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Interfaces in Electrochemistry

Electrochemical phenomena involve reactions that occur at an electrode - electrolyte interface. Very often, the interfacial characteristics determine the thermodynamics as well as the kinetics of redox processes. Nature of electrode material, electrolyte along with potential difference between electrodes play significant roles in these processes. For example, electrocatalysis, capacitance at an interface and redox reactions leading to energy storage can be tuned based on these variables. Change of solvents / electrolytes based on ionic liquids, deep eutectic solvents lead to differences in the interfacial characteristics. Use of solid electrolytes poses certain other challenges. This lecture will bring out certain fundamentals of interfacial characteristics with several examples. Use of solid electrolytes and their interfaces related to solid state batteries will also be discussed. Our research efforts in these directions will be described.

S Sampath is a Professor at the Department of Inorganic and Physical Chemistry, Indian Institute of Science, Bangalore. His research interests involve studies on various interfaces with particular relevance to electrochemical phenomena. Various materials including layered chalcogenides such as MPX_3 ; transition metal nitrides / carbides; self-assembled monolayers and Langmuir-Blodgett films; deep eutectics are of interest to his group to develop electrochemical energy conversion and storage devices.