J Material Sci Eng 2014, 3:3
http://dx.doi.org/10.4172/2169-0022.S1.017

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Materials Science & Engineering
October 06-08, 2014 Hilton San Antonio Airport, USA

A substrate independent approach for fabrication of biocompatible nano-silver/polymer antibacterial coatings

Shima Taheri
University of South Australia, Australia

The development of silver nanoparticle (AgNPs) as a potent alternative to conventional antibiotics has been extensively investigated over the last decades. However, due to the prominent cytotoxic effect of silver on mammalian cells, there is always strong motivation to develop alternative technology that can compact bacterial infection without affecting the mammalian cells. Capping AgNPs with appropriate functional groups and incorporating them into a polymeric matrix is a feasible alternative to overcome these limitations. AgNPs with different chemical structures (nanocapsules and nanoparticles) and functionalities (polymer, lipid, and starch) were synthesized. To demonstrate application as antibacterial coatings, the stabilized AgNPs were then immobilized onto model surfaces made of a thin layer of allylamine plasma polymerized film. This substrate-independent technique preserves the AgNPs functionalities for a longer period of application time. All fabricated surface coatings exhibited superior antibacterial activity against four important Gram-positive and Gram-negative pathogens. This study further aimed to focus on investigating the effects of AgNPs surface components on delivery of engineered AgNPs from the coatings into the human fibroblast cell as well as bone marrow derived macrophages (BMDM). Most of the surfaces did not affect BMDM function or viability and demonstrated no toxicity toward fibroblast cells, except for lipid coated nano-silvers. Therefore, the chemical structures of nanoparticles significantly affect the coatings' antibacterial, biofilm prevention and biocompatibility capabilities. We believe that such biocompatible nanostructures are of potential interest for various biomedical applications such as smart drug carriers and antibacterial coatings for medical devices and wound dressings.

Biography

Shima Taheri is a PhD student from University of South Australia. She qualified in Chemistry in 2004 and then went on to do a Masters Degree in Organic Chemistry followed by MBA-Strategic Management. She has already 12 refereed journal papers, more than 314 citations and H-index=7. Her area of interest is currently surface modification of biomedical devices via deposition of a thin layer of antibacterial protective coating that is fabricated via immobilization of silver nanoparticles onto plasma polymerized films. Furthermore, she is studying bacteria and cell interaction with these surfaces.

Shima.Taheri@unisa.edu.au

Synthesis and characterisation of polypyrrole foncionnel doped with acids

S Madani and **Y Nouar**
University 20 Augest Skikda, Algeria

In this work we synthesized by electrochemical way two conductive polymers under various conditions (polypyrrole). After their characterization, a comparative study is carried out between the two modes of synthesis and properties of both polymers. The polypyrrole was synthesized under different electrochemical conditions: (time, current density, doping agent, oxidizing agent, speed of agitation, monomer concentration and temperature), the measurement of electrical conductivity allows us to choose the operating conditions of the synthesis by electrochemical way the polypyrrole. The conductivities of the synthesized polymers were in the range of (1.4 -5.2).10-4 S.cm-1 for the polypyrrole. The polypyrrole synthesized electrochemically are characterized by electrical conductivity; by FTIR spectroscopy to identify and confirm the formation of the desired functional groups, by DR-X by DSC by ATG and by scanning voltammetry for the characterization. The results have shown that the polypyrrole synthesized by electrochemical way and doped by HCl presents the best electrical conductivity. The electrochemical route gives polymers with the best conductivities and finer particles.

salimpolymere@yahoo.fr