

CHAPTER - IX

Concluding Remarks

Symmetrical tetraalkylammonium halides and alkali metal halides show numerous interesting properties that are now being actively investigated in many laboratories. Most of the common knowledge on non-aqueous solutions has come from viscosity and conductivity measurements. We therefore determined the transport properties of alkali-metal chlorides and bromides and symmetrical tetraalkylammonium bromides in 2-methoxyethanol, 1,2-dimethoxyethane and their aqueous mixtures from viscosity and conductance measurements.

The viscosity B-coefficients give us quantitative values of the ion-solvent interactions, but still we have no unambiguous method of division of B-coefficients into ionic B-values in all solvents. The use of Bu_4NBBu_4 or Bu_4NBPh_4 appears to be sound, but we lack sufficient data measured in different solvents to arrive at a definite conclusion. It is desirable to use different methods of division of B-values to have reasonably consistent B_{ion} values.

Accurate B_{ion} values would give the solvation number of ions. It is known that

$$B_{ion} = B_{ion}^{Einst} + B_{ion}^{Str} + B_{ion}^{disord}$$

but it is not possible to calculate the individual constituents like B_{ion}^{Einst} etc. so that the effect of charges on the nature

of solvation can be properly explored. Efforts should be made to know at least β_{ion}^{Einst} values experimentally.

Similarly, different methods are to be used to find out the limiting conductances of the ions from the equivalent conductances of electrolytes. Proper evaluation of the limiting equivalent conductance, the single-ion conductance λ_{\pm}° , the ionic association constant K_A , and the ion-size parameter a° and their dependence on the dielectric constant would be of great help in determining ion-ion and ion-solvent interactions. However, the variation of λ° for ions depends not only on their solvodynamic entity but also on their movement through the different solvents. This aspect needs consideration and further study.

However, it is necessary to remember that ion-solvent interactions are very complex in nature. There are strong electrical forces between the ions and between the ions and the solvents, and it is not really possible to separate them all. Nevertheless, if careful judgement is used, valid conclusions can be drawn in many cases from viscosity and conductivity measurements relating to degree of structure and order of the system.

More extensive studies of the different transport properties of electrolytes in non-aqueous and mixed solvents will be of immense help in understanding the nature of ion-solvent interactions and the role of solvents in different chemical processes.