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

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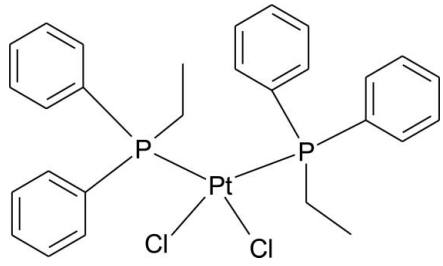
Key indicators: single-crystal X-ray study; T = 120 K; mean σ(C–C) = 0.006 Å; R factor = 0.029; wR factor = 0.072; data-to-parameter ratio = 18.7.

In the title compound, $[PtCl_2(C_{14}H_{15}P)_2]$, the isomer from the reaction of potassium tetrachloridoplatinate(II) and ethyldiphenylphosphine, the Pt atom is in a square-planar geometry.

Related literature

For the related *cis*-dichloridobis(methyldiphenylphosphine)-platinum(II), see Ho *et al.* (1982). For related literature, see: Domańska-Babul *et al.* (2007); Krautscheid *et al.* (1997); Porzio *et al.* (1980).



Experimental

Crystal data

$[PtCl_2(C_{14}H_{15}P)_2]$
M_r = 694.45
Monoclinic, $P2_1/c$
a = 14.2831 (6) Å
b = 11.1025 (5) Å
c = 16.9556 (7) Å
β = 106.677 (4)°
V = 2575.69 (19) Å^3
Z = 4
Mo $K\alpha$ radiation
μ = 5.80 mm^{-1}
T = 120 (2) K
0.26 × 0.14 × 0.07 mm

Data collection

Oxford Diffraction KM-4 CCD diffractometer
Absorption correction: analytical (*CrysAlis RED*; Oxford Diffraction, 2006; Clark & Reid, 1995). T_{min} = 0.232, T_{max} = 0.501
19512 measured reflections
5614 independent reflections
5413 reflections with $I > 2\sigma(I)$
R_{int} = 0.032

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.029
$wR(F^2)$ = 0.072
S = 1.10
5614 reflections
300 parameters
H-atom parameters constrained
$\Delta\rho_{max}$ = 2.88 e Å^{-3}
$\Delta\rho_{min}$ = −1.23 e Å^{-3}

Table 1
Selected bond lengths (Å).

Pt1—P1	2.2633 (9)	Pt1—Cl1	2.3458 (9)
Pt1—P2	2.2517 (9)	Pt1—Cl2	2.3618 (9)

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: NG2281).

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supplementary materials

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cis-Dichloridobis(ethyldiphenylphosphine-*κP*)platinum(II)

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Comment

In the course of our studies upon the reactivity of $[(R_3P)_2MCl_2]$ towards $R'_2P–P(SiMe_3)_2$ (Domańska-Babul *et al.*, 2007) we have studied the reaction of $(^iPr_2N)_2P–P(SiMe_3)_2$ with $[(EtPh_2P)_2PtCl_2]$. The title compound was obtained unchanged in the synthesis.

The complex exhibits square-planar coordination that is typical for platinum(II) compounds. The platinum atom is 0.0556 (4) Å above the square plane. The structure is similar to that of $[(MePh_2P)_2PtCl_2]$ (Ho *et al.*, 1982). The square planar geometry is characteristic of complexes having less bulky tertiary phosphines. Significant deviation from planarity is observed with sterically bulky phosphines ligands, as noted in *cis*-dichlorobis(di-*t*-butylphenylphosphine)platinum(II) (Krautscheid *et al.*, 1997; Porzio *et al.*, 1980). The bond dimensions involving the platinum atom are typical of [*cis*-$(R_3P)_2PtCl_2$] compounds such as for $[(MePh_2P)_2PtCl_2]$. Weak intermolecular C—H···Cl interactions are also present.

Experimental

The compound was been obtained as yellow powder by the reaction of a solution of ethyl(diphenyl)phosphane in ethanol with a solution of potassium tetrachloroplatinate(II) in water. It was obtained in a crystalline habit from the reaction of $(^iPr_2N)_2P–P(SiMe_3)_2$ with $[(EtPh_2P)_2PtCl_2]$ a 1:1 molar ratio in THF. Crystals were obtained by recrystallization from pentane at 249 K

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

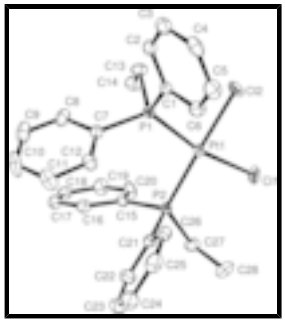


Fig. 1. View of (I) (50% probability displacement ellipsoids)

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

Crystal data

$[PtCl_2(C_{14}H_{15}P)_2]$	F_{000} = 1360
M_r = 694.45	D_x = 1.791 Mg m^{-3}
Monoclinic, $P2_1/c$	Mo $K\alpha$ radiation λ = 0.71073 Å
Hall symbol: -P 2ybc	Cell parameters from 9761 reflections
a = 14.2831 (6) Å	θ = 2.9–32.5º
b = 11.1025 (5) Å	μ = 5.80 mm^{-1}
c = 16.9556 (7) Å	T = 120 (2) K
β = 106.677 (4)º	Prism, yellow
V = 2575.69 (19) Å^3	0.26 × 0.14 × 0.07 mm
Z = 4	

Data collection

Oxford Diffraction KM-4-CCD diffractometer	5413 reflections with $I > 2\sigma(I)$
Monochromator: graphite	R_{int} = 0.032
0.75° ω scans	θ_{max} = 27º
Absorption correction: Analytical CrysAlis RED (Oxford Diffraction, 2006; Clark & Reid, 1995).	θ_{min} = 2.9º
T_{min} = 0.232, T_{max} = 0.501	h = −18→18
19512 measured reflections	k = −14→14
5614 independent reflections	l = −21→13

Refinement

Refinement on F^2	H-atom parameters constrained
Least-squares matrix: full	$w = 1/[\sigma^2(F_o^2) + (0.0399P)^2 + 6.0673P]$ where $P = (F_o^2 + 2F_c^2)/3$
$R[F^2 > 2\sigma(F^2)]$ = 0.029	$(\Delta/\sigma)_{max}$ = 0.001
$wR(F^2)$ = 0.072	$\Delta\rho_{max}$ = 2.88 e Å^{-3}
S = 1.10	$\Delta\rho_{min}$ = −1.23 e Å^{-3}
5614 reflections	Extinction correction: none
300 parameters	

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	0.270906 (9)	0.459023 (11)	0.282544 (7)	0.01446 (6)
P1	0.15530 (6)	0.41497 (8)	0.34561 (5)	0.01523 (17)
P2	0.36679 (6)	0.29500 (8)	0.31639 (5)	0.01523 (17)
Cl1	0.36472 (8)	0.53298 (8)	0.20004 (6)	0.0278 (2)
Cl2	0.17113 (7)	0.62945 (9)	0.23685 (6)	0.0308 (2)
C1	0.1445 (3)	0.5374 (3)	0.4142 (2)	0.0167 (7)
C2	0.0551 (3)	0.5606 (3)	0.4295 (2)	0.0221 (7)
H2	−0.0001	0.5119	0.4043	0.027*
C3	0.0462 (3)	0.6541 (3)	0.4811 (2)	0.0256 (8)
H3	−0.0152	0.6699	0.4904	0.031*
C4	0.1265 (3)	0.7245 (3)	0.5193 (2)	0.0268 (8)
H4	0.1207	0.7873	0.5557	0.032*
C5	0.2154 (3)	0.7028 (4)	0.5043 (2)	0.0287 (8)
H5	0.2705	0.7513	0.5301	0.034*
C6	0.2243 (3)	0.6101 (3)	0.4515 (2)	0.0244 (8)
H6	0.2852	0.5964	0.441	0.029*
C7	0.1573 (3)	0.2795 (3)	0.4077 (2)	0.0179 (7)
C8	0.0867 (3)	0.1887 (3)	0.3837 (2)	0.0258 (8)
H8	0.0362	0.1962	0.3333	0.031*
C9	0.0898 (4)	0.0879 (4)	0.4328 (3)	0.0357 (10)
H9	0.0402	0.0284	0.4168	0.043*
C10	0.1648 (4)	0.0736 (4)	0.5049 (3)	0.0386 (11)
H10	0.1679	0.0031	0.5373	0.046*
C11	0.2353 (4)	0.1624 (4)	0.5297 (2)	0.0316 (9)
H11	0.2874	0.1524	0.5788	0.038*
C12	0.2297 (3)	0.2667 (3)	0.4825 (2)	0.0227 (7)
H12	0.2758	0.3296	0.5016	0.027*
C13	0.0365 (3)	0.4052 (4)	0.2677 (2)	0.0225 (7)
H13A	−0.0121	0.3729	0.2937	0.029*
H13B	0.0152	0.4873	0.2475	0.029*
C14	0.0376 (3)	0.3256 (4)	0.1944 (2)	0.0300 (9)
H14A	0.0771	0.3641	0.1629	0.045*
H14B	−0.0294	0.3148	0.159	0.045*
H14C	0.0657	0.247	0.2144	0.045*
C15	0.2996 (3)	0.1563 (3)	0.2819 (2)	0.0181 (7)
C16	0.2805 (3)	0.0686 (3)	0.3338 (2)	0.0212 (7)
H16	0.2992	0.0818	0.3916	0.025*
C17	0.2339 (3)	−0.0384 (3)	0.3015 (3)	0.0237 (8)
H17	0.2212	−0.098	0.3373	0.028*

C18	0.2061 (3)	−0.0577 (4)	0.2169 (3)	0.0249 (8)
H18	0.1767	−0.1319	0.1951	0.03*
C19	0.2210 (3)	0.0305 (4)	0.1648 (3)	0.0298 (9)
H19	0.1994	0.0187	0.1069	0.036*
C20	0.2678 (3)	0.1370 (4)	0.1970 (2)	0.0280 (8)
H20	0.2782	0.1974	0.1607	0.034*
C21	0.4359 (2)	0.2718 (3)	0.4232 (2)	0.0184 (7)
C22	0.4926 (3)	0.1674 (4)	0.4455 (3)	0.0284 (8)
H22	0.4899	0.1057	0.4061	0.034*
C23	0.5528 (3)	0.1547 (4)	0.5254 (3)	0.0332 (9)
H23	0.5913	0.0839	0.5402	0.04*
C24	0.5576 (3)	0.2429 (4)	0.5837 (2)	0.0333 (10)
H24	0.5987	0.2325	0.6383	0.04*
C25	0.5021 (3)	0.3470 (4)	0.5622 (2)	0.0295 (9)
H25	0.5046	0.4077	0.6023	0.035*
C26	0.4427 (3)	0.3623 (3)	0.4817 (2)	0.0225 (7)
H26	0.4066	0.4348	0.4666	0.027*
C27	0.4649 (3)	0.2823 (4)	0.2668 (2)	0.0232 (7)
H27A	0.4863	0.1972	0.2697	0.03*
H27B	0.4379	0.3034	0.2079	0.03*
C28	0.5551 (3)	0.3615 (4)	0.3040 (3)	0.0313 (9)
H28A	0.5372	0.4465	0.2938	0.047*
H28B	0.6065	0.3414	0.2783	0.047*
H28C	0.5791	0.3472	0.3634	0.047*

Atomic displacement parameters (Å^2)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Pt1	0.01654 (8)	0.01163 (8)	0.01519 (8)	−0.00052 (4)	0.00450 (5)	0.00112 (4)
P1	0.0155 (4)	0.0138 (4)	0.0161 (4)	0.0003 (3)	0.0041 (3)	−0.0004 (3)
P2	0.0140 (4)	0.0137 (4)	0.0174 (4)	−0.0005 (3)	0.0037 (3)	−0.0013 (3)
Cl1	0.0330 (5)	0.0240 (5)	0.0315 (5)	−0.0059 (4)	0.0174 (4)	0.0040 (3)
Cl2	0.0351 (5)	0.0213 (4)	0.0369 (5)	0.0105 (4)	0.0121 (4)	0.0129 (4)
C1	0.0216 (17)	0.0132 (16)	0.0164 (16)	0.0034 (12)	0.0072 (14)	0.0024 (12)
C2	0.0253 (19)	0.0192 (17)	0.0244 (18)	−0.0008 (14)	0.0111 (15)	0.0020 (14)
C3	0.034 (2)	0.0206 (18)	0.0275 (19)	0.0058 (15)	0.0176 (16)	0.0023 (15)
C4	0.045 (2)	0.0164 (17)	0.0201 (17)	0.0039 (16)	0.0118 (16)	−0.0002 (14)
C5	0.033 (2)	0.0226 (19)	0.027 (2)	−0.0041 (16)	0.0029 (16)	−0.0045 (16)
C6	0.0220 (18)	0.0225 (18)	0.0272 (18)	0.0005 (14)	0.0045 (15)	−0.0034 (15)
C7	0.0203 (16)	0.0157 (16)	0.0198 (16)	−0.0002 (13)	0.0090 (13)	−0.0010 (13)
C8	0.0266 (19)	0.0230 (19)	0.030 (2)	−0.0086 (15)	0.0116 (16)	−0.0073 (15)
C9	0.051 (3)	0.024 (2)	0.040 (2)	−0.0164 (19)	0.024 (2)	−0.0079 (18)
C10	0.074 (3)	0.0173 (19)	0.032 (2)	−0.006 (2)	0.028 (2)	0.0026 (17)
C11	0.052 (3)	0.0221 (19)	0.0204 (18)	0.0032 (18)	0.0101 (17)	−0.0003 (15)
C12	0.0294 (19)	0.0163 (17)	0.0228 (17)	0.0001 (14)	0.0081 (15)	−0.0020 (14)
C13	0.0164 (16)	0.0253 (19)	0.0225 (17)	0.0018 (14)	0.0003 (13)	−0.0030 (14)
C14	0.0258 (19)	0.036 (2)	0.0238 (19)	0.0035 (17)	−0.0006 (15)	−0.0048 (17)
C15	0.0174 (16)	0.0125 (16)	0.0232 (17)	0.0018 (13)	0.0036 (13)	−0.0027 (13)

C16	0.0215 (17)	0.0209 (17)	0.0210 (17)	0.0003 (14)	0.0060 (14)	−0.0007 (14)
C17	0.0224 (19)	0.0180 (18)	0.032 (2)	−0.0005 (13)	0.0097 (16)	0.0003 (14)
C18	0.0199 (17)	0.0193 (18)	0.034 (2)	−0.0024 (14)	0.0058 (15)	−0.0071 (15)
C19	0.033 (2)	0.028 (2)	0.025 (2)	−0.0058 (16)	0.0031 (17)	−0.0062 (16)
C20	0.038 (2)	0.0209 (19)	0.0211 (18)	−0.0082 (16)	0.0017 (16)	0.0010 (15)
C21	0.0155 (15)	0.0182 (17)	0.0182 (16)	−0.0031 (13)	−0.0006 (12)	−0.0014 (13)
C22	0.0238 (19)	0.0234 (19)	0.034 (2)	0.0019 (15)	0.0019 (16)	0.0030 (16)
C23	0.025 (2)	0.030 (2)	0.038 (2)	0.0001 (16)	−0.0030 (17)	0.0126 (18)
C24	0.028 (2)	0.042 (2)	0.0219 (19)	−0.0080 (18)	−0.0055 (15)	0.0113 (18)
C25	0.031 (2)	0.034 (2)	0.0212 (18)	−0.0110 (17)	0.0038 (15)	−0.0035 (16)
C26	0.0209 (17)	0.0206 (18)	0.0252 (18)	−0.0030 (14)	0.0051 (14)	−0.0007 (14)
C27	0.0213 (17)	0.0238 (18)	0.0263 (19)	0.0030 (14)	0.0099 (15)	−0.0041 (15)
C28	0.0193 (18)	0.043 (2)	0.032 (2)	−0.0063 (17)	0.0092 (16)	−0.0061 (18)

Geometric parameters (Å, °)

Pt1—P1	2.2633 (9)	C13—H13A	0.99
Pt1—P2	2.2517 (9)	C13—H13B	0.99
Pt1—Cl1	2.3458 (9)	C14—H14A	0.98
Pt1—Cl2	2.3618 (9)	C14—H14B	0.98
P1—C1	1.824 (3)	C14—H14C	0.98
P1—C13	1.830 (4)	C15—C16	1.391 (5)
P1—C7	1.832 (4)	C15—C20	1.397 (5)
P2—C21	1.816 (4)	C16—C17	1.394 (5)
P2—C15	1.820 (4)	C16—H16	0.95
P2—C27	1.835 (4)	C17—C18	1.391 (6)
C1—C6	1.391 (5)	C17—H17	0.95
C1—C2	1.398 (5)	C18—C19	1.376 (6)
C2—C3	1.387 (5)	C18—H18	0.95
C2—H2	0.95	C19—C20	1.390 (5)
C3—C4	1.386 (6)	C19—H19	0.95
C3—H3	0.95	C20—H20	0.95
C4—C5	1.385 (6)	C21—C26	1.396 (5)
C4—H4	0.95	C21—C22	1.403 (5)
C5—C6	1.394 (5)	C22—C23	1.388 (6)
C5—H5	0.95	C22—H22	0.95
C6—H6	0.95	C23—C24	1.379 (7)
C7—C12	1.395 (5)	C23—H23	0.95
C7—C8	1.400 (5)	C24—C25	1.390 (6)
C8—C9	1.388 (6)	C24—H24	0.95
C8—H8	0.95	C25—C26	1.395 (5)
C9—C10	1.385 (7)	C25—H25	0.95
C9—H9	0.95	C26—H26	0.95
C10—C11	1.386 (7)	C27—C28	1.537 (5)
C10—H10	0.95	C27—H27A	0.99
C11—C12	1.397 (5)	C27—H27B	0.99
C11—H11	0.95	C28—H28A	0.98
C12—H12	0.95	C28—H28B	0.98
C13—C14	1.529 (5)	C28—H28C	0.98

P2—Pt1—P1	100.23 (3)	C14—C13—H13B	108.9
P2—Pt1—Cl1	91.45 (3)	P1—C13—H13B	108.9
P1—Pt1—Cl1	167.54 (3)	H13A—C13—H13B	107.7
P2—Pt1—Cl2	175.70 (3)	C13—C14—H14A	109.5
P1—Pt1—Cl2	82.81 (3)	C13—C14—H14B	109.5
Cl1—Pt1—Cl2	85.30 (3)	H14A—C14—H14B	109.5
C1—P1—C13	105.86 (17)	C13—C14—H14C	109.5
C1—P1—C7	103.62 (15)	H14A—C14—H14C	109.5
C13—P1—C7	102.95 (17)	H14B—C14—H14C	109.5
C1—P1—Pt1	110.29 (12)	C16—C15—C20	118.7 (3)
C13—P1—Pt1	108.86 (13)	C16—C15—P2	124.8 (3)
C7—P1—Pt1	123.80 (11)	C20—C15—P2	116.6 (3)
C21—P2—C15	106.63 (16)	C15—C16—C17	120.4 (3)
C21—P2—C27	100.27 (17)	C15—C16—H16	119.8
C15—P2—C27	100.92 (17)	C17—C16—H16	119.8
C21—P2—Pt1	119.05 (12)	C18—C17—C16	120.0 (4)
C15—P2—Pt1	112.12 (11)	C18—C17—H17	120
C27—P2—Pt1	115.72 (13)	C16—C17—H17	120
C6—C1—C2	118.8 (3)	C19—C18—C17	120.1 (4)
C6—C1—P1	120.9 (3)	C19—C18—H18	120
C2—C1—P1	120.3 (3)	C17—C18—H18	120
C3—C2—C1	120.6 (4)	C18—C19—C20	119.9 (4)
C3—C2—H2	119.7	C18—C19—H19	120
C1—C2—H2	119.7	C20—C19—H19	120
C4—C3—C2	120.2 (4)	C19—C20—C15	120.9 (4)
C4—C3—H3	119.9	C19—C20—H20	119.6
C2—C3—H3	119.9	C15—C20—H20	119.6
C5—C4—C3	119.7 (4)	C26—C21—C22	119.2 (3)
C5—C4—H4	120.1	C26—C21—P2	120.9 (3)
C3—C4—H4	120.1	C22—C21—P2	119.5 (3)
C4—C5—C6	120.2 (4)	C23—C22—C21	119.7 (4)
C4—C5—H5	119.9	C23—C22—H22	120.2
C6—C5—H5	119.9	C21—C22—H22	120.2
C1—C6—C5	120.5 (4)	C24—C23—C22	121.1 (4)
C1—C6—H6	119.8	C24—C23—H23	119.4
C5—C6—H6	119.8	C22—C23—H23	119.4
C12—C7—C8	118.4 (3)	C23—C24—C25	119.7 (4)
C12—C7—P1	119.4 (3)	C23—C24—H24	120.2
C8—C7—P1	122.2 (3)	C25—C24—H24	120.2
C9—C8—C7	120.6 (4)	C24—C25—C26	119.9 (4)
C9—C8—H8	119.7	C24—C25—H25	120
C7—C8—H8	119.7	C26—C25—H25	120
C10—C9—C8	120.5 (4)	C25—C26—C21	120.4 (4)
C10—C9—H9	119.8	C25—C26—H26	119.8
C8—C9—H9	119.8	C21—C26—H26	119.8
C9—C10—C11	119.8 (4)	C28—C27—P2	115.4 (3)
C9—C10—H10	120.1	C28—C27—H27A	108.4
C11—C10—H10	120.1	P2—C27—H27A	108.4
C10—C11—C12	120.0 (4)	C28—C27—H27B	108.4

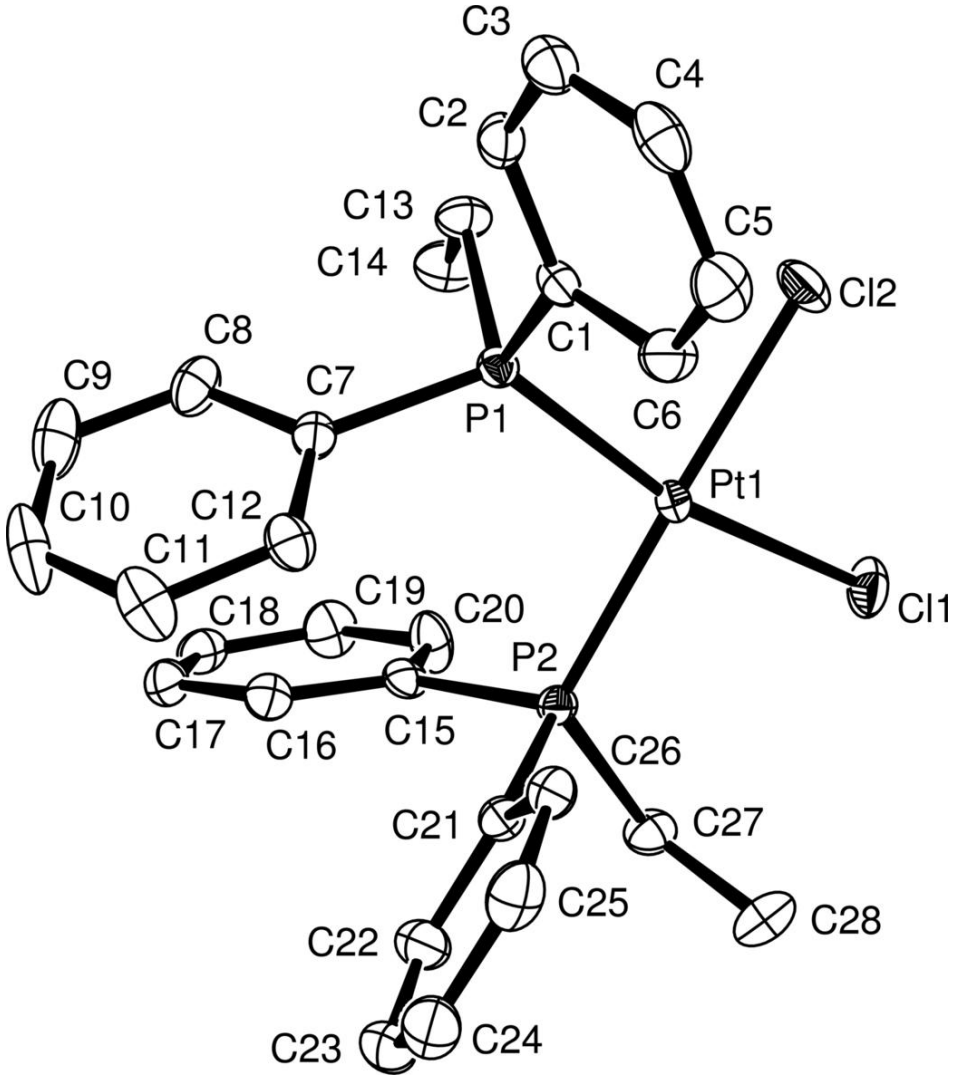
C10—C11—H11	120	P2—C27—H27B	108.4
C12—C11—H11	120	H27A—C27—H27B	107.5
C7—C12—C11	120.7 (4)	C27—C28—H28A	109.5
C7—C12—H12	119.7	C27—C28—H28B	109.5
C11—C12—H12	119.7	H28A—C28—H28B	109.5
C14—C13—P1	113.4 (3)	C27—C28—H28C	109.5
C14—C13—H13A	108.9	H28A—C28—H28C	109.5
P1—C13—H13A	108.9	H28B—C28—H28C	109.5
P2—Pt1—P1—C1	125.44 (12)	C7—C8—C9—C10	−2.3 (6)
Cl1—Pt1—P1—C1	−75.1 (2)	C8—C9—C10—C11	2.2 (7)
Cl2—Pt1—P1—C1	−57.64 (13)	C9—C10—C11—C12	0.9 (7)
P2—Pt1—P1—C13	−118.82 (13)	C8—C7—C12—C11	3.9 (5)
Cl1—Pt1—P1—C13	40.6 (2)	P1—C7—C12—C11	−177.6 (3)
Cl2—Pt1—P1—C13	58.09 (14)	C10—C11—C12—C7	−4.0 (6)
P2—Pt1—P1—C7	2.09 (14)	C1—P1—C13—C14	167.9 (3)
Cl1—Pt1—P1—C7	161.55 (18)	C7—P1—C13—C14	−83.7 (3)
Cl2—Pt1—P1—C7	179.01 (14)	Pt1—P1—C13—C14	49.3 (3)
P1—Pt1—P2—C21	−67.66 (14)	C21—P2—C15—C16	19.0 (4)
Cl1—Pt1—P2—C21	116.69 (14)	C27—P2—C15—C16	123.3 (3)
Cl2—Pt1—P2—C21	157.7 (4)	Pt1—P2—C15—C16	−112.9 (3)
P1—Pt1—P2—C15	57.73 (13)	C21—P2—C15—C20	−159.4 (3)
Cl1—Pt1—P2—C15	−117.92 (13)	C27—P2—C15—C20	−55.1 (3)
Cl2—Pt1—P2—C15	−76.9 (5)	Pt1—P2—C15—C20	68.7 (3)
P1—Pt1—P2—C27	172.74 (14)	C20—C15—C16—C17	2.6 (5)
Cl1—Pt1—P2—C27	−2.92 (14)	P2—C15—C16—C17	−175.7 (3)
Cl2—Pt1—P2—C27	38.1 (5)	C15—C16—C17—C18	−0.2 (6)
C13—P1—C1—C6	−146.9 (3)	C16—C17—C18—C19	−2.5 (6)
C7—P1—C1—C6	105.2 (3)	C17—C18—C19—C20	2.8 (6)
Pt1—P1—C1—C6	−29.3 (3)	C18—C19—C20—C15	−0.3 (7)
C13—P1—C1—C2	32.5 (3)	C16—C15—C20—C19	−2.3 (6)
C7—P1—C1—C2	−75.5 (3)	P2—C15—C20—C19	176.1 (3)
Pt1—P1—C1—C2	150.1 (3)	C15—P2—C21—C26	−138.3 (3)
C6—C1—C2—C3	−0.2 (5)	C27—P2—C21—C26	117.0 (3)
P1—C1—C2—C3	−179.6 (3)	Pt1—P2—C21—C26	−10.3 (3)
C1—C2—C3—C4	−1.1 (6)	C15—P2—C21—C22	49.4 (3)
C2—C3—C4—C5	1.4 (6)	C27—P2—C21—C22	−55.4 (3)
C3—C4—C5—C6	−0.5 (6)	Pt1—P2—C21—C22	177.3 (3)
C2—C1—C6—C5	1.1 (6)	C26—C21—C22—C23	1.3 (6)
P1—C1—C6—C5	−179.5 (3)	P2—C21—C22—C23	173.9 (3)
C4—C5—C6—C1	−0.8 (6)	C21—C22—C23—C24	0.2 (6)
C1—P1—C7—C12	−58.4 (3)	C22—C23—C24—C25	−0.6 (7)
C13—P1—C7—C12	−168.6 (3)	C23—C24—C25—C26	−0.7 (6)
Pt1—P1—C7—C12	67.8 (3)	C24—C25—C26—C21	2.3 (6)
C1—P1—C7—C8	120.0 (3)	C22—C21—C26—C25	−2.6 (6)
C13—P1—C7—C8	9.8 (3)	P2—C21—C26—C25	−175.0 (3)
Pt1—P1—C7—C8	−113.8 (3)	C21—P2—C27—C28	−51.3 (3)
C12—C7—C8—C9	−0.8 (6)	C15—P2—C27—C28	−160.6 (3)
P1—C7—C8—C9	−179.2 (3)	Pt1—P2—C27—C28	78.1 (3)

Hydrogen-bond geometry (Å, °)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
C13—H13B···Cl2	0.99	2.78	3.278 (4)	112
C18—H18···Cl2^{i}	0.95	2.75	3.539 (4)	141
C27—H27A···Cl1^{ii}	0.99	2.74	3.622 (4)	149
C27—H27B···Cl1	0.99	2.74	3.185 (4)	108
C28—H28A···Cl1	0.98	2.70	3.373 (5)	126

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

Fig. 1


C3
C4
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C11
Cl1
C18
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C20
P2
C17
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C21
C27
C25
C28
C22
C23
C24