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Retraction of articles by H. Zhong *et al.*

H. Zhong,[a]* S.-H. Duan,[a] Y.-P. Hong,[a] M.-L. Li,[a] Y.-Q. Liu,[a] C.-J. Luo,[a] Q.-Y. Luo,[a] S.-Z. Xiao,[a] H.-L. Xie,[a] Y.-P. Xu,[a] X.-M. Yang,[b,a] X.-R. Zeng[a] and Q. Y. Zhong[c]

[a]College of Chemistry and Chemical Engineering, Provincial Key Laboratory of Coordination Chemistry, Jinggangshan University, Jian 343009, People's Republic of China, [b]Institute of Applied Materials, Jiangxi University of Finance and Economics, Nanchang 330032, People's Republic of China, and [c]Jian Training School, Jian 343000, People's Republic of China
Correspondence e-mail: huazhong06@126.com

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A series of 41 papers by H. Zhong *et al.* are retracted.

As a result of problems with the data sets and incorrect atom assignments, 41 papers by H. Zhong *et al.* are retracted. Full details of all the articles are given in Table 1.

Table 1
Details of articles to be retracted, in order of publication.

Title	Reference	DOI	Refcode
Aquachlorobis(1,10-phenanthroline)cobalt(II) chloride thiourea solvate	Zhong, Zeng, Liu & Luo (2006*a*)	10.1107/S1600536806041122	KERQEE
cis-Dichlorobis(1,10-phenanthroline)cobalt(II)	Zhong, Zeng & Luo (2006)	10.1107/S1600536806047295	MEQFOE
Tris(quinolin-8-olato-κ^2N,O)cobalt(III) glyoxal hemisolvate monohydrate	Zhong, Zeng, Liu & Luo (2006*b*)	10.1107/S1600536806050240	MEQHEW
(8-Quinolinol-κ^2N,O)bis(8-quinolinolato-κ^2N,O)nickel(II) glyoxal hemisolvate monohydrate	Zhong, Zeng, Liu & Luo (2007)	10.1107/S1600536806053232	METVUD
Aquachlorobis(1,10-phenanthroline)cobalt(II) chloride thioacetamide solvate	Zhong, Zeng & Luo (2007)	10.1107/S1600536806053530	METQIM
(8-Quinolinol-κ^2N,O)-bis(8-quinolinolato-κ^2N,O)zinc(II) glyoxal hemisolvate monohydrate	Zhong, Zeng, Luo, Li & Xiao (2007)	10.1107/S1600536807001171	DEXTEG
(Dimethylglyoxime-κ^2N,N')bis(1,10-phenanthroline-κ^2N,N')nickel(II) dinitrate dihydrate	Zhong, Zeng, Yang, Luo & Li (2007*a*)	10.1107/S1600536807004102	YEYGOZ
(Dimethylglyoxime-κ^2N,N')bis(1,10-phenanthroline-κ^2N,N')zinc(II) dinitrate dihydrate	Zhong, Zeng, Yang, Luo & Li (2007*b*)	10.1107/S1600536807004096	YEYGUF
Chloridobis(1,10-phenanthroline-$\kappa N,N'$)copper(I) hexahydrate	Zhong, Zeng, Yang, Luo & Xiao (2007)	10.1107/S160053680700791X	HEGKOU01
Tetrakis(pyridine-κN)bis(thiocyanato-κN)cobalt(II)	Zhong, Zeng, Yang & Luo (2007*a*)	10.1107/S1600536807017461	ITCPCO01
Tetrakis(pyridine-κN)bis(thiocyanato-κN)copper(II)	Zhong, Zeng, Yang & Luo (2007*b*)	10.1107/S160053680701879X	AVUJEG02
Tetrakis(nitrato-κ^2O,O')bis(4-phenylpyridine-κN)cerium(IV)	Zhong, Zeng, Yang & Luo (2007*c*)	10.1107/S1600536807018831	CICDOI
Bis(4,4′-bipyridine-κ^2N,N')tetrakis(nitrato-κ^2O,O')cerium(IV)	Zhong, Zeng, Yang & Luo (2007*d*)	10.1107/S1600536807021502	YIDNEF
(1,10-Phenanthroline)tris(phenoxyacetato)lanthanum(III)	Zhong, Zeng, Yang, Luo & Xu (2007)	10.1107/S1600536807027171	EDUROL
(1,10-Phenanthroline)tris(phenoxyacetato)cerium(III)	Zhong, Yang, Luo & Xu (2007*a*)	10.1107/S1600536807028061	EDUTUT
(1,10-Phenanthroline)tri(3-phenylpropanoato)lanthanum(III)	Zhong, Yang, Luo & Xu (2007*b*)	10.1107/S1600536807028693	RIGQEE
(1,10-Phenanthroline-κ^2N,N')tris(phenoxyacetato)-$\kappa O;\kappa O;\kappa O,O'$-neodymium(III)	Zhong, Yang, Luo & Xu (2007*c*)	10.1107/S1600536807030371	UDUMEM
Bis(2,2′-bipyridyl-κ^2N,N')bis(thiocyanato-κN)nickel(II)	Zhong, Yang, Luo & Xu (2007*d*)	10.1107/S1600536807031613	YEJGOJ01
Bis(2,2′-bipyridyl-κ^2N,N')bis(isothiocyanato-κN)copper(II)	Zhong, Yang, Luo & Xu (2007*e*)	10.1107/S1600536807033181	UFAPOH
Bis(2,2′-bipyridyl-κ^2N,N')bis(thiocyanato-κN)zinc(II)	Zhong, Yang, Luo & Xu (2007*f*)	10.1107/S1600536807035337	TIGFAR
(1,10-Phenanthroline-κ^2N,N')tris(3-phenylpropanoato-κO)neodymium(III)	Zhong, Yang, Luo & Xu (2007*g*)	10.1107/S1600536807035350	TIGFEV
2-Fluoro-3,5-dinitrobenzamide monohydrate	Zhong, Yang, Xie & Luo (2007*j*)	10.1107/S1600536807038676	VIKGAY
2-Fluoro-3,5-dinitrobenzoic acid-ammonia (1/1)	Zhong, Yang, Xie & Luo (2007*k*)	10.1107/S1600536807039724	KILKIA
1-Hydroxy-4,6-dinitropyridine-2-carboxamide monohydrate	Zhong, Yang, Xie & Luo (2007*l*)	10.1107/S1600536807040779	AFETAH
N-(2-Hydroxyphenyl)carbamic acid-ammonia (1/1)	Zhong, Yang, Xie & Luo (2007*m*)	10.1107/S160053680704086X	AFINAF
catena-Poly[[bis(μ-anilinoacetato-$\kappa^2O:O'$)bis(μ-anilinoacetato-$\kappa^3O,O':O$)bis[(1,10-phenanthroline-κ^2N,N')samarium(III)]-μ-anilinoacetato-$\kappa^2O:O'$]	Zhong, Yang, Xie & Luo (2007*a*)	10.1107/S1600536807043528	PILDAQ
2-Hydroxy-5-nitrobenzene-1,3-dicarboxylic acid monohydrate	Zhong, Yang, Xie & Luo (2007*n*)	10.1107/S1600536807045199	XILWIZ
catena-Poly[[tetra-μ-anilinoacetato-bis(1,10-phenanthroline)-dineodymium(III)]-di-μ-anilinoacetato]	Zhong, Yang, Xie & Luo (2007*b*)	10.1107/S1600536807048489	WIMWEV
Hexaaquacopper(II) bis(4-methylbenzenesulfonate)	Zhong, Yang, Xie & Luo (2007*c*)	10.1107/S1600536807049525	TOLSCV01

Table 1 (continued)

Title	Reference	DOI	Refcode
catena-Poly[[tetra-μ-anilinoacetato-bis(1,10-phenanthroline)-dilanthanum(III)]-di-μ-anilinoacetato]	Zhong, Yang, Xie & Luo (2007*d*)	10.1107/S1600536807051240	GIMZEI
Hexaaquachromium(II) bis(4-methylbenzenesulfonate)	Zhong, Yang, Xie & Luo (2007*e*)	10.1107/S1600536807051227	GIMZIM
Hexaaquamanganese(II) bis(4-methylbenzenesulfonate)	Zhong, Yang, Xie & Luo (2007*f*)	10.1107/S1600536807052051	QUKQES01
catena-Poly[[(acetato-κO)(1,10-phenanthroline-κ^2N,N')cobalt(II)]-μ-acetato-$\kappa^2O:O'$]	Zhong, Yang, Xie & Luo (2007*g*)	10.1107/S1600536807053494	NIQLAB
Hexaaquanickel(II) bis(4-aminobenzenesulfonate)	Zhong, Zhong, Xie & Luo (2007*a*)	10.1107/S1600536807054372	HIPZOW
catena-Poly[[(acetato-κO)(1,10-phenanthroline-κ^2N,N')copper(II)]-μ-acetato-$\kappa^2O:O'$]	Zhong, Yang, Xie & Luo (2007*h*)	10.1107/S160053680705622X	XIRGOV
Hexaaquazinc(II) bis(4-aminobenzenesulfonate)	Zhong, Zhong, Xie & Luo (2007*b*)	10.1107/S1600536807056498	XIRJEO
catena-Poly[[(acetato-κO)(1,10-phenanthroline-κ^2N,N')nickel(II)]-μ-acetato-$\kappa^2O:O'$]	Zhong, Yang, Xie & Luo (2007*i*)	10.1107/S1600536807058540	HIQJOH
Hexaaquacobalt(II) bis(4-aminobenzenesulfonate)	Zhong, Xie & Luo (2007)	10.1107/S1600536807058527	HIQJUN
catena-Poly[[tetra-μ-anilinoacetato-bis(1,10-phenanthroline)-dieuropium(III)]-di-μ-anilinoacetato]	Zhong, Yang, Duan & Hong (2007)	10.1107/S1600536807060643	YIQMAN
(Dimethylglyoxime-κ^2N,N')bis(1,10-phenanthroline-κ^2N,N')copper(II) dinitrate dihydrate	Zhong, Yang, Luo & Li (2007)	10.1107/S1600536807061193	YIQNUI
catena-Poly[[(1,10-phenanthroline-κ^2N,N')praseodymium(III)]-di-μ-phenoxyacetato-$\kappa^4O:O'$-[(1,10-phenanthroline-κ^2N,N')-praseodymium(III)]-di-μ-phenoxyacetato-$\kappa^4O:O'$-di-μ-phenoxyacetato-$\kappa^3O,O':O;\kappa^3O:O,O'$]	Zhong, Yang, Luo & Xu (2008)	10.1107/S1600536807068614	GISJIC

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catena-Poly[[tetra-μ-anilinoacetato-bis(1,10-phenanthroline)dieuropium(III)]-di-μ-anilinoacetato]

H. Zhong,[a]* X.-M. Yang,[b] S.-H. Duan[a] and Y.-P. Hong[a]

[a]College of Chemistry and Chemical Engineering, Provincial Key Laboratory of Coordination Chemistry, Jinggangshan University, Jian 343009, People's Republic of China, and [b]Institute of Applied Materials, Jiangxi University of Finance and Economics, Nanchang 330032, People's Republic of China
Correspondence e-mail: huazhong06@126.com

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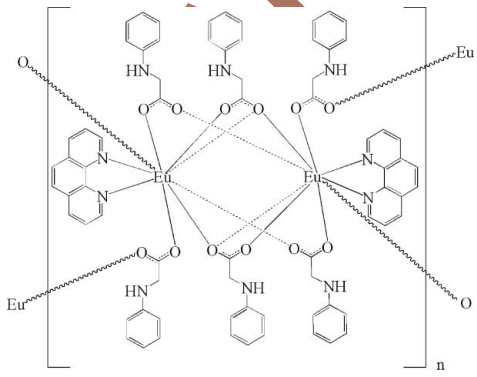
Key indicators: single-crystal X-ray study; T = 273 K; mean σ(C–C) = 0.012 Å; R factor = 0.047; wR factor = 0.127; data-to-parameter ratio = 18.3.

In the crystal structure of the title compound, $[Eu_2(C_8H_8NO_2)_6(C_{12}H_8N_2)_2]_n$, the Eu^{III} atoms are bridged by two tridentate, two bidentate and four mondentate carboxylate groups with an inversion centre between the two Eu^{III} ions of this dinuclear structural unit. Each Eu atom is nine-coordinated by two 1,10-phenanthroline N atoms and seven O atoms of four anilinoacetate ligands. In the crystal structure, the chains are linked by C—H···N and C—H···O hydrogen bonds into a polymeric ribbon structure.

Related literature

For a related structure, see: Zhong *et al.* (2007*a*,*b*,*c*). For bond-length data, see: Allen *et al.* (1987).



Experimental

Crystal data

$[Eu_2(C_8H_8NO_2)_6(C_{12}H_8N_2)_2]$
M_r = 1565.26
Monoclinic, $P2_1/n$
a = 19.783 (2) Å
b = 8.8013 (14) Å
c = 21.2014 (12) Å
β = 105.816 (5)°
V = 3551.8 (7) Å^3
Z = 2
Mo $K\alpha$ radiation
μ = 1.82 mm^{-1}
T = 273 (2) K
0.34 × 0.12 × 0.09 mm

Data collection

Bruker APEXII area-detector diffractometer
Absorption correction: multi-scan (*SADABS*; Sheldrick, 1996)
T_{min} = 0.581, T_{max} = 0.859
27025 measured reflections
7520 independent reflections
4961 reflections with $I > 2\sigma(I)$
R_{int} = 0.043

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.047
$wR(F^2)$ = 0.127
S = 1.02
7520 reflections
411 parameters
5 restraints
H atoms treated by a mixture of independent and constrained refinement
$\Delta\rho_{max}$ = 1.49 e Å^{-3}
$\Delta\rho_{min}$ = −0.85 e Å^{-3}

Table 1
Selected geometric parameters (Å, °).

Eu1—O1	2.608 (3)	Eu1—O5^{i}	2.585 (3)
Eu1—O2^{i}	2.435 (3)	Eu1—O6^{ii}	2.576 (3)
Eu1—O2	2.916 (4)	Eu1—N1	2.700 (4)
Eu1—O3	2.518 (3)	Eu1—N2	2.776 (4)
Eu1—O4	2.487 (3)		
O1—Eu1—O2	47.12 (9)	O2—Eu1—N1	102.55 (12)
O1—Eu1—O3	71.02 (11)	O2—Eu1—N2	118.44 (11)
O1—Eu1—O4	140.70 (11)	O3—Eu1—N1	126.06 (12)
O2—Eu1—O3	64.84 (10)	O3—Eu1—N2	79.59 (12)
O2—Eu1—O4	139.91 (10)	O4—Eu1—N1	77.35 (12)
O3—Eu1—O4	146.44 (11)	O4—Eu1—N2	96.70 (11)
O1—Eu1—N1	65.09 (12)	N1—Eu1—N2	60.42 (14)
O1—Eu1—N2	75.12 (11)		

Symmetry codes: (i) $-x+2, -y, -z+2$; (ii) $-x+2, -y+1, -z+2$.

Table 2
Hydrogen-bond geometry (Å, °).

D—H···A	D—H	H···A	D···A	D—H···A
C22—H22B···O4^{iii}	0.97	2.48	3.424 (7)	164
C12—H12···N4^{ii}	0.93	2.53	3.380 (8)	151
C12—H12···O6^{ii}	0.93	2.51	3.089 (7)	121
C10—H10···O1^{iv}	0.93	2.45	3.314 (7)	154
C1—H1···O5^{i}	0.93	2.41	3.121 (7)	134

Symmetry codes: (i) $-x+2, -y, -z+2$; (ii) $-x+2, -y+1, -z+2$; (iii) $x, y-1, z$; (iv) $-x+\frac{3}{2}, y+\frac{1}{2}, -z+\frac{3}{2}$.

Data collection: *APEX2* (Bruker, 2005); cell refinement: *SAINT* (Siemens, 1996); data reduction: *SAINT*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 1997); program(s) used to refine structure: *SHELXL97* (Sheldrick, 1997); molecular graphics: *SHELXTL* (Siemens, 1996); software used to prepare material for publication: *SHELXTL*.

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Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: AT2497).

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supplementary materials

Acta Cryst. (2007). E**63**, m3142-m3143 [**doi:10.1107/S1600536807060643**]

catena-Poly[[tetra-μ-anilinoacetato-bis(1,10-phenanthroline)dieuropium(III)]-di-μ-anilinoacetato]

H. Zhong, X.-M. Yang, S.-H. Duan and Y.-P. Hong

Comment

The crystal structure of $[RE_2(C_8H_8NO_2)_6(C_{12}H_8N_2)_2]_n$ (RE = Sm, Nd and La), (II), have previously been reported (Zhong *et al.*, 2007*a*,b,c). The crystal structure determination of the title compound, (I), has been carried out in order to elucidate the molecular conformation and to compare it with that of (II). We report herein the crystal structure of (I).

In the molecule of (I) (Fig. 1), the ligand bond lengths and angles are within normal ranges (Allen *et al.*, 1987). The title compound, $[Eu_2(C_8H_8NO_2)_6(C_{12}H_8N_2)_2]_n$, which are bridged by two terdentate, two bidentate and four mondentate carboxyl groups with an inversion centre between the two Eu^{III} ions. Each Eu atom is nine-coordinated by two N atoms of 1,10-phenanthroline (phen) ligand and seven O atoms of four anilinoacetate ligands (Table 1). The Eu—O and Eu bonds are in the range of [2.435 (3)–2.916 (4) Å] and [2.700 (4) to 2.776 (4) Å], respectively, as in (II).

In the crystal structure, C—H···N and C—H···O hydrogen bonds (Fig. 2 and Table 2) seem to be effective in the stabilization of the structure, resulting in the formation of a supramolecular network structure, as in (II).

The four compounds, (I) and (II), are isostructural.

Experimental

Crystals of the title compound were synthesized using hydrothermal method in a 23 ml Teflon-lined Parr bomb, which was then sealed. Europium (III) nitrate hexahydrate (206.7 mg, 0.5 mmol), phen (198 mg, 1 mmol), anilinoacetic acid (292.4 mg, 2 mmol), ammonia (0.5 mol/l, 4 ml) and distilled water (8 g) were placed into the bomb and sealed. The bomb was then heated under autogenous pressure up to 453 K over the course of 7 d and allowed to cool at room temperature for 24 h. Upon opening the bomb, a clear colorless solution was decanted from small colorless crystals. These crystals were washed with distilled water followed by ethanol, and allowed to air-dry at room temperature.

Refinement

H3A and H4A (for NH) were located in difference syntheses and refined isotropically [N—H = 0.78 (3) and 0.83 (6) Å, U_{iso}(H) = 0.07 (1) and 0.08 (2) Å^2]. The H atoms were positioned geometrically, with N—H = 0.86 Å (for NH) and C—H = 0.93 − 0.97 Å (for CH), and constrained to ride on their parent atoms, with U_{iso}(H) = xU_{eq}(C,*N*), where x = 1.2 for aromatic and NH H atoms and x = 1.5 for methyl H atoms.

Figures

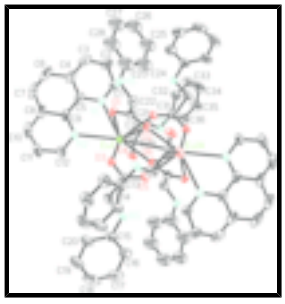

Fig. 1. The molecular structure of the title molecule, with the atom-numbering scheme. Displacement ellipsoids are drawn at the 30% probability level [symmetry code (A): 2 − *x*, −*y*, 2 − *z*]. All H atoms have been omitted for clarity.

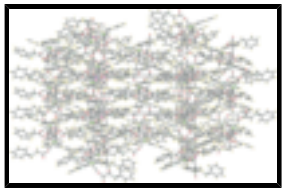

Fig. 2. A packing diagram of (I). Hydrogen bonds are shown as dashed lines.

catena-Poly[[tetra-μ-anilinoacetato-bis(1,10- phenanthroline)dieuropium(III)]-di-μ-anilinoacetato]

Crystal data

$[Eu_2(C_8H_8NO_2)_6(C_{12}H_8N_2)_2]$	F_{000} = 1576
M_r = 1565.26	D_x = 1.464 Mg m^{-3}
Monoclinic, $P2_1/n$	Mo $K\alpha$ radiation λ = 0.71073 Å
Hall symbol: -P 2yn	Cell parameters from 9044 reflections
a = 19.783 (2) Å	θ = 2.7–26.1°
b = 8.8013 (14) Å	μ = 1.82 mm^{-1}
c = 21.2014 (12) Å	T = 273 (2) K
β = 105.816 (5)°	Plane, colourless
V = 3551.8 (7) Å^3	0.34 × 0.12 × 0.09 mm
Z = 2	

Data collection

Bruker APEXII area-detector diffractometer	7520 independent reflections
Radiation source: fine-focus sealed tube	4961 reflections with $I > 2\sigma(I)$
Monochromator: graphite	R_{int} = 0.043
T = 273(2) K	θ_{max} = 27.0°
φ and ω scans	θ_{min} = 2.0°
Absorption correction: multi-scan (SADABS; Sheldrick, 1996)	h = −25→24
T_{min} = 0.581, T_{max} = 0.859	k = −10→11
27025 measured reflections	l = −26→26

Refinement

Refinement on F^2

Least-squares matrix: full

$R[F^2 > 2\sigma(F^2)] = 0.047$

$wR(F^2) = 0.127$

$S = 1.02$

7520 reflections

411 parameters

5 restraints

Primary atom site location: structure-invariant direct methods

Secondary atom site location: difference Fourier map

Hydrogen site location: inferred from neighbouring sites

H atoms treated by a mixture of independent and constrained refinement

$w = 1/[\sigma^2(F_o^2) + (0.0708P)^2 + 1.1179P]$ where $P = (F_o^2 + 2F_c^2)/3$

$(\Delta/\sigma)_{max} = 0.002$

$\Delta\rho_{max} = 1.49$ e Å^{-3}

$\Delta\rho_{min} = -0.85$ e Å^{-3}

Extinction correction: none

Special details

Geometry. All e.s.d.'s (except the e.s.d. in the dihedral angle between two l.s. planes) are estimated using the full covariance matrix. The cell e.s.d.'s are taken into account individually in the estimation of e.s.d.'s in distances, angles and torsion angles; correlations between e.s.d.'s in cell parameters are only used when they are defined by crystal symmetry. An approximate (isotropic) treatment of cell e.s.d.'s is used for estimating e.s.d.'s involving l.s. planes.

Refinement. Refinement of F^2 against ALL reflections. The weighted *R*-factor *wR* and goodness of fit *S* are based on F^2, conventional *R*-factors *R* are based on *F*, with *F* set to zero for negative F^2. The threshold expression of $F^2 > \sigma(F^2)$ is used only for calculating *R*-factors(gt) *etc*. and is not relevant to the choice of reflections for refinement. *R*-factors based on F^2 are statistically about twice as large as those based on *F*, and *R*- factors based on ALL data will be even larger.

Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å^2)

	x	*y*	*z*	U_{iso}*/U_{eq}
Eu1	0.931209 (13)	0.19067 (3)	0.964289 (11)	0.04106 (11)
O1	0.84657 (16)	−0.0352 (4)	0.91894 (16)	0.0422 (8)
O2	0.94691 (17)	−0.1382 (4)	0.97736 (16)	0.0476 (8)
O3	0.97044 (17)	0.0609 (4)	0.87446 (15)	0.0452 (8)
O4	0.93985 (18)	0.4212 (4)	1.03389 (15)	0.0448 (8)
O5	1.06684 (18)	−0.0828 (4)	0.92183 (16)	0.0473 (8)
O6	1.0076 (2)	0.6122 (4)	1.09116 (16)	0.0539 (9)
N1	0.7970 (2)	0.2338 (5)	0.9672 (2)	0.0455 (10)
N2	0.8341 (2)	0.3067 (4)	0.8547 (2)	0.0468 (10)
N3	1.1191 (2)	−0.0134 (6)	0.8228 (2)	0.0469 (11)
N5	0.7853 (2)	−0.3271 (4)	0.8984 (2)	0.0450 (10)
H5A	0.7628	−0.3417	0.8580	0.054*
N4	0.9877 (2)	0.5262 (5)	1.20640 (19)	0.0436 (10)
C1	0.7784 (3)	0.1908 (7)	1.0196 (3)	0.0620 (16)
H1	0.8133	0.1671	1.0576	0.074*
C2	0.7090 (3)	0.1799 (9)	1.0198 (4)	0.083 (2)

H2	0.6964	0.1530	1.0575	0.100*
C3	0.6584 (4)	0.2107 (9)	0.9612 (5)	0.092 (3)
H3	0.6113	0.1982	0.9599	0.110*
C4	0.6742 (3)	0.2585 (9)	0.9055 (4)	0.077 (2)
C5	0.7465 (3)	0.2678 (6)	0.9087 (3)	0.0507 (13)
C6	0.6224 (4)	0.2954 (11)	0.8388 (5)	0.109 (3)
H6	0.5746	0.2829	0.8343	0.131*
C7	0.6419 (4)	0.3435 (10)	0.7880 (4)	0.100 (3)
H7	0.6081	0.3710	0.7498	0.120*
C8	0.7132 (3)	0.3537 (8)	0.7907 (3)	0.0671 (18)
C9	0.7661 (3)	0.3098 (6)	0.8509 (3)	0.0499 (13)
C10	0.7359 (5)	0.4045 (8)	0.7374 (3)	0.087 (2)
H10	0.7036	0.4400	0.6998	0.104*
C11	0.8044 (5)	0.4017 (8)	0.7407 (3)	0.080 (2)
H11	0.8203	0.4321	0.7053	0.096*
C12	0.8528 (3)	0.3502 (7)	0.8007 (3)	0.0610 (15)
H12	0.9002	0.3468	0.8024	0.073*
C13	1.0285 (3)	0.0026 (6)	0.8770 (2)	0.0409 (11)
C14	1.0524 (3)	0.0510 (7)	0.8173 (3)	0.0512 (13)
H14A	1.0191	0.0160	0.7775	0.061*
H14B	1.0552	0.1609	0.8156	0.061*
C15	1.1463 (3)	0.0138 (7)	0.7702 (3)	0.0610 (15)
C16	1.2071 (3)	−0.0572 (9)	0.7757 (3)	0.0765 (19)
H16	1.2269	−0.1189	0.8116	0.092*
C17	1.2400 (4)	−0.0367 (10)	0.7266 (5)	0.093 (2)
H17	1.2830	−0.0833	0.7301	0.111*
C18	1.2100 (5)	0.0521 (10)	0.6723 (5)	0.106 (3)
H18	1.2330	0.0624	0.6397	0.128*
C19	1.1477 (5)	0.1245 (11)	0.6655 (4)	0.109 (3)
H19	1.1278	0.1841	0.6289	0.131*
C20	1.1147 (4)	0.1063 (9)	0.7152 (4)	0.083 (2)
H20	1.0722	0.1546	0.7124	0.100*
C21	0.8840 (3)	−0.1515 (6)	0.9389 (2)	0.0431 (12)
C22	0.8583 (3)	−0.3150 (6)	0.9197 (3)	0.0545 (14)
H22A	0.8780	−0.3501	0.8852	0.065*
H22B	0.8756	−0.3809	0.9573	0.065*
C23	0.7535 (7)	−0.3143 (10)	0.9462 (7)	0.1243 (16)
C24	0.7846 (6)	−0.2767 (10)	1.0124 (7)	0.1243 (16)
H24	0.8326	−0.2584	1.0277	0.149*
C25	0.7421 (6)	−0.2681 (11)	1.0536 (7)	0.1243 (16)
H25	0.7602	−0.2451	1.0978	0.149*
C26	0.6719 (6)	−0.2946 (10)	1.0268 (7)	0.1243 (16)
H26	0.6431	−0.2843	1.0547	0.149*
C27	0.6385 (6)	−0.3358 (10)	0.9615 (6)	0.1243 (16)
H27	0.5908	−0.3579	0.9476	0.149*
C28	0.6802 (6)	−0.3414 (10)	0.9198 (6)	0.1243 (16)
H28	0.6613	−0.3623	0.8755	0.149*
C29	0.9697 (3)	0.4996 (6)	1.0863 (2)	0.0417 (11)
C30	0.9484 (3)	0.4461 (7)	1.1474 (2)	0.0542 (14)

H30A	0.8986	0.4634	1.1408	0.065*
H30B	0.9570	0.3378	1.1533	0.065*
C31	0.9743 (3)	0.4892 (6)	1.2657 (2)	0.0521 (13)
C32	0.9280 (3)	0.3784 (9)	1.2720 (3)	0.0706 (18)
H32	0.9027	0.3236	1.2357	0.085*
C33	0.9196 (5)	0.3497 (12)	1.3341 (4)	0.109 (3)
H33	0.8893	0.2730	1.3393	0.130*
C34	0.9573 (5)	0.4368 (12)	1.3906 (3)	0.102 (3)
H34	0.9497	0.4196	1.4314	0.122*
C35	1.0033 (4)	0.5429 (9)	1.3832 (3)	0.086 (2)
H35	1.0284	0.5984	1.4193	0.103*
C36	1.0139 (3)	0.5704 (8)	1.3220 (3)	0.0705 (17)
H36	1.0470	0.6420	1.3177	0.085*
H4A	0.959 (3)	0.596 (6)	1.204 (3)	0.08 (2)*
H3A	1.1044 (17)	−0.091 (3)	0.8091 (16)	0.07 (1)*

Atomic displacement parameters (Å^2)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Eu1	0.04517 (16)	0.03736 (17)	0.03679 (15)	−0.00155 (12)	0.00464 (10)	0.00065 (11)
O1	0.0382 (17)	0.0343 (19)	0.0479 (19)	0.0005 (15)	0.0008 (14)	−0.0027 (15)
O2	0.0393 (18)	0.051 (2)	0.045 (2)	−0.0022 (16)	0.0000 (15)	0.0083 (16)
O3	0.050 (2)	0.049 (2)	0.0379 (18)	0.0054 (17)	0.0138 (15)	0.0020 (16)
O4	0.061 (2)	0.0342 (19)	0.0396 (18)	−0.0046 (16)	0.0139 (15)	−0.0048 (15)
O5	0.055 (2)	0.049 (2)	0.0406 (19)	0.0089 (17)	0.0176 (16)	0.0107 (16)
O6	0.074 (2)	0.050 (2)	0.039 (2)	−0.025 (2)	0.0186 (17)	−0.0034 (16)
N1	0.042 (2)	0.040 (2)	0.049 (3)	0.0031 (19)	0.0033 (19)	−0.0093 (19)
N2	0.057 (3)	0.039 (2)	0.036 (2)	0.003 (2)	−0.0015 (18)	0.0002 (18)
N3	0.047 (2)	0.054 (3)	0.045 (3)	0.006 (2)	0.022 (2)	0.010 (2)
N5	0.037 (2)	0.032 (2)	0.056 (3)	−0.0128 (17)	−0.0045 (18)	−0.0075 (18)
N4	0.061 (3)	0.043 (3)	0.028 (2)	−0.021 (2)	0.0151 (19)	−0.0060 (18)
C1	0.051 (3)	0.077 (5)	0.058 (4)	0.008 (3)	0.015 (3)	−0.002 (3)
C2	0.051 (4)	0.116 (7)	0.087 (5)	0.005 (4)	0.027 (4)	−0.010 (4)
C3	0.043 (4)	0.109 (7)	0.122 (7)	−0.006 (4)	0.020 (4)	−0.014 (5)
C4	0.046 (3)	0.085 (5)	0.083 (5)	0.008 (3)	−0.009 (3)	−0.021 (4)
C5	0.048 (3)	0.035 (3)	0.062 (4)	0.007 (2)	0.002 (3)	−0.011 (2)
C6	0.049 (4)	0.146 (9)	0.107 (7)	0.017 (5)	−0.021 (4)	−0.027 (6)
C7	0.075 (5)	0.115 (7)	0.078 (5)	0.039 (5)	−0.031 (4)	−0.015 (5)
C8	0.067 (4)	0.068 (4)	0.046 (4)	0.018 (3)	−0.018 (3)	−0.010 (3)
C9	0.054 (3)	0.033 (3)	0.050 (3)	0.006 (2)	−0.009 (2)	−0.003 (2)
C10	0.113 (6)	0.070 (5)	0.050 (4)	0.018 (4)	−0.024 (4)	−0.001 (3)
C11	0.116 (6)	0.074 (5)	0.038 (3)	−0.002 (4)	0.002 (3)	0.009 (3)
C12	0.075 (4)	0.055 (4)	0.046 (3)	−0.002 (3)	0.004 (3)	0.010 (3)
C13	0.050 (3)	0.034 (3)	0.038 (3)	−0.008 (2)	0.011 (2)	−0.004 (2)
C14	0.060 (3)	0.051 (3)	0.045 (3)	0.007 (3)	0.018 (2)	0.011 (2)
C15	0.064 (4)	0.069 (4)	0.057 (4)	−0.009 (3)	0.029 (3)	0.000 (3)
C16	0.072 (4)	0.094 (5)	0.074 (4)	0.005 (4)	0.037 (4)	0.001 (4)
C17	0.082 (5)	0.097 (6)	0.117 (6)	−0.008 (5)	0.057 (5)	−0.010 (5)

C18	0.138 (8)	0.085 (6)	0.133 (8)	−0.018 (6)	0.101 (7)	−0.001 (6)
C19	0.148 (8)	0.115 (7)	0.092 (6)	0.021 (6)	0.078 (6)	0.035 (5)
C20	0.096 (5)	0.089 (5)	0.082 (5)	0.004 (4)	0.056 (4)	0.023 (4)
C21	0.043 (3)	0.052 (3)	0.031 (2)	−0.007 (2)	0.004 (2)	−0.005 (2)
C22	0.057 (3)	0.043 (3)	0.059 (3)	0.003 (3)	0.007 (3)	−0.008 (3)
C23	0.132 (4)	0.090 (3)	0.174 (5)	0.015 (3)	0.082 (4)	0.031 (3)
C24	0.132 (4)	0.090 (3)	0.174 (5)	0.015 (3)	0.082 (4)	0.031 (3)
C25	0.132 (4)	0.090 (3)	0.174 (5)	0.015 (3)	0.082 (4)	0.031 (3)
C26	0.132 (4)	0.090 (3)	0.174 (5)	0.015 (3)	0.082 (4)	0.031 (3)
C27	0.132 (4)	0.090 (3)	0.174 (5)	0.015 (3)	0.082 (4)	0.031 (3)
C28	0.132 (4)	0.090 (3)	0.174 (5)	0.015 (3)	0.082 (4)	0.031 (3)
C29	0.055 (3)	0.032 (3)	0.039 (3)	−0.001 (2)	0.013 (2)	0.004 (2)
C30	0.070 (3)	0.054 (3)	0.040 (3)	−0.021 (3)	0.017 (2)	−0.007 (2)
C31	0.068 (3)	0.054 (3)	0.034 (3)	−0.002 (3)	0.014 (2)	0.004 (2)
C32	0.071 (4)	0.094 (5)	0.049 (3)	−0.031 (4)	0.020 (3)	−0.002 (3)
C33	0.122 (7)	0.142 (8)	0.078 (5)	−0.050 (6)	0.053 (5)	0.001 (5)
C34	0.114 (6)	0.151 (8)	0.047 (4)	−0.030 (6)	0.035 (4)	0.003 (5)
C35	0.106 (5)	0.106 (6)	0.041 (3)	−0.021 (5)	0.013 (3)	−0.010 (4)
C36	0.082 (4)	0.075 (5)	0.051 (3)	−0.019 (4)	0.013 (3)	−0.010 (3)

Geometric parameters (Å, °)

Eu1—O1	2.608 (3)	C10—C11	1.337 (10)
Eu1—O2^{i}	2.435 (3)	C10—H10	0.9300
Eu1—O2	2.916 (4)	C11—C12	1.441 (8)
Eu1—O3	2.518 (3)	C11—H11	0.9300
Eu1—O4	2.487 (3)	C12—H12	0.9300
Eu1—O5^{i}	2.585 (3)	C13—C14	1.528 (7)
Eu1—O6^{ii}	2.576 (3)	C14—H14A	0.9700
Eu1—N1	2.700 (4)	C14—H14B	0.9700
Eu1—N2	2.776 (4)	C15—C16	1.332 (9)
Eu1—Eu1^{i}	4.3265 (7)	C15—C20	1.420 (9)
O1—C21	1.267 (6)	C16—C17	1.382 (10)
O2—C21	1.293 (6)	C16—H16	0.9300
O2—Eu1^{i}	2.435 (3)	C17—C18	1.384 (12)
O3—C13	1.245 (6)	C17—H17	0.9300
O4—C29	1.304 (6)	C18—C19	1.361 (12)
O5—C13	1.284 (6)	C18—H18	0.9300
O5—Eu1^{i}	2.585 (3)	C19—C20	1.391 (9)
O6—C29	1.230 (6)	C19—H19	0.9300
O6—Eu1^{ii}	2.576 (3)	C20—H20	0.9300
N1—C1	1.317 (7)	C21—C22	1.544 (7)
N1—C5	1.395 (7)	C22—H22A	0.9700
N2—C9	1.325 (7)	C22—H22B	0.9700
N2—C12	1.350 (7)	C23—C24	1.410 (17)
N3—C15	1.386 (7)	C23—C28	1.426 (16)
N3—C14	1.411 (6)	C24—C25	1.368 (14)
N3—H3A	0.78 (3)	C24—H24	0.9300

N5—C23	1.337 (12)	C25—C26	1.371 (16)
N5—C22	1.393 (7)	C25—H25	0.9300
N5—H5A	0.8600	C26—C27	1.410 (16)
N4—C31	1.392 (6)	C26—H26	0.9300
N4—C30	1.461 (6)	C27—C28	1.364 (13)
N4—H4A	0.83 (6)	C27—H27	0.9300
C1—C2	1.379 (9)	C28—H28	0.9300
C1—H1	0.9300	C29—C30	1.541 (7)
C2—C3	1.393 (12)	C30—H30A	0.9700
C2—H2	0.9300	C30—H30B	0.9700
C3—C4	1.369 (12)	C31—C32	1.369 (8)
C3—H3	0.9300	C31—C36	1.428 (8)
C4—C5	1.414 (9)	C32—C33	1.394 (9)
C4—C6	1.538 (11)	C32—H32	0.9300
C5—C9	1.431 (8)	C33—C34	1.445 (11)
C6—C7	1.309 (13)	C33—H33	0.9300
C6—H6	0.9300	C34—C35	1.344 (10)
C7—C8	1.398 (11)	C34—H34	0.9300
C7—H7	0.9300	C35—C36	1.390 (9)
C8—C10	1.399 (10)	C35—H35	0.9300
C8—C9	1.466 (7)	C36—H36	0.9300
O1—Eu1—O2	47.12 (9)	C5—C9—C8	121.2 (5)
O1—Eu1—O3	71.02 (11)	C11—C10—C8	119.7 (6)
O1—Eu1—O4	140.70 (11)	C11—C10—H10	120.1
O2—Eu1—O3	64.84 (10)	C8—C10—H10	120.1
O2—Eu1—O4	139.91 (10)	C10—C11—C12	118.2 (7)
O3—Eu1—O4	146.44 (11)	C10—C11—H11	120.9
O1—Eu1—N1	65.09 (12)	C12—C11—H11	120.9
O1—Eu1—N2	75.12 (11)	N2—C12—C11	124.6 (6)
O2—Eu1—N1	102.55 (12)	N2—C12—H12	117.7
O2—Eu1—N2	118.44 (11)	C11—C12—H12	117.7
O3—Eu1—N1	126.06 (12)	O3—C13—O5	128.7 (4)
O3—Eu1—N2	79.59 (12)	O3—C13—C14	109.8 (4)
O4—Eu1—N1	77.35 (12)	O5—C13—C14	121.4 (4)
O4—Eu1—N2	96.70 (11)	N3—C14—C13	108.3 (4)
N1—Eu1—N2	60.42 (14)	N3—C14—H14A	110.0
$O2^{i}$—Eu1—O4	87.41 (12)	C13—C14—H14A	110.0
$O2^{i}$—Eu1—O3	80.31 (11)	N3—C14—H14B	110.0
$O2^{i}$—Eu1—$O6^{ii}$	80.57 (12)	C13—C14—H14B	110.0
O4—Eu1—$O6^{ii}$	75.90 (11)	H14A—C14—H14B	108.4
O3—Eu1—$O6^{ii}$	71.35 (11)	C16—C15—N3	112.8 (6)
$O2^{i}$—Eu1—$O5^{i}$	72.25 (11)	C16—C15—C20	121.8 (6)
O4—Eu1—$O5^{i}$	76.37 (11)	N3—C15—C20	125.4 (6)
O3—Eu1—$O5^{i}$	127.64 (11)	C15—C16—C17	118.1 (7)
$O6^{ii}$—Eu1—$O5^{i}$	141.68 (11)	C15—C16—H16	120.9
$O2^{i}$—Eu1—O1	119.34 (12)	C17—C16—H16	120.9

O6^{ii}—Eu1—O1	132.82 (11)	C16—C17—C18	121.2 (7)
O5^{i}—Eu1—O1	84.78 (11)	C16—C17—H17	119.4
O2^{i}—Eu1—N1	149.20 (12)	C18—C17—H17	119.4
O6^{ii}—Eu1—N1	120.21 (14)	C19—C18—C17	121.5 (7)
O5^{i}—Eu1—N1	78.16 (12)	C19—C18—H18	119.2
O2^{i}—Eu1—N2	149.19 (13)	C17—C18—H18	119.2
O6^{ii}—Eu1—N2	70.99 (13)	C18—C19—C20	117.6 (8)
O5^{i}—Eu1—N2	138.42 (12)	C18—C19—H19	121.2
O2^{i}—Eu1—O2	72.45 (13)	C20—C19—H19	121.2
O6^{ii}—Eu1—O2	131.37 (11)	C19—C20—C15	119.7 (7)
O5^{i}—Eu1—O2	64.69 (10)	C19—C20—H20	120.1
O2^{i}—Eu1—Eu1^{i}	39.99 (9)	C15—C20—H20	120.1
O4—Eu1—Eu1^{i}	119.35 (8)	O1—C21—O2	120.8 (5)
O3—Eu1—Eu1^{i}	67.59 (8)	O1—C21—C22	122.9 (4)
O6^{ii}—Eu1—Eu1^{i}	110.69 (9)	O2—C21—C22	116.3 (5)
O5^{i}—Eu1—Eu1^{i}	62.63 (7)	N5—C22—C21	113.3 (4)
O1—Eu1—Eu1^{i}	79.46 (7)	N5—C22—H22A	108.9
N1—Eu1—Eu1^{i}	129.05 (10)	C21—C22—H22A	108.9
N2—Eu1—Eu1^{i}	143.56 (8)	N5—C22—H22B	108.9
O2—Eu1—Eu1^{i}	32.46 (6)	C21—C22—H22B	108.9
C21—O1—Eu1	103.5 (3)	H22A—C22—H22B	107.7
C21—O2—Eu1^{i}	162.2 (4)	N5—C23—C24	127.4 (11)
C21—O2—Eu1	88.3 (3)	N5—C23—C28	109.1 (12)
Eu1^{i}—O2—Eu1	107.55 (13)	C24—C23—C28	123.5 (11)
C13—O3—Eu1	128.7 (3)	C25—C24—C23	118.1 (12)
C29—O4—Eu1	151.5 (3)	C25—C24—H24	121.0
C13—O5—Eu1^{i}	139.5 (3)	C23—C24—H24	121.0
C29—O6—Eu1^{ii}	148.9 (3)	C24—C25—C26	117.2 (13)
C1—N1—C5	120.9 (5)	C24—C25—H25	121.4
C1—N1—Eu1	118.7 (4)	C26—C25—H25	121.4
C5—N1—Eu1	118.7 (3)	C25—C26—C27	126.9 (11)
C9—N2—C12	116.9 (5)	C25—C26—H26	116.5
C9—N2—Eu1	121.1 (3)	C27—C26—H26	116.5
C12—N2—Eu1	121.8 (4)	C28—C27—C26	116.2 (12)
C15—N3—C14	115.1 (4)	C28—C27—H27	121.9
C15—N3—H3A	92 (3)	C26—C27—H27	121.9
C14—N3—H3A	95 (3)	C27—C28—C23	118.0 (13)
C23—N5—C22	114.0 (7)	C27—C28—H28	121.0
C23—N5—H5A	123.0	C23—C28—H28	121.0
C22—N5—H5A	123.0	O6—C29—O4	128.5 (4)
C31—N4—C30	118.2 (4)	O6—C29—C30	118.4 (4)
C31—N4—H4A	86 (5)	O4—C29—C30	113.0 (4)
C30—N4—H4A	96 (5)	N4—C30—C29	111.7 (4)
N1—C1—C2	122.0 (6)	N4—C30—H30A	109.3

N1—C1—H1	119.0	C29—C30—H30A	109.3
C2—C1—H1	119.0	N4—C30—H30B	109.3
C1—C2—C3	117.2 (7)	C29—C30—H30B	109.3
C1—C2—H2	121.4	H30A—C30—H30B	107.9
C3—C2—H2	121.4	C32—C31—N4	123.5 (5)
C4—C3—C2	123.5 (6)	C32—C31—C36	120.3 (5)
C4—C3—H3	118.3	N4—C31—C36	116.2 (5)
C2—C3—H3	118.3	C32—C31—H4A	122 (3)
C3—C4—C5	116.2 (6)	C36—C31—H4A	109 (2)
C3—C4—C6	127.3 (7)	C31—C32—C33	118.4 (6)
C5—C4—C6	116.4 (8)	C31—C32—H32	120.8
N1—C5—C4	120.0 (6)	C33—C32—H32	120.8
N1—C5—C9	121.3 (5)	C32—C33—C34	121.3 (7)
C4—C5—C9	118.6 (6)	C32—C33—H33	119.4
C7—C6—C4	123.5 (8)	C34—C33—H33	119.4
C7—C6—H6	118.2	C35—C34—C33	119.0 (6)
C4—C6—H6	118.2	C35—C34—H34	120.5
C6—C7—C8	120.5 (7)	C33—C34—H34	120.5
C6—C7—H7	119.8	C34—C35—C36	120.6 (7)
C8—C7—H7	119.8	C34—C35—H35	119.7
C7—C8—C10	122.0 (7)	C36—C35—H35	119.7
C7—C8—C9	119.5 (7)	C35—C36—C31	120.3 (6)
C10—C8—C9	118.5 (6)	C35—C36—H36	119.8
N2—C9—C5	116.8 (4)	C31—C36—H36	119.8
N2—C9—C8	122.0 (6)		

Symmetry codes: (i) −*x*+2, −*y*, −*z*+2; (ii) −*x*+2, −*y*+1, −*z*+2.

Hydrogen-bond geometry (Å, °)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
C22—H22B···O4^{iii}	0.97	2.48	3.424 (7)	164
C12—H12···N4^{ii}	0.93	2.53	3.380 (8)	151
C12—H12···O6^{ii}	0.93	2.51	3.089 (7)	121
C10—H10···O1^{iv}	0.93	2.45	3.314 (7)	154
C1—H1···O5^{i}	0.93	2.41	3.121 (7)	134

Symmetry codes: (iii) *x*, *y*−1, *z*; (ii) −*x*+2, −*y*+1, −*z*+2; (iv) −*x*+3/2, *y*+1/2, −*z*+3/2; (i) −*x*+2, −*y*, −*z*+2.

Fig. 1

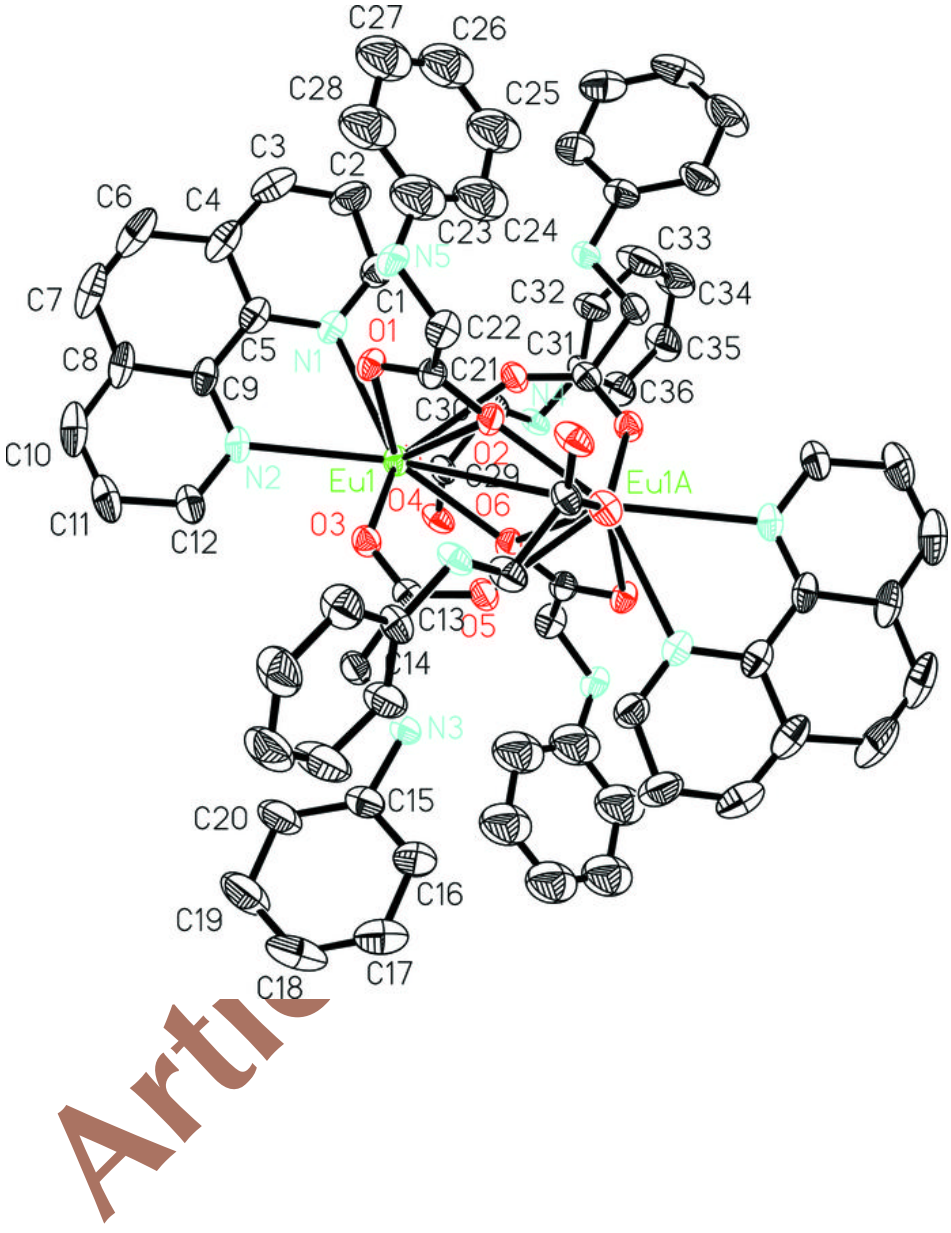
C27
C26
C28
C25
C3
C2
C6
C4
C23
C24
C33
N5
C7
C1
C32
C34
O1
C22
C5
N1
C31
C35
C8
C21
C9
C36
C30
N4
C10
O2
N2
Eu1
C29
Eu1A
O4
O6
C11
C12
O3
C13
O5
C14
N3
C15
C20
C16
C19
C17
C18

Fig. 2