J Material Sci Eng 2013, 2:4
http://dx.doi.org/10.4172/2169-0022.S1.012

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Materials Science & Engineering

October 07-09, 2013 Hampton Inn Tropicana, Las Vegas, NV, USA

In vivo evaluation of poly (lactide-co-glycolide)/bioactive glass/hydroxyapatite nanocomposite coating in rabbit tibiae

Mehdi Mehdikhani-Nahrkhalaji
Semnan University, Iran

The aim of this study was to evaluate the interaction of bioactive and biodegradable poly (lactide-co-glycolide)/bioactive glass/hydroxyapatite (PBGHA) nanocomposite coating with bone. Sol-gel derived 58S bioactive glass (BG) nanoparticles, 50/50 wt% poly (lactic acid)/poly (glycolic acid) (PLGA), and hydroxyapatite nanoparticles were used to prepare the coating. The nanocomposite coating was characterized by SEM, XRD, and AFM. Mechanical stability of the prepared nanocomposite coating was studied during intramed¬ullary implantation of coated Kirschner wires (k-wires) into rabbit tibiae. Titanium mini-screws coated with PBGHA nanocomposite coating was implanted intramedullary in rabbit tibia. Bone tissue interaction with the prepared nanocomposite coating was evaluated 30 and 60 days after surgery. Results showed that PBGHA nanocomposite coating remained stable on the K-wires with a minimum of 96% of the original coating mass. Tissue around the coated implants showed no adverse reactions to the coating. Woven and trabecular bone formation were observed around the coated samples with a minimum inflammatory reaction. It was concluded that PBGHA nanocomposite coating provides an ideal surface for bone formation and it could be used as a candidate for coating the orthopedic implants.

Biography

Mehdi Mehdikhani-Nahrkhalaji has completed his Ph.D. at the age of 32 years from Isfahan University of Technology, Iran. He is the Assistant Professor at the Department of Materials and Metallurgical Engineering, Semnan University, Semnan, Iran. He has published several papers in reputed journals and serving as a reviewer of repute.

me.mehdikhani@gmail.com

Versatile silica coating strategy on hydrophobic quantum dots towards nanoengineering

Mohamed F. Foda
Huazhong Agricultural University, China

Semiconductor quantum dots (QDs) possess several advantages including 10 times brighter, mainly due to their wide absorption reign, compared with fluorescent proteins and organic dyes, ultra-stable against photo bleaching, and present narrower and more symmetric emission spectra. More interesting, multicore QDs can be excited using single light source. In addition, hydrophobic (QDs) for biomedical aspects and nano-engineering fabrication should be perfectly synthesized allowing robust, reproducible and specifically sufficient biological probes in the optical window of 500-900 nm to be achieved. In current work, an effective, versatile and direct silica coating strategy on hydrophobic QDs based on organosilane micellization and silicate deposition for nano-engineering purposes were carried out. This method skipped the conventional water solubilization step for oil-soluble QDs and greatly favored the fluorescence preservation by confining the QDs in a lipophilic interior of a silica bead. By this manner, we created a serious of CdSe/ZnS@SiO2 nano-spheres ranging from 16 nm to 38 nm with multi-core structure and a tunable silica shell thickness. These nano-spheres exhibited a quantum yield of 90% relative to the oil sample, colloidal stability in biological medium and robust photochemical. Another approach to incorporate multiple hydrophobic I-III-VI2 QDs for example copper indium sulfide directly into silica beads with a relative small size around 20nm. The silica coating layer maintained the emission properties of QDs regarding the photoluminescent spectrum, quantum yield and the PL lifetime. Also, silica coating on metal affinity induced QDs nano assemblies towards ultra bright, stable and color encoded fluorescent spheres were successfully achieved.

Biography

He-You Han has completed his Ph.D. in 2000 from Wuhan University. He is the dean of Science College, at Huazhong Agricultural University. His research interest focuses on Nanosensors and Food Safety. He has published more than 70 papers in reputed journals and serving as an editorial board member in many journals for example Journal of Analytical Science, The Journal of Light Scattering, and The American Journal of Biomedical Sciences.

m.frahat@fagr.bu.edu.eg