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cis-Dichloridobis(diethylphenylphosphine-κ*P*)platinum(II)

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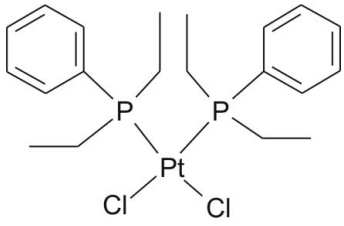
Key indicators: single-crystal X-ray study; T = 120 K; mean σ(C–C) = 0.007 Å; R factor = 0.025; wR factor = 0.089; data-to-parameter ratio = 18.7.

In the title compound, $[PtCl_2(C_{10}H_{15}P)_2]$, the Pt atom adopts a slightly distorted square-planar geometry. The phenyl rings form dihedral angles of 82.21 (11) and 79.98 (11)° with the $PtCl_2P_2$ mean plane. The crystal structure is stabilized by weak intra- and intermolecular C—H···Cl hydrogen bonds.

Related literature

For the structure of the related *cis*-dichloridobis(ethyldiphenylphosphine-κ*P*)platinum(II) compound, see: Domanska-Babul, Chojnacki & Pikies (2007). For related literature, see: Chojnacki *et al.* (2007); Domanska-Babul, Chojnacki, Matern & Pikies (2007); Ho *et al.* (1982); Matern *et al.* (2000); Porzio *et al.* (1980).



Experimental

Crystal data

$[PtCl_2(C_{10}H_{15}P)_2]$
M_r = 598.37
Monoclinic, $P2_1/c$
a = 14.8957 (5) Å
b = 9.0402 (5) Å
c = 16.3565 (5) Å
β = 94.865 (3)°
V = 2194.63 (16) Å^3
Z = 4
Mo $K\alpha$ radiation
μ = 6.79 mm^{-1}
T = 120 (2) K
0.16 × 0.11 × 0.06 mm

Data collection

Oxford Diffraction KM-4 CCD diffractometer
Absorption correction: analytical [*CrysAlis RED*; Oxford Diffraction (2006), Clark & Reid (1995)]
T_{min} = 0.278, T_{max} = 0.398
9492 measured reflections
4301 independent reflections
4145 reflections with $I > 2\sigma(I)$
R_{int} = 0.013

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.025
$wR(F^2)$ = 0.089
S = 1.36
4301 reflections
230 parameters
H-atom parameters constrained
$\Delta\rho_{max}$ = 1.33 e Å^{-3}
$\Delta\rho_{min}$ = −1.25 e Å^{-3}

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

D—H···A	D—H	H···A	D···A	D—H···A
C7—H7A···Cl1	0.99	2.67	3.178 (5)	112
C19—H19A···Cl2	0.99	2.77	3.155 (5)	103
C5—H5···Cl1^{i}	0.95	2.78	3.677 (5)	158
C17—H17A···Cl1^{ii}	0.99	2.51	3.382 (5)	146

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

Data collection: *CrysAlis CCD* (Oxford Diffraction, 2006); cell refinement: *CrysAlis RED* (Oxford Diffraction, 2006); data reduction: *CrysAlis RED*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 1997); program(s) used to refine structure: *SHELXL97* (Sheldrick, 1997); molecular graphics: *ORTEP-3 for Windows* (Farrugia, 1997); software used to prepare material for publication: *WinGX* (Farrugia, 1999) and *PLATON* (Spek, 2003).

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Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: RZ2163).

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supplementary materials

Acta Cryst. (2007). E**63**, m2583 [**doi:10.1107/S1600536807045540**]

cis-Dichloridobis(diethylphenylphosphine-κ*P*)platinum(II)

W. Domanska-Babul, J. Pikies and J. Chojnacki

Comment

We have a standing interest in the reactivity of $[(R_3P)_2PtCl_2]$ compounds towards diphosphanes (Domanska-Babul, Chojnacki, Matern & Pikies, 2007). The title compound, $[(Et_2PhP)_2PtCl_2]$, was obtained according to the published procedure (Matern *et al.*, 2000) and recovered from the reaction mixture during the studies.

An *ORTEP* plot of the title compound is shown in Fig. 1. The geometry of the Pt atom is slightly distorted square planar with the metal displaced by only 0.0007 (2) Å from the $PtCl_2P_2$ mean plane. The Cl and P atoms display a substantial tetrahedral distortion, being displaced by 0.1647 (13), −0.1394 (13), −0.1349 (13) and 0.1267 (12) Å for Cl1, Cl2, P1 and P2 respectively. For comparison, the displacements found for the same atoms in the related complex $[(EtPh_2P)_2PtCl_2]$ (Domanska-Babul, Chojnacki & Pikies 2007) are −0.0238 (5), −0.0008 (5), −0.0251 (5) and −0.0060 (5) Å respectively. Even more significant departures from planarity are observed in the case of sterically demanding phosphanes ligands, *viz.* in $[cis\text{-}(^tBu_2PhP)_2PtCl_2]$ (Porzio *et al.*, 1980). The bond angle P1–Pt–P2 of 94.43 (4)° indicates steric repulsion of the $PhEt_2P$ groups smaller than those observed for the $EtPh_2P$ groups in $[(EtPh_2P)_2PtCl_2]$ (100.23 °) and for the $MePh_2P$ groups in $[(MePh_2P)_2PtCl_2]$ (98.11 °; Ho *et al.*, 1982). The average Pt–P and Pt–Cl distances of 2.253 (13) Å and 2.356 (12) Å respectively are typical for $[cis\text{-}(R_3P)_2PtCl_2]$ complexes. The dihedral angles formed by the C1—C6 and C11—C16 phenyl rings with the $PtCl_2P_2$ mean plane are 82.21 (11) and 79.98 (11) ° respectively. The crystal structure is reinforced by weak intra- and intermolecular C—H···Cl hydrogen interactions (Table 1).

Experimental

The title compound compound $[cis\text{-}\{C_6H_5(C_2H_5)_2P\}_2PtCl_2]$ has been obtained as yellow powder in the reaction of a solution of phenyl(diethyl)phosphane in ethanol with a solution of potassium tetrachloroplatinate(II) in water (Matern *et al.*, 2000). Slow crystallization from THF at ambient temperature yielded crystals suitable for X-ray analysis.

Refinement

All C–H hydrogen atoms were refined as riding on carbon atoms with methyl C–H = 0.98 Å, methylen C–H = 0.99 Å, aromatic C–H = 0.95 Å and $U_{iso}(H) = 1.2\ U_{eq}(C)$ for aromatic CH, 1.3 for CH_2 groups and 1.5 for methyl groups.

Figures

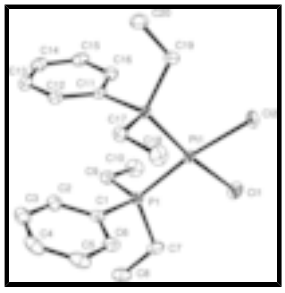


Fig. 1. View of the title compound (50% probability displacement ellipsoids). H atoms are omitted for clarity.

cis-Dichloridobis(diethylphenylphosphine-κ_P_)platinum(II)

Crystal data

$[PtCl_2(C_{10}H_{15}P)_2]$	F_{000} = 1168
M_r = 598.37	D_x = 1.811 Mg m^{-3}
Monoclinic, $P2_1/c$	Mo $K\alpha$ radiation λ = 0.71073 Å
Hall symbol: -P 2ybc	Cell parameters from 12825 reflections
a = 14.8957 (5) Å	θ = 2.3–32.4º
b = 9.0402 (5) Å	μ = 6.79 mm^{-1}
c = 16.3565 (5) Å	T = 120 (2) K
β = 94.865 (3)º	Prism, colourless
V = 2194.63 (16) Å^3	0.16 × 0.11 × 0.06 mm
Z = 4	

Data collection

Oxford Diffraction KM-4 CCD diffractometer	4145 reflections with $I > 2\sigma(I)$
Monochromator: graphite	R_{int} = 0.013
0.75° ω scans	θ_{max} = 26º
Absorption correction: analytical [CrysAlis RED; Oxford Diffraction (2006), Clark & Reid (1995)]	θ_{min} = 2.5º
T_{min} = 0.278, T_{max} = 0.398	h = −17→18
9492 measured reflections	k = −11→8
4301 independent reflections	l = −20→19

Refinement

Refinement on F^2	H-atom parameters constrained
Least-squares matrix: full	$w = 1/[\sigma^2(F_o^2) + (0.0454P)^2 + 6.1376P]$ where $P = (F_o^2 + 2F_c^2)/3$
$R[F^2 > 2\sigma(F^2)]$ = 0.025	$(\Delta/\sigma)_{max}$ = 0.003
$wR(F^2)$ = 0.089	$\Delta\rho_{max}$ = 1.33 e Å^{-3}

S = 1.36
4301 reflections
230 parameters

$\Delta\rho_{min}$ = −1.25 e Å^{-3}
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.

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

	x	y	z	U_{iso}*/U_{eq}
Pt1	0.251723 (11)	0.969895 (18)	0.300696 (10)	0.01372 (9)
Cl1	0.23065 (9)	0.71248 (14)	0.29244 (8)	0.0258 (3)
Cl2	0.27795 (9)	0.93276 (16)	0.44366 (7)	0.0252 (3)
P1	0.20696 (9)	0.99057 (15)	0.16603 (8)	0.0161 (2)
P2	0.29263 (8)	1.20887 (13)	0.31503 (7)	0.0142 (2)
C1	0.1381 (3)	1.1543 (6)	0.1407 (3)	0.0172 (9)
C2	0.1664 (3)	1.2704 (6)	0.0932 (3)	0.0211 (10)
H2	0.2229	1.264	0.0706	0.025*
C3	0.1137 (4)	1.3946 (6)	0.0786 (3)	0.0255 (11)
H3	0.1344	1.4734	0.0467	0.031*
C4	0.0304 (4)	1.4047 (7)	0.1106 (3)	0.0283 (12)
H4	−0.0058	1.4903	0.1007	0.034*
C5	0.0006 (3)	1.2896 (7)	0.1570 (3)	0.0277 (12)
H5	−0.0568	1.2955	0.1781	0.033*
C6	0.0542 (3)	1.1656 (6)	0.1728 (3)	0.0216 (10)
H6	0.0338	1.0878	0.2056	0.026*
C7	0.1319 (3)	0.8410 (6)	0.1277 (3)	0.0246 (11)
H7A	0.1636	0.7455	0.1371	0.032*
H7B	0.0784	0.8399	0.1597	0.032*
C8	0.1001 (4)	0.8539 (7)	0.0362 (3)	0.0300 (12)
H8A	0.0785	0.9547	0.0243	0.045*
H8B	0.0511	0.7835	0.0227	0.045*
H8C	0.1505	0.8318	0.0033	0.045*
C9	0.2961 (4)	0.9903 (6)	0.0959 (3)	0.0201 (10)
H9A	0.269	0.9986	0.0387	0.026*
H9B	0.3357	1.0771	0.1074	0.026*
C10	0.3520 (4)	0.8496 (7)	0.1050 (4)	0.0295 (12)
H10A	0.3808	0.8432	0.161	0.044*
H10B	0.3984	0.8514	0.0659	0.044*
H10C	0.3128	0.7636	0.0938	0.044*
C11	0.3676 (3)	1.2696 (5)	0.2393 (3)	0.0152 (9)
C12	0.3512 (3)	1.3932 (6)	0.1890 (3)	0.0187 (9)
H12	0.2988	1.4515	0.1938	0.022*
C13	0.4116 (4)	1.4313 (6)	0.1317 (3)	0.0235 (10)

H13	0.3987	1.5126	0.0959	0.028*
C14	0.4902 (3)	1.3512 (6)	0.1268 (3)	0.0250 (11)
H14	0.5311	1.3776	0.0878	0.03*
C15	0.5094 (3)	1.2316 (6)	0.1794 (3)	0.0233 (10)
H15	0.5646	1.1795	0.1779	0.028*
C16	0.4478 (3)	1.1887 (6)	0.2339 (3)	0.0205 (10)
H16	0.4597	1.1044	0.2677	0.025*
C17	0.2020 (3)	1.3438 (5)	0.3135 (3)	0.0175 (9)
H17A	0.2277	1.4422	0.3282	0.023*
H17B	0.1721	1.3503	0.2572	0.023*
C18	0.1314 (4)	1.3038 (7)	0.3732 (3)	0.0274 (12)
H18A	0.1015	1.2111	0.3557	0.041*
H18B	0.0866	1.3831	0.3734	0.041*
H18C	0.1612	1.2917	0.4286	0.041*
C19	0.3615 (3)	1.2459 (6)	0.4116 (3)	0.0194 (10)
H19A	0.324	1.2295	0.4579	0.025*
H19B	0.4117	1.1739	0.4171	0.025*
C20	0.4005 (4)	1.4016 (6)	0.4183 (3)	0.0251 (11)
H20A	0.4417	1.4165	0.3753	0.038*
H20B	0.4335	1.4144	0.4723	0.038*
H20C	0.3515	1.4741	0.4116	0.038*

Atomic displacement parameters (Å^2)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Pt1	0.01339 (12)	0.01029 (13)	0.01751 (13)	0.00008 (6)	0.00151 (8)	0.00160 (6)
Cl1	0.0306 (6)	0.0100 (5)	0.0368 (7)	−0.0006 (5)	0.0024 (5)	0.0022 (5)
Cl2	0.0323 (6)	0.0244 (6)	0.0186 (6)	−0.0026 (5)	−0.0003 (5)	0.0078 (5)
P1	0.0162 (6)	0.0141 (5)	0.0176 (6)	−0.0015 (5)	−0.0002 (5)	−0.0014 (5)
P2	0.0155 (5)	0.0109 (5)	0.0162 (5)	−0.0012 (4)	0.0015 (4)	0.0004 (4)
C1	0.014 (2)	0.020 (3)	0.017 (2)	0.0010 (18)	−0.0018 (17)	−0.0036 (19)
C2	0.023 (2)	0.024 (3)	0.016 (2)	−0.001 (2)	0.0022 (18)	−0.001 (2)
C3	0.033 (3)	0.023 (3)	0.020 (2)	0.004 (2)	−0.002 (2)	−0.001 (2)
C4	0.030 (3)	0.029 (3)	0.025 (3)	0.014 (2)	−0.006 (2)	−0.004 (2)
C5	0.018 (2)	0.038 (3)	0.026 (3)	0.008 (2)	−0.002 (2)	−0.007 (2)
C6	0.017 (2)	0.027 (3)	0.021 (2)	−0.002 (2)	0.0008 (18)	−0.004 (2)
C7	0.019 (2)	0.021 (3)	0.032 (3)	−0.004 (2)	−0.001 (2)	−0.005 (2)
C8	0.027 (3)	0.031 (3)	0.031 (3)	−0.005 (2)	−0.004 (2)	−0.010 (2)
C9	0.019 (2)	0.022 (2)	0.019 (2)	0.001 (2)	0.0013 (19)	−0.005 (2)
C10	0.027 (3)	0.029 (3)	0.033 (3)	0.009 (2)	0.007 (2)	−0.006 (2)
C11	0.012 (2)	0.016 (2)	0.018 (2)	−0.0026 (17)	0.0007 (16)	−0.0025 (18)
C12	0.017 (2)	0.019 (2)	0.020 (2)	−0.0029 (18)	0.0009 (18)	−0.0012 (19)
C13	0.025 (3)	0.022 (2)	0.023 (2)	−0.007 (2)	0.002 (2)	0.004 (2)
C14	0.023 (2)	0.029 (3)	0.025 (2)	−0.008 (2)	0.008 (2)	−0.005 (2)
C15	0.015 (2)	0.024 (3)	0.031 (3)	−0.001 (2)	0.0034 (19)	−0.006 (2)
C16	0.020 (2)	0.017 (2)	0.024 (2)	0.0005 (19)	0.0007 (19)	−0.001 (2)
C17	0.019 (2)	0.012 (2)	0.021 (2)	0.0048 (18)	0.0011 (18)	0.0007 (18)
C18	0.024 (3)	0.034 (3)	0.026 (3)	0.006 (2)	0.011 (2)	0.003 (2)

C19	0.017 (2)	0.022 (3)	0.018 (2)	−0.0030 (19)	−0.0016 (17)	−0.0003 (19)
C20	0.025 (3)	0.027 (3)	0.023 (2)	−0.005 (2)	0.000 (2)	−0.005 (2)

Geometric parameters (Å, °)

Pt1—P2	2.2515 (12)	C9—H9A	0.99
Pt1—P1	2.2544 (13)	C9—H9B	0.99
Pt1—Cl1	2.3505 (12)	C10—H10A	0.98
Pt1—Cl2	2.3619 (12)	C10—H10B	0.98
P1—C9	1.828 (5)	C10—H10C	0.98
P1—C1	1.828 (5)	C11—C12	1.397 (7)
P1—C7	1.831 (5)	C11—C16	1.409 (7)
P2—C17	1.818 (5)	C12—C13	1.396 (7)
P2—C11	1.822 (5)	C12—H12	0.95
P2—C19	1.840 (5)	C13—C14	1.385 (8)
C1—C2	1.392 (7)	C13—H13	0.95
C1—C6	1.400 (7)	C14—C15	1.395 (8)
C2—C3	1.379 (8)	C14—H14	0.95
C2—H2	0.95	C15—C16	1.387 (7)
C3—C4	1.390 (8)	C15—H15	0.95
C3—H3	0.95	C16—H16	0.95
C4—C5	1.383 (9)	C17—C18	1.537 (7)
C4—H4	0.95	C17—H17A	0.99
C5—C6	1.388 (8)	C17—H17B	0.99
C5—H5	0.95	C18—H18A	0.98
C6—H6	0.95	C18—H18B	0.98
C7—C8	1.535 (8)	C18—H18C	0.98
C7—H7A	0.99	C19—C20	1.523 (7)
C7—H7B	0.99	C19—H19A	0.99
C8—H8A	0.98	C19—H19B	0.99
C8—H8B	0.98	C20—H20A	0.98
C8—H8C	0.98	C20—H20B	0.98
C9—C10	1.520 (7)	C20—H20C	0.98
P2—Pt1—P1	94.43 (4)	C10—C9—H9B	109.4
P2—Pt1—Cl1	171.72 (4)	P1—C9—H9B	109.4
P1—Pt1—Cl1	89.94 (5)	H9A—C9—H9B	108
P2—Pt1—Cl2	90.73 (5)	C9—C10—H10A	109.5
P1—Pt1—Cl2	171.70 (5)	C9—C10—H10B	109.5
Cl1—Pt1—Cl2	85.77 (5)	H10A—C10—H10B	109.5
C9—P1—C1	106.4 (2)	C9—C10—H10C	109.5
C9—P1—C7	103.8 (2)	H10A—C10—H10C	109.5
C1—P1—C7	101.9 (2)	H10B—C10—H10C	109.5
C9—P1—Pt1	116.29 (18)	C12—C11—C16	119.0 (4)
C1—P1—Pt1	113.72 (16)	C12—C11—P2	123.7 (4)
C7—P1—Pt1	113.26 (19)	C16—C11—P2	117.3 (4)
C17—P2—C11	106.6 (2)	C13—C12—C11	120.1 (5)
C17—P2—C19	104.4 (2)	C13—C12—H12	120
C11—P2—C19	101.5 (2)	C11—C12—H12	120
C17—P2—Pt1	116.61 (16)	C14—C13—C12	120.4 (5)

C11—P2—Pt1	113.22 (16)	C14—C13—H13	119.8
C19—P2—Pt1	112.99 (17)	C12—C13—H13	119.8
C2—C1—C6	118.4 (5)	C13—C14—C15	120.0 (5)
C2—C1—P1	123.1 (4)	C13—C14—H14	120
C6—C1—P1	118.4 (4)	C15—C14—H14	120
C3—C2—C1	121.1 (5)	C16—C15—C14	120.0 (5)
C3—C2—H2	119.5	C16—C15—H15	120
C1—C2—H2	119.5	C14—C15—H15	120
C2—C3—C4	120.1 (5)	C15—C16—C11	120.4 (5)
C2—C3—H3	120	C15—C16—H16	119.8
C4—C3—H3	120	C11—C16—H16	119.8
C5—C4—C3	119.7 (5)	C18—C17—P2	112.3 (3)
C5—C4—H4	120.1	C18—C17—H17A	109.1
C3—C4—H4	120.1	P2—C17—H17A	109.1
C4—C5—C6	120.2 (5)	C18—C17—H17B	109.1
C4—C5—H5	119.9	P2—C17—H17B	109.1
C6—C5—H5	119.9	H17A—C17—H17B	107.9
C5—C6—C1	120.5 (5)	C17—C18—H18A	109.5
C5—C6—H6	119.8	C17—C18—H18B	109.5
C1—C6—H6	119.8	H18A—C18—H18B	109.5
C8—C7—P1	114.0 (4)	C17—C18—H18C	109.5
C8—C7—H7A	108.8	H18A—C18—H18C	109.5
P1—C7—H7A	108.8	H18B—C18—H18C	109.5
C8—C7—H7B	108.8	C20—C19—P2	114.3 (4)
P1—C7—H7B	108.8	C20—C19—H19A	108.7
H7A—C7—H7B	107.6	P2—C19—H19A	108.7
C7—C8—H8A	109.5	C20—C19—H19B	108.7
C7—C8—H8B	109.5	P2—C19—H19B	108.7
H8A—C8—H8B	109.5	H19A—C19—H19B	107.6
C7—C8—H8C	109.5	C19—C20—H20A	109.5
H8A—C8—H8C	109.5	C19—C20—H20B	109.5
H8B—C8—H8C	109.5	H20A—C20—H20B	109.5
C10—C9—P1	111.1 (4)	C19—C20—H20C	109.5
C10—C9—H9A	109.4	H20A—C20—H20C	109.5
P1—C9—H9A	109.4	H20B—C20—H20C	109.5
Cl1—Pt1—P1—C1	141.79 (18)	C17—P2—C11—C12	−3.0 (5)
Cl1—Pt1—P1—C7	26.11 (18)	C17—P2—C11—C16	174.8 (4)
Cl1—Pt1—P1—C9	−94.1 (2)	C19—P2—C11—C12	−112.1 (4)
P2—Pt1—P1—C1	−45.25 (18)	C19—P2—C11—C16	65.8 (4)
P2—Pt1—P1—C7	−160.93 (18)	Pt1—P2—C17—C18	50.7 (4)
P2—Pt1—P1—C9	78.9 (2)	C11—P2—C17—C18	178.3 (3)
Cl2—Pt1—P2—C11	135.17 (17)	C19—P2—C17—C18	−74.8 (4)
Cl2—Pt1—P2—C17	−100.55 (18)	Pt1—P2—C19—C20	172.4 (3)
Cl2—Pt1—P2—C19	20.46 (17)	C11—P2—C19—C20	50.8 (4)
P1—Pt1—P2—C11	−51.34 (17)	C17—P2—C19—C20	−59.9 (4)
P1—Pt1—P2—C17	72.95 (18)	P1—C1—C2—C3	−177.3 (4)
P1—Pt1—P2—C19	−166.05 (17)	C6—C1—C2—C3	0.5 (7)
Pt1—P1—C1—C2	113.7 (4)	P1—C1—C6—C5	178.3 (4)
Pt1—P1—C1—C6	−64.1 (4)	C2—C1—C6—C5	0.4 (7)

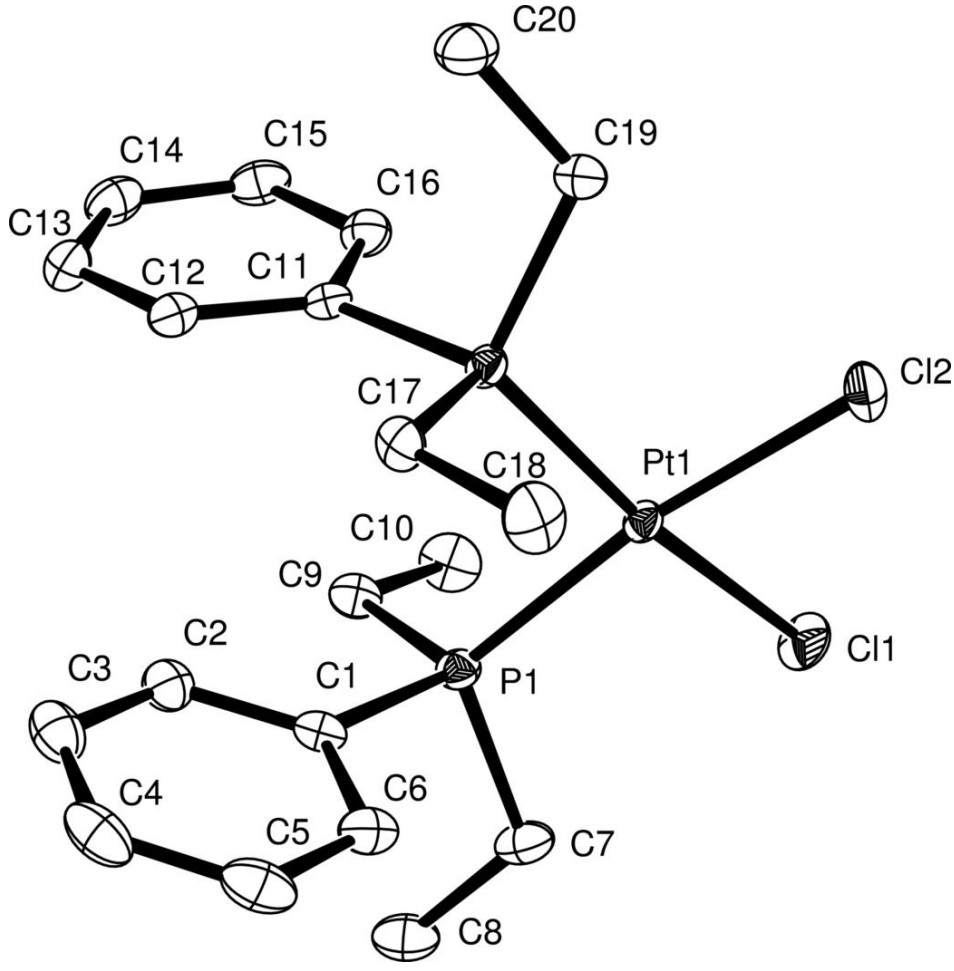
C7—P1—C1—C2	−124.1 (4)	C1—C2—C3—C4	−0.7 (8)
C7—P1—C1—C6	58.2 (4)	C2—C3—C4—C5	−0.1 (8)
C9—P1—C1—C2	−15.6 (5)	C3—C4—C5—C6	1.1 (8)
C9—P1—C1—C6	166.6 (4)	C4—C5—C6—C1	−1.2 (8)
Pt1—P1—C7—C8	179.5 (3)	P2—C11—C12—C13	−179.2 (4)
C1—P1—C7—C8	57.0 (4)	C16—C11—C12—C13	3.0 (7)
C9—P1—C7—C8	−53.4 (4)	P2—C11—C16—C15	−178.0 (4)
Pt1—P1—C9—C10	58.3 (4)	C12—C11—C16—C15	0.0 (7)
C1—P1—C9—C10	−173.8 (4)	C11—C12—C13—C14	−3.1 (8)
C7—P1—C9—C10	−66.8 (4)	C12—C13—C14—C15	0.1 (8)
Pt1—P2—C11—C12	126.5 (4)	C13—C14—C15—C16	2.9 (8)
Pt1—P2—C11—C16	−55.6 (4)	C14—C15—C16—C11	−2.9 (8)

Hydrogen-bond geometry (Å, °)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
C7—H7A···Cl1	0.99	2.67	3.178 (5)	112
C19—H19A···Cl2	0.99	2.77	3.155 (5)	103
C5—H5···Cl1^{i}	0.95	2.78	3.677 (5)	158
C17—H17A···Cl1^{ii}	0.99	2.51	3.382 (5)	146

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

Fig. 1


C20
C19
C14
C15
C16
C13
C12
C11
C17
Cl2
C18
Pt1
C10
C9
C2
C3
C1
P1
Cl1
C4
C6
C5
C7
C8