

form been suggested as an intermediate in cyclooctatetraene reactions. [A very similar cyclooctadienyl form has been found in acetylacetonato(cycloocta-2,4-dienyl)palladium (Churchill, 1966).] This new conformation has an approximate mirror plane with the equivalent bond-distance pairs: allylic, 1.405, 1.421 Å; adjacent single bonds, 1.451, 1.454 Å; double bonds, 1.327, 1.334 Å; and terminal single bonds, 1.486, 1.482 Å. The C—Cl bond [1.800 (3) Å] is significantly longer than the single-bond distance (1.76 Å), though it is very nearly identical with the distance found in pentamethylbenzyl trichloride [1.796 (11) Å] (Baenziger & Schultz, 1973). Chemical reactions of this complex indicate that this Cl atom is quite labile, in keeping with the longer distance, as is also observed for the pentamethylbenzyl trichloride molecule.

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Structure of Tri- μ -iodo-diiodotetrakis(methyldiphenylphosphine)diiridium Triiodide Formed from Oxidative Additions of I₂ to the Cation {Ir[PCH₃(C₆H₅)₂]₄}⁺

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Abstract. {Ir₂I₅[PCH₃(C₆H₅)₂]₄}I₃, $M_r = 2200.6$, monoclinic, $P2_1/c$, $a = 12.45$ (2), $b = 28.98$ (2), $c = 17.38$ (2) Å, $\beta = 107.7$ (1)°, $V = 5976$ Å³, $Z = 4$, $D_m = 2.46$, $D_c = 2.45$ g cm⁻³, $\mu(\text{Mo } K\alpha) = 90.6$ cm⁻¹, $\lambda(\text{Mo } K\alpha) = 0.7107$ Å. Anisotropic least-squares refinement converged to $R = 0.09$ for 3993 observed reflections. Coordination around Ir is approximately

octahedral and the binuclear compound has a triple I bridge. Ir—I lengths average 2.75 (P *trans*) and 2.68 Å (I *trans*). Ir—P lengths average 2.33 Å.

Introduction. During studies on oxidative addition reactions of the cations [IrL₄]⁺ ($L =$ neutral donor ligand) with the halogens X_2 ($X = \text{Cl, Br and I}$) we found (Singleton & van der Stok, unpublished) that when $L = \text{P}(\text{OCH}_3)(\text{C}_6\text{H}_5)_2$ and $\text{P}(\text{CH}_3)(\text{C}_6\text{H}_5)_2$, addition reactions were usually accompanied by loss of

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one or two molecules of L from the coordination sphere. This ligand loss was enhanced when going from Cl to Br to I and only with I_2 were complexes of stoichiometry $[\text{Ir}_4\text{L}_2]$ [$L = \text{P}(\text{OCH}_3)(\text{C}_6\text{H}_5)_2$ and $\text{P}(\text{CH}_3)(\text{C}_6\text{H}_5)_2$] isolated. These compounds, together with $\{\text{IrCl}_4[\text{P}(\text{C}_6\text{H}_5)_3]_2\}$ (Bennett & Milner, 1969) represented the only ones prepared from an oxidative addition reaction involving an Ir^{I} precursor. No Rh^{IV} species containing tertiary P donor ligands were known at that stage and this could be due to the relative instability of the Rh^{IV} oxidation state when compared with that of Ir^{IV} . It was thus surprising that corresponding reactions of $[\text{RhL}_4]^+$ [$L = \text{P}(\text{OCH}_3)(\text{C}_6\text{H}_5)_2$ and $\text{P}(\text{CH}_3)(\text{C}_6\text{H}_5)_2$] gave $[\text{RhX}_4\text{L}_2]$ ($X = \text{Br}$ and I) with Br_2 and I_2 . The complexes had the expected (Chatt, Leigh, Mingos & Paske, 1968) appearances of metal(IV) products; namely they were dark brown or purple in colour, had intermediate to zero conductivity and gave broad unresolved ^1H NMR methyl resonances. Molecular weights gave values in between a monomer and a dimer which could have been indicative of dissociation and dimerization occurring in solution, though no anion exchange with PF_6^- or $\text{B}(\text{C}_6\text{H}_5)_4^-$ could be effected from these solutions. It was unexpected that no MCl_4L_2 complexes were obtained with Cl_2 , the strongest of the three oxidizing agents used, and because of this anomaly it was decided to characterize fully one of these compounds. Consequently an X-ray structural determination of the compound of stoichiometry $\{\text{Ir}_4[\text{PCH}_3(\text{C}_6\text{H}_5)_2]_2\}$ was undertaken. This determination, establishing the product as the salt $\{\text{Ir}_2\text{I}_5[\text{PCH}_3(\text{C}_6\text{H}_5)_2]_4\}\text{I}_3$, has now been completed (Nolte, van der Stok & Singleton, 1976) and is presented.

A purple wedge-like crystal of dimensions $0.07 \times 0.24 \times 0.26$ mm was mounted on the Philips PW1100 four-circle single-crystal diffractometer at the NPRL, CSIR, and intensity data were collected between $3 \leq \theta \leq 22^\circ$. Graphite-monochromatized $\text{Mo } K\alpha$ radiation was used to scan all reflections for 30 s each in the ω - 2θ mode and background measurements were of the same duration. Standard reflections (151, 162 and 364)

showed no decrease in intensity after 132 h of data collection. Of the 7496 reflections measured, 3993 were classified as observed [$I > 2\sigma(I)$]. Background and L_p corrections were applied, but no corrections were made for extinction. Absorption was taken into account and transmission factors, evaluated by numerical integration, varied from 0.37 to 0.83.

Patterson and Fourier methods yielded the positions of all the non-hydrogen atoms and least-squares refinement, performed on an IBM 360/65 computer, reduced the residual value ($R = \Sigma ||F_o| - |F_c|| / \Sigma |F_o|$) to 0.092 for unit weights. Thermal parameters of the Ir, I and P atoms were allowed to vary anisotropically, while those of the C atoms varied isotropically. At the termination of the refinement unexplained electron density of up to $2 \text{ e } \text{ \AA}^{-3}$ was observed in random positions, mainly around the heavy atoms and is likely to have arisen from errors in scattering factors and/or anisotropic vibration of the C atoms. The XRAY system of crystallographic programs (Stewart, Kruger, Ammon, Dickinson & Hall, 1972) was used for the calculations and all figures were drawn by the ORTEP program (Johnson, 1965). The scattering factor tables of Cromer & Mann (1968) were corrected for anomalous dispersion.*

Discussion. The numbering system is given in Fig. 1. Table 1 gives the final positional and isotropic thermal parameters with their standard deviations, while bond lengths and angles are summarized in Tables 2 and 3. The cation $\{\text{Ir}_2\text{I}_5[\text{PCH}_3(\text{C}_6\text{H}_5)_2]_4\}^+$ and anion I_3^- are discrete and there is no indication from this determination why low solution conductivity values were obtained for these salts. Coordination around the Ir atoms is distorted octahedral with three I atoms shared by both Ir atoms in a triple-halogen bridge. The six remaining positions are occupied by one I and two P

* Lists of structure factors and anisotropic thermal parameters have been deposited with the British Library Lending Division as Supplementary Publication No. SUP 33259 (40 pp.). Copies may be obtained through The Executive Secretary, International Union of Crystallography, 13 White Friars, Chester CH1 1NZ, England.

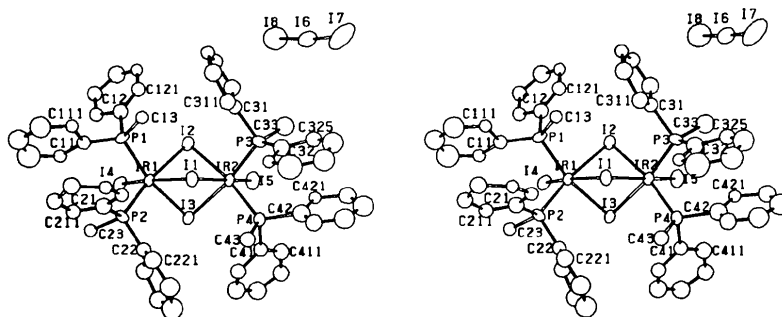


Fig. 1. Stereoscopic view of the molecule.

atoms on each Ir. No metal-metal bond exists between the Ir atoms which are more than 3.5 Å removed.

There is a certain asymmetry in the molecule caused by the non-equivalence of the iridium-iodide bond lengths resulting from structural *trans* effects. Thus the Ir-I bonds in the *trans* position to P have distances of 2.74 (1) to 2.76 (1) Å whereas those in the *trans* position to the terminal iodides have lengths of 2.68 (1) and 2.69 (1) Å. These approach closely the mean length 2.68 (1) Å observed for the terminal Ir-I bonds. Ir-P bond lengths average 2.33 (1) Å and are the same length as those observed in $\{[(\text{C}_6\text{H}_5)_3\text{P}]_2\text{HIr}[\text{SC}_6\text{H}_5]_2\text{ClIrH}[\text{P}(\text{C}_6\text{H}_5)_3]_2\}\text{ClO}_4 \cdot 3(\text{CH}_3)_2\text{CO}$ (Roberts, Ferguson & Senoff, 1975).

The shorter Ir-I bond lengths in the bridge are accompanied by a slightly larger Ir(1)-I(1)-Ir(2) angle of 85.5 (1)° when compared with those of 82.7 (1) and 83.0 (1)° for the other two Ir-I-Ir angles. Further indications of deviations from octahedral symmetry come from the angles between atoms in the *trans* position which vary between 166.9 and 171.0° and from the angles subtended at the Ir atom by the bridging I atoms, which lie in the range 78-82°. The P-Ir-P angles average 98.2 (5)°, and the terminal

I atoms are displaced from the phosphine ligands towards the bridging I atoms, giving P-Ir-I angles also greater than 90°. These angular distortions are probably due to non-bonded repulsions from the bulky phosphine ligands.

Average values of the remaining bond lengths are 1.87 (6) Å for P-C and 1.40 (9) Å for C-C. Average bond angles are 114 (2) and 103 (2)° for Ir-P-C and C-P-C respectively. In the anion the I-I bond lengths average 2.91 (1) Å and the I-I-I angle is 177.2 (5)°. All these values are consistent with those reported in the literature (Jovanović, Manojlović-Muir & Muir, 1974; Clark, Skelton & Waters, 1975; Pritzkow, 1975).

Inspection of the tables shows several unrealistic thermal parameters and high estimated standard deviations. Since the crystals were of poor quality, irregularly shaped and formed in tight clusters, the data obtained from one of these fragments are presumably not very accurate. Also, as a result of the long *b* axis, complete resolution of reflection spots was not always possible. However, the general trends observed in the structure are consistent and appear reliable.

Examination of Fig. 1 shows apparent internal symmetry in the cation, but symmetry-equivalent

Table 1. Atomic coordinates ($\times 10^4$) and isotropic thermal parameters ($\text{Å}^2 \times 10^4$) with their *e.s.d.*'s in parentheses

	<i>x</i>	<i>y</i>	<i>z</i>	<i>U</i>		<i>x</i>	<i>y</i>	<i>z</i>	<i>U</i>
Ir(1)	7189 (2)	2598 (1)	4346 (1)		C(22)	10055 (39)	2878 (23)	4786 (28)	296 (117)
Ir(2)	6231 (2)	3787 (1)	3947 (1)		C(221)	10492 (54)	3051 (24)	4227 (38)	632 (179)
I(1)	7248 (3)	3206 (1)	3190 (2)		C(222)	11332 (57)	3432 (26)	4398 (40)	692 (189)
I(2)	5098 (3)	2994 (1)	4105 (2)		C(223)	11803 (63)	3538 (23)	5256 (45)	820 (218)
I(3)	7730 (3)	3386 (1)	5272 (2)		C(224)	11386 (55)	3327 (20)	5813 (39)	652 (182)
I(4)	7001 (3)	2154 (1)	5657 (2)		C(225)	10512 (49)	2972 (16)	5589 (34)	515 (154)
I(5)	5227 (3)	4205 (1)	4916 (2)		C(23)	9634 (39)	1969 (20)	5363 (27)	285 (116)
I(6)	819 (4)	4204 (2)	961 (3)		C(31)	4218 (47)	3484 (22)	2137 (33)	471 (148)
I(7)	1507 (6)	4593 (2)	-348 (4)		C(311)	4580 (54)	3319 (20)	1531 (38)	633 (180)
I(8)	41 (6)	3787 (2)	2224 (4)		C(312)	3919 (48)	2969 (20)	985 (34)	497 (149)
P(1)	6310 (11)	1996 (5)	3479 (8)		C(313)	2995 (48)	2789 (19)	1197 (34)	511 (151)
P(2)	9045 (10)	2384 (5)	4548 (8)		C(314)	2621 (44)	2973 (19)	1822 (32)	411 (135)
P(3)	4905 (13)	4003 (5)	2751 (8)		C(315)	3166 (59)	3335 (24)	2266 (41)	725 (196)
P(4)	7457 (12)	4407 (5)	4056 (9)		C(32)	5435 (47)	4292 (19)	1986 (33)	459 (142)
C(11)	7081 (45)	1463 (18)	3466 (31)	410 (136)	C(321)	6377 (49)	4161 (21)	1826 (35)	520 (152)
C(111)	6994 (44)	1286 (19)	2666 (32)	431 (138)	C(322)	6681 (65)	4410 (27)	1274 (46)	848 (217)
C(112)	7564 (56)	836 (24)	2674 (40)	691 (190)	C(323)	6168 (66)	4805 (28)	917 (46)	872 (230)
C(113)	7923 (55)	576 (23)	3391 (41)	663 (183)	C(324)	5141 (80)	4957 (33)	1099 (57)	1160 (294)
C(114)	8063 (67)	739 (28)	4170 (48)	913 (235)	C(325)	4744 (52)	4726 (22)	1662 (37)	576 (166)
C(115)	7516 (36)	1195 (16)	4151 (25)	213 (104)	C(33)	3645 (51)	4333 (21)	2860 (36)	573 (159)
C(12)	4964 (43)	1793 (18)	3665 (30)	380 (128)	C(41)	8155 (43)	4615 (18)	5084 (30)	375 (130)
C(121)	3935 (38)	1982 (16)	3266 (26)	267 (111)	C(411)	7752 (47)	4968 (19)	5466 (33)	444 (137)
C(122)	2972 (45)	1856 (19)	3384 (32)	432 (142)	C(412)	8280 (64)	5146 (27)	6232 (45)	822 (220)
C(123)	3037 (49)	1538 (20)	3982 (35)	512 (151)	C(413)	9196 (59)	4908 (24)	6653 (42)	711 (195)
C(124)	4066 (45)	1280 (19)	4368 (32)	429 (138)	C(414)	9640 (49)	4515 (21)	6360 (35)	525 (157)
C(125)	5033 (39)	1437 (16)	4275 (27)	283 (116)	C(415)	9163 (51)	4401 (21)	5562 (36)	555 (161)
C(13)	5858 (40)	2196 (17)	2426 (28)	316 (120)	C(42)	6920 (52)	4989 (21)	3501 (37)	576 (167)
C(21)	9325 (42)	2095 (18)	3638 (30)	363 (126)	C(421)	5986 (47)	5131 (20)	3629 (33)	478 (147)
C(211)	9884 (54)	1688 (22)	3826 (39)	631 (172)	C(422)	5617 (57)	5613 (24)	3192 (40)	703 (192)
C(212)	10022 (47)	1410 (20)	3154 (34)	487 (149)	C(423)	6236 (54)	5787 (22)	2714 (38)	609 (170)
C(213)	9669 (48)	1604 (18)	2365 (35)	511 (155)	C(424)	7064 (57)	5550 (24)	2609 (40)	671 (186)
C(214)	9255 (42)	2088 (16)	2332 (30)	366 (130)	C(425)	7515 (54)	5155 (23)	3025 (39)	630 (174)
C(215)	9055 (37)	2317 (16)	2937 (26)	249 (110)	C(43)	8666 (45)	4289 (19)	3694 (31)	433 (141)

Table 2. Bond distances (Å) with e.s.d.'s

Ir(1)—I(1)	2.69 (1)	Ir(2)—I(1)	2.68 (1)
Ir(1)—I(2)	2.76 (1)	Ir(2)—I(2)	2.75 (1)
Ir(1)—I(3)	2.76 (1)	Ir(2)—I(3)	2.74 (1)
Ir(1)—I(4)	2.69 (1)	Ir(2)—I(5)	2.67 (1)
Ir(1)—P(1)	2.35 (1)	Ir(2)—P(3)	2.31 (1)
Ir(1)—P(2)	2.31 (1)	Ir(2)—P(4)	2.33 (1)
P(1)—C(11)	1.82 (6)	P(3)—C(31)	1.89 (6)
P(1)—C(12)	1.90 (6)	P(3)—C(32)	1.85 (6)
P(1)—C(13)	1.84 (5)	P(3)—C(33)	1.90 (7)
P(2)—C(21)	1.91 (6)	P(4)—C(41)	1.83 (5)
P(2)—C(22)	1.87 (5)	P(4)—C(42)	1.96 (6)
P(2)—C(23)	1.83 (5)	P(4)—C(43)	1.83 (6)
C(11)—C(111)	1.46 (8)	C(31)—C(311)	1.35 (10)
C(111)—C(112)	1.48 (9)	C(311)—C(312)	1.46 (8)
C(112)—C(113)	1.41 (9)	C(312)—C(313)	1.41 (9)
C(113)—C(114)	1.39 (11)	C(313)—C(314)	1.41 (9)
C(114)—C(115)	1.48 (9)	C(314)—C(315)	1.36 (8)
C(115)—C(11)	1.39 (7)	C(315)—C(31)	1.46 (10)
C(12)—C(121)	1.37 (6)	C(32)—C(321)	1.34 (9)
C(121)—C(122)	1.33 (8)	C(321)—C(322)	1.34 (11)
C(122)—C(123)	1.37 (8)	C(322)—C(323)	1.37 (11)
C(123)—C(124)	1.46 (8)	C(323)—C(324)	1.47 (14)
C(124)—C(125)	1.34 (8)	C(324)—C(325)	1.40 (13)
C(125)—C(12)	1.46 (7)	C(325)—C(32)	1.53 (8)
C(21)—C(211)	1.36 (8)	C(41)—C(411)	1.39 (8)
C(211)—C(212)	1.47 (9)	C(411)—C(412)	1.39 (9)
C(212)—C(213)	1.42 (8)	C(412)—C(413)	1.34 (10)
C(213)—C(214)	1.49 (8)	C(413)—C(414)	1.43 (10)
C(214)—C(215)	1.33 (7)	C(414)—C(415)	1.37 (8)
C(215)—C(21)	1.33 (7)	C(415)—C(41)	1.42 (7)
C(22)—C(221)	1.35 (9)	C(42)—C(421)	1.32 (9)
C(221)—C(222)	1.49 (9)	C(421)—C(422)	1.59 (9)
C(222)—C(223)	1.46 (10)	C(422)—C(423)	1.39 (11)
C(223)—C(224)	1.37 (11)	C(423)—C(424)	1.30 (10)
C(224)—C(225)	1.46 (9)	C(424)—C(425)	1.38 (9)
C(225)—C(22)	1.37 (7)	C(425)—C(42)	1.36 (10)
I(6)—I(7)	2.89 (1)	I(6)—I(8)	2.92 (1)

Table 3. Bond angles (°) with e.s.d.'s

P(1)—Ir(1)—I(3)	166.9 (4)	P(3)—Ir(2)—I(3)	170.5 (3)
P(2)—Ir(1)—I(2)	171.0 (4)	P(4)—Ir(2)—I(2)	168.3 (3)
I(4)—Ir(1)—I(1)	167.4 (1)	I(5)—Ir(2)—I(1)	167.2 (2)
P(1)—Ir(1)—P(2)	98.5 (5)	P(3)—Ir(2)—P(4)	97.9 (5)
P(1)—Ir(1)—I(1)	96.9 (4)	P(3)—Ir(2)—I(1)	92.4 (4)
P(1)—Ir(1)—I(2)	88.7 (4)	P(3)—Ir(2)—I(2)	93.9 (4)
P(1)—Ir(1)—I(4)	92.5 (4)	P(3)—Ir(2)—I(5)	95.8 (4)
P(2)—Ir(1)—I(1)	92.1 (4)	P(4)—Ir(2)—I(1)	97.5 (4)
P(2)—Ir(1)—I(3)	94.5 (3)	P(4)—Ir(2)—I(3)	89.8 (3)
P(2)—Ir(1)—I(4)	94.7 (4)	P(4)—Ir(2)—I(5)	91.1 (4)
I(1)—Ir(1)—I(2)	81.5 (1)	I(1)—Ir(2)—I(2)	81.8 (1)
I(1)—Ir(1)—I(3)	80.6 (1)	I(1)—Ir(2)—I(3)	81.0 (1)
I(2)—Ir(1)—I(3)	78.2 (1)	I(2)—Ir(2)—I(3)	78.5 (1)
I(4)—Ir(1)—I(2)	90.4 (1)	I(5)—Ir(2)—I(2)	87.9 (1)
I(4)—Ir(1)—I(3)	88.3 (1)	I(5)—Ir(2)—I(3)	89.5 (1)
Ir(1)—P(1)—C(11)	120 (2)	Ir(2)—P(3)—C(31)	112 (2)
Ir(1)—P(1)—C(12)	113 (2)	Ir(2)—P(3)—C(32)	117 (2)
Ir(1)—P(1)—C(13)	110 (2)	Ir(2)—P(3)—C(33)	116 (2)
Ir(1)—P(2)—C(21)	115 (1)	Ir(2)—P(4)—C(41)	116 (2)
Ir(1)—P(2)—C(22)	114 (2)	Ir(2)—P(4)—C(42)	120 (2)
Ir(1)—P(2)—C(23)	116 (2)	Ir(2)—P(4)—C(43)	114 (2)
C(11)—P(1)—C(12)	104 (3)	C(31)—P(3)—C(32)	99 (3)
C(11)—P(1)—C(13)	105 (2)	C(31)—P(3)—C(33)	102 (3)
C(12)—P(1)—C(13)	104 (2)	C(32)—P(3)—C(33)	109 (3)
C(21)—P(2)—C(22)	104 (2)	C(41)—P(4)—C(42)	101 (2)
C(21)—P(2)—C(23)	103 (2)	C(41)—P(4)—C(43)	102 (2)
C(22)—P(2)—C(23)	104 (2)	C(42)—P(4)—C(43)	101 (3)
Ir(1)—I(1)—Ir(2)	85.5 (1)	Ir(1)—I(2)—Ir(2)	82.7 (1)
Ir(1)—I(3)—Ir(2)	83.0 (1)	I(7)—I(6)—I(8)	177.2 (5)
C(111)—C(11)—C(115)	121 (5)	C(311)—C(31)—C(315)	123 (5)
C(112)—C(11)—C(11)	114 (5)	C(312)—C(31)—C(31)	120 (6)
C(113)—C(112)—C(111)	120 (6)	C(313)—C(312)—C(311)	116 (6)
C(114)—C(113)—C(112)	126 (7)	C(314)—C(313)—C(312)	123 (5)
C(115)—C(114)—C(113)	111 (6)	C(315)—C(314)—C(313)	120 (6)
C(11)—C(115)—C(114)	125 (5)	C(31)—C(315)—C(314)	117 (7)
C(121)—C(12)—C(125)	119 (5)	C(321)—C(32)—C(325)	126 (6)
C(122)—C(121)—C(12)	124 (5)	C(322)—C(321)—C(32)	117 (6)
C(123)—C(122)—C(121)	117 (5)	C(323)—C(322)—C(321)	126 (8)
C(124)—C(123)—C(122)	122 (6)	C(324)—C(323)—C(322)	118 (8)
C(125)—C(124)—C(123)	118 (5)	C(325)—C(324)—C(323)	121 (8)
C(12)—C(125)—C(124)	118 (4)	C(32)—C(325)—C(324)	112 (7)
C(211)—C(21)—C(215)	128 (6)	C(411)—C(41)—C(415)	115 (5)
C(212)—C(21)—C(21)	117 (5)	C(412)—C(41)—C(41)	126 (5)
C(213)—C(212)—C(211)	118 (5)	C(413)—C(412)—C(411)	114 (7)
C(214)—C(213)—C(212)	114 (5)	C(414)—C(413)—C(412)	125 (6)
C(215)—C(214)—C(213)	126 (5)	C(415)—C(414)—C(413)	117 (5)
C(21)—C(215)—C(214)	115 (5)	C(41)—C(415)—C(414)	121 (6)
C(221)—C(22)—C(225)	122 (5)	C(421)—C(42)—C(425)	132 (6)
C(222)—C(221)—C(22)	123 (6)	C(422)—C(421)—C(42)	110 (6)
C(223)—C(222)—C(221)	114 (6)	C(423)—C(422)—C(421)	118 (6)
C(224)—C(223)—C(222)	120 (6)	C(424)—C(423)—C(422)	120 (6)
C(225)—C(224)—C(223)	122 (6)	C(425)—C(424)—C(423)	126 (7)
C(22)—C(225)—C(224)	117 (6)	C(42)—C(425)—C(424)	114 (6)
P(1)—C(11)—C(111)	115 (4)	P(3)—C(31)—C(311)	121 (5)
P(1)—C(11)—C(115)	122 (4)	P(3)—C(31)—C(315)	115 (5)
P(1)—C(12)—C(121)	122 (4)	P(3)—C(32)—C(321)	123 (4)
P(1)—C(12)—C(125)	119 (3)	P(3)—C(32)—C(325)	111 (5)
P(2)—C(21)—C(211)	113 (4)	P(4)—C(41)—C(411)	125 (4)
P(2)—C(21)—C(215)	119 (4)	P(4)—C(41)—C(415)	120 (4)
P(2)—C(22)—C(221)	121 (4)	P(4)—C(42)—C(421)	112 (5)
P(2)—C(22)—C(225)	115 (4)	P(4)—C(42)—C(425)	116 (5)

positions of the anion dispose of the possibility of undetected crystallographic symmetry. Furthermore, the plane of projection, defined by Ir(1), Ir(2), I(2) and I(3), does not coincide with any of the unit-cell faces. Indeed, certain bridging compounds have previously been reported (Roberts, Ferguson & Senoff, 1975; Paulus, Fritz & Schwarzahns, 1968) to exhibit additional pseudosymmetry.

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