metal-organic compounds

Di-μ_2-bromido-bis[bromido(η^6-1,2,4,5-tetramethylbenzene)ruthenium(II)]

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The asymmetric unit of the title compound, $[Ru_2Br_4(C_{10}H_{14})_2]$, contains one half of the centrosymmetric molecule. Each Ru center is coordinated by tetramethylbenzene ring in a η^6-coordination mode, and one terminal and two bridging bromine atoms. The aromatic rings and the Ru_2Br_2 four-membered ring form a dihedral angle of 55.99 (8)°. In the crystal structure, weak intermolecular C—H$\cdots$Br interactions link molecules into chains propagated in [001].

Related literature

For our work on the synthesis and catalytic applications of ruthenium–arene complexes, see: Cerón-Camacho *et al.* (2006); Díaz Camacho *et al.* (2008). For related structures, see: González-Torres *et al.* (2009) and references therein. For details of the synthesis, see: Bennett *et al.* (1982).
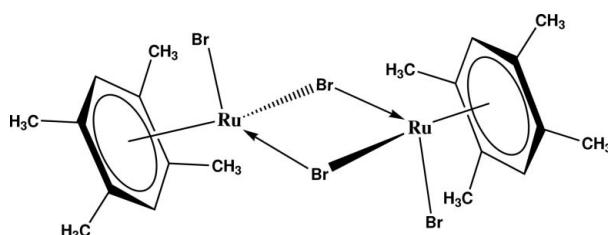
Experimental

Crystal data

$[Ru_2Br_4(C_{10}H_{14})_2]$

$M_r = 790.20$

Triclinic, $P\bar{1}$

$a = 7.8866$ (13) Å

$b = 8.2873$ (14) Å

$c = 9.8627$ (17) Å

$\alpha = 88.335$ (2)°

$\beta = 74.508$ (2)°

$\gamma = 69.648$ (2)°

$V = 580.96$ (17) Å^3

$Z = 1$

Mo $K\alpha$ radiation

$\mu = 8.18$ mm^{-1}

$T = 298$ K

$0.35 \times 0.15 \times 0.12$ mm

Data collection

Bruker SMART CCD area-detector diffractometer

Absorption correction: face indexed-numerical (*SHELXTL*>; Sheldrick, 2008)

$T_{min} = 0.139$, $T_{max} = 0.478$

4786 measured reflections

2108 independent reflections

1878 reflections with $I > 2\sigma(I)$

$R_{int} = 0.063$

Refinement

$R[F^2 > 2\sigma(F^2)] = 0.024$

$wR(F^2) = 0.060$

$S = 1.00$

2108 reflections

122 parameters

H-atom parameters constrained

$\Delta\rho_{max} = 0.52$ e Å^{-3}

$\Delta\rho_{min} = -0.65$ e Å^{-3}

Table 1

Hydrogen-bond geometry (Å, °).

D—H$\cdots$A	D—H	H$\cdots$A	$D\cdots$A	D—H$\cdots$A
C6—H6$\cdots$Br2^i	0.93	2.86	3.739 (4)	158

Symmetry code: (i) $-x + 1, -y + 1, -z$.

Data collection: *SMART* (Bruker, 1999); cell refinement: *SAINT* (Bruker, 1999); data reduction: *SAINT*; program(s) used to solve structure: *SHELXTL* (Sheldrick, 2008); program(s) used to refine structure: *SHELXTL*; molecular graphics: *SHELXTL*; software used to prepare material for publication: *SHELXTL*.

References

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supporting information

Di-*μ*₂-bromido-bis[bromido(*η*⁶-1,2,4,5-tetramethylbenzene)ruthenium(II)]

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S1. Comment

In continuation of our studies of ruthenium arene complexes (Díaz Camacho *et al.* 2008; Cerón-Camacho *et al.* 2006; González-Torres, *et al.* 2009), we present here the title compound (I).

The asymmetric unit of (I) consists of a half molecule, which is completed with a symmetry operation of 1 - *x*, 1 - *y*, 1 - *z* (Fig. 1). The bond lengths and angles in *η*⁶ - tetramethylbenzene fragment are in accordance with those observed in similar structures (González-Torres *et al.*, 2009 and references therein). Complex (I) exhibits a typical *η*⁶ - arene coordination of the tetramethylbenzene fragment to the ruthenium dinuclear structure bridged by two bromines and completing the coordination sphere two bromines one for each ruthenium atom arranged in a *trans* geometry. The *η*⁶ - arene fragment and the metal coordination center bridge (Br2—Ru—Br2 symmetry related) form a dihedral angle of 55.99 (8)°.

In the crystal structure, the molecules are linked by weak C—H···Br interaction (Table 1) into chains along direction [001].

S2. Experimental

The title compound was prepared according to the procedure reported by Bennett *et al.* (1982). Spectroscopic analysis agreed with that reported in the same reference.

S3. Refinement

C-bound H atoms were placed in geometrically idealized positions (C—H 0.93-0.96 Å), and refined as riding, with $U_{iso}(H) = 1.2-1.5 \, U_{eq}$ (C).
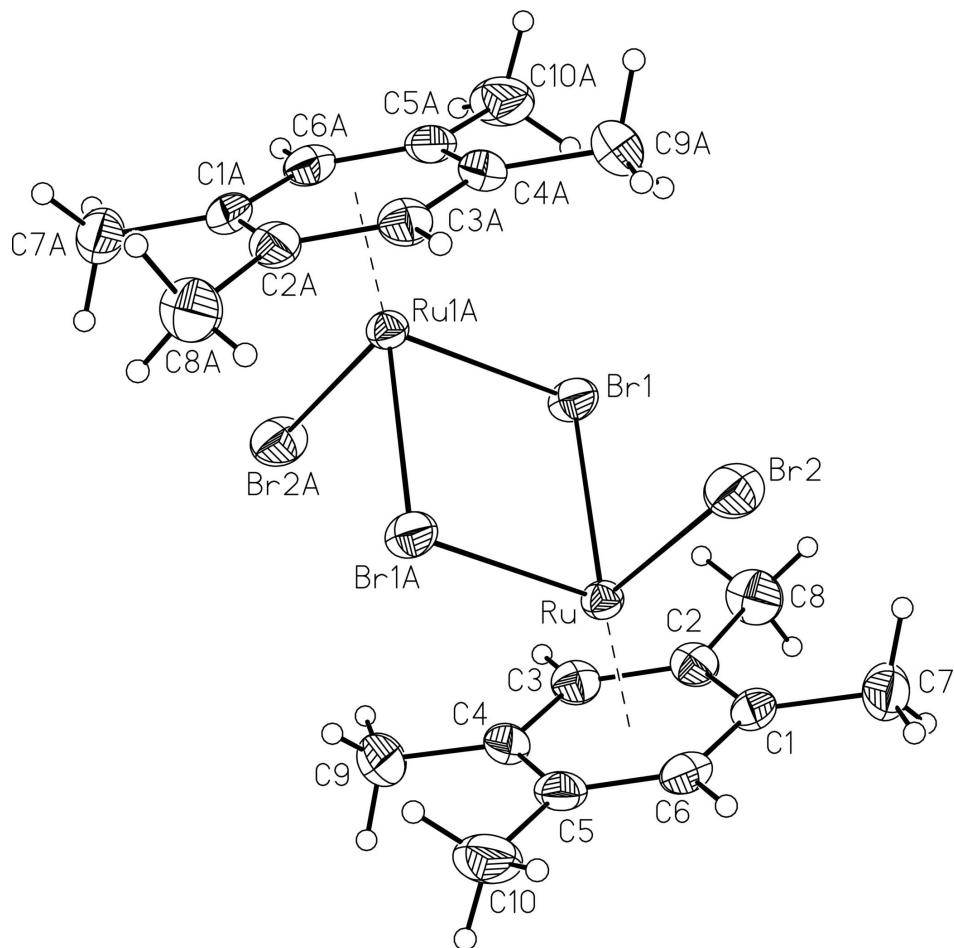
Figure 1

Molecular structure of (I) showing the atomic numbering and 40% probability displacement ellipsoids [symmetry code: (A) 1 - x, 1 - y, 1 - z].

Di-μ_2-bromido-bis[bromido(η^6-1,2,4,5-tetramethylbenzene)ruthenium(II)]

Crystal data

[Ru$_2$Br$_4$(C$_{10}$H$_{14}$)$_2$]	$Z = 1$
$M_r = 790.20$	$F(000) = 376$
Triclinic, $P\bar{1}$	$D_x = 2.259$ Mg m^{-3}
Hall symbol: -P 1	Mo $K\alpha$ radiation, $\lambda = 0.71073$ Å
$a = 7.8866$ (13) Å	Cell parameters from 3668 reflections
$b = 8.2873$ (14) Å	$\theta = 2.6–25.4°$
$c = 9.8627$ (17) Å	$\mu = 8.18$ mm^{-1}
$\alpha = 88.335$ (2)°	$T = 298$ K
$\beta = 74.508$ (2)°	Prism, red
$\gamma = 69.648$ (2)°	0.35 × 0.15 × 0.12 mm
$V = 580.96$ (17) Å^3	

Data collection

Bruker SMART CCD area-detector diffractometer	4786 measured reflections
Radiation source: fine-focus sealed tube	2108 independent reflections
Graphite monochromator	1878 reflections with $I > 2\sigma(I)$
Detector resolution: 0.83 pixels mm^{-1}	$R_{int} = 0.063$
ω scans	$\theta_{max} = 25.4°$, $\theta_{min} = 2.2°$
Absorption correction: face indexed-numerical (*SHELXTL*; Sheldrick, 2008)	$h = -9 \rightarrow 9$
	$k = -9 \rightarrow 9$
$T_{min} = 0.139$, $T_{max} = 0.478$	$l = -11 \rightarrow 11$

Refinement

Refinement on F^2	Secondary atom site location: difference Fourier map
Least-squares matrix: full	
$R[F^2 > 2\sigma(F^2)] = 0.024$	Hydrogen site location: inferred from neighbouring sites
$wR(F^2) = 0.060$	
$S = 1.00$	H-atom parameters constrained
2108 reflections	$w = 1/[\sigma^2(F_o^2) + (0.0227P)^2]$
122 parameters	where $P = (F_o^2 + 2F_c^2)/3$
0 restraints	$(\Delta/\sigma)_{max} = 0.001$
Primary atom site location: structure-invariant direct methods	$\Delta\rho_{max} = 0.52$ e Å^{-3}
	$\Delta\rho_{min} = -0.65$ e Å^{-3}

Special details

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

Refinement. Refinement of F^2 against ALL reflections. The weighted R-factor wR and goodness of fit S are based on F^2, conventional R-factors R are based on F, with F set to zero for negative F^2. The threshold expression of $F^2 > \sigma(F^2)$ is used only for calculating R-factors(gt) *etc*. and is not relevant to the choice of reflections for refinement. R-factors based on F^2 are statistically about twice as large as those based on F, and R- factors based on ALL data will be even larger.

Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å^2)

	x	y	z	$U_{iso}*/U_{eq}$
Ru	0.63750 (4)	0.49125 (3)	0.30491 (3)	0.02810 (10)
Br1	0.64758 (5)	0.29795 (4)	0.51434 (4)	0.04089 (12)
Br2	0.41130 (6)	0.36687 (6)	0.24801 (4)	0.05137 (14)
C1	0.8371 (5)	0.3925 (4)	0.0980 (4)	0.0367 (8)
C2	0.9352 (5)	0.3568 (4)	0.2017 (4)	0.0379 (8)
C3	0.9134 (5)	0.4943 (4)	0.2952 (4)	0.0377 (8)
H3	0.9789	0.4699	0.3634	0.045*
C4	0.7972 (5)	0.6654 (4)	0.2891 (4)	0.0407 (9)
C5	0.6944 (5)	0.7014 (4)	0.1860 (4)	0.0396 (9)
C6	0.7172 (5)	0.5650 (5)	0.0931 (4)	0.0389 (8)
H6	0.6507	0.5888	0.0255	0.047*
C7	0.8478 (6)	0.2543 (5)	−0.0040 (4)	0.0546 (11)
H7A	0.7734	0.3062	−0.0672	0.082*
H7B	0.8006	0.1717	0.0475	0.082*
H7C	0.9762	0.1974	−0.0572	0.082*
C8	1.0565 (6)	0.1754 (5)	0.2196 (5)	0.0557 (11)

H8A	1.1764	0.1450	0.1505	0.084*
H8B	0.9959	0.0967	0.2073	0.084*
H8C	1.0744	0.1692	0.3124	0.084*
C9	0.7843 (7)	0.8028 (5)	0.3909 (5)	0.0620 (12)
H9A	0.8514	0.7506	0.4584	0.093*
H9B	0.6547	0.8639	0.4392	0.093*
H9C	0.8385	0.8818	0.3405	0.093*
C10	0.5588 (7)	0.8778 (5)	0.1774 (5)	0.0629 (13)
H10A	0.4830	0.8707	0.1176	0.094*
H10B	0.6271	0.9520	0.1389	0.094*
H10C	0.4792	0.9236	0.2700	0.094*

Atomic displacement parameters (Å^2)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Ru	0.02570 (16)	0.02940 (16)	0.02784 (16)	−0.01036 (12)	−0.00439 (11)	0.00292 (10)
Br1	0.0380 (2)	0.0341 (2)	0.0370 (2)	−0.00366 (16)	−0.00100 (16)	0.00683 (15)
Br2	0.0483 (3)	0.0736 (3)	0.0462 (2)	−0.0382 (2)	−0.0134 (2)	0.00497 (19)
C1	0.0333 (19)	0.0419 (19)	0.0313 (18)	−0.0173 (16)	0.0031 (15)	−0.0009 (15)
C2	0.0252 (17)	0.0367 (19)	0.045 (2)	−0.0104 (15)	0.0003 (15)	0.0011 (15)
C3	0.0300 (19)	0.045 (2)	0.042 (2)	−0.0177 (16)	−0.0095 (16)	0.0051 (16)
C4	0.045 (2)	0.0378 (19)	0.040 (2)	−0.0241 (17)	−0.0011 (17)	0.0014 (15)
C5	0.039 (2)	0.0362 (18)	0.040 (2)	−0.0169 (17)	−0.0010 (16)	0.0090 (15)
C6	0.041 (2)	0.049 (2)	0.0294 (17)	−0.0213 (18)	−0.0081 (16)	0.0099 (15)
C7	0.056 (3)	0.060 (3)	0.047 (2)	−0.029 (2)	0.001 (2)	−0.013 (2)
C8	0.038 (2)	0.046 (2)	0.069 (3)	−0.0035 (19)	−0.007 (2)	0.002 (2)
C9	0.084 (3)	0.057 (2)	0.056 (3)	−0.045 (3)	−0.008 (2)	−0.006 (2)
C10	0.066 (3)	0.043 (2)	0.065 (3)	−0.013 (2)	−0.006 (2)	0.021 (2)

Geometric parameters (Å, º)

Ru—C6	2.150 (3)	C4—C5	1.427 (5)
Ru—C3	2.161 (4)	C4—C9	1.498 (5)
Ru—C5	2.180 (4)	C5—C6	1.408 (5)
Ru—C2	2.182 (3)	C5—C10	1.497 (5)
Ru—C1	2.191 (3)	C6—H6	0.9300
Ru—C4	2.200 (4)	C7—H7A	0.9600
Ru—Br2	2.5313 (6)	C7—H7B	0.9600
Ru—Br1^i	2.5676 (5)	C7—H7C	0.9600
Ru—Br1	2.5780 (5)	C8—H8A	0.9600
Br1—Ru^i	2.5676 (5)	C8—H8B	0.9600
C1—C2	1.407 (5)	C8—H8C	0.9600
C1—C6	1.421 (5)	C9—H9A	0.9600
C1—C7	1.511 (5)	C9—H9B	0.9600
C2—C3	1.421 (5)	C9—H9C	0.9600
C2—C8	1.510 (5)	C10—H10A	0.9600
C3—C4	1.406 (5)	C10—H10B	0.9600
C3—H3	0.9300	C10—H10C	0.9600

C6—Ru—C3	79.89 (15)	C4—C3—C2	122.8 (3)
C6—Ru—C5	37.93 (13)	C4—C3—Ru	72.7 (2)
C3—Ru—C5	68.14 (14)	C2—C3—Ru	71.7 (2)
C6—Ru—C2	68.16 (14)	C4—C3—H3	118.6
C3—Ru—C2	38.18 (13)	C2—C3—H3	118.6
C5—Ru—C2	81.73 (14)	Ru—C3—H3	129.7
C6—Ru—C1	38.21 (14)	C3—C4—C5	118.3 (3)
C3—Ru—C1	68.06 (13)	C3—C4—C9	119.3 (4)
C5—Ru—C1	69.31 (13)	C5—C4—C9	122.4 (3)
C2—Ru—C1	37.53 (14)	C3—C4—Ru	69.7 (2)
C6—Ru—C4	68.13 (14)	C5—C4—Ru	70.2 (2)
C3—Ru—C4	37.60 (13)	C9—C4—Ru	131.5 (3)
C5—Ru—C4	38.01 (14)	C6—C5—C4	118.6 (3)
C2—Ru—C4	69.00 (13)	C6—C5—C10	119.3 (4)
C1—Ru—C4	81.45 (13)	C4—C5—C10	122.0 (4)
C6—Ru—Br2	92.41 (11)	C6—C5—Ru	69.9 (2)
C3—Ru—Br2	154.25 (9)	C4—C5—Ru	71.7 (2)
C5—Ru—Br2	119.06 (11)	C10—C5—Ru	128.2 (3)
C2—Ru—Br2	116.19 (10)	C5—C6—C1	122.9 (3)
C1—Ru—Br2	90.67 (10)	C5—C6—Ru	72.2 (2)
C4—Ru—Br2	157.03 (10)	C1—C6—Ru	72.4 (2)
C6—Ru—Br1i	119.11 (10)	C5—C6—H6	118.5
C3—Ru—Br1i	118.25 (9)	C1—C6—H6	118.5
C5—Ru—Br1i	92.02 (9)	Ru—C6—H6	129.5
C2—Ru—Br1i	156.13 (10)	C1—C7—H7A	109.5
C1—Ru—Br1i	157.12 (10)	C1—C7—H7B	109.5
C4—Ru—Br1i	91.93 (9)	H7A—C7—H7B	109.5
Br2—Ru—Br1i	87.02 (2)	C1—C7—H7C	109.5
C6—Ru—Br1	158.03 (10)	H7A—C7—H7C	109.5
C3—Ru—Br1	90.73 (10)	H7B—C7—H7C	109.5
C5—Ru—Br1	152.74 (10)	C2—C8—H8A	109.5
C2—Ru—Br1	92.20 (10)	C2—C8—H8B	109.5
C1—Ru—Br1	119.82 (10)	H8A—C8—H8B	109.5
C4—Ru—Br1	115.15 (10)	C2—C8—H8C	109.5
Br2—Ru—Br1	87.508 (18)	H8A—C8—H8C	109.5
Br1i—Ru—Br1	82.838 (17)	H8B—C8—H8C	109.5
Rui—Br1—Ru	97.162 (17)	C4—C9—H9A	109.5
C2—C1—C6	118.3 (3)	C4—C9—H9B	109.5
C2—C1—C7	122.8 (3)	H9A—C9—H9B	109.5
C6—C1—C7	118.8 (3)	C4—C9—H9C	109.5
C2—C1—Ru	70.89 (19)	H9A—C9—H9C	109.5
C6—C1—Ru	69.36 (18)	H9B—C9—H9C	109.5
C7—C1—Ru	129.3 (3)	C5—C10—H10A	109.5
C1—C2—C3	119.0 (3)	C5—C10—H10B	109.5
C1—C2—C8	121.6 (3)	H10A—C10—H10B	109.5
C3—C2—C8	119.3 (3)	C5—C10—H10C	109.5
C1—C2—Ru	71.58 (19)	H10A—C10—H10C	109.5

C3—C2—Ru	70.13 (19)	H10B—C10—H10C	109.5
C8—C2—Ru	128.1 (3)		
C6—Ru—Br1—Ru^{i}	−177.6 (3)	Ru—C3—C4—C5	−52.5 (3)
C3—Ru—Br1—Ru^{i}	118.39 (9)	C2—C3—C4—C9	−179.3 (4)
C5—Ru—Br1—Ru^{i}	80.4 (2)	Ru—C3—C4—C9	127.1 (4)
C2—Ru—Br1—Ru^{i}	156.56 (10)	C2—C3—C4—Ru	53.6 (3)
C1—Ru—Br1—Ru^{i}	−176.65 (12)	C6—Ru—C4—C3	−102.2 (2)
C4—Ru—Br1—Ru^{i}	88.77 (10)	C5—Ru—C4—C3	−132.1 (3)
Br2—Ru—Br1—Ru^{i}	−87.31 (2)	C2—Ru—C4—C3	−28.2 (2)
Br1^{i}—Ru—Br1—Ru^{i}	0.0	C1—Ru—C4—C3	−64.9 (2)
C6—Ru—C1—C2	131.8 (3)	Br2—Ru—C4—C3	−136.0 (2)
C3—Ru—C1—C2	29.9 (2)	Br1^{i}—Ru—C4—C3	137.1 (2)
C5—Ru—C1—C2	103.8 (2)	Br1—Ru—C4—C3	54.1 (2)
C4—Ru—C1—C2	66.5 (2)	C6—Ru—C4—C5	29.92 (19)
Br2—Ru—C1—C2	−135.2 (2)	C3—Ru—C4—C5	132.1 (3)
Br1^{i}—Ru—C1—C2	140.9 (2)	C2—Ru—C4—C5	103.9 (2)
Br1—Ru—C1—C2	−47.7 (2)	C1—Ru—C4—C5	67.2 (2)
C3—Ru—C1—C6	−101.9 (2)	Br2—Ru—C4—C5	−3.9 (4)
C5—Ru—C1—C6	−27.9 (2)	Br1^{i}—Ru—C4—C5	−90.81 (19)
C2—Ru—C1—C6	−131.8 (3)	Br1—Ru—C4—C5	−173.80 (16)
C4—Ru—C1—C6	−65.3 (2)	C6—Ru—C4—C9	146.2 (4)
Br2—Ru—C1—C6	93.0 (2)	C3—Ru—C4—C9	−111.6 (5)
Br1^{i}—Ru—C1—C6	9.1 (4)	C5—Ru—C4—C9	116.3 (5)
Br1—Ru—C1—C6	−179.45 (18)	C2—Ru—C4—C9	−139.8 (4)
C6—Ru—C1—C7	−111.0 (4)	C1—Ru—C4—C9	−176.5 (4)
C3—Ru—C1—C7	147.2 (4)	Br2—Ru—C4—C9	112.4 (4)
C5—Ru—C1—C7	−138.9 (4)	Br1^{i}—Ru—C4—C9	25.5 (4)
C2—Ru—C1—C7	117.2 (4)	Br1—Ru—C4—C9	−57.5 (4)
C4—Ru—C1—C7	−176.3 (4)	C3—C4—C5—C6	−1.4 (5)
Br2—Ru—C1—C7	−17.9 (3)	C9—C4—C5—C6	179.0 (3)
Br1^{i}—Ru—C1—C7	−101.9 (4)	Ru—C4—C5—C6	−53.7 (3)
Br1—Ru—C1—C7	69.6 (4)	C3—C4—C5—C10	176.4 (4)
C6—C1—C2—C3	−1.2 (5)	C9—C4—C5—C10	−3.2 (6)
C7—C1—C2—C3	−178.6 (3)	Ru—C4—C5—C10	124.1 (4)
Ru—C1—C2—C3	−53.6 (3)	C3—C4—C5—Ru	52.3 (3)
C6—C1—C2—C8	176.3 (4)	C9—C4—C5—Ru	−127.3 (4)
C7—C1—C2—C8	−1.1 (6)	C3—Ru—C5—C6	102.0 (2)
Ru—C1—C2—C8	123.9 (4)	C2—Ru—C5—C6	64.8 (2)
C6—C1—C2—Ru	52.4 (3)	C1—Ru—C5—C6	28.1 (2)
C7—C1—C2—Ru	−125.0 (4)	C4—Ru—C5—C6	131.1 (3)
C6—Ru—C2—C1	−29.8 (2)	Br2—Ru—C5—C6	−50.6 (2)
C3—Ru—C2—C1	−131.6 (3)	Br1^{i}—Ru—C5—C6	−138.3 (2)
C5—Ru—C2—C1	−66.6 (2)	Br1—Ru—C5—C6	143.5 (2)
C4—Ru—C2—C1	−103.8 (2)	C6—Ru—C5—C4	−131.1 (3)
Br2—Ru—C2—C1	51.8 (2)	C3—Ru—C5—C4	−29.2 (2)
Br1^{i}—Ru—C2—C1	−142.7 (2)	C2—Ru—C5—C4	−66.3 (2)
Br1—Ru—C2—C1	140.1 (2)	C1—Ru—C5—C4	−103.0 (2)

C6—Ru—C2—C3	101.8 (2)	Br2—Ru—C5—C4	178.27 (16)
C5—Ru—C2—C3	64.9 (2)	Br1^i—Ru—C5—C4	90.55 (19)
C1—Ru—C2—C3	131.6 (3)	Br1—Ru—C5—C4	12.3 (3)
C4—Ru—C2—C3	27.8 (2)	C6—Ru—C5—C10	112.1 (5)
Br2—Ru—C2—C3	−176.69 (17)	C3—Ru—C5—C10	−146.0 (4)
Br1^i—Ru—C2—C3	−11.2 (4)	C2—Ru—C5—C10	176.9 (4)
Br1—Ru—C2—C3	−88.4 (2)	C1—Ru—C5—C10	140.2 (4)
C6—Ru—C2—C8	−146.0 (4)	C4—Ru—C5—C10	−116.8 (4)
C3—Ru—C2—C8	112.3 (4)	Br2—Ru—C5—C10	61.5 (4)
C5—Ru—C2—C8	177.2 (4)	Br1^i—Ru—C5—C10	−26.2 (4)
C1—Ru—C2—C8	−116.2 (4)	Br1—Ru—C5—C10	−104.5 (4)
C4—Ru—C2—C8	140.0 (4)	C4—C5—C6—C1	0.4 (5)
Br2—Ru—C2—C8	−64.4 (4)	C10—C5—C6—C1	−177.4 (4)
Br1^i—Ru—C2—C8	101.1 (4)	Ru—C5—C6—C1	−54.1 (3)
Br1—Ru—C2—C8	23.9 (3)	C4—C5—C6—Ru	54.6 (3)
C1—C2—C3—C4	0.2 (5)	C10—C5—C6—Ru	−123.3 (4)
C8—C2—C3—C4	−177.4 (4)	C2—C1—C6—C5	0.9 (5)
Ru—C2—C3—C4	−54.1 (3)	C7—C1—C6—C5	178.4 (3)
C1—C2—C3—Ru	54.3 (3)	Ru—C1—C6—C5	54.0 (3)
C8—C2—C3—Ru	−123.3 (3)	C2—C1—C6—Ru	−53.1 (3)
C6—Ru—C3—C4	67.1 (2)	C7—C1—C6—Ru	124.4 (3)
C5—Ru—C3—C4	29.5 (2)	C3—Ru—C6—C5	−67.3 (2)
C2—Ru—C3—C4	134.5 (3)	C2—Ru—C6—C5	−105.2 (2)
C1—Ru—C3—C4	105.1 (2)	C1—Ru—C6—C5	−134.5 (3)
Br2—Ru—C3—C4	141.4 (2)	C4—Ru—C6—C5	−30.0 (2)
Br1^i—Ru—C3—C4	−50.6 (2)	Br2—Ru—C6—C5	137.5 (2)
Br1—Ru—C3—C4	−132.8 (2)	Br1^i—Ru—C6—C5	49.5 (2)
C6—Ru—C3—C2	−67.4 (2)	Br1—Ru—C6—C5	−133.2 (2)
C5—Ru—C3—C2	−105.0 (2)	C3—Ru—C6—C1	67.2 (2)
C1—Ru—C3—C2	−29.4 (2)	C5—Ru—C6—C1	134.5 (3)
C4—Ru—C3—C2	−134.5 (3)	C2—Ru—C6—C1	29.3 (2)
Br2—Ru—C3—C2	6.9 (4)	C4—Ru—C6—C1	104.5 (2)
Br1^i—Ru—C3—C2	174.90 (17)	Br2—Ru—C6—C1	−88.0 (2)
Br1—Ru—C3—C2	92.6 (2)	Br1^i—Ru—C6—C1	−175.95 (18)
C2—C3—C4—C5	1.1 (5)	Br1—Ru—C6—C1	1.3 (4)

Symmetry code: (i) −*x*+1, −*y*+1, −*z*+1.

Hydrogen-bond geometry (Å, º)

D—H···A	D—H	H···A	D···A	D—H···A
C6—H6···Br2^{ii}	0.93	2.86	3.739 (4)	158

Symmetry code: (ii) −*x*+1, −*y*+1, −*z*.