

Bis[dichlorido(5,5'-dimethyl-2,2'-bipyridine- κ^2N,N')gold(III)] tetrachloridoaurate(III) dichloridoaurate(I)

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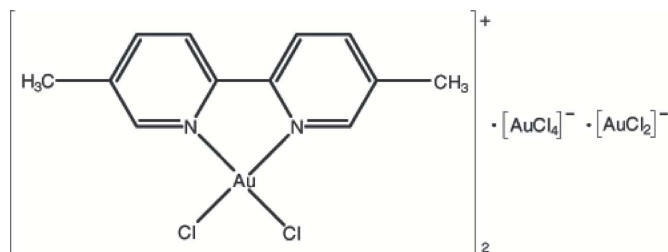
Received 21 January 2009; accepted 21 February 2009

Key indicators: single-crystal X-ray study; $T = 295$ K; mean $\sigma(C-C) = 0.015$ Å; R factor = 0.042; wR factor = 0.112; data-to-parameter ratio = 19.1.

The title compound, $[Au^{III}Cl_2(C_{12}H_{12}N_2)]_2[Au^{III}Cl_4][Au^I Cl_2]$, contains three distinct types of Au atom. In the cation, the Au^{III} atom is four-coordinated in a distorted square-planar arrangement by an N,N' -bidentate 5,5'-dimethyl-2,2'-bipyridine ligand and two terminal Cl atoms. In the $[AuCl_4]^-$ anion, the centrosymmetric Au^{III} atom has a square-planar coordination. The centrosymmetric $[AuCl_2]^-$ anion is linear. Intra- and intermolecular $C-H \cdots Cl$ hydrogen bonds help to establish the conformation and packing.

Related literature

For related structures, see: Abbate *et al.* (2000); Adams & Strähle (1982); Ahmadi, Amani & Khavasi (2008); Ahmadi, Dehghan, Amani & Khavasi (2008); Bjernemose *et al.* (2004); Hayoun *et al.* (2006); Hollis & Lippard (1983); McInnes *et al.* (1995); Yıldırım *et al.* (2008).



Experimental

Crystal data

$[AuCl_2(C_{12}H_{12}N_2)]_2[AuCl_4][AuCl_2]$ $a = 9.0698$ (4) Å
 $M_r = 1510.86$ $b = 10.0886$ (4) Å
 Triclinic, $P\bar{1}$ $c = 11.1678$ (5) Å

$\alpha = 91.155$ (4)°
 $\beta = 108.148$ (4)°
 $\gamma = 111.344$ (3)°
 $V = 894.09$ (7) Å³
 $Z = 1$

Mo $K\alpha$ radiation
 $\mu = 17.13$ mm⁻¹
 $T = 295$ K
 $0.41 \times 0.28 \times 0.08$ mm

Data collection

Stoe IPDS-2 diffractometer
 Absorption correction: integration
 (*X-RED32*; Stoe & Cie, 2002)
 $T_{min} = 0.054$, $T_{max} = 0.341$

9898 measured reflections
 3651 independent reflections
 3193 reflections with $I > 2\sigma(I)$
 $R_{int} = 0.059$

Refinement

$R[F^2 > 2\sigma(F^2)] = 0.042$
 $wR(F^2) = 0.112$
 $S = 1.05$
 3651 reflections

191 parameters
 H-atom parameters constrained
 $\Delta\rho_{max} = 1.64$ e Å⁻³
 $\Delta\rho_{min} = -1.91$ e Å⁻³

Table 1
Selected bond lengths (Å).

Au1—N1	2.028 (9)	Au2—Cl3	2.246 (5)
Au1—N2	2.027 (7)	Au2—Cl4	2.261 (3)
Au1—Cl1	2.252 (3)	Au3—Cl5	2.248 (3)
Au1—Cl2	2.262 (3)		

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

$D-H \cdots A$	$D-H$	$H \cdots A$	$D \cdots A$	$D-H \cdots A$
C1—H1 \cdots Cl1	0.93	2.59	3.203 (11)	124
C8—H8 \cdots Cl2 ⁱ	0.93	2.75	3.666 (12)	169
C11—H11 \cdots Cl2	0.93	2.64	3.233 (11)	122

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

Data collection: *X-Area* (Stoe & Cie, 2002); cell refinement: *X-Area*; data reduction: *X-RED32* (Stoe & Cie, 2002); program(s) used to solve structure: *SIR97* (Altomare *et al.*, 1999); program(s) used to refine structure: *SHELXL97* (Sheldrick, 2008); molecular graphics: *ORTEP-3 for Windows* (Farrugia, 1997); software used to prepare material for publication: *WinGX* (Farrugia, 1999).

The authors acknowledge the Faculty of Arts and Sciences, Ondokuz Mayıs University, Turkey, for the use of the Stoe IPDS-2 diffractometer (purchased under grant F.279 of the University Research Fund). NS, VA and AA are grateful to Shahid Beheshti University for financial support.

Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: HB2902).

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supplementary materials

Acta Cryst. (2009). E65, m335-m336 [doi:10.1107/S1600536809006436]

**Bis[dichlorido(5,5'-dimethyl-2,2'-bipyridine- κ^2N,N')gold(III)]
dichloridoaurate(I) tetrachloridoaurate(III)**

S. Karaca, M. Akkurt, N. Safari, V. Amani, O. Büyükgüngör and A. Abedi

Comment

Recently, we reported the synthesis and crystal structure of the $[\text{Au}(\text{dtbpy})\text{Cl}_2][\text{AuCl}_4]\cdot\text{CH}_3\text{CN}$, (II), (Yıldırım *et al.*, 2008) [where dtbpy is 4,4'-di-*tert*-butyl-2,2'-bipyridine]. There are several Au^{III} complexes, with formula, $[\text{AuCl}_2(\text{N}-\text{N})]\text{X}$, such as $[\text{AuCl}_2(\text{bipy})][\text{BF}_4]$, (III), (McInnes *et al.*, 1995), $[\text{AuCl}_2(\text{bipy})](\text{NO}_3)$, (IV), (Bjernemose *et al.*, 2004), $[\text{AuCl}_2(\text{bipy})][\text{AuBr}_4]$, (V), (Hayoun *et al.*, 2006), $[\text{AuCl}_2(\text{dmphen})][\text{AuCl}_4]$, (VI), (Ahmadi, Amani *et al.*, 2008) and $[\text{AuCl}_2(\text{phen})]\text{Cl}\cdot\text{H}_2\text{O}$, (VII), (Abbate *et al.*, 2000) [where bipy is 2,2'-bipyridine, dmphen is 4,7-diphenyl-1,10-phenanthroline and phen is 1,10-phenanthroline] have been synthesized and characterized by single-crystal X-ray diffraction methods. Two Au^{III} complexes with formula, $[\text{AuCl}_2\text{L}_2]\text{X}$, $[\text{AuCl}_2(\text{py})_2][\text{AuCl}_4]$, (VIII), and $[\text{AuCl}_2(\text{py})_2]\text{Cl}\cdot\text{H}_2\text{O}$, (IX), (Adams & Strähle 1982) [py is pyridine] and two mixed-valence $\text{Au}^{\text{I}}-\text{Au}^{\text{III}}$ complexes, $[\text{Au}(\text{terpy})\text{Cl}]_2[\text{AuCl}_2]_3[\text{AuCl}_4]$, (X), (Hollis & Lippard, 1983) and $[\text{Au}(\text{dmpy})_2][\text{AuCl}_4]$, (XI), (Ahmadi, Dehghan *et al.*, 2008) [where terpy is 2,2',2''-terpyridine and dmpy is 2,6-dimethylpyridine] have been synthesized and characterized by single-crystal X-ray diffraction methods. We report herein the synthesis and crystal structure of the title compound (I).

In the asymmetric unit of the title compound (I), (Fig. 1), there are one cation and two half-anions. In the cation, the Au^{III} atom is four-coordinated in a distorted square-planar configuration by two N atoms from the ligand and two terminal Cl atoms. In the anion AuCl_4 , the Au^{III} atom has a square-planar coordination. The anion AuCl_2 is linear. In the cation, the Au—Cl and Au—N bond lengths and angles (Table 1) are in good agreement with the corresponding values in (II), (III), (IV), (V), (VI), (VII), (VIII), (IX), (X) and (XI). In the anion, the Au—Cl bond lengths and angles (Table 1) are normal.

Intra and intermolecular C—H \cdots Cl hydrogen bonding interactions (Table 2) stabilize the molecular conformation and the packing arrangement (Fig. 2).

Experimental

A solution of 5,5'-dimethyl-2,2'-bipyridine (0.20 g, 1.09 mmol) in ethanol (20 ml) was added to a solution of $\text{HAuCl}_4\cdot 3\text{H}_2\text{O}$, (0.37 g, 1.09 mmol) in acetonitrile (20 ml) and the resulting yellow solution was stirred for 10 min at 313 K. Then, it was left to evaporate slowly at room temperature. After one week, yellow prismatic crystals of (I) were isolated (yield 0.28 g, 72.8%; m.p. 553 K).

Refinement

All H-atoms were placed in calculated positions with C—H = 0.93 Å and C—H 0.96 Å, and were included in the refinement in the riding model approximation, with $U_{\text{iso}}(\text{H}) = 1.2U_{\text{eq}}(\text{ring C})$ and $U_{\text{iso}}(\text{H}) = 1.5U_{\text{eq}}(\text{methyl C})$. In the final Fourier map, the highest and deepest peaks were located 0.91 and 0.81 Å from atom Au1, respectively.

Figures

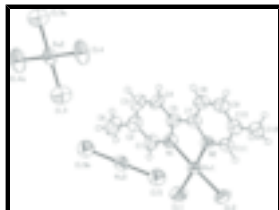


Fig. 1. The molecular structure of (I) showing 50% probability displacement ellipsoids for the non-hydrogen atoms. Symmetry code suffixes: (a) $-x, -y, -z$; (b) $2-x, 1-y, 1-z$.

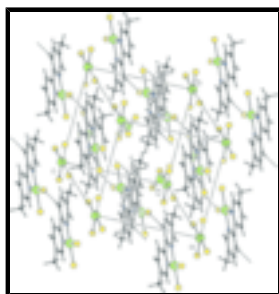


Fig. 2. A general view of the packing and hydrogen bonding interactions in (I).

Bis[dichlorido(5,5'-dimethyl-2,2'-bipyridine- κ^2N,N')gold(III)] tetrachloridoaurate(III) dichloridoaurate(I)

Crystal data

$[\text{AuCl}_2(\text{C}_{12}\text{H}_{12}\text{N}_2)]_2[\text{AuCl}_4][\text{AuCl}_2]$

$M_r = 1510.86$

Triclinic, $P\bar{1}$

Hall symbol: $-P\ 1$

$a = 9.0698\ (4)\ \text{\AA}$

$b = 10.0886\ (4)\ \text{\AA}$

$c = 11.1678\ (5)\ \text{\AA}$

$\alpha = 91.155\ (4)^\circ$

$\beta = 108.148\ (4)^\circ$

$\gamma = 111.344\ (3)^\circ$

$V = 894.09\ (7)\ \text{\AA}^3$

$Z = 1$

$F_{000} = 682$

$D_x = 2.806\ \text{Mg m}^{-3}$

Mo $K\alpha$ radiation

$\lambda = 0.71073\ \text{\AA}$

Cell parameters from 16778 reflections

$\theta = 1.9\text{--}28.0^\circ$

$\mu = 17.13\ \text{mm}^{-1}$

$T = 295\ \text{K}$

Prism, yellow

$0.41 \times 0.28 \times 0.08\ \text{mm}$

Data collection

Stoe IPDS-2
diffractometer

Monochromator: plane graphite

Detector resolution: $6.67\ \text{pixels mm}^{-1}$

$T = 295\ \text{K}$

ω scans

Absorption correction: integration
(X-RED32; Stoe & Cie, 2002)

$T_{\min} = 0.054, T_{\max} = 0.341$

9898 measured reflections

3651 independent reflections

3193 reflections with $I > 2\sigma(I)$

$R_{\text{int}} = 0.059$

$\theta_{\text{max}} = 26.5^\circ$

$\theta_{\text{min}} = 1.9^\circ$

$h = -10 \rightarrow 11$

$k = -12 \rightarrow 12$

$l = -14 \rightarrow 14$

Refinement

Refinement on F^2	Hydrogen site location: inferred from neighbouring sites
Least-squares matrix: full	H-atom parameters constrained
$R[F^2 > 2\sigma(F^2)] = 0.042$	$w = 1/[\sigma^2(F_o^2) + (0.0703P)^2 + 0.309P]$
$wR(F^2) = 0.112$	where $P = (F_o^2 + 2F_c^2)/3$
$S = 1.05$	$(\Delta/\sigma)_{\max} = 0.001$
3651 reflections	$\Delta\rho_{\max} = 1.64 \text{ e } \text{\AA}^{-3}$
191 parameters	$\Delta\rho_{\min} = -1.91 \text{ e } \text{\AA}^{-3}$
Primary atom site location: structure-invariant direct methods	Extinction correction: SHELXL97 (Sheldrick, 2008), $F_c^* = kF_c[1+0.001XF_c^2\Lambda^3/\sin(2\theta)]^{-1/4}$
Secondary atom site location: difference Fourier map	Extinction coefficient: 0.0042 (5)

Special details

Geometry. Bond distances, angles *etc.* have been calculated using the rounded fractional coordinates. All su's are estimated from the variances of the (full) variance-covariance matrix. The cell e.s.d.'s are taken into account in the estimation of distances, angles and torsion angles

Refinement. Refinement on F^2 for ALL reflections except those flagged by the user for potential systematic errors. Weighted R -factors wR and all goodnesses 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 observed criterion of $F^2 > \sigma(F^2)$ is used only for calculating $-R$ -factor-obs *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 (\AA^2)

	x	y	z	$U_{\text{iso}}^*/U_{\text{eq}}$
Au1	1.23403 (3)	0.77774 (3)	0.26312 (3)	0.0544 (1)
Cl1	1.2859 (3)	0.5914 (3)	0.1987 (3)	0.0790 (9)
Cl2	1.5117 (3)	0.9173 (3)	0.3196 (3)	0.0782 (9)
N1	0.9831 (9)	0.6658 (8)	0.2201 (7)	0.060 (2)
N2	1.1693 (8)	0.9371 (7)	0.3140 (6)	0.0528 (19)
C1	0.9039 (11)	0.5243 (9)	0.1758 (9)	0.066 (3)
C2	0.7317 (12)	0.4506 (10)	0.1500 (9)	0.069 (3)
C3	0.6467 (11)	0.5303 (11)	0.1758 (10)	0.076 (3)
C4	0.7298 (11)	0.6737 (11)	0.2244 (10)	0.074 (3)
C5	0.8990 (11)	0.7414 (9)	0.2443 (8)	0.060 (3)
C6	0.6455 (15)	0.2922 (11)	0.1035 (13)	0.093 (4)
C7	1.0005 (10)	0.8939 (9)	0.2956 (8)	0.056 (3)
C8	0.9407 (12)	0.9933 (11)	0.3240 (10)	0.069 (3)
C9	1.0501 (13)	1.1320 (11)	0.3714 (11)	0.076 (3)
C10	1.2194 (13)	1.1753 (9)	0.3894 (10)	0.070 (3)
C11	1.2737 (11)	1.0742 (9)	0.3607 (8)	0.060 (3)

supplementary materials

C12	1.3426 (14)	1.3307 (10)	0.4439 (12)	0.082 (4)
Au2	0.00000	0.00000	0.00000	0.0681 (2)
Cl3	0.2497 (5)	-0.0056 (5)	0.0129 (5)	0.1187 (16)
Cl4	0.1272 (6)	0.2391 (3)	0.0717 (3)	0.1093 (12)
Au3	1.00000	0.50000	0.50000	0.0654 (2)
Cl5	1.2288 (4)	0.7061 (3)	0.5439 (3)	0.0836 (7)*
H1	0.96620	0.47370	0.16190	0.0790*
H3	0.53150	0.48610	0.16010	0.0910*
H4	0.67160	0.72540	0.24380	0.0880*
H6A	0.62170	0.24230	0.17190	0.1400*
H6B	0.71750	0.25990	0.07430	0.1400*
H6C	0.54210	0.27280	0.03460	0.1400*
H8	0.82660	0.96600	0.31100	0.0820*
H9	1.00990	1.19880	0.39200	0.0910*
H11	1.38780	1.10100	0.37400	0.0730*
H12A	1.38440	1.34120	0.53520	0.1240*
H12B	1.28570	1.39460	0.41790	0.1240*
H12C	1.43510	1.35400	0.41270	0.1240*

Atomic displacement parameters (\AA^2)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Au1	0.0476 (2)	0.0555 (2)	0.0651 (2)	0.0246 (1)	0.0206 (1)	0.0069 (1)
Cl1	0.0748 (14)	0.0681 (12)	0.1089 (19)	0.0387 (10)	0.0390 (13)	0.0006 (12)
Cl2	0.0476 (10)	0.0728 (13)	0.113 (2)	0.0220 (9)	0.0284 (11)	0.0031 (13)
N1	0.053 (3)	0.062 (4)	0.059 (4)	0.019 (3)	0.017 (3)	0.002 (3)
N2	0.051 (3)	0.060 (3)	0.053 (4)	0.025 (3)	0.021 (3)	0.009 (3)
C1	0.062 (5)	0.057 (4)	0.074 (6)	0.015 (4)	0.027 (4)	0.002 (4)
C2	0.067 (5)	0.066 (5)	0.062 (5)	0.015 (4)	0.022 (4)	0.000 (4)
C3	0.051 (5)	0.080 (6)	0.079 (6)	0.007 (4)	0.023 (4)	0.003 (5)
C4	0.043 (4)	0.072 (5)	0.091 (7)	0.007 (4)	0.021 (4)	0.005 (5)
C5	0.057 (4)	0.066 (5)	0.061 (5)	0.025 (4)	0.025 (4)	0.011 (4)
C6	0.077 (7)	0.072 (6)	0.107 (9)	0.005 (5)	0.031 (6)	-0.010 (6)
C7	0.050 (4)	0.062 (4)	0.060 (5)	0.028 (3)	0.018 (3)	0.006 (4)
C8	0.061 (5)	0.078 (5)	0.079 (6)	0.036 (4)	0.030 (4)	0.012 (5)
C9	0.085 (6)	0.071 (5)	0.094 (7)	0.047 (5)	0.040 (5)	0.009 (5)
C10	0.084 (6)	0.054 (4)	0.071 (6)	0.027 (4)	0.026 (5)	0.011 (4)
C11	0.060 (5)	0.060 (4)	0.062 (5)	0.031 (4)	0.014 (4)	0.006 (4)
C12	0.087 (7)	0.057 (5)	0.103 (8)	0.031 (4)	0.029 (6)	0.007 (5)
Au2	0.0810 (3)	0.0527 (3)	0.0547 (3)	0.0170 (2)	0.0130 (2)	0.0067 (2)
Cl3	0.098 (2)	0.133 (3)	0.127 (3)	0.052 (2)	0.033 (2)	0.018 (2)
Cl4	0.160 (3)	0.0549 (12)	0.0797 (18)	0.0144 (15)	0.0305 (19)	0.0013 (11)
Au3	0.0724 (3)	0.0670 (3)	0.0672 (3)	0.0335 (2)	0.0296 (2)	0.0161 (2)

Geometric parameters (\AA , $^\circ$)

Au1—N1	2.028 (9)	C5—C7	1.466 (12)
Au1—N2	2.027 (7)	C7—C8	1.375 (15)
Au1—Cl1	2.252 (3)	C8—C9	1.362 (15)

Au1—C12	2.262 (3)	C9—C10	1.380 (18)
Au2—C14 ⁱ	2.261 (3)	C10—C11	1.355 (15)
Au2—C13 ⁱ	2.246 (5)	C10—C12	1.530 (14)
Au2—C13	2.246 (5)	C1—H1	0.9300
Au2—C14	2.261 (3)	C3—H3	0.9300
Au3—C15 ⁱⁱ	2.248 (3)	C4—H4	0.9300
Au3—C15	2.248 (3)	C6—H6B	0.9600
N1—C1	1.343 (12)	C6—H6A	0.9600
N1—C5	1.334 (13)	C6—H6C	0.9600
N2—C7	1.375 (13)	C8—H8	0.9300
N2—C11	1.339 (11)	C9—H9	0.9300
C1—C2	1.393 (15)	C11—H11	0.9300
C2—C3	1.380 (16)	C12—H12C	0.9600
C2—C6	1.496 (14)	C12—H12A	0.9600
C3—C4	1.369 (15)	C12—H12B	0.9600
C4—C5	1.375 (15)		
Au1...C13 ⁱⁱⁱ	3.588 (5)	N1...C7	2.368 (12)
Au1...C15	3.243 (3)	N1...C11	3.173 (9)
Au2...C7 ^{iv}	3.490 (8)	N2...C12	3.165 (9)
Au2...C7 ^v	3.490 (8)	N2...N1	2.619 (10)
Au3...C1	3.486 (9)	N2...C5	2.396 (12)
Au3...C1 ⁱⁱ	3.486 (9)	C1...Au3	3.486 (9)
C11...C14 ^{vi}	3.394 (4)	C1...Au3	3.486 (9)
C11...N1	3.173 (9)	C3...C11 ^{viii}	3.625 (12)
C11...C1	3.203 (11)	C5...C14 ^{iv}	3.477 (9)
C11...C12	3.166 (4)	C6...C13	3.564 (14)
C11...C3 ^{vi}	3.625 (12)	C7...Au2 ^{iv}	3.490 (8)
C12...N2	3.165 (9)	C7...Au2 ⁱⁱⁱ	3.490 (8)
C12...C11	3.233 (11)	C8...C13 ^{iv}	3.644 (12)
C12...C11	3.166 (4)	C10...C14 ⁱⁱⁱ	3.513 (11)
C12...C11 ^{vii}	3.476 (9)	C11...C12 ^{vii}	3.476 (9)
C12...C15 ^{vii}	3.650 (4)	C12...C12 ^{xi}	3.448 (15)
C13...C6	3.564 (14)	C4...H8	2.8100
C13...C8 ^{iv}	3.644 (12)	C8...H4	2.7900
C13...C14	3.185 (7)	H1...C11	2.5900
C13...Au1 ^v	3.588 (5)	H1...H6B	2.3900
C13...C14 ⁱ	3.188 (7)	H3...C11 ^{viii}	2.9300
C14...C13 ⁱ	3.188 (7)	H3...H6C	2.5900
C14...C10 ^v	3.513 (11)	H4...C8	2.7900
C14...C5 ^{iv}	3.477 (9)	H4...C11 ^{viii}	3.1200
C14...C13	3.185 (7)	H4...C12 ^{viii}	3.0500
C14...C11 ^{viii}	3.394 (4)	H4...H8	2.2800
C14...N1 ^{iv}	3.367 (8)	H6A...C15 ⁱⁱ	2.9900
C15...Au1	3.243 (3)	H6B...H1	2.3900

supplementary materials

C15...C12 ^{vii}	3.650 (4)	H6B...C13 ^{ix}	2.8700
C11...H4 ^{vi}	3.1200	H6C...H3	2.5900
C11...H1	2.5900	H6C...C13	3.0200
C11...H3 ^{vi}	2.9300	H8...H4	2.2800
C12...H8 ^{vi}	2.7500	H8...C4	2.8100
C12...H11	2.6400	H8...C12 ^{viii}	2.7500
C12...H4 ^{vi}	3.0500	H9...H12B	2.4800
C13...H6C	3.0200	H9...C15 ^x	2.9300
C13...H6B ^{ix}	2.8700	H11...C12	2.6400
C15...H11 ^{vii}	3.1200	H11...H12C	2.4300
C15...H6A ⁱⁱ	2.9900	H11...C15 ^{vii}	3.1200
C15...H9 ^x	2.9300	H12B...H9	2.4800
N1...C14 ^{iv}	3.367 (8)	H12C...H11	2.4300
N1...N2	2.619 (10)		
C11—Au1—C12	89.07 (11)	C7—C8—C9	119.4 (11)
C11—Au1—N1	95.5 (2)	C8—C9—C10	121.3 (11)
C11—Au1—N2	175.8 (2)	C11—C10—C12	121.1 (11)
C12—Au1—N1	175.3 (2)	C9—C10—C11	117.6 (9)
C12—Au1—N2	95.0 (2)	C9—C10—C12	121.3 (10)
N1—Au1—N2	80.5 (3)	N2—C11—C10	122.5 (10)
C13 ⁱ —Au2—C14 ⁱ	89.95 (19)	C2—C1—H1	119.00
C13—Au2—C14 ⁱ	90.05 (19)	N1—C1—H1	119.00
C13—Au2—C14	89.95 (19)	C2—C3—H3	120.00
C13—Au2—C13 ⁱ	180.00	C4—C3—H3	120.00
C13 ⁱ —Au2—C14	90.05 (19)	C3—C4—H4	120.00
C14—Au2—C14 ⁱ	180.00	C5—C4—H4	120.00
C15—Au3—C15 ⁱⁱ	180.00	C2—C6—H6A	109.00
Au1—N1—C1	124.0 (7)	C2—C6—H6B	109.00
Au1—N1—C5	115.3 (6)	C2—C6—H6C	109.00
C1—N1—C5	120.7 (9)	H6B—C6—H6C	109.00
Au1—N2—C11	126.2 (7)	H6A—C6—H6B	109.00
Au1—N2—C7	113.9 (5)	H6A—C6—H6C	109.00
C7—N2—C11	120.0 (8)	C7—C8—H8	120.00
N1—C1—C2	122.3 (10)	C9—C8—H8	120.00
C3—C2—C6	121.8 (11)	C10—C9—H9	119.00
C1—C2—C3	116.3 (9)	C8—C9—H9	119.00
C1—C2—C6	121.8 (10)	N2—C11—H11	119.00
C2—C3—C4	120.9 (10)	C10—C11—H11	119.00
C3—C4—C5	120.1 (10)	C10—C12—H12A	110.00
N1—C5—C4	119.7 (8)	C10—C12—H12B	109.00
N1—C5—C7	115.4 (9)	C10—C12—H12C	109.00
C4—C5—C7	124.8 (9)	H12A—C12—H12B	109.00
N2—C7—C5	115.0 (8)	H12A—C12—H12C	109.00
N2—C7—C8	119.3 (8)	H12B—C12—H12C	109.00
C5—C7—C8	125.8 (9)		

Cl1—Au1—N1—C1	3.4 (7)	C11—N2—C7—C8	0.9 (12)
N2—Au1—N1—C1	-177.7 (8)	N1—C1—C2—C3	-1.7 (14)
Cl1—Au1—N1—C5	-179.5 (6)	N1—C1—C2—C6	-178.6 (10)
N2—Au1—N1—C5	-0.7 (6)	C6—C2—C3—C4	176.7 (10)
Cl2—Au1—N2—C7	-179.0 (5)	C1—C2—C3—C4	-0.2 (15)
N1—Au1—N2—C7	0.0 (6)	C2—C3—C4—C5	2.1 (16)
Cl2—Au1—N2—C11	1.5 (7)	C3—C4—C5—C7	180.0 (9)
N1—Au1—N2—C11	-179.5 (7)	C3—C4—C5—N1	-2.2 (14)
Au1—N1—C1—C2	178.6 (7)	C4—C5—C7—N2	176.7 (8)
C5—N1—C1—C2	1.7 (14)	C4—C5—C7—C8	-4.2 (15)
Au1—N1—C5—C4	-176.8 (7)	N1—C5—C7—N2	-1.2 (11)
C1—N1—C5—C4	0.4 (13)	N1—C5—C7—C8	177.9 (9)
Au1—N1—C5—C7	1.2 (10)	C5—C7—C8—C9	180.0 (9)
C1—N1—C5—C7	178.4 (8)	N2—C7—C8—C9	-0.9 (14)
Au1—N2—C11—C10	178.3 (7)	C7—C8—C9—C10	1.1 (16)
C7—N2—C11—C10	-1.1 (13)	C8—C9—C10—C11	-1.3 (16)
Au1—N2—C7—C8	-178.6 (7)	C8—C9—C10—C12	-179.4 (10)
Au1—N2—C7—C5	0.6 (9)	C12—C10—C11—N2	179.4 (9)
C11—N2—C7—C5	-179.9 (7)	C9—C10—C11—N2	1.3 (14)

Symmetry codes: (i) $-x, -y, -z$; (ii) $-x+2, -y+1, -z+1$; (iii) $x+1, y+1, z$; (iv) $-x+1, -y+1, -z$; (v) $x-1, y-1, z$; (vi) $x+1, y, z$; (vii) $-x+3, -y+2, -z+1$; (viii) $x-1, y, z$; (ix) $-x+1, -y, -z$; (x) $-x+2, -y+2, -z+1$; (xi) $-x+3, -y+3, -z+1$.

Hydrogen-bond geometry ($\text{\AA}, ^\circ$)

$D-H\cdots A$	$D-H$	$H\cdots A$	$D\cdots A$	$D-H\cdots A$
C1—H1 \cdots C11	0.93	2.59	3.203 (11)	124
C8—H8 \cdots C12 ^{viii}	0.93	2.75	3.666 (12)	169
C11—H11 \cdots C12	0.93	2.64	3.233 (11)	122

Symmetry codes: (viii) $x-1, y, z$.

Fig. 1

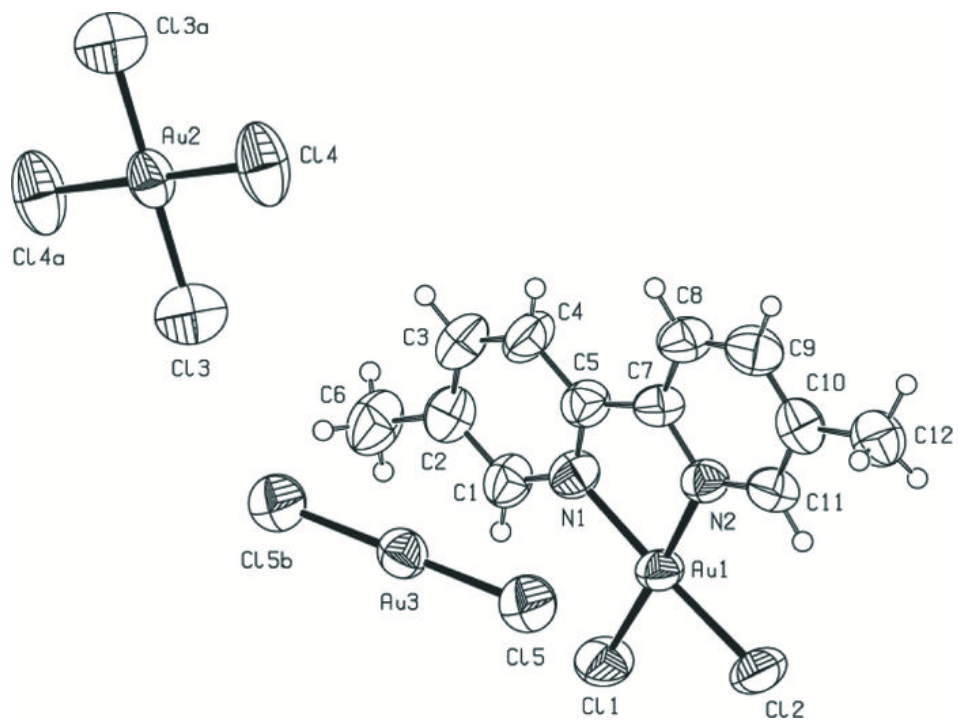


Fig. 2

