CONCLUSION

The observation on the ion exchange of simple monovalent anions in water-2-ethoxy ethanol has been explained on the basis of Diamond's water structure enforced ion pairing. However, the model is satisfactory as a qualitative description. Though the thermodynamic model in principle is a quantitative one (equation 4.1) a quantitative verification of this equation suffers from the inadequacy of data available for various terms involved in this expression. This is particularly true regarding the free energies of transfer of resin \( R_A \) and \( R_B \) from the infinitely dilute water solution to corresponding infinitely dilute mixed solvent. Availability of such ancillary data from independent experimental observations would greatly help in the development of a quantitative model for ion exchange processes.

2-ethoxy ethanol contains an alcoholic proton and is expected to behave like an alcohol, i.e., as a protic solvent. However, the data presented in Table IV.5 and Figure 4.7 indicate that it is behaving more like an aprotic solvent than a protic alcohol.

A systematic study of the exchange behaviour of simple monovalent anions in water-methanol and water-2-methoxy ethanol would greatly assist in better interpretation of the data in 2-ethoxy ethanol.

For better understanding of the influence of different parameters of the external solution on the anion selectivity, it would be interesting to investigate the influence of the ionic strength of the external solution.
For example, the selectivity of a given pair of ions such as ClO$_4^-$-Cl$^-$ as a function of varying ionic-strength from 0.5 to 0.01 M, would give valuable insight into the effect of activity coefficients on the selectivity. Another interesting study would be to keep the ionic strength the same, e.g. 0.05 M and alter the charge on the ions, (some divalent ions of the type SO$_4^{2-}$ in place of monovalent ions.)

The present investigation, in common with other investigations, involves the evaluation of selectivity coefficients on the basis of the measured capacities and concentration of only one of the ions in the external solution phase at equilibrium. This introduces unavoidable errors in the calculation of $K_{B/A}^A$, as seen in the difference in magnitude of $K_C$ values in aqueous medium reported by different investigators for the same ion pair, on the same resin under identical conditions. Such discrepancies could be overcome by determining both counter ions simultaneously taking into consideration of volume changes of external solution during exchange process. Measuring the water activity in water-2-ethoxy ethanol solution by isopiestic method would greatly facilitate the interpretation of water-2-ethoxy ethanol solvent on the exchange selectivity.

The observed selectivity coefficients vary significantly with the resin phase composition both in water and water-2-ethoxy ethanol medium, but no satisfactory explanation for this variation can be given. A theory which can provide a quantitative description of the ion exchange selectivity in terms of physico-chemical properties of both the resin and the external solution phase is in great need.
CHAPTER IV

REFERENCES