

**A Report on Guest Lecture on
“Sustainable Energy Storage Systems: From Materials to Devices”
Organised by Department of Electronics & Communication Engineering
Date: 28.11.2023**



Submitted by: Dr. Sourav Ghosh, Assistant Professor, Department of Electronics & Communication Engineering
Resource Person: Dr. Deepak Dubal, Professor, School of Chemistry & Physics, Queensland University of Technology, Australia

Participants: 142 Students & 6 faculty

Report Received on: 29.11.2023

Time: 2 pm to 4 pm

Venue: Seminar Hall A

The Department of Electronics & Communication Engineering organized a guest lecture on “**Sustainable Energy Storage Systems: From Materials to Devices**” for the ECE students on 28.11.23 from 2 pm to 4 pm in seminar hall A. The resource person was Dr. Deepak Dubal, Professor, School of Chemistry & Physics, Queensland University of Technology, Australia. The gathering was welcomed by Ms. Shruthi and Mr. Vamsi, III-year students of ECE, MITS. The session then started with a small speech from Dr P. Ramanathan, Vice Principal (Academics), MITS, Mrs U. Vijaya Lakshmi, International Relations Coordinator and students' Counsellor, MITS, and Dr. S. Rajasekaran, Head of the department, ECE. They enlightened the students on the importance of electronic materials and their application in energy storage systems from a contemporary perspective. Then, Dr. Sourav Ghosh, Assistant Professor, ECE, MITS, introduced the speaker to the audience. Finally, Dr. Deepak Dubal was felicitated with a bouquet of flower, memento, and shawl by the dignitaries (Photo attached). The felicitation ceremony was followed by the guest lecture.

Speaker's Profile:

Dr. Deepak Dubal is a renowned scientist (**Top 2% scientist worldwide in 2023 by Stanford University**) with a substantial background in energy storage materials and devices. His research group have significantly impacted the advancement of sustainable and environmentally friendly energy storage solutions. His innovative advances in sustainable energy materials and technologies have enriched the research community through his **250+ publications and patents**. Dr. Dubal is known for multiple prestigious accolades, such as the ARC Future Fellowship (Australia), the Marie-Curie Fellowship (Spain), and the Alexander von Humboldt Fellowship (Germany), to name a few.

Key Highlights:

1. Materials for Sustainable Energy Storage:

The lecture commenced with an overview of materials used in energy storage systems. The speaker highlighted the importance of sustainable materials that enhance energy storage capacity and minimize environmental impact. Various materials, including nanocarbons, metal oxides, etc., were highlighted.

2. Innovative Supercapacitor & Battery Technologies:

The speaker delved into recent advancements in supercapacitor and battery technologies, emphasizing the development of next-generation energy storage beyond conventional options. Topics covered included solid-state batteries, metal-ion supercapacitors, and hybrid energy storage systems. The potential of these technologies to revolutionize energy storage and address current challenges, such as safety, was thoroughly explored.

3. Non-conventional energy resource:

An integral part of the lecture was on piezoelectric materials. Piezoelectric materials are crucial in nanogenerators, devices that convert mechanical energy into electrical energy at the nanoscale. These materials generate an electric charge in response to mechanical stress or deformation. This capability is harnessed for various applications, including powering small electronic devices and sensors. Dr. Dubal explained the application of such materials in defense and wearables.

4. Challenges and Opportunities:

Dr. Dubal discussed the existing challenges in the field and proposed potential solutions. This included strategies for improving the efficiency of energy storage devices, reducing costs, and addressing issues related to resource availability. The talk also highlighted the numerous opportunities for research and innovation in sustainable energy storage.

5. Case Studies and Success Stories:

Practical applications and success stories of sustainable energy storage systems were presented. Case studies illustrated how these technologies have been implemented in various real-world scenarios, showcasing their impact on energy efficiency, grid stability, and overall environmental sustainability.

6. Q&A Session:

An engaging question-and-answer session between students and the professor followed the lecture. After that, some more insightful discussions were recorded for MITS radio along with Ms. Jyosna (ECE student). Discussions ranged from technical aspects of materials and devices to broader topics such as appropriate approaches towards research for undergrads and potential research opportunities, etc.

In conclusion, the guest lecture on "Sustainable Energy Storage Systems: From Materials to Devices" provided a comprehensive and insightful exploration of energy storage technologies' current state and prospects. The audience gained valuable knowledge on sustainable materials and innovative devices to ensure environmental sustainability. The event significantly fostered awareness and understanding of the challenges and opportunities in this dynamic and crucial field.

Photos:

