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(*N*-Benzoyl-*N*-phenylhydroxylaminato)carbonyl(triphenylarsine)rhodium(I)

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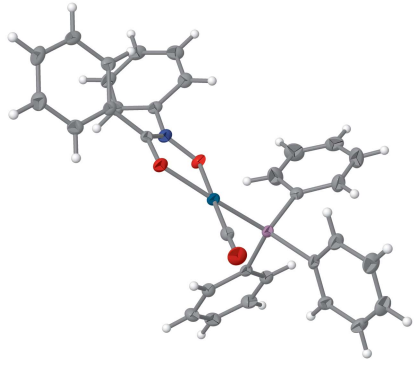
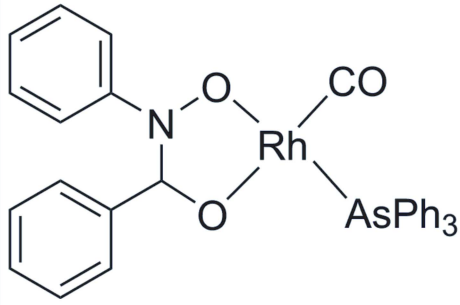
Structural data: full structural data are available from iucrdata.iucr.org

The molecule of the title compound, [Rh($C_{13}H_{10}NO_2$){As(C_6H_5)$_3$}(CO)] or [Rh(BPHA)($AsPh_3$)(CO)] (BPHA is the *N*-benzoyl-*N*-phenylhydroxylaminate anion), comprises a bidentate *N*-benzoyl-*N*-phenylhydroxylaminate anion coordinating through the O atoms to the soft Lewis acid, rhodium(I), and two monodentate ligands, *viz*. triphenylarsine and carbonyl. The resulting CO_2As coordination environment around the central Rh^I atom is distorted square planar.=

3D view



Chemical scheme



Structure description

The title complex, [Rh(BPHA)($AsPh_3$)(CO)], is composed of an *O*,*O*-bidentate *N*-benzoyl-*N*-phenylhydroxylaminate anion, a carbonyl ligand and a monodentate triphenylarsine ligand, all coordinating to the soft rhodium(I) metal atom (Fig. 1 and Table 1). The crystal structure is isotypic with that of [Rh(BPHA)(PPh_3)(CO)] and shows similar Rh—O and Rh—C bond lengths (2.037/2.089 and 1.809 Å, respectively; Leipoldt & Grobler, 1982). The coordination environment in the molecule of [Rh(BPHA)-($AsPh_3$)(CO)] is distorted square planar, as shown by the small O1—Rh—O2 bite angle of 79.53 (7)°, which is similar to the bite angles of related structures with *O*,*O*-binding five-membered chelate rings reported in the literature (Elmakki *et al.*, 2017). The C02—Rh—O2 and C02—Rh—O1 angles involving the C02≡O02 carbonyl ligand were also found to deviate from ideal values, at 99.31 (9) and 178.39 (10)°, respectively, similar to those of related structures (Elmakki *et al.*, 2016).

The crystal packing is dominated by van der Waals interactions (Fig. 2).

Synthesis and crystallization

A stepwise process was pursued in the complexation of the rhodium metal atom by the bidentate *N*-phenyl-*N*-benzoylhydroxylaminate anion. First, $[RhCl(CO)_2]_2$ was prepared

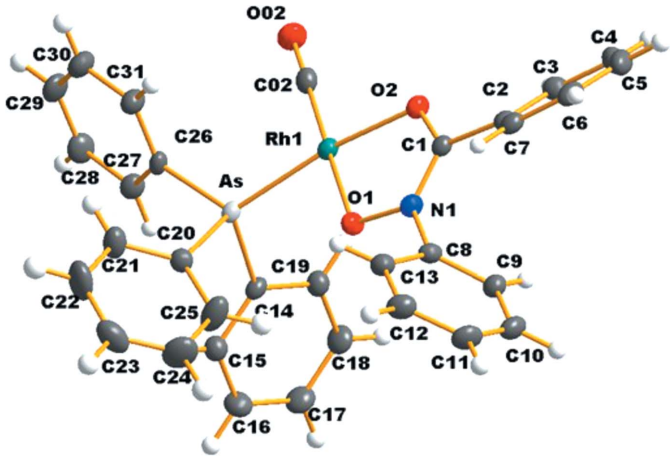


Figure 1
The molecular structure of the title compound, showing atoms with displacement ellipsoids at the 50% probability level.

in situ by heating $RhCl_3{\cdot}3H_2O$ in 5 ml of dimethylformamide under reflux for 30 min, followed by addition of the bidentate ligand to the reaction mixture, which then resulted in the formation of a dicarbonylrhodium species, $[Rh(BPHA)(CO)_2]$ (Leipoldt & Grobler, 1982). $Rh(BPHA)(CO)_2]$ (65 mg) was then dissolved in 5 ml of acetone. Triphenylarsine ($AsPh_3$; 70 mg) was added to the reaction mixture under stirring, resulting in the immediate evolution of CO gas. The reaction mixture was then left to crystallize, resulting in the formation of yellow crystals suitable for X-ray analysis.

Refinement

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

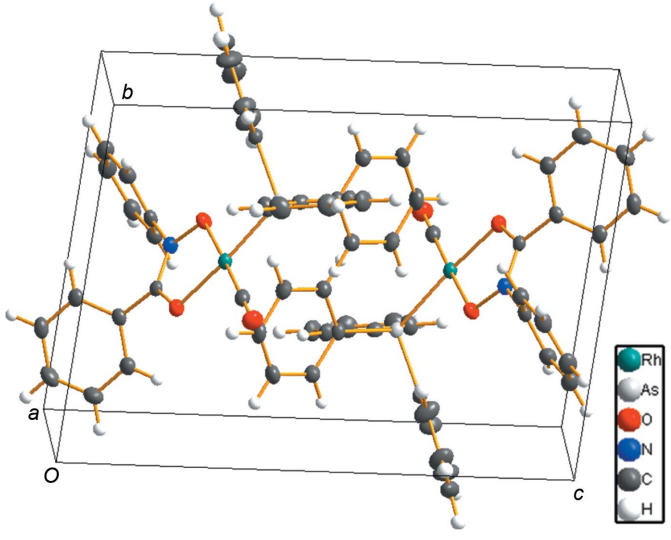


Figure 2
An illustration of the molecular packing in the unit cell of [Rh(BPHA)-(CO)($AsPh_3$)], viewed approximately along the *a* axis; atom labels have been omitted for clarity.

Table 1
Selected bond lengths (Å).

Rh1—As	2.3337 (4)	Rh1—O1	2.0338 (18)
Rh1—O2	2.0682 (17)	Rh1—C02	1.813 (3)

Table 2
Experimental details.

Crystal data	
Chemical formula	$[Rh(C_{13}H_{10}NO_2)(C_{18}H_{15}As)(CO)]$
M_r	649.36
Crystal system, space group	Triclinic, $P\overline{1}$
Temperature (K)	100
a, *b*, *c* (Å)	9.5178 (17), 10.1995 (19), 14.589 (2)
α, β, γ (°)	81.516 (6), 83.142 (6), 72.351 (7)
V (Å^3)	1330.7 (4)
Z	2
Radiation type	Mo $K\alpha$
μ (mm^{-1})	1.91
Crystal size (mm)	0.21 × 0.13 × 0.03
Data collection	
Diffractometer	Bruker APEXII CCD
Absorption correction	Multi-scan (*SADABS*; Krause *et al.*, 2015)
T_{min}, T_{max}	0.634, 0.746
No. of measured, independent and observed [$I > 2\sigma(I)$] reflections	38485, 6425, 5747
R_{int}	0.065
(sin $\theta/\lambda)_{max}$ (Å^{-1})	0.660
Refinement	
$R[F^2 > 2\sigma(F^2)]$, $wR(F^2)$, S	0.030, 0.074, 1.07
No. of reflections	6425
No. of parameters	343
H-atom treatment	H-atom parameters constrained
$\Delta\rho_{max}$, $\Delta\rho_{min}$ (e Å^{-3})	1.14, −0.61

Computer programs: *APEX2* and *SAINT* (Bruker, 2012), *SHELXS* (Sheldrick, 2008), *SHELXL* (Sheldrick, 2015), *OLEX2* (Dolomanov *et al.*, 2009) and *DIAMOND* (Brandenburg & Putz, 2005).

Acknowledgements

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full crystallographic data

IUCrData (2023). **8**, x230355 [https://doi.org/10.1107/S2414314623003553]

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Crystal data

$[Rh(C_{13}H_{10}NO_2)(C_{18}H_{15}As)(CO)]$
M_r = 649.36
Triclinic, $P\overline{1}$
a = 9.5178 (17) Å
b = 10.1995 (19) Å
c = 14.589 (2) Å
α = 81.516 (6)°
β = 83.142 (6)°
γ = 72.351 (7)°
V = 1330.7 (4) Å^3
Z = 2
$F(000)$ = 652
D_x = 1.621 Mg m^{-3}
Mo $K\alpha$ radiation, λ = 0.71073 Å
Cell parameters from 9339 reflections
θ = 2.3–28.3°
μ = 1.91 mm^{-1}
T = 100 K
Plate, yellow
0.21 × 0.13 × 0.03 mm

Data collection

Bruker APEXII CCD diffractometer
φ and ω scans
Absorption correction: multi-scan (SADABS; Krause *et al.*, 2015)
T_{min} = 0.634, T_{max} = 0.746
38485 measured reflections
6425 independent reflections
5747 reflections with $I > 2\sigma(I)$
R_{int} = 0.065
θ_{max} = 28.0°, θ_{min} = 2.1°
h = −12→12
k = −13→13
l = −19→19

Refinement

Refinement on F^2
Least-squares matrix: full
$R[F^2 > 2\sigma(F^2)]$ = 0.030
$wR(F^2)$ = 0.074
S = 1.07
6425 reflections
343 parameters
0 restraints
Hydrogen site location: inferred from neighbouring sites
H-atom parameters constrained
$w = 1/[\sigma^2(F_o^2) + (0.0141P)^2 + 1.8613P]$ where $P = (F_o^2 + 2F_c^2)/3$
$(\Delta/\sigma)_{max}$ = 0.002
$\Delta\rho_{max}$ = 1.14 e Å^{-3}
$\Delta\rho_{min}$ = −0.61 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}
Rh1	0.25715 (2)	0.53736 (2)	0.27266 (2)	0.01779 (6)
As	0.12957 (3)	0.72691 (2)	0.35181 (2)	0.01699 (6)
O2	0.39711 (19)	0.38301 (18)	0.19949 (12)	0.0210 (4)
O1	0.42339 (19)	0.62308 (18)	0.22612 (13)	0.0217 (4)
O02	0.0140 (2)	0.4121 (2)	0.33366 (15)	0.0313 (4)
N1	0.5303 (2)	0.5365 (2)	0.17371 (15)	0.0207 (4)
C1	0.5119 (3)	0.4183 (2)	0.15914 (16)	0.0169 (4)
C26	−0.0798 (3)	0.7588 (2)	0.38511 (18)	0.0197 (5)
C8	0.6478 (3)	0.5925 (3)	0.13234 (17)	0.0198 (5)
C14	0.2129 (3)	0.7244 (3)	0.46672 (17)	0.0189 (5)
C20	0.1411 (3)	0.9043 (3)	0.28753 (17)	0.0207 (5)
C15	0.2025 (3)	0.8463 (3)	0.50321 (19)	0.0241 (5)
H15	0.1470	0.9331	0.4741	0.029*
C7	0.6819 (3)	0.3597 (3)	0.01447 (18)	0.0212 (5)
H7	0.6631	0.4551	−0.0082	0.025*
C27	−0.1418 (3)	0.7798 (3)	0.47479 (19)	0.0237 (5)
H27	−0.0816	0.7815	0.5218	0.028*
C13	0.6118 (3)	0.7151 (3)	0.07297 (19)	0.0241 (5)
H13	0.5113	0.7637	0.0637	0.029*
C2	0.6182 (3)	0.3193 (3)	0.10122 (17)	0.0190 (5)
C19	0.2907 (3)	0.5971 (3)	0.51116 (18)	0.0237 (5)
H19	0.2958	0.5138	0.4873	0.028*
C02	0.1092 (3)	0.4594 (3)	0.31095 (18)	0.0224 (5)
C6	0.7729 (3)	0.2591 (3)	−0.03845 (19)	0.0250 (5)
H6	0.8153	0.2862	−0.0978	0.030*
C28	−0.2931 (3)	0.7983 (3)	0.4956 (2)	0.0304 (6)
H28	−0.3356	0.8119	0.5570	0.036*
C9	0.7931 (3)	0.5246 (3)	0.15114 (19)	0.0232 (5)
H9	0.8160	0.4439	0.1950	0.028*
C3	0.6475 (3)	0.1796 (3)	0.13401 (19)	0.0247 (5)
H3	0.6039	0.1518	0.1928	0.030*
C18	0.3607 (3)	0.5920 (3)	0.59044 (19)	0.0280 (6)
H18	0.4137	0.5054	0.6211	0.034*
C11	0.8703 (3)	0.6955 (3)	0.0429 (2)	0.0296 (6)
H11	0.9472	0.7295	0.0106	0.036*
C31	−0.1692 (3)	0.7556 (3)	0.3171 (2)	0.0268 (6)
H31	−0.1268	0.7393	0.2559	0.032*
C12	0.7241 (3)	0.7658 (3)	0.0274 (2)	0.0290 (6)
H12	0.7011	0.8487	−0.0144	0.035*
C16	0.2733 (3)	0.8406 (3)	0.58217 (19)	0.0284 (6)
H16	0.2669	0.9234	0.6069	0.034*
C4	0.7403 (3)	0.0805 (3)	0.0812 (2)	0.0298 (6)
H4	0.7616	−0.0149	0.1044	0.036*
C10	0.9049 (3)	0.5768 (3)	0.1046 (2)	0.0275 (6)
H10	1.0053	0.5304	0.1155	0.033*

C17	0.3531 (3)	0.7141 (3)	0.6246 (2)	0.0301 (6)
H17	0.4033	0.7106	0.6779	0.036*
C5	0.8022 (3)	0.1204 (3)	−0.0057 (2)	0.0300 (6)
H5	0.8644	0.0523	−0.0423	0.036*
C29	−0.3810 (3)	0.7971 (3)	0.4275 (2)	0.0332 (6)
H29	−0.4841	0.8107	0.4420	0.040*
C25	0.2759 (3)	0.9299 (3)	0.2743 (2)	0.0390 (7)
H25	0.3614	0.8592	0.2938	0.047*
C24	0.2892 (4)	1.0577 (4)	0.2327 (2)	0.0417 (8)
H24	0.3829	1.0747	0.2256	0.050*
C21	0.0196 (3)	1.0048 (3)	0.2526 (2)	0.0324 (6)
H21	−0.0736	0.9871	0.2583	0.039*
C23	0.1672 (4)	1.1593 (3)	0.2019 (2)	0.0368 (7)
H23	0.1750	1.2480	0.1759	0.044*
C30	−0.3194 (3)	0.7760 (3)	0.3380 (2)	0.0340 (7)
H30	−0.3802	0.7755	0.2911	0.041*
C22	0.0335 (4)	1.1316 (3)	0.2091 (3)	0.0442 (8)
H22	−0.0499	1.1994	0.1841	0.053*

Atomic displacement parameters (Å²)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Rh1	0.01456 (9)	0.02186 (10)	0.01630 (10)	−0.00485 (7)	0.00038 (7)	−0.00246 (7)
As	0.01309 (12)	0.02045 (12)	0.01611 (13)	−0.00335 (9)	−0.00019 (9)	−0.00199 (9)
O2	0.0163 (8)	0.0257 (9)	0.0210 (9)	−0.0066 (7)	0.0018 (7)	−0.0040 (7)
O1	0.0176 (8)	0.0245 (9)	0.0235 (10)	−0.0066 (7)	0.0048 (7)	−0.0087 (7)
O02	0.0258 (10)	0.0340 (10)	0.0364 (12)	−0.0152 (8)	0.0031 (8)	−0.0022 (9)
N1	0.0172 (10)	0.0252 (10)	0.0200 (11)	−0.0067 (8)	0.0012 (8)	−0.0046 (8)
C1	0.0154 (11)	0.0209 (11)	0.0138 (11)	−0.0045 (9)	−0.0014 (8)	−0.0012 (8)
C26	0.0126 (10)	0.0187 (11)	0.0253 (13)	−0.0023 (8)	0.0003 (9)	−0.0014 (9)
C8	0.0196 (11)	0.0245 (12)	0.0178 (12)	−0.0091 (9)	0.0011 (9)	−0.0066 (9)
C14	0.0139 (11)	0.0261 (12)	0.0159 (12)	−0.0045 (9)	−0.0007 (9)	−0.0031 (9)
C20	0.0212 (12)	0.0222 (11)	0.0182 (12)	−0.0065 (9)	0.0007 (9)	−0.0019 (9)
C15	0.0234 (13)	0.0254 (12)	0.0220 (13)	−0.0053 (10)	−0.0005 (10)	−0.0033 (10)
C7	0.0176 (11)	0.0281 (12)	0.0190 (12)	−0.0074 (10)	−0.0039 (9)	−0.0023 (9)
C27	0.0212 (12)	0.0280 (13)	0.0215 (13)	−0.0086 (10)	0.0014 (10)	−0.0014 (10)
C13	0.0223 (12)	0.0258 (12)	0.0260 (14)	−0.0085 (10)	−0.0019 (10)	−0.0056 (10)
C2	0.0144 (11)	0.0244 (12)	0.0191 (12)	−0.0053 (9)	−0.0025 (9)	−0.0056 (9)
C19	0.0224 (12)	0.0245 (12)	0.0218 (13)	−0.0039 (10)	−0.0005 (10)	−0.0024 (10)
C02	0.0218 (12)	0.0228 (12)	0.0191 (13)	−0.0018 (10)	−0.0015 (10)	−0.0019 (9)
C6	0.0183 (12)	0.0381 (14)	0.0191 (13)	−0.0076 (11)	−0.0006 (10)	−0.0074 (10)
C28	0.0236 (13)	0.0376 (15)	0.0277 (15)	−0.0089 (11)	0.0093 (11)	−0.0058 (12)
C9	0.0202 (12)	0.0259 (12)	0.0235 (13)	−0.0059 (10)	−0.0029 (10)	−0.0042 (10)
C3	0.0257 (13)	0.0275 (13)	0.0218 (13)	−0.0086 (10)	−0.0020 (10)	−0.0038 (10)
C18	0.0286 (14)	0.0314 (13)	0.0204 (14)	−0.0045 (11)	−0.0044 (11)	0.0010 (10)
C11	0.0248 (13)	0.0402 (15)	0.0294 (15)	−0.0187 (12)	0.0039 (11)	−0.0069 (12)
C31	0.0197 (12)	0.0335 (14)	0.0267 (14)	−0.0051 (10)	−0.0008 (10)	−0.0087 (11)
C12	0.0314 (14)	0.0333 (14)	0.0258 (15)	−0.0154 (12)	−0.0009 (11)	−0.0023 (11)

C16	0.0336 (15)	0.0320 (14)	0.0210 (14)	−0.0097 (12)	−0.0012 (11)	−0.0083 (11)
C4	0.0307 (14)	0.0233 (12)	0.0339 (16)	−0.0036 (11)	−0.0030 (12)	−0.0074 (11)
C10	0.0185 (12)	0.0381 (15)	0.0286 (15)	−0.0095 (11)	0.0004 (10)	−0.0115 (11)
C17	0.0311 (15)	0.0407 (16)	0.0190 (14)	−0.0101 (12)	−0.0046 (11)	−0.0040 (11)
C5	0.0222 (13)	0.0328 (14)	0.0337 (16)	−0.0007 (11)	−0.0025 (11)	−0.0153 (12)
C29	0.0153 (12)	0.0405 (16)	0.0431 (18)	−0.0075 (11)	0.0029 (12)	−0.0081 (13)
C25	0.0228 (14)	0.0416 (17)	0.048 (2)	−0.0094 (12)	−0.0029 (13)	0.0112 (14)
C24	0.0386 (17)	0.0452 (18)	0.046 (2)	−0.0252 (15)	0.0003 (15)	0.0052 (15)
C21	0.0230 (13)	0.0269 (13)	0.0418 (18)	−0.0032 (11)	0.0029 (12)	0.0005 (12)
C23	0.0518 (19)	0.0258 (13)	0.0319 (17)	−0.0152 (13)	0.0118 (14)	−0.0041 (12)
C30	0.0199 (13)	0.0419 (16)	0.0415 (18)	−0.0075 (12)	−0.0050 (12)	−0.0101 (13)
C22	0.0405 (18)	0.0228 (14)	0.058 (2)	0.0006 (13)	0.0035 (16)	0.0053 (14)

Geometric parameters (Å, º)

Rh1—As	2.3337 (4)	C6—C5	1.379 (4)
Rh1—O2	2.0682 (17)	C28—H28	0.9500
Rh1—O1	2.0338 (18)	C28—C29	1.376 (4)
Rh1—C02	1.813 (3)	C9—H9	0.9500
As—C26	1.933 (2)	C9—C10	1.395 (4)
As—C14	1.932 (2)	C3—H3	0.9500
As—C20	1.939 (2)	C3—C4	1.386 (4)
O2—C1	1.301 (3)	C18—H18	0.9500
O1—N1	1.367 (3)	C18—C17	1.387 (4)
O02—C02	1.144 (3)	C11—H11	0.9500
N1—C1	1.319 (3)	C11—C12	1.387 (4)
N1—C8	1.437 (3)	C11—C10	1.375 (4)
C1—C2	1.479 (3)	C31—H31	0.9500
C26—C27	1.388 (4)	C31—C30	1.384 (4)
C26—C31	1.392 (4)	C12—H12	0.9500
C8—C13	1.387 (4)	C16—H16	0.9500
C8—C9	1.385 (4)	C16—C17	1.381 (4)
C14—C15	1.395 (3)	C4—H4	0.9500
C14—C19	1.393 (3)	C4—C5	1.391 (4)
C20—C25	1.371 (4)	C10—H10	0.9500
C20—C21	1.384 (4)	C17—H17	0.9500
C15—H15	0.9500	C5—H5	0.9500
C15—C16	1.388 (4)	C29—H29	0.9500
C7—H7	0.9500	C29—C30	1.385 (4)
C7—C2	1.397 (4)	C25—H25	0.9500
C7—C6	1.391 (4)	C25—C24	1.390 (4)
C27—H27	0.9500	C24—H24	0.9500
C27—C28	1.395 (4)	C24—C23	1.371 (5)
C13—H13	0.9500	C21—H21	0.9500
C13—C12	1.385 (4)	C21—C22	1.391 (4)
C2—C3	1.389 (4)	C23—H23	0.9500
C19—H19	0.9500	C23—C22	1.374 (5)
C19—C18	1.390 (4)	C30—H30	0.9500

C6—H6	0.9500	C22—H22	0.9500
O2—Rh1—As	171.06 (5)	C29—C28—H28	119.8
O1—Rh1—As	91.66 (5)	C8—C9—H9	120.6
O1—Rh1—O2	79.53 (7)	C8—C9—C10	118.8 (2)
C02—Rh1—As	89.53 (8)	C10—C9—H9	120.6
C02—Rh1—O2	99.31 (9)	C2—C3—H3	119.9
C02—Rh1—O1	178.39 (10)	C4—C3—C2	120.2 (3)
C26—As—Rh1	118.78 (7)	C4—C3—H3	119.9
C26—As—C20	103.15 (10)	C19—C18—H18	120.1
C14—As—Rh1	112.68 (7)	C17—C18—C19	119.7 (3)
C14—As—C26	104.81 (11)	C17—C18—H18	120.1
C14—As—C20	100.97 (11)	C12—C11—H11	119.7
C20—As—Rh1	114.44 (8)	C10—C11—H11	119.7
C1—O2—Rh1	111.54 (15)	C10—C11—C12	120.6 (3)
N1—O1—Rh1	110.33 (13)	C26—C31—H31	119.9
O1—N1—C8	114.38 (19)	C30—C31—C26	120.3 (3)
C1—N1—O1	119.1 (2)	C30—C31—H31	119.9
C1—N1—C8	126.2 (2)	C13—C12—C11	119.9 (3)
O2—C1—N1	119.3 (2)	C13—C12—H12	120.0
O2—C1—C2	117.1 (2)	C11—C12—H12	120.0
N1—C1—C2	123.5 (2)	C15—C16—H16	120.1
C27—C26—As	122.12 (19)	C17—C16—C15	119.8 (3)
C27—C26—C31	119.6 (2)	C17—C16—H16	120.1
C31—C26—As	118.27 (19)	C3—C4—H4	119.9
C13—C8—N1	118.2 (2)	C3—C4—C5	120.2 (3)
C9—C8—N1	120.5 (2)	C5—C4—H4	119.9
C9—C8—C13	121.3 (2)	C9—C10—H10	119.9
C15—C14—As	121.74 (19)	C11—C10—C9	120.1 (3)
C19—C14—As	118.28 (19)	C11—C10—H10	119.9
C19—C14—C15	119.9 (2)	C18—C17—H17	119.6
C25—C20—As	118.6 (2)	C16—C17—C18	120.7 (3)
C25—C20—C21	118.7 (3)	C16—C17—H17	119.6
C21—C20—As	122.7 (2)	C6—C5—C4	119.7 (2)
C14—C15—H15	120.1	C6—C5—H5	120.1
C16—C15—C14	119.9 (2)	C4—C5—H5	120.1
C16—C15—H15	120.1	C28—C29—H29	120.0
C2—C7—H7	120.2	C28—C29—C30	120.1 (3)
C6—C7—H7	120.2	C30—C29—H29	120.0
C6—C7—C2	119.5 (2)	C20—C25—H25	119.5
C26—C27—H27	120.2	C20—C25—C24	121.0 (3)
C26—C27—C28	119.7 (3)	C24—C25—H25	119.5
C28—C27—H27	120.2	C25—C24—H24	120.0
C8—C13—H13	120.4	C23—C24—C25	120.0 (3)
C12—C13—C8	119.1 (3)	C23—C24—H24	120.0
C12—C13—H13	120.4	C20—C21—H21	119.9
C7—C2—C1	123.2 (2)	C20—C21—C22	120.3 (3)
C3—C2—C1	117.0 (2)	C22—C21—H21	119.9

C3—C2—C7	119.7 (2)	C24—C23—H23	120.3
C14—C19—H19	120.1	C24—C23—C22	119.5 (3)
C18—C19—C14	119.8 (2)	C22—C23—H23	120.3
C18—C19—H19	120.1	C31—C30—C29	120.0 (3)
O02—C02—Rh1	178.5 (2)	C31—C30—H30	120.0
C7—C6—H6	119.7	C29—C30—H30	120.0
C5—C6—C7	120.7 (3)	C21—C22—H22	119.8
C5—C6—H6	119.7	C23—C22—C21	120.3 (3)
C27—C28—H28	119.8	C23—C22—H22	119.8
C29—C28—C27	120.4 (3)		

Rh1—O2—C1—N1	4.4 (3)	C8—C9—C10—C11	1.5 (4)
Rh1—O2—C1—C2	−177.62 (16)	C14—C15—C16—C17	−0.4 (4)
Rh1—O1—N1—C1	1.5 (3)	C14—C19—C18—C17	−0.2 (4)
Rh1—O1—N1—C8	175.94 (16)	C20—C25—C24—C23	−1.8 (6)
As—C26—C27—C28	−178.1 (2)	C20—C21—C22—C23	−1.2 (5)
As—C26—C31—C30	179.1 (2)	C15—C14—C19—C18	−1.6 (4)
As—C14—C15—C16	−175.2 (2)	C15—C16—C17—C18	−1.4 (4)
As—C14—C19—C18	175.6 (2)	C7—C2—C3—C4	0.4 (4)
As—C20—C25—C24	−176.8 (3)	C7—C6—C5—C4	−0.1 (4)
As—C20—C21—C22	178.4 (3)	C27—C26—C31—C30	1.4 (4)
O2—C1—C2—C7	137.2 (2)	C27—C28—C29—C30	0.6 (5)
O2—C1—C2—C3	−39.0 (3)	C13—C8—C9—C10	−4.1 (4)
O1—N1—C1—O2	−4.1 (3)	C2—C7—C6—C5	−0.8 (4)
O1—N1—C1—C2	178.1 (2)	C2—C3—C4—C5	−1.3 (4)
O1—N1—C8—C13	−58.9 (3)	C19—C14—C15—C16	1.9 (4)
O1—N1—C8—C9	121.5 (2)	C19—C18—C17—C16	1.7 (4)
N1—C1—C2—C7	−45.0 (4)	C6—C7—C2—C1	−175.5 (2)
N1—C1—C2—C3	138.8 (3)	C6—C7—C2—C3	0.6 (4)
N1—C8—C13—C12	−175.6 (2)	C28—C29—C30—C31	0.3 (5)
N1—C8—C9—C10	175.5 (2)	C9—C8—C13—C12	4.0 (4)
C1—N1—C8—C13	115.1 (3)	C3—C4—C5—C6	1.1 (4)
C1—N1—C8—C9	−64.5 (3)	C31—C26—C27—C28	−0.5 (4)
C1—C2—C3—C4	176.7 (2)	C12—C11—C10—C9	1.2 (4)
C26—C27—C28—C29	−0.5 (4)	C10—C11—C12—C13	−1.3 (4)
C26—C31—C30—C29	−1.3 (5)	C25—C20—C21—C22	−3.2 (5)
C8—N1—C1—O2	−177.9 (2)	C25—C24—C23—C22	−2.7 (5)
C8—N1—C1—C2	4.3 (4)	C24—C23—C22—C21	4.2 (5)
C8—C13—C12—C11	−1.3 (4)	C21—C20—C25—C24	4.7 (5)