Suresh Raj Pant et al., J Material Sci Eng 2015, 4:5
http://dx.doi.org/10.4172/2169-0022.C1.029

OMICS International
conferenceseries.com

4th International Conference and Exhibition on
Materials Science & Engineering
September 14-16, 2015 Orlando, USA

A facile strategy for the fabrication of three-dimensional nanofibrous scaffold

Suresh Raj Pant[1], **Mahesh Kumar Joshi**[2, 3], **Hem Raj Pant**[1, 2], **Han Joo Kim**[3], **Chan Hee Park**[3] and **Cheol Sang Kim**[3]
[1]Research Institute for Next Generation, Nepal
[2]Tribhuvan University, Nepal
[3]Chonbuk National University, Republic of Korea

One of the major concerns of scientific community with electrospun nanofibrous scaffolds is the densely packed fibers in 2-D array which impedes their applicability in tissue regeneration. To overcome these problems, a three-dimensional nanofibrous scaffold was fabricated using a noble gas foaming technique and studied for biomedical applications. In this novel approach, Polycaprolactone (PCL) nonwoven membrane was fabricated by electrospinning process and treated with Sodium Borohydride (SB) solution (0.1 M solution prepared in methanol) to modify into 3-D scaffold. We have purposed the mechanism for the fabrication of 3-D scaffold. As the PCL mat was put into the SB solution interconnected pores of a mat are filled with that solution driven by capillary forces where it undergoes hydrolysis to produce hydrogen gas. The in situ generated gas molecules form clusters to minimize the free energy resulting in pore nucleation that reorganizes the nanofibers to form a low density, macroporous, spongy and multi-layered 3-D scaffold. The scaffolds were characterized in terms of porosity, density and biocompatibility. Large pore size and multilayered structure of as fabricated scaffold improved the cell infiltration and growth compared to 2-D electrospun mat. This simple and facile process will reveal a new approach for the fabrication of a three-dimensional, low-density, nanofibrous materials for biomedical and industrial applications using a wide variety of polymers.

Biography

Suresh Raj Pant has completed his Master's degree from Chonbuk National University, Jeonju, South Korea. Presently, he is associated with Research Institute for Next Generation (RING) Nepal as a Research Associate.

sureshpant_sp@yahoo.com
pant.suresh88@gmail.com

Notes: