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P.S.E.1.

TWO-STEP SINTERING, PHASE TRANSFORMATIONS, ELECTRICAL AND MECHANICAL PROPERTIES OF NANOSTRUCTURED BIOCERAMIC MATERIALS BASED ON HYDROXYAPATITE

M.J. Lukić[1], Lj. Veselinović[1], Č. Jovalekić[2], S.D. Škapin[3], S. Marković[1], D. Uskoković[1]
[1]Centre for Fine Particles Processing and Nanotechnologies, Institute of Technical Sciences of SASA, Belgrade, Serbia, [2]Center for Multidisciplinary Studies, University of Belgrade, Serbia, [3]Jožef Stefan Institute, Ljubljana, Slovenia

Hydroxyapatite based materials are still the most promising materials in the field of skeletal and dental tissue reconstruction. Improvement of their existing properties and broadening their application fields requires simultaneous achievements in synthesis and processing of advanced nanostructured materials, accompanied by understanding of basic principles governing their behaviour.

In this study, overall procedure, from synthesis, processing and characterization of dense nanostructured hydroxyapatite and biphasic calcium phosphate, is presented. The consideration of nanosintering phenomena and influence of phase transformations on sintering behaviour of nanocrystalline Ca-deficient hydroxyapatite will be given. Electrical and mechanical properties will also be determined.

P.S.E.2.

SELENIUM NANOPARTICLES FOR BIOMEDICAL APPLICATION

N. Filipović, M. Stevanović, D. Uskoković
Institute of Technical Sciences of SASA, Belgrade, Serbia

Ever since its discovery, selenium has attracted the attention of many scientists due to its specific characteristics and behavior, which provided a wide range of applications for this element, from photo- and electrical industry to biology and medicine. The diverse applications are directly related with selenium chemical form, size and shape of its particles. When it comes to biomedical applications, it is well known fact that selenium is an essential micronutrient for animals and humans but with a narrow margin between beneficial and toxic effects. As a potential anticancer agent, its use requires consumption over the long term, so the toxicity of Se is always a crucial concern. Elemental selenium nanoparticles (Nano-Se) have emerged as a novel selenium source with the advantage of reduced risk of selenium toxicity, but with same bioavailability and efficacy in increasing the activities of selenoenzimes compared with other seleno-compounds. We synthesized stabile, amorphous, red spherical nanoparticles with average diameter of ~80 nm, by employing the reduction of sodium selenite with ascorbic acid in the presence of bovine serum albumin. The obtained particles were characterized by X-ray diffraction, zetasizer, electron microscopy (SEM+EDS, TEM, HRTEM), and showed good anticancer activity.