Editorial

Biocompatible Functional Nanomaterials: Synthesis, Properties, and Applications

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Biocompatible nanomaterials are revolutionizing many aspects of preventive and therapeutic healthcare, which are already playing important roles in developing new medical devices, prostheses, bioassay technologies, tissue repair and replacement technologies, drug delivery systems, and diagnostic techniques. In recent years, much attention has been focused on the synthesis and applications of biocompatible functional nanomaterials, owing to their promising potential and practical applications in biomedical science, biosensors, biochip design, drug delivery, cancer diagnosis and therapy, implantable devices, gene vectors, bionanotechnology, and tissue engineering.

This special issue is one of the important and keep growing fields on nanoscience, nanoengineering, and nanotechnology. Its to create new functional nanomaterials with a variety of sizes and morphologies such as ZnAl_2O_4 films, hydroxyapatite nanopowder, and calcium carbonate nanoparticles. These nanomaterials have widespread applications in drug delivery, tissue engineering, dental implant, bone substitute, sensors, photoluminescence, and mechanical properties. This themed issue includes some research articles covering important applications of biocompatible functional nanomaterials. M. A. Alvarez-Pérez et al. fabricated the thin nanostructure films of ZnAl_2O_4 prepared by spray pyrolysis, which improved the in vitro cell adhesion on the surface of the as-prepared ceramic film, viability, and cell-material

interactions of osteoblastic cells. Zhu's group synthesized rare earth-ions- (Er^{3+} -) doped ZnO nanospheres through a sonochemical conversion process that displayed enhanced photoluminescence and upconversion photoluminescence properties, in comparison with pure ZnO counterparts. In particular, biocompatible functional nanomaterials have promising potential applications in biomedical field because of their excellent biocompatibility. For example, Goerne and his coworkers have prepared SiO_2 -based nanoparticles in the mixed solvents (water and alcoxide) by the sol-gel technology at acidic conditions and applied for the control delivery of nonsteroidal anti-inflammatory drugs.

Altogether, this issue suggests that the biocompatible functional nanomaterials have a great potential to be used in drug delivery, tissue engineering, bone substitutes, bone-filling materials, sensors, and photoluminescence. It provides new research and developments of the biocompatible functional nanomaterials performed by the researchers in this field.

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