Coordination Chemistry Reviews
Elsevier Publishing Company, Amsterdam – Printed in The Netherlands

X-RAY BIBLIOGRAPHY

compiled by M. KEETON

Department of Chemistry, McMaster University, Hamilton, Ontario (Canada)

(Received July 15th, 1971)

Tetra-*n*-butylammonium iodopentadecacarbonylhexarhodate, $N(C_4H_9)_4\ Rh_6(CO)_{15}I$
($P2_1/n$) $R = 4.1\%$ for 1650 reflections. The mean edge of the metal octahedron is 2.746 Å long. Each of four carbonyl groups bridges three metal atoms on alternate faces of the octahedron and the remaining carbonyl groups and the iodine atom behave as unidentate ligands. The Rh–I distance is 2.709 Å. The idealized symmetry of the anion is C_s.
Vincenzo G. Albano, Pier L. Bellon and Mirella Sansoni, *J. Chem. Soc. A*, (1971) 678.

Complex formed from isonitrosoacetophenone and potassium *o*-nitrophenolate $KC_6H_4(NO_2)OHONCHC(O)C_6H_5$
($P2_1/c$) $R = 5.3\%$ for 1557 reflections. The potassium atom is surrounded by eight electron-rich atoms of the ligands. Seven of these are oxygen atoms and one is the oxime-nitrogen atom. The two ligands may be regarded as chelated, the *o*-nitrophenol forms a six-membered ring and the isonitrosoacetophenone ligand makes a five-membered ring by the interaction of potassium ion with the keto-oxygen atom and the oxime nitrogen atom. A polymeric sequence is formed parallel to the *b* axis when two oxygen atoms from the *o*-nitrophenolate interact with two symmetry-related potassium ions. The *o*-nitrophenolate is connected to the isonitrosoacetophenone by a symmetrical hydrogen bond of length 2.51 Å.
M. A. Bush and Mary R. Truter, *J. Chem. Soc. A*, (1971) 745.

Methyltriphenylphosphonium bis(dodecahydro-nido-decaborato) zincate, $(Ph_3MeP)_2Zn(B_{10}H_{12})_2$
($C2/c$) $R = 8.9\%$ for 4569 reflections. The anionic complex comprises two bidentate $B_{10}H_{12}{}^{2-}$ ligands co-ordinated tetrahedrally to zinc(II). The cadmium and mercury analogues are isostructural.
N.N. Greenwood, J.A. McGennety and J.D. Owen, *J. Chem. Soc. A*, (1971) 809.

Arsenic trichloride trimethylamine, $AsCl_3 \cdot NMe_3$
($P2_1/c$) $R = 8.3\%$ for 513 independent reflections. The structure consists of discrete $AsCl_3$, NMe_3 molecules which are based on trigonal bipyramidal arsenic co-ordination.
M. Webster and S. Keats, *J. Chem. Soc. A*, (1971) 836.

Coord. Chem. Rev., 7 (1971) 229–238

Bis tricarbonyl-(3-chloro-2-methylnitrosobenzene)iron, $C_{20}H_{12}Cl_2N_2O_8Fe_2$

($P2_1/n$) R = 5 8% for 1008 reflections The molecules are centrosymmetric with the two iron and two nitrogen atoms coplanar. The oxygen atoms lie on either side of this plane in positions such that each is bonded to one iron atom only Thus, the nitroso groups bridge the iron atoms unsymmetrically

M J Barrow and O S Mills, *J Chem Soc A*, (1971) 864

Arsenic trifluoride – antimony pentafluoride

($P2_1/m$) R = 12 2% for 557 reflections The atomic arrangement is consistent with the formulation as a molecular adduct, but there are also considerable contributions to the overall structure from the ionic form $AsF_2^+SbF_6^-$ and from an endless-chain arrangement

A J. Edwards and R J C. Sells, *J Chem. Soc. A*, (1971) 942.

μ-Oxo-bis-*N*,*N'*-ethylenebis(salicylideneiminato)iron(III) dichloromethane, Fe(salen)$_2$O, CH_2Cl_2

($P2_1/c$) R = 10 9% for 2836 reflections. The Fe–O–Fe angle was found to be 142 2° The magnetic anisotropy is discussed in terms of the "dipolar coupling" approach to the spin–spin exchange in the molecule

P. Coggon, A T McPhail, F E Mabbs and V N McLachlan, *J Chem Soc A*, (1971) 1014

Protactinium tetrabromide, $PaBr_4$

($I\Delta/amd$) R = 12 3% The crystals are tetragonal $PaBr_4$ is isostructural with $ThCl_4$. The Pa–Br bond distances are 2 77 and 3 07 Å, a value of 1 63 Å for the covalent single bond radius of Pa^{IV} is given

D. Brown, T J Petcher and A J Smith, *J Chem. Soc A*, (1971) 908

π-Cyclopentadienyl-*trans*-dicarbonyliodo(triphenylphosphine)molybdenum, (π-C_5H_5)Mo(CO)$_2$(PPH$_3$)I, (I)

π-cyclopentadienyl-*cis*-carbonylchloro-1,2-bis(diphenylphosphine)ethane molybdenum, (π-C_5H_5)Mo(CO)(PPh$_2$CH$_2$CH$_2$PPh$_2$)Cl, (II)

Compound I crystallizes in triclinic space group $P\bar{1}$ Compound II in the orthorhombic space group *Pbca* R = 7 5% for 3425 reflections for I and 6 7% for 1706 independent reflections for II Each molybdenum atom is in a distorted square pyramid defined by the π-cyclopentadienyl ring at the apex and the other ligands at the corners of the base Mo–C bond lengths are 1 984 ± 0 015 Å and 1 982 ± 0 018 Å in I and in II 1 938 ± 0 018 Å Mo–P bond lengths are 2 481 ± 0 005 Å in I and in II 2 496 ± 0 004 Å and 2 439 ± 0 005 Å The mean Mo–I and +Mo–Cl distances are 2 858 ± 0 003 Å and 2 541 ± 0 005 Å The Mo–C separations in I are a mean 2 333 Å and in II a mean 2 310 Å

M.A. Bush, A D.V Hardy, Lj Manojlovic-Muir and G A. Sim, *J Chem Soc A*, (1971) 1003

Bis(imidotetramethyldithiodiphosphino-*S*,*S*)nickel(II), $SP(CH_3)_2NP(CH_3)_2S_2Ni$
$(P2_1/c)$ $R = 7.49\%$ for 2357 independent reflections. Discrete molecular units of this complex are separated by normal Van der Waal distances The central Ni^{II} ion is tetrahedrally coordinated by four sulfur atoms, the mean Ni–S distance being 2 282 (12) Å
M R Churchill, J Cooke, J P Fennessey and J Wormald, *Inorg Chem* , 10 (1971) 1031

Dichloronitrosylbis(triphenylphosphine)iridium, $IrCl_2(NO)(P(C_6H_5)_3)_2$
$(C_{2h}^{6}-I2/a)$ $R = 3\ 2\%$ for 1338 reflections The geometry around the iridium atom is square-pyramidal with the nitrogen atom of the nitrosyl group occupying the apical position. Although oxygen and nitrogen atoms are disordered around the two-fold axis, it is found that the iridium–nitrogen–oxygen bond angle is 123(2)°. Important bond lengths are Ir–Cl 2 348 Å, Ir–P 2 367 Å, Ir–N 1 94 Å, N–O 1 03 Å The nitrosyl ligand is co-ordinated to iridium in a nonlinear fashion
D M P Mingos and J A Ibers, *Inorg Chem* , 10 (1971) 1035

Iodomethylnitrosylbis(triphenylphosphine)iridium, $IrI(CH_3)(NO)(P(C_6H_5)_3)_2$
$(C_{2h}^{6}-I2/a)$ $R = 3.3\%$ for 1304 independent reflections The coordination around the iridium is square pyramidal with the nitrosyl group occupying the apical position and the other ligands in the basal plane Important bond lengths are Ir–N 1.91 Å, Ir–P 2 348 Å, Ir–I 2 726 Å, Ir–C 2 05 Å, N–O 1.23 Å
D M P. Mingos, J A Ibers and W T Robinson, *Inorg Chem.*, 10 (1971) 1043.

Bis(DL-histidinato)nickel(II)monohydrate, Ni(DL-his)$_2$ H_2O and Bis(L-histidinato)nickel(II)monohydrate, Ni(L-his)$_2 \cdot H_2O$
*Aba*2, C_2, respectively In both compounds the histidinate ion acts as a tridentate ligand In both crystals the three-band systems observed are as expected for a nickel(II) atom in an effective ligand field of octahedral symmetry
P L. Meredith and R A. Palmer, *Inorg Chem* , 10 (1971) 1049

Trinitrotriamminecobalt(III), $Co(NO_2)_3(NH_3)_3$
$(P2_12_12_1)$ $R = 9\ 0\%$ for 670 reflections The molecule is the meridial isomer All intramolecular non-bonded separations are normal ranging upward from 2.70 Å The six nitrogen atoms are bonded to the cobalt atom in an octahedral arrangement. The structure is a very closely packed and compact one.
M Laing, S Baines and P Sommerville, *Inorg Chem* , 10 (1971) 1057

Tris(ethylenediamine)cobalt(III)di-μ-chloro-bis(trichlorocuprate(II))dichloride dihydrate, $Co(N_2C_2H_8)_3 2Cu_2Cl_8Cl_2\ \ 2H_2O$
(D_{2h}^{15}, *Pbca* of the orthorhombic system) $R = 6\ 5\%$ for 1275 independent reflections The $Cu_2Cl_8{}^{4-}$ anion consists of two distorted trigonal bipyramids sharing a common edge
D J Hodgson, P K Hale and W E Hatfield, *Inorg Chem* , 10 (1971) 1061

Dichlorobis(4-methylpyridine 1-oxide)copper(II), $(C_6H_7NO)_2CuCl_2$ (green modification)
$(P2_1/c)$ R = 8 7% for 687 reflections The copper atoms lie at centres of symmetry and are co-ordinated to two chlorine and two oxygen atoms in a *trans* square planar geometry
D R Johnson and W.H. Watson *Inorg Chem.*, 10 (1971) 1068

Tetraethylammonium hexabromoantimonate(V), $(C_2H_5)_4NSbBr_6$
$(I4_1\ md)$ R = 4 2% for 276 independent reflections The structure consists of slightly disordered octahedral $Sb^VBr_6{}^-$ anions and $(C_2H_5)_4N^+$ cations which are twofold disordered about intersecting mirror planes The similar sizes of tetraethylammonium and the hexabromoantimonate(V) ions permit efficient packing, hence stability
M L Hackert, R A. Jacobson and T A Keiderling, *Inorg Chem* , 10 (1971) 1075

Potassium lead hexanitrocuprate(II), $K_2PbCu(NO_2)_6$
R = 2.8% for 1366 reflections, of which 464 are independent The hexanitrocuprate ion has T_h symmetry The compound is isostructural with $K_2BaCu(NO_2)_6$
D L Cullen and E C Lingafelter, *Inorg Chem* , 10 (1971) 1264

Hexacarbonoctacobalt tetracosacarbonyl, $Co_8(CO)_{24}C_6$
$(P\overline{1})$ R = 6 8% for 1386 reflections. At both ends of the molecule are the well-established $-CCo_3(CO)_9$ groups of the parent compound; these are linked by a four-carbon chain containing two acetylene bonds, one of which forms a bridge with a $Co_2(CO)_6$ group.
R J Dellaca and B R Penfold, *Inorg Chem* , 10 (1971) 1269

μ-Oxalato-bis(tetrapyridineruthenium(II)) tetrafluoroborate,
$Ru(C_5H_5N)_4C_2O_4Ru(C_5H_5N)_4\ (BF_4)_2$
$(P2_1/c)$ R = 6 9% for 3165 reflections The two ruthenium atoms are linked to a centro-symmetric planar tetradentate oxalate ligand. The co-ordinating ligands from slightly distorted octahedra about each ruthenium atom consisting of two oxygen atoms from the oxalate ligand and four nitrogen atoms from the pyridine ligands The tetrafluoroborate anion is disordered about one of the threefold B—F axes of the tetrahedron
P T. Cheng, B R Loescher and S C Nyburg, *Inorg Chem* , 10 (1971) 1275.

Dichlorobis(4-methylpyridine 1-oxide)copper(II) (yellow modification)
$(P2_1/n)$ R = 6 1% for 1469 non-zero reflections The coordination around the copper ion may be described as highly distorted square-base pyramid with a chlorine atom at the apical site The oxygen bridging system contains unequal Cu—O bond lengths
D R. Johnson and W.H. Watson, *Inorg Chem.*, 10 (1971) 1281

μ-Diazido-tetrakis(triphenylphosphine)dicopper(I), $[Cu(N_3)(P(C_6H_5)_3)_2]_2$
$(P2_1/c\,(C_{2h}^5))$ $R = 6\ 5\%$ for 2628 non-zero reflections Two copper atoms are bridged by the two azide groups through terminal nitrogens to form an eight-membered ring Both azide ions possess a linear structure with the N–N distances all equal. The copper(I) ion manifests its tetrahedral geometry with distortions because of a large P–Cu–P angle (122.3(1)°)
R F Ziolo, A P Gaughan, Zvi Dori, C G Purpont and R Eisenberg, *Inorg Chem.*, 10 (1971) 1289

Magnesium orthovanadate, $Mg_3(VO_4)_2$
$(Cmca)$ $R = 4\ 7\%$ for 1697 reflections The structure consists of nearly cubic close packing of oxygen atom layers The Mg ions are in octahedral sites and the V ion in a tetrahedral site The VO_4 group has a crystallographic mirror plane Cations lying on sites of C_m symmetry have Mg–O bond length 2 092 Å, compared with 2 098 Å for cations on sites of C_{2h} geometry
N Krishnamachari and C Calvo, *Can J Chem*, 49 (1971) 1629.

Chlorobis(dimethylglyoximato)triphenylphosphinerhodium(III),
$Rh(C_4H_7N_2O_2)_2P(C_6H_5)_3Cl$
It crystallizes in the monoclinic space group $(P2_1/c)$ $R = 5\ 5\%$ for 5658 reflections The $Rh(C_4H_7N_2O_2)_2$ system is not strictly planar, rather the two C_2N_2 chelate rings are tilted away from the phenyl groups As a result, the rhodium atom is displaced from the plane toward the phosphorus by 0 126 Å Essentially, all phenyl groups and chelate rings are planar However, the molecule has no crystallographic symmetry or idealized point group symmetry
F A Cotton and J G. Norman, Jr, *J Amer Chem Soc*, 93 (1971) 80

A sultine derivative, π-$C_5H_5Fe(CO)_2C_4H_5SO_2$
$(P2_1/c\,(C_{2h}^5))$ $R = 5\ 8\%$ for 1178 independent reflections The π-$C_5H_5Fe(CO)_2$ portion has the usual stereochemistry, however, the incoming SO_2 molecule is involved in a sultine ring which is bonded to the iron atom via an iron linkage
M R Churchill and J Wormald, *J Amer Chem Soc.*, 93 (1971) 354

Potassium hydrogen di-iodate, $KIO_3\ HIO_3$
$(P2_1/c)$ $R = 5\ 0\%$ for 1392 observed reflections The iodate units are all basically pyramidal, weak interionic I–O contacts complete a very distorted octahedral environment around three iodine atoms There is a capped octahedral (7-co-ordinate) environment around the remaining iodine atom
I.Y.Y. Chan and F W.B. Einstein, *Can. J Chem*, 49 (1971) 469

Bis-(2,4-pentanedionato)4-aminopyridinecopper(II)
$(P2_1/c)$ $R = 7\ 0\%$ The geometry about each copper atom is approximately that of a tetragonal pyramid The apex of the pyramid is occupied by an oxygen atom, the heterocyclic nitrogen is in the basal plane, and the 4-amino group is uncoordinated and hydrogen bonded to oxygen in a neighbouring molecule
G W Bushnell, *Can J. Chem*, 49 (1971) 555

$Ca_3(AsO_4)_2$

($R3c$) $R = 6.3\%$ for 769 reflections. The structure consists of CaO_n polyhedra and AsO_4 tetrahedra paralleling the c-axis The chain on the three-fold axis has only one AsO_4 per half cell with one and a half cations between adjacent arsenic atoms This structure is the same as that of $Ca_3(VO_4)_2$

R Gopal and C Calvo, *Can J Chem.*, 49 (1971) 1036.

α-Li_5GaO_4

($Pbca$) $R = 12.9\%$ for 249 reflections The structure is a superstructure of Li_2O with "isolated" GaO_4 groups and vacancies in the cation lattice.

F Stewner and R Hoppe, *Acta Cryst* , B27 (1971) 616

Hydrazinium (+2) hexafluorotitanate(IV), $N_2H_6TiF_6$

($Ia3$) $R = 8.0\%$. The structure is formed of discrete $TiF_6{}^{2-}$ octahedra, with Ti—F 1 855 Å connected by N—H F bonds The hydrazine (+2) group has a *trans* configuration

B Kojic-Prodic, B Matkovic and S Scavnicar, *Acta Cryst* , B27 (1971) 635

Hydrazinium (+2) hexafluorozirconate, $N_2H_6ZrF_6$

$C2/m$ (C_{2h}^3) One symmetrically independent F atom and one N atom occupy general positions, two F atoms and the Zr atom occupy special positions on the mirror plane and two F atoms lie on the twofold axes Zr is eightfold coordinated by fluorine in the shape of a bicapped trigonal prism Each prism shares edges with two neighbouring polyhedra forming infinite zigzag chains held together by N—H F hydrogen bonds

B Kojic-Prodic, B Matkovic and S Scavnicar, *Acta Cryst* , B27 (1971) 638

Zinc diborate, ZnB_4O_7

($Pbca$) $R = 6.7\%$ for 530 observed reflections The structure consists of BO_3 triangles and BO_4 tetrahedra sharing a common vertex Each zinc atom is surrounded by four close oxygen atoms arranged in an irregular tetrahedron

M Martinez-Ripoll, S Martinez-Carrera and S Garcia-Blanco, *Acta Cryst* , B27 (1971) 672

Copper metaborate, CuB_2O_4

($I\bar{4}2d$) $R = 5.3\%$. All boron atoms are tetrahedrally coordinated The structure consists of BO_4 tetrahedra sharing the four common oxygen atoms Each copper atom is surrounded in a planar-square coordination by four oxygen atoms. All interatomic distances are of the usual magnitude

M. Martinez-Ripoll, S. Martinez-Carrera and S Garcia-Blanco, *Acta Cryst.*, B27 (1971) 677

Bis-μ-(tri-1,2,4-triazolo-N^1,N^2)-triaquonickel nickel hexanitrate dihydrate,
$(H_2O)_3(C_2H_3N_3)_3Ni_2Ni(NO_3)_6(H_2O)_2$

($P2_1/c$) R = 4.5% based upon 5201 observed reflections The structure consists of discrete centrosymmetric trinuclear cations $(H_2O)_3(C_2H_3N_3)_3Ni_2Ni^{6+}$ in which the central nickel ion is joined to each terminal nickel ion by three planar triazoles. Three molecules of water complete the octahedral coordination of the terminal nickel ions

Curt W. Reimann and Marcello Zocchi, *Acta Cryst.*, B27 (1971) 682.

Hydrated praseodymium chelate of 1,1,1,2,2,3,3-heptafluoro-7,7-dimethyl-4,6-octanedione,
$Pr_2(fod)_6 \cdot 2H_2O)$

($P2_1/n$) R = 8 5% for 3706 reflections A dimer is formed through bridging across two carbonyl oxygen atoms as well as a molecule of water The other water molecule was found to be situated between two perfluoro side-chains Both praseodymium atoms are eight co-ordinate, but the coordination geometries are different and related to a dodecahedron and a bicapped trigonal prism

J P R de Villiers and J.C A. Boeyens, *Acta Cryst* , B27 (1971) 692

Nickel acetate tetrahydrate, $Ni(C_2H_3O_2)_2 4H_2O$

($P2_1/c$) R = 6.8% for 800 reflections The nickel atom, located at the centre of symmetry, has a slightly distorted octahedral arrangement of oxygen atoms Each acetate group is planar and the groups are distributed in the form of the parallel sheets The structure is extensively hydrogen bonded

T C Downie, W Harrison, E S Raper and M A Hepworth, *Acta Cryst* , B27 (1971) 692

Diazidodipyridinecadmium, $Cd(N_3)_2(C_5H_5N)_2$

($I4_1/a$) R = 5.6% for 443 independent reflections The cadmium atom is octahedrally coordinated by six ligand nitrogen atoms These octahedra are linked together by the azide groups to form a three-dimensional net. The azide groups are linear and symmetrical

Ingela Agrell, *Acta Chem Scand* , 24 (1970) 3575.

$Na_2Cr_3O_8OH$ and $K_2Cr_3O_8OH$

($P2_1/m$) R = 9 8% for the sodium compound and R = 8 0% for the potassium compound The structure is formed by $Cr^{III}O_6$ octahedra, arranged in strings by sharing of edges, and $Cr^{VI}O_4$ tetrahedra, attached to the strings of octahedra by corner sharing to form a chain

Alo Jonsson, *Acta Chem Scand* , 24 (1970) 3627

$LiMoO_2AsO_4$

($Pn2_1a$) R = 3 95%. The structure is built up of MoO_6 octahedra interconnected by AsO_4 tetrahedra The lithium atoms are octahedrally surrounded by oxygen atoms

Barbro Linnros, *Acta Chem Scand* , 25 (1970) 3711.

Nickel(II)ethylenedithiodiacetate dihydrate, $NiZ \cdot 2H_2O$
($P4_12_12$) $R = 14.0\%$. The nickel atom is surrounded by a distorted octahedron formed by two *cis* sulphur atoms, equiplanar with two *cis* water molecules. The coordination octahedron is completed by two *trans* carboxyl oxygens.
J. Loub, J. Podlahova, *Inorg. Nucl. Chem. Letters*, 7 (1971) 409.

Tetraethylammonium tris(ethylxanthato)lead(II), $(C_2H_5)_4NPb(C_2H_5OCS_2)_3$
($P2_1/c$) $R = 10.0\%$ for 766 reflections. The crystal is ionic with tetraethylammonium as cation and tris(ethylaxanthato)lead(II) as anion. Each lead has as nearest neighbours six sulfur atoms. Five of the sulfur atoms are planar, the sixth forming an apex of a distorted pentagonal bipyramid.
W.G. Mumme and G. Winter, *Inorg. Nucl. Chem. Letters*, 7 (1971) 505.

$Re_2O_3(S_2CNEt_2)_4$
($P2_1/n$) $R = 8.5\%$ for 1733 reflections. The structure consists of an almost linear O–Re–O–Re–O grouping. There is a slight distortion from planarity of the ReS_4 units.
D.G. Tesley, R.A. Walton and D.L. Wells, *Inorg. Nucl. Chem. Letters*, 7 (1971) 523.

LiBr α-alanylglycine dihydrate, $LiBr \cdot NH_3CH(CH_3)CONHCH_2CO_2 \cdot (H_2O)_2$
($P2_1$) $R = 3.7\%$ for 1358 independent reflections. Both the carboxyl and the peptide group are planar. The two planes are mutually perpendicular. The lithium ion is bonded to four oxygen atoms in a nearly tetrahedral arrangement.
J.P. Declercq, R. Meulemans, P. Peret and M. Van Meerssche, *Acta Cryst.*, B27 (1971) 539.

Thaumasite, $[Ca_3Si(OH)_6 \cdot 12H_2O](SO_4)(CO_3)$
The space group is $P6_3$. It has a structure based on columns of empirical composition $Ca_3Si(OH)_6 \cdot 12H_2O^{4+}$ running parallel to the c axis, between which occur the CO_3^{2-} and the SO_4^{2-} groups. The thaumasite contains octahedral $Si(OH)_6^{2-}$ groups.
R.A. Edge and H.F.W. Taylor, *Acta Cryst.*, B27 (1971) 594.

MTe_3O_8 (M = Ti, Sn, Hf, Zr)
$TiTe_3O_8$, $SnTe_3O_8$, $HfTe_3O_8$, $ZrTe_3O_8$ are of space group $Ia3$. In $TiTe_3O_8$, the titanium atom has an octahedral coordination and the tellurium atom is surrounded as in paratellurite TeO_2. The $SnTe_3O_8$, $HfTe_3O_8$, and $ZrTe_3O_8$ structures are isostructural with that of $TiTe_3O_8$.
Georges Meunier and Jean Galy, *Acta Cryst.*, B27 (1971) 602.

UTe_3O_9
Space group is $Pa3$. The tellurium and uranium atoms have C.N.4 and 8 (with a linear UO_2^{2+} group).
Jean Galy and Georges Meunier, *Acta Cryst.*, B27 (1971) 608.

Dimeric methyl-1-propynylberyllium-trimethylamine, $CH_3BeC{\equiv}CCH_3\ N(CH_3)_3$
$(P2_1/n)$ $R = 4\ 9\%$ for 1156 reflections Two beryllium atoms are joined by two propynyl groups to form a planar four-membered ring with the terminal triple-bonded carbon atoms of the propynyl groups acting as the bridging atoms In addition, a methyl group and a trimethyl amine group are bonded to each beryllium atom The propynyl groups are almost in a plane defined by the beryllium and bridging carbon atoms with the amine and methyl groups disposed in another plane perpendicular to the first
B. Morosin and J. Howatson, *J Organometal Chem* , 29 (1971) 7.

Bis(triphenylphosphine)(1 1-dichloro-2,2-dicyanoethylene)platinum(0),
$PtCl_2C = C(CN)_2(P(C_6H_5)_3)_2$
$(C_{2h}^{5}-P2_1/c)$ $R = 5\ 3\%$ for 1777 reflections The coordination about the Pt atom is trigonal The two central atoms of the olefin ligand are not equidistant from the metal The olefinic C atoms lie strictly in the plane of the Pt and the two P atoms
A McAdam, J.N. Francis and J.A Ibers, *J Organometal Chem* , 29 (1971) 149

Bis(phthalocyaninato)uranium(IV), $C_{64}H_{32}N_{16}V$
$(C2/c)$ $R = 5\ 7\%$ for 6032 reflections The nitrogen atoms of the pyrrole rings of two Pc systems are in 8-fold coordination around the uranium atom The four nitrogen atoms of each ligand form a square The molecule possesses 422 symmetry.
A Gieren and W Hoppe, *Chem Commun* , (1971) 413

Bis(ethylenediammonium-monobromide)tetrabromocuprate(II),
$(NH_3CH_2CH_2NH_2\ HBr)_2CuBr_4$
$(P2_1/m)$ $R = 10\ 9\%$ for 944 reflections Four bromine atoms surround each copper atom in a very distorted compressed tetrahedron The ethylenediammonium ions are hydrogen bonded to the $CuBr_4^{2-}$ ions and the remaining two bromine atoms. The structure has C_s symmetry
Don N. Anderson and R D Willet, *Inorg Chim Acta*, 5 (1971) 41

Tetrakis(thioacetamide)nickel(II)bromide, $Ni(SCHN_2CH_3)_4Br_2$
$(B2/b)$ $R = 6\ 8\%$. The Ni atoms lie on a crystallographic centre of symmetry, thus the nickel and four sulfur atoms are coplanar The two bromine atoms occupy almost axial positions to the plane, but at long distances which implies only Van der Waals forces exist between metal and halogen.
W A. Spoffard III, P Boldrini and E L Amma, *Inorg Chim Acta*, 5 (1971) 70

Tetracarbonyl(hexamethylbicyclo 2,2,0 hexa-2,5-diene)chromium, $(CH_3)_6C_6Cr(CO)_4$
$(Pnma)$ $R = 11.1\%$ for 804 reflections The molecule possesses idealized $mm2(C_{2v})$ symmetry and is an octahedral complex of chromium in which the ligand occupies two positions *cis* to one another.
Gottfried Huttner and Owen S Mills, *J Organometal Chem* , 29 (1971) 275

Bis(1,2-propanediamine)copper(II) dichromate(VI)

R = 13.6% for 166 intensities. The copper is in approximate square planar coordination to nitrogen atoms of two 1,2-propanediamine molecules. The dichromate ion has a distorted tetrahedral configuration and two oxygen atoms from different dichromate groups semi-coordinate to the chromium atom making up the octahedron

R. Uggla, J Visti, M Klinga and M Nasakkala, *Suomen Kemistilehti*, B43 (1970) 488

cis-Dichlorobis(2,2′-dipyridyl)cobalt(III) tetrachlorocobaltate(II), *cis*-$[\mathrm{CoCl_2dip_2}]_2[\mathrm{CoCl_4}]$

($P2/n$) R = 13.6% for 1684 visually estimated reflections. The compound is composed of *cis*-$[\mathrm{CoCl_2dip_2}]^+$ and $[\mathrm{CoCl_4}]^{2-}$ ions in the ratio 2.1. The geometry around the $\mathrm{Co^{III}}$ atom is similar to that in *cis*-$[\mathrm{CoCl_2en_2}]^+$ and *cis*-$[\mathrm{CoCl_2phen_2}]$

M Hinamoto, S Ooi and H Huroya, *Bull Chem Soc Japan*, 44 (1971) 586

$\mathrm{Li_4Cr_2(C_4H_8)\ 4\ C_4H_{10}O}$

($Pccn$) R = 15.2% for 1097 reflections. The molecular symmetry is C_2 while the $\mathrm{Cr_2[(C_4H_8)LiO]_4}$ group is D_2 The coordination of the two chromium atoms is of the same type to that of Re in $[\mathrm{Re_2Cl_8}]^{2-}$ Cr—Cr is 1.975 ± 0.005 Å

J. Krausse and G Schodl, *J Organometal Chem* , 27 (1971) 59

$\mathrm{Et_4N^+[Br_2Co_2(CO)_8Ir]^-}$

($P2_1/n$) R = 11.3% for 898 reflections. The anion is tetrahedral about the iridium atom with the cobalt moieties in the normal trigonal bipyramidal configuration

P P Cradwick, *J. Organometal Chem* , 27 (1971) 251.

$\mathrm{[Ni(C_{10}H_{10}N_2)_2NO_3]NO_3}$

($P2_1/c$) R = 6.04% This is the first accurate report of a nickel(II) complex involving a bidentate nitrate group as well as an ionic one. The effect of coordination lengthens the N—O bonds N—O—(Ni) 1.265 and 1.277 and N—O, 1.210 Å

L F. Power and A M Tait, *Inorg Nucl Chem Letters*, 7 (1971) 337