J Material Sci Eng 2012, 1:3
http://dx.doi.org/10.4172/2169-0022.S1.008

OMICS Group Conferences
Accelerating Scientific Discovery

International Conference and Expo on
Materials Science & Engineering

October 22-24, 2012 DoubleTree by Hilton Chicago-North Shore, USA

Polymers: Protective barriers in medical devices

Vicki A Barbur

Polymers are a baseline component facilitating the development of many medical devices from the protective apparel used for clinicians and patients to minimize the chance infection transmission, through the equipment used to create nasal or oral pathways for compromised patients, and finally, to the canisters used to manage the potentially hazardous fluids created during the course of normal hospital procedures. The ongoing development of polymers and composite structures to deliver the appropriate performance characteristics to meet the needs of the application is a growing area of opportunity, yet also challenging since there is the underlying requirement to do no harm when such materials come into close contact with the patient, the caregiver or the environment.

There are a number of types of polymer, some of which are already routinely available, for example, shape memory and temperature-responsive polymers, halochromic and chromogenic systems. Self-healing polymeric materials have the intrinsic ability to repair any damage due to normal usage, thus expanding the material's lifetime. In addition, thermoelectric polymeric materials can be used to build devices that convert temperature differences into electricity and vice-versa, providing opportunities to incorporate additional functionality into medical devices longer term.

In broad terms, this paper focuses on the need for research and development in textiles to support the advancing requirements for improved medical devices and protective apparel. Yet not only do these products have to provide clinical effectiveness, but they also need to deliver a personal environment that ensures comfort. This paper will contrast the sophistication of materials in use to meet demands of performance and comfort with ideas for new features that can be developed with future advances.

vbarbur@gmail.com

A review of opportunities for electrospun nanofibers in analytical chemistry

Samuel Chigome
Rhodes University, South Africa

Challenges associated with analyte and matrix complexities and the ever increasing pressure from all sectors of industry for alternative analytical devices, have necessitated the development and application of new materials in analytical chemistry. To date, nanomaterials have emerged as having excellent properties for analytical chemistry applications mainly due to their large surface area to volume ratio and the availability of a wide variety of chemical and morphological modification methods. Of the available nanofibrous material fabrication methods, electrospinning has emerged as the most versatile. It is the aim of this contribution to highlight some of the recent developments that harness the great potential shown by electrospun nanofibers for application in analytical chemistry. The review discusses the use of electrospun nanofibers as a platform for low resolution separation or as a chromatographic sorbent bed for high resolution separation. It concludes by discussing the applications of electrospun nanofibers in detection systems with a specific focus on the development of simple electrospun nanofiber based colorimetric probes.

Biography

Samuel Chigome is currently a PhD student in Analytical Chemistry at Rhodes University under the supervision of Prof Nelson Torto. Samuel received his Bsc (Hons) Degree in Applied Chemistry from the National University of Science and Technology, in Zimbabwe. In 2008, he obtained his MSc degree in Analytical Chemistry from the University of Botswana. His research focuses on the development of miniaturized solid phase extraction devices that use electrospun nanofibers as the sorbent bed. He is also a visiting junior research fellow to the Nanosciences and Nanotechnology Laboratories, iThemba LABS for the electrospinning of polymer nanofiber composites for photonic applications.

S.Chigome@ru.ac.za