

Crystal Structure of Trichlorobis-(*o*-methoxyphenyldimethylarsine)rhodium(III)

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As a part of a study ^{1,2} on the behaviour of the d^8 trivalent ions of the transition metals with some bidentate ligands, which have one arsenic and one nitrogen or oxygen donor, the crystal structure

of trichlorobis-(*o*-methoxyphenyldimethylarsine)-rhodium(III) has been determined by X-ray analysis.

The compound, $C_{18}H_{26}O_2Cl_3As_2Rh$, is *orthorhombic* with $a = 9.077 \pm 0.012$, $b = 15.218 \pm 0.03$,

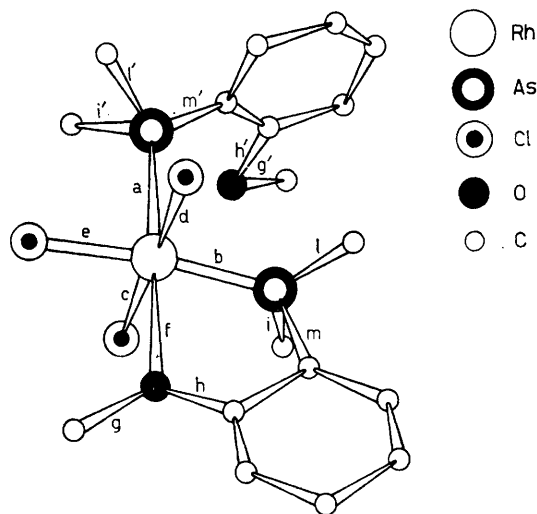
TABLE

Bond lengths and angles

<i>a</i>	2.331(05)	$\angle ab$	99.5° (0.5°)	$\angle ai'$	108.5° (2°)
<i>b</i>	2.353(05)	$\angle ac$	94.9° (0.5°)	$\angle al'$	115° (2°)
<i>c</i>	2.33(1)	$\angle ad$	88.6° (0.5°)	$\angle am'$	115° (2°)
<i>d</i>	2.35(1)	$\angle ae$	87.5° (0.5°)	$\angle bi$	115° (2°)
<i>e</i>	2.39(1)	$\angle af$	176° (1°)	$\angle bl$	120° (2°)
<i>f</i>	2.25(2)	$\angle bc$	89.9° (0.5°)	$\angle bm$	101° (2°)
<i>g</i>	1.38(4)	$\angle bd$	86.6° (0.5°)	$\angle fh$	119° (2°)
<i>g'</i>	1.45(6)	$\angle be$	173° (2°)	$\angle fg$	120° (2°)
<i>h</i>	1.30(4)	$\angle bf$	80.6° (1°)	$\angle hg$	120° (2°)
<i>h'</i>	1.27(4)	$\angle cd$	175.4° (1°)	$\angle h'g'$	116° (2°)
<i>i</i>	1.93(4)	$\angle ce$	89.7° (1°)	$\angle il$	108° (2°)
<i>i'</i>	1.95(5)	$\angle cf$	89.1° (1°)	$\angle im$	104° (2°)
<i>l</i>	2.06(4)	$\angle de$	93.3° (1°)	$\angle lm$	102° (2°)
<i>l'</i>	2.07(4)	$\angle df$	87.3° (1°)	$\angle l'l'$	102° (2°)
<i>m</i>	1.87(3)	$\angle ef$	92.4° (1°)	$\angle l'm'$	102° (2°)
<i>m'</i>	1.95(4)			$\angle l'm'$	108° (2°)

The figures in parentheses are estimated standard deviations.

$c = 16.954 \pm 0.03 \text{ \AA}$, space group $P2_12_12_1$, $D_m = 1.76 \text{ g. cm.}^{-3}$, $D_c = 1.79 \text{ g. cm.}^{-3}$, $Z = 4$. The



FIGURE

structure was solved by three-dimensional Patterson and electron-density syntheses, and refined by the least-squares method. The $R(hkl)$ index is 11.4% for 1412 reflections.

The Figure shows a perspective view of the molecule. Bond lengths and angles are listed in the Table.

The co-ordination polyhedron is a distorted octahedron with the two arsenic atoms in the *cis*-position. The distortion is particularly evident in the angle $\angle bf$ which is approximately 10° smaller than that which would be present in a perfectly regular octahedral arrangement. In the present case³ the chelation does not affect the length of the C–O bonds, which show the same double-bond character in the two ligands, only one of which is co-ordinated. In addition the lengths of both Rh–As bonds are a little less than the sum of the covalent radii, showing some back donation effect. The benzene rings show no significant deviation from normal geometry and no unusual contacts are observed between the different molecules in the unit cell.

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¹ L. Volponi, C. Panattoni, R. Graziani, and G. Bombieri, *Gazzetta*, 1966, **96**, 1158.

² C. Panattoni, L. Volponi, G. Bombieri, and R. Graziani, *Gazzetta*, 1967, **97**, 1006.

³ G. Bombieri, R. Graziani, C. Panattoni, and L. Volponi, *Chem. Comm.*, 1967, 977.