



CAMM Seminar

Advanced Microscopy and Materials Webinar Series

Title of the Talk I

Sustainable Energy Storage Technologies: From Materials to Devices

Date : 9th Nov 2023;
Time: 4 p.m. (IST)

Venue : HSB 209
(Physics Seminar Hall)

ABSTRACT: The global energy demand is increasing and finding new sustainable energy alternatives to fossil fuels is now critically important. Our research is emphasized on exploring new materials and new mechanisms to develop safe, lightweight, and performance-efficient energy storage technologies for range of applications from milliwatt-scale wearable devices to kilo/megawatt-scale electric & space vehicles. We actively design and engineer advanced materials with a strong focus on structural control at the nano/microscale and the meso-nanoscale. This work forms the basis for the development of complex nano-architectures conceived and optimized for the applications in Supercapacitors, rechargeable Li-batteries, post LIBs (Na/K and Al) and hybrid devices.

Title of the Talk II

Low Carbon Emission Technologies for Manufacturing of Sustainable Materials

Date : 10th Nov 2023;
Time: 4 p.m. (IST)

Venue : HSB 209
(Physics Seminar Hall)

ABSTRACT: The traditional heating methods used for the production of battery materials such as carbon-anodes and oxide-cathodes are highly energy intensive and contribute to a large CO₂ emissions. The thermal energy is transferred from the heating element of a heating instrument to carbon precursors via thermal radiation, convection, or conduction through various mediums. We have developed a new rapid heating method with low carbon emissions to produce carbon products from agricultural waste and oxide-cathode. Unlike conventional process where the heating rate is limited to 5 degree/min and resident time is in hours, the new method provides rapid heating with less resident time. We are also interested in value-addition of biomass and battery recycling research, aiding shift towards the circular economy and sustainable practices.



Speaker

Prof Deepak P. Dubal
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Centre for Material Science
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Dr. Deepak P. Dubal is a Professor at the Queensland University of Technology (QUT), Australia, known for his outstanding contributions to the field of clean energy conversion and storage systems such as supercapacitors, batteries and triboelectric/piezoelectric nanogenerators. His research focuses on the design and development of functional materials for clean energy conversion and storage technologies. This work is crucial for advancing sustainable energy solutions and reducing environmental impact. Additionally, Prof. Dubal's team is extending their research into areas such as radiant heaters, biomass vaporization, and battery recycling, aligning with the principles of the circular economy and sustainable practices. Prof. Dubal has earned multiple prestigious fellowships throughout his career, including the Brain Korea-21 Fellowship at Gwangju Institute of Science and Technology (GIST) in South Korea (2011), the Alexander von Humboldt Fellowship at Chemnitz University of Technology (TUC) in Germany (2012), the Marie Curie Fellowship at the Catalan Institute of Nanoscience and Nanotechnology (ICN2) in Spain (2014), and the Vice-Chancellor Fellowship at the University of Adelaide (UoA) in Australia (2017). In 2018, he was awarded an exceptionally competitive ARC - Future Fellowship, which led to his transition to QUT. Prof. Dubal's research has resulted in over 250 peer-reviewed journal articles. More about Prof. Dubal at <https://www.qut.edu.au/about/our-people/academic-profiles/deepak.dubal>