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Bis[2-hydroxy-*N*′-(2-hydroxybenzoyl)-benzohydrazitato]dipyridinecadmium(II)

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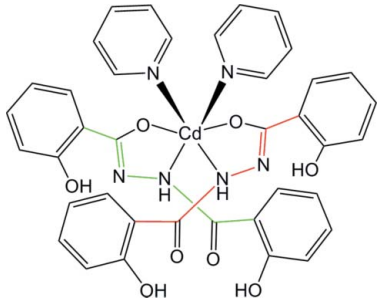
Key indicators: single-crystal X-ray study; T = 298 K; mean σ(C–C) = 0.006 Å; R factor = 0.027; wR factor = 0.071; data-to-parameter ratio = 13.1.

The title complex, $[Cd(C_{14}H_{11}N_2O_4)_2(C_5H_5N)_2]$, exhibits crystallographic twofold symmetry. The Cd^{II} atom is located on the twofold rotation axis and reveals a slightly distorted octahedral coordination defined by four atoms (N_2O_2) from two symmetry-related chelate ligands and two pyridine N atoms. Intramolecular O—H···O and N—H···O hydrogen bonds stabilize the molecular conformation while intermolecular O—H···O hydrogen bonding links molecules into a triad, generating a helix along the threefold screw axis.

Related literature

Three manganese metallacrowns with unsymmetrical aroylhydrazine ligands were synthesized and reported by Dou *et al.* (2006) and John *et al.* (2006). For the crystal structure of an iron compound with *N*,*N*′-bis-picolinoyl hydrazine, see: Bernhardt *et al.* (2005). For a nickel complex formed by *N*,*N*′-disalicyloylhydrazine, see: Chen *et al.* (2007).



Experimental

Crystal data

$[Cd(C_{14}H_{11}N_2O_4)_2(C_5H_5N)_2]$
M_r = 813.10
Trigonal, $P3_121$
a = 13.0380 (10) Å
c = 18.069 (3) Å
V = 2660.0 (5) Å^3
Z = 3
Mo $K\alpha$ radiation
μ = 0.68 mm^{-1}
T = 298 (2) K
0.40 × 0.38 × 0.35 mm

Data collection

Bruker SMART 1000 CCD area-detector diffractometer
Absorption correction: multi-scan (*SADABS*; Sheldrick, 1996)
T_{min} = 0.773, T_{max} = 0.797
13955 measured reflections
3146 independent reflections
2750 reflections with $I > 2\sigma(I)$
R_{int} = 0.033

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.027
$wR(F^2)$ = 0.071
S = 1.00
3146 reflections
241 parameters
H-atom parameters constrained
$\Delta\rho_{max}$ = 0.90 e Å^{-3}
$\Delta\rho_{min}$ = −0.32 e Å^{-3}
Absolute structure: Flack (1983), 1353 Friedel pairs
Flack parameter: −0.06 (3)

Table 1
Selected bond lengths (Å).

Cd1—N1	2.331 (3)	Cd1—O1	2.389 (2)
Cd1—N3	2.337 (3)		

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

D—H···A	D—H	H···A	D···A	D—H···A
O4—H4···O3	0.82	1.92	2.638 (4)	145
N2—H2···O2	0.86	1.94	2.624 (4)	135
O2—H2*A*···O3^{i}	0.82	1.88	2.639 (3)	153

Symmetry code: (i) $x-y, -y, -z+\frac{5}{3}$.

Data collection: *SMART* (Siemens, 1996); cell refinement: *SAINT* (Siemens, 1996); data reduction: *SAINT*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 2008); program(s) used to refine structure: *SHELXL97* (Sheldrick, 2008); molecular graphics: *SHELXTL* (Sheldrick, 2008); 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: KP2188).

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supporting information

Acta Cryst. (2008). E**64**, m1466 [doi:10.1107/S1600536808034533]

Bis[2-hydroxy-*N*′-(2-hydroxybenzoyl)benzohydrazitato]dipyridinecadmium(II)

Yu-Ting Chen and Da-Cheng Li

S1. Comment

Metal complexes with aroylhydrazine ligands are of increasing attention due to their interesting chemical activities (John *et al.* 2006; Dou *et al.*, 2006). However, the research on the compounds with symmetrical diaroylhydrazine ligands was limited (Bernhardt *et al.*, 2005; Chen *et al.*, 2007). As an extension of our work on the structural characterization of these compounds, the title complex, (I), is synthesized and characterized by X-ray structure analysis. The complex (I) exhibits a twofold rotation symmetry. It comprises of one Cd^{II} atom at special position at the twofold rotation axes coordinated by two ligands and two pyridines (Fig. 1 and Table 1). Each ligand acts as the bidentate via the iminoacyl groups forming two five-membered rings around metal ion with the dihedral angle of 59.71 (4)°.

Intramolecular O4—H4···O3 and N2—H2···O2 hydrogen bonds stabilizes the molecular conformation. There is also an intermolecular hydrogen bond O—H···O hydrogen bond [2.639 (3) Å] (Table 2) assembling three molecules into a triad, that is a basic structural element of a helix along [0 0 1] direction (Fig. 2).

S2. Experimental

The solution of $Cd(NO_3)_24H_2O$ (0.123 g, 0.4 mmol) in methanol (10 mL) was added to the mixture of 1,2-disalicyloylhydrazine (0.054 g, 0.2 mmol) and sodium hydroxide (0.032 g, 0.8 mmol) in pyridine (10 mL). A colourless solution was generated after stirring for two hours at room temperature. The solution was allowed to stand for 2 weeks, whereupon white block crystals were obtained. Yield: 0.058 g, 77%. m. p.> 573 K. Anal. for $C_{38}H_{32}CdN_6O_8$: Calc. C, 56.08; H, 3.93; N, 10.33; Found: C, 56.54; H, 3.71; N, 10.54%. The No. of CCDC: 686345.

S3. Refinement

All H atoms were placed in geometrically idealized positions and treated as riding on their parent atoms with C(sp_2 hybrid)-H distances of 0.93Å (U_{iso}(H)=1.2U_{eq}(C)).

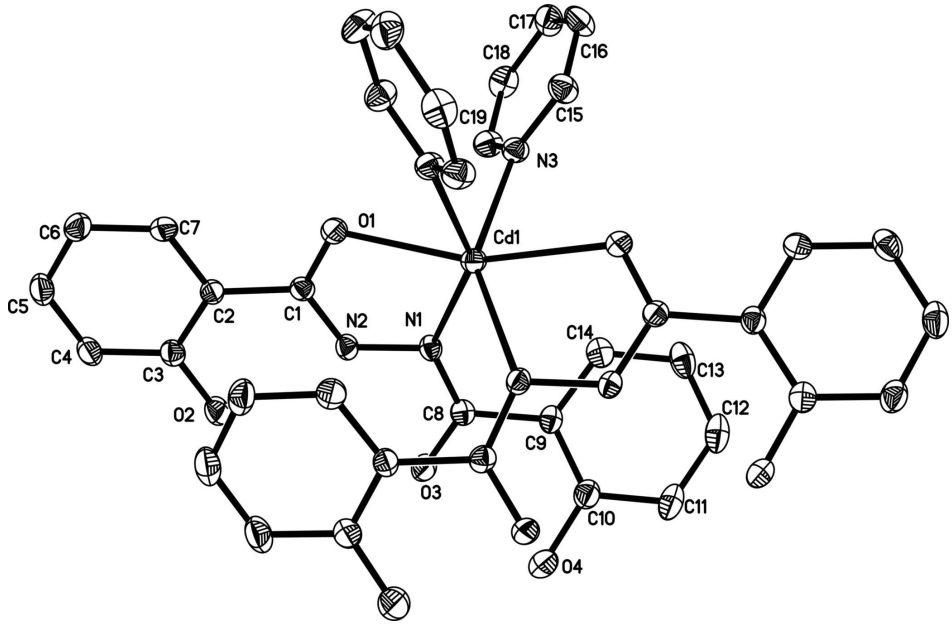

Figure 1

The molecular structure of the title complex. Displacement ellipsoids are drawn at the 30% probability level.

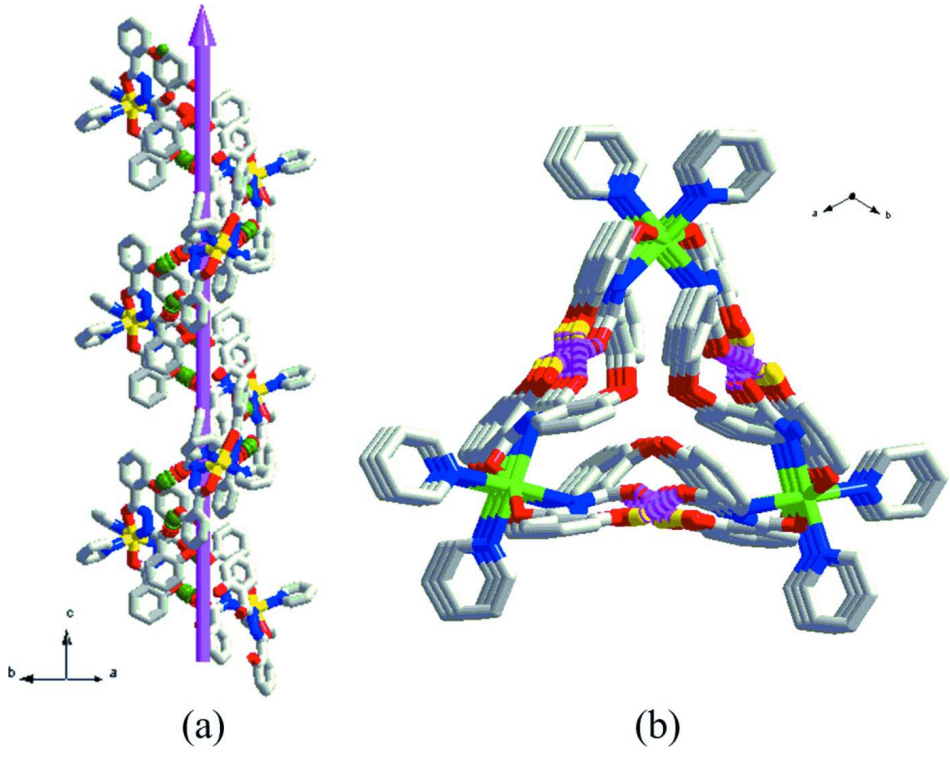

Figure 2

Supramolecular structure of the title complex in the direction [001].

Bis[2-hydroxy-N′-(2-hydroxybenzoyl)benzohydrazitato]dipyridinecadmium(II)

Crystal data

$[Cd(C_{14}H_{11}N_2O_4)_2(C_5H_5N)_2]$
$M_r = 813.10$
Trigonal, $P3_121$
$a = 13.038$ (1) Å
$c = 18.069$ (3) Å
$V = 2660.0$ (5) Å^3
$Z = 3$
$F(000) = 1242$
$D_x = 1.523$ Mg m^{-3}
Mo $K\alpha$ radiation, $\lambda = 0.71073$ Å
Cell parameters from 5141 reflections
$\theta = 2.9$–$22.9°$
$\mu = 0.68$ mm^{-1}
$T = 298$ K
Block, colourless
0.40 × 0.38 × 0.35 mm

Data collection

Bruker SMART 1000 CCD area-detector diffractometer
Radiation source: fine-focus sealed tube
Graphite monochromator
φ and ω scans
Absorption correction: multi-scan (*SADABS*; Sheldrick, 1996)
$T_{min} = 0.773$, $T_{max} = 0.797$
13955 measured reflections
3146 independent reflections
2750 reflections with $I > 2\sigma(I)$
$R_{int} = 0.033$
$\theta_{max} = 25.0°$, $\theta_{min} = 1.8°$
$h = -15 \rightarrow 15$
$k = -15 \rightarrow 15$
$l = -21 \rightarrow 10$

Refinement

Refinement on F^2
Least-squares matrix: full
$R[F^2 > 2\sigma(F^2)] = 0.027$
$wR(F^2) = 0.071$
$S = 1.00$
3146 reflections
241 parameters
0 restraints
Primary atom site location: structure-invariant direct methods
Secondary atom site location: difference Fourier map
Hydrogen site location: inferred from neighbouring sites
H-atom parameters constrained
$w = 1/[\sigma^2(F_o^2) + (0.041P)^2 + 0.5675P]$ where $P = (F_o^2 + 2F_c^2)/3$
$(\Delta/\sigma)_{max} < 0.001$
$\Delta\rho_{max} = 0.90$ e Å^{-3}
$\Delta\rho_{min} = -0.32$ e Å^{-3}
Absolute structure: Flack (1983), 1353 Friedel pairs
Absolute structure parameter: −0.06 (3)

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 (Å²)

	x	*y*	*z*	U_{iso}*/U_{eq}
Cd1	1.0000	0.45722 (2)	0.6667	0.04088 (11)
N1	0.8620 (2)	0.2612 (2)	0.69499 (15)	0.0387 (7)
N2	0.8356 (3)	0.2467 (3)	0.77051 (14)	0.0406 (6)
H2	0.8005	0.1771	0.7897	0.049*

N3	0.8726 (2)	0.5186 (3)	0.61934 (16)	0.0449 (7)
O1	0.9119 (2)	0.4418 (2)	0.78506 (13)	0.0517 (7)
O2	0.7567 (3)	0.1137 (2)	0.88928 (14)	0.0584 (7)
H2A	0.7290	0.0561	0.9170	0.088*
O3	0.8013 (3)	0.06392 (19)	0.69676 (12)	0.0558 (6)
O4	0.9060 (3)	0.0079 (3)	0.59233 (16)	0.0797 (10)
H4	0.8760	0.0022	0.6331	0.120*
C1	0.8648 (3)	0.3405 (3)	0.81227 (18)	0.0391 (8)
C2	0.8409 (3)	0.3228 (3)	0.89327 (19)	0.0403 (8)
C3	0.7918 (3)	0.2136 (4)	0.9296 (2)	0.0454 (9)
C4	0.7786 (4)	0.2086 (4)	1.0058 (2)	0.0548 (10)
H4A	0.7467	0.1360	1.0298	0.066*
C5	0.8122 (4)	0.3102 (4)	1.0464 (2)	0.0614 (11)
H5	0.8012	0.3053	1.0974	0.074*
C6	0.8618 (4)	0.4184 (4)	1.0120 (2)	0.0556 (10)
H6	0.8858	0.4872	1.0393	0.067*
C7	0.8753 (3)	0.4233 (3)	0.9357 (2)	0.0477 (9)
H7	0.9085	0.4965	0.9123	0.057*
C8	0.8396 (3)	0.1621 (3)	0.66318 (18)	0.0402 (8)
C9	0.8647 (3)	0.1680 (3)	0.58281 (18)	0.0415 (8)
C10	0.9002 (4)	0.0938 (4)	0.5519 (2)	0.0547 (10)
C11	0.9321 (4)	0.1039 (4)	0.4769 (2)	0.0687 (13)
H11	0.9592	0.0562	0.4568	0.082*
C12	0.9225 (4)	0.1852 (4)	0.4338 (2)	0.0673 (12)
H12	0.9435	0.1926	0.3841	0.081*
C13	0.8832 (4)	0.2547 (4)	0.4624 (2)	0.0629 (12)
H13	0.8754	0.3080	0.4320	0.075*
C14	0.8542 (3)	0.2472 (4)	0.5364 (2)	0.0516 (9)
H14	0.8274	0.2958	0.5555	0.062*
C15	0.9145 (4)	0.6185 (4)	0.5806 (2)	0.0550 (10)
H15	0.9942	0.6587	0.5675	0.066*
C16	0.8437 (4)	0.6645 (4)	0.5591 (2)	0.0636 (12)
H16	0.8760	0.7358	0.5334	0.076*
C17	0.7270 (4)	0.6045 (4)	0.5759 (2)	0.0627 (12)
H17	0.6777	0.6335	0.5616	0.075*
C18	0.6827 (3)	0.5002 (4)	0.6144 (2)	0.0591 (11)
H18	0.6026	0.4570	0.6263	0.071*
C19	0.7572 (3)	0.4610 (3)	0.6349 (2)	0.0535 (9)
H19	0.7262	0.3903	0.6612	0.064*

Atomic displacement parameters (Å²)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Cd1	0.0445 (2)	0.03796 (14)	0.04239 (18)	0.02224 (11)	0.00869 (17)	0.00434 (9)
N1	0.0392 (17)	0.0368 (16)	0.0340 (15)	0.0144 (14)	0.0019 (12)	0.0033 (12)
N2	0.0437 (16)	0.0396 (16)	0.0347 (15)	0.0179 (13)	0.0072 (13)	0.0058 (14)
N3	0.0448 (18)	0.0430 (17)	0.0494 (17)	0.0236 (15)	0.0064 (13)	0.0045 (14)
O1	0.0692 (18)	0.0398 (14)	0.0459 (15)	0.0271 (13)	0.0147 (13)	0.0067 (12)

O2	0.080 (2)	0.0438 (15)	0.0434 (15)	0.0254 (14)	0.0077 (13)	0.0107 (13)
O3	0.0734 (19)	0.0376 (13)	0.0493 (14)	0.0223 (15)	0.0222 (15)	0.0080 (11)
O4	0.118 (3)	0.081 (2)	0.066 (2)	0.070 (2)	0.0278 (19)	0.0082 (17)
C1	0.0388 (19)	0.041 (2)	0.041 (2)	0.0226 (17)	0.0035 (16)	0.0036 (17)
C2	0.042 (2)	0.049 (2)	0.0364 (18)	0.0282 (17)	0.0029 (15)	0.0027 (16)
C3	0.044 (2)	0.056 (2)	0.042 (2)	0.0290 (18)	0.0009 (16)	0.0031 (18)
C4	0.065 (3)	0.066 (3)	0.042 (2)	0.040 (2)	0.0030 (19)	0.012 (2)
C5	0.074 (3)	0.092 (4)	0.037 (2)	0.055 (3)	0.005 (2)	0.006 (2)
C6	0.064 (3)	0.073 (3)	0.048 (2)	0.048 (2)	−0.0070 (19)	−0.011 (2)
C7	0.055 (2)	0.049 (2)	0.049 (2)	0.0344 (19)	0.0047 (17)	0.0020 (17)
C8	0.0341 (18)	0.0382 (17)	0.0420 (17)	0.0133 (15)	0.0033 (15)	0.0030 (14)
C9	0.038 (2)	0.0391 (17)	0.0363 (16)	0.0113 (17)	0.0027 (16)	−0.0017 (13)
C10	0.063 (3)	0.049 (2)	0.047 (2)	0.025 (2)	0.005 (2)	−0.0025 (18)
C11	0.077 (3)	0.076 (3)	0.046 (2)	0.033 (3)	0.011 (2)	−0.011 (2)
C12	0.065 (3)	0.073 (3)	0.039 (2)	0.016 (2)	0.004 (2)	−0.006 (2)
C13	0.065 (3)	0.061 (2)	0.040 (2)	0.014 (2)	−0.010 (2)	0.0026 (18)
C14	0.047 (2)	0.044 (2)	0.050 (2)	0.0129 (17)	−0.0035 (18)	−0.0011 (19)
C15	0.050 (2)	0.056 (2)	0.060 (3)	0.027 (2)	0.0090 (18)	0.012 (2)
C16	0.069 (3)	0.067 (3)	0.062 (2)	0.040 (2)	0.007 (2)	0.025 (2)
C17	0.065 (3)	0.088 (3)	0.053 (2)	0.051 (3)	−0.006 (2)	0.002 (2)
C18	0.041 (2)	0.074 (3)	0.062 (3)	0.028 (2)	−0.0012 (19)	−0.007 (2)
C19	0.048 (2)	0.044 (2)	0.063 (2)	0.0198 (19)	0.0099 (19)	0.0037 (19)

Geometric parameters (Å, º)

Cd1—N1	2.331 (3)	C5—H5	0.9300
Cd1—N1^{i}	2.331 (3)	C6—C7	1.387 (5)
Cd1—N3^{i}	2.337 (3)	C6—H6	0.9300
Cd1—N3	2.337 (3)	C7—H7	0.9300
Cd1—O1	2.389 (2)	C8—C9	1.482 (4)
Cd1—O1^{i}	2.389 (2)	C9—C10	1.382 (5)
N1—C8	1.307 (4)	C9—C14	1.389 (5)
N1—N2	1.397 (4)	C10—C11	1.404 (5)
N2—C1	1.320 (4)	C11—C12	1.371 (6)
N2—H2	0.8600	C11—H11	0.9300
N3—C15	1.332 (5)	C12—C13	1.346 (6)
N3—C19	1.333 (5)	C12—H12	0.9300
O1—C1	1.245 (4)	C13—C14	1.380 (5)
O2—C3	1.357 (4)	C13—H13	0.9300
O2—H2A	0.8200	C14—H14	0.9300
O3—C8	1.271 (4)	C15—C16	1.385 (6)
O4—C10	1.371 (5)	C15—H15	0.9300
O4—H4	0.8200	C16—C17	1.352 (6)
C1—C2	1.490 (5)	C16—H16	0.9300
C2—C7	1.385 (5)	C17—C18	1.372 (6)
C2—C3	1.399 (5)	C17—H17	0.9300
C3—C4	1.384 (5)	C18—C19	1.356 (6)
C4—C5	1.380 (6)	C18—H18	0.9300

C4—H4A	0.9300	C19—H19	0.9300
C5—C6	1.372 (6)		

N1—Cd1—N1^{i}	89.45 (14)	C5—C6—C7	118.8 (4)
N1—Cd1—N3^{i}	145.80 (9)	C5—C6—H6	120.6
N1^{i}—Cd1—N3^{i}	99.48 (10)	C7—C6—H6	120.6
N1—Cd1—N3	99.48 (10)	C2—C7—C6	122.2 (4)
N1^{i}—Cd1—N3	145.80 (9)	C2—C7—H7	118.9
N3^{i}—Cd1—N3	91.48 (14)	C6—C7—H7	118.9
N1—Cd1—O1	68.64 (9)	O3—C8—N1	124.5 (3)
N1^{i}—Cd1—O1	125.88 (9)	O3—C8—C9	119.0 (3)
N3^{i}—Cd1—O1	79.62 (9)	N1—C8—C9	116.4 (3)
N3—Cd1—O1	87.84 (9)	C10—C9—C14	117.9 (3)
N1—Cd1—O1^{i}	125.88 (9)	C10—C9—C8	120.1 (3)
N1^{i}—Cd1—O1^{i}	68.64 (9)	C14—C9—C8	121.9 (3)
N3^{i}—Cd1—O1^{i}	87.84 (9)	O4—C10—C9	122.1 (3)
N3—Cd1—O1^{i}	79.62 (9)	O4—C10—C11	117.1 (4)
O1—Cd1—O1^{i}	162.04 (12)	C9—C10—C11	120.7 (4)
C8—N1—N2	112.2 (3)	C12—C11—C10	118.9 (4)
C8—N1—Cd1	131.0 (2)	C12—C11—H11	120.5
N2—N1—Cd1	111.44 (19)	C10—C11—H11	120.5
C1—N2—N1	119.7 (3)	C13—C12—C11	121.0 (4)
C1—N2—H2	120.1	C13—C12—H12	119.5
N1—N2—H2	120.1	C11—C12—H12	119.5
C15—N3—C19	117.2 (3)	C12—C13—C14	120.4 (4)
C15—N3—Cd1	120.9 (2)	C12—C13—H13	119.8
C19—N3—Cd1	121.7 (2)	C14—C13—H13	119.8
C1—O1—Cd1	113.9 (2)	C13—C14—C9	120.9 (4)
C3—O2—H2A	109.5	C13—C14—H14	119.6
C10—O4—H4	109.5	C9—C14—H14	119.6
O1—C1—N2	121.1 (3)	N3—C15—C16	122.3 (4)
O1—C1—C2	120.4 (3)	N3—C15—H15	118.8
N2—C1—C2	118.5 (3)	C16—C15—H15	118.8
C7—C2—C3	118.0 (3)	C17—C16—C15	119.2 (4)
C7—C2—C1	117.0 (3)	C17—C16—H16	120.4
C3—C2—C1	124.9 (3)	C15—C16—H16	120.4
O2—C3—C4	121.0 (4)	C16—C17—C18	118.8 (4)
O2—C3—C2	119.2 (3)	C16—C17—H17	120.6
C4—C3—C2	119.8 (4)	C18—C17—H17	120.6
C5—C4—C3	120.8 (4)	C19—C18—C17	119.1 (4)
C5—C4—H4A	119.6	C19—C18—H18	120.5
C3—C4—H4A	119.6	C17—C18—H18	120.5
C6—C5—C4	120.4 (4)	N3—C19—C18	123.3 (4)
C6—C5—H5	119.8	N3—C19—H19	118.3
C4—C5—H5	119.8	C18—C19—H19	118.3

N1^{i}—Cd1—N1—C8	−39.3 (3)	C7—C2—C3—C4	0.2 (5)
N3^{i}—Cd1—N1—C8	−145.5 (3)	C1—C2—C3—C4	177.0 (4)

N3—Cd1—N1—C8	107.5 (3)	O2—C3—C4—C5	−178.7 (4)
O1—Cd1—N1—C8	−168.6 (3)	C2—C3—C4—C5	0.7 (6)
O1^{i}—Cd1—N1—C8	23.6 (3)	C3—C4—C5—C6	−1.4 (6)
N1^{i}—Cd1—N1—N2	112.3 (2)	C4—C5—C6—C7	1.2 (6)
N3^{i}—Cd1—N1—N2	6.1 (3)	C3—C2—C7—C6	−0.4 (5)
N3—Cd1—N1—N2	−100.9 (2)	C1—C2—C7—C6	−177.5 (3)
O1—Cd1—N1—N2	−17.02 (19)	C5—C6—C7—C2	−0.3 (6)
O1^{i}—Cd1—N1—N2	175.09 (18)	N2—N1—C8—O3	−1.8 (5)
C8—N1—N2—C1	172.8 (3)	Cd1—N1—C8—O3	149.6 (3)
Cd1—N1—N2—C1	15.7 (3)	N2—N1—C8—C9	180.0 (3)
N1—Cd1—N3—C15	−164.9 (3)	Cd1—N1—C8—C9	−28.6 (4)
N1^{i}—Cd1—N3—C15	−61.7 (4)	O3—C8—C9—C10	−30.0 (5)
N3^{i}—Cd1—N3—C15	47.6 (3)	N1—C8—C9—C10	148.3 (3)
O1—Cd1—N3—C15	127.1 (3)	O3—C8—C9—C14	150.3 (4)
O1^{i}—Cd1—N3—C15	−39.9 (3)	N1—C8—C9—C14	−31.4 (5)
N1—Cd1—N3—C19	20.6 (3)	C14—C9—C10—O4	−175.9 (4)
N1^{i}—Cd1—N3—C19	123.8 (3)	C8—C9—C10—O4	4.4 (6)
N3^{i}—Cd1—N3—C19	−126.9 (3)	C14—C9—C10—C11	4.1 (6)
O1—Cd1—N3—C19	−47.3 (3)	C8—C9—C10—C11	−175.6 (4)
O1^{i}—Cd1—N3—C19	145.6 (3)	O4—C10—C11—C12	177.2 (4)
N1—Cd1—O1—C1	19.5 (2)	C9—C10—C11—C12	−2.9 (7)
N1^{i}—Cd1—O1—C1	−53.3 (3)	C10—C11—C12—C13	−0.1 (7)
N3^{i}—Cd1—O1—C1	−147.5 (3)	C11—C12—C13—C14	1.6 (7)
N3—Cd1—O1—C1	120.5 (2)	C12—C13—C14—C9	−0.2 (6)
O1^{i}—Cd1—O1—C1	166.0 (2)	C10—C9—C14—C13	−2.6 (5)
Cd1—O1—C1—N2	−19.3 (4)	C8—C9—C14—C13	177.1 (3)
Cd1—O1—C1—C2	160.3 (2)	C19—N3—C15—C16	2.3 (6)
N1—N2—C1—O1	2.6 (5)	Cd1—N3—C15—C16	−172.4 (3)
N1—N2—C1—C2	−177.0 (3)	N3—C15—C16—C17	−2.1 (6)
O1—C1—C2—C7	−1.1 (5)	C15—C16—C17—C18	0.6 (6)
N2—C1—C2—C7	178.5 (3)	C16—C17—C18—C19	0.5 (6)
O1—C1—C2—C3	−178.0 (3)	C15—N3—C19—C18	−1.2 (6)
N2—C1—C2—C3	1.6 (5)	Cd1—N3—C19—C18	173.5 (3)
C7—C2—C3—O2	179.6 (3)	C17—C18—C19—N3	−0.2 (7)
C1—C2—C3—O2	−3.5 (5)		

Symmetry code: (i) −*x*+2, −*x*+*y*+1, −*z*+4/3.

Hydrogen-bond geometry (Å, º)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
O4—H4···O3	0.82	1.92	2.638 (4)	145
N2—H2···O2	0.86	1.94	2.624 (4)	135
O2—H2*A*···O3^{ii}	0.82	1.88	2.639 (3)	153

Symmetry code: (ii) *x*−*y*, −*y*, −*z*+5/3.