

Energy Conversion and Storage

From 2nd Dec to 7 Dec

Overview

The curriculum for the workshop consists of 6 modules. The first module will introduce the participants to the basic concepts of electrochemistry, particularly the thermodynamic and kinetic aspects. A part of the first module will also introduce the participants to some of the electrochemical characterization techniques such as potential step and sweep methods. The details of the various modules and the subtopic within each module are given below.

Basic Electrochemistry

1. Overview of electrode processes
2. Potentials and Thermodynamics
3. Electrode kinetics and transport
4. Reference Electrodes
5. Potential step and sweep methods

Fuel Cell Technology

1. Basic fuel cell operation
2. Fuel cell efficiency
3. Electrode kinetics applied to fuel cells
4. Simplified Kinetics
5. Charge transport
6. Mass transport
7. Fuel Cell Characterization
8. Different fuel cell types and applications.

Materials Synthesis and Characterization

1. Different methods of materials synthesis
2. Characterization of materials.

Batteries

1. Battery basics
2. Lead-acid/lead-carbon batteries
3. lithium-ion batteries
4. Beyond lithium-ion batteries.

Solar cells

1. Solar cells - Basics & Physics
2. Inorganic solar cells
3. Organic solar cells
4. Solar cell assembly and characterization.

Photocatalysis

1. Basic aspects of photocatalysis
2. Artificial photosynthesis
3. Solar fuels
4. Metal contaminant removal from water.

You should attend if:

This course is designed for students, faculty and engineers. Anyone having a degree in Electrochemical Engineering, Chemical Engineering, Mechanical Engineering, Metallurgical Engineering, Materials Science, Chemistry, Physics can attend the course. This is an ideal course for those who are into energy conversion and storage as the course introduces them to the basics as well as some advanced concepts.

Fee

For TEQIP participants it is free of cost

About Speakers



Dr Meduri Praveen: He is an asst. professor in the Department of Chemical Engineering. He has completed his B.Tech from BITS, Pilani and obtained a PhD from the University of Louisville, USA. He worked as a postdoctoral fellow at Pennsylvania State University, USA, before joining IITH as a regular faculty. He primarily works in the area of Metal-ion/Metal-sulfur/Metal-selenide batteries, photo-electrochemical water splitting, solar fuels, and carbon sequestration



Dr Vinod Janardhanan: He is a professor in the Department of Chemical Engineering. He completed his B.Tech in Chemical Engineering from Govt. Engineering College Trichur, M.Tech from IITM and PhD from KIT, Germany. Before joining IITH as a regular faculty he was a postdoctoral fellow in the Department of Chemical Engineering at the University of Cambridge, UK. His research interests are in the area of fuel cells, particularly in the multi-scale modeling of solid oxide fuel cells and high temperature polymer electrolyte membrane fuel cells, and heterogeneous catalysis.



Dr Ch. Subrahmanyam: He is a professor in the Department of Chemistry. He obtained his PhD from IITM. Before joining IITH, he was a regular faculty at NIT Trichy. He predominantly works in the area of wastewater treatment, CO₂ activation, electrochemical water splitting, abatement of pollutants. He has authored more than 130 peer reviewed journal publications



Dr Raavi Santhosh Kumar: He is an Associate Professor of Department of Physics. His research interests are "Exciton dissociation dynamics at a donor/acceptor interface in an organic photovoltaic (OPV) blends and development of optical techniques to address various device physics aspects of OPV. He has authored more than 45 refereed journal articles. He is the recipient of BASE fellowship award (2019) under IUSSTF and FAPESP-Visiting Researcher award (2017)

Course Coordinator

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