V SUMMARY

RESINIFIED LIGANDS

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Ligands, possessing specificity and selectivity for metal ions, have found a wide range of applications in analytical and synthetic fields. Numerous ligands containing one or more of the groups namely phenolic, carboxylic, carbonyl, thionyl, amino, etc. with suitable orientation have been developed and studied from theoretical and technological view points. Resinification of some of these ligands has been carried out by Rosset(1), Gregor(2), Morguchi and Miura (3), Trivedi and Krishnaswamy(4), Joshi and Patel(5), DeGeiso et al(6), Sen et al(7), Parikh(8), Varnon and Eccles(9), Zhou and Pan(10), Jones and Nyssen(11), Utkelov et al(12), etc. In our laboratories, work has been carried out on :

(i) Preparation and study of the linear polymers containing salicylic acid, salicylaldehyde, and 8-hydroxyquinoline by Parikh(8).

(ii) preparation of bis-bidentate ligands, and their chelate polymers and study of their magnetic , spectral, semiconducting and pyrolytic properties by Mistry(13), Kapadia(14) and Vyas(15),

(iii) preparation of condensation polymers containing phenolic, carboxylic and amino groups and study of their ion exchange characteristics by Sheth(16),

(iv) preparation of quinonic polymers and study of their redox properties by Godhwani(17),

(v) preparation of chelate polymers and ion exchange resins, etc(18).

In continuation of the work in progress in our laboratories and recent development, we planned :

(i) to prepare a wide range of condensation polymers using

(a) ligands such as 8-hydroxyquinoline, salicylaldehyde, oxine-imines, etc.,

(b) phenols such as resorcinol, m-cresol, m-aminophenol, bis phenol A, etc.

(c) amines such as melamine, thiourea etc.,

(d) alcohol such as polyvinyl alcohol, and

(e) condensing agents such as formaldehyde, furfural, glyoxal, etc.,

(ii) to study their general and ion exchange properties such as water content, density, ion-exchange capacity, pH titration, ion uptake, solvent uptake, etc.

(iii) to obtain IR spectra and magnetic susceptibility of some of them,

(iv) to evaluate their dissociation constants, distribution coefficients, ion exchange isotherm, etc. and

(v) to discuss their structural characteristics, magnetic moment, etc.

Initially, oxime-imines of 2,3-dioxobutyranilide were prepared but they could not be converted into suitable resins. Using 8-hydroxy quinoline and salicylaldehyde, we prepared the resins with

(a) phenols (resorcinol, m-cresol, bis phenol A, and m-amino phenol),

(b) amino (melamine) or

(c) polyvinyl alcohol

in presence of formaldehyde as condensing agents. Resins using melamine, salicylaldehyde and glyoxal or n-butyraldehyde and the known resins using phenols and amines with formaldehyde or furfural as condensing agents were also prepared.

These resins are, in general, insoluble in 3N HCl and 3N NaoH and organic solvents. (Resins with polyvinyl alcohol have partial solubility in acid or alkali).

Water content and density of these resins and N-analysis of some of these resins were obtained and are used to calculate their mole composition, concentration of inorganic groups, void volume fraction, etc.

Resins were converted into acid (H) form, base (OH) form and NH_4 form.

pH titration of some of these resins was carried out and is used to determine apparent dissociation constants of these resins(16,19). Ion uptake at higher pH is considered to involve both ion exchange and electrolyte sorption.

Ion uptake by these resins was studied using ions such as Cu(II), Ni(II), Zn(II) and Mg(II) at different concentrations and under basic conditions for Cu(II), Ni(II), and Zn(II). The data have been used to calculate distribution coefficients for these ions and to correlate them for various resins.

Ion uptake by these resins was also studied using ions such as Cu(II), Ni(II) and Zn(II) in presence of excess NH_4 ions. The data have been used to calculate their distribution coefficient and to suggest the salting out effect. It has been found that Cu(II), Ni(II) and Zn(II) exhibit differences in behaviour.

IR spectra of the resin in acid form, NH_4 form and Cu form have been obtained and are used in

discussing their relative structural characteristics. Magnetic moment of the Cu form resin was evaluated.

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