Five-co-ordination in Complexes of Manganese(II), Cobalt(II), and Zinc(II) with *N*-Methylsalicylaldimine

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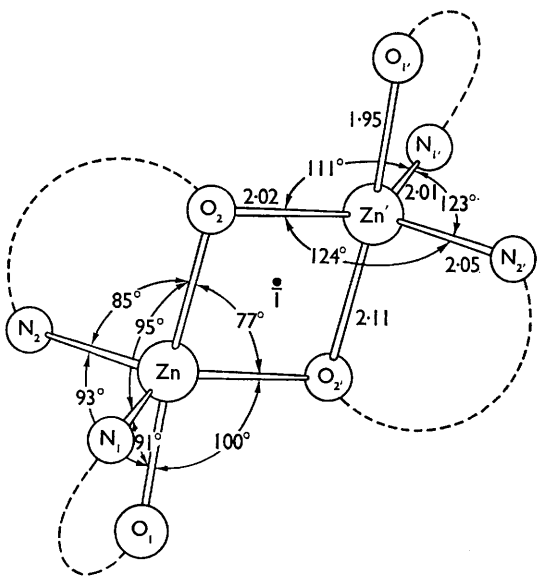
N-METHYLSALICYLALDIMINE forms complex compounds of the general formula bis-(*N*-methylsalicylaldiminato)metal(II) with many bivalent 3*d* metals. The structures of the β-form of the nickel complex[1] and of the α-form of the copper derivative[2] have been determined by *X*-ray analysis; the four ligand atoms are in a square planar configuration.

We have investigated the structure of the analogous complexes of manganese(II), cobalt(II), and zinc(II) by means of *X*-ray diffraction and found them to be mutually isomorphous and isostructural. Crystal data for the three complexes are, in the above order: $a = 9{\cdot}35$, 9·40, 9·48 Å; $b = 10{\cdot}76$, 10·72, 10·53 Å; $c = 8{\cdot}45$, 8·30, 8·45 Å; $\alpha = 100°\ 28'$, 96° 23′, 99° 45′; $\beta = 92°\ 29'$, 95° 16′, 92° 58′; $\gamma = 117°\ 51'$, 118° 10′, 117° 58′; $V = 731{\cdot}59$, 722·28, 725·71 Å; $Z = 2$; space group $P\bar{1}$.

The zinc complex has been examined by three-dimensional *X*-ray analysis, Cu-$K\alpha$ radiation being used. At the present stage of the refinement, the *R* factor is 10·7%, based on 1861 independent, observed reflections. The entire molecule (Figure) consists of dimers of bis-(*N*-methylsalicylaldiminato)zinc(II) formed by sharing two oxygen atoms by the zinc atoms of the two complex monomers. Thus the zinc atom is pentaco-ordinated in a distorted trigonal bipyramidal environment of two nitrogen and three oxygen atoms. The metal–metal distance is 3·22 Å. Bond lengths and angles about the zinc atom are shown in the Figure. It should be noted that the bridging oxygen–zinc intrachelate distance



The salicylaldimine residues are schematically represented by dotted lines.

is *ca.* 0·1 Å longer than the corresponding O–Zn interchelate distance.

The structures of these complexes of manganese(II) and cobalt(II) seem to be the first structures of five-co-ordinated high-spin complexes of these atoms so far elucidated by *X*-ray analysis.

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[1] E. Frasson, C. Panattoni, and L. Sacconi, *J. Phys. Chem.*, 1959, **63**, 1908.
[2] E. C. Lingafelter and C. Simmons, *Acta Cryst.*, 1961, **14**, 1222.