ORGANOMETALLICS
Organometallics, 1998, 17(13), 2839-2843, DOI:10.1021/om9709751

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Syntheses and Characterization of Nickel(II) and Ruthenium(II) Complexes with the Novel Phosphine Ligands 1-Diphenylphosphinomethyl-1-phenyl-1-silacyclopent-3-ene and 1,1-Bis(diphenylphosphinomethyl)-1-silacyclopent-3-ene. Crystal Structure of $CpRuCl[(PPh_2CH_2)_2SiC_4H_6)]$

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Supporting Information

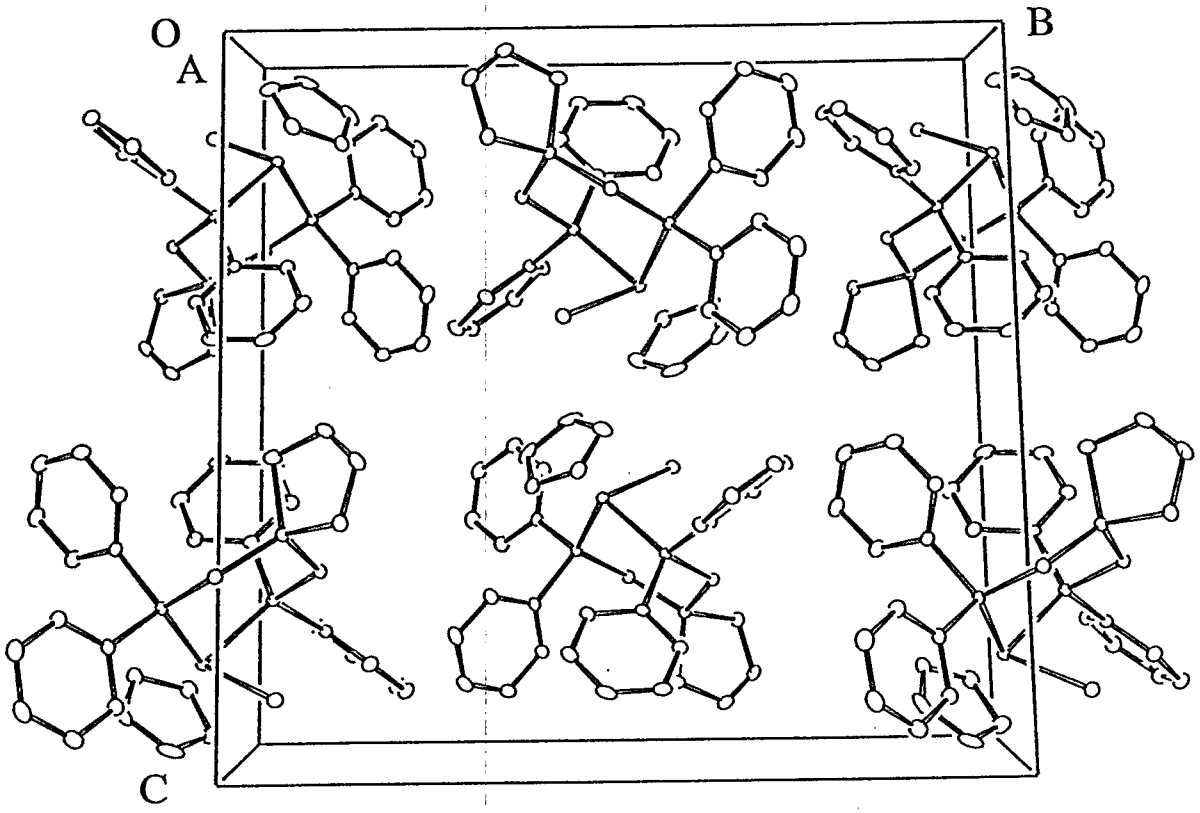

Figure 1. ORTEP view of the unit cell down the *a* axis. Hydrogens are omitted for clarity

Table S-1. Crystal data, data collection, and structure refinement.

Crystal data

Chemical formula	$C_{35}H_{35}ClP_2RuSi$
Formula weight, M_r	682.21
Crystal shape	prism
Colour	orange
Size (mm)	0.15 x 0.24 x 0.36
Crystal system	Monoclinic
Space group	$P2_1/c$
a (Å)	9.2699(7)
b (Å)	18.2490(13)
c (Å)	18.5500(12)
β (°)	102.902(6)
Volume (Å^3)	3058.8(4)
Z	4
D_{calc} (g cm^{-3})	1.481
F(000)	1400
μ (mm^{-1})	6.63
Radiation	CuKα
Wavelength, λ (Å)	1.54056
No. of reflections for cell measurement	25
2θ range (°)	40 - 45
Temperature (K)	210(2)

Data collection

Diffractometer	Enraf-Nonius CAD-4
Data-collection method	$\omega/2\theta$ scan
Absorption correction	Gaussian integration
Transmission range, T_{max}, T_{min}	0.18-0.42
No. of reflections measured	21729
No. of independent reflections	5790
No. of observed reflections	5427
Criterion for observed reflections	$I > 3\sigma(I)$
R_{int}	0.027
$2\theta_{max}$(°)	140

Table S-1. (continued)

Ranges of *h,k,l*	$-11 \le h \le 11$
	$-22 \le k \le 22$
	$0 \le l \le 22$
No. of standard reflections	4
Interval, time (min)	60
Intensity fluctuation (%)	1.0

Solution and refinement

System used	SHELXL-96
Solution	Direct methods
Refinement method	Full-matrix on F^2
Final *R* indices[a], $I > 3\sigma(I)$	R = 0.025
	R*w* = 0.035
R indices,[a] all data	R1 = 0.027
	R*w* = 0.036
Goodness-of-fit, S[a]	1.94
Largest difference peak, $\Delta\rho_{max}$ (e/Å^3)	0.48
Largest difference hole, $\Delta\rho_{min}$ (e/Å^3)	-0.64

[a] $R = \Sigma(||F_o|-|F_c||)/\Sigma(|F_o|)$, $Rw = [\Sigma[w(|F_o|-|F_c|)^2]/\Sigma[w(|F_o|)^2]]^{1/2}$

$S = [\Sigma[w(|F_o|-|F_c|)^2]/(\text{No. of reflns - No. of params.})]^{1/2}$

Table S-2. Atomic coordinates and equivalent isotropic temperature factor for the non-hydrogen atoms.

Atom	x	y	z	B_{iso}[a]
Ru	0.854167(16)	0.026363(8)	0.148167(8)	1.614(5)
Si	1.12404(6)	-0.08400(3)	0.32338(3)	1.95(2)
P(1)	1.06497(6)	0.06523(3)	0.22918(3)	1.68(2)
P(2)	0.79813(5)	-0.05665(3)	0.22926(3)	1.63(2)
Cl	0.99889(6)	-0.07038(3)	0.10685(3)	2.32(2)
C(1)	0.7054(3)	0.1217(1)	0.1279(1)	2.75(9)
C(2)	0.8083(3)	0.1290(2)	0.0824(2)	3.87(12)
C(3)	0.7895(3)	0.0692(2)	0.0337(1)	4.47(13)
C(4)	0.6740(3)	0.0246(2)	0.0481(2)	3.92(11)
C(5)	0.6215(3)	0.0578(1)	0.1055(1)	2.87(9)
C(6)	1.2664(3)	-0.1597(1)	0.3402(1)	2.56(8)
C(7)	1.2717(3)	-0.1804(1)	0.4191(1)	3.20(10)
C(8)	1.2017(3)	-0.1389(1)	0.4583(1)	3.32(10)
C(9)	1.1216(3)	-0.0714(1)	0.4241(1)	3.10(11)
C(10)	1.1916(2)	-0.0070(1)	0.2724(1)	1.96(8)
C(20)	0.9425(2)	-0.1217(1)	0.2709(1)	1.98(8)
C(11)	1.0482(2)	0.1249(1)	0.3066(1)	2.02(7)
C(12)	1.1299(3)	0.1160(1)	0.3787(1)	3.17(11)
C(13)	1.1133(4)	0.1643(2)	0.4344(1)	4.07(14)
C(14)	1.0168(3)	0.2220(1)	0.4192(1)	3.49(11)
C(15)	0.9365(3)	0.2320(1)	0.3479(2)	3.22(11)
C(16)	0.9525(3)	0.1840(1)	0.2922(1)	2.74(9)
C(11')	1.1860(2)	0.1220(1)	0.1850(1)	2.03(8)
C(12')	1.2807(3)	0.1748(1)	0.2237(1)	2.75(9)
C(13')	1.3680(3)	0.2174(1)	0.1886(2)	3.41(11)
C(14')	1.3613(3)	0.2076(1)	0.1136(2)	3.35(11)
C(15')	1.2703(3)	0.1545(1)	0.0746(1)	3.11(10)
C(16')	1.1830(3)	0.1115(1)	0.1099(1)	2.57(9)
C(21)	0.7212(2)	-0.0244(1)	0.3066(1)	1.98(8)
C(22)	0.6858(3)	-0.0728(1)	0.3584(1)	2.64(9)
C(23)	0.6146(3)	-0.0482(2)	0.4118(1)	3.18(10)
C(24)	0.5765(3)	0.0248(2)	0.4139(1)	3.38(11)
C(25)	0.6104(3)	0.0731(1)	0.3632(1)	3.18(10)
C(26)	0.6828(3)	0.0487(1)	0.3099(1)	2.58(9)
C(21')	0.6477(2)	-0.1165(1)	0.1817(1)	1.83(7)
C(22')	0.5005(2)	-0.1012(1)	0.1822(1)	2.27(8)
C(23')	0.3855(3)	-0.1420(1)	0.1404(1)	2.65(10)
C(24')	0.4169(3)	-0.2004(1)	0.0981(1)	2.91(9)
C(25')	0.5623(3)	-0.2166(1)	0.0972(1)	2.77(9)
C(26')	0.6771(2)	-0.1746(1)	0.1383(1)	2.40(9)

[a]B_{iso} is the mean of the principal axes of the thermal ellipsoid.

Table S-3. Anisotropic temperature factors (x 10^2) for the non-hydrogen atoms.

Atom	U_{11}	U_{22}	U_{33}	U_{12}	U_{13}	U_{23}
Ru	1.843(8)	2.224(8)	2.022(7)	0.196(5)	0.342(6)	0.150(5)
Si	2.45(3)	2.29(3)	2.43(3)	0.22(2)	0.05(2)	0.10(2)
P(1)	2.02(2)	1.94(2)	2.38(2)	0.03(2)	0.43(2)	-0.03(2)
P(2)	1.90(2)	2.18(2)	2.15(2)	-0.05(2)	0.50(2)	-0.08(2)
Cl	3.12(3)	2.91(2)	3.01(2)	0.49(2)	1.13(2)	-0.21(2)
C(1)	3.22(13)	2.87(11)	3.97(12)	1.01(9)	-0.03(10)	0.61(9)
C(2)	3.40(14)	4.51(15)	6.68(18)	1.07(11)	0.90(13)	3.49(14)
C(3)	5.44(18)	8.86(23)	2.81(12)	4.07(17)	1.20(12)	2.63(14)
C(4)	4.35(17)	5.54(17)	3.74(14)	1.89(12)	-1.78(12)	-1.12(12)
C(5)	2.26(12)	3.71(13)	4.61(13)	0.67(10)	0.12(10)	0.77(10)
C(6)	2.83(12)	2.68(11)	3.87(12)	0.16(9)	0.05(9)	0.16(9)
C(7)	4.15(14)	3.13(12)	4.17(13)	-0.13(10)	-0.58(11)	1.31(10)
C(8)	5.06(16)	4.12(14)	2.92(11)	-1.04(12)	-0.19(11)	1.05(10)
C(9)	5.08(16)	3.80(13)	2.67(11)	0.00(11)	0.38(11)	-0.23(9)
C(10)	2.00(10)	2.41(10)	2.89(10)	0.14(8)	0.18(8)	-0.08(8)
C(20)	2.44(11)	2.28(10)	2.76(10)	0.08(8)	0.46(8)	0.15(8)
C(11)	2.76(11)	2.12(9)	2.93(10)	-0.45(8)	0.89(8)	-0.32(8)
C(12)	5.86(17)	2.83(12)	3.06(12)	0.44(11)	0.37(11)	-0.18(9)
C(13)	8.50(23)	3.99(14)	2.84(12)	-0.25(14)	0.98(13)	-0.37(10)
C(14)	6.30(19)	3.58(13)	4.25(13)	-0.98(12)	3.01(13)	-1.31(11)
C(15)	4.15(15)	2.93(12)	5.60(15)	0.23(10)	2.01(12)	-1.06(11)
C(16)	3.24(13)	3.12(12)	3.96(12)	0.33(9)	0.60(10)	-0.65(10)
C(11')	2.41(11)	2.16(9)	3.20(10)	0.06(8)	0.72(8)	0.25(8)
C(12')	3.27(13)	3.23(12)	4.00(12)	-0.65(10)	0.92(10)	-0.30(10)
C(13')	3.64(15)	3.53(13)	6.00(16)	-1.20(10)	1.54(12)	-0.23(12)
C(14')	3.65(14)	3.56(13)	6.10(16)	-0.16(11)	2.34(12)	1.14(12)
C(15')	4.22(15)	4.10(13)	4.05(13)	0.35(11)	2.05(11)	0.73(10)
C(16')	3.35(13)	3.07(11)	3.54(11)	-0.07(9)	1.14(10)	-0.01(9)
C(21)	2.33(11)	2.98(11)	2.21(10)	-0.31(8)	0.52(8)	-0.43(8)
C(22)	3.95(13)	3.31(12)	3.00(11)	-0.26(10)	1.24(10)	-0.09(9)
C(23)	4.62(15)	5.07(15)	2.74(11)	-0.52(12)	1.57(10)	0.07(11)
C(24)	4.04(15)	6.16(18)	3.02(12)	-0.07(12)	1.60(11)	-1.49(11)
C(25)	4.40(15)	3.99(14)	3.94(13)	0.25(11)	1.48(11)	-1.04(11)
C(26)	3.53(13)	3.08(11)	3.27(11)	-0.15(10)	0.95(10)	-0.41(9)
C(21')	2.26(10)	2.42(10)	2.29(9)	-0.24(8)	0.55(8)	0.06(8)
C(22')	2.39(11)	2.71(10)	3.54(11)	-0.02(8)	0.71(9)	-0.49(9)
C(23')	2.22(11)	3.62(12)	4.16(12)	-0.32(9)	0.52(9)	-0.14(10)
C(24')	3.14(13)	3.80(13)	3.71(12)	-0.89(10)	-0.08(10)	-0.50(10)
C(25')	3.72(13)	3.26(12)	3.39(12)	-0.46(10)	0.49(10)	-1.04(9)
C(26')	2.57(11)	3.40(12)	3.24(11)	-0.16(9)	0.79(9)	-0.58(9)

T.F.=$\exp[-2p^2(U_{11}h^2a^{*2}+U_{22}k^2b^{*2}+U_{33}l^2c^{*2}+2U_{12}hka^*b^*+2U_{13}hla^*c^*+2U_{23}klb^*c^*)]$

Table S-4. Refined hydrogen coordinates and temperature factors

Atom	x	y	z	B_{iso}
H(1)	0.685(3)	0.157(2)	0.162(2)	5.0(8)
H(2)	0.882(3)	0.169(1)	0.085(2)	4.1(7)
H(3)	0.839(4)	0.058(2)	0.002(2)	7.5(10)
H(4)	0.640(4)	-0.016(2)	0.029(2)	5.1(8)
H(5)	0.543(3)	0.040(1)	0.127(2)	4.2(7)
H(6A)	1.355(3)	-0.142(1)	0.336(1)	3.2(6)
H(6B)	1.233(3)	-0.199(1)	0.310(2)	3.5(6)
H(7)	1.321(3)	-0.221(2)	0.438(2)	4.3(7)
H(8)	1.201(4)	-0.147(2)	0.505(2)	5.5(8)
H(9A)	1.023(3)	-0.065(2)	0.431(2)	4.3(7)
H(9B)	1.169(4)	-0.027(1)	0.448(2)	4.3(7)
H(10A)	1.208(3)	-0.029(1)	0.233(2)	3.7(7)
H(10B)	1.281(3)	0.016(1)	0.301(1)	2.4(5)
H(20A)	0.905(3)	-0.156(1)	0.300(1)	3.2(6)
H(20B)	0.961(3)	-0.145(1)	0.229(1)	2.3(5)
H(12)	1.196(3)	0.076(1)	0.392(1)	3.0(6)
H(13)	1.162(3)	0.163(2)	0.479(2)	4.7(7)
H(14)	1.014(3)	0.252(1)	0.456(1)	3.3(6)
H(15)	0.872(3)	0.272(2)	0.338(2)	5.0(8)
H(16)	0.905(3)	0.192(1)	0.243(1)	3.3(6)
H(12')	1.281(3)	0.180(1)	0.274(1)	3.1(6)
H(13')	1.432(3)	0.252(2)	0.219(2)	3.8(6)
H(14')	1.419(3)	0.235(1)	0.090(1)	3.5(6)
H(15')	1.262(3)	0.145(1)	0.026(1)	3.6(6)
H(16')	1.114(3)	0.076(1)	0.081(1)	2.9(5)
H(22)	0.704(3)	-0.117(1)	0.356(1)	3.5(6)
H(23)	0.586(3)	-0.077(1)	0.447(1)	3.3(6)
H(24)	0.538(3)	0.039(1)	0.447(2)	4.6(7)
H(25)	0.577(3)	0.125(1)	0.362(1)	3.4(6)
H(26)	0.708(3)	0.082(1)	0.270(1)	3.4(6)
H(22')	0.482(3)	-0.063(1)	0.214(1)	2.9(5)
H(23')	0.285(3)	-0.126(1)	0.144(1)	2.7(5)
H(24')	0.341(3)	-0.231(1)	0.069(1)	3.6(6)
H(25')	0.592(3)	-0.256(1)	0.070(1)	2.5(5)
H(26')	0.771(3)	-0.184(1)	0.133(1)	2.8(5)

Table S-5. Interatomic distances (Å) and bond angles (deg) between the non-hydrogen atoms.

Ru-P(1)	2.2953(5)	C(8)-C(9)	1.503(4)
Ru-P(2)	2.2753(5)	C(11)-C(12)	1.391(3)
Ru-Cl	2.4419(5)	C(11)-C(16)	1.384(3)
Ru-C(1)	2.200(2)	C(12)-C(13)	1.392(4)
Ru-C(2)	2.224(2)	C(13)-C(14)	1.370(4)
Ru-C(3)	2.216(2)	C(14)-C(15)	1.378(4)
Ru-C(4)	2.202(2)	C(15)-C(16)	1.388(3)
Ru-C(5)	2.201(2)	C(11')-C(12')	1.391(3)
Si-C(6)	1.887(2)	C(11')-C(16')	1.399(3)
Si-C(9)	1.887(2)	C(12')-C(13')	1.385(3)
Si-C(10)	1.877(2)	C(13')-C(14')	1.389(4)
Si-C(20)	1.876(2)	C(14')-C(15')	1.379(4)
P(1)-C(10)	1.827(2)	C(15')-C(16')	1.391(3)
P(1)-C(11)	1.836(2)	C(21)-C(22)	1.397(3)
P(1)-C(11')	1.848(2)	C(21)-C(26)	1.387(3)
P(2)-C(20)	1.826(2)	C(22)-C(23)	1.383(3)
P(2)-C(21)	1.836(2)	C(23)-C(24)	1.380(4)
P(2)-C(21')	1.835(2)	C(24)-C(25)	1.374(4)
C(1)-C(2)	1.413(4)	C(25)-C(26)	1.386(3)
C(1)-C(5)	1.411(3)	C(21')-C(22')	1.394(3)
C(2)-C(3)	1.403(5)	C(21')-C(26')	1.394(3)
C(3)-C(4)	1.418(5)	C(22')-C(23')	1.387(3)
C(4)-C(5)	1.404(4)	C(23')-C(24')	1.392(4)
C(6)-C(7)	1.501(3)	C(24')-C(25')	1.384(4)
C(7)-C(8)	1.317(4)	C(25')-C(26')	1.392(3)

Table S-5. (continued)

P(1)-Ru-P(2)	93.41(2)	P(1)-C(11)-C(12)	124.1(2)
P(1)-Ru-Cl	88.96(2)	P(1)-C(11)-C(16)	118.3(2)
P(2)-Ru-Cl	87.06(2)	C(12)-C(11)-C(16)	117.6(2)
C(6)-Si-C(9)	95.0(1)	C(11)-C(12)-C(13)	120.9(2)
C(6)-Si-C(10)	109.3(1)	C(12)-C(13)-C(14)	120.6(2)
C(6)-Si-C(20)	109.3(1)	C(13)-C(14)-C(15)	119.2(2)
C(9)-Si-C(10)	119.1(1)	C(14)-C(15)-C(16)	120.4(2)
C(9)-Si-C(20)	110.5(1)	C(11)-C(16)-C(15)	121.3(2)
C(10)-Si-C(20)	112.0(1)	P(1)-C(11')-C(12')	122.3(2)
Ru-P(1)-C(10)	115.72(7)	P(1)-C(11')-C(16')	119.1(2)
Ru-P(1)-C(11)	119.13(7)	C(12')-C(11')-C(16')	118.6(2)
Ru-P(1)-C(11')	113.27(7)	C(11')-C(12')-C(13')	120.9(2)
C(10)-P(1)-C(11)	104.0(1)	C(12')-C(13')-C(14')	119.9(2)
C(10)-P(1)-C(11')	101.8(1)	C(13')-C(14')-C(15')	120.1(2)
C(11)-P(1)-C(11')	100.4(1)	C(14')-C(15')-C(16')	120.0(2)
Ru-P(2)-C(20)	117.29(7)	C(11')-C(16')-C(15')	120.4(2)
Ru-P(2)-C(21)	119.29(7)	P(2)-C(21)-C(22)	121.8(2)
Ru-P(2)-C(21')	09.84(6)	P(2)-C(21)-C(26)	119.4(2)
C(20)-P(2)-C(21)	104.68(10)	C(22)-C(21)-C(26)	118.4(2)
C(20)-P(2)-C(21')	102.91(9)	C(21)-C(22)-C(23)	120.7(2)
C(21)-P(2)-C(21')	100.39(9)	C(22)-C(23)-C(24)	120.0(2)
C(2)-C(1)-C(5)	107.7(2)	C(23)-C(24)-C(25)	120.0(2)
C(1)-C(2)-C(3)	107.9(2)	C(24)-C(25)-C(26)	120.2(2)
C(2)-C(3)-C(4)	108.4(2)	C(21)-C(26)-C(25)	120.7(2)
C(3)-C(4)-C(5)	107.4(2)	P(2)-C(21')-C(22')	121.2(1)
C(1)-C(5)-C(4)	108.6(2)	P(2)-C(21')-C(26')	120.3(2)
Si-C(6)-C(7)	102.4(2)	C(22')-C(21')-C(26')	118.3(2)
C(6)-C(7)-C(8)	118.7(2)	C(21')-C(22')-C(23')	121.3(2)
C(7)-C(8)-C(9)	119.8(2)	C(22')-C(23')-C(24')	119.7(2)
Si-C(9)-C(8)	101.8(2)	C(23')-C(24')-C(25')	119.7(2)
Si-C(10)-P(1)	120.5(1)	C(24')-C(25')-C(26')	120.2(2)
Si-C(20)-P(2)	118.0(1)	C(21')-C(26')-C(25')	120.7(2)

Table S-6. Distances and angles involving the hydrogen atoms

Bond	Distances, Å	Bonds	Angles, deg
C(1)-H(1)	0.95(3)	C(2)-C(1)-H(1)	126.0(19)
		C(5)-C(1)-H(1)	125.6(19)
C(2)-H(2)	0.99(3)	C(1)-C(2)-H(2)	126.0(17)
		C(3)-C(2)-H(2)	126.1(17)
C(3)-H(3)	0.85(4)	C(2)-C(3)-H(3)	128(3)
		C(4)-C(3)-H(3)	122(3)
C(4)-H(4)	0.85(3)	C(3)-C(4)-H(4)	130.4(22)
		C(5)-C(4)-H(4)	122.1(22)
C(5)-H(5)	0.95(3)	C(1)-C(5)-H(5)	125.5(17)
		C(4)-C(5)-H(5)	125.9(17)
C(6)-H(6A)	0.90(3)	Si-C(6)-H(6A)	110.2(16)
C(6)-H(6B)	0.93(3)	Si-C(6)-H(6B)	110.0(17)
		C(7)-C(6)-H(6A)	110.0(16)
		C(7)-C(6)-H(6B)	109.4(17)
		H(6A)-C(6)-H(6B)	114.2(24)
C(7)-H(7)	0.91(3)	C(6)-C(7)-H(7)	119.3(18)
		C(8)-C(7)-H(7)	122.0(18)
C(8)-H(8)	0.88(3)	C(7)-C(8)-H(8)	124.0(21)
		C(9)-C(8)-H(8)	116.2(21)
C(9)-H(9A)	0.96(3)	Si-C(9)-H(9A)	111.9(18)
C(9)-H(9B)	0.97(3)	Si-C(9)-H(9B)	116.1(18)
		C(8)-C(9)-H(9A)	116.3(17)
		C(8)-C(9)-H(9B)	111.2(18)
		H(9A)-C(9)-H(9B)	100(3)
C(10)-H(10A)	0.88(3)	Si-C(10)-H(10A)	103.0(17)
C(10)-H(10B)	0.97(3)	Si-C(10)-H(10B)	112.3(14)
		P(1)-C(10)-H(10A)	99.9(18)
		P(1)-C(10)-H(10B)	108.6(14)
		H(10A)-C(10)-H(10B)	111.5(24)
C(20)-H(20A)	0.95(3)	Si-C(20)-H(20A)	110.5(15)
C(20)-H(20B)	0.93(2)	Si-C(20)-H(20B)	106.9(14)
		P(2)-C(20)-H(20A)	110.3(16)
		P(2)-C(20)-H(20B)	101.3(14)
		H(20A)-C(20)-H(20B)	109.1(21)
C(12)-H(12)	0.95(3)	C(11)-C(12)-H(12)	121.8(15)
		C(13)-C(12)-H(12)	117.2(15)

Table S-6. (continued)

C(13)-H(13)	0.85(3)	C(12)-C(13)-H(13)	125.3(20)
		C(14)-C(13)-H(13)	114.1(20)
C(14)-H(14)	0.89(3)	C(13)-C(14)-H(14)	117.0(17)
		C(15)-C(14)-H(14)	123.7(17)
C(15)-H(15)	0.94(3)	C(14)-C(15)-H(15)	118.6(19)
		C(16)-C(15)-H(15)	121.0(19)
C(16)-H(16)	0.93(3)	C(11)-C(16)-H(16)	116.8(16)
		C(15)-C(16)-H(16)	121.8(16)
C(12')-H(12')	0.95(3)	C(11')-C(12')-H(12')	116.4(16)
		C(13')-C(12')-H(12')	122.7(16)
C(13')-H(13')	0.96(3)	C(12')-C(13')-H(13')	115.7(17)
		C(14')-C(13')-H(13')	124.4(17)
C(14')-H(14')	0.91(3)	C(13')-C(14')-H(14')	120.8(17)
		C(15')-C(14')-H(14')	119.1(17)
C(15')-H(15')	0.90(3)	C(14')-C(15')-H(15')	124.0(17)
		C(16')-C(15')-H(15')	116.0(17)
C(16')-H(16')	0.98(3)	C(11')-C(16')-H(16')	120.0(15)
		C(15')-C(16')-H(16')	119.4(15)
C(22)-H(22)	0.84(3)	C(21)-C(22)-H(22)	119.8(18)
		C(23)-C(22)-H(22)	119.4(18)
C(23)-H(23)	0.93(3)	C(22)-C(23)-H(23)	125.0(16)
		C(24)-C(23)-H(23)	115.0(16)
C(24)-H(24)	0.83(3)	C(23)-C(24)-H(24)	118.6(19)
		C(25)-C(24)-H(24)	121.3(19)
C(25)-H(25)	0.99(3)	C(24)-C(25)-H(25)	120.4(16)
		C(26)-C(25)-H(25)	119.3(16)
C(26)-H(26)	1.01(3)	C(21)-C(26)-H(26)	115.9(15)
		C(25)-C(26)-H(26)	123.4(15)
C(22')-H(22')	0.96(3)	C(21')-C(22')-H(22')	117.6(15)
		C(23')-C(22')-H(22')	121.1(15)
C(23')-H(23')	0.99(3)	C(22')-C(23')-H(23')	115.1(14)
		C(24')-C(23')-H(23')	125.3(14)
C(24')-H(24')	0.97(3)	C(23')-C(24')-H(24')	122.5(16)
		C(25')-C(24')-H(24')	117.7(16)
C(25')-H(25')	0.95(2)	C(24')-C(25')-H(25')	124.1(15)
		C(26')-C(25')-H(25')	115.6(15)
C(26')-H(26')	0.91(3)	C(21')-C(26')-H(26')	120.8(15)
		C(25')-C(26')-H(26')	118.3(15)

Table S-7. Distances (Å) to the weighted least-squares planes.

Plane 1

C(1)	0.007(3)	C(2)	-0.007(4)	C(3)	0.000(4)
C(4)	0.007(4)	C(5)	-0.008(3)	Ru*	1.8542(13)

Plane 2

C(11)	-0.005(3)	C(12)	0.007(4)	C(13)	0.001(4)
C(14)	-0.005(4)	C(15)	0.001(4)	C(16)	0.004(3)
P(1)*	0.033(4)				

Plane 3

C(11')	-0.008(3)	C(12')	0.006(3)	C(13')	0.005(4)
C(14')	-0.011(4)	C(15')	0.002(3)	C(16')	0.008(3)
P(1)*	-0.043(3)				

Plane 4

C(21)	-0.001(3)	C(22)	-0.002(3)	C(23)	0.004(4)
C(24)	-0.002(4)	C(25)	-0.002(3)	C(26)	0.003(3)
P(2)*	-0.183(4)				

Plane 5

C(21')	0.001(3)	C(22')	0.005(3)	C(23')	-0.008(3)
C(24')	0.003(3)	C(25')	0.005(3)	C(26')	-0.006(3)
P(2)	-0.158(3)				

Plane 6

C(6)	-0.002(3)	C(7)	0.005(3)	C(8)	-0.006(4)
C(9)	0.003(4)	Si	-0.327(4)		

Plane 7

P(1)	-0.0009(7)	P(2)	0.0008(7)	C(10)	0.015(3)
C(20)	-0.016(3)	Ru*	-1.0954(11)	Si*	0.6465(23)
C(11)*	1.7435(23)	C(11')*	-0.7696(23)	C(21)*	1.7446(24)
C(21')*	-0.7845(23)				

Table S-7. (continued)

Plane 8

Ru	0.0000(21)	P(1)	0.0000(7)	P(2)	0.0000(7)
Cl*	-2.4381(6)				

Plane 9

Si	0.0000(8)	C(10)	0.000(3)	C(20)	0.000(3)
C(6)*	-1.521(3)	C(9)*	1.243(4)		

Dihedral angle between planes

7 and 8	44.35(5)
7 and 9	38.05(10)

Table S-8. Torsion angles (deg)

P(2)-Ru-P(1)-C(10)	50.0(1)	P(2)-Ru-P(1)-C(11)	-75.2(1)
P(2)-Ru-P(1)-C(11')	167.1(1)	Cl-Ru-P(1)-C(10)	-37.0(1)
Cl-Ru-P(1)-C(11)	-162.2(1)	Cl-Ru-P(1)-C(11')	80.1(1)
P(1)-Ru-P(2)-C(21)	75.6(1)	P(1)-Ru-P(2)-C(20)	-52.5(1)
Cl-Ru-P(2)-C(20)	36.3(1)	P(1)-Ru-P(2)-C(21')	-169.5(1)
Cl-Ru-P(2)-C(21')	-80.7(1)	Cl-Ru-P(2)-C(21)	164.3(1)
C(9)-Si-C(6)-C(7)	13.1(1)	C(10)-Si-C(6)-C(7)	136.3(2)
C(20)-Si-C(6)-C(7)	-100.7(2)	C(6)-Si-C(9)-C(8)	-13.5(1)
C(10)-Si-C(9)-C(8)	-128.9(2)	C(20)-Si-C(9)-C(8)	99.4(2)
C(6)-Si-C(10)-P(1)	166.1(1)	C(9)-Si-C(10)-P(1)	-86.3(1)
C(20)-Si-C(10)-P(1)	44.8(1)	C(6)-Si-C(20)-P(2)	-166.3(1)
C(9)-Si-C(20)-P(2)	90.4(1)	C(10)-Si-C(20)-P(2)	-44.9(1)
Ru-P(1)-C(10)-Si	-54.3(1)	C(11)-P(1)-C(10)-Si	78.3(1)
C(11')-P(1)-C(10)-Si	-177.6(1)	Ru-P(1)-C(11)-C(12)	136.2(2)
Ru-P(1)-C(11)-C(16)	-46.3(1)	C(10)-P(1)-C(11)-C(12)	5.5(1)
C(10)-P(1)-C(11)-C(16)	-177.0(2)	C(11')-P(1)-C(11)-C(12)	-99.6(2)
C(11')-P(1)-C(11)-C(16)	77.9(1)	Ru-P(1)-C(11')-C(12')	152.4(2)
Ru-P(1)-C(11')-C(16')	-27.8(1)	C(10)-P(1)-C(11')-C(12')	-82.6(1)
C(10)-P(1)-C(11')-C(16')	97.2(2)	C(11)-P(1)-C(11')-C(12')	24.2(1)
C(11)-P(1)-C(11')-C(16')	-155.9(2)	Ru-P(2)-C(20)-Si	57.0(1)
C(21)-P(2)-C(20)-Si	-77.7(1)	C(21')-P(2)-C(20)-Si	177.7(1)
Ru-P(2)-C(21)-C(22)	-179.5(2)	Ru-P(2)-C(21)-C(26)	7.2(1)
C(20)-P(2)-C(21)-C(22)	-45.8(1)	C(20)-P(2)-C(21)-C(26)	140.8(2)
C(21')-P(2)-C(21)-C(22)	60.6(1)	C(21')-P(2)-C(21)-C(26)	-112.7(2)
Ru-P(2)-C(21')-C(22')	-94.5(1)	Ru-P(2)-C(21')-C(26')	79.4(1)
C(20)-P(2)-C(21')-C(22')	139.8(2)	C(20)-P(2)-C(21')-C(26')	-46.3(1)
C(21)-P(2)-C(21')-C(22')	32.0(1)	C(21)-P(2)-C(21')-C(26')	-154.1(2)
Si-C(6)-C(7)-C(8)	-9.4(1)	C(5)-C(1)-C(2)-C(3)	-1.3(1)
C(7)-C(8)-C(9)-Si	11.1(1)	C(2)-C(1)-C(5)-C(4)	1.6(2)
C(1)-C(2)-C(3)-C(4)	0.5(1)	C(3)-C(4)-C(5)-C(1)	-1.3(1)
C(2)-C(3)-C(4)-C(5)	0.5(1)	C(6)-C(7)-C(8)-C(9)	-1.2(1)
C(16)-C(11)-C(12)-C(13)	1.3(1)	P(1)-C(11)-C(12)-C(13)	178.8(2)
C(12)-C(11)-C(16)-C(15)	-1.1(1)	P(1)-C(11)-C(16)-C(15)	-178.8(2)
C(12)-C(13)-C(14)-C(15)	-0.3(1)	C(11)-C(12)-C(13)-C(14)	-0.6(1)
C(14)-C(15)-C(16)-C(11)	0.3(1)	C(13)-C(14)-C(15)-C(16)	0.4(1)
C(16')-C(11')-C(12')-C(13')	1.4(1)	P(1)-C(11')-C(12')-C(13')	-178.8(2)
C(12')-C(11')-C(16')-C(15')	-1.7(1)	P(1)-C(11')-C(16')-C(15')	178.5(2)
C(12')-C(13')-C(14')-C(15')	-1.3(1)	C(11')-C(12')-C(13')-C(14')	0.1(1)
C(14')-C(15')-C(16')-C(11')	0.4(1)	C(13')-C(14')-C(15')-C(16')	1.1(1)
C(26)-C(21)-C(22)-C(23)	-0.2(1)	P(2)-C(21)-C(22)-C(23)	-173.6(2)
C(22)-C(21)-C(26)-C(25)	-0.3(1)	P(2)-C(21)-C(26)-C(25)	173.2(2)
C(22)-C(23)-C(24)-C(25)	-0.6(1)	C(21)-C(22)-C(23)-C(24)	0.6(1)
C(24)-C(25)-C(26)-C(21)	0.4(1)	C(23)-C(24)-C(25)-C(26)	0.1(1)
C(26')-C(21')-C(22')-C(23')	-0.5(1)	P(2)-C(21')-C(22')-C(23')	173.6(2)
C(22')-C(21')-C(26')-C(25')	-0.7(1)	P(2)-C(21')-C(26')-C(25')	-174.8(2)
C(22')-C(23')-C(24')-C(25')	-1.0(1)	C(21')-C(22')-C(23')-C(24')	1.3(1)
C(24')-C(25')-C(26')-C(21')	1.0(1)	C(23')-C(24')-C(25')-C(26')	-0.1(1)