

## *cis*-Dichloridobis(triisopropoxyphosphine)platinum(II)

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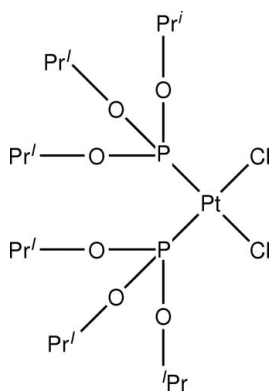
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Key indicators: single-crystal X-ray study;  $T = 125$  K; mean  $\sigma(\text{C}-\text{C}) = 0.005$  Å;  $R$  factor = 0.024;  $wR$  factor = 0.038; data-to-parameter ratio = 18.2.

The title compound,  $[\text{PtCl}_2(\text{C}_9\text{H}_{21}\text{O}_3\text{P})_2]$ , was obtained from a solution of  $\text{PtCl}_2(\text{COD})$  ( $\text{COD} = 1,5$ -cyclooctadiene) and triisopropylphosphite in dichloromethane. The complex features a Pt(II) atom coordinated by two Cl and two P atoms, yielding a slightly distorted *cis* square-planar geometry.

### Related literature

For the structure of *cis*-bis(trimethoxyphosphite)dichlorido-platinum, see: Bao *et al.* (1987), for *cis*-dichloridobis(dimethoxyphenylphosphino)platinum(II), see: Slawin *et al.* (2007a); for dichloridobis(methoxydiphenylphosphino)platinum(II), see: Slawin *et al.* (2007b) and for *cis*-bis(trimethoxyphosphite)-dichloridopalladium(II), see Slawin *et al.* (2009).



### Experimental

#### Crystal data

$[\text{PtCl}_2(\text{C}_9\text{H}_{21}\text{O}_3\text{P})_2]$   
 $M_r = 682.47$   
Monoclinic,  $P2_1/c$   
 $a = 10.8962$  (4) Å  
 $b = 18.9114$  (8) Å  
 $c = 14.2754$  (6) Å  
 $\beta = 104.7461$  (10)°

$V = 2844.7$  (2) Å<sup>3</sup>  
 $Z = 4$   
Mo  $K\alpha$  radiation  
 $\mu = 5.24$  mm<sup>-1</sup>  
 $T = 125$  K  
 $0.22 \times 0.22 \times 0.13$  mm

#### Data collection

Rigaku SCXmini diffractometer  
Absorption correction: multi-scan  
(*ABSCOR*; Higashi, 1995)  
 $T_{\min} = 0.356$ ,  $T_{\max} = 0.506$

24157 measured reflections  
4995 independent reflections  
4473 reflections with  $I > 2\sigma(I)$   
 $R_{\text{int}} = 0.040$

#### Refinement

$R[F^2 > 2\sigma(F^2)] = 0.024$   
 $wR(F^2) = 0.038$   
 $S = 1.11$   
4995 reflections

275 parameters  
H-atom parameters constrained  
 $\Delta\rho_{\max} = 0.57$  e Å<sup>-3</sup>  
 $\Delta\rho_{\min} = -0.49$  e Å<sup>-3</sup>

**Table 1**

Selected geometric parameters (Å, °).

Pt1—Cl1	2.3548 (7)	Pt1—P1	2.2176 (7)
Pt1—Cl2	2.3547 (9)	Pt1—P2	2.2117 (8)
Cl1—Pt1—Cl2	87.18 (2)	Cl2—Pt1—P1	85.34 (2)
Cl1—Pt1—P1	171.35 (2)	Cl2—Pt1—P2	175.09 (3)
Cl1—Pt1—P2	90.80 (2)	P1—Pt1—P2	96.99 (3)

Data collection: *SCXmini* (Rigaku, 2006); cell refinement: *PROCESS-AUTO* (Rigaku, 1998); data reduction: *PROCESS-AUTO*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 2008); program(s) used to refine structure: *SHELXL97* (Sheldrick, 2008); molecular graphics: *CrystalStructure* (Rigaku, 2006); software used to prepare material for publication: *CrystalStructure*.

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Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: F12086).

### References

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Slawin, A. M. Z., Waddell, P. G. & Woollins, J. D. (2007a). *Acta Cryst.* **E63**, m2017.  
Slawin, A. M. Z., Waddell, P. G. & Woollins, J. D. (2007b). *Acta Cryst.* **E63**, m2018.  
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**supplementary materials**

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***cis*-Dichloridobis(triisopropoxyphosphine)platinum(II)**

**A. M. Z. Slawin, P. G. Waddell and J. D. Woollins**

**Comment**

The title complex can be compared to similar platinum dichloride complexes containing trimethoxy phosphite; [PtCl<sub>2</sub>(P(OMe)<sub>3</sub>)<sub>2</sub>] (Bao *et al.*, 1987). When compared to the structure of [PtCl<sub>2</sub>(P(OMe)Ph<sub>2</sub>)<sub>2</sub>] and [PtCl<sub>2</sub>(P(OMe)<sub>2</sub>Ph)<sub>2</sub>] (Slawin *et al.*, 2007*a*, 2007*b*) we note that the title compound has marginally shorter coordination bond lengths and significantly reduced Cl—Pt—Cl and P—Pt—P angles. Cl(1)—Pt(1)—Cl(2) 87.18?(2)°, P(1)—Pt(1)—P(2) 96.99?(3)°

**Experimental**

0.5 g (1.34 mmol) of PtCl<sub>2</sub>(COD) was dissolved in the minimum volume of dichloromethane in a round-bottomed flask. To this 0.52 mL (2.67 mmol) of triisopropylphosphite was added. The solution was stirred for 0.5 h at room temperature. The product was precipitated *via* slow diffusion of hexane and the product was filtered off and dried under vacuum, [PtCl<sub>2</sub>(P(O<sup>*i*</sup>Pr)<sub>3</sub>)<sub>2</sub>](0.82 mmol, *ca* 63%). <sup>31</sup>P-<sup>1</sup>H}NMR: δ 61.7 p.p.m.. *J*{Pt—P} 5812 Hz.

**Refinement**

All H atoms were included in calculated positions (C—H distances are 0.98 Å for methyl H atoms, 1.00 Å for methylene H atoms) and were refined as riding atoms with *U*<sub>iso</sub>(H) = 1.2 *U*<sub>eq</sub>(parent atom, methylene H atoms) or *U*<sub>iso</sub>(H) = 1.5 *U*<sub>eq</sub>(parent atom, methyl H atoms). The highest peak in the difference map is 1.23 Å from atom Pt1.

**Figures**

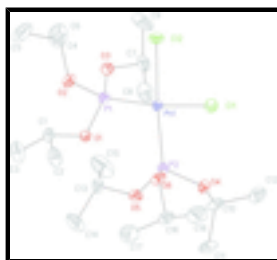


Fig. 1. The structure of (1) with displacement ellipsoids drawn at the 50% probability level, hydrogen atoms omitted for clarity.

***cis*-Dichloridobis(triisopropoxyphosphine)platinum(II)**

*Crystal data*

[PtCl<sub>2</sub>(C<sub>9</sub>H<sub>21</sub>O<sub>3</sub>P)<sub>2</sub>]

*M<sub>r</sub>* = 682.47

Monoclinic, *P*2<sub>1</sub>/*c*

Hall symbol: -*P* 2ybc

*F*<sub>000</sub> = 1360.00

*D<sub>x</sub>* = 1.593 Mg m<sup>-3</sup>

Mo *K*α radiation, λ = 0.71075 Å

Cell parameters from 27042 reflections

## supplementary materials

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$a = 10.8962$ (4) Å	$\theta = 3.0$ – $27.5^\circ$
$b = 18.9114$ (8) Å	$\mu = 5.24$ mm <sup>-1</sup>
$c = 14.2754$ (6) Å	$T = 125$ K
$\beta = 104.7461$ (10) <sup>o</sup>	Chip, colourless
$V = 2844.7$ (2) Å <sup>3</sup>	$0.22 \times 0.22 \times 0.13$ mm
$Z = 4$	

### Data collection

Rigaku SCXmini diffractometer	4995 independent reflections
Radiation source: fine-focus sealed tube	4473 reflections with $F^2 > 2\sigma(F^2)$
Detector resolution: 6.85 pixels mm <sup>-1</sup>	$R_{\text{int}} = 0.040$
$T = 125$ K	$\theta_{\text{max}} = 25.0^\circ$
$\omega$ scans	$\theta_{\text{min}} = 2.1^\circ$
Absorption correction: multi-scan (ABSCOR; Higashi, 1995)	$h = -12 \rightarrow 12$
$T_{\text{min}} = 0.356$ , $T_{\text{max}} = 0.506$	$k = -22 \rightarrow 22$
24157 measured reflections	$l = -16 \rightarrow 16$

### Refinement

Refinement on $F^2$	H-atom parameters constrained
$R[F^2 > 2\sigma(F^2)] = 0.024$	$w = 1/[\sigma^2(F_o^2) + (0.0077P)^2 + 2.3925P]$
$wR(F^2) = 0.038$	where $P = (F_o^2 + 2F_c^2)/3$
$S = 1.11$	$(\Delta/\sigma)_{\text{max}} = 0.001$
4995 reflections	$\Delta\rho_{\text{max}} = 0.57$ e Å <sup>-3</sup>
275 parameters	$\Delta\rho_{\text{min}} = -0.49$ e Å <sup>-3</sup>
	Extinction correction: none

### Special details

**Geometry.** ENTER SPECIAL DETAILS OF THE MOLECULAR GEOMETRY

**Refinement.** Refinement was performed using all reflections. The weighted  $R$ -factor ( $wR$ ) and goodness of fit ( $S$ ) are based on  $F^2$ .  $R$ -factor (gt) are based on  $F$ . The threshold expression of  $F^2 > 2.0 \sigma(F^2)$  is used only for calculating  $R$ -factor (gt).

### Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å<sup>2</sup>)

	$x$	$y$	$z$	$U_{\text{iso}}^*/U_{\text{eq}}$
Pt(1)	0.111011 (11)	0.242171 (6)	0.268469 (9)	0.01376 (4)
Cl(1)	0.15473 (8)	0.36409 (4)	0.26788 (6)	0.02227 (18)
Cl(2)	-0.09964 (8)	0.27341 (4)	0.26386 (7)	0.0280 (2)
P(1)	0.04057 (8)	0.13168 (4)	0.25627 (6)	0.01632 (18)
P(2)	0.31368 (8)	0.21699 (4)	0.28526 (6)	0.01501 (17)
O(1)	0.14345 (19)	0.07376 (10)	0.25384 (16)	0.0175 (5)
O(2)	-0.0612 (2)	0.11456 (11)	0.15873 (16)	0.0234 (5)

O(3)	-0.0298 (2)	0.10821 (11)	0.33539 (17)	0.0221 (5)
O(4)	0.4129 (2)	0.27767 (10)	0.32742 (15)	0.0180 (5)
O(5)	0.3566 (2)	0.19463 (12)	0.19174 (17)	0.0256 (5)
O(6)	0.3592 (2)	0.15798 (11)	0.36474 (16)	0.0200 (5)
C(1)	0.1080 (3)	-0.00243 (16)	0.2408 (2)	0.0216 (8)
C(2)	0.1982 (3)	-0.04269 (17)	0.3196 (2)	0.0326 (9)
C(3)	0.1142 (4)	-0.02438 (18)	0.1407 (2)	0.0384 (10)
C(4)	-0.1988 (3)	0.12485 (18)	0.1375 (2)	0.0311 (9)
C(5)	-0.2575 (3)	0.0519 (2)	0.1211 (3)	0.0587 (14)
C(6)	-0.2359 (4)	0.1716 (2)	0.0491 (3)	0.0513 (12)
C(7)	0.0033 (3)	0.13724 (18)	0.4343 (2)	0.0279 (8)
C(8)	0.1093 (3)	0.0943 (2)	0.4968 (2)	0.0382 (10)
C(9)	-0.1176 (3)	0.1367 (2)	0.4670 (3)	0.0449 (11)
C(10)	0.4641 (3)	0.32852 (17)	0.2685 (2)	0.0228 (8)
C(11)	0.5885 (3)	0.29936 (19)	0.2570 (2)	0.0315 (9)
C(12)	0.4805 (3)	0.39815 (17)	0.3221 (2)	0.0321 (9)
C(13)	0.2760 (3)	0.16206 (17)	0.1040 (2)	0.0225 (8)
C(14)	0.3629 (4)	0.1203 (2)	0.0582 (3)	0.0442 (11)
C(15)	0.2054 (4)	0.2179 (2)	0.0382 (2)	0.0534 (12)
C(16)	0.4941 (3)	0.13800 (17)	0.3989 (2)	0.0253 (8)
C(17)	0.5077 (3)	0.0630 (2)	0.3695 (3)	0.0533 (13)
C(18)	0.5323 (3)	0.1501 (2)	0.5057 (2)	0.0466 (11)
H(1)	0.0195	-0.0089	0.2473	0.026*
H(2)	0.2847	-0.0377	0.3120	0.039*
H(3)	0.1744	-0.0928	0.3155	0.039*
H(4)	0.1945	-0.0239	0.3828	0.039*
H(5)	0.0548	0.0043	0.0924	0.046*
H(6)	0.0912	-0.0744	0.1306	0.046*
H(7)	0.2005	-0.0173	0.1338	0.046*
H(8)	-0.2217	0.1481	0.1937	0.037*
H(9)	-0.2317	0.0288	0.0677	0.070*
H(10)	-0.3501	0.0560	0.1049	0.070*
H(11)	-0.2286	0.0237	0.1802	0.070*
H(12)	-0.1912	0.2169	0.0627	0.062*
H(13)	-0.3277	0.1799	0.0326	0.062*
H(14)	-0.2128	0.1484	-0.0054	0.062*
H(15)	0.0324	0.1872	0.4322	0.034*
H(16)	0.0835	0.0446	0.4955	0.046*
H(17)	0.1283	0.1119	0.5636	0.046*
H(18)	0.1850	0.0984	0.4721	0.046*
H(19)	-0.1809	0.1667	0.4239	0.054*
H(20)	-0.1007	0.1547	0.5334	0.054*
H(21)	-0.1500	0.0882	0.4648	0.054*
H(22)	0.4031	0.3342	0.2035	0.027*
H(23)	0.6462	0.2918	0.3210	0.038*
H(24)	0.6265	0.3331	0.2204	0.038*
H(25)	0.5733	0.2543	0.2219	0.038*
H(26)	0.3979	0.4146	0.3288	0.038*
H(27)	0.5160	0.4332	0.2857	0.038*

## supplementary materials

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H(28)	0.5383	0.3918	0.3864	0.038*
H(29)	0.2141	0.1293	0.1225	0.027*
H(30)	0.4276	0.1518	0.0444	0.053*
H(31)	0.3135	0.0991	-0.0023	0.053*
H(32)	0.4041	0.0829	0.1026	0.053*
H(33)	0.1510	0.2441	0.0712	0.064*
H(34)	0.1530	0.1959	-0.0205	0.064*
H(35)	0.2660	0.2505	0.0208	0.064*
H(36)	0.5458	0.1693	0.3674	0.030*
H(37)	0.4570	0.0321	0.4000	0.064*
H(38)	0.5971	0.0490	0.3902	0.064*
H(39)	0.4778	0.0589	0.2989	0.064*
H(40)	0.5205	0.2001	0.5192	0.056*
H(41)	0.6217	0.1373	0.5311	0.056*
H(42)	0.4797	0.1209	0.5367	0.056*

### Atomic displacement parameters ( $\text{\AA}^2$ )

	$U^{11}$	$U^{22}$	$U^{33}$	$U^{12}$	$U^{13}$	$U^{23}$
Pt(1)	0.01280 (7)	0.01280 (7)	0.01598 (7)	0.00090 (6)	0.00422 (5)	0.00039 (6)
Cl(1)	0.0217 (4)	0.0136 (4)	0.0319 (5)	-0.0003 (3)	0.0075 (4)	0.0018 (3)
Cl(2)	0.0155 (4)	0.0193 (4)	0.0505 (6)	0.0030 (3)	0.0111 (4)	-0.0011 (3)
P(1)	0.0143 (4)	0.0152 (4)	0.0197 (5)	-0.0008 (3)	0.0047 (3)	0.0000 (3)
P(2)	0.0131 (4)	0.0171 (4)	0.0152 (4)	0.0002 (3)	0.0043 (3)	-0.0004 (3)
O(1)	0.0145 (12)	0.0139 (11)	0.0237 (13)	-0.0001 (8)	0.0044 (10)	-0.0013 (9)
O(2)	0.0168 (12)	0.0244 (12)	0.0254 (14)	-0.0020 (10)	-0.0012 (11)	-0.0037 (10)
O(3)	0.0226 (13)	0.0195 (12)	0.0279 (14)	-0.0059 (9)	0.0131 (11)	-0.0031 (10)
O(4)	0.0178 (12)	0.0175 (11)	0.0187 (12)	-0.0038 (9)	0.0046 (10)	0.0006 (9)
O(5)	0.0174 (13)	0.0394 (14)	0.0214 (13)	-0.0001 (10)	0.0076 (11)	-0.0091 (10)
O(6)	0.0140 (12)	0.0178 (11)	0.0258 (14)	0.0004 (9)	0.0004 (10)	0.0073 (9)
C(1)	0.0244 (19)	0.0115 (16)	0.030 (2)	-0.0046 (14)	0.0082 (17)	-0.0032 (13)
C(2)	0.046 (2)	0.0159 (18)	0.034 (2)	0.0017 (17)	0.008 (2)	0.0006 (16)
C(3)	0.059 (2)	0.023 (2)	0.031 (2)	-0.0006 (18)	0.008 (2)	-0.0051 (16)
C(4)	0.017 (2)	0.0241 (19)	0.044 (2)	0.0016 (15)	-0.0071 (18)	-0.0037 (17)
C(5)	0.027 (2)	0.035 (2)	0.103 (4)	-0.0081 (19)	-0.005 (2)	-0.005 (2)
C(6)	0.046 (2)	0.041 (2)	0.052 (3)	0.010 (2)	-0.015 (2)	0.002 (2)
C(7)	0.040 (2)	0.0227 (19)	0.026 (2)	-0.0053 (16)	0.0177 (19)	-0.0063 (15)
C(8)	0.053 (2)	0.036 (2)	0.026 (2)	-0.0003 (19)	0.013 (2)	-0.0005 (17)
C(9)	0.057 (3)	0.041 (2)	0.052 (3)	0.007 (2)	0.042 (2)	0.002 (2)
C(10)	0.0162 (19)	0.0271 (19)	0.026 (2)	-0.0051 (14)	0.0073 (16)	0.0091 (15)
C(11)	0.017 (2)	0.041 (2)	0.038 (2)	-0.0048 (16)	0.0108 (18)	0.0048 (18)
C(12)	0.027 (2)	0.024 (2)	0.045 (2)	-0.0072 (16)	0.0079 (19)	0.0070 (17)
C(13)	0.027 (2)	0.0254 (19)	0.0166 (19)	-0.0076 (15)	0.0085 (16)	-0.0053 (14)
C(14)	0.054 (2)	0.047 (2)	0.036 (2)	0.014 (2)	0.019 (2)	-0.011 (2)
C(15)	0.074 (3)	0.065 (3)	0.021 (2)	0.030 (2)	0.012 (2)	0.004 (2)
C(16)	0.0150 (19)	0.0242 (19)	0.034 (2)	0.0035 (14)	0.0006 (17)	0.0058 (15)
C(17)	0.034 (2)	0.039 (2)	0.076 (3)	0.014 (2)	-0.004 (2)	-0.009 (2)
C(18)	0.030 (2)	0.060 (2)	0.041 (2)	0.012 (2)	-0.006 (2)	0.003 (2)

*Geometric parameters (Å, °)*

Pt(1)—Cl(1)	2.3548 (7)	C(4)—H(8)	1.000
Pt(1)—Cl(2)	2.3547 (9)	C(5)—H(9)	0.980
Pt(1)—P(1)	2.2176 (7)	C(5)—H(10)	0.980
Pt(1)—P(2)	2.2117 (8)	C(5)—H(11)	0.980
P(1)—O(1)	1.574 (2)	C(6)—H(12)	0.980
P(1)—O(2)	1.577 (2)	C(6)—H(13)	0.980
P(1)—O(3)	1.582 (2)	C(6)—H(14)	0.980
P(2)—O(4)	1.587 (2)	C(7)—H(15)	1.000
P(2)—O(5)	1.580 (2)	C(8)—H(16)	0.980
P(2)—O(6)	1.579 (2)	C(8)—H(17)	0.980
O(1)—C(1)	1.491 (3)	C(8)—H(18)	0.980
O(2)—C(4)	1.466 (4)	C(9)—H(19)	0.980
O(3)—C(7)	1.472 (4)	C(9)—H(20)	0.980
O(4)—C(10)	1.477 (4)	C(9)—H(21)	0.980
O(5)—C(13)	1.470 (3)	C(10)—H(22)	1.000
O(6)—C(16)	1.475 (3)	C(11)—H(23)	0.980
C(1)—C(2)	1.500 (4)	C(11)—H(24)	0.980
C(1)—C(3)	1.506 (5)	C(11)—H(25)	0.980
C(4)—C(5)	1.513 (5)	C(12)—H(26)	0.980
C(4)—C(6)	1.509 (5)	C(12)—H(27)	0.980
C(7)—C(8)	1.505 (4)	C(12)—H(28)	0.980
C(7)—C(9)	1.505 (6)	C(13)—H(29)	1.000
C(10)—C(11)	1.510 (5)	C(14)—H(30)	0.980
C(10)—C(12)	1.510 (4)	C(14)—H(31)	0.980
C(13)—C(14)	1.504 (5)	C(14)—H(32)	0.980
C(13)—C(15)	1.490 (5)	C(15)—H(33)	0.980
C(16)—C(17)	1.497 (5)	C(15)—H(34)	0.980
C(16)—C(18)	1.491 (5)	C(15)—H(35)	0.980
C(1)—H(1)	1.000	C(16)—H(36)	1.000
C(2)—H(2)	0.980	C(17)—H(37)	0.980
C(2)—H(3)	0.980	C(17)—H(38)	0.980
C(2)—H(4)	0.980	C(17)—H(39)	0.980
C(3)—H(5)	0.980	C(18)—H(40)	0.980
C(3)—H(6)	0.980	C(18)—H(41)	0.980
C(3)—H(7)	0.980	C(18)—H(42)	0.980
Cl(2)···C(11) <sup>i</sup>	3.410 (3)	H(19)···H(12) <sup>ii</sup>	2.981
C(7)···C(15) <sup>ii</sup>	3.591 (5)	H(19)···H(23) <sup>i</sup>	3.144
C(11)···Cl(2) <sup>iii</sup>	3.410 (3)	H(19)···H(36) <sup>i</sup>	2.880
C(15)···C(7) <sup>iv</sup>	3.591 (5)	H(19)···H(38) <sup>i</sup>	3.233
Pt(1)···H(34) <sup>ii</sup>	3.155	H(19)···H(41) <sup>i</sup>	2.992
Pt(1)···H(35) <sup>ii</sup>	3.571	H(20)···Cl(2) <sup>ii</sup>	3.557
Cl(1)···H(1) <sup>v</sup>	3.035	H(20)···C(2) <sup>vi</sup>	3.340
Cl(1)···H(3) <sup>v</sup>	3.574	H(20)···H(3) <sup>vi</sup>	2.748
Cl(1)···H(6) <sup>v</sup>	3.551	H(20)···H(4) <sup>vi</sup>	3.036

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Cl(1)···H(11) <sup>v</sup>	3.162	H(20)···H(12) <sup>ii</sup>	2.693
Cl(1)···H(17) <sup>iv</sup>	2.893	H(20)···H(33) <sup>ii</sup>	3.275
Cl(1)···H(31) <sup>ii</sup>	3.369	H(20)···H(41) <sup>i</sup>	3.034
Cl(1)···H(34) <sup>ii</sup>	3.231	H(21)···C(2) <sup>vi</sup>	3.364
Cl(2)···H(3) <sup>v</sup>	2.807	H(21)···C(8) <sup>vi</sup>	3.505
Cl(2)···H(6) <sup>v</sup>	3.238	H(21)···H(3) <sup>vi</sup>	3.215
Cl(2)···H(20) <sup>iv</sup>	3.557	H(21)···H(4) <sup>vi</sup>	2.643
Cl(2)···H(23) <sup>i</sup>	3.099	H(21)···H(16) <sup>vi</sup>	2.635
Cl(2)···H(24) <sup>i</sup>	3.101	H(21)···H(36) <sup>i</sup>	3.595
Cl(2)···H(25) <sup>i</sup>	3.479	H(21)···H(38) <sup>i</sup>	2.791
P(2)···H(35) <sup>ii</sup>	3.584	H(21)···H(41) <sup>i</sup>	3.024
O(4)···H(30) <sup>ii</sup>	3.339	H(22)···C(18) <sup>iv</sup>	3.473
O(4)···H(35) <sup>ii</sup>	3.567	H(22)···H(17) <sup>iv</sup>	3.309
O(6)···H(35) <sup>ii</sup>	3.185	H(22)···H(40) <sup>iv</sup>	3.269
C(2)···H(20) <sup>vi</sup>	3.340	H(22)···H(42) <sup>iv</sup>	2.845
C(2)···H(21) <sup>vi</sup>	3.364	H(23)···Cl(2) <sup>iii</sup>	3.099
C(2)···H(24) <sup>vii</sup>	3.170	H(23)···C(6) <sup>xii</sup>	3.256
C(2)···H(41) <sup>viii</sup>	3.076	H(23)···H(12) <sup>xii</sup>	3.457
C(3)···H(5) <sup>ix</sup>	3.389	H(23)···H(13) <sup>xii</sup>	3.010
C(3)···H(9) <sup>ix</sup>	3.526	H(23)···H(14) <sup>xii</sup>	2.801
C(3)···H(14) <sup>ix</sup>	3.383	H(23)···H(19) <sup>iii</sup>	3.144
C(5)···H(26) <sup>x</sup>	3.186	H(24)···Cl(2) <sup>iii</sup>	3.101
C(5)···H(31) <sup>ix</sup>	3.298	H(24)···C(2) <sup>xiii</sup>	3.170
C(6)···H(23) <sup>xi</sup>	3.256	H(24)···C(18) <sup>iv</sup>	2.992
C(6)···H(28) <sup>xi</sup>	3.159	H(24)···H(2) <sup>xiii</sup>	2.711
C(6)···H(40) <sup>xi</sup>	3.542	H(24)···H(3) <sup>xiii</sup>	2.739
C(7)···H(33) <sup>ii</sup>	3.138	H(24)···H(40) <sup>iv</sup>	2.879
C(7)···H(34) <sup>ii</sup>	3.535	H(24)···H(41) <sup>iv</sup>	2.747
C(7)···H(35) <sup>ii</sup>	3.525	H(24)···H(42) <sup>iv</sup>	2.839
C(8)···H(16) <sup>vi</sup>	3.382	H(25)···Cl(2) <sup>iii</sup>	3.479
C(8)···H(21) <sup>vi</sup>	3.505	H(25)···C(18) <sup>iv</sup>	3.507
C(8)···H(33) <sup>ii</sup>	3.230	H(25)···H(8) <sup>iii</sup>	3.106
C(8)···H(35) <sup>ii</sup>	3.369	H(25)···H(13) <sup>iii</sup>	3.455
C(9)···H(3) <sup>vi</sup>	3.420	H(25)···H(40) <sup>iv</sup>	2.933
C(9)···H(4) <sup>vi</sup>	3.281	H(25)···H(41) <sup>iv</sup>	3.554
C(9)···H(12) <sup>ii</sup>	3.277	H(25)···H(42) <sup>iv</sup>	3.497
C(9)···H(16) <sup>vi</sup>	3.475	H(26)···C(5) <sup>v</sup>	3.186
C(9)···H(38) <sup>i</sup>	3.447	H(26)···C(14) <sup>ii</sup>	3.456
C(9)···H(41) <sup>i</sup>	3.199	H(26)···H(9) <sup>v</sup>	3.390
C(10)···H(42) <sup>iv</sup>	3.489	H(26)···H(10) <sup>v</sup>	2.928
C(11)···H(40) <sup>iv</sup>	3.285	H(26)···H(11) <sup>v</sup>	2.748



C(11)···H(41) <sup>iv</sup>	3.543	H(26)···H(30) <sup>ii</sup>	3.263
C(11)···H(42) <sup>iv</sup>	3.416	H(26)···H(31) <sup>ii</sup>	2.802
C(12)···H(10) <sup>v</sup>	3.574	H(27)···C(17) <sup>xiii</sup>	3.273
C(12)···H(13) <sup>xii</sup>	3.519	H(27)···H(2) <sup>xiii</sup>	2.916
C(12)···H(30) <sup>ii</sup>	3.497	H(27)···H(7) <sup>xiii</sup>	3.151
C(12)···H(31) <sup>ii</sup>	3.453	H(27)···H(10) <sup>v</sup>	3.541
C(12)···H(39) <sup>xiii</sup>	3.582	H(27)···H(32) <sup>xiii</sup>	3.257
C(14)···H(9) <sup>ix</sup>	3.453	H(27)···H(37) <sup>xiii</sup>	3.318
C(14)···H(10) <sup>iii</sup>	3.262	H(27)···H(38) <sup>xiii</sup>	3.323
C(14)···H(26) <sup>iv</sup>	3.456	H(27)···H(39) <sup>xiii</sup>	2.675
C(14)···H(28) <sup>iv</sup>	3.479	H(28)···C(6) <sup>xii</sup>	3.159
C(15)···H(15) <sup>iv</sup>	2.759	H(28)···C(14) <sup>ii</sup>	3.479
C(15)···H(17) <sup>iv</sup>	3.369	H(28)···H(7) <sup>xiii</sup>	3.399
C(15)···H(18) <sup>iv</sup>	3.591	H(28)···H(9) <sup>xii</sup>	3.454
C(16)···H(19) <sup>iii</sup>	3.510	H(28)···H(10) <sup>xii</sup>	3.201
C(17)···H(27) <sup>vii</sup>	3.273	H(28)···H(13) <sup>xii</sup>	2.603
C(18)···H(2) <sup>viii</sup>	3.554	H(28)···H(14) <sup>xii</sup>	2.862
C(18)···H(13) <sup>xii</sup>	3.538	H(28)···H(30) <sup>ii</sup>	2.934
C(18)···H(22) <sup>ii</sup>	3.473	H(28)···H(31) <sup>ii</sup>	3.245
C(18)···H(24) <sup>ii</sup>	2.992	H(30)···O(4) <sup>iv</sup>	3.339
C(18)···H(25) <sup>ii</sup>	3.507	H(30)···C(12) <sup>iv</sup>	3.497
C(18)···H(35) <sup>ii</sup>	3.510	H(30)···H(10) <sup>iii</sup>	2.971
H(1)···Cl(1) <sup>x</sup>	3.035	H(30)···H(13) <sup>iii</sup>	2.766
H(2)···C(18) <sup>viii</sup>	3.554	H(30)···H(26) <sup>iv</sup>	3.263
H(2)···H(24) <sup>vii</sup>	2.711	H(30)···H(28) <sup>iv</sup>	2.934
H(2)···H(27) <sup>vii</sup>	2.916	H(30)···H(40) <sup>iv</sup>	3.031
H(2)···H(41) <sup>viii</sup>	2.905	H(31)···Cl(1) <sup>iv</sup>	3.369
H(2)···H(42) <sup>viii</sup>	3.302	H(31)···C(5) <sup>ix</sup>	3.298
H(3)···Cl(1) <sup>x</sup>	3.574	H(31)···C(12) <sup>iv</sup>	3.453
H(3)···Cl(2) <sup>x</sup>	2.807	H(31)···H(9) <sup>ix</sup>	2.663
H(3)···C(9) <sup>vi</sup>	3.420	H(31)···H(10) <sup>ix</sup>	3.348
H(3)···H(20) <sup>vi</sup>	2.748	H(31)···H(11) <sup>ix</sup>	3.390
H(3)···H(21) <sup>vi</sup>	3.215	H(31)···H(26) <sup>iv</sup>	2.802
H(3)···H(24) <sup>vii</sup>	2.739	H(31)···H(28) <sup>iv</sup>	3.245
H(3)···H(41) <sup>viii</sup>	2.821	H(32)···H(9) <sup>ix</sup>	3.403
H(4)···C(9) <sup>vi</sup>	3.281	H(32)···H(10) <sup>iii</sup>	2.718
H(4)···H(20) <sup>vi</sup>	3.036	H(32)···H(27) <sup>vii</sup>	3.257
H(4)···H(21) <sup>vi</sup>	2.643	H(33)···C(7) <sup>iv</sup>	3.138
H(4)···H(38) <sup>viii</sup>	3.484	H(33)···C(8) <sup>iv</sup>	3.230
H(4)···H(41) <sup>viii</sup>	2.978	H(33)···H(15) <sup>iv</sup>	2.448
H(5)···C(3) <sup>ix</sup>	3.389	H(33)···H(17) <sup>iv</sup>	2.734

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H(5)···H(5) <sup>ix</sup>	2.610	H(33)···H(18) <sup>iv</sup>	3.358
H(5)···H(6) <sup>ix</sup>	3.442	H(33)···H(20) <sup>iv</sup>	3.275
H(5)···H(9) <sup>ix</sup>	3.402	H(34)···Pt(1) <sup>iv</sup>	3.155
H(6)···Cl(1) <sup>x</sup>	3.551	H(34)···Cl(1) <sup>iv</sup>	3.231
H(6)···Cl(2) <sup>x</sup>	3.238	H(34)···C(7) <sup>iv</sup>	3.535
H(6)···H(5) <sup>ix</sup>	3.442	H(34)···H(6) <sup>ix</sup>	3.563
H(6)···H(14) <sup>ix</sup>	2.849	H(34)···H(15) <sup>iv</sup>	2.572
H(6)···H(34) <sup>ix</sup>	3.563	H(35)···Pt(1) <sup>iv</sup>	3.571
H(7)···H(9) <sup>ix</sup>	2.989	H(35)···P(2) <sup>iv</sup>	3.584
H(7)···H(14) <sup>ix</sup>	3.107	H(35)···O(4) <sup>iv</sup>	3.567
H(7)···H(27) <sup>vii</sup>	3.151	H(35)···O(6) <sup>iv</sup>	3.185
H(7)···H(28) <sup>vii</sup>	3.399	H(35)···C(7) <sup>iv</sup>	3.525
H(8)···H(25) <sup>i</sup>	3.106	H(35)···C(8) <sup>iv</sup>	3.369
H(9)···C(3) <sup>ix</sup>	3.526	H(35)···C(18) <sup>iv</sup>	3.510
H(9)···C(14) <sup>ix</sup>	3.453	H(35)···H(15) <sup>iv</sup>	2.797
H(9)···H(5) <sup>ix</sup>	3.402	H(35)···H(17) <sup>iv</sup>	3.139
H(9)···H(7) <sup>ix</sup>	2.989	H(35)···H(18) <sup>iv</sup>	3.018
H(9)···H(26) <sup>x</sup>	3.390	H(35)···H(40) <sup>iv</sup>	2.932
H(9)···H(28) <sup>xi</sup>	3.454	H(35)···H(42) <sup>iv</sup>	3.335
H(9)···H(31) <sup>ix</sup>	2.663	H(36)···H(19) <sup>iii</sup>	2.880
H(9)···H(32) <sup>ix</sup>	3.403	H(36)···H(21) <sup>iii</sup>	3.595
H(10)···C(12) <sup>x</sup>	3.574	H(37)···H(27) <sup>vii</sup>	3.318
H(10)···C(14) <sup>i</sup>	3.262	H(37)···H(37) <sup>viii</sup>	3.023
H(10)···H(26) <sup>x</sup>	2.928	H(37)···H(38) <sup>viii</sup>	3.544
H(10)···H(27) <sup>x</sup>	3.541	H(37)···H(41) <sup>viii</sup>	3.520
H(10)···H(28) <sup>xi</sup>	3.201	H(37)···H(42) <sup>viii</sup>	3.056
H(10)···H(30) <sup>i</sup>	2.971	H(38)···C(9) <sup>iii</sup>	3.447
H(10)···H(31) <sup>ix</sup>	3.348	H(38)···H(4) <sup>viii</sup>	3.484
H(10)···H(32) <sup>i</sup>	2.718	H(38)···H(19) <sup>iii</sup>	3.233
H(11)···Cl(1) <sup>x</sup>	3.162	H(38)···H(21) <sup>iii</sup>	2.791
H(11)···H(26) <sup>x</sup>	2.748	H(38)···H(27) <sup>vii</sup>	3.323
H(11)···H(31) <sup>ix</sup>	3.390	H(38)···H(37) <sup>viii</sup>	3.544
H(12)···C(9) <sup>iv</sup>	3.277	H(38)···H(42) <sup>viii</sup>	3.542
H(12)···H(19) <sup>iv</sup>	2.981	H(39)···C(12) <sup>vii</sup>	3.582
H(12)···H(20) <sup>iv</sup>	2.693	H(39)···H(27) <sup>vii</sup>	2.675
H(12)···H(23) <sup>xi</sup>	3.457	H(40)···C(6) <sup>xii</sup>	3.542
H(12)···H(40) <sup>xi</sup>	3.425	H(40)···C(11) <sup>ii</sup>	3.285
H(12)···H(41) <sup>xi</sup>	3.390	H(40)···H(12) <sup>xii</sup>	3.425
H(13)···C(12) <sup>xi</sup>	3.519	H(40)···H(13) <sup>xii</sup>	2.787
H(13)···C(18) <sup>xi</sup>	3.538	H(40)···H(22) <sup>ii</sup>	3.269
H(13)···H(23) <sup>xi</sup>	3.010	H(40)···H(24) <sup>ii</sup>	2.879

H(13)···H(25) <sup>i</sup>	3.455	H(40)···H(25) <sup>ii</sup>	2.933
H(13)···H(28) <sup>xi</sup>	2.603	H(40)···H(30) <sup>ii</sup>	3.031
H(13)···H(30) <sup>i</sup>	2.766	H(40)···H(35) <sup>ii</sup>	2.932
H(13)···H(40) <sup>xi</sup>	2.787	H(41)···C(2) <sup>viii</sup>	3.076
H(13)···H(41) <sup>xi</sup>	3.501	H(41)···C(9) <sup>iii</sup>	3.199
H(14)···C(3) <sup>ix</sup>	3.383	H(41)···C(11) <sup>ii</sup>	3.543
H(14)···H(6) <sup>ix</sup>	2.849	H(41)···H(2) <sup>viii</sup>	2.905
H(14)···H(7) <sup>ix</sup>	3.107	H(41)···H(3) <sup>viii</sup>	2.821
H(14)···H(23) <sup>xi</sup>	2.801	H(41)···H(4) <sup>viii</sup>	2.978
H(14)···H(28) <sup>xi</sup>	2.862	H(41)···H(12) <sup>xii</sup>	3.390
H(15)···C(15) <sup>ii</sup>	2.759	H(41)···H(13) <sup>xii</sup>	3.501
H(15)···H(33) <sup>ii</sup>	2.448	H(41)···H(19) <sup>iii</sup>	2.992
H(15)···H(34) <sup>ii</sup>	2.572	H(41)···H(20) <sup>iii</sup>	3.034
H(15)···H(35) <sup>ii</sup>	2.797	H(41)···H(21) <sup>iii</sup>	3.024
H(16)···C(8) <sup>vi</sup>	3.382	H(41)···H(24) <sup>ii</sup>	2.747
H(16)···C(9) <sup>vi</sup>	3.475	H(41)···H(25) <sup>ii</sup>	3.554
H(16)···H(16) <sup>vi</sup>	2.508	H(41)···H(37) <sup>viii</sup>	3.520
H(16)···H(21) <sup>vi</sup>	2.635	H(42)···C(10) <sup>ii</sup>	3.489
H(17)···Cl(1) <sup>ii</sup>	2.893	H(42)···C(11) <sup>ii</sup>	3.416
H(17)···C(15) <sup>ii</sup>	3.369	H(42)···H(2) <sup>viii</sup>	3.302
H(17)···H(22) <sup>ii</sup>	3.309	H(42)···H(22) <sup>ii</sup>	2.845
H(17)···H(33) <sup>ii</sup>	2.734	H(42)···H(24) <sup>ii</sup>	2.839
H(17)···H(35) <sup>ii</sup>	3.139	H(42)···H(25) <sup>ii</sup>	3.497
H(18)···C(15) <sup>ii</sup>	3.591	H(42)···H(35) <sup>ii</sup>	3.335
H(18)···H(33) <sup>ii</sup>	3.358	H(42)···H(37) <sup>viii</sup>	3.056
H(18)···H(35) <sup>ii</sup>	3.018	H(42)···H(38) <sup>viii</sup>	3.542
H(19)···C(16) <sup>i</sup>	3.510		
Cl(1)—Pt(1)—Cl(2)	87.18 (2)	C(4)—C(6)—H(12)	109.5
Cl(1)—Pt(1)—P(1)	171.35 (2)	C(4)—C(6)—H(13)	109.5
Cl(1)—Pt(1)—P(2)	90.80 (2)	C(4)—C(6)—H(14)	109.5
Cl(2)—Pt(1)—P(1)	85.34 (2)	H(12)—C(6)—H(13)	109.5
Cl(2)—Pt(1)—P(2)	175.09 (3)	H(12)—C(6)—H(14)	109.5
P(1)—Pt(1)—P(2)	96.99 (3)	H(13)—C(6)—H(14)	109.5
Pt(1)—P(1)—O(1)	115.04 (8)	O(3)—C(7)—H(15)	109.0
Pt(1)—P(1)—O(2)	114.47 (8)	C(8)—C(7)—H(15)	109.0
Pt(1)—P(1)—O(3)	115.43 (8)	C(9)—C(7)—H(15)	109.0
O(1)—P(1)—O(2)	100.50 (11)	C(7)—C(8)—H(16)	109.5
O(1)—P(1)—O(3)	107.34 (12)	C(7)—C(8)—H(17)	109.5
O(2)—P(1)—O(3)	102.31 (12)	C(7)—C(8)—H(18)	109.5
Pt(1)—P(2)—O(4)	116.80 (8)	H(16)—C(8)—H(17)	109.5
Pt(1)—P(2)—O(5)	117.90 (8)	H(16)—C(8)—H(18)	109.5
Pt(1)—P(2)—O(6)	110.65 (9)	H(17)—C(8)—H(18)	109.5
O(4)—P(2)—O(5)	101.20 (12)	C(7)—C(9)—H(19)	109.5

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O(4)—P(2)—O(6)	100.33 (10)	C(7)—C(9)—H(20)	109.5
O(5)—P(2)—O(6)	108.15 (12)	C(7)—C(9)—H(21)	109.5
P(1)—O(1)—C(1)	120.80 (19)	H(19)—C(9)—H(20)	109.5
P(1)—O(2)—C(4)	127.4 (2)	H(19)—C(9)—H(21)	109.5
P(1)—O(3)—C(7)	122.4 (2)	H(20)—C(9)—H(21)	109.5
P(2)—O(4)—C(10)	125.05 (18)	O(4)—C(10)—H(22)	109.9
P(2)—O(5)—C(13)	126.2 (2)	C(11)—C(10)—H(22)	109.9
P(2)—O(6)—C(16)	121.6 (2)	C(12)—C(10)—H(22)	109.9
O(1)—C(1)—C(2)	107.3 (2)	C(10)—C(11)—H(23)	109.5
O(1)—C(1)—C(3)	108.2 (2)	C(10)—C(11)—H(24)	109.5
C(2)—C(1)—C(3)	113.1 (3)	C(10)—C(11)—H(25)	109.5
O(2)—C(4)—C(5)	106.3 (2)	H(23)—C(11)—H(24)	109.5
O(2)—C(4)—C(6)	107.0 (3)	H(23)—C(11)—H(25)	109.5
C(5)—C(4)—C(6)	113.1 (3)	H(24)—C(11)—H(25)	109.5
O(3)—C(7)—C(8)	109.3 (2)	C(10)—C(12)—H(26)	109.5
O(3)—C(7)—C(9)	105.9 (2)	C(10)—C(12)—H(27)	109.5
C(8)—C(7)—C(9)	114.4 (3)	C(10)—C(12)—H(28)	109.5
O(4)—C(10)—C(11)	107.7 (2)	H(26)—C(12)—H(27)	109.5
O(4)—C(10)—C(12)	107.0 (2)	H(26)—C(12)—H(28)	109.5
C(11)—C(10)—C(12)	112.3 (2)	H(27)—C(12)—H(28)	109.5
O(5)—C(13)—C(14)	106.6 (2)	O(5)—C(13)—H(29)	109.3
O(5)—C(13)—C(15)	109.9 (2)	C(14)—C(13)—H(29)	109.4
C(14)—C(13)—C(15)	112.3 (3)	C(15)—C(13)—H(29)	109.3
O(6)—C(16)—C(17)	108.1 (2)	C(13)—C(14)—H(30)	109.5
O(6)—C(16)—C(18)	107.1 (3)	C(13)—C(14)—H(31)	109.5
C(17)—C(16)—C(18)	114.2 (3)	C(13)—C(14)—H(32)	109.5
O(1)—C(1)—H(1)	109.4	H(30)—C(14)—H(31)	109.5
C(2)—C(1)—H(1)	109.4	H(30)—C(14)—H(32)	109.5
C(3)—C(1)—H(1)	109.4	H(31)—C(14)—H(32)	109.5
C(1)—C(2)—H(2)	109.5	C(13)—C(15)—H(33)	109.5
C(1)—C(2)—H(3)	109.5	C(13)—C(15)—H(34)	109.5
C(1)—C(2)—H(4)	109.5	C(13)—C(15)—H(35)	109.5
H(2)—C(2)—H(3)	109.5	H(33)—C(15)—H(34)	109.5
H(2)—C(2)—H(4)	109.5	H(33)—C(15)—H(35)	109.5
H(3)—C(2)—H(4)	109.5	H(34)—C(15)—H(35)	109.5
C(1)—C(3)—H(5)	109.5	O(6)—C(16)—H(36)	109.1
C(1)—C(3)—H(6)	109.5	C(17)—C(16)—H(36)	109.1
C(1)—C(3)—H(7)	109.5	C(18)—C(16)—H(36)	109.1
H(5)—C(3)—H(6)	109.5	C(16)—C(17)—H(37)	109.5
H(5)—C(3)—H(7)	109.5	C(16)—C(17)—H(38)	109.5
H(6)—C(3)—H(7)	109.5	C(16)—C(17)—H(39)	109.5
O(2)—C(4)—H(8)	110.1	H(37)—C(17)—H(38)	109.5
C(5)—C(4)—H(8)	110.1	H(37)—C(17)—H(39)	109.5
C(6)—C(4)—H(8)	110.1	H(38)—C(17)—H(39)	109.5
C(4)—C(5)—H(9)	109.5	C(16)—C(18)—H(40)	109.5
C(4)—C(5)—H(10)	109.5	C(16)—C(18)—H(41)	109.5
C(4)—C(5)—H(11)	109.5	C(16)—C(18)—H(42)	109.5
H(9)—C(5)—H(10)	109.5	H(40)—C(18)—H(41)	109.5
H(9)—C(5)—H(11)	109.5	H(40)—C(18)—H(42)	109.5

H(10)—C(5)—H(11)	109.5	H(41)—C(18)—H(42)	109.5
Cl(1)—Pt(1)—P(2)—O(4)	21.21 (10)	Pt(1)—P(2)—O(4)—C(10)	-93.9 (2)
Cl(1)—Pt(1)—P(2)—O(5)	-99.70 (10)	Pt(1)—P(2)—O(5)—C(13)	-25.7 (2)
Cl(1)—Pt(1)—P(2)—O(6)	135.11 (9)	Pt(1)—P(2)—O(6)—C(16)	-172.06 (19)
Cl(2)—Pt(1)—P(1)—O(1)	179.48 (10)	O(4)—P(2)—O(5)—C(13)	-154.4 (2)
Cl(2)—Pt(1)—P(1)—O(2)	63.79 (11)	O(5)—P(2)—O(4)—C(10)	35.4 (2)
Cl(2)—Pt(1)—P(1)—O(3)	-54.62 (9)	O(4)—P(2)—O(6)—C(16)	-48.1 (2)
P(1)—Pt(1)—P(2)—O(4)	-162.57 (9)	O(6)—P(2)—O(4)—C(10)	146.5 (2)
P(1)—Pt(1)—P(2)—O(5)	76.52 (10)	O(5)—P(2)—O(6)—C(16)	57.4 (2)
P(1)—Pt(1)—P(2)—O(6)	-48.67 (9)	O(6)—P(2)—O(5)—C(13)	100.7 (2)
P(2)—Pt(1)—P(1)—O(1)	-4.85 (10)	P(1)—O(1)—C(1)—C(2)	-129.3 (2)
P(2)—Pt(1)—P(1)—O(2)	-120.55 (11)	P(1)—O(1)—C(1)—C(3)	108.3 (2)
P(2)—Pt(1)—P(1)—O(3)	121.04 (9)	P(1)—O(2)—C(4)—C(5)	-115.5 (3)
Pt(1)—P(1)—O(1)—C(1)	-176.87 (19)	P(1)—O(2)—C(4)—C(6)	123.5 (2)
Pt(1)—P(1)—O(2)—C(4)	-86.4 (2)	P(1)—O(3)—C(7)—C(8)	-87.0 (3)
Pt(1)—P(1)—O(3)—C(7)	-31.2 (2)	P(1)—O(3)—C(7)—C(9)	149.3 (2)
O(1)—P(1)—O(2)—C(4)	149.7 (2)	P(2)—O(4)—C(10)—C(11)	-94.7 (2)
O(2)—P(1)—O(1)—C(1)	-53.4 (2)	P(2)—O(4)—C(10)—C(12)	144.3 (2)
O(1)—P(1)—O(3)—C(7)	98.5 (2)	P(2)—O(5)—C(13)—C(14)	-153.8 (2)
O(3)—P(1)—O(1)—C(1)	53.2 (2)	P(2)—O(5)—C(13)—C(15)	84.3 (3)
O(2)—P(1)—O(3)—C(7)	-156.2 (2)	P(2)—O(6)—C(16)—C(17)	-114.9 (3)
O(3)—P(1)—O(2)—C(4)	39.2 (2)	P(2)—O(6)—C(16)—C(18)	121.6 (2)

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

Fig. 1

