7th International Conference on
Smart Materials and Sustainable Technologies
April 08-09, 2019 | Toronto, Canada

SCIENTIFIC TRACK | **DAY 1** *JOURNAL OF MATERIAL SCIENCES & ENGINEERING 2019, VOLUME 8 | DOI: 10.4172/2169-0022-C3-131*

Carbon based smart organic devices and bio-product derived sustainable technology application

Ravi Prakash
Carleton University, Canada

Micro/nano-sized carbon suspensions and organic conductors and semiconductors have emerged as smart, cost-effective and sustainable alternatives to metal electrodes and inorganic semiconductor and dielectric materials for manufacturing carbon-based sensors, integrated systems and energy storage technology. Carbon based materials can be derived from sustainable bio-product supplies, or by recycling and re-using industrial and environmental by-products; these materials can be refined using simple chemical processing and can be deposited through direct patterning using low-cost additive manufacturing. Resultant active electrical/electronic devices can be produced at both small and large scale using additive manufacturing techniques such as spin/dip/roll coating, aerosol spraying and screen printing. My research team is investigating novel copolymer and bio-product based conductive and semiconductor materials, which in addition to their electrical properties, also offer active interfaces for sensory applications due to the extremely high surface-to-volume ratio of these materials. In this talk, I will share some recent technological advancements reported by my research team in implementing organic field effect transistors (O-FET) using carbon-based conductive, dielectric and semi conductive layers on various substrate materials for biological and chemical sensing applications. I will demonstrate several configurations of a novel bio-electrolytic energy storage device which incorporates Carrageenan, a water-soluble polysaccharide that can be extracted from sustainable bio-products using environmentally friendly synthesis process. Carrageenan has the potential to be modified into bio-electrolytes with high specific capacitance for high density energy storage application such as supercapacitors. Our flexible bio-electrolytic energy storage device furthermore utilizes novel gel-based electrodes to produce a fully bio-product dependent energy storage solution.

Biography

Ravi Prakash is an Assistant Professor in the Department of Electronics at Carleton University. He received his B.Sc. degree (2008) in Mechanical Engineering from Indian Institute of Technology Madras, India and his M.Sc. (2010) and Ph.D. (2013) in Electrical and Computer Engineering from University of Calgary, Canada. Prior to joining Carleton in 2018, he worked as Assistant Professor in the Electrical Engineering Department at Queen's University (2017-18). His research contributions are primarily in the fields of point-of-care diagnostics, chemical and biological sensors, cleantech, soft-wearable systems for non-invasive health monitoring, organic semiconductor and conductor materials and micro/nano fabrication techniques.

ravi.prakash@carleton.ca