APPENDIX

LIST OF PUBLICATIONS

Abstract :

1. Study of some ternary complexes in solution., J.Ind.Chem. Soc., 49(5), (1972).

Mixed ligand formation constants K_{MAL} (where M = Cu^{2+}, Ni^{2+}, Zn^{2+} and Cd^{2+}; A = dipyridyl; L = catechol, pyrogallol or protocatechuic acid) have been determined by using a modified form of Irving-Rossotti titration technique. Values of K_{MAL} have been found to be very close to K_{ML_1} in Ni^{2+}, Zn^{2+} and Cd^{2+} and $K_{MAL} > K_{ML_1}$ in Cu(II) systems. This relationship has been explained in terms of charge neutralisation, interaction and favourable geometry.

2. Studies of mixed ligand complexes of Cu^{2+}, Ni^{2+}, Zn^{2+} and Cd^{2+}., Ind.J.Chem., 10, 742 (1972).

Irving-Rossotti technique has been applied to study the formation constants of the reaction

$$(MA)^{-} + L^{2-} \rightleftharpoons (MAL)^{3-}$$

where LH_2 = catechol, pyrogallol and 2,3-dihydroxynaphthalene. A similar equation with L^{3-} represents coordination of protocatechuic acid. Metal NTA 1:1 complexes are formed at lower pH and are stable at higher pH. The values of formation constants obtained for the mixed ligand system K_{MAL} are found to be less than the first formation constant in the binary system K_{ML_1}. This behaviour may be due to (i) the differences in electrostatic repulsions experienced by L^{2-} to add to M^{2+} (aqu), (ML) or $MNTA^{-}$, or (ii) the NTA^{3-} occupying more coordination positions around metal ions than L^{2-}. The formation constants of binary copper complexes

are higher than that of Ni-chelates, Zn-chelates and Cd-chelates. However, in ternary system the magnetitude of such differences is small. The observations has been explained in terms of Jahn-Tellor distortion.

3. A study of Cu^{2+}, Ni^{2+}, Zn^{2+} and Cd^{2+} heterochelates., Ind. J.Chem., 10(9), 948 (1972).

The complexes of the type (M.dipy.catechol), where M = Cu^{2+}, Ni^{2+}, Zn^{2+} and Cd^{2+} have been prepared and characterised by analytical, magnetic and spectral studies.

4. Some metal complexes with catechol, pyrogallol, 2,3-dihydroxy-naphthalene and protocatechuic acid., Ind.J.Chem., 10(12), 1190 (1972).

The formation constants of the chelates of different metal ions with the polyhydroxy aromatic ligands have been determined at 30°C. using Irving-Rossotti titration technique. The stabilities of the complexes follow the Irving-Williams order in each case and they increase in order

$$Tl^{+} < Mg^{2+} < Cd^{2+} < Co^{2+} < Zn^{2+} < Be^{2+} < UO_2^{2+} < Al^{3+}$$

The stabilities in case of Zn(II), Ni(II), UO_2^{2+} and Al^{3+} chelates have been explained on the basis of the relative contribution of ionic and covalent forces.

5. Study of quaternary complexes of Ni(II) with catechol and thioglycollic or thiolactic acid and pyridine or β- or γ-picoline., J.Inorg.Nucl.Chem., (in press).

The quaternary complexes of type $(MALX_2)Na_2.nH_2O$, where M = Ni(II), A = thioglycollic acid or thiolactic acid, L = catechol and X = pyridine or β- or γ-picoline have been

prepared and characterised by analytical, magnetic and spectral studies.

6. Study in some heterochelates Part III., Cu(II), Ni(II), Zn(II) or Cd(II) + Histidine or Ethylenediaminetetraacetic acid + polyhydroxy aromatic phenols systems., Bull.Chem. Soc. (Japan), (in press).

An extension of Irving-Rossotti technique has been applied to study the formation constant of mixed ligand complexes as follows :

$$(MA)^{+} + L^{2-} \rightleftharpoons (MAL)^{-}$$

$$(MB)^{2-} + L^{2-} \rightleftharpoons (MBL)^{4-}$$

where M = Cu(II), Ni(II), Zn(II) and Cd(II); A = Histidine; B = ethylenediaminetetraacetic acid and LH_2 = catechol, pyrogallol or 2,3-dihydroxynaphthalene.

The values obtained for the mixed ligand formation constants K_{MAL} and K_{MBL} are found to be less than the first formation constant K_{ML_1} in the binary systems.

7. Study in some heterochelates Part IV : Ni(II) + o-phenanthroline + mercapto acid or aromatic polyhydroxy ligand., Ind.J.Chem., (communicated).

Formation constants of mixed ligand complexes $\log K_{MAL}$, where M = Ni, A = 1,10-phenanthroline and L = aromatic polyhydroxy phenol, phenolic acid or mercapto acid, have been determined by using a modified form of Irving-Rossotti titration technique. The value of mixed ligand formation constant, K_{MAL} is almost equal to the value of K_{ML_1}. The results have been interpreted in terms of the nature of bonds.