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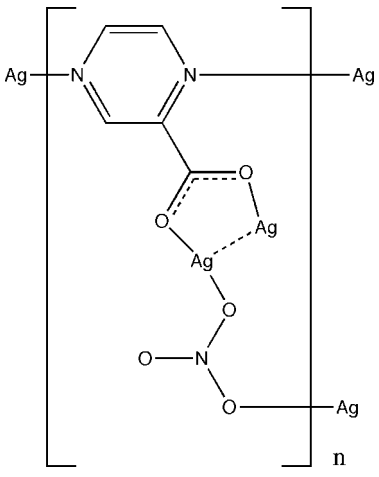
Key indicators: single-crystal X-ray study; T = 150 K; mean σ(C–C) = 0.008 Å; R factor = 0.030; wR factor = 0.063; data-to-parameter ratio = 10.5.

The title compound, $[Ag_2(C_5H_3N_2O_2)(NO_3)]_n$, is a three-dimensional coordination polymer containing two-dimensional slabs held together by bridging nitrate groups. $AgNO_4$ and $AgNO_5$ silver coordination polyhedra arise. Weak argentophilic interactions [Ag···Ag = 3.0686 (7) Å] occur in the crystal structure.

Related literature

For related literature, see: Dong *et al.* (2000); Qin *et al.* (2004).



Experimental

Crystal data

$[Ag_2(C_5H_3N_2O_2)(NO_3)]$
M_r = 400.84
Monoclinic, $P2_1/c$
a = 8.8263 (6) Å
b = 5.9804 (4) Å
c = 15.3032 (11) Å
β = 93.480 (2)°
V = 806.29 (10) Å^3
Z = 4
Mo $K\alpha$ radiation
μ = 4.86 mm^{-1}
T = 150 (1) K
0.08 × 0.04 × 0.02 mm

Data collection

Bruker SMART APEX CCD diffractometer
Absorption correction: multi-scan (*SADABS*; Bruker, 2001)
T_{min} = 0.862, T_{max} = 1.000
(expected range = 0.782–0.907)
8281 measured reflections
1425 independent reflections
1216 reflections with $I > 2\sigma(I)$
R_{int} = 0.063

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.030
$wR(F^2)$ = 0.063
S = 1.03
1425 reflections
136 parameters
H-atom parameters constrained
$\Delta\rho_{max}$ = 0.83 e Å^{-3}
$\Delta\rho_{min}$ = −0.64 e Å^{-3}

Table 1
Selected bond lengths (Å).

Ag1—N1^{i}	2.268 (5)	Ag2—O2	2.337 (4)
Ag1—O1	2.311 (4)	Ag2—N2^{iv}	2.377 (5)
Ag1—O5^{ii}	2.464 (4)	Ag2—O3	2.426 (4)
Ag1—O1^{i}	2.534 (4)	Ag2—O5^{v}	2.483 (4)
Ag1—O2^{iii}	2.633 (4)	Ag2—O4	2.726 (5)
Ag1—Ag2	3.0686 (7)	Ag2—O1^{i}	2.801 (4)

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

Data collection: *SMART* (Bruker, 1998); cell refinement: *SAINT-Plus* (Bruker, 2001); data reduction: *SAINT-Plus*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 1997); program(s) used to refine structure: *SHELXL97* (Sheldrick, 1997); molecular graphics: *SHELXTL* (Sheldrick, 2000); software used to prepare material for publication: *SHELXTL*.

Financial support from the National Science Foundation through award CHE:0714439 and the University of South Carolina Magellan Scholar Program are gratefully acknowledged.

Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: HB2494).

References

Bruker (1998). *SMART*. Version 5.625. Bruker AXS Inc., Madison, Wisconsin, USA.
Bruker (2001). *SAINT-Plus* (Version 6.22) and *SADABS* (Version 2.1). Bruker AXS Inc., Madison, Wisconsin, USA.
Dong, Y. B., Smith, M. D. & zur Loye, H.-C. (2000). *Solid State Sci.* **2**, 335–341.
Qin, S. B., Lu, S. M., Ke, Y. X., Li, H. M., Wu, X. T. & Du, W. X. (2004). *Solid State Sci.* **6**, 753–755.
Sheldrick, G. M. (1997). *SHELXS97* and *SHELXL97*. University of Göttingen, Germany.
Sheldrick, G. W. (2000). *SHELXTL*. Version 6.1. Bruker AXS Inc., Madison, Wisconsin, USA.

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supplementary materials

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Poly[μ_2-nitrato-(μ_4-pyrazine-2-carboxylato)disilver(I)]

K. L. Seward, J. M. Ellsworth, Z. M. Khaliq, M. D. Smith and H.-C. zur Loye

Comment

Single crystal X-ray analysis of the title compound, (I), revealed a three-dimensional structure composed of silver dimer units [Ag1···Ag2 = 3.0686 (7), linked into two-dimensional slabs by the pca (2-pyrazinecarboxylate, $C_5H_3N_2O_2^-$) groups. (Dong *et al.*, 2000) The asymmetric unit is shown in **Figure 1** and geometrical data are listed in **Table 1**. All available coordination sites of the pca ligands (Qin *et al.*, 2004) are used in bonding to silver. The pca ligands bind to Ag1 atoms in a chelating fashion through N1 and O1 as shown in **Figure 2**. The Ag1 atoms are bridged to each other through an μ-2 interaction from the chelating oxygen atoms on the pca ligands (**Figure 2**) forming one-dimensional zigzag chains along the *b* axis (**Figure 3**). Each Ag1 atom is also bonded to the non-chelating oxygen atom O2. The terminal nitrogen atom (N2) and non-chelating oxygen atom (O2) (**Figure 3**) on the pca ligands are bonded to Ag2 atoms, connecting the zigzag chains in the c direction, propagating them into two-dimensional slabs in the [001] plane (**Figure 4**). Extending form either side of the slabs are nitrate groups, which are bonded to both Ag1 and Ag2. Ag1 is coordinated to one nitrate group through O5 and Ag2 is coordinated to three nitrate groups through O5, O3, and O4. These nitrate groups serve to tether the slabs into the extended three-dimensional structure shown in **Figure 5**.

Experimental

2-Pyrazinecarboxylic acid (8.05 mmol, 1000 mg) and $Co(NO_3)(H_2O)_6$ (8.05 mmol, 2340 mg) were weighed and placed into a 100 ml round bottom flask. which was then heated to a temperature of 373 K and kept constant for 12 h and then allowed to cool to room temperature. The product, cobalt (III) pyrazinecarboxylate, (II), was suction filtrated and allowed to dry. After drying, (II) and $AgNO_3$ were combined in a 23 ml Teflon-lined autoclave with 5 ml of distilled water. The autoclave was sealed and heated to 403 K at a rate of 1.0 K/min. and held at a constant temperature for 24 h. After this period, the autoclave was cooled to 305 K at a rate of 0.1 K/min. Colorless plates of (I) were hand picked from the reaction.

Refinement

The hydrogen atoms were geometrically placed (C—H = 0.93 Å) and refined as riding with $U_{iso}(H) = 1.2U_{eq}(C)$.

Figures

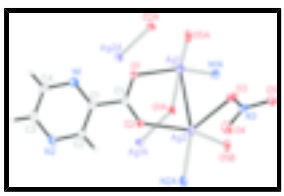
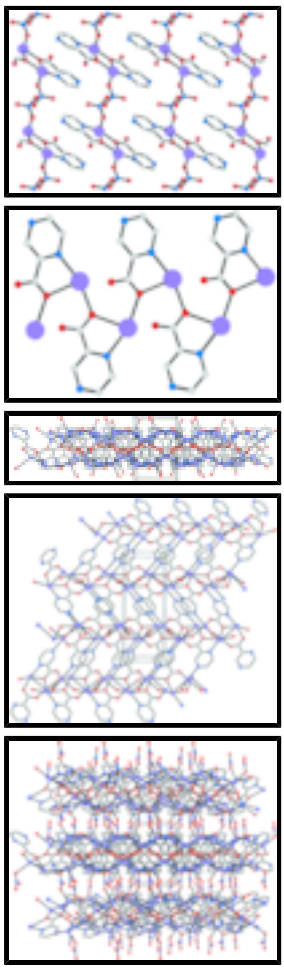


Figure 1. Asymmetric unit of (I) with additional atoms in a 3.5 Å coordination sphere around the Ag atoms. Atoms of the asymmetric unit highlighted with solid bonds. Displacement ellipsoids for the non-hydrogen atoms are drawn at the 50% probability level.
Figure 2. Chelating binding mode of pca ligands to Ag1 atoms, Ag2 atoms omitted for clarity.
Figure 3. Detail of the zigzag chain along the *b* axis, Ag2 atoms omitted for clarity.
Figure 4. Views (*a*) parallel and (*b*) perpendicular to the infinite slabs which propagate in the *bc* plane.
Figure 5. Full three-dimensional structure viewed along the [001] direction.



Poly[μ_2-nitrato-(μ_4-pyrazine-2-carboxylato)disilver(I)]

Crystal data

$[Ag_2(C_5H_3N_2O_2)(NO_3)]$	F_{000} = 752
M_r = 400.84	D_x = 3.302 Mg m^{-3}
Monoclinic, $P2_1/c$	Mo $K\alpha$ radiation λ = 0.71073 Å
Hall symbol: -P 2ybc	Cell parameters from 1599 reflections
a = 8.8263 (6) Å	θ = 2.3–22.7º
b = 5.9804 (4) Å	μ = 4.86 mm^{-1}
c = 15.3032 (11) Å	T = 150 (1) K
β = 93.480 (2)º	Plate, colorless
V = 806.29 (10) Å^3	0.08 × 0.04 × 0.02 mm
Z = 4	

Data collection

Bruker SMART APEX CCD diffractometer	1425 independent reflections

Radiation source: fine-focus sealed tube	1216 reflections with $I > 2\sigma(I)$
Monochromator: graphite	$R_{int} = 0.063$
$T = 150(1)$ K	$\theta_{max} = 25.0^o$
ω scans	$\theta_{min} = 2.3^o$
Absorption correction: multi-scan (SADABS; Bruker, 2001)	$h = -10 \rightarrow 10$
$T_{min} = 0.862$, $T_{max} = 1.000$	$k = -7 \rightarrow 7$
8281 measured reflections	$l = -18 \rightarrow 18$

Refinement

Refinement on F^2	Secondary atom site location: difference Fourier map
Least-squares matrix: full	Hydrogen site location: inferred from neighbouring sites
$R[F^2 > 2\sigma(F^2)] = 0.030$	H-atom parameters constrained
$wR(F^2) = 0.063$	$w = 1/[\sigma^2(F_o^2) + (0.0283P)^2]$ where $P = (F_o^2 + 2F_c^2)/3$
$S = 1.03$	$(\Delta/\sigma)_{max} = 0.001$
1425 reflections	$\Delta\rho_{max} = 0.83$ e Å^{-3}
136 parameters	$\Delta\rho_{min} = -0.64$ e Å^{-3}
Primary atom site location: structure-invariant direct methods	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 $F^2 > 2$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	0.36377 (5)	0.31527 (7)	0.81236 (3)	0.01864 (15)
Ag2	0.25055 (5)	−0.04248 (8)	0.68028 (3)	0.01901 (15)
C1	0.6342 (6)	0.3866 (9)	0.5699 (4)	0.0133 (13)
C2	0.6641 (6)	0.2422 (10)	0.5023 (4)	0.0154 (13)
H2	0.6167	0.0995	0.5003	0.018*
C3	0.8236 (6)	0.4983 (10)	0.4470 (4)	0.0180 (14)
H3	0.8890	0.5454	0.4035	0.022*
C4	0.7993 (7)	0.6392 (10)	0.5159 (4)	0.0184 (14)
H4	0.8528	0.7770	0.5203	0.022*
C5	0.5214 (6)	0.3149 (10)	0.6354 (4)	0.0153 (13)

N1	0.7015 (6)	0.5872 (8)	0.5776 (3)	0.0175 (11)
N2	0.7577 (5)	0.2963 (8)	0.4394 (3)	0.0173 (11)
N3	−0.0623 (6)	0.1116 (8)	0.7017 (3)	0.0188 (12)
O1	0.4992 (5)	0.4448 (7)	0.6981 (3)	0.0191 (10)
O2	0.4573 (4)	0.1311 (7)	0.6200 (2)	0.0169 (9)
O3	0.0463 (5)	0.1172 (7)	0.7592 (3)	0.0236 (10)
O4	−0.0353 (5)	0.0837 (8)	0.6231 (3)	0.0287 (11)
O5	−0.1959 (4)	0.1354 (7)	0.7241 (3)	0.0224 (10)

Atomic displacement parameters (Å^2)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Ag1	0.0219 (3)	0.0141 (3)	0.0204 (3)	0.0010 (2)	0.0058 (2)	0.00323 (19)
Ag2	0.0166 (3)	0.0229 (3)	0.0182 (3)	−0.0022 (2)	0.00601 (19)	−0.0016 (2)
C1	0.012 (3)	0.013 (3)	0.014 (3)	0.002 (2)	−0.002 (2)	0.002 (2)
C2	0.017 (3)	0.017 (3)	0.012 (3)	−0.001 (3)	−0.002 (2)	0.001 (2)
C3	0.011 (3)	0.026 (4)	0.016 (3)	0.002 (3)	0.000 (3)	0.009 (3)
C4	0.018 (3)	0.011 (3)	0.027 (4)	−0.004 (3)	0.000 (3)	0.002 (3)
C5	0.014 (3)	0.017 (3)	0.014 (3)	0.005 (3)	0.002 (2)	0.005 (3)
N1	0.018 (3)	0.018 (3)	0.016 (3)	0.000 (2)	0.000 (2)	−0.001 (2)
N2	0.015 (3)	0.024 (3)	0.014 (3)	−0.002 (2)	0.004 (2)	0.001 (2)
N3	0.022 (3)	0.007 (3)	0.027 (3)	−0.004 (2)	0.005 (3)	−0.003 (2)
O1	0.023 (2)	0.015 (2)	0.021 (2)	−0.0017 (18)	0.0110 (19)	−0.0045 (18)
O2	0.021 (2)	0.016 (2)	0.015 (2)	−0.0063 (18)	0.0053 (18)	−0.0018 (17)
O3	0.019 (2)	0.022 (2)	0.029 (3)	0.0013 (19)	−0.003 (2)	−0.007 (2)
O4	0.031 (3)	0.033 (3)	0.023 (3)	−0.003 (2)	0.011 (2)	−0.004 (2)
O5	0.011 (2)	0.024 (3)	0.032 (3)	−0.0001 (19)	0.006 (2)	−0.008 (2)

Geometric parameters (Å, °)

Ag1—N1^{i}	2.268 (5)	C2—H2	0.9500
Ag1—O1	2.311 (4)	C3—N2	1.343 (8)
Ag1—O5^{ii}	2.464 (4)	C3—C4	1.377 (9)
Ag1—O1^{i}	2.534 (4)	C3—H3	0.9500
Ag1—O2^{iii}	2.633 (4)	C4—N1	1.354 (8)
Ag1—Ag2	3.0686 (7)	C4—H4	0.9500
Ag2—O2	2.337 (4)	C5—O2	1.252 (7)
Ag2—N2^{iv}	2.377 (5)	C5—O1	1.260 (7)
Ag2—O3	2.426 (4)	N1—Ag1^{iii}	2.268 (5)
Ag2—O5^{v}	2.483 (4)	N2—Ag2^{iv}	2.377 (5)
Ag2—O4	2.726 (5)	N3—O4	1.250 (6)
Ag2—O1^{i}	2.801 (4)	N3—O5	1.256 (6)
C1—N1	1.341 (7)	N3—O3	1.262 (6)
C1—C2	1.384 (8)	O1—Ag1^{iii}	2.534 (4)
C1—C5	1.516 (8)	O5—Ag1^{v}	2.464 (4)
C2—N2	1.346 (7)	O5—Ag2^{ii}	2.483 (4)

N1^{i}—Ag1—O1	158.37 (16)	O1^{i}—Ag2—Ag1	50.89 (8)
N1^{i}—Ag1—O5^{ii}	117.34 (16)	N1—C1—C2	121.4 (5)
O1—Ag1—O5^{ii}	84.23 (14)	N1—C1—C5	120.0 (5)
N1^{i}—Ag1—O1^{i}	70.42 (16)	C2—C1—C5	118.7 (5)
O1—Ag1—O1^{i}	88.53 (9)	N2—C2—C1	122.5 (5)
O5^{ii}—Ag1—O1^{i}	161.38 (14)	N2—C2—H2	118.7
N1^{i}—Ag1—O2^{iii}	108.24 (15)	C1—C2—H2	118.7
O1—Ag1—O2^{iii}	74.41 (13)	N2—C3—C4	122.0 (6)
O5^{ii}—Ag1—O2^{iii}	82.52 (13)	N2—C3—H3	119.0
O1^{i}—Ag1—O2^{iii}	112.02 (13)	C4—C3—H3	119.0
N1^{i}—Ag1—Ag2	88.99 (13)	N1—C4—C3	121.9 (6)
O1—Ag1—Ag2	84.16 (10)	N1—C4—H4	119.0
O5^{ii}—Ag1—Ag2	103.01 (10)	C3—C4—H4	119.0
O1^{i}—Ag1—Ag2	59.08 (10)	O2—C5—O1	126.5 (5)
O2^{iii}—Ag1—Ag2	157.29 (9)	O2—C5—C1	115.6 (5)
O2—Ag2—N2^{iv}	88.14 (15)	O1—C5—C1	117.9 (5)
O2—Ag2—O3	130.03 (15)	C1—N1—C4	116.2 (5)
N2^{iv}—Ag2—O3	130.27 (16)	C1—N1—Ag1^{iii}	118.2 (4)
O2—Ag2—O5^{v}	139.56 (14)	C4—N1—Ag1^{iii}	125.5 (4)
N2^{iv}—Ag2—O5^{v}	87.74 (15)	C3—N2—C2	115.8 (5)
O3—Ag2—O5^{v}	80.52 (14)	C3—N2—Ag2^{iv}	129.3 (4)
O2—Ag2—O4	118.69 (14)	C2—N2—Ag2^{iv}	114.0 (4)
N2^{iv}—Ag2—O4	86.86 (15)	O4—N3—O5	121.0 (5)
O3—Ag2—O4	49.43 (14)	O4—N3—O3	119.5 (5)
O5^{v}—Ag2—O4	101.22 (13)	O5—N3—O3	119.5 (5)
O2—Ag2—O1^{i}	70.81 (13)	C5—O1—Ag1	118.8 (4)
N2^{iv}—Ag2—O1^{i}	118.73 (14)	C5—O1—Ag1^{iii}	113.2 (4)
O3—Ag2—O1^{i}	105.05 (13)	Ag1—O1—Ag1^{iii}	127.74 (17)
O5^{v}—Ag2—O1^{i}	76.19 (13)	C5—O2—Ag2	132.1 (4)
O4—Ag2—O1^{i}	153.84 (12)	N3—O3—Ag2	101.4 (3)
O2—Ag2—Ag1	73.70 (9)	N3—O4—Ag2	87.4 (3)
N2^{iv}—Ag2—Ag1	161.16 (12)	N3—O5—Ag1^{v}	114.3 (3)
O3—Ag2—Ag1	67.65 (10)	N3—O5—Ag2^{ii}	117.9 (3)
O5^{v}—Ag2—Ag1	102.71 (10)	Ag1^{v}—O5—Ag2^{ii}	126.91 (17)
O4—Ag2—Ag1	106.05 (10)		
N1^{i}—Ag1—Ag2—O2	−145.90 (16)	C1—C2—N2—C3	1.4 (8)
O1—Ag1—Ag2—O2	13.55 (15)	C1—C2—N2—Ag2^{iv}	−169.3 (4)
O5^{ii}—Ag1—Ag2—O2	96.24 (14)	O2—C5—O1—Ag1	12.5 (8)
O1^{i}—Ag1—Ag2—O2	−78.24 (15)	C1—C5—O1—Ag1	−168.8 (4)
O2^{iii}—Ag1—Ag2—O2	−5.7 (3)	O2—C5—O1—Ag1^{iii}	−173.1 (5)
N1^{i}—Ag1—Ag2—N2^{iv}	−130.0 (4)	C1—C5—O1—Ag1^{iii}	5.6 (6)

O1—Ag1—Ag2—N2^{iv}	29.5 (4)	N1^{i}—Ag1—O1—C5	53.1 (7)
O5^{ii}—Ag1—Ag2—N2^{iv}	112.2 (4)	O5^{ii}—Ag1—O1—C5	−122.9 (4)
O1^{i}—Ag1—Ag2—N2^{iv}	−62.3 (4)	O1^{i}—Ag1—O1—C5	39.9 (3)
O2^{iii}—Ag1—Ag2—N2^{iv}	10.3 (4)	O2^{iii}—Ag1—O1—C5	153.3 (4)
N1^{i}—Ag1—Ag2—O3	66.45 (17)	Ag2—Ag1—O1—C5	−19.1 (4)
O1—Ag1—Ag2—O3	−134.10 (15)	N1^{i}—Ag1—O1—Ag1^{iii}	−120.4 (4)
O5^{ii}—Ag1—Ag2—O3	−51.42 (15)	O5^{ii}—Ag1—O1—Ag1^{iii}	63.6 (2)
O1^{i}—Ag1—Ag2—O3	134.11 (15)	O1^{i}—Ag1—O1—Ag1^{iii}	−133.6 (3)
O2^{iii}—Ag1—Ag2—O3	−153.3 (3)	O2^{iii}—Ag1—O1—Ag1^{iii}	−20.20 (19)
N1^{i}—Ag1—Ag2—O5^{v}	−7.57 (15)	Ag2—Ag1—O1—Ag1^{iii}	167.4 (2)
O1—Ag1—Ag2—O5^{v}	151.88 (14)	O1—C5—O2—Ag2	9.9 (9)
O5^{ii}—Ag1—Ag2—O5^{v}	−125.44 (17)	C1—C5—O2—Ag2	−168.8 (3)
O1^{i}—Ag1—Ag2—O5^{v}	60.09 (14)	N2^{iv}—Ag2—O2—C5	166.0 (5)
O2^{iii}—Ag1—Ag2—O5^{v}	132.7 (2)	O3—Ag2—O2—C5	21.2 (6)
N1^{i}—Ag1—Ag2—O4	98.23 (16)	O5^{v}—Ag2—O2—C5	−109.6 (5)
O1—Ag1—Ag2—O4	−102.32 (14)	O4—Ag2—O2—C5	80.6 (5)
O5^{ii}—Ag1—Ag2—O4	−19.63 (14)	O1^{i}—Ag2—O2—C5	−72.6 (5)
O1^{i}—Ag1—Ag2—O4	165.89 (14)	Ag1—Ag2—O2—C5	−19.0 (5)
O2^{iii}—Ag1—Ag2—O4	−121.5 (2)	O4—N3—O3—Ag2	−16.1 (5)
N1^{i}—Ag1—Ag2—O1^{i}	−67.66 (16)	O5—N3—O3—Ag2	164.3 (4)
O1—Ag1—Ag2—O1^{i}	91.79 (11)	O2—Ag2—O3—N3	104.4 (3)
O5^{ii}—Ag1—Ag2—O1^{i}	174.48 (14)	N2^{iv}—Ag2—O3—N3	−26.6 (4)
O2^{iii}—Ag1—Ag2—O1^{i}	72.6 (2)	O5^{v}—Ag2—O3—N3	−105.4 (3)
N1—C1—C2—N2	−2.1 (9)	O4—Ag2—O3—N3	8.4 (3)
C5—C1—C2—N2	177.2 (5)	O1^{i}—Ag2—O3—N3	−178.2 (3)
N2—C3—C4—N1	−3.5 (9)	Ag1—Ag2—O3—N3	146.6 (3)
N1—C1—C5—O2	175.8 (5)	O5—N3—O4—Ag2	−166.4 (5)
C2—C1—C5—O2	−3.5 (8)	O3—N3—O4—Ag2	14.0 (5)
N1—C1—C5—O1	−3.1 (8)	O2—Ag2—O4—N3	−128.1 (3)
C2—C1—C5—O1	177.7 (5)	N2^{iv}—Ag2—O4—N3	145.8 (3)
C2—C1—N1—C4	0.0 (8)	O3—Ag2—O4—N3	−8.3 (3)
C5—C1—N1—C4	−179.2 (5)	O5^{v}—Ag2—O4—N3	58.7 (3)
C2—C1—N1—Ag1^{iii}	177.5 (4)	O1^{i}—Ag2—O4—N3	−22.8 (5)
C5—C1—N1—Ag1^{iii}	−1.8 (7)	Ag1—Ag2—O4—N3	−48.2 (3)
C3—C4—N1—C1	2.7 (8)	O4—N3—O5—Ag1^{v}	60.4 (6)
C3—C4—N1—Ag1^{iii}	−174.6 (4)	O3—N3—O5—Ag1^{v}	−120.0 (4)
C4—C3—N2—C2	1.3 (8)	O4—N3—O5—Ag2^{ii}	−129.7 (4)
C4—C3—N2—Ag2^{iv}	170.3 (4)	O3—N3—O5—Ag2^{ii}	49.9 (6)

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

Fig. 1

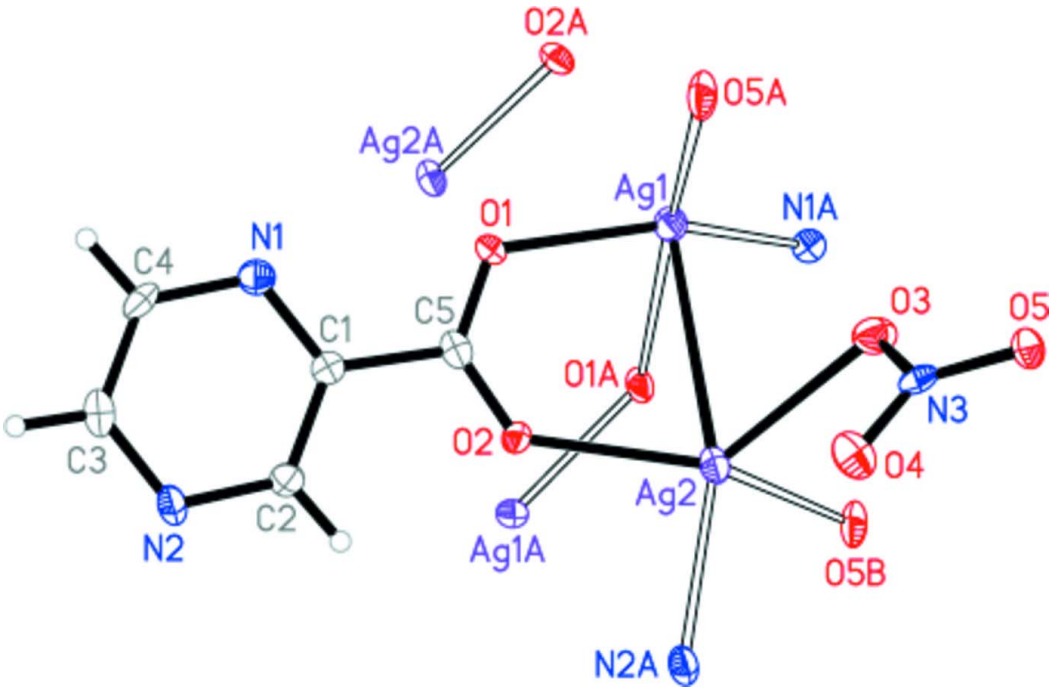


Fig. 2

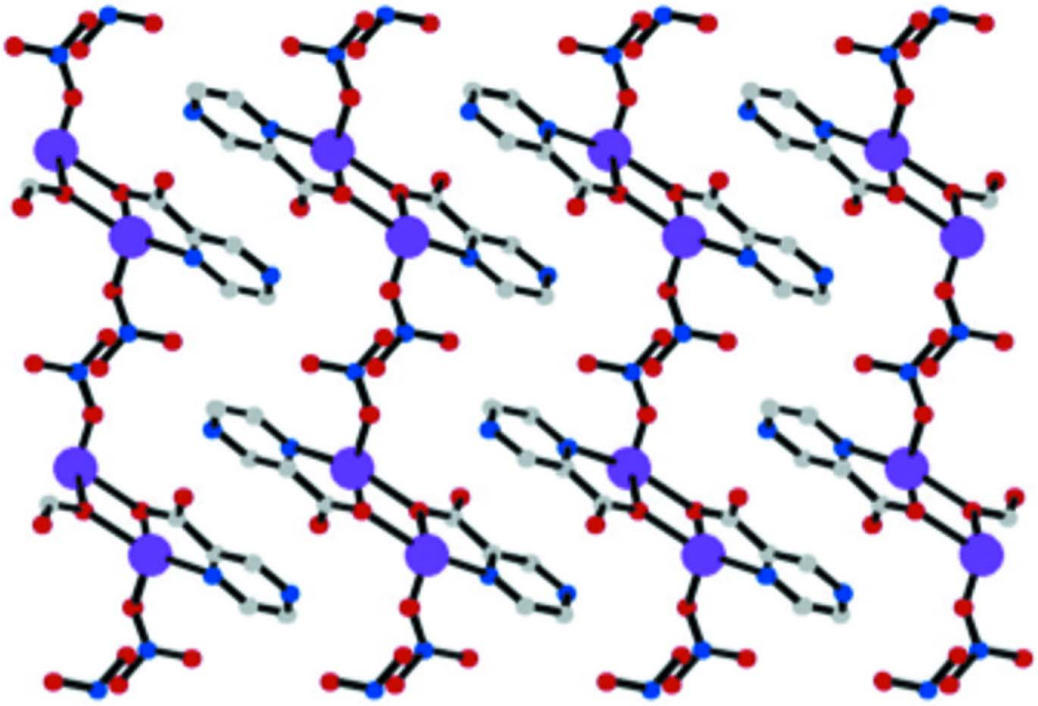


Fig. 3

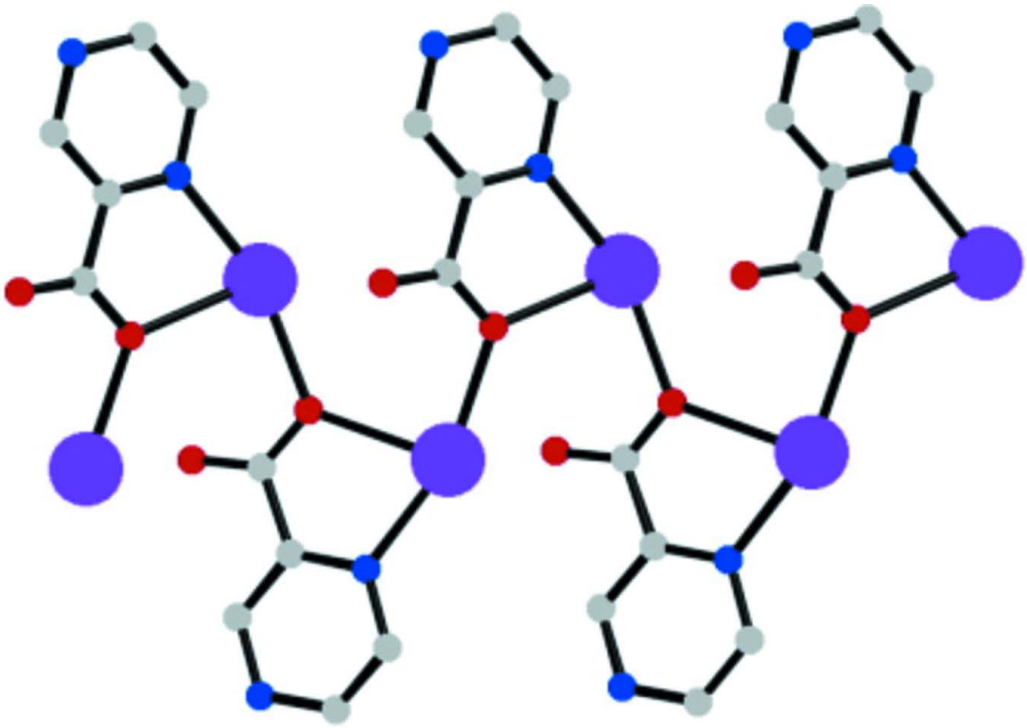


Fig. 4

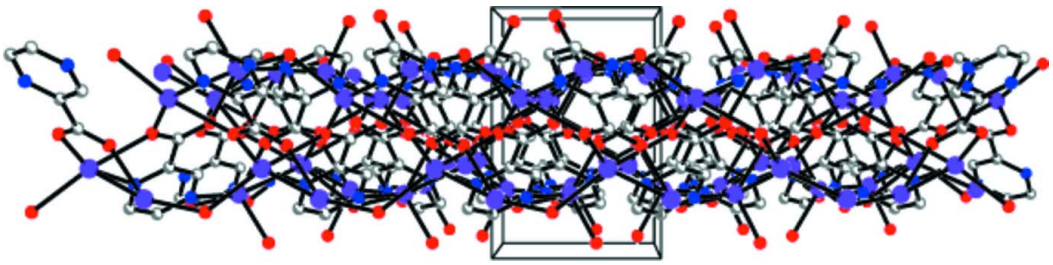


Fig. 5

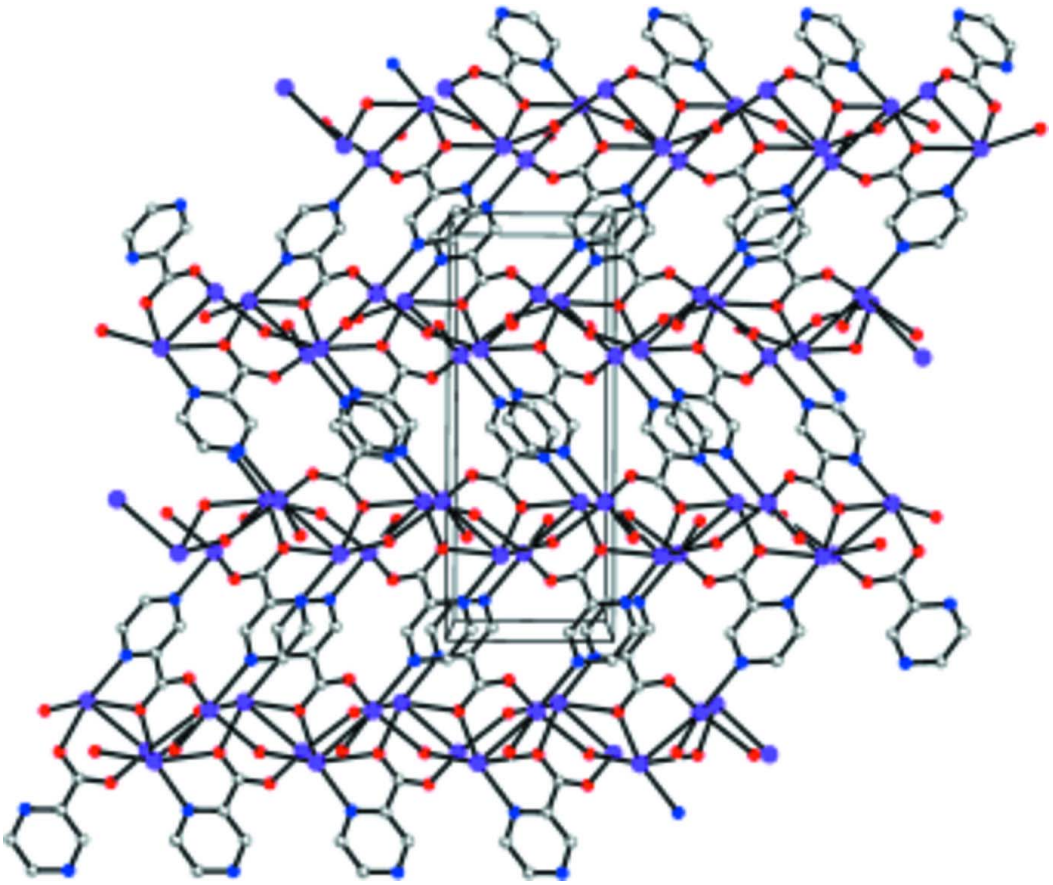


Fig. 6