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ADVANCED MATERIALS LABORATORY, SCHOOL OF PHYSICS, MKU-MADURAI

India is one of the fastest developing countries in the renewable energy sector. Amid growing alarms on environmental issues along with global warming and air pollution, green energy as well as the government's Initiatives to make India a manufacturing hub, the Indian market is on the edge for an 'explosive' demand for supercapacitors (SC) due to their diverse applications in transportation and consumer markets. SCs have penetrated rather silently into the field of medical equipment too (non-life-support applications, critical medical equipment, solenoid activation for drug delivery, heating wire to vaporize a drug for inhalation).

Manufacturing front of supercapacitor technology- a technocrat's wonder child is in evolution mode that requires special nourishment and attention. The unavailability of indigenous raw materials, with almost everything being imported including aluminum foil, separators, carbon and electrolytes, special interest has to be given to standardization of machinery and equipment.

We believe our research activities on energy conversion and storage will have a great impact on India's current power deficiency where the scheduled and unscheduled power outages take place. Also we hope, along with the effective business focusing and benefit of financial outcomes, the industries can go beyond and encourage the collaborative academic research for the betterment of society and thus to our country. Our research group mainly concentrates on the "***Contribution and development of technology to Industrial readiness/Technology transfer (ToT)***" by

1. Designing and engineering of energy materials both for energy conversion and storage
2. New electrolytes for better performance strategies like widening the potential window, stability etc.
3. Effective electrolyte-electrode interfacial engineering for better electrochemical efficiency
4. developing sustainable electrode materials, electrolytes and separators
5. Fabrication of the prototypes for the industry readiness-cost and energy efficient electrodes and devices
6. High-energy density and high-power supercapacitors with environmentally benign process

Initiation: The research-to-industry process is supposed to be hastened as at present the academic research is least supported by Industry and most of the research outcome sleeps inside the

laboratory. As a solution to transfer the technology to market and thus to the end users the collaboration with industry is initiated with

- Active Char. Pvt. Ltd, Cochin: In-kind project collaboration for the ongoing DST-MES (Materials for Energy Storage) project
- MatLabs Technology, Mumbai: The linkage has been created for the internship, student support, on-the-job training, sharing research facilities etc. The company will accommodate the students, faculties and research scholars to educate and to do the industry readiness research activities, which lead to technology transfer.

The discussions are going on with other industries like Adani Power Ltd., RenewSys India Pvt. Ltd, Carborundum Universal Limited-Electro Minerals Division, Zoxcell, SPEL and these companies have their caliber consistently highlighted through excellent products available worldwide, contributing towards sustainable society.

