Acta Crystallographica Section E
Structure Reports Online
ISSN 1600-5368

cis-Dimethylbis(triphenylarsine)-platinum(II)

Anwar Abo-Amer

Chemistry Department, Al al-Bayt University, Al-Mafraq, Jordan
Correspondence e-mail: anwar.aboamer@aabu.edu.jo

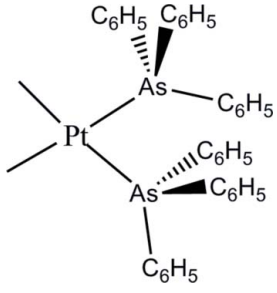
Received 24 December 2009; accepted 26 December 2009

Key indicators: single-crystal X-ray study; T = 150 K; mean σ(C–C) = 0.004 Å; R factor = 0.020; wR factor = 0.077; data-to-parameter ratio = 25.2.

In the title compound, $[Pt(CH_3)_2(C_{18}H_{15}As)_2]$, the Pt^{II} atom adopts a distorted *cis*-$PtAs_2C_2$ square-planar coordination geometry. In the crystal, molecules interact *via* aromatic π–π stacking interactions [centroid–centroid separation = 3.6741 (18) Å].

Related literature

For the structures of related complexes, see: Anderson *et al.* (1982); Al-Fawaz *et al.* (2004); Fun *et al.* (2006). For further synthetic details, see: Puddephatt *et al.* (1998).



Experimental

Crystal data

$[Pt(CH_3)_2(C_{18}H_{15}As)_2]$
M_r = 837.60
Triclinic, $P\overline{1}$
a = 10.1033 (9) Å
b = 10.3937 (8) Å
c = 17.2452 (13) Å
α = 91.106 (2)°
β = 99.588 (2)°
γ = 115.227 (2)°
V = 1607.0 (2) Å^3
Z = 2
Mo $K\alpha$ radiation
μ = 6.43 mm^{-1}
T = 150 K
0.22 × 0.20 × 0.19 mm

Data collection

Bruker APEXII CCD diffractometer
Absorption correction: multi-scan (*SADABS*; Bruker, 2001)
T_{min} = 0.332, T_{max} = 0.374
19166 measured reflections
9358 independent reflections
8543 reflections with $I > 2\sigma(I)$
R_{int} = 0.019

Refinement

$R[F^2 > 2\sigma(F^2)]$ = 0.020
$wR(F^2)$ = 0.077
S = 0.64
9358 reflections
372 parameters
H-atom parameters constrained
$\Delta\rho_{max}$ = 0.56 e Å^{-3}
$\Delta\rho_{min}$ = −1.07 e Å^{-3}

Table 1
Selected bond lengths (Å).

Pt1—C20	2.060 (3)	Pt1—As1	2.3960 (3)
Pt1—C19	2.083 (3)	Pt1—As2	2.4086 (3)

Data collection: *APEX2* (Bruker, 2001); cell refinement: *SAINT* (Bruker, 2001); data reduction: *SAINT*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 2008); program(s) used to refine structure: *SHELXL97* (Sheldrick, 2008); molecular graphics: *SHELXTL* (Sheldrick, 2008); software used to prepare material for publication: *SHELXTL*.

I would like to thank Prof. Puddephatt (University of Western Ontario) for financial support and the data collection.

Supplementary data and figures for this paper are available from the IUCr electronic archives (Reference: HB5294).

References

Al-Fawaz, A., Aldridge, S., Coombs, D. L., Dickinson, A. A., Willock, D. J., Ooi, L., Light, M. E., Coles, S. J. & Hursthouse, M. B. (2004). *Dalton Trans.* pp. 4030–4037.
Anderson, G. K., Clark, H. C., Davies, J. A. & Ferguson, G. (1982). *J. Crystallogr. Spectrosc. Res.* **12**, 449–458.
Bruker (2001). *APEX2*, *SAINT* and *SADABS*. Bruker AXS Inc., Madison, Wisconsin, USA.
Fun, H.-K., Chantrapromma, S., Liu, Y.-C., Chen, Z.-F. & Liang, H. (2006). *Acta Cryst.* E**62**, m1252–m1254.
Puddephatt, R. J., Hill, G. S., Irwin, M. J., Levy, C. J. & Rendina, L. M. (1998). *Inorg. Synth.* **32**, 149–153.
Sheldrick, G. M. (2008). *Acta Cryst.* A**64**, 112–122.

supporting information

Acta Cryst. (2010). E**66**, m172 [https://doi.org/10.1107/S1600536809055470]

cis-Dimethylbis(triphenylarsine)platinum(II)

Anwar Abo-Amer

S1. Comment

cis- and *trans*-Dimethylebis(triphenylarsine)platinum(II) are useful to prepare other platinum complexes. The structures of the *cis*-isomer have been not reported. During the course of our studies on platinium sulfide compounds *cis*-[$Pt_2Me_4(\mu$-$SMe_2)_2$] with Lewis bases, a colorless crystals of the title compound, (I), was obtained. As shown in Fig.1, the platinum centre is four-coordinated and adopts a nearly square planar geometry. The Pt—As bond lengths (2.3960 (2) and 2.4086 (2) Å) and Pt—C bond lengths (2.060 (3) and 2.083 (3) Å), as well as the bond angles around the Pt atom are similar to those in the above-mentioned structures.

S2. Experimental

The title complex was prepared by the addition of an excess of $AsPh_3$(0.2133 mmol) to an anhydrous diethyl ether solution (20 ml) of *cis*-[$PtMe_2(SMe_2)_2]_2$ (0.17413 mmol) (Puddephatt *et al.* 1998) at 298 K. The desired product precipitates spontaneously in near quantitative yield (78.9% yield) and was recrystallized from dichloromethane at 298 K to yield colourless prisms of (I).

S3. Refinement

Thelargest peak in the final difference electron density synthesis was 0.559 $e^-/Å^3$ and the largest hole was -1.070 $e^-/Å^3$ with an RMS deviation of 0.104 $e^-/Å^3$.

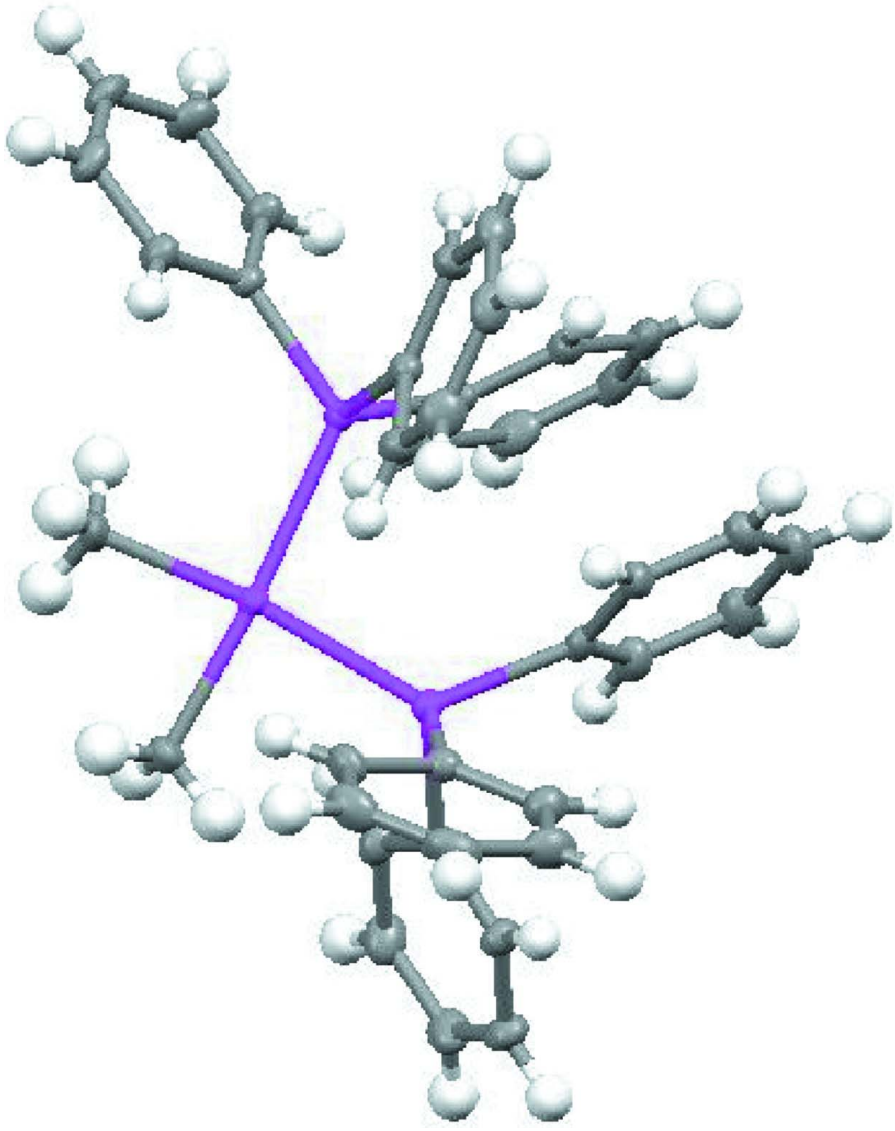


Figure 1

The molecular structure of (I) showing 50% displacement ellipsoids (H atoms omitted for clarity).

cis-Dimethylbis(triphenylarsine)platinum(II)

Crystal data

$[Pt(CH_3)_2(C_{18}H_{15}As)_2]$
$M_r = 837.60$
Triclinic, $P\overline{1}$
Hall symbol: -P 1
$a = 10.1033\ (9)$ Å
$b = 10.3937\ (8)$ Å
$c = 17.2452\ (13)$ Å
$\alpha = 91.106\ (2)°$
$\beta = 99.588\ (2)°$
$\gamma = 115.227\ (2)°$
$V = 1607.0\ (2)$ Å^3
$Z = 2$
$F(000) = 816$
$D_x = 1.731$ Mg m^{-3}
Mo $K\alpha$ radiation, $\lambda = 0.71073$ Å
Cell parameters from 9885 reflections
$\theta = 2.3–30.2°$
$\mu = 6.43$ mm^{-1}
$T = 150$ K
Prism, colourless
0.22 × 0.20 × 0.19 mm

Data collection

Bruker APEXII CCD diffractometer
Radiation source: fine-focus sealed tube
Graphite monochromator
φ and ω scans
Absorption correction: multi-scan (*SADABS*; Bruker, 2001)
T_{min} = 0.332, T_{max} = 0.374
19166 measured reflections
9358 independent reflections
8543 reflections with $I > 2\sigma(I)$
R_{int} = 0.019
θ_{max} = 30.2°, θ_{min} = 1.2°
h = −14→13
k = −14→14
l = −24→24

Refinement

Refinement on F^2
Least-squares matrix: full
$R[F^2 > 2\sigma(F^2)]$ = 0.020
$wR(F^2)$ = 0.077
S = 0.64
9358 reflections
372 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
$w = 1/[\sigma^2(F_o^2) + (0.1P)^2]$ where $P = (F_o^2 + 2F_c^2)/3$
$(\Delta/\sigma)_{max}$ = 0.066
$\Delta\rho_{max}$ = 0.56 e Å^{-3}
$\Delta\rho_{min}$ = −1.07 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 (Å²)

	x	y	z	U_{iso}*/U_{eq}
Pt1	1.029195 (9)	0.072490 (9)	0.271372 (5)	0.01642 (4)
As1	1.04466 (3)	0.25078 (3)	0.367248 (15)	0.01542 (6)
As2	0.85760 (3)	0.10672 (3)	0.168572 (15)	0.01719 (6)
C1	0.8543 (3)	0.2235 (3)	0.39079 (15)	0.0188 (4)
C2	0.8076 (3)	0.3307 (3)	0.39670 (16)	0.0236 (5)
H2	0.8707	0.4259	0.3885	0.028*
C3	0.6679 (3)	0.2982 (4)	0.41463 (17)	0.0311 (6)
H3	0.6352	0.3710	0.4180	0.037*
C4	0.5768 (3)	0.1597 (4)	0.42758 (19)	0.0357 (7)
H4	0.4829	0.1382	0.4412	0.043*
C5	0.6223 (3)	0.0536 (4)	0.42067 (19)	0.0336 (7)
H5	0.5586	−0.0414	0.4288	0.040*
C6	0.7605 (3)	0.0839 (3)	0.40192 (17)	0.0248 (5)
H6	0.7908	0.0098	0.3967	0.030*
C7	1.1385 (2)	0.4450 (3)	0.33885 (15)	0.0176 (4)
C8	1.1859 (3)	0.4651 (3)	0.26647 (16)	0.0241 (5)

H8	1.1696	0.3849	0.2322	0.029*
C9	1.2570 (3)	0.6023 (3)	0.2447 (2)	0.0322 (6)
H9	1.2887	0.6161	0.1954	0.039*
C10	1.2818 (3)	0.7199 (3)	0.2954 (2)	0.0330 (7)
H10	1.3291	0.8139	0.2803	0.040*
C11	1.2374 (3)	0.6997 (3)	0.3677 (2)	0.0295 (6)
H11	1.2559	0.7800	0.4026	0.035*
C12	1.1659 (3)	0.5623 (3)	0.38953 (16)	0.0227 (5)
H12	1.1358	0.5489	0.4393	0.027*
C13	1.1613 (3)	0.2778 (3)	0.47356 (15)	0.0180 (4)
C14	1.3155 (3)	0.3227 (3)	0.48190 (17)	0.0246 (5)
H14	1.3604	0.3403	0.4366	0.029*
C15	1.4027 (3)	0.3414 (3)	0.55628 (19)	0.0299 (6)
H15	1.5072	0.3723	0.5617	0.036*
C16	1.3385 (3)	0.3152 (3)	0.62213 (18)	0.0303 (6)
H16	1.3988	0.3279	0.6728	0.036*
C17	1.1872 (4)	0.2707 (4)	0.61499 (18)	0.0340 (7)
H17	1.1434	0.2533	0.6607	0.041*
C18	1.0979 (3)	0.2513 (3)	0.54014 (17)	0.0264 (5)
H18	0.9934	0.2198	0.5352	0.032*
C19	1.0329 (3)	−0.0808 (3)	0.19328 (19)	0.0294 (6)
H19A	1.1365	−0.0600	0.1916	0.044*
H19B	0.9808	−0.0790	0.1403	0.044*
H19C	0.9833	−0.1757	0.2112	0.044*
C20	1.1755 (3)	0.0233 (3)	0.34881 (18)	0.0297 (6)
H20A	1.1554	−0.0765	0.3362	0.045*
H20B	1.1627	0.0367	0.4030	0.045*
H20C	1.2780	0.0862	0.3440	0.045*
C21	0.7011 (3)	−0.0729 (3)	0.11442 (15)	0.0190 (4)
C22	0.6602 (3)	−0.1928 (3)	0.15666 (18)	0.0266 (5)
H22	0.7092	−0.1856	0.2097	0.032*
C23	0.5468 (3)	−0.3232 (3)	0.1202 (2)	0.0320 (6)
H23	0.5195	−0.4051	0.1486	0.038*
C24	0.4745 (3)	−0.3344 (3)	0.0442 (2)	0.0314 (6)
H24	0.3960	−0.4234	0.0206	0.038*
C25	0.5153 (3)	−0.2165 (3)	0.00144 (18)	0.0286 (6)
H25	0.4660	−0.2248	−0.0517	0.034*
C26	0.6292 (3)	−0.0855 (3)	0.03672 (16)	0.0231 (5)
H26	0.6577	−0.0046	0.0075	0.028*
C27	0.9495 (3)	0.2048 (3)	0.08340 (16)	0.0208 (5)
C28	1.0904 (3)	0.2177 (3)	0.07933 (18)	0.0256 (5)
H28	1.1393	0.1803	0.1179	0.031*
C29	1.1602 (3)	0.2855 (3)	0.0186 (2)	0.0338 (7)
H29	1.2560	0.2925	0.0155	0.041*
C30	1.0929 (4)	0.3417 (3)	−0.03621 (19)	0.0326 (7)
H30	1.1421	0.3888	−0.0770	0.039*
C31	0.9532 (4)	0.3303 (3)	−0.03262 (18)	0.0317 (6)
H31	0.9059	0.3689	−0.0713	0.038*

C32	0.8815 (3)	0.2632 (3)	0.02676 (17)	0.0260 (5)
H32	0.7856	0.2566	0.0291	0.031*
C33	0.7360 (3)	0.2037 (3)	0.18684 (15)	0.0196 (5)
C34	0.7918 (3)	0.3515 (3)	0.18978 (17)	0.0236 (5)
H34	0.8900	0.4068	0.1812	0.028*
C35	0.7047 (3)	0.4193 (3)	0.20524 (18)	0.0297 (6)
H35	0.7431	0.5203	0.2063	0.036*
C36	0.5628 (4)	0.3401 (4)	0.2190 (2)	0.0328 (6)
H36	0.5037	0.3866	0.2297	0.039*
C37	0.5064 (3)	0.1928 (4)	0.21732 (19)	0.0322 (6)
H37	0.4089	0.1383	0.2270	0.039*
C38	0.5923 (3)	0.1251 (3)	0.20146 (17)	0.0261 (5)
H38	0.5532	0.0241	0.2005	0.031*

Atomic displacement parameters (Å²)

	U^{11}	U^{22}	U^{33}	U^{12}	U^{13}	U^{23}
Pt1	0.01636 (6)	0.01714 (6)	0.01599 (6)	0.00868 (4)	0.00017 (4)	−0.00089 (4)
As1	0.01461 (10)	0.01646 (11)	0.01471 (12)	0.00679 (9)	0.00170 (9)	0.00018 (9)
As2	0.01673 (11)	0.01870 (12)	0.01557 (12)	0.00809 (9)	0.00068 (9)	0.00099 (9)
C1	0.0151 (9)	0.0246 (12)	0.0153 (11)	0.0081 (9)	0.0010 (8)	0.0000 (9)
C2	0.0226 (11)	0.0284 (13)	0.0212 (12)	0.0137 (10)	0.0009 (10)	−0.0017 (10)
C3	0.0269 (12)	0.0515 (18)	0.0212 (13)	0.0245 (13)	0.0012 (11)	−0.0013 (12)
C4	0.0186 (11)	0.064 (2)	0.0231 (14)	0.0167 (13)	0.0042 (10)	0.0064 (14)
C5	0.0202 (12)	0.0395 (17)	0.0292 (15)	0.0011 (11)	0.0062 (11)	0.0046 (13)
C6	0.0183 (10)	0.0248 (12)	0.0272 (14)	0.0060 (9)	0.0027 (10)	0.0022 (10)
C7	0.0157 (9)	0.0182 (11)	0.0183 (11)	0.0072 (8)	0.0023 (8)	0.0003 (9)
C8	0.0226 (11)	0.0270 (13)	0.0199 (12)	0.0084 (10)	0.0034 (10)	0.0001 (10)
C9	0.0307 (13)	0.0323 (15)	0.0314 (16)	0.0094 (12)	0.0110 (12)	0.0135 (12)
C10	0.0308 (14)	0.0239 (13)	0.0427 (18)	0.0112 (11)	0.0039 (13)	0.0125 (13)
C11	0.0284 (13)	0.0202 (12)	0.0389 (17)	0.0109 (10)	0.0031 (12)	0.0046 (11)
C12	0.0254 (11)	0.0216 (12)	0.0206 (12)	0.0104 (10)	0.0028 (10)	0.0006 (9)
C13	0.0173 (9)	0.0179 (10)	0.0159 (11)	0.0061 (8)	0.0007 (8)	0.0004 (8)
C14	0.0215 (11)	0.0284 (13)	0.0225 (13)	0.0103 (10)	0.0025 (10)	0.0026 (10)
C15	0.0206 (11)	0.0296 (14)	0.0328 (16)	0.0082 (10)	−0.0044 (11)	0.0038 (12)
C16	0.0316 (13)	0.0293 (14)	0.0228 (13)	0.0116 (11)	−0.0088 (11)	0.0032 (11)
C17	0.0377 (15)	0.0427 (17)	0.0181 (13)	0.0153 (14)	0.0019 (12)	0.0054 (12)
C18	0.0244 (12)	0.0352 (15)	0.0203 (13)	0.0127 (11)	0.0062 (10)	0.0057 (11)
C19	0.0348 (14)	0.0320 (15)	0.0272 (14)	0.0222 (12)	0.0009 (12)	−0.0050 (11)
C20	0.0353 (14)	0.0370 (15)	0.0254 (14)	0.0275 (13)	−0.0040 (11)	−0.0033 (12)
C21	0.0182 (10)	0.0194 (11)	0.0177 (11)	0.0074 (9)	0.0014 (9)	0.0016 (9)
C22	0.0256 (12)	0.0269 (13)	0.0258 (14)	0.0106 (10)	0.0024 (10)	0.0090 (11)
C23	0.0261 (12)	0.0236 (13)	0.0437 (18)	0.0082 (11)	0.0065 (12)	0.0107 (12)
C24	0.0195 (11)	0.0241 (13)	0.0434 (18)	0.0052 (10)	0.0000 (11)	−0.0032 (12)
C25	0.0224 (11)	0.0319 (14)	0.0252 (14)	0.0089 (11)	−0.0030 (10)	−0.0044 (11)
C26	0.0219 (11)	0.0240 (12)	0.0201 (12)	0.0083 (10)	−0.0001 (9)	0.0029 (10)
C27	0.0201 (10)	0.0197 (11)	0.0203 (12)	0.0065 (9)	0.0040 (9)	−0.0006 (9)
C28	0.0230 (11)	0.0260 (13)	0.0301 (14)	0.0115 (10)	0.0089 (10)	0.0005 (11)

C29	0.0327 (14)	0.0280 (14)	0.0405 (18)	0.0088 (12)	0.0192 (13)	0.0018 (12)
C30	0.0421 (16)	0.0236 (13)	0.0274 (15)	0.0064 (12)	0.0172 (13)	−0.0010 (11)
C31	0.0423 (16)	0.0275 (14)	0.0215 (14)	0.0108 (12)	0.0079 (12)	0.0051 (11)
C32	0.0277 (12)	0.0251 (13)	0.0225 (13)	0.0091 (10)	0.0042 (10)	0.0045 (10)
C33	0.0195 (10)	0.0270 (12)	0.0151 (11)	0.0131 (9)	0.0022 (9)	0.0039 (9)
C34	0.0265 (12)	0.0242 (12)	0.0227 (13)	0.0143 (10)	0.0024 (10)	0.0024 (10)
C35	0.0374 (15)	0.0319 (14)	0.0274 (14)	0.0220 (13)	0.0065 (12)	0.0031 (11)
C36	0.0394 (15)	0.0419 (17)	0.0301 (15)	0.0282 (14)	0.0104 (13)	0.0077 (13)
C37	0.0306 (13)	0.0448 (18)	0.0283 (15)	0.0203 (13)	0.0129 (12)	0.0112 (13)
C38	0.0261 (12)	0.0304 (14)	0.0247 (13)	0.0137 (11)	0.0079 (10)	0.0074 (11)

Geometric parameters (Å, º)

Pt1—C20	2.060 (3)	C17—H17	0.9500
Pt1—C19	2.083 (3)	C18—H18	0.9500
Pt1—As1	2.3960 (3)	C19—H19A	0.9800
Pt1—As2	2.4086 (3)	C19—H19B	0.9800
As1—C1	1.935 (2)	C19—H19C	0.9800
As1—C7	1.943 (2)	C20—H20A	0.9800
As1—C13	1.951 (2)	C20—H20B	0.9800
As2—C27	1.940 (3)	C20—H20C	0.9800
As2—C21	1.945 (2)	C21—C26	1.388 (4)
As2—C33	1.949 (2)	C21—C22	1.397 (4)
C1—C2	1.391 (4)	C22—C23	1.396 (4)
C1—C6	1.393 (4)	C22—H22	0.9500
C2—C3	1.395 (4)	C23—C24	1.366 (5)
C2—H2	0.9500	C23—H23	0.9500
C3—C4	1.386 (5)	C24—C25	1.387 (4)
C3—H3	0.9500	C24—H24	0.9500
C4—C5	1.374 (5)	C25—C26	1.396 (4)
C4—H4	0.9500	C25—H25	0.9500
C5—C6	1.391 (4)	C26—H26	0.9500
C5—H5	0.9500	C27—C28	1.385 (3)
C6—H6	0.9500	C27—C32	1.396 (4)
C7—C12	1.384 (3)	C28—C29	1.395 (4)
C7—C8	1.398 (4)	C28—H28	0.9500
C8—C9	1.388 (4)	C29—C30	1.356 (5)
C8—H8	0.9500	C29—H29	0.9500
C9—C10	1.395 (5)	C30—C31	1.377 (5)
C9—H9	0.9500	C30—H30	0.9500
C10—C11	1.384 (5)	C31—C32	1.380 (4)
C10—H10	0.9500	C31—H31	0.9500
C11—C12	1.391 (4)	C32—H32	0.9500
C11—H11	0.9500	C33—C34	1.389 (4)
C12—H12	0.9500	C33—C38	1.399 (3)
C13—C18	1.383 (4)	C34—C35	1.393 (4)
C13—C14	1.403 (3)	C34—H34	0.9500
C14—C15	1.388 (4)	C35—C36	1.380 (4)

C14—H14	0.9500	C35—H35	0.9500
C15—C16	1.375 (4)	C36—C37	1.385 (5)
C15—H15	0.9500	C36—H36	0.9500
C16—C17	1.378 (4)	C37—C38	1.383 (4)
C16—H16	0.9500	C37—H37	0.9500
C17—C18	1.403 (4)	C38—H38	0.9500

C20—Pt1—C19	84.17 (12)	C13—C18—C17	120.2 (3)
C20—Pt1—As1	91.34 (8)	C13—C18—H18	119.9
C19—Pt1—As1	175.17 (8)	C17—C18—H18	119.9
C20—Pt1—As2	172.47 (8)	Pt1—C19—H19A	109.5
C19—Pt1—As2	88.30 (9)	Pt1—C19—H19B	109.5
As1—Pt1—As2	96.184 (10)	H19A—C19—H19B	109.5
C1—As1—C7	106.44 (10)	Pt1—C19—H19C	109.5
C1—As1—C13	100.90 (10)	H19A—C19—H19C	109.5
C7—As1—C13	99.16 (10)	H19B—C19—H19C	109.5
C1—As1—Pt1	114.16 (8)	Pt1—C20—H20A	109.5
C7—As1—Pt1	114.10 (7)	Pt1—C20—H20B	109.5
C13—As1—Pt1	120.02 (7)	H20A—C20—H20B	109.5
C27—As2—C21	103.04 (11)	Pt1—C20—H20C	109.5
C27—As2—C33	101.73 (11)	H20A—C20—H20C	109.5
C21—As2—C33	99.24 (11)	H20B—C20—H20C	109.5
C27—As2—Pt1	113.51 (8)	C26—C21—C22	119.6 (2)
C21—As2—Pt1	112.60 (8)	C26—C21—As2	122.77 (19)
C33—As2—Pt1	123.96 (7)	C22—C21—As2	117.67 (19)
C2—C1—C6	119.8 (2)	C23—C22—C21	119.4 (3)
C2—C1—As1	125.07 (19)	C23—C22—H22	120.3
C6—C1—As1	115.17 (19)	C21—C22—H22	120.3
C1—C2—C3	119.9 (3)	C24—C23—C22	120.8 (3)
C1—C2—H2	120.1	C24—C23—H23	119.6
C3—C2—H2	120.1	C22—C23—H23	119.6
C4—C3—C2	120.0 (3)	C23—C24—C25	120.2 (3)
C4—C3—H3	120.0	C23—C24—H24	119.9
C2—C3—H3	120.0	C25—C24—H24	119.9
C5—C4—C3	120.1 (3)	C24—C25—C26	119.7 (3)
C5—C4—H4	120.0	C24—C25—H25	120.1
C3—C4—H4	120.0	C26—C25—H25	120.1
C4—C5—C6	120.6 (3)	C21—C26—C25	120.3 (3)
C4—C5—H5	119.7	C21—C26—H26	119.9
C6—C5—H5	119.7	C25—C26—H26	119.9
C5—C6—C1	119.6 (3)	C28—C27—C32	118.8 (3)
C5—C6—H6	120.2	C28—C27—As2	117.8 (2)
C1—C6—H6	120.2	C32—C27—As2	123.44 (19)
C12—C7—C8	119.8 (2)	C27—C28—C29	119.9 (3)
C12—C7—As1	122.02 (19)	C27—C28—H28	120.0
C8—C7—As1	118.05 (19)	C29—C28—H28	120.0
C9—C8—C7	120.0 (3)	C30—C29—C28	120.8 (3)
C9—C8—H8	120.0	C30—C29—H29	119.6

C7—C8—H8	120.0	C28—C29—H29	119.6
C8—C9—C10	119.8 (3)	C29—C30—C31	119.9 (3)
C8—C9—H9	120.1	C29—C30—H30	120.1
C10—C9—H9	120.1	C31—C30—H30	120.1
C11—C10—C9	120.0 (3)	C30—C31—C32	120.5 (3)
C11—C10—H10	120.0	C30—C31—H31	119.8
C9—C10—H10	120.0	C32—C31—H31	119.8
C10—C11—C12	120.2 (3)	C31—C32—C27	120.2 (3)
C10—C11—H11	119.9	C31—C32—H32	119.9
C12—C11—H11	119.9	C27—C32—H32	119.9
C7—C12—C11	120.1 (3)	C34—C33—C38	118.6 (2)
C7—C12—H12	120.0	C34—C33—As2	121.24 (19)
C11—C12—H12	120.0	C38—C33—As2	120.0 (2)
C18—C13—C14	119.1 (2)	C33—C34—C35	120.4 (3)
C18—C13—As1	122.79 (19)	C33—C34—H34	119.8
C14—C13—As1	118.08 (19)	C35—C34—H34	119.8
C15—C14—C13	120.1 (3)	C36—C35—C34	120.2 (3)
C15—C14—H14	119.9	C36—C35—H35	119.9
C13—C14—H14	119.9	C34—C35—H35	119.9
C16—C15—C14	120.3 (3)	C35—C36—C37	120.0 (3)
C16—C15—H15	119.9	C35—C36—H36	120.0
C14—C15—H15	119.9	C37—C36—H36	120.0
C15—C16—C17	120.4 (3)	C38—C37—C36	119.9 (3)
C15—C16—H16	119.8	C38—C37—H37	120.0
C17—C16—H16	119.8	C36—C37—H37	120.0
C16—C17—C18	119.9 (3)	C37—C38—C33	120.8 (3)
C16—C17—H17	120.1	C37—C38—H38	119.6
C18—C17—H17	120.1	C33—C38—H38	119.6