PREFACE

The developments made in science and technology from time to time during the past three to four Centuries have been a catalyst for social development. In the broader realm of science and technology, Electrochemistry had become a prominent organ of many a type of industry. Several upcoming modern approaches like the Nano- medicine, bank totally on Nano-electrolytes.The next generation of the therapy called Nano-Therapy is ambitiously waiting for the Nano-electrolytes to favour its growth. This became the crux or the focus and after the well- known industrial revolution of England, rapid strides resulted in this area. Corrosion, Surfactants, Batteries and Cells are the main elements and several fields of interest of research even today are struggling to attain technological perfection using these elements. Even medicine in the modern form requires the electrochemical assistance for the purpose of diagnostics and therapy.

A major fragment of these electrochemical elements are still expecting a lot from the hands of the researchers. Electrolytes play a dominant role in the technological growth of a nation in spite of the involved complexities for their proper understanding and even today pose challenges for both the scientists as well as the technologists. A host of intelligent scientists laid the foundation and yet the construction of the electrochemical mansion is becoming a continuously changing and progressively turning into a huge complex dream due to the sophistication of the involved problems one faces when charged ingredients kept in the liquid media are necessary, to be analysed, in situations posing multiple number of boundary conditions for this.

Theories are getting developed starting from the times of Debye- Huckel to the present times of Pitzer, Lu & Maurer and many a stalwarts that attempted to access the electrolytic systems with their principles. It has provided the world, whole new sets of equations, and ingredients. Every moment is seeing sophisticated in the experimental techniques and accuracy of measurements is systematically increasing from moment to moment. The advent of the growth in the mathematical application possible with a widest arena of tools like the finite element method, is promising the revelation of the exact situations around the central ion of the ionic atmosphere of Debye and Huckel. Another author is working in the same laboratory on this line.

Several complications about the three dimensional pictures are now in a position to be very precisely analysed ,even under dynamic conditions of the physio- chemical processes, with the use of Molecular Dynamic Simulations. ETIPM (Eigen Tomm Ion Pair Mechanism) is one such

mechanism which is being analysed with the Simulation Analysis, around the globe in several premier laboratories of research.

This progressively creates new arenas that throw thrust on the prevalent theories. On the other hand several intricate happenings in the chemical reaction arena are getting unravelled. The 1965 Chemistry Nobel prize winning mechanism of Manfred Eigen and Tamm (called ETIPM in the thesis) is one such example. It is necessary to point out here that all the Physiochemical parameters studied by the author in this work pointed out conspicuous evidences concurrently for this mechanism, and supplement the findings of a host of well- known scientists like Marcus, Buchner & Barthel and Chandrika Akilan (to mention a few).

This thesis is the outcome of one such effort by the author, which is the consequence of the inspiration derived by him, after the literature survey. He could penetrate a little into the area of the ionic liquid systems, and the experimental findings by him viewed in the light of the available concepts reveal very precise confirmations to the ETIPM.