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Poly[[μ_2-1,4-bis(3-pyridylmethoxy)-benzene-hemi-μ_2-fumarato-silver(I)] monohydrate]

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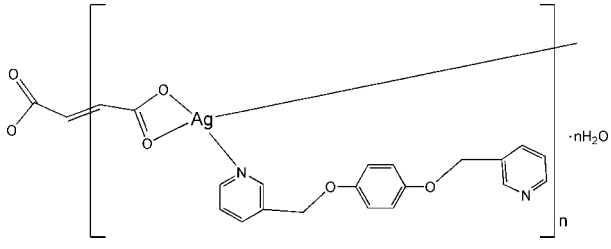
Key indicators: single-crystal X-ray study; T = 293 K; mean σ(C–C) = 0.005 Å; R factor = 0.034; wR factor = 0.107; data-to-parameter ratio = 15.9.

The asymmetric unit of the title structure, $\{[Ag(C_{18}H_{16}N_2O_2)(C_4H_2O_4)_{0.5}]\cdot H_2O\}_n$, contains one Ag^I cation, one 1,4-bis(3-pyridylmethoxy)benzene (L) ligand, half of a fumarate ligand and one solvent water molecule. The Ag^I ion is in a distorted tetrahedral coordination geometry. Each L ligand bridges two symmetry-related Ag^I cations to form extended one-dimensional chains, which are, in turn, bridged by fumarate ligands to create chains of rings. The solvent water molecules donate hydrogen bonds to the carboxylate O atoms of fumarate ligands, generating a two-dimensional supramolecular structure.

Related literature

For related literature, see: Allen *et al.* (1987); Fujita *et al.* (1995); Yaghi *et al.* (1995; Zaworotko & Moulton (2001); Corespo *et al.* (1998).



Experimental

Crystal data

$[Ag(C_{18}H_{16}N_2O_2)(C_4H_2O_4)_{0.5}]\cdot H_2O$
M_r = 475.24
Triclinic, $P\overline{1}$
a = 8.5730 (8) Å
b = 9.7120 (9) Å
c = 12.0990 (11) Å
α = 88.845 (2)°
β = 71.8670 (10)°
γ = 77.047 (2)°
V = 931.65 (15) Å^3
Z = 2
Mo $K\alpha$ radiation
μ = 1.12 mm^{-1}
T = 293 (2) K
0.42 × 0.36 × 0.35 mm

Data collection

Bruker APEX CCD area-detector diffractometer
Absorption correction: multi-scan (*SADABS*; Sheldrick, 1996)
T_{min} = 0.632, T_{max} = 0.676
5611 measured reflections
4127 independent reflections
3629 reflections with $I > 2\sigma(I)$
R_{int} = 0.018

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.034
$wR(F^2)$ = 0.107
S = 1.09
4127 reflections
259 parameters
3 restraints
H atoms treated by a mixture of independent and constrained refinement
$\Delta\rho_{max}$ = 1.17 e Å^{-3}
$\Delta\rho_{min}$ = −0.57 e Å^{-3}

Table 1
Hydrogen-bond geometry (Å, °).

D—H···A	D—H	H···A	D···A	D—H···A
O1W—H1B···O1	0.85 (5)	2.23 (5)	2.941 (6)	141 (7)
O1W—H1A···O1^{i}	0.85 (6)	2.07 (3)	2.888 (5)	162 (8)

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

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* (Sheldrick, 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: LH2537).

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supplementary materials

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Poly[[μ_2-1,4-bis(3-pyridylmethoxy)benzene-hemi-μ_2-fumarato-silver(I)] monohydrate]

S.-L. Li, H.-Y. Bai and J. Yang

Comment

The design and synthesis of supramolecular complexes exhibiting novel structures and properties has provided exciting new prospects for chemists (Fujita *et al.*, 1995; Yaghi *et al.*, 1995; Zaworotko & Moulton, 2001). Among various supramolecular compounds, Ag(I) compounds are attractive because of their diverse structural types (Corespo *et al.*, 1998). In this paper, we isolated a new Ag supramolecular compound, $\{[Ag(L)(fum)_{0.5}]\cdot H_2O\}_n$, constructed using 1,4-bis(pyridin-3-ylmethoxy)benzene (*L*) and fumarate (fum) ligands.

In the title structure, each Ag^I cation is four-coordinated and shows a tetrahedral geometry, surrounded by two N atoms from different *L* ligands and two carboxylate oxygen atoms from different fum anions (Fig. 1). The dihedral angle between two pyridine rings in the same *L* ligand is 23.6 (5)°. All bond distances and angles are normal (Allen *et al.*, 1987). The *L* ligands exhibit bis-monodentate coordination modes and links Ag^I cations to generate an extended chain, which is further linked by fumarate anions to generate a double chainlike structure (Fig. 2). The lattice water molecules donate hydrogen bonds to carboxylate oxygen atoms of fumarate anions from adjacent double-chains, thus forming an intereting two-dimensional supramolecular structure (Fig. 3).

Experimental

A mixture of *L* (0.30 g, 1 mmol), $AgNO_3$ (0.17 g, 1 mmol), fumaric acid (0.12 g, 1 mmol) and H_2O (10 ml) was stirred for 1 h and then sealed in a 25 ml Teflonlined stainless steel container. The container was heated to 423 K and held at that temperature for 72 h, then cooled to room temperature at a rate of 10 K h^{-1}. Colorless crystals of the title compound were collected in 56% yield based on Ag.

Refinement

All H atoms bonded to C atoms were positioned geometrically and refined as riding atoms with C—H = 0.93 A ° and U_{iso}(H) = 1.2Ueq(C). The water H-atoms were located in a difference Fourier map, and were refined freely with $U_{iso}(H) = 1.5U_{eq}(O)$.

Figures

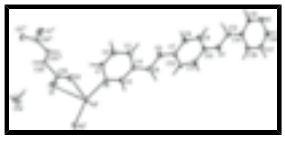

Fig. 1. View of the coordination enviroment of an Ag atom. Displacement ellipsoids are drawn at the 30% probability level. Symmetry codes: (i) $x + 2, y - 1, z - 1$; (ii) $1 - x, -y, 1 - z$.

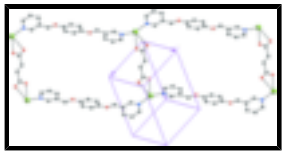

Fig. 2. Ball-stick representation of part of an extended chain of rings.

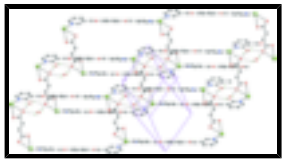

Fig. 3. Ball-stick representation of part of the two-dimensional supramolecular structure. Hydrogen bonds are shown as dashed lines.

Poly[[μ_2-1,4-bis(3-pyridylmethoxy)benzene-hemi-μ_2-fumarato-silver(I)] hydrate]

Crystal data

$[Ag(C_{18}H_{16}N_2O_2)(C_4H_2O_4)_{0.5}]\cdot H_2O$	$Z = 2$
$M_r = 475.24$	$F_{000} = 480$
Triclinic, $P\overline{1}$	$D_x = 1.694$ Mg m^{-3}
Hall symbol: -P 1	Mo $K\alpha$ radiation $\lambda = 0.71069$ Å
$a = 8.5730$ (8) Å	Cell parameters from 4127 reflections
$b = 9.7120$ (9) Å	$\theta = 1.8$–$28.5°$
$c = 12.0990$ (11) Å	$\mu = 1.12$ mm^{-1}
$\alpha = 88.845$ (2)°	$T = 293$ (2) K
$\beta = 71.8670$ (10)°	Block, colorless
$\gamma = 77.047$ (2)°	0.42 × 0.36 × 0.35 mm
$V = 931.65$ (15) Å^3	

Data collection

Bruker APEX CCD area-detector diffractometer	4127 independent reflections
Radiation source: fine-focus sealed tube	3629 reflections with $I > 2\sigma(I)$
Monochromator: graphite	$R_{int} = 0.018$
$T = 293(2)$ K	$\theta_{max} = 28.5°$
ω scans	$\theta_{min} = 1.8°$
Absorption correction: multi-scan (SADABS; Sheldrick, 1996)	$h = -11 \rightarrow 11$
$T_{min} = 0.632$, $T_{max} = 0.676$	$k = -12 \rightarrow 12$
5611 measured reflections	$l = -15 \rightarrow 8$

Refinement

Refinement on F^2	Secondary atom site location: difference Fourier map
Least-squares matrix: full	Hydrogen site location: inferred from neighbouring sites
$R[F^2 > 2\sigma(F^2)] = 0.034$	H atoms treated by a mixture of independent and constrained refinement
$wR(F^2) = 0.107$	$w = 1/[\sigma^2(F_o^2) + (0.0611P)^2 + 0.3593P]$

	where $P = (F_o^2 + 2F_c^2)/3$
$S = 1.09$	$(\Delta/\sigma)_{max} = 0.001$
4127 reflections	$\Delta\rho_{max} = 1.17$ e Å^{-3}
259 parameters	$\Delta\rho_{min} = -0.57$ e Å^{-3}
3 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.

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}
Ag1	0.64106 (3)	0.45095 (3)	0.55161 (2)	0.04642 (11)
C1	0.4381 (4)	0.4066 (3)	0.8046 (3)	0.0479 (8)
H1	0.5187	0.3215	0.7871	0.058*
C2	0.3196 (5)	0.4286 (4)	0.9124 (3)	0.0547 (9)
H2	0.3224	0.3613	0.9680	0.066*
C3	0.1954 (4)	0.5524 (4)	0.9376 (3)	0.0476 (7)
H3	0.1127	0.5687	1.0101	0.057*
C4	0.1949 (3)	0.6511 (3)	0.8549 (3)	0.0352 (6)
C5	0.3232 (3)	0.6225 (3)	0.7493 (3)	0.0362 (6)
H5	0.3262	0.6902	0.6937	0.043*
C6	0.0622 (4)	0.7879 (3)	0.8736 (3)	0.0391 (6)
H6A	0.1143	0.8682	0.8640	0.047*
H6B	0.0016	0.7916	0.8175	0.047*
C7	−0.1839 (4)	0.9076 (3)	1.0236 (3)	0.0416 (7)
C8	−0.2800 (4)	0.9094 (3)	1.1393 (3)	0.0470 (8)
H8	−0.2509	0.8372	1.1858	0.056*
C9	−0.4204 (4)	1.0199 (3)	1.1857 (3)	0.0448 (7)
H9	−0.4861	1.0209	1.2631	0.054*
C10	−0.4615 (4)	1.1267 (3)	1.1173 (3)	0.0378 (6)
C11	−0.3624 (4)	1.1257 (3)	1.0023 (3)	0.0427 (7)
H11	−0.3894	1.1998	0.9566	0.051*
C12	−0.2235 (4)	1.0157 (3)	0.9544 (3)	0.0418 (7)
H12	−0.1581	1.0148	0.8769	0.050*
C13	−0.7012 (4)	1.2405 (3)	1.2734 (3)	0.0409 (7)
H13A	−0.6349	1.2422	1.3252	0.049*

H13B	−0.7448	1.1556	1.2856	0.049*
C14	−0.8441 (3)	1.3692 (3)	1.2985 (3)	0.0354 (6)
C15	−0.9936 (3)	1.3643 (3)	1.3841 (3)	0.0356 (6)
H15	−1.0021	1.2801	1.4208	0.043*
C16	−0.8321 (4)	1.4946 (3)	1.2444 (3)	0.0444 (7)
H16	−0.7342	1.5014	1.1858	0.053*
C17	−0.9688 (4)	1.6107 (4)	1.2789 (3)	0.0515 (8)
H17	−0.9628	1.6967	1.2444	0.062*
C18	−1.1126 (4)	1.5963 (3)	1.3645 (3)	0.0457 (7)
H18	−1.2037	1.6740	1.3870	0.055*
C19	0.6094 (4)	0.1537 (3)	0.5074 (3)	0.0428 (7)
C20	0.5740 (4)	0.0108 (3)	0.4968 (3)	0.0416 (7)
H20	0.6633	−0.0679	0.4847	0.050*
N1	0.4431 (3)	0.5020 (3)	0.7234 (2)	0.0388 (5)
N2	−1.1269 (3)	1.4750 (3)	1.4167 (2)	0.0372 (5)
O1	0.7521 (4)	0.1564 (3)	0.5123 (4)	0.0778 (10)
O2	0.4997 (3)	0.2597 (2)	0.5080 (3)	0.0596 (7)
O3	−0.0494 (3)	0.7919 (2)	0.9878 (2)	0.0562 (7)
O4	−0.5989 (3)	1.2410 (2)	1.15538 (19)	0.0470 (5)
O1W	1.0451 (6)	−0.0306 (5)	0.3447 (3)	0.0956 (12)
H1A	1.107 (6)	−0.084 (7)	0.378 (5)	0.143*
H1B	0.946 (3)	−0.015 (8)	0.392 (5)	0.143*

Atomic displacement parameters (Å^2)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Ag1	0.02882 (14)	0.05097 (17)	0.04432 (17)	−0.00020 (10)	0.00425 (10)	−0.00846 (11)
C1	0.0378 (16)	0.0375 (15)	0.0535 (19)	0.0032 (12)	−0.0014 (14)	−0.0017 (14)
C2	0.0462 (18)	0.0487 (18)	0.051 (2)	0.0015 (15)	0.0014 (15)	0.0091 (15)
C3	0.0387 (16)	0.0505 (18)	0.0394 (16)	−0.0026 (14)	0.0027 (13)	−0.0011 (13)
C4	0.0270 (13)	0.0354 (14)	0.0377 (15)	−0.0021 (11)	−0.0054 (11)	−0.0094 (11)
C5	0.0308 (13)	0.0347 (14)	0.0372 (15)	−0.0031 (11)	−0.0051 (12)	−0.0056 (11)
C6	0.0317 (14)	0.0396 (14)	0.0357 (15)	0.0029 (11)	−0.0032 (12)	−0.0101 (11)
C7	0.0293 (14)	0.0362 (14)	0.0451 (17)	0.0034 (11)	0.0011 (12)	−0.0083 (12)
C8	0.0381 (16)	0.0410 (16)	0.0443 (17)	0.0069 (13)	0.0009 (14)	0.0013 (13)
C9	0.0352 (15)	0.0450 (16)	0.0370 (16)	0.0042 (13)	0.0036 (13)	−0.0042 (13)
C10	0.0260 (13)	0.0372 (14)	0.0393 (15)	0.0046 (11)	−0.0023 (11)	−0.0095 (11)
C11	0.0346 (15)	0.0451 (16)	0.0386 (16)	0.0049 (12)	−0.0072 (13)	−0.0017 (13)
C12	0.0309 (14)	0.0505 (17)	0.0320 (14)	0.0004 (12)	0.0010 (12)	−0.0076 (12)
C13	0.0269 (13)	0.0400 (15)	0.0434 (16)	0.0025 (11)	−0.0002 (12)	−0.0058 (12)
C14	0.0253 (12)	0.0361 (14)	0.0371 (15)	0.0008 (10)	−0.0038 (11)	−0.0090 (11)
C15	0.0259 (13)	0.0349 (13)	0.0384 (15)	−0.0008 (10)	−0.0031 (11)	−0.0072 (11)
C16	0.0296 (14)	0.0473 (17)	0.0466 (17)	−0.0040 (12)	−0.0017 (13)	−0.0006 (13)
C17	0.0450 (18)	0.0400 (16)	0.057 (2)	−0.0034 (14)	−0.0036 (16)	0.0044 (14)
C18	0.0321 (15)	0.0407 (16)	0.0528 (19)	0.0047 (12)	−0.0058 (14)	−0.0073 (13)
C19	0.0439 (17)	0.0377 (15)	0.0421 (17)	−0.0125 (13)	−0.0046 (13)	0.0008 (12)
C20	0.0426 (16)	0.0311 (13)	0.0450 (17)	−0.0042 (12)	−0.0079 (14)	0.0014 (12)
N1	0.0284 (11)	0.0365 (12)	0.0400 (13)	−0.0002 (9)	0.0010 (10)	−0.0059 (10)

N2	0.0257 (11)	0.0378 (12)	0.0397 (13)	0.0001 (9)	−0.0027 (10)	−0.0107 (10)
O1	0.0632 (18)	0.0588 (17)	0.124 (3)	−0.0218 (14)	−0.043 (2)	0.0142 (18)
O2	0.0475 (14)	0.0339 (11)	0.0852 (19)	−0.0040 (10)	−0.0071 (13)	−0.0046 (11)
O3	0.0423 (13)	0.0443 (12)	0.0509 (14)	0.0131 (10)	0.0132 (11)	0.0001 (10)
O4	0.0330 (11)	0.0467 (12)	0.0403 (12)	0.0127 (9)	0.0029 (9)	−0.0047 (9)
O1W	0.093 (3)	0.109 (3)	0.073 (2)	−0.005 (2)	−0.022 (2)	0.010 (2)

Geometric parameters (Å, °)

Ag1—N2^{i}	2.202 (2)	C10—O4	1.388 (3)
Ag1—N1	2.217 (2)	C11—C12	1.386 (4)
Ag1—O2	2.577 (3)	C11—H11	0.9300
Ag1—Ag1^{ii}	3.0193 (5)	C12—H12	0.9300
C1—N1	1.335 (4)	C13—O4	1.425 (4)
C1—C2	1.367 (5)	C13—C14	1.501 (4)
C1—H1	0.9300	C13—H13A	0.9700
C2—C3	1.382 (5)	C13—H13B	0.9700
C2—H2	0.9300	C14—C16	1.379 (4)
C3—C4	1.372 (4)	C14—C15	1.384 (4)
C3—H3	0.9300	C15—N2	1.343 (3)
C4—C5	1.386 (4)	C15—H15	0.9300
C4—C6	1.512 (4)	C16—C17	1.393 (4)
C5—N1	1.341 (4)	C16—H16	0.9300
C5—H5	0.9300	C17—C18	1.375 (5)
C6—O3	1.411 (4)	C17—H17	0.9300
C6—H6A	0.9700	C18—N2	1.337 (4)
C6—H6B	0.9700	C18—H18	0.9300
C7—C12	1.377 (5)	C19—O2	1.228 (4)
C7—O3	1.382 (3)	C19—O1	1.250 (4)
C7—C8	1.384 (4)	C19—C20	1.502 (4)
C8—C9	1.393 (4)	C20—C20^{iii}	1.309 (6)
C8—H8	0.9300	C20—H20	0.9300
C9—C10	1.366 (4)	N2—Ag1^{iv}	2.202 (2)
C9—H9	0.9300	O1W—H1A	0.85 (6)
C10—C11	1.386 (4)	O1W—H1B	0.85 (5)
N2^{i}—Ag1—N1	153.76 (10)	C10—C11—H11	119.6
N2^{i}—Ag1—O2	116.46 (9)	C7—C12—C11	118.9 (3)
N1—Ag1—O2	89.76 (9)	C7—C12—H12	120.5
N2^{i}—Ag1—Ag1^{ii}	106.01 (7)	C11—C12—H12	120.5
N1—Ag1—Ag1^{ii}	85.94 (7)	O4—C13—C14	108.2 (2)
O2—Ag1—Ag1^{ii}	63.49 (6)	O4—C13—H13A	110.1
N1—C1—C2	122.8 (3)	C14—C13—H13A	110.1
N1—C1—H1	118.6	O4—C13—H13B	110.1
C2—C1—H1	118.6	C14—C13—H13B	110.1
C1—C2—C3	119.0 (3)	H13A—C13—H13B	108.4
C1—C2—H2	120.5	C16—C14—C15	118.0 (3)
C3—C2—H2	120.5	C16—C14—C13	123.5 (3)

C4—C3—C2	119.5 (3)	C15—C14—C13	118.4 (3)
C4—C3—H3	120.2	N2—C15—C14	123.4 (3)
C2—C3—H3	120.2	N2—C15—H15	118.3
C3—C4—C5	117.7 (3)	C14—C15—H15	118.3
C3—C4—C6	123.3 (3)	C14—C16—C17	119.1 (3)
C5—C4—C6	119.0 (3)	C14—C16—H16	120.5
N1—C5—C4	123.3 (3)	C17—C16—H16	120.5
N1—C5—H5	118.4	C18—C17—C16	119.0 (3)
C4—C5—H5	118.4	C18—C17—H17	120.5
O3—C6—C4	107.4 (2)	C16—C17—H17	120.5
O3—C6—H6A	110.2	N2—C18—C17	122.6 (3)
C4—C6—H6A	110.2	N2—C18—H18	118.7
O3—C6—H6B	110.2	C17—C18—H18	118.7
C4—C6—H6B	110.2	O2—C19—O1	124.1 (3)
H6A—C6—H6B	108.5	O2—C19—C20	118.8 (3)
C12—C7—O3	125.2 (3)	O1—C19—C20	117.1 (3)
C12—C7—C8	120.7 (3)	$C20^{iii}$—C20—C19	124.6 (4)
O3—C7—C8	114.1 (3)	$C20^{iii}$—C20—H20	117.7
C7—C8—C9	119.7 (3)	C19—C20—H20	117.7
C7—C8—H8	120.1	C1—N1—C5	117.7 (3)
C9—C8—H8	120.1	C1—N1—Ag1	118.8 (2)
C10—C9—C8	120.0 (3)	C5—N1—Ag1	123.5 (2)
C10—C9—H9	120.0	C18—N2—C15	117.9 (3)
C8—C9—H9	120.0	C18—N2—$Ag1^{iv}$	122.60 (19)
C9—C10—C11	119.9 (3)	C15—N2—$Ag1^{iv}$	119.5 (2)
C9—C10—O4	124.3 (3)	C19—O2—Ag1	99.6 (2)
C11—C10—O4	115.8 (3)	C7—O3—C6	117.5 (2)
C12—C11—C10	120.8 (3)	C10—O4—C13	115.5 (2)
C12—C11—H11	119.6	H1A—O1W—H1B	106 (6)
N1—C1—C2—C3	2.4 (6)	O1—C19—C20—$C20^{iii}$	172.3 (4)
C1—C2—C3—C4	−0.9 (6)	C2—C1—N1—C5	−1.6 (5)
C2—C3—C4—C5	−1.3 (5)	C2—C1—N1—Ag1	−179.4 (3)
C2—C3—C4—C6	178.6 (3)	C4—C5—N1—C1	−0.8 (5)
C3—C4—C5—N1	2.2 (5)	C4—C5—N1—Ag1	176.9 (2)
C6—C4—C5—N1	−177.7 (3)	$N2^{i}$—Ag1—N1—C1	−109.7 (3)
C3—C4—C6—O3	1.5 (4)	O2—Ag1—N1—C1	68.1 (3)
C5—C4—C6—O3	−178.6 (3)	$Ag1^{ii}$—Ag1—N1—C1	131.5 (3)
C12—C7—C8—C9	1.5 (5)	$N2^{i}$—Ag1—N1—C5	72.7 (3)
O3—C7—C8—C9	−179.3 (3)	O2—Ag1—N1—C5	−109.5 (2)
C7—C8—C9—C10	−0.8 (5)	$Ag1^{ii}$—Ag1—N1—C5	−46.1 (2)
C8—C9—C10—C11	−0.7 (5)	C17—C18—N2—C15	0.8 (5)
C8—C9—C10—O4	179.9 (3)	C17—C18—N2—$Ag1^{iv}$	−178.9 (3)
C9—C10—C11—C12	1.5 (5)	C14—C15—N2—C18	−0.9 (5)
O4—C10—C11—C12	−179.0 (3)	C14—C15—N2—$Ag1^{iv}$	178.7 (2)
O3—C7—C12—C11	−179.8 (3)	O1—C19—O2—Ag1	−7.9 (4)
C8—C7—C12—C11	−0.7 (5)	C20—C19—O2—Ag1	173.8 (2)

C10—C11—C12—C7	−0.8 (5)	N2^{i}—Ag1—O2—C19	65.7 (2)
O4—C13—C14—C16	−30.1 (4)	N1—Ag1—O2—C19	−113.2 (2)
O4—C13—C14—C15	152.9 (3)	Ag1^{ii}—Ag1—O2—C19	161.2 (2)
C16—C14—C15—N2	0.1 (5)	C12—C7—O3—C6	4.0 (5)
C13—C14—C15—N2	177.3 (3)	C8—C7—O3—C6	−175.2 (3)
C15—C14—C16—C17	0.9 (5)	C4—C6—O3—C7	−178.9 (3)
C13—C14—C16—C17	−176.2 (3)	C9—C10—O4—C13	−1.1 (5)
C14—C16—C17—C18	−1.0 (6)	C11—C10—O4—C13	179.4 (3)
C16—C17—C18—N2	0.2 (6)	C14—C13—O4—C10	−179.0 (3)
O2—C19—C20—C20^{iii}	−9.4 (6)		

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

Hydrogen-bond geometry (Å, °)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
O1W—H1B···O1	0.85 (5)	2.23 (5)	2.941 (6)	141 (7)
O1W—H1A···O1^{v}	0.85 (6)	2.07 (3)	2.888 (5)	162 (8)

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

Fig. 1

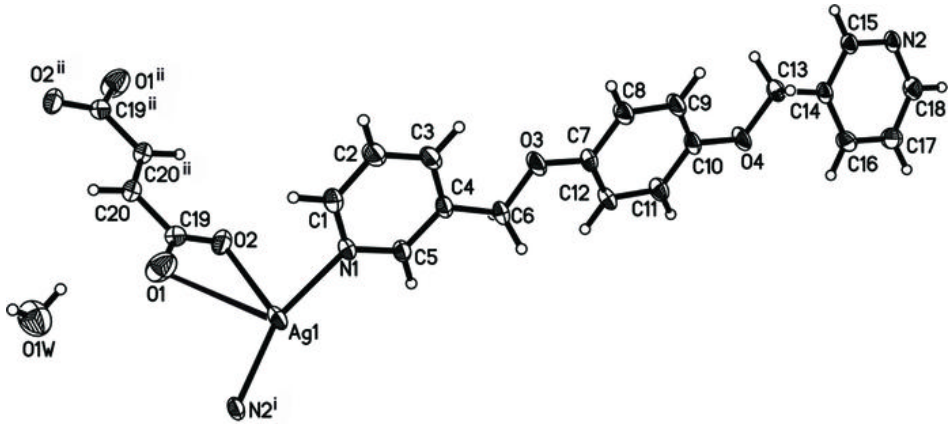
O2ii
O1ii
C19ii
C20ii
C20
C19
O2
O1
O1W
Ag1
N2i
C2
C3
C1
C4
N1
C5
C6
O3
C7
C8
C9
C12
C11
C10
O4
C13
C14
C15
N2
C18
C17
C16

Fig. 2

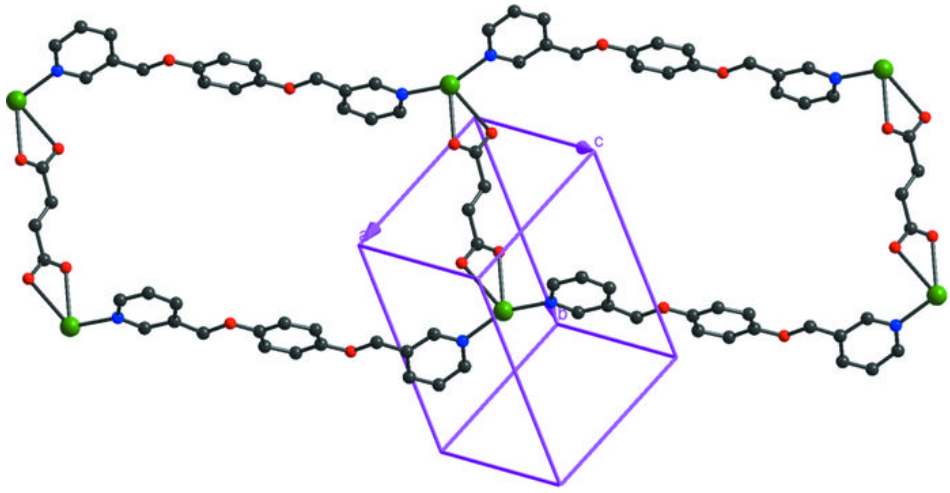

Fig. 3