C(32)	−0.0218 (12)	0.4371 (18)	0.1349 (17)	0.071 (6)
C(33)	0.0679 (12)	0.4047 (19)	0.3034 (17)	0.075 (7)
C(1*p*)	0.1855 (12)	0.1464 (18)	0.2451 (18)	0.076 (6)
O(11)	0.2938 (9)	0.4291 (14)	0.2571 (13)	0.094 (5)
O(12)	0.2299 (10)	0.5268 (14)	−0.0338 (13)	0.094 (5)
O(13)	0.3335 (10)	0.2404 (14)	0.0169 (13)	0.095 (6)
O(21)	−0.0521 (9)	0.0903 (14)	0.0874 (12)	0.085 (5)
O(22)	−0.0411 (9)	0.3444 (12)	−0.0931 (12)	0.080 (5)
O(23)	0.1494 (9)	0.1025 (13)	−0.1042 (12)	0.084 (5)
O(31)	−0.0902 (9)	0.2345 (14)	0.2526 (13)	0.095 (5)
O(32)	−0.0628 (10)	0.4918 (15)	0.0946 (14)	0.102 (6)
O(33)	0.0874 (10)	0.4390 (14)	0.3750 (14)	0.097 (5)

Table 6. *Geometric parameters* (Å, °) *for* (3)

Os(1)—Os(2)	2.9776 (11)	Os(3)—C(31)	1.83 (2)
Os(1)—Os(3)	2.9741 (11)	Os(3)—C(32)	1.87 (2)
Os(2)—Os(3)	2.8547 (11)	Os(3)—C(33)	1.86 (3)
Os(1)—P(1)	2.350 (5)	C(11)—O(11)	1.18 (3)
Os(2)—P(1)	2.318 (5)	C(12)—O(12)	1.14 (3)
Os(3)—P(1)	2.317 (5)	C(13)—O(13)	1.16 (3)
P(1)—C(1*p*)	1.83 (3)	C(21)—O(21)	1.10 (3)
Os(1)—C(11)	1.87 (2)	C(22)—O(22)	1.16 (3)
Os(1)—C(12)	1.92 (3)	C(23)—O(23)	1.16 (3)
Os(1)—C(13)	1.88 (2)	C(31)—O(31)	1.19 (3)
Os(2)—C(21)	1.92 (2)	C(32)—O(32)	1.20 (3)
Os(2)—C(22)	1.92 (2)	C(33)—O(33)	1.19 (3)
Os(2)—C(23)	1.86 (2)		
Os(2)—Os(1)—Os(3)	57.33 (3)	Os(1)—Os(2)—C(21)	146.5 (6)
Os(1)—Os(2)—Os(3)	61.28 (3)	Os(1)—Os(2)—C(22)	109.3 (7)
Os(1)—Os(3)—Os(2)	61.40 (3)	Os(1)—Os(2)—C(23)	102.9 (6)
Os(2)—Os(1)—P(1)	49.89 (13)	Os(3)—Os(2)—C(21)	94.7 (6)
Os(3)—Os(1)—P(1)	49.92 (13)	Os(3)—Os(2)—C(22)	96.0 (7)
Os(1)—Os(2)—P(1)	50.84 (13)	Os(3)—Os(2)—C(23)	160.7 (6)
Os(3)—Os(2)—P(1)	51.96 (13)	Os(1)—Os(3)—C(31)	147.8 (6)
Os(1)—Os(3)—P(1)	50.90 (13)	Os(1)—Os(3)—C(32)	109.5 (7)
Os(2)—Os(3)—P(1)	52.00 (13)	Os(1)—Os(3)—C(33)	103.70 (8)
Os(1)—P(1)—Os(2)	79.27 (17)	Os(2)—Os(3)—C(31)	92.3 (6)
Os(1)—P(1)—Os(3)	79.18 (17)	Os(2)—Os(3)—C(32)	98.3 (7)
Os(1)—P(1)—C(1*p*)	127.5 (8)	Os(2)—Os(3)—C(33)	157.3 (8)
Os(2)—P(1)—Os(3)	76.04 (16)	C(11)—Os(1)—C(12)	97.1 (10)
Os(2)—P(1)—C(1*p*)	136.7 (8)	C(11)—Os(1)—C(13)	91.5 (10)
Os(3)—P(1)—C(1*p*)	135.6 (8)	C(12)—Os(1)—C(13)	98.0 (10)
P(1)—Os(1)—C(11)	95.3 (7)	C(21)—Os(2)—C(22)	95.4 (9)
P(1)—Os(1)—C(12)	162.4 (8)	C(21)—Os(2)—C(23)	94.5 (9)
P(1)—Os(1)—C(13)	94.0 (7)	C(22)—Os(2)—C(23)	100.0 (9)
P(1)—Os(2)—C(22)	146.7 (7)	C(31)—Os(3)—C(32)	91.4 (10)
P(1)—Os(2)—C(23)	110.1 (7)	C(31)—Os(3)—C(33)	94.7 (10)
P(1)—Os(2)—C(21)	96.3 (6)	C(32)—Os(3)—C(33)	103.0 (11)
P(1)—Os(3)—C(31)	98.9 (6)	Os(1)—C(11)—O(11)	175 (2)
P(1)—Os(3)—C(32)	148.6 (7)	Os(1)—C(12)—O(12)	175 (2)
P(1)—Os(3)—C(33)	105.5 (8)	Os(1)—C(13)—O(13)	177 (2)
Os(2)—Os(1)—C(11)	144.6 (7)	Os(2)—C(21)—O(21)	177.0 (19)
Os(2)—Os(1)—C(12)	115.6 (8)	Os(2)—C(22)—O(22)	175 (2)
Os(2)—Os(1)—C(13)	96.8 (7)	Os(2)—C(23)—O(23)	178.8 (19)
Os(3)—Os(1)—C(11)	97.2 (7)	Os(3)—C(31)—O(31)	175.9 (18)
Os(3)—Os(1)—C(12)	115.9 (8)	Os(3)—C(32)—O(32)	175 (2)
Os(3)—Os(1)—C(13)	143.4 (7)	Os(3)—C(33)—O(33)	175 (2)

The structure of (1) was solved by direct methods using *SHELXS*84 (Sheldrick, 1984). The methyl groups of the phosphine were each found to be disordered over two sites, such that the occupancy of C(11) and C(12) refined to 0.606 (9) and that of the alternative positions represented by C(11′) and C(12′) to 0.394 (9). Only the Os atoms were allowed anisotropic thermal motion. The absolute structure was determined and is presented here; the other polarity gave higher residuals *R* and *wR* of 0.0450 and 0.0493, respectively, and higher errors in atomic positional and displacement parameters. The structures of compounds (2) and (3) were solved similarly. The atoms allowed anisotropic thermal motion were Os, P and O for (2) and Os and P for (3). The programs used were *SHELX*76 (Sheldrick, 1976) and *SHELXS*86 (Sheldrick, 1985). *CALC* (Gould & Taylor, 1985) was used for molecular geometry calculations.

We thank the SERC for support, Johnson Matthey PLC for loans of platinum group metals and the Royal Society of Edinburgh and the Scottish Office Education Department for a Research Support Fellowship (to MS).

Lists of structure factors and anisotropic displacement parameters have been deposited with the British Library Document Supply Centre as Supplementary Publication No. SUP 71506 (36 pp.). Copies may be obtained through The Technical Editor, International Union of Crystallography, 5 Abbey Square, Chester CH1 2HU, England. [CIF reference: HU1044]

References

Bruce, M. I., Guss, J. M., Mason, R., Skelton, B. W. & White, A. H. (1983). *J. Organomet. Chem.* **251**, 261–271.

Carty, A. J., Cherkas, A. A., Nucciarone, D., Patel, V. D. & Taylor, N. J. (1985). *Organometallics*, **4**, 1792 1800.

Carty, A. J., Cherkas, A. A. & Taylor, N. J. (1990). *J. Chem. Soc. Chem. Commun.* pp. 385–387.

Colbran, S. B., Johnson, B. F. G., Lewis, J. & Sorrell, R. M. (1985). *J. Organomet. Chem.* **296**, C1 C5.

Cromer, D. T. & Mann, J. B. (1968). *Acta Cryst.* A**24**, 321 324.

Day, M. W., Deeming, A. J., Doherty, S., Hardcastle, K. I. & Minassian, H. (1991). *J. Chem. Soc. Dalton Trans.* pp. 1273–1279.

Ebsworth, E. A. V., McIntosh, A. P. & Schröder, M. (1986). *J. Organomet. Chem.* **312**, C41–C43.

Gould, R. O. & Taylor, P. (1985). *CALC. Program for Molecular Geometry Calculations*. Univ. of Edinburgh, Scotland.

Huttner, G., Natarajan, K. & Zsolnai, L. (1981). *J. Organomet. Chem.* **220**, 365 381.

Iwasaki, F., Mays, M. J., Raithby, P. R., Taylor, P. L. & Wheatley, P. J. (1981). *J. Organomet. Chem.* **213**, 185–206.

Sheldrick, G. M. (1976). *SHELX76. Program for Crystal Structure Determination*. Univ. of Cambridge, England.

Sheldrick, G. M. (1984). *SHELXS84. Program for the Solution of Crystal Structures*. Univ. of Göttingen, Germany.

Sheldrick, G. M. (1986). *SHELXS86. Program for the Solution of Crystal Structures*. Univ. of Göttingen, Germany.

Acta Cryst. (1994). C50, 375–377

Tetra-*n*-butylammonium Tris(perfluorophenyl)(triphenylphosphine)platinate(II)

IRENE ARA AND MILAGROS TOMÁS*

Departamento de Química Inorgánica,
Instituto de Ciencia de Materiales de Aragón,
Univesidad de Zaragoza-CSIC, 50009 Zaragoza, Spain

(*Received* 29 *January* 1993; *accepted* 16 *August* 1993)

Abstract

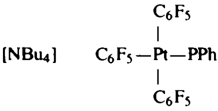
The coordination geometry of the ligands around the Pt atom is approximately square planar in $[N(C_4H_9)_4][Pt(C_6F_5)_3(C_{18}H_{15}P)]$, with Pt—C dis-

Acta Crystallographica Section C
ISSN 0108-2701 © 1994

tances in the range 2.038 (11)–2.066 (10) Å and the Pt—P distance 2.279 (3) Å. Bond angles between adjacent ligands range from 86.2 (4) to 94.6 (3)°.

Comment

Many cationic or neutral mononuclear Pt derivatives containing triphenylphosphine (PPh_3) as a ligand have been reported in the literature; however, anionic complexes are practically unknown. The structure determination of the title compound (I) was



$$[NBu_4]\quad C_6F_5\text{—}\underset{\substack{|\\ C_6F_5}}{\overset{\substack{C_6F_5\\ |}}{Pt}}\text{—}PPh_3$$

(I)

undertaken in order to establish structural differences, if any, with known cationic or neutral complexes. Since the Pt—P bond has a certain degree of π back-donation it would be expected that an anionic complex could allow more electron density to drift towards the P atom, thus resulting in shorter distances. Details of synthetic work have been reported previously (Usón, Forniés, Martínez & Tomás, 1980; Usón, Forniés, Tomás & Fandos, 1984).

The Pt atom is located in an approximately square-planar environment formed by three C atoms [C(1), C(7) and C(13)] and one P atom. Bond lengths are Pt—C(1) = 2.066 (10), Pt—C(7) = 2.057 (10), Pt—C(13) = 2.038 (11) and Pt—P = 2.279 (3) Å. All Pt—C distances can be considered identical within experimental error. Bond angles between the Pt and two adjacent atoms range from 86.2 (4) to 94.6 (3)°, while the *trans* bond angles are 173.6 (4) and 176.7 (3)°. Bond distances and angles within the pentafluorophenyl and phenyl rings are consistent with the corresponding values usually shown by these groups when coordinated to Pt centres (Usón & Forniés, 1988). As the space group is non-centrosymmetric, the enantiomorph was chosen on the basis of a lower weighted R factor.

A search of the Cambridge Structural Database showed a large number of mononuclear complexes in which the Pt—P distances are comparable with the one in the present structure, even though they correspond to neutral or cationic complexes. However, a tendency to longer distances in cationic complexes is observed, with an average value larger than 2.300 Å. As far as we know, the only structurally characterized triphenylphosphineplatinum(II) anionic complex shows a Pt—P distance of 2.236 Å (de Renzi, di Blasio, Panunzi, Pedone & Vitagliano, 1976), which is shorter than the distance found in the present study. This may be due to the different *trans* influence of the ligands, which, together with the charge of the complex, leads to the distance found in the structure.

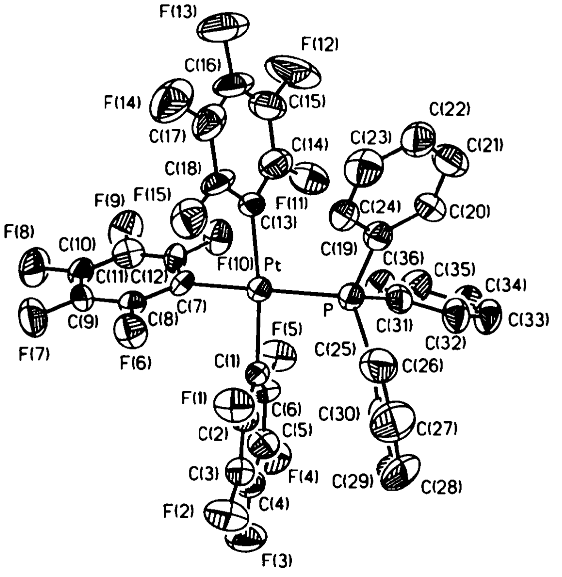


Fig. 1. Structure and labelling scheme of the complex anion $[Pt(C_6F_5)_3(PPh_3)]^-$. Atoms are represented by their 40% probability ellipsoids.

Experimental

Crystal data

$[N(C_4H_9)_4][Pt(C_6F_5)_3$-
$(C_{18}H_{15}P)]$
M_r = 1201.023
Orthorhombic
$P2_12_12_1$
a = 11.903 (2) Å
b = 20.019 (4) Å
c = 21.640 (3) Å
V = 5156.3 (15) Å^3
Z = 4
D_x = 1.539 Mg m^{-3}

Mo $K\alpha$ radiation
λ = 0.71069 Å
Cell parameters from 48 reflections
θ = 11.5–15°
μ = 2.841 mm^{-1}
T = 291 K
Prismatic
0.27 × 0.06 × 0.06 mm
Colourless
Crystal source: dichloromethane/hexane

Data collection

Stoe Siemens AED-2 diffractometer
ω/θ scans
Absorption correction: none
10 322 measured reflections
8474 independent reflections
5025 observed reflections [$F > 6.0\sigma(F)$]

$R_{\rm int}$ = 2.82
$\theta_{\rm max}$ = 25°
h = −14 → 14
k = −23 → 23
l = −25 → 25
3 standard reflections
frequency: 45 min
intensity variation: none

Refinement

Refinement on F
R = 0.0391

$\Delta\rho_{\rm max}$ = 0.99 e Å^{-3}
$\Delta\rho_{\rm min}$ = −0.61 e Å^{-3}

$wR = 0.0411$
$S = 1.0387$
5025 reflections
636 parameters
Only H-atom U's refined
$w = 1/[\sigma^2(F) + 0.0004F^2]$
$(\Delta/\sigma)_{\max} = -0.115$

Extinction correction: none
Atomic scattering factors from *International Tables for X-ray Crystallography* (1974, Vol. IV, pp. 55, 99, 149)

Table 1. *Fractional atomic coordinates and equivalent isotropic displacement parameters* (Å^2)

$$U_{\rm eq} = (1/3)\Sigma_i\Sigma_jU_{ij}a_i^*a_j^*\mathbf{a}_i.\mathbf{a}_j.$$

	x	y	z	$U_{\rm eq}$
Pt	0.1002 (1)	−0.0113 (1)	0.1820 (1)	0.047 (1)
P	0.1293 (3)	0.0848 (1)	0.2361 (2)	0.053 (1)
F(1)	0.2802 (6)	0.0469 (4)	0.0869 (3)	0.078 (3)
F(2)	0.2643 (8)	0.1088 (4)	−0.0210 (4)	0.107 (4)
F(3)	0.0586 (8)	0.1380 (4)	−0.0701 (3)	0.114 (4)
F(4)	−0.1286 (7)	0.1029 (5)	−0.0068 (4)	0.108 (4)
F(5)	−0.1138 (6)	0.0401 (4)	0.1011 (3)	0.084 (3)
F(6)	0.2400 (6)	−0.1018 (4)	0.0825 (4)	0.076 (3)
F(7)	0.1863 (8)	−0.2141 (4)	0.0230 (4)	0.101 (4)
F(8)	−0.0176 (7)	−0.2711 (3)	0.0377 (4)	0.104 (4)
F(9)	−0.1690 (7)	−0.2145 (4)	0.1150 (4)	0.099 (4)
F(10)	−0.1181 (5)	−0.1043 (3)	0.1774 (4)	0.077 (3)
F(11)	−0.0594 (8)	−0.0438 (5)	0.3004 (4)	0.112 (4)
F(12)	−0.0474 (12)	−0.1300 (6)	0.3916 (5)	0.186 (7)
F(13)	0.1398 (12)	−0.2098 (4)	0.4016 (4)	0.178 (7)
F(14)	0.3135 (10)	−0.1944 (4)	0.3209 (5)	0.147 (5)
F(15)	0.2973 (7)	−0.1090 (4)	0.2270 (4)	0.095 (3)
C(1)	0.0861 (10)	0.0409 (4)	0.0999 (5)	0.045 (4)
C(2)	0.1776 (11)	0.0594 (7)	0.0654 (6)	0.056 (5)
C(3)	0.1685 (13)	0.0906 (7)	0.0103 (6)	0.066 (6)
C(4)	0.0656 (15)	0.1067 (6)	−0.0137 (6)	0.077 (7)
C(5)	−0.0278 (13)	0.0901 (7)	0.0182 (7)	0.073 (6)
C(6)	−0.0141 (11)	0.0566 (6)	0.0733 (6)	0.057 (5)
C(7)	0.0643 (9)	−0.0967 (5)	0.1330 (5)	0.044 (4)
C(8)	0.1361 (10)	−0.1274 (5)	0.0930 (5)	0.050 (4)
C(9)	0.1103 (13)	−0.1849 (5)	0.0609 (5)	0.067 (5)
C(10)	0.0058 (13)	−0.2150 (6)	0.0684 (6)	0.067 (5)
C(11)	−0.0679 (10)	−0.1848 (7)	0.1077 (6)	0.066 (5)
C(12)	−0.0371 (11)	−0.1290 (5)	0.1389 (6)	0.056 (5)
C(13)	0.1164 (12)	−0.0721 (5)	0.2570 (5)	0.053 (5)
C(14)	0.0359 (15)	−0.0806 (7)	0.3016 (7)	0.084 (7)
C(15)	0.0389 (21)	−0.1259 (9)	0.3507 (8)	0.110 (9)
C(16)	0.1332 (25)	−0.1640 (9)	0.3560 (8)	0.120 (12)
C(17)	0.2171 (18)	−0.1562 (7)	0.3151 (9)	0.104 (8)
C(18)	0.2095 (14)	−0.1114 (6)	0.2663 (7)	0.069 (6)
C(19)	0.1926 (10)	0.0743 (5)	0.3130 (7)	0.059 (4)
C(20)	0.1503 (12)	0.1046 (6)	0.3651 (6)	0.071 (6)
C(21)	0.2042 (14)	0.0951 (7)	0.4209 (6)	0.086 (6)
C(22)	0.2989 (14)	0.0567 (7)	0.4265 (7)	0.085 (6)
C(23)	0.3394 (11)	0.0265 (6)	0.3754 (7)	0.082 (6)
C(24)	0.2878 (10)	0.0341 (5)	0.3198 (7)	0.065 (4)
C(25)	0.2174 (12)	0.1488 (6)	0.2003 (5)	0.062 (5)
C(26)	0.3284 (16)	0.1583 (7)	0.2156 (7)	0.094 (7)
C(27)	0.3942 (17)	0.2046 (8)	0.1848 (9)	0.127 (8)
C(28)	0.3495 (21)	0.2428 (8)	0.1396 (10)	0.131 (11)
C(29)	0.2382 (20)	0.2354 (8)	0.1234 (8)	0.117 (9)
C(30)	0.1708 (15)	0.1877 (6)	0.1525 (6)	0.088 (6)
C(31)	−0.0003 (13)	0.1298 (7)	0.2494 (5)	0.0064 (5)
C(32)	0.0006 (13)	0.1972 (7)	0.2702 (6)	0.076 (6)
C(33)	−0.0966 (16)	0.2300 (6)	0.2800 (6)	0.083 (6)
C(34)	−0.1962 (16)	0.1998 (8)	0.2703 (7)	0.091 (7)
C(35)	−0.2011 (13)	0.1345 (8)	0.2502 (7)	0.089 (7)
C(36)	−0.1009 (14)	0.0995 (6)	0.2400 (6)	0.074 (5)
N	−0.0863 (10)	0.0527 (5)	0.5989 (5)	0.072 (4)
C(37)	−0.0255 (11)	−0.0105 (8)	0.5809 (7)	0.092 (6)
C(38)	−0.0989 (16)	−0.0718 (7)	0.5732 (7)	0.100 (7)
C(39)	−0.0382 (15)	−0.1303 (8)	0.5471 (9)	0.116 (8)
C(40)	−0.1022 (18)	−0.1922 (8)	0.5434 (9)	0.147 (10)
C(41)	−0.1815 (11)	0.0699 (7)	0.5546 (6)	0.084 (6)
C(42)	−0.1502 (14)	0.0785 (9)	0.4867 (7)	0.111 (8)
C(43)	−0.2513 (18)	0.0996 (13)	0.4470 (10)	0.188 (14)
C(44)	−0.3441 (31)	0.0607 (16)	0.4431 (14)	0.280 (22)
C(45)	−0.0006 (12)	0.1071 (8)	0.6024 (8)	0.091 (7)
C(46)	−0.0414 (12)	0.1766 (8)	0.6193 (8)	0.107 (8)
C(47)	0.0483 (14)	0.2287 (8)	0.6240 (8)	0.116 (8)
C(48)	0.0036 (17)	0.2975 (8)	0.6398 (9)	0.138 (9)
C(49)	−0.1397 (12)	0.0440 (7)	0.6610 (6)	0.092 (6)
C(50)	−0.0639 (11)	0.0208 (9)	0.7127 (6)	0.108 (7)
C(51)	−0.1252 (17)	0.0258 (9)	0.7753 (7)	0.136 (9)
C(52)	−0.1307 (22)	0.0876 (10)	0.8034 (10)	0.211 (16)

Table 2. *Selected geometric parameters* (Å, °)

Pt—P	2.279 (3)	Pt—C(1)	2.066 (10)
Pt—C(7)	2.057 (10)	Pt—C(13)	2.038 (11)
P—C(19)	1.838 (14)	P—C(25)	1.828 (13)
P—C(31)	1.809 (15)	F(1)—C(2)	1.330 (15)
F(2)—C(3)	1.375 (17)	F(3)—C(4)	1.375 (15)
F(4)—C(5)	1.343 (18)	F(5)—C(6)	1.371 (15)
F(6)—C(8)	1.359 (14)	F(7)—C(9)	1.354 (16)
F(8)—C(10)	1.335 (14)	F(9)—C(11)	1.352 (15)
F(10)—C(12)	1.366 (14)	F(11)—C(14)	1.352 (20)
F(12)—C(15)	1.359 (25)	F(13)—C(16)	1.351 (20)
F(14)—C(17)	1.385 (22)	F(15)—C(18)	1.348 (18)
P—Pt—C(1)	91.6 (3)	P—Pt—C(7)	176.7 (3)
C(1)—Pt—C(7)	87.7 (4)	P—Pt—C(13)	94.6 (3)
C(1)—Pt—C(13)	173.6 (4)	C(7)—Pt—C(13)	86.2 (4)
Pt—P—C(19)	115.5 (4)	Pt—P—C(25)	117.5 (4)
C(19)—P—C(25)	103.2 (5)	Pt—P—C(31)	111.9 (5)
C(19)—P—C(31)	105.2 (6)	C(25)—P—C(31)	102.0 (6)
Pt—C(1)—C(2)	122.7 (9)	Pt—C(1)—C(6)	123.5 (9)
Pt—C(7)—C(8)	124.9 (8)	Pt—C(7)—C(12)	121.7 (8)
Pt—C13—C(14)	124.7 (11)	Pt—C(13)—C(18)	122.3 (10)

Two octants (+ + + and − − −) were measured. All methylene and phenyl H atoms were included in calculated positions; a common isotropic displacement parameter refined to 0.11 (1) Å^2. Only the H atoms of two methyl groups [C(40) and C(52)] could be located [U = 0.24 (7) and 0.14 (4) Å^2, respectively] by combining the information of the difference Fourier map and calculated positions. The correct enantiomorph was chosen on the basis of a lower weighted R factor (0.0411 *versus* 0.0749). All calculations were performed using *SHELXTL-Plus* (Sheldrick, 1987).

We thank the Comisión Interministerial de Ciencia y Tecnología (Spain) for financial support (project PB89-0057).

Lists of structure factors, anisotropic displacement parameters, H-atom coordinates and complete geometry have been deposited with the British Library Document Supply Centre as Supplementary Publication No. SUP 71566 (37 pp.). Copies may be obtained through The Technical Editor, International Union of Crystallography, 5 Abbey Square, Chester CH1 2HU, England. [CIF reference: HU1049]

References

Renzi, A. de, di Blasio, B., Panunzi, A., Pedone, C. & Vitagliano, A. (1976). *Gazz. Chim. Ital.* **106**, 709 723.

Sheldrick, G. M. (1987). *SHELXTL-Plus*. PC version. Siemens Analytical X-ray Instruments Inc., Madison, Wisconsin, USA.

Usón, R. & Fornies, J. (1988). *Adv. Organomet. Chem.* **28**, 219-297, and references therein.

Usón, R., Forniés, J., Martínez, F. & Tomás, M. (1980). *J. Chem. Soc. Dalton. Trans.* pp. 888-894.

Usón, R., Forniés, J., Tomás, M. & Fandos, R. (1984). *J. Organomet. Chem.* **263**, 253-260.