

S U M M A R Y

Solution equilibria is one of the very important topics in inorganic chemistry. The chemistry of Schiff's base complexes enjoys considerable popularity. Many facts of this topic are being passing challenges to inorganic and structural chemists. There has been exhaustive work on this topic in past years yet the topic is not fully understood.

In the present study the new Schiff's bases have been synthesized by condensation of derivatives of (4 aryl) 4-aryl-2-aminothiazole and substituted salicyldehyde. The substituents on the former compound were CH_3 and while for the latter one they were CH_3 and Cl , H . The metal ions selected for the work were Cu(II) , Ni(II) , Co(II) Zn(II) , Mn(II) and Cd(II) . The experimental technique of determination of stability constant employed was based on (pH metry). The solvent used in the process was ethanol + water (1:1) mixture (V/V). In the present work the study of formation curve was obtained by Calvin and Bjerrum, pH titration technique which is one of the universal methods.

The technique involved a series of titrations of standard alkali viz. (i) perchloric acid, (ii) perchloric acid + ligand and (iii) perchloric acid + ligand + metal ion in the presence of inert electrolyte such as NaClO_4 . The total volume and temp. in all these titrations was kept constant.

The nature of titration curve, its displacement indicate the formation of complex.

The Schiff bases prepared possessed favourable features for formation of six membered chelate ring with metal ions, in which the phenolic hydrogen gets deprotonated and a $M - O$ bond is formed while nitrogen of azomethine group donates a pair of electrons (lone-pair) for the formation of co-ordinate bond.

The average number of ligand attached per metal ion (\bar{n}), free ligand exponent P_L were calculated from the titration curves using Irving and Rossotti method.

It was generally observed that the ligand solutions were colourless in acidic medium and developed various shades of colours depending on the metal ion. The stability constants were determined by half integral method, as well as graphical method.

The pK values for all the systems studied indicated following pattern.

$$TS^1 \cdot 5 \text{ MSA} > TS^1 - \text{SA} > TS^1 \cdot 5 \text{ CSA}$$

$$TS^4 \cdot 5 \text{ MSA} > TS^4 - \text{SA} > TS^4 \cdot 5 \text{ CSA}$$

The trend is explained on the basis of electron withdrawing character of the substituent groups.

The pK_{OH}^H values of Schiff's base were found higher compared to those of Vic-hydroxy aldehydes. This is presumably due to strong H-bonding caused by electronegative nitrogen atom.

Following conclusions can be deduced on the basis of the study carried out.

- 1) The substituents in the ligand aromatic ring alter the electron density at various sites and in turn affect proton-ligand, metal ligand stability constants as well as chelation.
- 2) The ligand formed fairly stable (1:1) complexes.
- 3) Further work on this line and collection of thermodynamic data for the above systems would help better understanding of the topic.