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μ-Carbonyl-bis(carbonyl{η⁵-[tricarbonyl(η⁶-2-methylindenyl)chromium(0)]rhodium(III)})(*Rh—Rh*)

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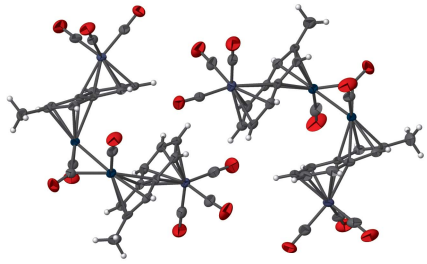
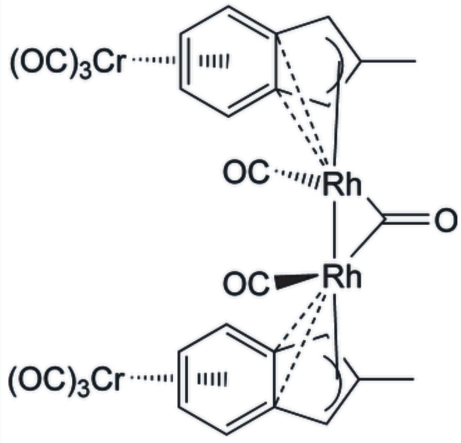
The structure of the title complex, $[Cr_2Rh_2(C_{10}H_9)_2(CO)_9]$, was solved by single-crystal X-ray diffraction analysis in the $P2_1/c$ space group. The crystal shows two units of the tetrametallic complex in the asymmetric unit. The most remarkable features of this new compound are the asymmetric bonding of the Rh^{III} atom to the indenyl ligand, which can be formulated in terms of an $\eta^2;\eta^3$ coordination rather than η^5, and the Rh—Rh distances of 2.6756 (6) and 2.6737 (6) Å that are characteristic of an intermetallic interaction supported by a bridging carbonyl ligand. The infrared spectroscopic signature informs of its clear bridging feature characterized by a significantly elongated C═O bond length compared to those in the two Rh-bound 'terminal' carbonyl ligands.

3D view



Chemical scheme



Structure description

Benzylic-type anions of tricarbonyl(η⁶-indenyl)chromium complexes (Ceccon *et al.*, 1988) are known to behave as efficient 'hemichelating' (Werlé *et al.*, 2013) ligands of transition metal atoms such as Pd^{II} (Werlé *et al.*, 2013, 2016, 2017), Pd^{I} (Werlé *et al.*, 2015) and Pt^{II} (Werlé *et al.*, 2013). It has been shown that the $Cr(CO)_3$ moiety contributes to the stabilization by establishing attractive dynamic and mostly non-covalent interactions (dispersion, electron correlation and electrostatic) with the hemichelated metal atom, the latter being bonded to the ligand in an η^1 fashion, thus displaying formal electronic unsaturation in terms of valence electron bookkeeping. We have found out (Werlé *et al.*, 2014) that the typical hemichelation of the metal atom could not be achieved for Rh^{I} atoms with indenyl-based anions but rather with fluorenyl-based anions, the reason being that with indenyl-based anions the Rh atom prefers, according to Ceccon and co-workers (Ceccon *et al.*, 1989,1993; Bellomo *et al.*, 1993; Bonifaci *et al.*, 1993, 1995, 1996; Cecchetto *et al.*, 1998) and us (Werlé *et al.*, 2014), to reach electron saturation by coordinating to the

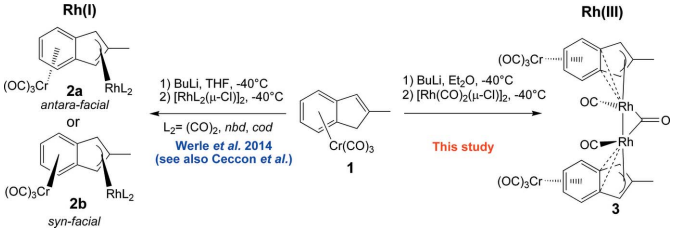


Figure 1
Reaction scheme.

indenyl ligand in an η^3-fashion, either in a *syn* or *anti*-facial manner, the former *syn* geometry being thermodynamically favored over the *anti* one due to attractive dispersion force.

In the course of our investigations we have focused on the use of the anion derived from tricarbonyl(η^6:2-methylindene)-chromium, *i.e* **1** (Fig. 1). This ligand was applied to the coordination of the Rh^I atom with $[L_2RhX]_2$ dimers (Werlé *et al.*, 2014). In the case where L_2 = two carbonyls, norbornadiene or cyclooctadiene, the results of syntheses carried out in tetrahydrofurane disclosed the formation of well-defined *syn* and *anti*-facial Rh^I complexes (Werlé *et al.*, 2014). In the case where L = CO, we observed that the outcome of the reaction depended on the nature of the solvent used in the reaction of the indenylic anion with $[Rh(\mu\text{-Cl})(CO)]_2$. This report discloses that when the reaction is carried out in diethyl ether (Fig. 1), also at a sub-ambient temperature, the main product is not a Cr^0,Rh^I complex such as **2a** or **2b** but rather a tetranuclear Cr^0,Rh^{III} complex formulated as μ-carbonyl-bis-{carbonyl{η^5:[tricarbonyl(η^6:2-methylindenyl)chromium]-rhodium(III)}}, *i.e* **3**, obtained in *ca* 27% yield (Fig. 1). Although the reason for the formal oxidation of Rh in this reaction is not clear, this new compound arises from the loss of one carbonyl ligand at the Rh atom and the establishment of an Rh—Rh interaction supported by a bridging CO ligand (Fig. 1), which according to FT–IR data is characterized by a typical stretching mode at 1712 cm^{-1} that contrasts with those of terminal carbonyl ligands.

Fig. 2 shows the structure of the two independent molecules of **3** present in the asymmetric unit, namely **3a**, and **3b**. This structure contains two η^6-bonded $Cr(CO)_3$ moieties bonded to the benzo moieties of the 2-methylindenyl ligand. In both molecules, the Rh atoms are bonded to the five-membered ring of the indenyl ligand in an *anti* fashion with respect to the $Cr(CO)_3$ moiety in a distorted η^5 way better described as η^2;η^3. Considering molecule **3a**, the latter composite hapticity is evident from the significant difference of interatomic distances existing between Rh1 (or Rh2) and atoms C1 and C6 of 2.371 (6) and 2.404 (6) Å [or C16 with C16—Rh2 = 2.342 (6) and C21 with C21—Rh2 2.353 (6) Å], and atoms C7, C8, C9 [or C22 with C22—Rh2 = 2.254 (5), C23 with C23—Rh2 = 2.290 (5), C24 with C24—Rh2 = 2.223 (5) Å] of 2.242 (5), 2.243 (5) and 2.213 (5) Å respectively. In **3a**, Rh atoms are connected to each other by a bridging carbonyl ligand at C15 and by a direct metal–metal interaction characterized by an Rh1—Rh2 distance of 2.6756 (6) Å, which lies in the range encountered in other carbonyl-bridged Rh clusters (Faraone *et al.*, 1983; Enders *et al.*, 2004).

Molecules **3a** and **3b** have an overall C_2 axis of symmetry aligned with the C15—O5 (**3a**) and C44—O14 (**3 b**) vectors. The C15—O15 bond [1.174 (7) Å] of the μ-bridging carbonyl is consistently elongated as compared to the two Rh-bound terminal carbonyl ligands embodied by C29—O9 [1.142 (7) Å] and C14—O4 [1.132 (7) Å] moieties. The structure of **3b** contains two η^6-bonded $Cr(CO)_3$ moieties bonded to the benzo moieties of the 2-methylindenyl ligand. Again, the Rh atoms are bonded to the five-membered ring of the indenyl ligand in an *anti* fashion with respect to the $Cr(CO)_3$ moiety in a distorted η^5 way, better described as η^2;η^3 owing to the significant difference of interatomic distances existing between Rh3 (or Rh4) and atoms C35 and C30 of 2.343 (5) and 2.398 (5) Å [or C50 2.379 (5) and C45 2.410 (6) Å], and atoms C36, C37, C38 [or C51 with C51—Rh4 = 2.217 (5), C52 with C52—Rh4 = 2.262 (5), C53 with C53—Rh4 = 2.240 (5) Å] of 2.202 (5), 2.258 (5) and 2.263 (5) Å, respectively. The Rh atoms are connected to each other by a bridging carbonyl ligand at C44 and by a direct metal–metal interaction characterized by a Rh3—Rh4 distance of 2.6737 (6) Å, which also lies in the range encountered in other carbonyl-bridged Rh clusters (Faraone *et al.*, 1983; Enders *et al.*, 2004). The C44—O14 bond [1.162 (7) Å] of the μ-bridging carbonyl is consistently elongated as compared to the two Rh-bound terminal carbonyl ligands embodied by C43—O13 [1.142 (7) Å] and C58—O18 [1.138 (6) Å] moieties.

Fig. 3 shows the unit cell and the weak C—H···H hydrogen-bond network that connects the molecules in the crystal lattice (*cf.* Table 1).

Synthesis and crystallization

A solution of **1** (0.200 g, 0.75 mmol) in diethyl ether (5 ml) was treated with 1.1 equivalent of *n*-BuLi (0.52 ml, 0.83 mmol) at −40°C. The solution of the anion was transferred after 30 min at −40°C *via* cannula transfer to an ether solution (5 ml)

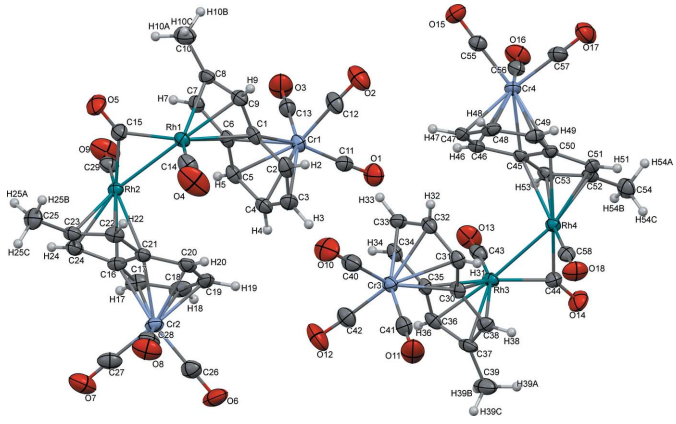


Figure 2
The asymmetric unit of **3** with displacement ellipsoid at the 30% probability level, showing the two independent molecules, *i.e.* **3a** (left) and **3b** (right).

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

D—H···A	D—H	H···A	D···A	D—H···A
C2—H2···O7^{i}	0.95	2.52	3.403 (8)	155
C32—H32···O6^{i}	0.95	2.72	3.632 (8)	162
C5—H5···O4^{ii}	0.95	2.23	3.108 (7)	153
C7—H7···O10^{ii}	0.95	2.61	3.432 (8)	144
C17—H17···O2^{iii}	0.95	2.55	3.399 (8)	149
C34—H34···O17^{iii}	0.95	2.67	3.510 (7)	148
C10—H10*C*···O14^{iv}	0.98	2.53	3.441 (8)	155
C25—H25*A*···O14^{v}	0.98	2.68	3.346 (8)	125
C20—H20···O9^{vi}	0.95	2.42	3.306 (7)	156
C51—H51···O5^{vii}	0.95	2.55	3.313 (8)	137
C54—H54*C*···O5^{vii}	0.98	2.72	3.336 (8)	122
C39—H39*B*···O5^{viii}	0.98	2.53	3.374 (8)	145
C38—H38···O6^{ix}	0.95	2.58	3.521 (8)	170
C22—H22···O15^{x}	0.95	2.69	3.554 (7)	152
C46—H46···O13^{xi}	0.95	2.47	3.262 (7)	141
C31—H31···O18^{xii}	0.95	2.51	3.144 (7)	124
C49—H49···O11^{xii}	0.95	2.66	3.411 (8)	136

Symmetry codes: (i) $x-1, y, z$; (ii) $x, -y+\frac{3}{2}, z-\frac{1}{2}$; (iii) $x+1, y, z$; (iv) $-x+1, y-\frac{1}{2}, -z+\frac{1}{2}$; (v) $-x+2, y-\frac{1}{2}, -z+\frac{1}{2}$; (vi) $x, -y+\frac{3}{2}, z+\frac{1}{2}$; (vii) $-x+1, y+\frac{1}{2}, -z+\frac{1}{2}$; (viii) $-x+2, y+\frac{1}{2}, -z+\frac{1}{2}$; (ix) $-x+2, -y+2, -z+1$; (x) $x+1, -y+\frac{3}{2}, z+\frac{1}{2}$; (xi) $-x+1, -y+2, -z$; (xii) $-x+1, -y+2, -z+1$.

containing 0.51 equivalents of $[Rh(\mu\text{-Cl})(CO)]_2$ (0.149 g, 0.38 mmol). After stirring for 2 h whilst the temperature was slowly raised to −15°C, the solvent was removed under reduced pressure and the residue extracted with cold cyclohexane. After filtration through Celite, the solvent was pumped off and the residue was crystallized by slow diffusion of pentane into a dichloromethane solution of **3** placed in a 5 mm-wide glass tube at *ca* 20°C to afford dark-red crystals (0.167 g, 0.20 mmol, 27%). Elemental analysis calculated for $C_{29}H_{18}Cr_2O_9Rh_2$: C, 42.46; H, 2.21. Found: C, 42.16; H, 2.51. HRMS-ESI (*m*/*z*): $[M+1H]^+$ calculated for $C_{29}H_{18}Cr_2O_9Rh_2$, 820.7944; found, 820.7869. IR (cm^{-1}) ν(CO): 2046(*s*), 2000(*s*), 1941(*s*), 1892(*s*), 1833(*vs*), 1712(*s*).^{1}H NMR (500 MHz, $CDCl_3$, 293 K) δ 5.70 (*dd*, J = 5, 3 Hz, 4H, H_{21}, H_{18}, H_4, H_7), 5.53 (*s*, 4H, H_{15}, H_{17}, H_3, H_1), 5.06 (*dd*, J = 5, 3 Hz, 4H, H_{19}, H_{20}, H_6, H_5), 2.20 (*s*, 3H, H_8), 2.20 (*s*, 3H, H_{22}). ^{13}C NMR (126 MHz, $CDCl_3$, 293 K) δ 233.73 (C_{10}, C_9, C_{11}, C_{24}, C_{23}, C_{25}), 211.63 (*bs*, C_{14}), 187.57 (*d*, J = 86.0 Hz, C_{12}, C_{13}), 129.70 (*d*, J = 6.6 Hz, C_{16}, C_2), 91.14 (*bs*, $C_{21'}$, $C_{17'}$, $C_{3'}$, $C_{7'}$), 90.12 (C_{19}, C_{20}, C_6, C_5), 83.77 (C_{21}, C_{18}, C_4, C_7), 74.52 (C_{15}, C_{17}, C_3, C_1), 17.28 (C_{22}, C_8).

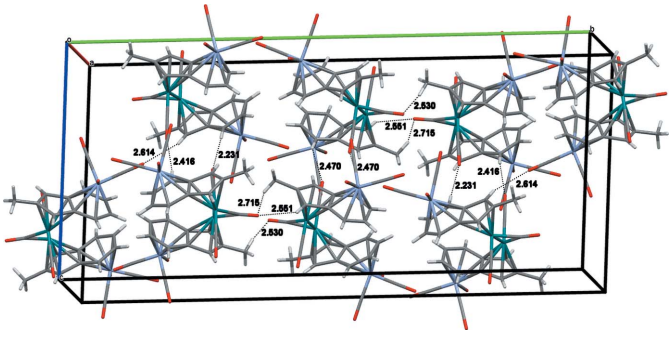


Figure 3
View of the weak C—H···O hydrogen-bond network (Table 1).

Table 2
Experimental details.

Crystal data	
Chemical formula	$[Cr_2Rh_2(C_{10}H_9)_2(CO)_9]$
M_r	820.25
Crystal system, space group	Monoclinic, $P2_1/c$
Temperature (K)	173
a, b, c (Å)	11.3335 (2), 32.6839 (9), 15.9743 (4)
β (°)	105.876 (1)
V (Å^3)	5691.5 (2)
Z	8
Radiation type	Mo $K\alpha$
μ (mm^{-1})	1.94
Crystal size (mm)	0.20 × 0.15 × 0.12
Data collection	
Diffractometer	KappaCCD
Absorption correction	Multi-scan (*MULABS* in *PLATON*; Spek, 2009)
T_{min}, T_{max}	0.718, 0.796
No. of measured, independent and observed [$I > 2\sigma(I)$] reflections	37459, 12891, 8387
R_{int}	0.071
(sin $\theta/\lambda)_{max}$ (Å^{-1})	0.649
Refinement	
$R[F^2 > 2\sigma(F^2)]$, $wR(F^2)$, S	0.057, 0.112, 1.03
No. of reflections	12891
No. of parameters	761
H-atom treatment	H-atom parameters constrained
$\Delta\rho_{max}$, $\Delta\rho_{min}$ (e Å^{-3})	0.94, −1.03

Computer programs: *COLLECT* (Nonius, 1998), *DENZO* and *SCALEPACK* (Otwinowski & Minor, 1997), *SHELXS2013* (Sheldrick, 2008), *SHELXL2014* (Sheldrick, 2015) and *Mercury* (Macrae *et al.*, 2008).

Refinement

Crystal data, data collection and structure refinement details are summarized in Table 2.

Funding information

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full crystallographic data

IUCrData (2019). **4**, x190573 [https://doi.org/10.1107/S241431461900573X]

μ-Carbonyl-bis(carbonyl{η^5-[tricarbonyl(η^6-2-methylindenyl)chromium(0)]rhodium(III)})(*Rh—Rh*)

Christophe Werlé, Corinne Bailly, Lydia Karmazin and Jean-Pierre Djukic

μ-Carbonyl-2:3κ^2*C*:*C*-octacarbonyl-1κ^3*C*, 2κ*C*,3κ*C*,4κ^3*C*-bis[1:2μ-(η^6:η^5);3:4μ-(η^5:η^6)-2-methylindenyl]-1,4-dichromium(0)-2,3-dirhodium(III)}(*Rh—Rh*)

Crystal data

$[Cr_2Rh_2(C_{10}H_9)_2(CO)_9]$
M_r = 820.25
Monoclinic, $P2_1/c$
a = 11.3335 (2) Å
b = 32.6839 (9) Å
c = 15.9743 (4) Å
β = 105.876 (1)°
V = 5691.5 (2) Å^3
Z = 8
$F(000)$ = 3216
D_x = 1.915 Mg m^{-3}
Mo $K\alpha$ radiation, λ = 0.71073 Å
Cell parameters from 55124 reflections
θ = 1.0–27.5°
μ = 1.94 mm^{-1}
T = 173 K
Prism, red
0.20 × 0.15 × 0.12 mm

Data collection

KappaCCD diffractometer
Radiation source: sealed tube
phi and ω scans
Absorption correction: multi-scan (MULABS in PLATON; Spek, 2009)
T_{min} = 0.718, T_{max} = 0.796
37459 measured reflections
12891 independent reflections
8387 reflections with $I > 2\sigma(I)$
R_{int} = 0.071
θ_{max} = 27.5°, θ_{min} = 1.3°
h = −13→14
k = −39→42
l = −20→14

Refinement

Refinement on F^2
Least-squares matrix: full
$R[F^2 > 2\sigma(F^2)]$ = 0.057
$wR(F^2)$ = 0.112
S = 1.03
12891 reflections
761 parameters
0 restraints
Primary atom site location: structure-invariant direct methods
Secondary atom site location: difference Fourier map
Hydrogen site location: inferred from neighbouring sites
H-atom parameters constrained
$w = 1/[\sigma^2(F_o^2) + (0.0268P)^2 + 16.631P]$ where $P = (F_o^2 + 2F_c^2)/3$
$(\Delta/\sigma)_{max}$ = 0.002
$\Delta\rho_{max}$ = 0.94 e Å^{-3}
$\Delta\rho_{min}$ = −1.03 e Å^{-3}

Special details

Geometry. All esds (except the esd in the dihedral angle between two l.s. planes) are estimated using the full covariance matrix. The cell esds are taken into account individually in the estimation of esds in distances, angles and torsion angles; correlations between esds in cell parameters are only used when they are defined by crystal symmetry. An approximate (isotropic) treatment of cell esds is used for estimating esds involving l.s. planes.

Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å²)

	x	*y*	*z*	U_{iso}*/U_{eq}
C1	0.7229 (5)	0.7700 (2)	0.2219 (4)	0.0275 (14)
C2	0.7325 (5)	0.8079 (2)	0.2692 (4)	0.0332 (16)
H2	0.6863	0.8121	0.3099	0.040*
C3	0.8096 (5)	0.8378 (2)	0.2545 (4)	0.0346 (15)
H3	0.8209	0.8620	0.2890	0.041*
C4	0.8725 (5)	0.8340 (2)	0.1902 (4)	0.0313 (15)
H4	0.9234	0.8557	0.1811	0.038*
C5	0.8611 (5)	0.7986 (2)	0.1395 (4)	0.0267 (14)
H5	0.9012	0.7966	0.0947	0.032*
C6	0.7886 (5)	0.76542 (19)	0.1559 (3)	0.0253 (13)
C7	0.7678 (5)	0.7237 (2)	0.1234 (4)	0.0275 (14)
H7	0.8056	0.7112	0.0837	0.033*
C8	0.6810 (5)	0.7048 (2)	0.1613 (4)	0.0305 (15)
C9	0.6619 (5)	0.7319 (2)	0.2258 (4)	0.0303 (15)
H9	0.6156	0.7257	0.2656	0.036*
C10	0.6280 (6)	0.6629 (2)	0.1388 (5)	0.0478 (19)
H10A	0.6859	0.6460	0.1183	0.072*
H10B	0.5505	0.6650	0.0930	0.072*
H10C	0.6129	0.6503	0.1906	0.072*
C11	0.6412 (5)	0.8781 (2)	0.0972 (4)	0.0307 (14)
C12	0.5134 (6)	0.8211 (2)	0.1302 (4)	0.0367 (16)
C13	0.6270 (5)	0.8122 (2)	0.0106 (4)	0.0366 (16)
C14	0.8903 (5)	0.7148 (2)	0.3863 (4)	0.0383 (17)
C15	0.9546 (5)	0.6631 (2)	0.2650 (4)	0.0306 (14)
C16	1.2562 (5)	0.7467 (2)	0.3233 (4)	0.0280 (14)
C17	1.2705 (6)	0.7829 (2)	0.2769 (4)	0.0344 (15)
H17	1.3245	0.7831	0.2408	0.041*
C18	1.2052 (6)	0.8174 (2)	0.2851 (4)	0.0374 (16)
H18	1.2089	0.8407	0.2504	0.045*
C19	1.1326 (5)	0.8188 (2)	0.3445 (4)	0.0358 (16)
H19	1.0897	0.8433	0.3493	0.043*
C20	1.1222 (5)	0.7852 (2)	0.3962 (4)	0.0296 (15)
H20	1.0772	0.7871	0.4382	0.036*
C21	1.1811 (5)	0.7481 (2)	0.3840 (4)	0.0253 (13)
C22	1.1803 (5)	0.70680 (19)	0.4176 (3)	0.0264 (14)
H22	1.1343	0.6980	0.4559	0.032*
C23	1.2594 (5)	0.6816 (2)	0.3841 (4)	0.0284 (14)
C24	1.2965 (5)	0.7048 (2)	0.3220 (4)	0.0312 (15)
H24	1.3415	0.6944	0.2844	0.037*

C25	1.2920 (6)	0.6381 (2)	0.4108 (4)	0.0412 (17)
H25A	1.2964	0.6221	0.3598	0.062*
H25B	1.2292	0.6264	0.4353	0.062*
H25C	1.3718	0.6373	0.4545	0.062*
C26	1.3496 (6)	0.8543 (2)	0.4480 (4)	0.0393 (17)
C27	1.4818 (6)	0.7941 (2)	0.4219 (4)	0.0415 (18)
C28	1.3476 (5)	0.7873 (2)	0.5332 (4)	0.0398 (17)
C29	1.0636 (5)	0.6995 (2)	0.1535 (4)	0.0322 (15)
C30	0.6917 (5)	1.00118 (19)	0.3747 (3)	0.0245 (13)
C31	0.6171 (5)	0.9736 (2)	0.4072 (4)	0.0281 (14)
H31	0.5836	0.9818	0.4530	0.034*
C32	0.5938 (5)	0.9347 (2)	0.3713 (4)	0.0292 (14)
H32	0.5400	0.9169	0.3903	0.035*
C33	0.6492 (5)	0.9212 (2)	0.3069 (4)	0.0315 (15)
H33	0.6303	0.8948	0.2823	0.038*
C34	0.7318 (5)	0.9462 (2)	0.2788 (4)	0.0314 (15)
H34	0.7735	0.9361	0.2389	0.038*
C35	0.7516 (5)	0.98697 (18)	0.3113 (3)	0.0231 (13)
C36	0.8185 (5)	1.0217 (2)	0.2900 (4)	0.0286 (15)
H36	0.8632	1.0218	0.2476	0.034*
C37	0.8058 (5)	1.0552 (2)	0.3432 (4)	0.0326 (15)
C38	0.7196 (5)	1.0443 (2)	0.3890 (3)	0.0279 (14)
H38	0.6858	1.0622	0.4232	0.033*
C39	0.8683 (6)	1.0960 (2)	0.3501 (5)	0.049 (2)
H39A	0.8111	1.1175	0.3562	0.074*
H39B	0.8947	1.1010	0.2974	0.074*
H39C	0.9400	1.0962	0.4010	0.074*
C40	0.8086 (6)	0.8885 (2)	0.4692 (4)	0.0402 (17)
C41	0.8517 (6)	0.9605 (2)	0.5338 (4)	0.0397 (17)
C42	0.9521 (6)	0.9344 (2)	0.4137 (4)	0.0372 (16)
C43	0.6001 (5)	1.0341 (2)	0.1258 (4)	0.0316 (15)
C44	0.5136 (5)	1.0899 (2)	0.2262 (4)	0.0289 (14)
C45	0.2980 (4)	0.99265 (19)	0.1372 (3)	0.0218 (13)
C46	0.3559 (5)	0.95396 (19)	0.1342 (4)	0.0263 (13)
H46	0.3999	0.9488	0.0925	0.032*
C47	0.3458 (5)	0.92417 (19)	0.1940 (4)	0.0291 (14)
H47	0.3872	0.8988	0.1950	0.035*
C48	0.2746 (5)	0.9309 (2)	0.2538 (4)	0.0299 (14)
H48	0.2710	0.9102	0.2948	0.036*
C49	0.2108 (5)	0.9671 (2)	0.2531 (3)	0.0280 (14)
H49	0.1576	0.9702	0.2895	0.034*
C50	0.2258 (5)	0.99931 (18)	0.1974 (3)	0.0227 (13)
C51	0.1842 (5)	1.04197 (19)	0.1871 (4)	0.0273 (14)
H51	0.1398	1.0554	0.2217	0.033*
C52	0.2201 (5)	1.05984 (19)	0.1181 (3)	0.0261 (13)
C53	0.2998 (5)	1.03163 (19)	0.0928 (3)	0.0247 (13)
H53	0.3468	1.0373	0.0532	0.030*
C54	0.1888 (5)	1.1019 (2)	0.0797 (4)	0.0383 (17)

H54A	0.1016	1.1029	0.0479	0.057*
H54B	0.2385	1.1079	0.0397	0.057*
H54C	0.2058	1.1223	0.1265	0.057*
C55	0.1197 (5)	0.8872 (2)	0.0947 (4)	0.0291 (14)
C56	0.1199 (5)	0.9496 (2)	0.0013 (4)	0.0318 (15)
C57	−0.0034 (6)	0.9482 (2)	0.1201 (4)	0.0369 (16)
C58	0.4135 (5)	1.05808 (19)	0.3504 (4)	0.0280 (14)
O1	0.6166 (4)	0.91143 (16)	0.0748 (3)	0.0475 (13)
O2	0.4114 (4)	0.82046 (18)	0.1308 (3)	0.0591 (15)
O3	0.5982 (4)	0.80494 (18)	−0.0629 (3)	0.0586 (15)
O4	0.9075 (5)	0.7174 (2)	0.4593 (3)	0.074 (2)
O5	0.9335 (4)	0.62782 (15)	0.2601 (3)	0.0490 (13)
O6	1.3691 (5)	0.88869 (16)	0.4667 (3)	0.0560 (14)
O7	1.5839 (4)	0.79062 (18)	0.4244 (3)	0.0609 (16)
O8	1.3622 (4)	0.77926 (18)	0.6060 (3)	0.0576 (15)
O9	1.0472 (4)	0.69946 (19)	0.0797 (3)	0.0604 (16)
O10	0.8184 (5)	0.85594 (17)	0.4977 (4)	0.0661 (16)
O11	0.8849 (5)	0.97218 (18)	0.6046 (3)	0.0622 (16)
O12	1.0509 (4)	0.92897 (18)	0.4079 (3)	0.0622 (16)
O13	0.5912 (4)	1.02920 (17)	0.0536 (3)	0.0502 (14)
O14	0.5195 (4)	1.12497 (15)	0.2158 (3)	0.0463 (12)
O15	0.0934 (4)	0.85293 (15)	0.0770 (3)	0.0409 (11)
O16	0.0970 (4)	0.95460 (17)	−0.0730 (3)	0.0509 (14)
O17	−0.1037 (4)	0.95229 (17)	0.1223 (3)	0.0544 (14)
O18	0.4283 (4)	1.06366 (15)	0.4228 (3)	0.0442 (13)
Cr1	0.67385 (8)	0.82458 (3)	0.12840 (6)	0.0286 (2)
Cr2	1.31816 (8)	0.80118 (3)	0.41678 (6)	0.0304 (2)
Cr3	0.79485 (8)	0.94023 (3)	0.42231 (6)	0.0269 (2)
Cr4	0.15766 (8)	0.94055 (3)	0.11995 (6)	0.0263 (2)
Rh1	0.85746 (4)	0.71371 (2)	0.26546 (3)	0.02481 (12)
Rh2	1.09339 (4)	0.70083 (2)	0.27332 (3)	0.02341 (12)
Rh3	0.62563 (4)	1.04127 (2)	0.24455 (3)	0.02471 (12)
Rh4	0.38643 (4)	1.04859 (2)	0.23193 (3)	0.02289 (12)

Atomic displacement parameters (Å²)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
C1	0.021 (3)	0.035 (4)	0.026 (3)	0.008 (3)	0.006 (2)	0.008 (3)
C2	0.032 (3)	0.046 (5)	0.022 (3)	0.012 (3)	0.008 (3)	−0.001 (3)
C3	0.031 (3)	0.034 (4)	0.033 (4)	0.001 (3)	−0.001 (3)	−0.006 (3)
C4	0.021 (3)	0.037 (4)	0.032 (3)	0.002 (3)	0.001 (3)	0.002 (3)
C5	0.023 (3)	0.039 (4)	0.020 (3)	0.005 (3)	0.010 (2)	0.005 (3)
C6	0.023 (3)	0.030 (4)	0.022 (3)	0.006 (3)	0.004 (2)	0.003 (3)
C7	0.027 (3)	0.031 (4)	0.021 (3)	0.005 (3)	0.001 (2)	0.004 (3)
C8	0.023 (3)	0.024 (4)	0.036 (4)	−0.001 (3)	−0.005 (3)	0.004 (3)
C9	0.024 (3)	0.030 (4)	0.035 (4)	−0.001 (3)	0.005 (3)	0.007 (3)
C10	0.039 (4)	0.038 (5)	0.058 (5)	−0.007 (3)	0.000 (3)	0.008 (4)
C11	0.028 (3)	0.030 (4)	0.031 (4)	−0.002 (3)	0.003 (3)	−0.003 (3)

C12	0.032 (3)	0.040 (4)	0.039 (4)	0.007 (3)	0.011 (3)	0.017 (3)
C13	0.032 (3)	0.037 (4)	0.040 (4)	0.007 (3)	0.008 (3)	−0.002 (3)
C14	0.034 (3)	0.051 (5)	0.033 (4)	0.005 (3)	0.012 (3)	0.013 (3)
C15	0.030 (3)	0.026 (4)	0.036 (4)	0.001 (3)	0.009 (3)	0.002 (3)
C16	0.029 (3)	0.029 (4)	0.023 (3)	−0.007 (3)	0.001 (3)	0.001 (3)
C17	0.043 (4)	0.037 (4)	0.023 (3)	−0.012 (3)	0.008 (3)	0.002 (3)
C18	0.049 (4)	0.031 (4)	0.022 (3)	−0.008 (3)	−0.006 (3)	0.006 (3)
C19	0.033 (3)	0.025 (4)	0.039 (4)	0.000 (3)	−0.009 (3)	−0.006 (3)
C20	0.023 (3)	0.039 (4)	0.023 (3)	−0.003 (3)	0.001 (2)	−0.007 (3)
C21	0.020 (3)	0.030 (4)	0.024 (3)	−0.002 (3)	0.002 (2)	−0.005 (3)
C22	0.029 (3)	0.034 (4)	0.016 (3)	−0.004 (3)	0.005 (2)	0.003 (3)
C23	0.024 (3)	0.031 (4)	0.027 (3)	−0.004 (3)	0.000 (3)	0.001 (3)
C24	0.024 (3)	0.037 (4)	0.030 (3)	−0.003 (3)	0.005 (3)	−0.006 (3)
C25	0.047 (4)	0.029 (4)	0.044 (4)	0.005 (3)	0.007 (3)	0.012 (3)
C26	0.040 (4)	0.038 (5)	0.034 (4)	−0.002 (3)	0.000 (3)	0.002 (3)
C27	0.043 (4)	0.051 (5)	0.027 (4)	−0.015 (4)	0.004 (3)	−0.002 (3)
C28	0.030 (3)	0.053 (5)	0.031 (4)	−0.006 (3)	0.000 (3)	−0.006 (3)
C29	0.027 (3)	0.041 (4)	0.029 (4)	−0.005 (3)	0.009 (3)	−0.002 (3)
C30	0.026 (3)	0.026 (4)	0.018 (3)	0.004 (3)	−0.001 (2)	0.010 (3)
C31	0.027 (3)	0.032 (4)	0.025 (3)	0.006 (3)	0.006 (3)	0.005 (3)
C32	0.022 (3)	0.030 (4)	0.035 (3)	0.001 (3)	0.007 (3)	0.006 (3)
C33	0.027 (3)	0.028 (4)	0.034 (4)	−0.003 (3)	−0.002 (3)	−0.003 (3)
C34	0.024 (3)	0.036 (4)	0.031 (3)	0.006 (3)	0.003 (3)	0.004 (3)
C35	0.023 (3)	0.024 (4)	0.021 (3)	0.005 (3)	0.003 (2)	0.007 (3)
C36	0.019 (3)	0.040 (4)	0.024 (3)	0.003 (3)	0.002 (2)	0.008 (3)
C37	0.020 (3)	0.031 (4)	0.038 (4)	−0.005 (3)	−0.008 (3)	0.010 (3)
C38	0.031 (3)	0.028 (4)	0.019 (3)	0.000 (3)	−0.001 (2)	0.002 (3)
C39	0.037 (4)	0.040 (5)	0.060 (5)	−0.012 (3)	−0.005 (3)	0.007 (4)
C40	0.031 (3)	0.038 (5)	0.046 (4)	−0.004 (3)	0.000 (3)	0.008 (4)
C41	0.033 (3)	0.036 (5)	0.045 (4)	0.007 (3)	0.003 (3)	0.002 (4)
C42	0.034 (3)	0.044 (5)	0.030 (4)	0.006 (3)	0.002 (3)	0.009 (3)
C43	0.023 (3)	0.035 (4)	0.036 (4)	−0.003 (3)	0.007 (3)	0.008 (3)
C44	0.028 (3)	0.026 (4)	0.032 (3)	−0.002 (3)	0.006 (3)	−0.002 (3)
C45	0.017 (3)	0.031 (4)	0.015 (3)	−0.001 (2)	0.001 (2)	−0.004 (3)
C46	0.019 (3)	0.028 (4)	0.029 (3)	−0.003 (3)	0.000 (2)	−0.006 (3)
C47	0.020 (3)	0.024 (4)	0.036 (4)	0.002 (3)	−0.006 (3)	−0.003 (3)
C48	0.035 (3)	0.026 (4)	0.022 (3)	−0.008 (3)	−0.004 (3)	−0.001 (3)
C49	0.032 (3)	0.032 (4)	0.018 (3)	−0.007 (3)	0.006 (2)	−0.005 (3)
C50	0.022 (3)	0.024 (4)	0.019 (3)	−0.003 (2)	0.001 (2)	−0.003 (3)
C51	0.023 (3)	0.029 (4)	0.027 (3)	0.002 (3)	0.003 (2)	−0.009 (3)
C52	0.024 (3)	0.029 (4)	0.020 (3)	−0.001 (3)	−0.003 (2)	−0.002 (3)
C53	0.020 (3)	0.037 (4)	0.016 (3)	0.000 (3)	0.003 (2)	−0.002 (3)
C54	0.037 (3)	0.041 (5)	0.032 (4)	0.009 (3)	0.001 (3)	0.004 (3)
C55	0.028 (3)	0.034 (4)	0.023 (3)	−0.002 (3)	0.004 (3)	0.001 (3)
C56	0.025 (3)	0.031 (4)	0.038 (4)	−0.002 (3)	0.005 (3)	0.000 (3)
C57	0.030 (3)	0.040 (5)	0.036 (4)	−0.007 (3)	0.002 (3)	−0.007 (3)
C58	0.026 (3)	0.027 (4)	0.030 (4)	−0.003 (3)	0.009 (3)	0.004 (3)
O1	0.048 (3)	0.042 (3)	0.048 (3)	0.007 (3)	0.007 (2)	0.010 (3)

O2	0.036 (3)	0.073 (4)	0.070 (4)	0.005 (3)	0.017 (3)	0.014 (3)
O3	0.064 (3)	0.071 (4)	0.032 (3)	0.012 (3)	0.000 (2)	−0.007 (3)
O4	0.064 (3)	0.141 (6)	0.018 (3)	0.003 (4)	0.014 (2)	0.011 (3)
O5	0.051 (3)	0.025 (3)	0.076 (4)	−0.005 (2)	0.026 (3)	0.001 (3)
O6	0.066 (3)	0.036 (3)	0.055 (3)	−0.013 (3)	−0.004 (3)	−0.008 (3)
O7	0.038 (3)	0.091 (5)	0.051 (3)	−0.013 (3)	0.008 (2)	−0.007 (3)
O8	0.056 (3)	0.081 (5)	0.031 (3)	−0.014 (3)	0.004 (2)	0.010 (3)
O9	0.053 (3)	0.105 (5)	0.025 (3)	−0.011 (3)	0.015 (2)	−0.003 (3)
O10	0.067 (3)	0.037 (4)	0.084 (4)	−0.004 (3)	0.004 (3)	0.027 (3)
O11	0.064 (3)	0.073 (4)	0.036 (3)	0.015 (3)	−0.010 (3)	−0.016 (3)
O12	0.032 (3)	0.082 (5)	0.075 (4)	0.015 (3)	0.019 (3)	0.020 (3)
O13	0.051 (3)	0.080 (4)	0.019 (2)	0.002 (3)	0.011 (2)	−0.001 (2)
O14	0.052 (3)	0.025 (3)	0.065 (3)	−0.002 (2)	0.021 (3)	0.006 (3)
O15	0.050 (3)	0.033 (3)	0.037 (3)	−0.004 (2)	0.008 (2)	−0.005 (2)
O16	0.046 (3)	0.072 (4)	0.028 (3)	−0.002 (3)	−0.001 (2)	0.005 (3)
O17	0.033 (3)	0.071 (4)	0.060 (3)	0.002 (3)	0.015 (2)	−0.013 (3)
O18	0.054 (3)	0.058 (4)	0.022 (2)	−0.013 (3)	0.013 (2)	−0.007 (2)
Cr1	0.0266 (5)	0.0309 (6)	0.0265 (5)	0.0041 (4)	0.0044 (4)	0.0039 (5)
Cr2	0.0319 (5)	0.0283 (6)	0.0259 (5)	−0.0044 (5)	−0.0009 (4)	−0.0025 (5)
Cr3	0.0240 (5)	0.0260 (6)	0.0272 (5)	0.0010 (4)	0.0012 (4)	0.0030 (4)
Cr4	0.0239 (5)	0.0271 (6)	0.0249 (5)	−0.0014 (4)	0.0017 (4)	−0.0045 (4)
Rh1	0.0233 (2)	0.0280 (3)	0.0221 (2)	0.0003 (2)	0.00445 (19)	0.0026 (2)
Rh2	0.0236 (2)	0.0239 (3)	0.0222 (2)	−0.0008 (2)	0.00524 (19)	−0.0002 (2)
Rh3	0.0225 (2)	0.0272 (3)	0.0220 (2)	−0.0015 (2)	0.00185 (18)	0.0039 (2)
Rh4	0.0227 (2)	0.0237 (3)	0.0198 (2)	−0.0002 (2)	0.00184 (18)	0.0002 (2)

Geometric parameters (Å, º)

C1—C9	1.435 (8)	C26—Cr2	1.816 (8)
C1—C2	1.438 (9)	C27—O7	1.153 (7)
C1—C6	1.455 (7)	C27—Cr2	1.848 (7)
C1—Cr1	2.294 (6)	C28—O8	1.158 (7)
C1—Rh1	2.371 (6)	C28—Cr2	1.854 (7)
C2—C3	1.375 (9)	C29—O9	1.142 (7)
C2—Cr1	2.232 (6)	C29—Rh2	1.851 (6)
C2—H2	0.9500	C34—Cr3	2.216 (6)
C3—C4	1.407 (8)	C35—C36	1.455 (8)
C3—Cr1	2.218 (6)	C35—Cr3	2.290 (5)
C3—H3	0.9500	C35—Rh3	2.343 (5)
C4—C5	1.397 (8)	C36—C37	1.418 (9)
C4—Cr1	2.219 (5)	C36—Rh3	2.202 (5)
C4—H4	0.9500	C36—H36	0.9500
C5—C6	1.426 (8)	C37—C38	1.417 (8)
C5—Cr1	2.248 (5)	C37—C39	1.501 (9)
C5—H5	0.9500	C37—Rh3	2.258 (5)
C6—C7	1.454 (8)	C38—Rh3	2.263 (5)
C6—Cr1	2.305 (6)	C38—H38	0.9500
C6—Rh1	2.404 (6)	C39—H39A	0.9800

C7—C8	1.429 (8)	C39—H39B	0.9800
C7—Rh1	2.242 (5)	C39—H39C	0.9800
C7—H7	0.9500	C40—O10	1.150 (8)
C8—C9	1.420 (8)	C40—Cr3	1.839 (7)
C8—C10	1.499 (9)	C41—O11	1.155 (7)
C8—Rh1	2.243 (5)	C41—Cr3	1.843 (7)
C9—Rh1	2.213 (5)	C42—O12	1.163 (7)
C9—H9	0.9500	C42—Cr3	1.835 (6)
C10—H10A	0.9800	C43—O13	1.142 (7)
C10—H10B	0.9800	C43—Rh3	1.854 (6)
C10—H10C	0.9800	C44—O14	1.162 (7)
C11—O1	1.156 (7)	C44—Rh4	1.996 (6)
C11—Cr1	1.829 (7)	C44—Rh3	2.006 (6)
C12—O2	1.158 (7)	C45—C46	1.431 (8)
C12—Cr1	1.830 (6)	C45—C50	1.440 (7)
C13—O3	1.154 (7)	C45—C53	1.461 (8)
C13—Cr1	1.855 (7)	C45—Cr4	2.295 (6)
C14—O4	1.132 (7)	C45—Rh4	2.410 (6)
C14—Rh1	1.863 (6)	C46—C47	1.391 (8)
C15—O5	1.174 (7)	C46—Cr4	2.239 (5)
C15—Rh2	1.975 (6)	C46—H46	0.9500
C15—Rh1	1.989 (6)	C47—C48	1.426 (8)
C16—C17	1.428 (8)	C47—Cr4	2.203 (5)
C16—C24	1.447 (9)	C47—H47	0.9500
C16—C21	1.455 (8)	C48—C49	1.385 (8)
C16—Cr2	2.306 (6)	C48—Cr4	2.208 (6)
C16—Rh2	2.342 (6)	C48—H48	0.9500
C17—C18	1.374 (9)	C49—C50	1.420 (8)
C17—Cr2	2.231 (6)	C49—Cr4	2.222 (5)
C17—H17	0.9500	C49—H49	0.9500
C18—C19	1.416 (9)	C50—C51	1.467 (8)
C18—Cr2	2.206 (6)	C50—Cr4	2.301 (6)
C18—H18	0.9500	C50—Rh4	2.379 (5)
C19—C20	1.398 (9)	C51—C52	1.403 (8)
C19—Cr2	2.182 (6)	C51—Rh4	2.217 (5)
C19—H19	0.9500	C51—H51	0.9500
C20—C21	1.424 (8)	C52—C53	1.424 (8)
C20—Cr2	2.216 (5)	C52—C54	1.508 (8)
C20—H20	0.9500	C52—Rh4	2.262 (5)
C21—C22	1.453 (8)	C53—Rh4	2.240 (5)
C21—Cr2	2.292 (6)	C53—H53	0.9500
C21—Rh2	2.353 (6)	C54—H54A	0.9800
C22—C23	1.425 (8)	C54—H54B	0.9800
C22—Rh2	2.254 (5)	C54—H54C	0.9800
C22—H22	0.9500	C55—O15	1.174 (7)
C23—C24	1.401 (8)	C55—Cr4	1.815 (7)
C23—C25	1.503 (9)	C56—O16	1.155 (7)
C23—Rh2	2.290 (5)	C56—Cr4	1.850 (7)

C24—Rh2	2.223 (5)	C57—O17	1.154 (7)
C24—H24	0.9500	C57—Cr4	1.843 (6)
C25—H25A	0.9800	C58—O18	1.138 (6)
C25—H25B	0.9800	Rh1—Rh2	2.6756 (6)
C25—H25C	0.9800	Rh3—Rh4	2.6737 (6)
C26—O6	1.167 (8)		

C9—C1—C2	133.8 (5)	C51—C52—Rh4	70.0 (3)
C9—C1—C6	106.8 (6)	C53—C52—Rh4	70.7 (3)
C2—C1—C6	119.3 (6)	C54—C52—Rh4	121.8 (4)
C9—C1—Cr1	132.0 (4)	C52—C53—C45	109.4 (5)
C2—C1—Cr1	69.1 (3)	C52—C53—Rh4	72.4 (3)
C6—C1—Cr1	71.9 (3)	C45—C53—Rh4	78.1 (3)
C9—C1—Rh1	65.9 (3)	C52—C53—H53	125.3
C2—C1—Rh1	124.3 (4)	C45—C53—H53	125.3
C6—C1—Rh1	73.5 (3)	Rh4—C53—H53	116.1
Cr1—C1—Rh1	144.7 (2)	C52—C54—H54A	109.5
C3—C2—C1	118.9 (5)	C52—C54—H54B	109.5
C3—C2—Cr1	71.4 (4)	H54A—C54—H54B	109.5
C1—C2—Cr1	73.8 (3)	C52—C54—H54C	109.5
C3—C2—H2	120.6	H54A—C54—H54C	109.5
C1—C2—H2	120.6	H54B—C54—H54C	109.5
Cr1—C2—H2	125.9	O15—C55—Cr4	178.8 (6)
C2—C3—C4	122.2 (6)	O16—C56—Cr4	179.0 (6)
C2—C3—Cr1	72.6 (3)	O17—C57—Cr4	178.2 (7)
C4—C3—Cr1	71.5 (3)	O18—C58—Rh4	178.9 (6)
C2—C3—H3	118.9	C11—Cr1—C12	86.4 (3)
C4—C3—H3	118.9	C11—Cr1—C13	87.2 (3)
Cr1—C3—H3	129.6	C12—Cr1—C13	89.6 (3)
C5—C4—C3	120.8 (6)	C11—Cr1—C3	95.7 (3)
C5—C4—Cr1	72.9 (3)	C12—Cr1—C3	116.3 (3)
C3—C4—Cr1	71.5 (3)	C13—Cr1—C3	154.1 (2)
C5—C4—H4	119.6	C11—Cr1—C4	95.4 (3)
C3—C4—H4	119.6	C12—Cr1—C4	153.3 (3)
Cr1—C4—H4	128.3	C13—Cr1—C4	117.1 (2)
C4—C5—C6	119.3 (5)	C3—Cr1—C4	37.0 (2)
C4—C5—Cr1	70.6 (3)	C11—Cr1—C2	119.4 (3)
C6—C5—Cr1	73.9 (3)	C12—Cr1—C2	89.5 (2)
C4—C5—H5	120.4	C13—Cr1—C2	153.3 (3)
C6—C5—H5	120.4	C3—Cr1—C2	36.0 (2)
Cr1—C5—H5	127.0	C4—Cr1—C2	66.4 (2)
C5—C6—C7	133.7 (5)	C11—Cr1—C5	120.0 (2)
C5—C6—C1	119.3 (6)	C12—Cr1—C5	153.6 (3)
C7—C6—C1	106.9 (5)	C13—Cr1—C5	90.0 (2)
C5—C6—Cr1	69.6 (3)	C3—Cr1—C5	66.2 (2)
C7—C6—Cr1	133.6 (4)	C4—Cr1—C5	36.5 (2)
C1—C6—Cr1	71.2 (3)	C2—Cr1—C5	79.2 (2)
C5—C6—Rh1	125.4 (4)	C11—Cr1—C1	156.3 (3)

C7—C6—Rh1	65.8 (3)	C12—Cr1—C1	90.3 (2)
C1—C6—Rh1	71.0 (3)	C13—Cr1—C1	116.3 (3)
Cr1—C6—Rh1	141.5 (2)	C3—Cr1—C1	64.9 (2)
C8—C7—C6	108.5 (5)	C4—Cr1—C1	77.4 (2)
C8—C7—Rh1	71.5 (3)	C2—Cr1—C1	37.0 (2)
C6—C7—Rh1	77.9 (3)	C5—Cr1—C1	66.4 (2)
C8—C7—H7	125.7	C11—Cr1—C6	156.3 (2)
C6—C7—H7	125.7	C12—Cr1—C6	117.1 (3)
Rh1—C7—H7	116.8	C13—Cr1—C6	90.0 (2)
C9—C8—C7	107.2 (5)	C3—Cr1—C6	77.0 (2)
C9—C8—C10	127.8 (6)	C4—Cr1—C6	65.1 (2)
C7—C8—C10	124.9 (6)	C2—Cr1—C6	66.8 (2)
C9—C8—Rh1	70.3 (3)	C5—Cr1—C6	36.5 (2)
C7—C8—Rh1	71.4 (3)	C1—Cr1—C6	36.89 (19)
C10—C8—Rh1	120.9 (4)	C26—Cr2—C27	89.4 (3)
C8—C9—C1	109.9 (5)	C26—Cr2—C28	89.4 (3)
C8—C9—Rh1	72.6 (3)	C27—Cr2—C28	91.3 (3)
C1—C9—Rh1	77.8 (3)	C26—Cr2—C19	88.9 (3)
C8—C9—H9	125.1	C27—Cr2—C19	150.1 (3)
C1—C9—H9	125.1	C28—Cr2—C19	118.6 (3)
Rh1—C9—H9	116.4	C26—Cr2—C18	92.9 (3)
C8—C10—H10A	109.5	C27—Cr2—C18	112.7 (3)
C8—C10—H10B	109.5	C28—Cr2—C18	155.9 (3)
H10A—C10—H10B	109.5	C19—Cr2—C18	37.6 (2)
C8—C10—H10C	109.5	C26—Cr2—C20	112.3 (3)
H10A—C10—H10C	109.5	C27—Cr2—C20	158.4 (3)
H10B—C10—H10C	109.5	C28—Cr2—C20	89.4 (2)
O1—C11—Cr1	177.2 (6)	C19—Cr2—C20	37.1 (2)
O2—C12—Cr1	177.3 (6)	C18—Cr2—C20	67.6 (2)
O3—C13—Cr1	179.3 (7)	C26—Cr2—C17	120.5 (3)
O4—C14—Rh1	176.4 (7)	C27—Cr2—C17	88.6 (3)
O5—C15—Rh2	139.6 (5)	C28—Cr2—C17	150.1 (3)
O5—C15—Rh1	135.5 (5)	C19—Cr2—C17	66.8 (2)
Rh2—C15—Rh1	84.9 (3)	C18—Cr2—C17	36.1 (2)
C17—C16—C24	134.1 (6)	C20—Cr2—C17	80.2 (2)
C17—C16—C21	119.3 (6)	C26—Cr2—C21	149.0 (3)
C24—C16—C21	106.5 (5)	C27—Cr2—C21	121.6 (3)
C17—C16—Cr2	68.8 (4)	C28—Cr2—C21	88.2 (3)
C24—C16—Cr2	134.4 (4)	C19—Cr2—C21	65.4 (2)
C21—C16—Cr2	71.0 (3)	C18—Cr2—C21	77.5 (2)
C17—C16—Rh2	122.9 (4)	C20—Cr2—C21	36.8 (2)
C24—C16—Rh2	67.1 (3)	C17—Cr2—C21	66.7 (2)
C21—C16—Rh2	72.3 (3)	C26—Cr2—C16	156.7 (3)
Cr2—C16—Rh2	141.9 (3)	C27—Cr2—C16	93.2 (3)
C18—C17—C16	119.3 (6)	C28—Cr2—C16	113.6 (3)
C18—C17—Cr2	71.0 (4)	C19—Cr2—C16	77.5 (2)
C16—C17—Cr2	74.5 (3)	C18—Cr2—C16	64.8 (2)
C18—C17—H17	120.3	C20—Cr2—C16	66.9 (2)

C16—C17—H17	120.3	C17—Cr2—C16	36.6 (2)
Cr2—C17—H17	125.9	C21—Cr2—C16	36.90 (19)
C17—C18—C19	121.2 (6)	C42—Cr3—C40	87.7 (3)
C17—C18—Cr2	73.0 (4)	C42—Cr3—C41	91.1 (3)
C19—C18—Cr2	70.2 (3)	C40—Cr3—C41	88.2 (3)
C17—C18—H18	119.4	C42—Cr3—C33	115.4 (3)
C19—C18—H18	119.4	C40—Cr3—C33	92.4 (3)
Cr2—C18—H18	130.0	C41—Cr3—C33	153.4 (3)
C20—C19—C18	121.9 (6)	C42—Cr3—C32	152.9 (3)
C20—C19—Cr2	72.8 (3)	C40—Cr3—C32	92.2 (3)
C18—C19—Cr2	72.1 (3)	C41—Cr3—C32	116.0 (3)
C20—C19—H19	119.1	C33—Cr3—C32	37.4 (2)
C18—C19—H19	119.1	C42—Cr3—C34	88.7 (2)
Cr2—C19—H19	128.3	C40—Cr3—C34	118.0 (3)
C19—C20—C21	118.1 (5)	C41—Cr3—C34	153.7 (3)
C19—C20—Cr2	70.1 (3)	C33—Cr3—C34	37.1 (2)
C21—C20—Cr2	74.5 (3)	C32—Cr3—C34	67.5 (2)
C19—C20—H20	121.0	C42—Cr3—C31	154.7 (3)
C21—C20—H20	121.0	C40—Cr3—C31	117.6 (3)
Cr2—C20—H20	126.1	C41—Cr3—C31	89.7 (2)
C20—C21—C22	133.7 (5)	C33—Cr3—C31	66.5 (2)
C20—C21—C16	119.9 (6)	C32—Cr3—C31	36.4 (2)
C22—C21—C16	106.4 (5)	C34—Cr3—C31	79.6 (2)
C20—C21—Cr2	68.7 (3)	C42—Cr3—C35	91.0 (2)
C22—C21—Cr2	133.7 (4)	C40—Cr3—C35	154.9 (3)
C16—C21—Cr2	72.1 (3)	C41—Cr3—C35	116.9 (3)
C20—C21—Rh2	123.0 (4)	C33—Cr3—C35	65.6 (2)
C22—C21—Rh2	67.9 (3)	C32—Cr3—C35	77.8 (2)
C16—C21—Rh2	71.5 (3)	C34—Cr3—C35	36.8 (2)
Cr2—C21—Rh2	142.1 (3)	C31—Cr3—C35	66.2 (2)
C23—C22—C21	109.2 (5)	C42—Cr3—C30	118.3 (3)
C23—C22—Rh2	73.1 (3)	C40—Cr3—C30	154.0 (2)
C21—C22—Rh2	75.4 (3)	C41—Cr3—C30	91.1 (3)
C23—C22—H22	125.4	C33—Cr3—C30	76.9 (2)
C21—C22—H22	125.4	C32—Cr3—C30	64.8 (2)
Rh2—C22—H22	117.9	C34—Cr3—C30	66.2 (2)
C24—C23—C22	107.3 (6)	C31—Cr3—C30	36.3 (2)
C24—C23—C25	127.9 (6)	C35—Cr3—C30	36.36 (19)
C22—C23—C25	124.8 (5)	C55—Cr4—C57	87.4 (3)
C24—C23—Rh2	69.3 (3)	C55—Cr4—C56	87.2 (3)
C22—C23—Rh2	70.4 (3)	C57—Cr4—C56	91.7 (3)
C25—C23—Rh2	124.4 (4)	C55—Cr4—C47	91.3 (2)
C23—C24—C16	110.1 (5)	C57—Cr4—C47	147.7 (3)
C23—C24—Rh2	74.6 (3)	C56—Cr4—C47	120.5 (2)
C16—C24—Rh2	76.1 (3)	C55—Cr4—C48	97.0 (2)
C23—C24—H24	124.9	C57—Cr4—C48	110.5 (3)
C16—C24—H24	124.9	C56—Cr4—C48	157.6 (2)
Rh2—C24—H24	116.2	C47—Cr4—C48	37.7 (2)

C23—C25—H25A	109.5	C55—Cr4—C49	125.0 (2)
C23—C25—H25B	109.5	C57—Cr4—C49	87.4 (2)
H25A—C25—H25B	109.5	C56—Cr4—C49	147.7 (3)
C23—C25—H25C	109.5	C47—Cr4—C49	67.2 (2)
H25A—C25—H25C	109.5	C48—Cr4—C49	36.4 (2)
H25B—C25—H25C	109.5	C55—Cr4—C46	112.4 (2)
O6—C26—Cr2	178.8 (6)	C57—Cr4—C46	160.1 (3)
O7—C27—Cr2	178.3 (7)	C56—Cr4—C46	91.0 (2)
O8—C28—Cr2	177.7 (6)	C47—Cr4—C46	36.5 (2)
O9—C29—Rh2	178.4 (6)	C48—Cr4—C46	67.0 (2)
C31—C30—C35	119.4 (6)	C49—Cr4—C46	79.9 (2)
C31—C30—C38	133.1 (5)	C55—Cr4—C45	148.7 (2)
C35—C30—C38	107.4 (5)	C57—Cr4—C45	123.6 (3)
C31—C30—Cr3	68.6 (3)	C56—Cr4—C45	87.9 (2)
C35—C30—Cr3	70.3 (3)	C47—Cr4—C45	65.1 (2)
C38—C30—Cr3	135.4 (4)	C48—Cr4—C45	77.1 (2)
C31—C30—Rh3	125.8 (4)	C49—Cr4—C45	66.3 (2)
C35—C30—Rh3	70.2 (3)	C46—Cr4—C45	36.8 (2)
C38—C30—Rh3	66.9 (3)	C55—Cr4—C50	161.1 (2)
Cr3—C30—Rh3	139.5 (3)	C57—Cr4—C50	94.2 (2)
C32—C31—C30	119.5 (5)	C56—Cr4—C50	111.6 (3)
C32—C31—Cr3	70.3 (3)	C47—Cr4—C50	77.3 (2)
C30—C31—Cr3	75.1 (3)	C48—Cr4—C50	64.8 (2)
C32—C31—H31	120.2	C49—Cr4—C50	36.5 (2)
C30—C31—H31	120.2	C46—Cr4—C50	66.5 (2)
Cr3—C31—H31	126.1	C45—Cr4—C50	36.51 (18)
C31—C32—C33	120.9 (6)	C14—Rh1—C15	93.7 (3)
C31—C32—Cr3	73.3 (3)	C14—Rh1—C9	101.1 (2)
C33—C32—Cr3	71.0 (3)	C15—Rh1—C9	137.3 (2)
C31—C32—H32	119.6	C14—Rh1—C7	162.3 (2)
C33—C32—H32	119.6	C15—Rh1—C7	102.5 (2)
Cr3—C32—H32	128.3	C9—Rh1—C7	62.0 (2)
C34—C33—C32	121.2 (6)	C14—Rh1—C8	131.0 (2)
C34—C33—Cr3	72.0 (3)	C15—Rh1—C8	105.7 (2)
C32—C33—Cr3	71.5 (3)	C9—Rh1—C8	37.1 (2)
C34—C33—H33	119.4	C7—Rh1—C8	37.2 (2)
C32—C33—H33	119.4	C14—Rh1—C1	102.7 (3)
Cr3—C33—H33	129.6	C15—Rh1—C1	163.3 (2)
C33—C34—C35	118.6 (6)	C9—Rh1—C1	36.3 (2)
C33—C34—Cr3	70.9 (3)	C7—Rh1—C1	60.8 (2)
C35—C34—Cr3	74.4 (3)	C8—Rh1—C1	60.8 (2)
C33—C34—H34	120.7	C14—Rh1—C6	132.4 (3)
C35—C34—H34	120.7	C15—Rh1—C6	130.7 (2)
Cr3—C34—H34	125.8	C9—Rh1—C6	60.2 (2)
C34—C35—C30	120.0 (5)	C7—Rh1—C6	36.3 (2)
C34—C35—C36	133.1 (5)	C8—Rh1—C6	60.4 (2)
C30—C35—C36	106.8 (5)	C1—Rh1—C6	35.48 (18)
C34—C35—Cr3	68.7 (3)	C14—Rh1—Rh2	92.31 (18)

C30—C35—Cr3	73.3 (3)	C15—Rh1—Rh2	47.33 (18)
C36—C35—Cr3	133.3 (4)	C9—Rh1—Rh2	164.86 (16)
C34—C35—Rh3	121.8 (4)	C7—Rh1—Rh2	103.94 (14)
C30—C35—Rh3	74.4 (3)	C8—Rh1—Rh2	133.71 (16)
C36—C35—Rh3	66.1 (3)	C1—Rh1—Rh2	133.67 (14)
Cr3—C35—Rh3	146.3 (2)	C6—Rh1—Rh2	105.43 (13)
C37—C36—C35	108.5 (5)	C29—Rh2—C15	90.0 (3)
C37—C36—Rh3	73.6 (3)	C29—Rh2—C24	104.0 (2)
C35—C36—Rh3	76.7 (3)	C15—Rh2—C24	142.1 (3)
C37—C36—H36	125.8	C29—Rh2—C22	164.7 (2)
C35—C36—H36	125.8	C15—Rh2—C22	103.9 (2)
Rh3—C36—H36	116.0	C24—Rh2—C22	61.1 (2)
C38—C37—C36	108.2 (5)	C29—Rh2—C23	132.2 (2)
C38—C37—C39	124.4 (6)	C15—Rh2—C23	110.6 (2)
C36—C37—C39	127.4 (6)	C24—Rh2—C23	36.1 (2)
C38—C37—Rh3	71.9 (3)	C22—Rh2—C23	36.5 (2)
C36—C37—Rh3	69.3 (3)	C29—Rh2—C16	105.7 (2)
C39—C37—Rh3	123.3 (4)	C15—Rh2—C16	164.1 (2)
C37—C38—C30	108.4 (5)	C24—Rh2—C16	36.8 (2)
C37—C38—Rh3	71.6 (3)	C22—Rh2—C16	60.8 (2)
C30—C38—Rh3	77.1 (3)	C23—Rh2—C16	60.5 (2)
C37—C38—H38	125.8	C29—Rh2—C21	135.4 (3)
C30—C38—H38	125.8	C15—Rh2—C21	128.7 (2)
Rh3—C38—H38	117.5	C24—Rh2—C21	61.0 (2)
C37—C39—H39A	109.5	C22—Rh2—C21	36.7 (2)
C37—C39—H39B	109.5	C23—Rh2—C21	60.7 (2)
H39A—C39—H39B	109.5	C16—Rh2—C21	36.11 (19)
C37—C39—H39C	109.5	C29—Rh2—Rh1	93.30 (17)
H39A—C39—H39C	109.5	C15—Rh2—Rh1	47.78 (18)
H39B—C39—H39C	109.5	C24—Rh2—Rh1	158.97 (16)
O10—C40—Cr3	178.9 (7)	C22—Rh2—Rh1	100.71 (14)
O11—C41—Cr3	177.6 (7)	C23—Rh2—Rh1	132.75 (14)
O12—C42—Cr3	177.0 (7)	C16—Rh2—Rh1	126.83 (15)
O13—C43—Rh3	176.1 (5)	C21—Rh2—Rh1	98.25 (13)
O14—C44—Rh4	138.1 (5)	C43—Rh3—C44	92.0 (3)
O14—C44—Rh3	138.1 (5)	C43—Rh3—C36	99.4 (2)
Rh4—C44—Rh3	83.8 (3)	C44—Rh3—C36	144.1 (2)
C46—C45—C50	120.4 (5)	C43—Rh3—C37	126.7 (2)
C46—C45—C53	133.4 (5)	C44—Rh3—C37	110.9 (2)
C50—C45—C53	106.2 (5)	C36—Rh3—C37	37.0 (2)
C46—C45—Cr4	69.5 (3)	C43—Rh3—C38	161.2 (2)
C50—C45—Cr4	72.0 (3)	C44—Rh3—C38	102.5 (2)
C53—C45—Cr4	133.6 (4)	C36—Rh3—C38	61.9 (2)
C46—C45—Rh4	125.1 (4)	C37—Rh3—C38	36.5 (2)
C50—C45—Rh4	71.4 (3)	C43—Rh3—C35	106.0 (2)
C53—C45—Rh4	65.5 (3)	C44—Rh3—C35	161.7 (2)
Cr4—C45—Rh4	142.5 (2)	C36—Rh3—C35	37.2 (2)
C47—C46—C45	118.1 (5)	C37—Rh3—C35	60.9 (2)

C47—C46—Cr4	70.4 (3)	C38—Rh3—C35	60.7 (2)
C45—C46—Cr4	73.7 (3)	C43—Rh3—C30	138.0 (3)
C47—C46—H46	121.0	C44—Rh3—C30	126.5 (2)
C45—C46—H46	121.0	C36—Rh3—C30	60.6 (2)
Cr4—C46—H46	126.8	C37—Rh3—C30	59.8 (2)
C46—C47—C48	121.4 (6)	C38—Rh3—C30	36.0 (2)
C46—C47—Cr4	73.2 (3)	C35—Rh3—C30	35.39 (18)
C48—C47—Cr4	71.4 (3)	C43—Rh3—Rh4	93.60 (17)
C46—C47—H47	119.3	C44—Rh3—Rh4	47.92 (17)
C48—C47—H47	119.3	C36—Rh3—Rh4	161.03 (15)
Cr4—C47—H47	128.5	C37—Rh3—Rh4	137.68 (17)
C49—C48—C47	121.1 (6)	C38—Rh3—Rh4	104.93 (15)
C49—C48—Cr4	72.3 (3)	C35—Rh3—Rh4	125.53 (13)
C47—C48—Cr4	70.9 (3)	C30—Rh3—Rh4	100.62 (13)
C49—C48—H48	119.4	C58—Rh4—C44	90.7 (2)
C47—C48—H48	119.4	C58—Rh4—C51	102.3 (2)
Cr4—C48—H48	129.9	C44—Rh4—C51	138.3 (2)
C48—C49—C50	119.1 (5)	C58—Rh4—C53	163.2 (2)
C48—C49—Cr4	71.3 (3)	C44—Rh4—C53	104.4 (2)
C50—C49—Cr4	74.8 (3)	C51—Rh4—C53	61.4 (2)
C48—C49—H49	120.4	C58—Rh4—C52	131.3 (2)
C50—C49—H49	120.4	C44—Rh4—C52	107.9 (2)
Cr4—C49—H49	125.2	C51—Rh4—C52	36.5 (2)
C49—C50—C45	119.6 (5)	C53—Rh4—C52	36.9 (2)
C49—C50—C51	133.3 (5)	C58—Rh4—C50	104.6 (2)
C45—C50—C51	107.1 (5)	C44—Rh4—C50	164.6 (2)
C49—C50—Cr4	68.7 (3)	C51—Rh4—C50	37.0 (2)
C45—C50—Cr4	71.5 (3)	C53—Rh4—C50	60.18 (19)
C51—C50—Cr4	133.1 (4)	C52—Rh4—C50	60.5 (2)
C49—C50—Rh4	125.0 (4)	C58—Rh4—C45	133.7 (2)
C45—C50—Rh4	73.7 (3)	C44—Rh4—C45	131.8 (2)
C51—C50—Rh4	65.5 (3)	C51—Rh4—C45	60.51 (19)
Cr4—C50—Rh4	144.4 (2)	C53—Rh4—C45	36.4 (2)
C52—C51—C50	109.2 (5)	C52—Rh4—C45	60.4 (2)
C52—C51—Rh4	73.5 (3)	C50—Rh4—C45	34.98 (17)
C50—C51—Rh4	77.5 (3)	C58—Rh4—Rh3	93.23 (17)
C52—C51—H51	125.4	C44—Rh4—Rh3	48.24 (18)
C50—C51—H51	125.4	C51—Rh4—Rh3	162.38 (15)
Rh4—C51—H51	115.6	C53—Rh4—Rh3	102.29 (13)
C51—C52—C53	107.3 (5)	C52—Rh4—Rh3	132.83 (14)
C51—C52—C54	127.8 (5)	C50—Rh4—Rh3	130.72 (14)
C53—C52—C54	124.8 (5)	C45—Rh4—Rh3	102.61 (12)
C9—C1—C2—C3	173.7 (6)	C49—C48—Cr4—C50	30.9 (3)
C6—C1—C2—C3	−3.9 (8)	C47—C48—Cr4—C50	−102.3 (4)
Cr1—C1—C2—C3	−57.4 (5)	C48—C49—Cr4—C55	45.6 (4)
Rh1—C1—C2—C3	85.5 (6)	C50—C49—Cr4—C55	174.3 (3)
C9—C1—C2—Cr1	−128.9 (7)	C48—C49—Cr4—C57	130.7 (4)

C6—C1—C2—Cr1	53.5 (5)	C50—C49—Cr4—C57	−100.6 (4)
Rh1—C1—C2—Cr1	142.9 (4)	C48—C49—Cr4—C56	−140.3 (5)
C1—C2—C3—C4	4.8 (9)	C50—C49—Cr4—C56	−11.6 (6)
Cr1—C2—C3—C4	−53.8 (5)	C48—C49—Cr4—C47	−29.0 (3)
C1—C2—C3—Cr1	58.6 (5)	C50—C49—Cr4—C47	99.7 (4)
C2—C3—C4—C5	−1.6 (9)	C50—C49—Cr4—C48	128.7 (5)
Cr1—C3—C4—C5	−55.9 (5)	C48—C49—Cr4—C46	−64.7 (4)
C2—C3—C4—Cr1	54.3 (5)	C50—C49—Cr4—C46	64.0 (3)
C3—C4—C5—C6	−2.6 (8)	C48—C49—Cr4—C45	−100.6 (4)
Cr1—C4—C5—C6	−57.8 (5)	C50—C49—Cr4—C45	28.1 (3)
C3—C4—C5—Cr1	55.2 (5)	C48—C49—Cr4—C50	−128.7 (5)
C4—C5—C6—C7	−172.3 (6)	C47—C46—Cr4—C55	−58.8 (4)
Cr1—C5—C6—C7	131.5 (6)	C45—C46—Cr4—C55	172.5 (3)
C4—C5—C6—C1	3.3 (8)	C47—C46—Cr4—C57	116.2 (8)
Cr1—C5—C6—C1	−52.9 (4)	C45—C46—Cr4—C57	−12.4 (9)
C4—C5—C6—Cr1	56.1 (5)	C47—C46—Cr4—C56	−146.2 (4)
C4—C5—C6—Rh1	−83.3 (6)	C45—C46—Cr4—C56	85.2 (4)
Cr1—C5—C6—Rh1	−139.4 (4)	C45—C46—Cr4—C47	−128.7 (5)
C9—C1—C6—C5	−178.3 (5)	C47—C46—Cr4—C48	29.3 (4)
C2—C1—C6—C5	−0.1 (8)	C45—C46—Cr4—C48	−99.4 (4)
Cr1—C1—C6—C5	52.1 (5)	C47—C46—Cr4—C49	65.0 (4)
Rh1—C1—C6—C5	−120.6 (5)	C45—C46—Cr4—C49	−63.7 (3)
C9—C1—C6—C7	−1.6 (6)	C47—C46—Cr4—C45	128.7 (5)
C2—C1—C6—C7	176.6 (5)	C47—C46—Cr4—C50	100.7 (4)
Cr1—C1—C6—C7	−131.2 (4)	C45—C46—Cr4—C50	−28.0 (3)
Rh1—C1—C6—C7	56.1 (4)	C46—C45—Cr4—C55	−13.4 (6)
C9—C1—C6—Cr1	129.6 (4)	C50—C45—Cr4—C55	−147.0 (4)
C2—C1—C6—Cr1	−52.2 (5)	C53—C45—Cr4—C55	117.6 (6)
Rh1—C1—C6—Cr1	−172.7 (2)	Rh4—C45—Cr4—C55	−134.9 (5)
C9—C1—C6—Rh1	−57.7 (4)	C46—C45—Cr4—C57	174.9 (4)
C2—C1—C6—Rh1	120.5 (5)	C50—C45—Cr4—C57	41.4 (4)
Cr1—C1—C6—Rh1	172.7 (2)	C53—C45—Cr4—C57	−54.0 (6)
C5—C6—C7—C8	−177.9 (6)	Rh4—C45—Cr4—C57	53.5 (5)
C1—C6—C7—C8	6.1 (6)	C46—C45—Cr4—C56	−94.5 (4)
Cr1—C6—C7—C8	−73.7 (6)	C50—C45—Cr4—C56	131.9 (4)
Rh1—C6—C7—C8	65.5 (4)	C53—C45—Cr4—C56	36.5 (5)
C5—C6—C7—Rh1	116.6 (6)	Rh4—C45—Cr4—C56	144.1 (4)
C1—C6—C7—Rh1	−59.4 (4)	C46—C45—Cr4—C47	30.8 (3)
Cr1—C6—C7—Rh1	−139.2 (5)	C50—C45—Cr4—C47	−102.8 (4)
C6—C7—C8—C9	−8.3 (6)	C53—C45—Cr4—C47	161.8 (6)
Rh1—C7—C8—C9	61.5 (4)	Rh4—C45—Cr4—C47	−90.7 (4)
C6—C7—C8—C10	174.9 (5)	C46—C45—Cr4—C48	68.7 (3)
Rh1—C7—C8—C10	−115.2 (6)	C50—C45—Cr4—C48	−64.9 (3)
C6—C7—C8—Rh1	−69.8 (4)	C53—C45—Cr4—C48	−160.3 (6)
C7—C8—C9—C1	7.4 (6)	Rh4—C45—Cr4—C48	−52.7 (4)
C10—C8—C9—C1	−176.0 (6)	C46—C45—Cr4—C49	105.5 (4)
Rh1—C8—C9—C1	69.6 (4)	C50—C45—Cr4—C49	−28.1 (3)
C7—C8—C9—Rh1	−62.2 (4)	C53—C45—Cr4—C49	−123.5 (6)

C10—C8—C9—Rh1	114.4 (6)	Rh4—C45—Cr4—C49	−16.0 (4)
C2—C1—C9—C8	178.6 (6)	C50—C45—Cr4—C46	−133.6 (5)
C6—C1—C9—C8	−3.6 (6)	C53—C45—Cr4—C46	131.0 (7)
Cr1—C1—C9—C8	77.0 (6)	Rh4—C45—Cr4—C46	−121.5 (6)
Rh1—C1—C9—C8	−66.2 (4)	C46—C45—Cr4—C50	133.6 (5)
C2—C1—C9—Rh1	−115.2 (7)	C53—C45—Cr4—C50	−95.4 (6)
C6—C1—C9—Rh1	62.6 (4)	Rh4—C45—Cr4—C50	12.1 (3)
Cr1—C1—C9—Rh1	143.2 (5)	C49—C50—Cr4—C55	−14.5 (8)
C24—C16—C17—C18	170.9 (6)	C45—C50—Cr4—C55	119.1 (7)
C21—C16—C17—C18	−5.2 (8)	C51—C50—Cr4—C55	−144.5 (7)
Cr2—C16—C17—C18	−57.1 (5)	Rh4—C50—Cr4—C55	106.3 (7)
Rh2—C16—C17—C18	81.9 (7)	C49—C50—Cr4—C57	79.9 (4)
C24—C16—C17—Cr2	−132.1 (7)	C45—C50—Cr4—C57	−146.5 (4)
C21—C16—C17—Cr2	51.9 (5)	C51—C50—Cr4—C57	−50.1 (6)
Rh2—C16—C17—Cr2	139.0 (4)	Rh4—C50—Cr4—C57	−159.3 (5)
C16—C17—C18—C19	5.6 (9)	C49—C50—Cr4—C56	173.3 (3)
Cr2—C17—C18—C19	−53.2 (5)	C45—C50—Cr4—C56	−53.1 (4)
C16—C17—C18—Cr2	58.8 (5)	C51—C50—Cr4—C56	43.3 (6)
C17—C18—C19—C20	−1.1 (9)	Rh4—C50—Cr4—C56	−65.9 (5)
Cr2—C18—C19—C20	−55.5 (5)	C49—C50—Cr4—C47	−68.6 (4)
C17—C18—C19—Cr2	54.5 (5)	C45—C50—Cr4—C47	65.0 (3)
C18—C19—C20—C21	−3.8 (8)	C51—C50—Cr4—C47	161.4 (6)
Cr2—C19—C20—C21	−59.0 (5)	Rh4—C50—Cr4—C47	52.2 (4)
C18—C19—C20—Cr2	55.2 (5)	C49—C50—Cr4—C48	−30.8 (3)
C19—C20—C21—C22	−172.4 (6)	C45—C50—Cr4—C48	102.8 (4)
Cr2—C20—C21—C22	130.8 (6)	C51—C50—Cr4—C48	−160.8 (6)
C19—C20—C21—C16	4.1 (8)	Rh4—C50—Cr4—C48	90.0 (5)
Cr2—C20—C21—C16	−52.7 (5)	C45—C50—Cr4—C49	133.6 (5)
C19—C20—C21—Cr2	56.8 (5)	C51—C50—Cr4—C49	−130.0 (7)
C19—C20—C21—Rh2	−82.4 (6)	Rh4—C50—Cr4—C49	120.8 (6)
Cr2—C20—C21—Rh2	−139.2 (4)	C49—C50—Cr4—C46	−105.4 (4)
C17—C16—C21—C20	0.3 (8)	C45—C50—Cr4—C46	28.2 (3)
C24—C16—C21—C20	−176.7 (5)	C51—C50—Cr4—C46	124.6 (6)
Cr2—C16—C21—C20	51.2 (5)	Rh4—C50—Cr4—C46	15.4 (4)
Rh2—C16—C21—C20	−118.1 (5)	C49—C50—Cr4—C45	−133.6 (5)
C17—C16—C21—C22	177.7 (5)	C51—C50—Cr4—C45	96.4 (6)
C24—C16—C21—C22	0.6 (6)	Rh4—C50—Cr4—C45	−12.8 (3)
Cr2—C16—C21—C22	−131.4 (4)	O5—C15—Rh1—C14	91.7 (8)
Rh2—C16—C21—C22	59.3 (4)	Rh2—C15—Rh1—C14	−89.7 (3)
C17—C16—C21—Cr2	−50.9 (5)	O5—C15—Rh1—C9	−19.1 (9)
C24—C16—C21—Cr2	132.1 (4)	Rh2—C15—Rh1—C9	159.5 (2)
Rh2—C16—C21—Cr2	−169.3 (2)	O5—C15—Rh1—C7	−81.0 (7)
C17—C16—C21—Rh2	118.4 (5)	Rh2—C15—Rh1—C7	97.6 (2)
C24—C16—C21—Rh2	−58.7 (4)	O5—C15—Rh1—C8	−42.8 (8)
Cr2—C16—C21—Rh2	169.3 (2)	Rh2—C15—Rh1—C8	135.8 (2)
C20—C21—C22—C23	−178.9 (6)	O5—C15—Rh1—C1	−77.3 (11)
C16—C21—C22—C23	4.2 (6)	Rh2—C15—Rh1—C1	101.3 (8)
Cr2—C21—C22—C23	−76.4 (6)	O5—C15—Rh1—C6	−107.0 (7)

Rh2—C21—C22—C23	65.9 (4)	Rh2—C15—Rh1—C6	71.6 (3)
C20—C21—C22—Rh2	115.2 (6)	O5—C15—Rh1—Rh2	−178.6 (9)
C16—C21—C22—Rh2	−61.6 (4)	C8—C9—Rh1—C14	−148.0 (4)
Cr2—C21—C22—Rh2	−142.2 (5)	C1—C9—Rh1—C14	96.4 (4)
C21—C22—C23—C24	−7.6 (6)	C8—C9—Rh1—C15	−39.9 (5)
Rh2—C22—C23—C24	59.8 (4)	C1—C9—Rh1—C15	−155.5 (4)
C21—C22—C23—C25	173.8 (5)	C8—C9—Rh1—C7	37.6 (4)
Rh2—C22—C23—C25	−118.8 (6)	C1—C9—Rh1—C7	−78.0 (4)
C21—C22—C23—Rh2	−67.4 (4)	C1—C9—Rh1—C8	−115.6 (5)
C22—C23—C24—C16	8.1 (6)	C8—C9—Rh1—C1	115.6 (5)
C25—C23—C24—C16	−173.4 (6)	C8—C9—Rh1—C6	79.2 (4)
Rh2—C23—C24—C16	68.5 (4)	C1—C9—Rh1—C6	−36.4 (3)
C22—C23—C24—Rh2	−60.4 (4)	C8—C9—Rh1—Rh2	60.2 (8)
C25—C23—C24—Rh2	118.1 (6)	C1—C9—Rh1—Rh2	−55.4 (8)
C17—C16—C24—C23	178.2 (6)	C8—C7—Rh1—C14	−55.8 (10)
C21—C16—C24—C23	−5.4 (6)	C6—C7—Rh1—C14	58.7 (10)
Cr2—C16—C24—C23	73.9 (7)	C8—C7—Rh1—C15	99.7 (4)
Rh2—C16—C24—C23	−67.5 (4)	C6—C7—Rh1—C15	−145.9 (3)
C17—C16—C24—Rh2	−114.3 (7)	C8—C7—Rh1—C9	−37.6 (4)
C21—C16—C24—Rh2	62.1 (4)	C6—C7—Rh1—C9	76.9 (3)
Cr2—C16—C24—Rh2	141.4 (5)	C6—C7—Rh1—C8	114.5 (5)
C35—C30—C31—C32	−6.0 (8)	C8—C7—Rh1—C1	−79.1 (4)
C38—C30—C31—C32	170.5 (6)	C6—C7—Rh1—C1	35.4 (3)
Cr3—C30—C31—C32	−56.6 (5)	C8—C7—Rh1—C6	−114.5 (5)
Rh3—C30—C31—C32	79.8 (7)	C8—C7—Rh1—Rh2	148.3 (3)
C35—C30—C31—Cr3	50.5 (4)	C6—C7—Rh1—Rh2	−97.2 (3)
C38—C30—C31—Cr3	−133.0 (6)	C9—C8—Rh1—C14	43.6 (5)
Rh3—C30—C31—Cr3	136.4 (4)	C7—C8—Rh1—C14	160.5 (4)
C30—C31—C32—C33	4.0 (8)	C10—C8—Rh1—C14	−79.4 (6)
Cr3—C31—C32—C33	−54.9 (5)	C9—C8—Rh1—C15	153.1 (4)
C30—C31—C32—Cr3	58.9 (5)	C7—C8—Rh1—C15	−90.0 (4)
C31—C32—C33—C34	1.6 (9)	C10—C8—Rh1—C15	30.1 (6)
Cr3—C32—C33—C34	−54.4 (5)	C7—C8—Rh1—C9	116.9 (5)
C31—C32—C33—Cr3	56.0 (5)	C10—C8—Rh1—C9	−123.0 (7)
C32—C33—C34—C35	−5.0 (8)	C9—C8—Rh1—C7	−116.9 (5)
Cr3—C33—C34—C35	−59.1 (5)	C10—C8—Rh1—C7	120.1 (7)
C32—C33—C34—Cr3	54.1 (5)	C9—C8—Rh1—C1	−37.7 (3)
C33—C34—C35—C30	2.8 (8)	C7—C8—Rh1—C1	79.2 (4)
Cr3—C34—C35—C30	−54.5 (5)	C10—C8—Rh1—C1	−160.7 (6)
C33—C34—C35—C36	−172.6 (6)	C9—C8—Rh1—C6	−78.6 (4)
Cr3—C34—C35—C36	130.1 (6)	C7—C8—Rh1—C6	38.3 (3)
C33—C34—C35—Cr3	57.3 (5)	C10—C8—Rh1—C6	158.4 (6)
C33—C34—C35—Rh3	−86.7 (6)	C9—C8—Rh1—Rh2	−161.7 (3)
Cr3—C34—C35—Rh3	−144.0 (3)	C7—C8—Rh1—Rh2	−44.8 (4)
C31—C30—C35—C34	2.7 (8)	C10—C8—Rh1—Rh2	75.3 (6)
C38—C30—C35—C34	−174.7 (5)	C9—C1—Rh1—C14	−91.5 (4)
Cr3—C30—C35—C34	52.4 (5)	C2—C1—Rh1—C14	36.3 (5)
Rh3—C30—C35—C34	−118.0 (5)	C6—C1—Rh1—C14	150.9 (4)

C31—C30—C35—C36	179.1 (5)	Cr1—C1—Rh1—C14	138.9 (5)
C38—C30—C35—C36	1.8 (6)	C9—C1—Rh1—C15	77.3 (9)
Cr3—C30—C35—C36	−131.1 (4)	C2—C1—Rh1—C15	−154.9 (7)
Rh3—C30—C35—C36	58.4 (3)	C6—C1—Rh1—C15	−40.3 (9)
C31—C30—C35—Cr3	−49.7 (4)	Cr1—C1—Rh1—C15	−52.4 (11)
C38—C30—C35—Cr3	132.9 (4)	C2—C1—Rh1—C9	127.8 (6)
Rh3—C30—C35—Cr3	−170.4 (2)	C6—C1—Rh1—C9	−117.6 (5)
C31—C30—C35—Rh3	120.7 (5)	Cr1—C1—Rh1—C9	−129.6 (7)
C38—C30—C35—Rh3	−56.6 (4)	C9—C1—Rh1—C7	81.4 (4)
Cr3—C30—C35—Rh3	170.4 (2)	C2—C1—Rh1—C7	−150.8 (6)
C34—C35—C36—C37	179.4 (6)	C6—C1—Rh1—C7	−36.2 (3)
C30—C35—C36—C37	3.6 (6)	Cr1—C1—Rh1—C7	−48.2 (5)
Cr3—C35—C36—C37	−79.1 (6)	C9—C1—Rh1—C8	38.6 (3)
Rh3—C35—C36—C37	67.4 (4)	C2—C1—Rh1—C8	166.4 (6)
C34—C35—C36—Rh3	112.0 (6)	C6—C1—Rh1—C8	−79.0 (4)
C30—C35—C36—Rh3	−63.8 (4)	Cr1—C1—Rh1—C8	−91.0 (5)
Cr3—C35—C36—Rh3	−146.5 (5)	C9—C1—Rh1—C6	117.6 (5)
C35—C36—C37—C38	−7.7 (6)	C2—C1—Rh1—C6	−114.6 (6)
Rh3—C36—C37—C38	61.8 (4)	Cr1—C1—Rh1—C6	−12.0 (4)
C35—C36—C37—C39	173.8 (5)	C9—C1—Rh1—Rh2	162.7 (3)
Rh3—C36—C37—C39	−116.8 (6)	C2—C1—Rh1—Rh2	−69.5 (5)
C35—C36—C37—Rh3	−69.4 (4)	C6—C1—Rh1—Rh2	45.1 (4)
C36—C37—C38—C30	8.8 (6)	Cr1—C1—Rh1—Rh2	33.1 (6)
C39—C37—C38—C30	−172.6 (5)	C5—C6—Rh1—C14	73.0 (6)
Rh3—C37—C38—C30	68.9 (4)	C7—C6—Rh1—C14	−159.4 (4)
C36—C37—C38—Rh3	−60.1 (4)	C1—C6—Rh1—C14	−39.9 (5)
C39—C37—C38—Rh3	118.4 (6)	Cr1—C6—Rh1—C14	−28.8 (6)
C31—C30—C38—C37	176.6 (6)	C5—C6—Rh1—C15	−81.3 (6)
C35—C30—C38—C37	−6.5 (6)	C7—C6—Rh1—C15	46.3 (4)
Cr3—C30—C38—C37	72.9 (6)	C1—C6—Rh1—C15	165.8 (4)
Rh3—C30—C38—C37	−65.3 (4)	Cr1—C6—Rh1—C15	176.8 (4)
C31—C30—C38—Rh3	−118.1 (6)	C5—C6—Rh1—C9	150.1 (6)
C35—C30—C38—Rh3	58.7 (4)	C7—C6—Rh1—C9	−82.3 (4)
Cr3—C30—C38—Rh3	138.1 (5)	C1—C6—Rh1—C9	37.2 (3)
C50—C45—C46—C47	−3.5 (8)	Cr1—C6—Rh1—C9	48.3 (4)
C53—C45—C46—C47	172.2 (6)	C5—C6—Rh1—C7	−127.6 (6)
Cr4—C45—C46—C47	−56.5 (4)	C1—C6—Rh1—C7	119.5 (5)
Rh4—C45—C46—C47	84.2 (6)	Cr1—C6—Rh1—C7	130.5 (6)
C50—C45—C46—Cr4	53.0 (4)	C5—C6—Rh1—C8	−166.8 (6)
C53—C45—C46—Cr4	−131.3 (6)	C7—C6—Rh1—C8	−39.2 (3)
Rh4—C45—C46—Cr4	140.6 (4)	C1—C6—Rh1—C8	80.2 (4)
C45—C46—C47—C48	3.3 (8)	Cr1—C6—Rh1—C8	91.3 (4)
Cr4—C46—C47—C48	−54.9 (5)	C5—C6—Rh1—C1	112.9 (6)
C45—C46—C47—Cr4	58.2 (4)	C7—C6—Rh1—C1	−119.5 (5)
C46—C47—C48—C49	1.4 (8)	Cr1—C6—Rh1—C1	11.1 (3)
Cr4—C47—C48—C49	−54.3 (5)	C5—C6—Rh1—Rh2	−34.9 (5)
C46—C47—C48—Cr4	55.7 (5)	C7—C6—Rh1—Rh2	92.7 (3)
C47—C48—C49—C50	−5.9 (8)	C1—C6—Rh1—Rh2	−147.9 (3)

Cr4—C48—C49—C50	−59.5 (5)	Cr1—C6—Rh1—Rh2	−136.8 (4)
C47—C48—C49—Cr4	53.7 (5)	O5—C15—Rh2—C29	84.0 (8)
C48—C49—C50—C45	5.6 (8)	Rh1—C15—Rh2—C29	−94.5 (3)
Cr4—C49—C50—C45	−52.2 (4)	O5—C15—Rh2—C24	−29.1 (10)
C48—C49—C50—C51	−172.4 (6)	Rh1—C15—Rh2—C24	152.4 (3)
Cr4—C49—C50—C51	129.8 (6)	O5—C15—Rh2—C22	−89.5 (8)
C48—C49—C50—Cr4	57.8 (5)	Rh1—C15—Rh2—C22	92.0 (2)
C48—C49—C50—Rh4	−84.6 (6)	O5—C15—Rh2—C23	−51.8 (9)
Cr4—C49—C50—Rh4	−142.3 (4)	Rh1—C15—Rh2—C23	129.7 (2)
C46—C45—C50—C49	−0.9 (8)	O5—C15—Rh2—C16	−104.8 (11)
C53—C45—C50—C49	−177.7 (5)	Rh1—C15—Rh2—C16	76.7 (9)
Cr4—C45—C50—C49	50.9 (4)	O5—C15—Rh2—C21	−120.1 (8)
Rh4—C45—C50—C49	−121.3 (5)	Rh1—C15—Rh2—C21	61.4 (3)
C46—C45—C50—C51	177.6 (5)	O5—C15—Rh2—Rh1	178.5 (9)
C53—C45—C50—C51	0.8 (6)	C23—C24—Rh2—C29	−146.5 (4)
Cr4—C45—C50—C51	−130.6 (4)	C16—C24—Rh2—C29	97.7 (4)
Rh4—C45—C50—C51	57.2 (4)	C23—C24—Rh2—C15	−37.9 (6)
C46—C45—C50—Cr4	−51.8 (4)	C16—C24—Rh2—C15	−153.7 (4)
C53—C45—C50—Cr4	131.4 (4)	C23—C24—Rh2—C22	36.8 (4)
Rh4—C45—C50—Cr4	−172.3 (2)	C16—C24—Rh2—C22	−79.0 (4)
C46—C45—C50—Rh4	120.4 (5)	C16—C24—Rh2—C23	−115.8 (5)
C53—C45—C50—Rh4	−56.3 (3)	C23—C24—Rh2—C16	115.8 (5)
Cr4—C45—C50—Rh4	172.3 (2)	C23—C24—Rh2—C21	79.0 (4)
C49—C50—C51—C52	−176.9 (6)	C16—C24—Rh2—C21	−36.8 (3)
C45—C50—C51—C52	4.9 (6)	C23—C24—Rh2—Rh1	69.2 (6)
Cr4—C50—C51—C52	−75.5 (6)	C16—C24—Rh2—Rh1	−46.6 (6)
Rh4—C50—C51—C52	67.3 (4)	C23—C22—Rh2—C29	−48.7 (11)
C49—C50—C51—Rh4	115.8 (6)	C21—C22—Rh2—C29	67.0 (11)
C45—C50—C51—Rh4	−62.4 (4)	C23—C22—Rh2—C15	106.0 (4)
Cr4—C50—C51—Rh4	−142.8 (4)	C21—C22—Rh2—C15	−138.3 (3)
C50—C51—C52—C53	−8.7 (6)	C23—C22—Rh2—C24	−36.4 (4)
Rh4—C51—C52—C53	61.2 (4)	C21—C22—Rh2—C24	79.3 (3)
C50—C51—C52—C54	174.7 (5)	C21—C22—Rh2—C23	115.7 (5)
Rh4—C51—C52—C54	−115.3 (6)	C23—C22—Rh2—C16	−78.8 (4)
C50—C51—C52—Rh4	−70.0 (4)	C21—C22—Rh2—C16	36.9 (3)
C51—C52—C53—C45	9.3 (6)	C23—C22—Rh2—C21	−115.7 (5)
C54—C52—C53—C45	−174.0 (5)	C23—C22—Rh2—Rh1	154.8 (3)
Rh4—C52—C53—C45	70.1 (4)	C21—C22—Rh2—Rh1	−89.5 (3)
C51—C52—C53—Rh4	−60.8 (4)	C24—C23—Rh2—C29	46.4 (5)
C54—C52—C53—Rh4	115.9 (6)	C22—C23—Rh2—C29	164.5 (4)
C46—C45—C53—C52	177.6 (5)	C25—C23—Rh2—C29	−76.1 (6)
C50—C45—C53—C52	−6.2 (6)	C24—C23—Rh2—C15	156.3 (4)
Cr4—C45—C53—C52	74.1 (6)	C22—C23—Rh2—C15	−85.6 (4)
Rh4—C45—C53—C52	−66.3 (4)	C25—C23—Rh2—C15	33.8 (6)
C46—C45—C53—Rh4	−116.1 (6)	C22—C23—Rh2—C24	118.1 (5)
C50—C45—C53—Rh4	60.1 (4)	C25—C23—Rh2—C24	−122.5 (7)
Cr4—C45—C53—Rh4	140.4 (4)	C24—C23—Rh2—C22	−118.1 (5)
C2—C3—Cr1—C11	134.6 (4)	C25—C23—Rh2—C22	119.4 (6)

C4—C3—Cr1—C11	−91.4 (4)	C24—C23—Rh2—C16	−38.3 (4)
C2—C3—Cr1—C12	45.8 (5)	C22—C23—Rh2—C16	79.8 (4)
C4—C3—Cr1—C12	179.8 (4)	C25—C23—Rh2—C16	−160.8 (6)
C2—C3—Cr1—C13	−130.1 (6)	C24—C23—Rh2—C21	−80.0 (4)
C4—C3—Cr1—C13	3.9 (8)	C22—C23—Rh2—C21	38.1 (3)
C2—C3—Cr1—C4	−133.9 (6)	C25—C23—Rh2—C21	157.5 (6)
C4—C3—Cr1—C2	133.9 (6)	C24—C23—Rh2—Rh1	−152.8 (3)
C2—C3—Cr1—C5	−105.1 (4)	C22—C23—Rh2—Rh1	−34.7 (4)
C4—C3—Cr1—C5	28.9 (4)	C25—C23—Rh2—Rh1	84.7 (5)
C2—C3—Cr1—C1	−31.2 (3)	C17—C16—Rh2—C29	36.4 (6)
C4—C3—Cr1—C1	102.8 (4)	C24—C16—Rh2—C29	−92.4 (4)
C2—C3—Cr1—C6	−68.2 (4)	C21—C16—Rh2—C29	150.3 (4)
C4—C3—Cr1—C6	65.7 (4)	Cr2—C16—Rh2—C29	133.8 (4)
C5—C4—Cr1—C11	−135.8 (4)	C17—C16—Rh2—C15	−134.4 (8)
C3—C4—Cr1—C11	92.3 (4)	C24—C16—Rh2—C15	96.8 (9)
C5—C4—Cr1—C12	131.5 (6)	C21—C16—Rh2—C15	−20.5 (10)
C3—C4—Cr1—C12	−0.4 (8)	Cr2—C16—Rh2—C15	−37.0 (11)
C5—C4—Cr1—C13	−46.1 (5)	C17—C16—Rh2—C24	128.8 (7)
C3—C4—Cr1—C13	−178.1 (4)	C21—C16—Rh2—C24	−117.2 (5)
C5—C4—Cr1—C3	132.0 (6)	Cr2—C16—Rh2—C24	−133.8 (6)
C5—C4—Cr1—C2	104.4 (4)	C17—C16—Rh2—C22	−151.5 (6)
C3—C4—Cr1—C2	−27.5 (4)	C24—C16—Rh2—C22	79.7 (4)
C3—C4—Cr1—C5	−132.0 (6)	C21—C16—Rh2—C22	−37.5 (3)
C5—C4—Cr1—C1	67.1 (4)	Cr2—C16—Rh2—C22	−54.1 (4)
C3—C4—Cr1—C1	−64.8 (4)	C17—C16—Rh2—C23	166.4 (6)
C5—C4—Cr1—C6	30.2 (3)	C24—C16—Rh2—C23	37.6 (3)
C3—C4—Cr1—C6	−101.7 (4)	C21—C16—Rh2—C23	−79.7 (4)
C3—C2—Cr1—C11	−54.4 (4)	Cr2—C16—Rh2—C23	−96.2 (5)
C1—C2—Cr1—C11	176.7 (3)	C17—C16—Rh2—C21	−114.0 (7)
C3—C2—Cr1—C12	−140.0 (4)	C24—C16—Rh2—C21	117.2 (5)
C1—C2—Cr1—C12	91.1 (4)	Cr2—C16—Rh2—C21	−16.6 (3)
C3—C2—Cr1—C13	131.9 (6)	C17—C16—Rh2—Rh1	−70.2 (5)
C1—C2—Cr1—C13	3.0 (7)	C24—C16—Rh2—Rh1	161.0 (3)
C1—C2—Cr1—C3	−128.9 (5)	C21—C16—Rh2—Rh1	43.7 (4)
C3—C2—Cr1—C4	28.2 (4)	Cr2—C16—Rh2—Rh1	27.2 (5)
C1—C2—Cr1—C4	−100.7 (4)	C20—C21—Rh2—C29	71.5 (6)
C3—C2—Cr1—C5	64.1 (4)	C22—C21—Rh2—C29	−159.8 (4)
C1—C2—Cr1—C5	−64.8 (3)	C16—C21—Rh2—C29	−42.7 (5)
C3—C2—Cr1—C1	128.9 (5)	Cr2—C21—Rh2—C29	−25.9 (6)
C3—C2—Cr1—C6	100.1 (4)	C20—C21—Rh2—C15	−72.9 (6)
C1—C2—Cr1—C6	−28.8 (3)	C22—C21—Rh2—C15	55.8 (4)
C4—C5—Cr1—C11	53.3 (4)	C16—C21—Rh2—C15	172.9 (4)
C6—C5—Cr1—C11	−176.9 (3)	Cr2—C21—Rh2—C15	−170.3 (4)
C4—C5—Cr1—C12	−130.9 (6)	C20—C21—Rh2—C24	151.8 (6)
C6—C5—Cr1—C12	−1.0 (7)	C22—C21—Rh2—C24	−79.6 (4)
C4—C5—Cr1—C13	140.1 (4)	C16—C21—Rh2—C24	37.6 (3)
C6—C5—Cr1—C13	−90.1 (4)	Cr2—C21—Rh2—C24	54.3 (4)
C4—C5—Cr1—C3	−29.3 (4)	C20—C21—Rh2—C22	−128.7 (6)

C6—C5—Cr1—C3	100.6 (4)	C16—C21—Rh2—C22	117.1 (5)
C6—C5—Cr1—C4	129.8 (5)	Cr2—C21—Rh2—C22	133.9 (6)
C4—C5—Cr1—C2	−64.6 (4)	C20—C21—Rh2—C23	−166.6 (6)
C6—C5—Cr1—C2	65.3 (3)	C22—C21—Rh2—C23	−38.0 (3)
C4—C5—Cr1—C1	−101.1 (4)	C16—C21—Rh2—C23	79.1 (4)
C6—C5—Cr1—C1	28.8 (3)	Cr2—C21—Rh2—C23	95.9 (5)
C4—C5—Cr1—C6	−129.8 (5)	C20—C21—Rh2—C16	114.2 (6)
C9—C1—Cr1—C11	123.7 (7)	C22—C21—Rh2—C16	−117.1 (5)
C2—C1—Cr1—C11	−7.1 (7)	Cr2—C21—Rh2—C16	16.8 (3)
C6—C1—Cr1—C11	−139.6 (6)	C20—C21—Rh2—Rh1	−31.8 (5)
Rh1—C1—Cr1—C11	−127.5 (6)	C22—C21—Rh2—Rh1	96.9 (3)
C9—C1—Cr1—C12	42.1 (6)	C16—C21—Rh2—Rh1	−146.0 (3)
C2—C1—Cr1—C12	−88.8 (4)	Cr2—C21—Rh2—Rh1	−129.2 (4)
C6—C1—Cr1—C12	138.7 (4)	C14—Rh1—Rh2—C29	179.9 (3)
Rh1—C1—Cr1—C12	150.9 (5)	C15—Rh1—Rh2—C29	87.0 (3)
C9—C1—Cr1—C13	−47.6 (6)	C9—Rh1—Rh2—C29	−27.7 (7)
C2—C1—Cr1—C13	−178.5 (3)	C7—Rh1—Rh2—C29	−7.3 (3)
C6—C1—Cr1—C13	49.0 (4)	C8—Rh1—Rh2—C29	18.7 (3)
Rh1—C1—Cr1—C13	61.2 (6)	C1—Rh1—Rh2—C29	−70.0 (3)
C9—C1—Cr1—C3	161.2 (6)	C6—Rh1—Rh2—C29	−44.8 (3)
C2—C1—Cr1—C3	30.3 (3)	C14—Rh1—Rh2—C15	92.9 (3)
C6—C1—Cr1—C3	−102.1 (4)	C9—Rh1—Rh2—C15	−114.7 (7)
Rh1—C1—Cr1—C3	−90.0 (5)	C7—Rh1—Rh2—C15	−94.3 (3)
C9—C1—Cr1—C4	−161.9 (6)	C8—Rh1—Rh2—C15	−68.2 (3)
C2—C1—Cr1—C4	67.3 (3)	C1—Rh1—Rh2—C15	−157.0 (3)
C6—C1—Cr1—C4	−65.2 (3)	C6—Rh1—Rh2—C15	−131.8 (3)
Rh1—C1—Cr1—C4	−53.1 (5)	C14—Rh1—Rh2—C24	−34.6 (5)
C9—C1—Cr1—C2	130.9 (7)	C15—Rh1—Rh2—C24	−127.5 (5)
C6—C1—Cr1—C2	−132.5 (5)	C9—Rh1—Rh2—C24	117.8 (8)
Rh1—C1—Cr1—C2	−120.4 (6)	C7—Rh1—Rh2—C24	138.2 (5)
C9—C1—Cr1—C5	−125.2 (6)	C8—Rh1—Rh2—C24	164.2 (5)
C2—C1—Cr1—C5	104.0 (4)	C1—Rh1—Rh2—C24	75.4 (5)
C6—C1—Cr1—C5	−28.5 (3)	C6—Rh1—Rh2—C24	100.7 (5)
Rh1—C1—Cr1—C5	−16.4 (4)	C14—Rh1—Rh2—C22	−6.2 (3)
C9—C1—Cr1—C6	−96.7 (7)	C15—Rh1—Rh2—C22	−99.1 (3)
C2—C1—Cr1—C6	132.5 (5)	C9—Rh1—Rh2—C22	146.2 (7)
Rh1—C1—Cr1—C6	12.1 (4)	C7—Rh1—Rh2—C22	166.7 (2)
C5—C6—Cr1—C11	6.8 (7)	C8—Rh1—Rh2—C22	−167.3 (3)
C7—C6—Cr1—C11	−124.8 (7)	C1—Rh1—Rh2—C22	103.9 (3)
C1—C6—Cr1—C11	139.5 (6)	C6—Rh1—Rh2—C22	129.2 (2)
Rh1—C6—Cr1—C11	128.4 (6)	C14—Rh1—Rh2—C23	14.0 (3)
C5—C6—Cr1—C12	179.5 (4)	C15—Rh1—Rh2—C23	−78.9 (3)
C7—C6—Cr1—C12	47.9 (6)	C9—Rh1—Rh2—C23	166.4 (7)
C1—C6—Cr1—C12	−47.8 (4)	C7—Rh1—Rh2—C23	−173.2 (3)
Rh1—C6—Cr1—C12	−58.9 (5)	C8—Rh1—Rh2—C23	−147.2 (3)
C5—C6—Cr1—C13	89.9 (4)	C1—Rh1—Rh2—C23	124.1 (3)
C7—C6—Cr1—C13	−41.7 (6)	C6—Rh1—Rh2—C23	149.3 (3)
C1—C6—Cr1—C13	−137.4 (4)	C14—Rh1—Rh2—C16	−67.6 (3)

Rh1—C6—Cr1—C13	−148.4 (4)	C15—Rh1—Rh2—C16	−160.5 (3)
C5—C6—Cr1—C3	−67.4 (3)	C9—Rh1—Rh2—C16	84.8 (7)
C7—C6—Cr1—C3	161.0 (6)	C7—Rh1—Rh2—C16	105.2 (2)
C1—C6—Cr1—C3	65.3 (3)	C8—Rh1—Rh2—C16	131.2 (3)
Rh1—C6—Cr1—C3	54.2 (4)	C1—Rh1—Rh2—C16	42.5 (3)
C5—C6—Cr1—C4	−30.2 (3)	C6—Rh1—Rh2—C16	67.7 (2)
C7—C6—Cr1—C4	−161.8 (6)	C14—Rh1—Rh2—C21	−43.3 (3)
C1—C6—Cr1—C4	102.5 (4)	C15—Rh1—Rh2—C21	−136.2 (3)
Rh1—C6—Cr1—C4	91.4 (4)	C9—Rh1—Rh2—C21	109.1 (7)
C5—C6—Cr1—C2	−103.8 (4)	C7—Rh1—Rh2—C21	129.5 (2)
C7—C6—Cr1—C2	124.6 (6)	C8—Rh1—Rh2—C21	155.5 (3)
C1—C6—Cr1—C2	28.9 (3)	C1—Rh1—Rh2—C21	66.8 (3)
Rh1—C6—Cr1—C2	17.8 (4)	C6—Rh1—Rh2—C21	92.0 (2)
C7—C6—Cr1—C5	−131.6 (7)	O14—C44—Rh3—C43	−85.7 (8)
C1—C6—Cr1—C5	132.7 (5)	Rh4—C44—Rh3—C43	93.0 (2)
Rh1—C6—Cr1—C5	121.6 (6)	O14—C44—Rh3—C36	23.4 (10)
C5—C6—Cr1—C1	−132.7 (5)	Rh4—C44—Rh3—C36	−157.8 (3)
C7—C6—Cr1—C1	95.7 (6)	O14—C44—Rh3—C37	45.1 (8)
Rh1—C6—Cr1—C1	−11.1 (3)	Rh4—C44—Rh3—C37	−136.1 (2)
C20—C19—Cr2—C26	−130.9 (4)	O14—C44—Rh3—C38	82.3 (8)
C18—C19—Cr2—C26	96.2 (4)	Rh4—C44—Rh3—C38	−98.9 (2)
C20—C19—Cr2—C27	142.3 (6)	O14—C44—Rh3—C35	104.9 (9)
C18—C19—Cr2—C27	9.4 (8)	Rh4—C44—Rh3—C35	−76.4 (7)
C20—C19—Cr2—C28	−42.1 (5)	O14—C44—Rh3—C30	112.3 (7)
C18—C19—Cr2—C28	−175.0 (4)	Rh4—C44—Rh3—C30	−68.9 (3)
C20—C19—Cr2—C18	132.9 (6)	O14—C44—Rh3—Rh4	−178.8 (9)
C18—C19—Cr2—C20	−132.9 (6)	C37—C36—Rh3—C43	141.8 (4)
C20—C19—Cr2—C17	105.1 (4)	C35—C36—Rh3—C43	−104.1 (4)
C18—C19—Cr2—C17	−27.8 (4)	C37—C36—Rh3—C44	34.9 (6)
C20—C19—Cr2—C21	31.1 (3)	C35—C36—Rh3—C44	149.1 (4)
C18—C19—Cr2—C21	−101.7 (4)	C35—C36—Rh3—C37	114.1 (5)
C20—C19—Cr2—C16	68.1 (4)	C37—C36—Rh3—C38	−36.5 (3)
C18—C19—Cr2—C16	−64.8 (4)	C35—C36—Rh3—C38	77.7 (4)
C17—C18—Cr2—C26	142.4 (4)	C37—C36—Rh3—C35	−114.1 (5)
C19—C18—Cr2—C26	−84.4 (4)	C37—C36—Rh3—C30	−77.8 (4)
C17—C18—Cr2—C27	51.8 (5)	C35—C36—Rh3—C30	36.4 (3)
C19—C18—Cr2—C27	−174.9 (4)	C37—C36—Rh3—Rh4	−85.5 (6)
C17—C18—Cr2—C28	−122.4 (7)	C35—C36—Rh3—Rh4	28.7 (7)
C19—C18—Cr2—C28	10.9 (9)	C38—C37—Rh3—C43	−167.9 (4)
C17—C18—Cr2—C19	−133.3 (6)	C36—C37—Rh3—C43	−49.6 (5)
C17—C18—Cr2—C20	−104.7 (4)	C39—C37—Rh3—C43	72.4 (6)
C19—C18—Cr2—C20	28.5 (4)	C38—C37—Rh3—C44	82.7 (4)
C19—C18—Cr2—C17	133.3 (6)	C36—C37—Rh3—C44	−159.0 (4)
C17—C18—Cr2—C21	−67.5 (4)	C39—C37—Rh3—C44	−37.0 (6)
C19—C18—Cr2—C21	65.8 (4)	C38—C37—Rh3—C36	−118.3 (5)
C17—C18—Cr2—C16	−30.7 (4)	C39—C37—Rh3—C36	122.0 (7)
C19—C18—Cr2—C16	102.5 (4)	C36—C37—Rh3—C38	118.3 (5)
C19—C20—Cr2—C26	54.8 (4)	C39—C37—Rh3—C38	−119.7 (7)

C21—C20—Cr2—C26	−177.0 (4)	C38—C37—Rh3—C35	−79.1 (4)
C19—C20—Cr2—C27	−124.3 (7)	C36—C37—Rh3—C35	39.2 (3)
C21—C20—Cr2—C27	4.0 (8)	C39—C37—Rh3—C35	161.1 (6)
C19—C20—Cr2—C28	143.9 (4)	C38—C37—Rh3—C30	−38.2 (4)
C21—C20—Cr2—C28	−87.8 (4)	C36—C37—Rh3—C30	80.1 (4)
C21—C20—Cr2—C19	128.3 (5)	C39—C37—Rh3—C30	−157.9 (6)
C19—C20—Cr2—C18	−29.0 (4)	C38—C37—Rh3—Rh4	32.9 (5)
C21—C20—Cr2—C18	99.3 (4)	C36—C37—Rh3—Rh4	151.2 (3)
C19—C20—Cr2—C17	−64.3 (4)	C39—C37—Rh3—Rh4	−86.8 (6)
C21—C20—Cr2—C17	64.0 (4)	C37—C38—Rh3—C43	31.6 (10)
C19—C20—Cr2—C21	−128.3 (5)	C30—C38—Rh3—C43	−83.1 (9)
C19—C20—Cr2—C16	−100.0 (4)	C37—C38—Rh3—C44	−108.4 (4)
C21—C20—Cr2—C16	28.3 (3)	C30—C38—Rh3—C44	136.9 (3)
C18—C17—Cr2—C26	−45.0 (5)	C37—C38—Rh3—C36	37.0 (4)
C16—C17—Cr2—C26	−174.3 (4)	C30—C38—Rh3—C36	−77.7 (4)
C18—C17—Cr2—C27	−133.5 (4)	C30—C38—Rh3—C37	−114.7 (5)
C16—C17—Cr2—C27	97.2 (4)	C37—C38—Rh3—C35	79.6 (4)
C18—C17—Cr2—C28	136.4 (5)	C30—C38—Rh3—C35	−35.1 (3)
C16—C17—Cr2—C28	7.1 (7)	C37—C38—Rh3—C30	114.7 (5)
C18—C17—Cr2—C19	28.9 (4)	C37—C38—Rh3—Rh4	−157.7 (3)
C16—C17—Cr2—C19	−100.3 (4)	C30—C38—Rh3—Rh4	87.6 (3)
C16—C17—Cr2—C18	−129.3 (5)	C34—C35—Rh3—C43	−42.7 (5)
C18—C17—Cr2—C20	65.1 (4)	C30—C35—Rh3—C43	−158.6 (3)
C16—C17—Cr2—C20	−64.2 (4)	C36—C35—Rh3—C43	84.5 (4)
C18—C17—Cr2—C21	101.0 (4)	Cr3—C35—Rh3—C43	−142.0 (5)
C16—C17—Cr2—C21	−28.3 (3)	C34—C35—Rh3—C44	126.2 (7)
C18—C17—Cr2—C16	129.3 (5)	C30—C35—Rh3—C44	10.3 (9)
C20—C21—Cr2—C26	5.5 (6)	C36—C35—Rh3—C44	−106.5 (7)
C22—C21—Cr2—C26	−125.3 (6)	Cr3—C35—Rh3—C44	27.0 (10)
C16—C21—Cr2—C26	139.0 (5)	C34—C35—Rh3—C36	−127.2 (6)
Rh2—C21—Cr2—C26	122.3 (5)	C30—C35—Rh3—C36	116.9 (5)
C20—C21—Cr2—C27	−178.3 (4)	Cr3—C35—Rh3—C36	133.5 (7)
C22—C21—Cr2—C27	51.0 (6)	C34—C35—Rh3—C37	−166.2 (5)
C16—C21—Cr2—C27	−44.7 (4)	C30—C35—Rh3—C37	77.9 (4)
Rh2—C21—Cr2—C27	−61.5 (5)	C36—C35—Rh3—C37	−39.0 (3)
C20—C21—Cr2—C28	91.4 (4)	Cr3—C35—Rh3—C37	94.5 (5)
C22—C21—Cr2—C28	−39.3 (6)	C34—C35—Rh3—C38	151.7 (5)
C16—C21—Cr2—C28	−135.1 (4)	C30—C35—Rh3—C38	35.8 (3)
Rh2—C21—Cr2—C28	−151.8 (5)	C36—C35—Rh3—C38	−81.1 (4)
C20—C21—Cr2—C19	−31.3 (3)	Cr3—C35—Rh3—C38	52.4 (5)
C22—C21—Cr2—C19	−162.1 (6)	C34—C35—Rh3—C30	115.9 (6)
C16—C21—Cr2—C19	102.2 (4)	C36—C35—Rh3—C30	−116.9 (5)
Rh2—C21—Cr2—C19	85.5 (5)	Cr3—C35—Rh3—C30	16.7 (4)
C20—C21—Cr2—C18	−69.1 (4)	C34—C35—Rh3—Rh4	63.8 (5)
C22—C21—Cr2—C18	160.2 (6)	C30—C35—Rh3—Rh4	−52.1 (4)
C16—C21—Cr2—C18	64.4 (4)	C36—C35—Rh3—Rh4	−169.0 (3)
Rh2—C21—Cr2—C18	47.7 (4)	Cr3—C35—Rh3—Rh4	−35.4 (6)
C22—C21—Cr2—C20	−130.7 (7)	C31—C30—Rh3—C43	−81.1 (6)

C16—C21—Cr2—C20	133.5 (5)	C35—C30—Rh3—C43	31.5 (5)
Rh2—C21—Cr2—C20	116.8 (6)	C38—C30—Rh3—C43	151.5 (4)
C20—C21—Cr2—C17	−105.4 (4)	Cr3—C30—Rh3—C43	17.6 (6)
C22—C21—Cr2—C17	123.9 (6)	C31—C30—Rh3—C44	71.4 (6)
C16—C21—Cr2—C17	28.1 (3)	C35—C30—Rh3—C44	−176.0 (3)
Rh2—C21—Cr2—C17	11.4 (4)	C38—C30—Rh3—C44	−56.0 (4)
C20—C21—Cr2—C16	−133.5 (5)	Cr3—C30—Rh3—C44	170.1 (3)
C22—C21—Cr2—C16	95.8 (6)	C31—C30—Rh3—C36	−150.9 (6)
Rh2—C21—Cr2—C16	−16.7 (3)	C35—C30—Rh3—C36	−38.2 (3)
C17—C16—Cr2—C26	12.5 (8)	C38—C30—Rh3—C36	81.7 (4)
C24—C16—Cr2—C26	144.2 (7)	Cr3—C30—Rh3—C36	−52.2 (4)
C21—C16—Cr2—C26	−121.0 (6)	C31—C30—Rh3—C37	166.2 (6)
Rh2—C16—Cr2—C26	−104.3 (7)	C35—C30—Rh3—C37	−81.2 (4)
C17—C16—Cr2—C27	−83.4 (4)	C38—C30—Rh3—C37	38.8 (3)
C24—C16—Cr2—C27	48.3 (6)	Cr3—C30—Rh3—C37	−95.1 (4)
C21—C16—Cr2—C27	143.1 (4)	C31—C30—Rh3—C38	127.4 (7)
Rh2—C16—Cr2—C27	159.8 (5)	C35—C30—Rh3—C38	−120.0 (5)
C17—C16—Cr2—C28	−176.2 (4)	Cr3—C30—Rh3—C38	−133.9 (6)
C24—C16—Cr2—C28	−44.4 (6)	C31—C30—Rh3—C35	−112.6 (7)
C21—C16—Cr2—C28	50.3 (4)	C38—C30—Rh3—C35	120.0 (5)
Rh2—C16—Cr2—C28	67.0 (5)	Cr3—C30—Rh3—C35	−13.9 (3)
C17—C16—Cr2—C19	67.9 (4)	C31—C30—Rh3—Rh4	26.6 (5)
C24—C16—Cr2—C19	−160.4 (6)	C35—C30—Rh3—Rh4	139.2 (3)
C21—C16—Cr2—C19	−65.6 (4)	C38—C30—Rh3—Rh4	−100.8 (3)
Rh2—C16—Cr2—C19	−48.9 (4)	Cr3—C30—Rh3—Rh4	125.3 (4)
C17—C16—Cr2—C18	30.2 (4)	O14—C44—Rh4—C58	−87.5 (8)
C24—C16—Cr2—C18	162.0 (6)	Rh3—C44—Rh4—C58	93.7 (2)
C21—C16—Cr2—C18	−103.3 (4)	O14—C44—Rh4—C51	22.1 (9)
Rh2—C16—Cr2—C18	−86.5 (5)	Rh3—C44—Rh4—C51	−156.7 (2)
C17—C16—Cr2—C20	105.3 (4)	O14—C44—Rh4—C53	85.0 (8)
C24—C16—Cr2—C20	−122.9 (6)	Rh3—C44—Rh4—C53	−93.8 (2)
C21—C16—Cr2—C20	−28.2 (3)	O14—C44—Rh4—C52	46.7 (8)
Rh2—C16—Cr2—C20	−11.5 (4)	Rh3—C44—Rh4—C52	−132.0 (2)
C24—C16—Cr2—C17	131.7 (7)	O14—C44—Rh4—C50	85.8 (12)
C21—C16—Cr2—C17	−133.5 (5)	Rh3—C44—Rh4—C50	−93.0 (8)
Rh2—C16—Cr2—C17	−116.8 (6)	O14—C44—Rh4—C45	112.7 (7)
C17—C16—Cr2—C21	133.5 (5)	Rh3—C44—Rh4—C45	−66.1 (3)
C24—C16—Cr2—C21	−94.8 (7)	O14—C44—Rh4—Rh3	178.8 (9)
Rh2—C16—Cr2—C21	16.7 (3)	C52—C51—Rh4—C58	147.3 (4)
C34—C33—Cr3—C42	−47.8 (5)	C50—C51—Rh4—C58	−98.0 (4)
C32—C33—Cr3—C42	179.1 (4)	C52—C51—Rh4—C44	41.9 (5)
C34—C33—Cr3—C40	−136.4 (4)	C50—C51—Rh4—C44	156.6 (3)
C32—C33—Cr3—C40	90.5 (4)	C52—C51—Rh4—C53	−37.3 (4)
C34—C33—Cr3—C41	132.8 (6)	C50—C51—Rh4—C53	77.4 (3)
C32—C33—Cr3—C41	−0.3 (8)	C50—C51—Rh4—C52	114.7 (5)
C34—C33—Cr3—C32	133.1 (6)	C52—C51—Rh4—C50	−114.7 (5)
C32—C33—Cr3—C34	−133.1 (6)	C52—C51—Rh4—C45	−79.1 (4)
C34—C33—Cr3—C31	104.4 (4)	C50—C51—Rh4—C45	35.6 (3)

C32—C33—Cr3—C31	−28.7 (4)	C52—C51—Rh4—Rh3	−61.3 (7)
C34—C33—Cr3—C35	31.0 (3)	C50—C51—Rh4—Rh3	53.4 (7)
C32—C33—Cr3—C35	−102.1 (4)	C52—C53—Rh4—C58	52.7 (10)
C34—C33—Cr3—C30	67.6 (4)	C45—C53—Rh4—C58	−62.3 (9)
C32—C33—Cr3—C30	−65.5 (4)	C52—C53—Rh4—C44	−100.7 (4)
C31—C32—Cr3—C42	−133.8 (6)	C45—C53—Rh4—C44	144.3 (3)
C33—C32—Cr3—C42	−1.7 (8)	C52—C53—Rh4—C51	36.9 (3)
C31—C32—Cr3—C40	136.9 (4)	C45—C53—Rh4—C51	−78.1 (3)
C33—C32—Cr3—C40	−91.0 (4)	C45—C53—Rh4—C52	−115.0 (5)
C31—C32—Cr3—C41	47.8 (4)	C52—C53—Rh4—C50	79.5 (4)
C33—C32—Cr3—C41	179.9 (4)	C45—C53—Rh4—C50	−35.5 (3)
C31—C32—Cr3—C33	−132.0 (5)	C52—C53—Rh4—C45	115.0 (5)
C31—C32—Cr3—C34	−103.5 (4)	C52—C53—Rh4—Rh3	−150.3 (3)
C33—C32—Cr3—C34	28.5 (4)	C45—C53—Rh4—Rh3	94.6 (3)
C33—C32—Cr3—C31	132.0 (5)	C51—C52—Rh4—C58	−44.6 (5)
C31—C32—Cr3—C35	−66.4 (4)	C53—C52—Rh4—C58	−162.1 (4)
C33—C32—Cr3—C35	65.7 (4)	C54—C52—Rh4—C58	78.2 (5)
C31—C32—Cr3—C30	−30.3 (3)	C51—C52—Rh4—C44	−152.2 (4)
C33—C32—Cr3—C30	101.7 (4)	C53—C52—Rh4—C44	90.3 (4)
C33—C34—Cr3—C42	138.0 (4)	C54—C52—Rh4—C44	−29.4 (5)
C35—C34—Cr3—C42	−93.4 (4)	C53—C52—Rh4—C51	−117.5 (5)
C33—C34—Cr3—C40	51.3 (4)	C54—C52—Rh4—C51	122.8 (6)
C35—C34—Cr3—C40	179.9 (3)	C51—C52—Rh4—C53	117.5 (5)
C33—C34—Cr3—C41	−132.2 (6)	C54—C52—Rh4—C53	−119.7 (6)
C35—C34—Cr3—C41	−3.6 (7)	C51—C52—Rh4—C50	38.9 (3)
C35—C34—Cr3—C33	128.6 (5)	C53—C52—Rh4—C50	−78.6 (4)
C33—C34—Cr3—C32	−28.7 (4)	C54—C52—Rh4—C50	161.7 (5)
C35—C34—Cr3—C32	99.8 (4)	C51—C52—Rh4—C45	79.3 (4)
C33—C34—Cr3—C31	−64.6 (4)	C53—C52—Rh4—C45	−38.2 (3)
C35—C34—Cr3—C31	64.0 (3)	C54—C52—Rh4—C45	−157.9 (5)
C33—C34—Cr3—C35	−128.6 (5)	C51—C52—Rh4—Rh3	158.8 (3)
C33—C34—Cr3—C30	−100.0 (4)	C53—C52—Rh4—Rh3	41.2 (4)
C35—C34—Cr3—C30	28.5 (3)	C54—C52—Rh4—Rh3	−78.4 (5)
C32—C31—Cr3—C42	129.7 (6)	C49—C50—Rh4—C58	−35.7 (5)
C30—C31—Cr3—C42	0.2 (7)	C45—C50—Rh4—C58	−150.8 (3)
C32—C31—Cr3—C40	−50.4 (4)	C51—C50—Rh4—C58	91.2 (4)
C30—C31—Cr3—C40	−179.9 (4)	Cr4—C50—Rh4—C58	−138.1 (4)
C32—C31—Cr3—C41	−138.2 (4)	C49—C50—Rh4—C44	151.2 (8)
C30—C31—Cr3—C41	92.2 (4)	C45—C50—Rh4—C44	36.1 (10)
C32—C31—Cr3—C33	29.5 (3)	C51—C50—Rh4—C44	−81.9 (9)
C30—C31—Cr3—C33	−100.1 (4)	Cr4—C50—Rh4—C44	48.8 (11)
C30—C31—Cr3—C32	−129.5 (5)	C49—C50—Rh4—C51	−126.9 (6)
C32—C31—Cr3—C34	65.9 (4)	C45—C50—Rh4—C51	118.0 (5)
C30—C31—Cr3—C34	−63.6 (4)	Cr4—C50—Rh4—C51	130.7 (6)
C32—C31—Cr3—C35	102.0 (4)	C49—C50—Rh4—C53	152.0 (6)
C30—C31—Cr3—C35	−27.5 (3)	C45—C50—Rh4—C53	36.9 (3)
C32—C31—Cr3—C30	129.5 (5)	C51—C50—Rh4—C53	−81.1 (3)
C34—C35—Cr3—C42	86.4 (4)	Cr4—C50—Rh4—C53	49.6 (4)

C30—C35—Cr3—C42	−141.0 (4)	C49—C50—Rh4—C52	−165.3 (6)
C36—C35—Cr3—C42	−43.4 (6)	C45—C50—Rh4—C52	79.6 (3)
Rh3—C35—Cr3—C42	−157.8 (5)	C51—C50—Rh4—C52	−38.4 (3)
C34—C35—Cr3—C40	−0.3 (7)	Cr4—C50—Rh4—C52	92.3 (5)
C30—C35—Cr3—C40	132.3 (6)	C49—C50—Rh4—C45	115.1 (6)
C36—C35—Cr3—C40	−130.1 (7)	C51—C50—Rh4—C45	−118.0 (5)
Rh3—C35—Cr3—C40	115.5 (7)	Cr4—C50—Rh4—C45	12.7 (3)
C34—C35—Cr3—C41	178.2 (3)	C49—C50—Rh4—Rh3	71.8 (5)
C30—C35—Cr3—C41	−49.2 (4)	C45—C50—Rh4—Rh3	−43.3 (4)
C36—C35—Cr3—C41	48.3 (6)	C51—C50—Rh4—Rh3	−161.3 (3)
Rh3—C35—Cr3—C41	−66.0 (5)	Cr4—C50—Rh4—Rh3	−30.6 (5)
C34—C35—Cr3—C33	−31.2 (3)	C46—C45—Rh4—C58	−73.7 (5)
C30—C35—Cr3—C33	101.4 (4)	C50—C45—Rh4—C58	40.8 (5)
C36—C35—Cr3—C33	−161.1 (6)	C53—C45—Rh4—C58	159.3 (3)
Rh3—C35—Cr3—C33	84.6 (5)	Cr4—C45—Rh4—C58	28.6 (6)
C34—C35—Cr3—C32	−68.6 (3)	C46—C45—Rh4—C44	77.6 (6)
C30—C35—Cr3—C32	63.9 (3)	C50—C45—Rh4—C44	−167.8 (3)
C36—C35—Cr3—C32	161.5 (6)	C53—C45—Rh4—C44	−49.4 (4)
Rh3—C35—Cr3—C32	47.1 (5)	Cr4—C45—Rh4—C44	180.0 (4)
C30—C35—Cr3—C34	132.5 (5)	C46—C45—Rh4—C51	−152.1 (5)
C36—C35—Cr3—C34	−129.9 (7)	C50—C45—Rh4—C51	−37.6 (3)
Rh3—C35—Cr3—C34	115.8 (6)	C53—C45—Rh4—C51	80.9 (3)
C34—C35—Cr3—C31	−105.0 (4)	Cr4—C45—Rh4—C51	−49.8 (4)
C30—C35—Cr3—C31	27.5 (3)	C46—C45—Rh4—C53	127.0 (6)
C36—C35—Cr3—C31	125.1 (6)	C50—C45—Rh4—C53	−118.5 (5)
Rh3—C35—Cr3—C31	10.8 (5)	Cr4—C45—Rh4—C53	−130.7 (6)
C34—C35—Cr3—C30	−132.5 (5)	C46—C45—Rh4—C52	165.7 (5)
C36—C35—Cr3—C30	97.6 (7)	C50—C45—Rh4—C52	−79.8 (3)
Rh3—C35—Cr3—C30	−16.8 (4)	C53—C45—Rh4—C52	38.7 (3)
C31—C30—Cr3—C42	−179.9 (4)	Cr4—C45—Rh4—C52	−92.0 (4)
C35—C30—Cr3—C42	45.6 (4)	C46—C45—Rh4—C50	−114.5 (6)
C38—C30—Cr3—C42	−49.6 (6)	C53—C45—Rh4—C50	118.5 (5)
Rh3—C30—Cr3—C42	59.5 (5)	Cr4—C45—Rh4—C50	−12.2 (3)
C31—C30—Cr3—C40	0.1 (7)	C46—C45—Rh4—Rh3	33.3 (5)
C35—C30—Cr3—C40	−134.3 (6)	C50—C45—Rh4—Rh3	147.8 (3)
C38—C30—Cr3—C40	130.5 (7)	C53—C45—Rh4—Rh3	−93.7 (3)
Rh3—C30—Cr3—C40	−120.4 (6)	Cr4—C45—Rh4—Rh3	135.7 (4)
C31—C30—Cr3—C41	−88.0 (4)	C43—Rh3—Rh4—C58	−177.6 (3)
C35—C30—Cr3—C41	137.5 (4)	C44—Rh3—Rh4—C58	−88.1 (3)
C38—C30—Cr3—C41	42.3 (6)	C36—Rh3—Rh4—C58	49.0 (6)
Rh3—C30—Cr3—C41	151.4 (4)	C37—Rh3—Rh4—C58	−14.2 (3)
C31—C30—Cr3—C33	68.0 (4)	C38—Rh3—Rh4—C58	5.4 (3)
C35—C30—Cr3—C33	−66.4 (3)	C35—Rh3—Rh4—C58	69.8 (3)
C38—C30—Cr3—C33	−161.7 (6)	C30—Rh3—Rh4—C58	42.1 (2)
Rh3—C30—Cr3—C33	−52.5 (4)	C43—Rh3—Rh4—C44	−89.5 (3)
C31—C30—Cr3—C32	30.3 (3)	C36—Rh3—Rh4—C44	137.1 (6)
C35—C30—Cr3—C32	−104.1 (4)	C37—Rh3—Rh4—C44	74.0 (3)
C38—C30—Cr3—C32	160.7 (6)	C38—Rh3—Rh4—C44	93.5 (3)

Rh3—C30—Cr3—C32	−90.2 (4)	C35—Rh3—Rh4—C44	158.0 (3)
C31—C30—Cr3—C34	105.6 (4)	C30—Rh3—Rh4—C44	130.3 (3)
C35—C30—Cr3—C34	−28.9 (3)	C43—Rh3—Rh4—C51	30.4 (6)
C38—C30—Cr3—C34	−124.1 (6)	C44—Rh3—Rh4—C51	119.9 (6)
Rh3—C30—Cr3—C34	−15.0 (4)	C36—Rh3—Rh4—C51	−103.1 (7)
C35—C30—Cr3—C31	−134.5 (5)	C37—Rh3—Rh4—C51	−166.2 (6)
C38—C30—Cr3—C31	130.3 (7)	C38—Rh3—Rh4—C51	−146.6 (6)
Rh3—C30—Cr3—C31	−120.5 (6)	C35—Rh3—Rh4—C51	−82.2 (6)
C31—C30—Cr3—C35	134.5 (5)	C30—Rh3—Rh4—C51	−109.9 (6)
C38—C30—Cr3—C35	−95.2 (6)	C43—Rh3—Rh4—C53	9.0 (3)
Rh3—C30—Cr3—C35	13.9 (3)	C44—Rh3—Rh4—C53	98.4 (3)
C46—C47—Cr4—C55	127.7 (4)	C36—Rh3—Rh4—C53	−124.5 (6)
C48—C47—Cr4—C55	−99.8 (4)	C37—Rh3—Rh4—C53	172.4 (3)
C46—C47—Cr4—C57	−145.1 (5)	C38—Rh3—Rh4—C53	−168.1 (2)
C48—C47—Cr4—C57	−12.6 (7)	C35—Rh3—Rh4—C53	−103.6 (2)
C46—C47—Cr4—C56	40.2 (5)	C30—Rh3—Rh4—C53	−131.3 (2)
C48—C47—Cr4—C56	172.8 (4)	C43—Rh3—Rh4—C52	−14.9 (3)
C46—C47—Cr4—C48	−132.5 (5)	C44—Rh3—Rh4—C52	74.5 (3)
C46—C47—Cr4—C49	−104.5 (4)	C36—Rh3—Rh4—C52	−148.4 (6)
C48—C47—Cr4—C49	28.0 (4)	C37—Rh3—Rh4—C52	148.5 (3)
C48—C47—Cr4—C46	132.5 (5)	C38—Rh3—Rh4—C52	168.1 (3)
C46—C47—Cr4—C45	−31.0 (3)	C35—Rh3—Rh4—C52	−127.5 (3)
C48—C47—Cr4—C45	101.5 (4)	C30—Rh3—Rh4—C52	−155.2 (3)
C46—C47—Cr4—C50	−67.5 (4)	C43—Rh3—Rh4—C50	70.0 (3)
C48—C47—Cr4—C50	65.0 (4)	C44—Rh3—Rh4—C50	159.5 (3)
C49—C48—Cr4—C55	−143.8 (4)	C36—Rh3—Rh4—C50	−63.5 (6)
C47—C48—Cr4—C55	83.0 (4)	C37—Rh3—Rh4—C50	−126.6 (3)
C49—C48—Cr4—C57	−54.0 (4)	C38—Rh3—Rh4—C50	−107.0 (2)
C47—C48—Cr4—C57	172.9 (4)	C35—Rh3—Rh4—C50	−42.6 (2)
C49—C48—Cr4—C56	116.6 (7)	C30—Rh3—Rh4—C50	−70.3 (2)
C47—C48—Cr4—C56	−16.5 (9)	C43—Rh3—Rh4—C45	46.3 (2)
C49—C48—Cr4—C47	133.1 (5)	C44—Rh3—Rh4—C45	135.7 (3)
C47—C48—Cr4—C49	−133.1 (5)	C36—Rh3—Rh4—C45	−87.2 (5)
C49—C48—Cr4—C46	104.7 (4)	C37—Rh3—Rh4—C45	−150.3 (3)
C47—C48—Cr4—C46	−28.4 (3)	C38—Rh3—Rh4—C45	−130.8 (2)
C49—C48—Cr4—C45	67.4 (4)	C35—Rh3—Rh4—C45	−66.3 (2)
C47—C48—Cr4—C45	−65.7 (4)	C30—Rh3—Rh4—C45	−94.0 (2)

Hydrogen-bond geometry (Å, º)

D—H···*A*	*D*—H	H···*A*	*D*···*A*	*D*—H···*A*
C2—H2···O7^{i}	0.95	2.52	3.403 (8)	155
C32—H32···O6^{i}	0.95	2.72	3.632 (8)	162
C5—H5···O4^{ii}	0.95	2.23	3.108 (7)	153
C7—H7···O10^{ii}	0.95	2.61	3.432 (8)	144
C17—H17···O2^{iii}	0.95	2.55	3.399 (8)	149
C34—H34···O17^{iii}	0.95	2.67	3.510 (7)	148
C10—H10*C*···O14^{iv}	0.98	2.53	3.441 (8)	155

C25—H25*A*···O14^{v}	0.98	2.68	3.346 (8)	125
C20—H20···O9^{vi}	0.95	2.42	3.306 (7)	156
C51—H51···O5^{vii}	0.95	2.55	3.313 (8)	137
C54—H54*C*···O5^{vii}	0.98	2.72	3.336 (8)	122
C39—H39*B*···O5^{viii}	0.98	2.53	3.374 (8)	145
C38—H38···O6^{ix}	0.95	2.58	3.521 (8)	170
C22—H22···O15^{x}	0.95	2.69	3.554 (7)	152
C46—H46···O13^{xi}	0.95	2.47	3.262 (7)	141
C31—H31···O18^{xii}	0.95	2.51	3.144 (7)	124
C49—H49···O11^{xii}	0.95	2.66	3.411 (8)	136

Symmetry codes: (i) $x-1, y, z$; (ii) $x, -y+3/2, z-1/2$; (iii) $x+1, y, z$; (iv) $-x+1, y-1/2, -z+1/2$; (v) $-x+2, y-1/2, -z+1/2$; (vi) $x, -y+3/2, z+1/2$; (vii) $-x+1, y+1/2, -z+1/2$; (viii) $-x+2, y+1/2, -z+1/2$; (ix) $-x+2, -y+2, -z+1$; (x) $x+1, -y+3/2, z+1/2$; (xi) $-x+1, -y+2, -z$; (xii) $-x+1, -y+2, -z+1$.