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(μ-3,4:9,10:17,18:23,24-Tetrabenzo-1,12,15,26-tetraaza-5,8,19,22-tetraoxacyclooctacosane-κ^4N^1,N^{26}:N^{12},N^{15})bis[aquadichloridocopper(II)]

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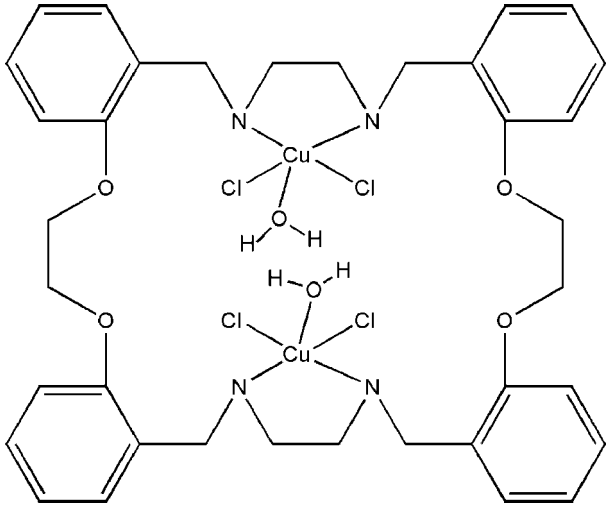
Key indicators: single-crystal X-ray study; T = 293 K; mean σ(C–C) = 0.009 Å; R factor = 0.048; wR factor = 0.142; data-to-parameter ratio = 14.1.

In the title compound, $[Cu_2Cl_4(C_{36}H_{44}N_4O_4)(H_2O)_2]$, the dinuclear complex molecule lies on an inversion centre. Each Cu^{II} atom shows a tetragonal–pyramidal coordination geometry formed by two Cl atoms, two N atoms from the macrocyclic ligand and one water molecule. The coordinated water molecules are hydrogen-bonded to the Cl atoms in adjacent molecules, generating a one-dimensional structure.

Related literature

For related literature, see: Adam *et al.* (1981); Barczyński *et al.* (2007); Davis *et al.* (1995); Higa *et al.* (2007); Jiang *et al.* (2007); Michalska *et al.* (2007); Zhou *et al.* (2007).



Experimental

Crystal data

$[Cu_2Cl_4(C_{36}H_{44}N_4O_4)(H_2O)_2]$
M_r = 901.66
Monoclinic, $P2_1/n$
a = 13.193 (1) Å
b = 8.4530 (8) Å
c = 17.913 (2) Å
β = 98.211 (2)°
V = 1977.2 (3) Å^3
Z = 2
Mo $K\alpha$ radiation
μ = 1.40 mm^{-1}
T = 293 (2) K
0.45 × 0.36 × 0.24 mm

Data collection

Bruker SMART APEX CCD area-detector diffractometer
Absorption correction: multi-scan (*SADABS*; Sheldrick, 1996)
T_{min} = 0.55, T_{max} = 0.72
9616 measured reflections
3493 independent reflections
2151 reflections with $I > 2\sigma(I)$
R_{int} = 0.062

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.048
$wR(F^2)$ = 0.142
S = 1.01
3493 reflections
247 parameters
2 restraints
H atoms treated by a mixture of independent and constrained refinement
$\Delta\rho_{max}$ = 0.47 e Å^{-3}
$\Delta\rho_{min}$ = −0.46 e Å^{-3}

Table 1
Selected geometric parameters (Å, °).

Cu1—N1	2.035 (4)	Cu1—O1*W*	2.303 (4)
Cu1—N2	2.044 (4)	Cu1—Cl2	2.3078 (15)
Cu1—Cl1	2.2964 (15)		
N1—Cu1—N2	84.17 (17)	Cl1—Cu1—O1*W*	96.31 (11)
N1—Cu1—Cl1	164.46 (13)	N1—Cu1—Cl2	88.39 (12)
N2—Cu1—Cl1	90.30 (13)	N2—Cu1—Cl2	169.54 (13)
N1—Cu1—O1*W*	98.39 (16)	Cl1—Cu1—Cl2	94.99 (5)
N2—Cu1—O1*W*	92.11 (16)	O1*W*—Cu1—Cl2	96.26 (11)

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

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
O1*W*—H1*B*···Cl1^{i}	1.00 (4)	2.22 (5)	3.152 (4)	155 (5)
O1*W*—H1*A*···Cl2^{i}	0.81 (4)	2.47 (5)	3.215 (4)	154 (6)

Symmetry code: (i) $-x+1, -y+2, -z+1$.

Data collection: *SMART* (Bruker, 1997); cell refinement: *SAINT* (Bruker, 1999); data reduction: *SAINT*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 1997); program(s) used to refine structure: *SHELXL97* (Sheldrick, 1997); molecular graphics: *SHELXTL-Plus* (Siemens, 1990); software used to prepare material for publication: *SHELXL97*.

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Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: HY2086).

  doi:10.1107/S1600536807047678

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supplementary materials

Acta Cryst. (2007). E**63**, m2652-m2653 [**doi:10.1107/S1600536807047678**]

(*μ*-3,4:9,10:17,18:23,24-Tetrabenzo-1,12,15,26-tetraaza-5,8,19,22-tetraoxacyclooctacosane-$\kappa^4N^1,N^{26}:N^{12},N^{15}$)bis[aquadichloridocopper(II)]

Z.-F. Jia, J.-F. Ma, L.-P. Zhang and T.-T. Han

Comment

The use of macrocyclic ligands for the formation of selective metal complex has received considerable attention over many years (Davis *et al.*, 1995). The method for the synthesis of the title complex has been reported (Adam *et al.*, 1981). However, to the best of our knowledge, the crystal structure has not been reported yet.

The molecule of the title compound is composed of two Cu^{II} atoms, four Cl^- atoms, a 3,4:9,10:17,18:23,24-tetrabenzo-1,12,15,26-tetraaza- 5,8,19,22-tetraoxacyclooctacosane (*L*) ligand and two water molecules (Fig.1). It is a centrosymmetric molecule. Each Cu^{II} atom shows a tetragonal-pyramidal coordination geometry, formed by two Cl^- atoms, two N atoms from *L* and one water molecule. The bond distances and angles show normal values (Table 1) (Higa *et al.*, 2007; Jiang *et al.*, 2007; Michalska *et al.*, 2007; Zhou *et al.*, 2007). There are hydrogen-bonding interactions in the crystal structure. As shown in Fig. 2 and in Table 2, there are two O—H···Cl hydrogen bonds between the water molecule and Cl^- atoms, leading to a one-dimensional supramolecular structure (Barczyński *et al.*, 2007).

Experimental

L (0.100 g, 0.17 mmol) dissolved in hot ethanol (15 ml) was added to a solution of $CuCl_2·2H_2O$ (0.030 g, 0.17 mmol) in hot water (10 ml). After stirring for 30 min, the mixture was filtered. Blue single crystals of the title compound were obtained after several days at room temperature.

Refinement

All H atoms bound to C atoms were positioned geometrically and refined as riding, with C—H = 0.93Å (CH) and 0.97Å (CH_2) and $U_{iso}(H) = 1.2U_{eq}(C)$. The H atoms bound to N atoms and belonging to water molecule were located in a difference Fourier map and refined with $U_{iso}(H) = 1.4U_{eq}(N)$ and $U_{iso}(H) = 1.3U_{eq}(O)$, respectively.

Figures

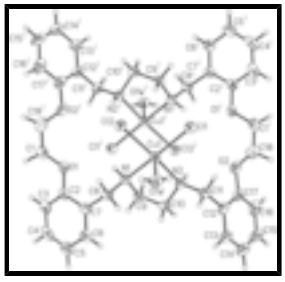

Fig. 1. Molecular structure of the title compound. Displacement ellipsoids are drawn at the 30% probability level. [Symmetry code: (i) $1-x, 1-y, 1-z$.]

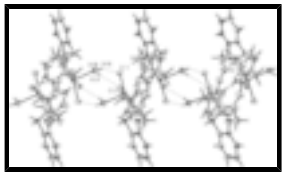

Fig. 2. One-dimensional structure in the title compound. Hydrogen bonds are shown as dashed lines. Displacement ellipsoids are drawn at the 30% probability level.

(μ-3,4:9,10:17,18:23,24-Tetrabenzo-1,12,15,26-tetraaza-5,8,19,22- tetraoxacyclooctacosane-κ^4*N*^{1},*N*^{26}:*N*^{12},*N*^{15})bis[aquadichloridocopper(II)]

Crystal data

$[Cu_2Cl_4(C_{36}H_{44}N_4O_4)(H_2O)_2]$	F_{000} = 932
M_r = 901.66	D_x = 1.515 Mg m^{-3}
Monoclinic, $P2_1/n$	Mo $K\alpha$ radiation λ = 0.71073 Å
Hall symbol: -P 2yn	Cell parameters from 3493 reflections
a = 13.193 (1) Å	θ = 1.8–25.1º
b = 8.4530 (8) Å	μ = 1.40 mm^{-1}
c = 17.913 (2) Å	*T* = 293 (2) K
β = 98.211 (2)º	Block, blue
V = 1977.2 (3) Å^3	0.45 × 0.36 × 0.24 mm
Z = 2	

Data collection

Bruker SMART APEX CCD area-detector diffractometer	3493 independent reflections
Radiation source: fine-focus sealed tube	2151 reflections with $I > 2\sigma(I)$
Monochromator: graphite	R_{int} = 0.062
T = 293(2) K	θ_{max} = 25.1º
φ and ω scans	θ_{min} = 1.8º
Absorption correction: multi-scan (SADABS; Sheldrick, 1996)	*h* = −15→14
T_{min} = 0.55, T_{max} = 0.72	*k* = −10→9
9616 measured reflections	*l* = −10→21

Refinement

Refinement on F^2	Secondary atom site location: difference Fourier map
Least-squares matrix: full	Hydrogen site location: inferred from neighbouring sites
$R[F^2 > 2\sigma(F^2)]$ = 0.048	H atoms treated by a mixture of independent and constrained refinement
$wR(F^2)$ = 0.142	$w = 1/[\sigma^2(F_o^2) + (0.0678P)^2]$ where $P = (F_o^2 + 2F_c^2)/3$
S = 1.01	$(\Delta/\sigma)_{max} < 0.001$
3493 reflections	$\Delta\rho_{max}$ = 0.47 e Å^{-3}

247 parameters	$\Delta\rho_{min} = -0.46$ e Å^{-3}
2 restraints	Extinction correction: none
Primary atom site location: structure-invariant direct methods	

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.

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

	x	*y*	*z*	U_{iso}*/U_{eq}
Cu1	0.44875 (4)	0.70615 (7)	0.52017 (3)	0.0447 (2)
C1	0.2640 (5)	0.4791 (7)	0.2253 (3)	0.0617 (15)
H7A	0.2055	0.5058	0.1883	0.074*
H7B	0.2647	0.3652	0.2320	0.074*
C2	0.1616 (4)	0.5391 (6)	0.3202 (3)	0.0517 (14)
C3	0.0785 (5)	0.4584 (7)	0.2829 (4)	0.0673 (17)
H4	0.0833	0.4084	0.2373	0.081*
C4	−0.0119 (5)	0.4520 (8)	0.3135 (5)	0.084 (2)
H3	−0.0670	0.3950	0.2887	0.101*
C5	−0.0218 (5)	0.5281 (9)	0.3794 (4)	0.085 (2)
H2	−0.0832	0.5243	0.3992	0.103*
C6	0.0609 (4)	0.6105 (8)	0.4161 (4)	0.0679 (17)
H1	0.0542	0.6631	0.4607	0.082*
C7	0.1536 (4)	0.6171 (6)	0.3884 (3)	0.0521 (14)
C8	0.2442 (4)	0.7015 (6)	0.4312 (3)	0.0506 (13)
H16A	0.2763	0.7660	0.3964	0.061*
H16B	0.2207	0.7715	0.4680	0.061*
C9	0.2833 (4)	0.4900 (6)	0.5276 (3)	0.0559 (15)
H17A	0.3217	0.3918	0.5332	0.067*
H17B	0.2117	0.4646	0.5118	0.067*
C10	0.2949 (4)	0.5753 (7)	0.6006 (3)	0.0566 (15)
H18A	0.2786	0.5053	0.6402	0.068*
H18B	0.2484	0.6647	0.5974	0.068*
C11	0.5860 (4)	0.2581 (6)	0.3172 (3)	0.0560 (15)
H15A	0.5168	0.2164	0.3097	0.067*
H15B	0.6327	0.1700	0.3288	0.067*
C12	0.6074 (5)	0.3359 (7)	0.2453 (3)	0.0585 (15)
C13	0.6979 (5)	0.3074 (8)	0.2161 (4)	0.0751 (19)
H14	0.7472	0.2411	0.2420	0.090*
C14	0.7156 (6)	0.3762 (10)	0.1493 (4)	0.088 (2)
H13	0.7751	0.3525	0.1293	0.106*
C15	0.6462 (7)	0.4785 (10)	0.1127 (4)	0.096 (3)
H12	0.6601	0.5272	0.0688	0.116*

C16	0.5547 (6)	0.5120 (8)	0.1396 (4)	0.083 (2)
H11	0.5073	0.5818	0.1142	0.099*
C17	0.5361 (5)	0.4361 (7)	0.2071 (3)	0.0638 (17)
C18	0.3590 (5)	0.5285 (7)	0.1969 (3)	0.0703 (18)
H8A	0.3551	0.5001	0.1441	0.084*
H8B	0.3665	0.6424	0.2010	0.084*
N1	0.3214 (3)	0.5906 (5)	0.4705 (2)	0.0453 (11)
N2	0.4025 (3)	0.6311 (5)	0.6184 (3)	0.0472 (11)
O1	0.2538 (3)	0.5538 (4)	0.2951 (2)	0.0561 (10)
O2	0.4457 (3)	0.4535 (5)	0.2392 (2)	0.0693 (11)
O1W	0.3772 (3)	0.9524 (4)	0.5303 (2)	0.0613 (11)
Cl1	0.60735 (10)	0.76791 (17)	0.58394 (8)	0.0568 (4)
Cl2	0.49428 (10)	0.74432 (16)	0.40179 (8)	0.0546 (4)
H1C	0.336 (4)	0.521 (6)	0.434 (3)	0.065*
H2C	0.437 (4)	0.555 (6)	0.631 (3)	0.065*
H1A	0.411 (4)	1.010 (7)	0.560 (3)	0.082*
H1B	0.361 (4)	1.029 (6)	0.488 (3)	0.082*

Atomic displacement parameters (Å^2)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Cu1	0.0428 (4)	0.0478 (4)	0.0444 (4)	−0.0036 (3)	0.0096 (3)	−0.0014 (3)
C1	0.066 (4)	0.062 (4)	0.053 (4)	0.007 (3)	−0.006 (3)	−0.004 (3)
C2	0.043 (3)	0.052 (3)	0.057 (4)	0.001 (3)	−0.002 (3)	0.007 (3)
C3	0.064 (4)	0.058 (4)	0.073 (4)	−0.007 (3)	−0.013 (4)	−0.001 (3)
C4	0.049 (4)	0.086 (5)	0.106 (6)	−0.013 (3)	−0.024 (4)	0.025 (5)
C5	0.052 (4)	0.113 (6)	0.090 (6)	−0.010 (4)	0.006 (4)	0.024 (5)
C6	0.055 (4)	0.085 (5)	0.062 (4)	0.008 (3)	0.006 (3)	0.009 (3)
C7	0.043 (3)	0.056 (3)	0.057 (4)	0.000 (3)	0.005 (3)	0.007 (3)
C8	0.049 (3)	0.052 (3)	0.051 (3)	0.004 (3)	0.008 (3)	−0.003 (3)
C9	0.049 (3)	0.059 (4)	0.058 (4)	−0.008 (3)	0.005 (3)	0.001 (3)
C10	0.052 (3)	0.066 (4)	0.053 (4)	−0.011 (3)	0.012 (3)	0.002 (3)
C11	0.057 (3)	0.058 (4)	0.056 (3)	−0.004 (3)	0.018 (3)	−0.005 (3)
C12	0.071 (4)	0.061 (4)	0.046 (3)	−0.016 (3)	0.019 (3)	−0.009 (3)
C13	0.069 (4)	0.094 (5)	0.069 (4)	−0.022 (4)	0.033 (4)	−0.023 (4)
C14	0.089 (6)	0.100 (6)	0.084 (6)	−0.027 (5)	0.045 (5)	−0.027 (5)
C15	0.116 (7)	0.111 (7)	0.076 (5)	−0.043 (5)	0.062 (5)	−0.016 (5)
C16	0.114 (6)	0.075 (5)	0.061 (4)	−0.023 (4)	0.018 (4)	0.006 (4)
C17	0.081 (5)	0.061 (4)	0.053 (4)	−0.018 (3)	0.021 (4)	−0.013 (3)
C18	0.096 (5)	0.057 (4)	0.060 (4)	0.001 (4)	0.016 (4)	0.001 (3)
N1	0.040 (2)	0.052 (3)	0.043 (3)	−0.002 (2)	0.005 (2)	0.002 (2)
N2	0.049 (3)	0.047 (3)	0.048 (3)	−0.006 (2)	0.015 (2)	−0.005 (2)
O1	0.056 (2)	0.062 (2)	0.049 (2)	−0.0024 (18)	0.002 (2)	−0.0123 (19)
O2	0.076 (3)	0.087 (3)	0.048 (2)	0.007 (2)	0.019 (2)	0.006 (2)
O1W	0.065 (3)	0.055 (3)	0.068 (3)	−0.003 (2)	0.022 (2)	−0.006 (2)
Cl1	0.0484 (8)	0.0649 (9)	0.0568 (8)	−0.0073 (6)	0.0069 (7)	−0.0017 (7)
Cl2	0.0542 (8)	0.0645 (9)	0.0464 (7)	−0.0070 (6)	0.0121 (7)	0.0024 (7)

Geometric parameters (Å, °)

Cu1—N1	2.035 (4)	C9—H17B	0.9700
Cu1—N2	2.044 (4)	C10—N2	1.486 (6)
Cu1—Cl1	2.2964 (15)	C10—H18A	0.9700
Cu1—O1W	2.303 (4)	C10—H18B	0.9700
Cu1—Cl2	2.3078 (15)	C11—N2^{i}	1.477 (7)
C1—O1	1.425 (6)	C11—C12	1.507 (7)
C1—C18	1.479 (7)	C11—H15A	0.9700
C1—H7A	0.9700	C11—H15B	0.9700
C1—H7B	0.9700	C12—C17	1.373 (8)
C2—O1	1.362 (6)	C12—C13	1.392 (7)
C2—C3	1.380 (7)	C13—C14	1.381 (9)
C2—C7	1.406 (7)	C13—H14	0.9300
C3—C4	1.382 (8)	C14—C15	1.357 (10)
C3—H4	0.9300	C14—H13	0.9300
C4—C5	1.368 (9)	C15—C16	1.391 (9)
C4—H3	0.9300	C15—H12	0.9300
C5—C6	1.379 (9)	C16—C17	1.421 (8)
C5—H2	0.9300	C16—H11	0.9300
C6—C7	1.385 (7)	C17—O2	1.403 (6)
C6—H1	0.9300	C18—O2	1.427 (7)
C7—C8	1.504 (7)	C18—H8A	0.9700
C8—N1	1.485 (6)	C18—H8B	0.9700
C8—H16A	0.9700	N1—H1C	0.93 (5)
C8—H16B	0.9700	N2—C11^{i}	1.477 (7)
C9—N1	1.474 (6)	N2—H2C	0.80 (5)
C9—C10	1.481 (7)	O1W—H1A	0.81 (4)
C9—H17A	0.9700	O1W—H1B	1.00 (4)
N1—Cu1—N2	84.17 (17)	N2—C10—H18B	110.0
N1—Cu1—Cl1	164.46 (13)	H18A—C10—H18B	108.3
N2—Cu1—Cl1	90.30 (13)	N2^{i}—C11—C12	112.3 (4)
N1—Cu1—O1W	98.39 (16)	N2^{i}—C11—H15A	109.1
N2—Cu1—O1W	92.11 (16)	C12—C11—H15A	109.1
Cl1—Cu1—O1W	96.31 (11)	N2^{i}—C11—H15B	109.1
N1—Cu1—Cl2	88.39 (12)	C12—C11—H15B	109.1
N2—Cu1—Cl2	169.54 (13)	H15A—C11—H15B	107.9
Cl1—Cu1—Cl2	94.99 (5)	C17—C12—C13	118.9 (6)
O1W—Cu1—Cl2	96.26 (11)	C17—C12—C11	119.7 (5)
O1—C1—C18	111.6 (5)	C13—C12—C11	121.4 (6)
O1—C1—H7A	109.3	C14—C13—C12	120.9 (7)
C18—C1—H7A	109.3	C14—C13—H14	119.6
O1—C1—H7B	109.3	C12—C13—H14	119.6
C18—C1—H7B	109.3	C15—C14—C13	120.1 (7)
H7A—C1—H7B	108.0	C15—C14—H13	120.0
O1—C2—C3	124.9 (6)	C13—C14—H13	120.0
O1—C2—C7	115.1 (5)	C14—C15—C16	121.4 (7)

C3—C2—C7	120.0 (5)	C14—C15—H12	119.3
C2—C3—C4	119.9 (6)	C16—C15—H12	119.3
C2—C3—H4	120.0	C15—C16—C17	117.8 (7)
C4—C3—H4	120.0	C15—C16—H11	121.1
C5—C4—C3	121.2 (7)	C17—C16—H11	121.1
C5—C4—H3	119.4	C12—C17—O2	115.0 (5)
C3—C4—H3	119.4	C12—C17—C16	120.9 (6)
C4—C5—C6	118.8 (6)	O2—C17—C16	124.2 (6)
C4—C5—H2	120.6	O2—C18—C1	110.3 (5)
C6—C5—H2	120.6	O2—C18—H8A	109.6
C5—C6—C7	122.0 (6)	C1—C18—H8A	109.6
C5—C6—H1	119.0	O2—C18—H8B	109.6
C7—C6—H1	119.0	C1—C18—H8B	109.6
C6—C7—C2	118.1 (5)	H8A—C18—H8B	108.1
C6—C7—C8	121.0 (5)	C9—N1—C8	114.5 (4)
C2—C7—C8	120.8 (5)	C9—N1—Cu1	108.4 (3)
N1—C8—C7	112.5 (4)	C8—N1—Cu1	111.8 (3)
N1—C8—H16A	109.1	C9—N1—H1C	105 (3)
C7—C8—H16A	109.1	C8—N1—H1C	105 (3)
N1—C8—H16B	109.1	Cu1—N1—H1C	112 (3)
C7—C8—H16B	109.1	$C11^{i}$—N2—C10	110.9 (4)
H16A—C8—H16B	107.8	$C11^{i}$—N2—Cu1	117.8 (3)
N1—C9—C10	109.2 (4)	C10—N2—Cu1	107.9 (3)
N1—C9—H17A	109.8	$C11^{i}$—N2—H2C	107 (4)
C10—C9—H17A	109.8	C10—N2—H2C	107 (4)
N1—C9—H17B	109.8	Cu1—N2—H2C	106 (4)
C10—C9—H17B	109.8	C2—O1—C1	116.7 (4)
H17A—C9—H17B	108.3	C17—O2—C18	119.5 (5)
C9—C10—N2	108.6 (4)	Cu1—O1W—H1A	113 (5)
C9—C10—H18A	110.0	Cu1—O1W—H1B	125 (3)
N2—C10—H18A	110.0	H1A—O1W—H1B	99 (5)
C9—C10—H18B	110.0		
O1—C2—C3—C4	−179.6 (5)	C10—C9—N1—C8	−86.8 (5)
C7—C2—C3—C4	−1.2 (8)	C10—C9—N1—Cu1	38.8 (5)
C2—C3—C4—C5	1.8 (10)	C7—C8—N1—C9	−61.3 (6)
C3—C4—C5—C6	−0.9 (11)	C7—C8—N1—Cu1	175.0 (3)
C4—C5—C6—C7	−0.6 (10)	N2—Cu1—N1—C9	−13.3 (3)
C5—C6—C7—C2	1.1 (9)	Cl1—Cu1—N1—C9	56.3 (6)
C5—C6—C7—C8	−177.2 (6)	O1W—Cu1—N1—C9	−104.6 (3)
O1—C2—C7—C6	178.3 (5)	Cl2—Cu1—N1—C9	159.3 (3)
C3—C2—C7—C6	−0.3 (8)	N2—Cu1—N1—C8	113.8 (3)
O1—C2—C7—C8	−3.3 (7)	Cl1—Cu1—N1—C8	−176.5 (3)
C3—C2—C7—C8	178.1 (5)	O1W—Cu1—N1—C8	22.5 (3)
C6—C7—C8—N1	103.8 (6)	Cl2—Cu1—N1—C8	−73.6 (3)
C2—C7—C8—N1	−74.6 (6)	C9—C10—N2—$C11^{i}$	169.4 (4)
N1—C9—C10—N2	−52.1 (6)	C9—C10—N2—Cu1	39.0 (5)
$N2^{i}$—C11—C12—C17	−75.4 (7)	N1—Cu1—N2—$C11^{i}$	−140.6 (4)

N2^{i}—C11—C12—C13	105.2 (6)	Cl1—Cu1—N2—C11^{i}	54.0 (4)
C17—C12—C13—C14	−1.0 (9)	O1W—Cu1—N2—C11^{i}	−42.3 (4)
C11—C12—C13—C14	178.4 (6)	Cl2—Cu1—N2—C11^{i}	174.5 (5)
C12—C13—C14—C15	2.8 (10)	N1—Cu1—N2—C10	−14.1 (3)
C13—C14—C15—C16	−2.4 (11)	Cl1—Cu1—N2—C10	−179.5 (3)
C14—C15—C16—C17	0.3 (10)	O1W—Cu1—N2—C10	84.2 (3)
C13—C12—C17—O2	177.9 (5)	Cl2—Cu1—N2—C10	−59.0 (9)
C11—C12—C17—O2	−1.5 (8)	C3—C2—O1—C1	−0.2 (7)
C13—C12—C17—C16	−1.1 (9)	C7—C2—O1—C1	−178.7 (5)
C11—C12—C17—C16	179.5 (5)	C18—C1—O1—C2	169.0 (5)
C15—C16—C17—C12	1.5 (9)	C12—C17—O2—C18	−167.5 (5)
C15—C16—C17—O2	−177.4 (6)	C16—C17—O2—C18	11.4 (8)
O1—C1—C18—O2	74.8 (6)	C1—C18—O2—C17	157.1 (5)

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

Hydrogen-bond geometry (Å, °)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
O1W—H1B···Cl1^{ii}	1.00 (4)	2.22 (5)	3.152 (4)	155 (5)
O1W—H1A···Cl2^{ii}	0.81 (4)	2.47 (5)	3.215 (4)	154 (6)

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

Fig. 1

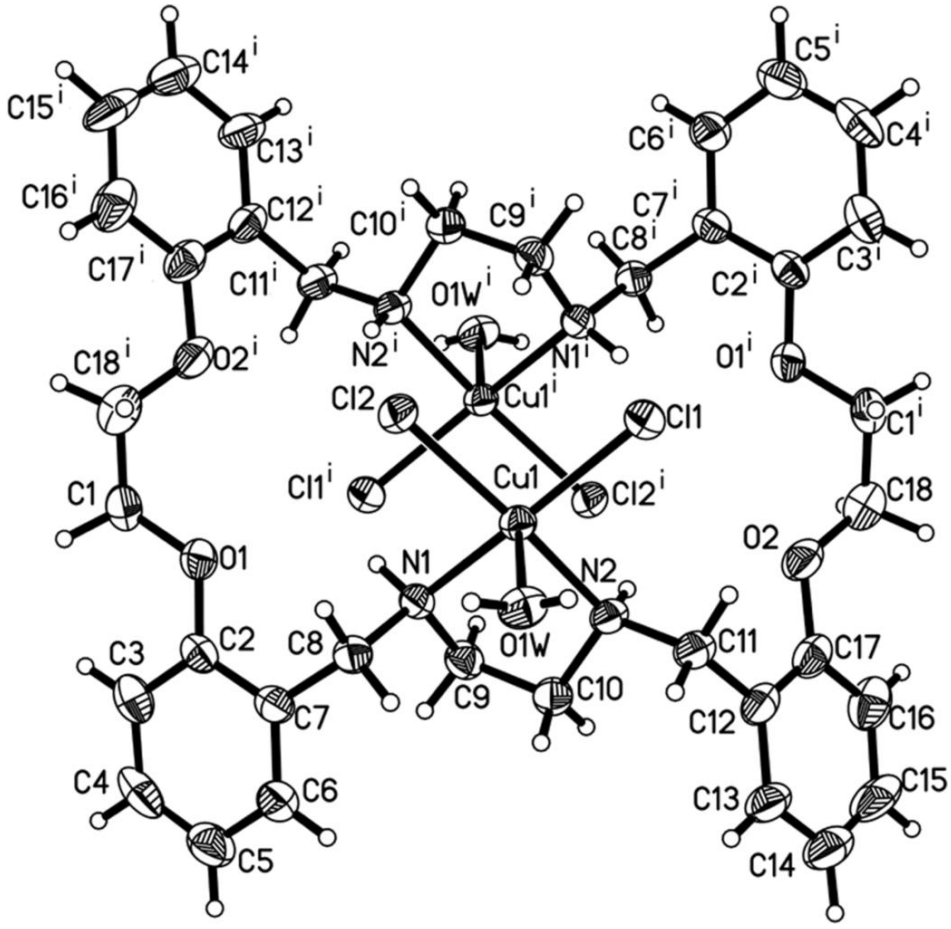
C14i
C15i
C13i
C16i
C12i
C17i
C11i
C10i
C9i
C5i
C6i
C4i
C7i
C8i
C3i
C2i
O1Wi
N2i
N1i
O1i
C18i
O2i
Cu1i
Cl2
Cl1
C1i
Cl1i
Cu1
Cl2i
C1
C18
O2
O1
N1
N2
C3
C2
C8
O1W
C11
C17
C9
C10
C12
C16
C7
C4
C6
C13
C15
C5
C14

Fig. 2