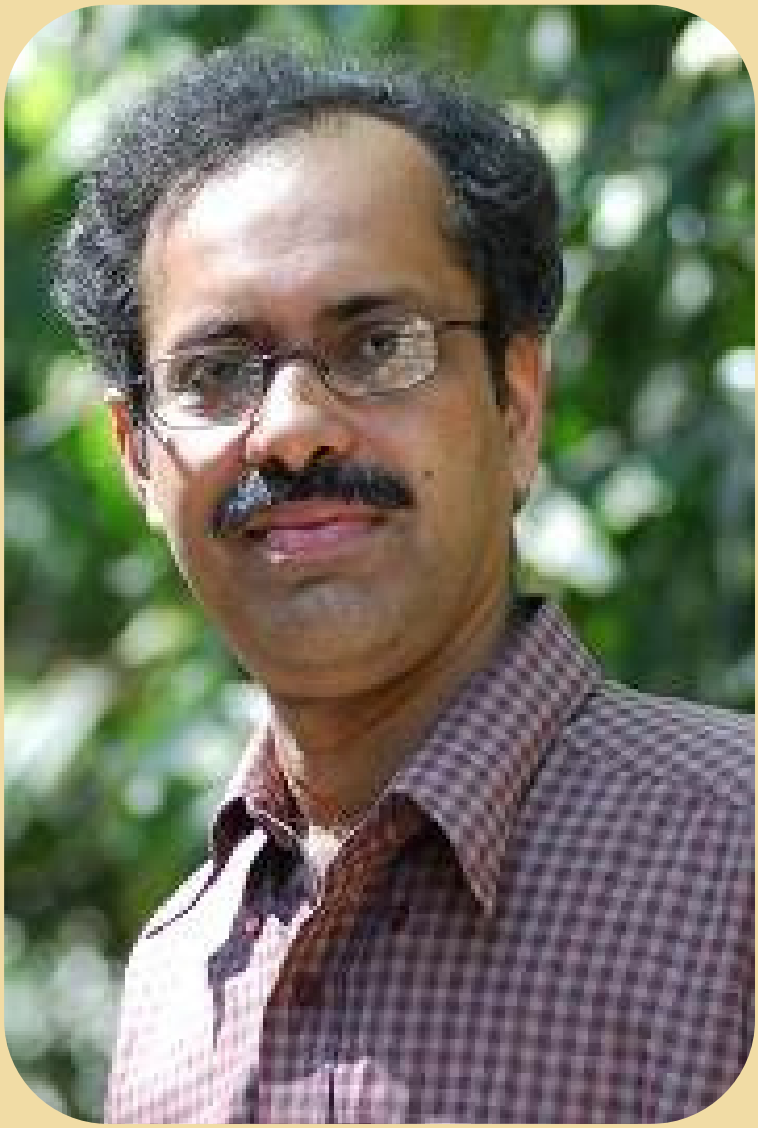
भारतीय प्रौद्योगिकी संस्थान मंडी

INDIAN INSTITUTE OF TECHNOLOGY MANDI

Institute Colloquium

Interfaces in Electrochemistry: Fundamentals to Energy Storage, Conversion, Sensors ...



21st February, 2025

05:00PM

Auditorium, North Campus

Prof. Srinivasan Sampath

Professor - Department of Inorganic and Physical Chemistry
Indian Institute of Science, Bangalore

Interfaces in Electrochemistry:
Fundamentals to Energy Storage, Conversion, Sensors …

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Electrochemical phenomena, though a few centuries old, have been attracting renewed interest particularly in the context of energy conversion, storage and the like. Interfaces between a solid and a liquid /solid play an important role in determining the thermodynamics and kinetics of (redox) reactions occurring in an electrochemical cell. Typically, an interface consists of ions and molecules whose thickness range from a few nm to several (tens and hundreds of) microns. Nature of electrode materials (morphology / size) and the electrolyte along with a potential difference play significant roles in the interfacial processes. For example, electrocatalysis, capacitance at an interface and kinetics of redox reactions leading to energy storage (batteries / fuel cells / capacitors) can be tuned using these variables. In addition, structure of the solvent near a solid surface is determined by the nature / composition of the material. The present lecture will discuss certain aspects of interfaces / materials with emphasis on some of our research in this direction.

Brief Bio-

Dr S Sampath is a Professor at the Department of Inorganic and Physical Chemistry, Indian Institute of Science, Bangalore with research interests spanning various aspects of electrochemical interfaces. His group is involved in understanding the nature of interfaces (solid/liquid; solid/solid and liquid-like/liquid) and manipulate them to probe electrochemical reactions. Various materials based on both inorganics (nitrides / carbides / chalcogenides) and organics (self assembled molecular systems, polymers and others) are studied in his group. In addition to peer reviewed publications, his group has several granted US, European and Indian patents on energy storage and sensors. He is an elected fellow of the Science and Engineering academies of India and also The World Academy of Sciences (TWAS), Italy.