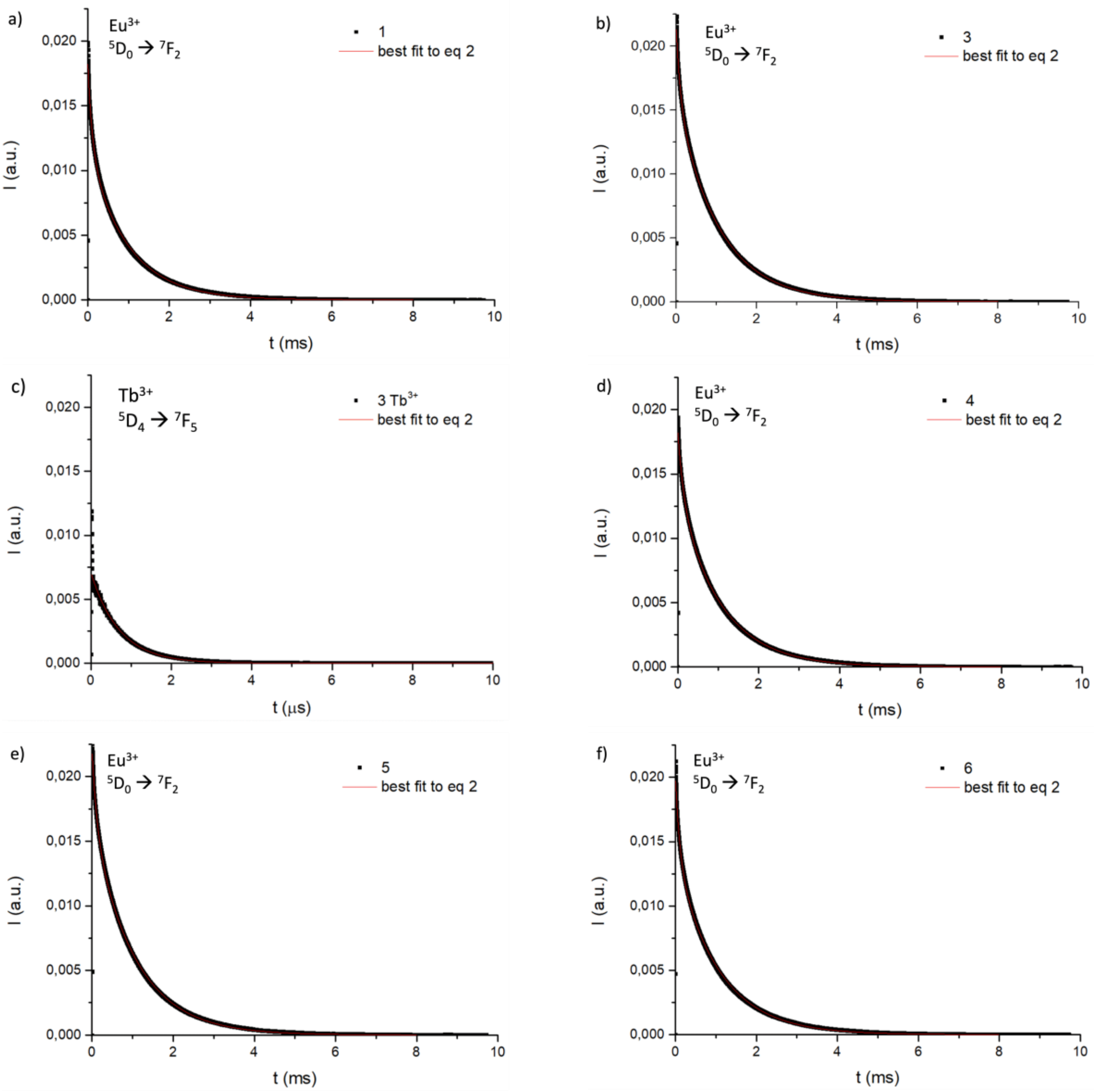


Fig. S9. Decay curves and best fits to equation 2 for all the compounds.

Table S1. Total quantities of Ln(III) nitrates in mmol for the synthesis of **1**-**6** compounds.

	Compound		
	1	**2**	**3**
$Eu(NO_3)_3{\cdot}5H_2O$	0.250	0	0.125
$Gd(NO_3)_3{\cdot}6H_2O$	0	0.250	0
$Tb(NO_3)_3{\cdot}5H_2O$	0	0	0.125
Total Ln(III)	0.250	0.250	0.250
f_{Eu}	1	0	0.5
f_{Gd}	0	1	0
f_{Tb}	0	0	0.5
Formula	$[Eu_2(bz)_4(tta)_2(phen)_2]$	$[Gd_2(bz)_4(tta)_2(phen)_2]$	$[EuTb(bz)_4(tta)_2(phen)_2]$
Composition	$[Eu_2(bz)_4(tta)_2(phen)_2]$	$[Gd_2(bz)_4(tta)_2(phen)_2]$	$[EuTb(bz)_4(tta)_2(phen)_2]$

	Compound		
	4	**5**	**6**
$Eu(NO_3)_3{\cdot}5H_2O$	0.125	0.150	0.200
$Gd(NO_3)_3{\cdot}6H_2O$	0.125	0.100	0.050
$Tb(NO_3)_3{\cdot}5H_2O$	0	0	0
Total Ln(III)	0.250	0.250	0.250
f_{Eu}	0.5	0.6	0.8
f_{Gd}	0.5	0.4	0.2
f_{Tb}	0	0	0
Formula	$[EuGd(bz)_4(tta)_2(phen)_2]$	$[Eu_{1,2}Gd_{0,8}(bz)_4(tta)_2(phen)_2]$	$[Eu_{1,6}Gd_{0,4}(bz)_4(tta)_2(phen)_2]$
Composition	$[EuGd(bz)_4(tta)_2(phen)_2]$	0.6 $[Eu_2(bz)_4(tta)_2(phen)_2]$ 0.4 $[EuGd(bz)_4(tta)_2(phen)_2]$	0.8 $[Eu_2(bz)_4(tta)_2(phen)_2]$ 0.2 $[EuGd(bz)_4(tta)_2(phen)_2]$

f_{Eu}; f_{Gd}; f_{Tb}, molar fractions of the metal ions in compounds **1**-**6**.

Table S2. Selected bond distances and angles for **1** (Å, º)

Distances (Å)			
Eu1—O1D	2.341 (3)	Eu1—O1B	2.453 (3)
Eu1—O2C^{i}	2.353 (3)	Eu1—N1A	2.605 (4)
Eu1—O1C	2.378 (3)	Eu1—N2A	2.657 (4)
Eu1—O2B	2.403 (3)	Eu1—O1D^{i}	2.860 (4)
Eu1—O2D^{i}	2.423 (3)	Eu1···Eu1i	4.0518(3)
Angles (º)			
O1D—Eu1—O2C^{i}	73.61 (12)	O2B—Eu1—N2A	65.94 (12)
O1D—Eu1—O1C	79.53 (13)	O2D^{i}—Eu1—N2A	66.96 (12)
O2C^{i}—Eu1—O1C	133.20 (11)	O1B—Eu1—N2A	117.24 (12)
O1D—Eu1—O2B	93.72 (13)	N1A—Eu1—N2A	62.29 (13)
O2C^{i}—Eu1—O2B	79.49 (13)	O1D—Eu1—O1D^{i}	78.10 (12)
O1C—Eu1—O2B	140.59 (12)	O2C^{i}—Eu1—O1D^{i}	71.77 (11)
O1D—Eu1—O2D^{i}	125.98 (13)	O1C—Eu1—O1D^{i}	65.58 (11)
O2C^{i}—Eu1—O2D^{i}	87.87 (14)	O2B—Eu1—O1D^{i}	151.26 (12)
O1C—Eu1—O2D^{i}	77.78 (13)	O2D^{i}—Eu1—O1D^{i}	47.88 (11)
O2B—Eu1—O2D^{i}	132.83 (12)	O1B—Eu1—O1D^{i}	132.34 (11)
O1D—Eu1—O1B	74.93 (12)	N1A—Eu1—O1D^{i}	117.56 (11)
O2C^{i}—Eu1—O1B	133.58 (13)	N2A—Eu1—O1D^{i}	106.83 (11)
O1C—Eu1—O1B	71.34 (12)	O1D—Eu1—C1D^{i}	102.59 (13)
O2B—Eu1—O1B	69.42 (12)	O2C^{i}—Eu1—C1D^{i}	80.20 (13)
O2D^{i}—Eu1—O1B	138.50 (14)	O1C—Eu1—C1D^{i}	69.08 (12)
O1D—Eu1—N1A	145.18 (13)	O2B—Eu1—C1D^{i}	149.10 (12)
O2C^{i}—Eu1—N1A	139.32 (12)	O2D^{i}—Eu1—C1D^{i}	23.39 (13)
O1C—Eu1—N1A	79.89 (12)	O1B—Eu1—C1D^{i}	140.07 (12)
O2B—Eu1—N1A	84.76 (13)	N1A—Eu1—C1D^{i}	95.84 (13)
O2D^{i}—Eu1—N1A	75.90 (13)	N2A—Eu1—C1D^{i}	86.93 (12)
O1B—Eu1—N1A	72.01 (12)	O1D^{i}—Eu1—C1D^{i}	24.53 (12)
O1D—Eu1—N2A	146.93 (13)	Eu1—O1D—Eu1^{i}	101.90 (12)
O2C^{i}—Eu1—N2A	77.05 (12)		
O1C—Eu1—N2A	132.85 (13)		

Symmetry code: (i) -*x*, -*y*+1, -*z*+1.