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ANAHEIM CONVENTION CENTER & ANAHEIM MARRIOTT

ANAHEIM, CALIFORNIA, USA

#TMSAnnualMeeting

SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2022 SYMPOSIUM:

SPECIAL TOPICS

Frontiers of Materials Award Symposium: Nanocarbon-based Flexible Devices: Emerging Materials and Processes

Nanocarbons like graphene, carbon nanotubes (CNTs), and nanofibers are promising for various applications including advanced electronic devices, novel energy systems, and next-generation healthcare diagnostics. This is owing to the excellent physical, chemical and electrochemical properties arising from the ordered sp²-rich atomic structure, the hierarchical nanoscale morphology, and the achievable surface chemistry of tailored nanocarbons. In particular, high surface area carbon electrodes for batteries, supercapacitors, and biosensors have consistently been shown to have superior performance when compared to metal electrodes. Nevertheless, major fabrication challenges still hinder our ability to scalably manufacture nanocarbon-based electrodes with tunable morphology and surface chemistry, especially on flexible substrates. While chemical vapor deposition (CVD) enables the synthesis of high-quality graphene and CNTs, the extreme environments of high temperatures and hydrocarbon-rich gaseous atmosphere in such reactors limit the choice of substrates to rigid temperature-resistant materials. On the other hand, many emerging flexible devices require the fabrication of functional nanocarbon electrodes on polymer substrates.

This symposium will focus on emerging technologies to overcome the above-mentioned roadblocks toward realization of nanocarbon-based flexible devices. In addition to recent advances in synthesis and characterization of functional nanocarbons, topics covered will include different printing technologies and transfer techniques of CVD-grown nanocarbons. The symposium will also cover a unique bottom-up approach for growing different types of nanocarbons directly on polymer films by laser irradiation. This emerging direct-write process, often referred to as laser-induced graphene (LIG), can uniquely produce spatially-varying morphologies and heteroatom-doping of graphene. Accordingly, this symposium will bring together an interdisciplinary group of invited speakers to talk about major contributions to chemical synthesis, electrochemistry, nanoelectronics, flexible device fabrication, polymer science, and laser processes. The unique convergence among these areas, which is geared toward solving a critical materials challenge, will be an addition to the TMS landscape. Hence, the symposium will foster interactions among physicists, chemists, and engineers within the TMS community and beyond.

ORGANIZER

Mostafa Bedewy, University of Pittsburgh

www.tms.org/TMS2022

QUESTIONS?

Contact programming@tms.org