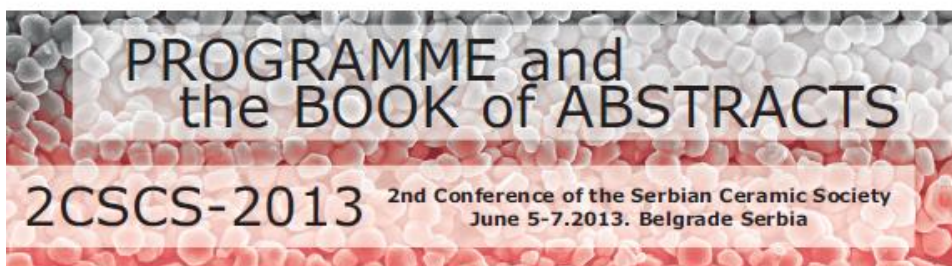


The Serbian Ceramic Society
The Academy of Engineering Sciences of Serbia
Institute for Multidisciplinary Research - University of Belgrade
Institute of Physics - University of Belgrade
Vinča Institute of Nuclear Sciences - University of Belgrade



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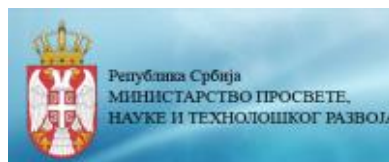
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P-5

ANTIMICROBIAL ACTIVITY OF SILVER AND SILICON DOPED CALCIUM-PHOSPHATE SCAFFOLDS

Bojan Jokić, Ksenija Milicević, Suzana Dimitrijević, Rada Petrović,
Djordje Janačković

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In this study, spherical particles of silicon substituted hydroxyapatite (HA) doped with different amount of silver were synthesized by hydrothermal method. Thereby silicon addition decreased the phase transformation temperature of HA into silicon-substituted α -tricalcium phosphate (α -Ca₃(PO₄)₂; α -TCP) retaining the spherical morphology of the particles and could have an influence on the biological response of a material and invoke enhanced cell adhesion, differentiation and gene expression additional doping with silver ions was performed in order to improve antimicrobial activity. Synthesized powders were used for scaffold preparation. The scaffolds were prepared by replica foam method. The antimicrobial effects of doped hydroxyapatite powders against pathogen bacterial strains Escherichia coli, Staphylococcus aureus and pathogen yeast Candida albicans were tested on powders preheated at 1150 °C and scaffolds. X-ray diffraction analysis and scanning electron microscopy confirmed complete transformation into α -TCP-HA on all scaffolds and uniform pore distribution. Quantitative test of antimicrobial activity of scaffolds showed that silicon-substituted α -tricalcium phosphate doped with silver had viable cells reduction ability for Escherichia coli, Staphylococcus aureus and Candida albicans up to 30, 28 and 41 %, respectively, related to silicon doped scaffolds, and 69, 98 and 47 %, related to control sample.

P-6

HYDROTHERMAL TREATMENT OF NANOANATASE WITH ALKALI AND ALKALINE EARTH HYDROXIDES

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Nanoanatase powder was hydrothermally treated with LiOH, NaOH, KOH or Ca(OH)₂ at $T = 120$ °C for 8 h. In all cases, the molar TiO₂ : hydroxide ratio was identical. The obtained samples were washed with distilled water, centrifuged and

dried at room temperature. Characterization of the samples was done by X-ray powder diffraction, TG/DTA/DSC and SEM analysis. Nanoanatase showed very diverse reactivity toward different alkali and alkaline earth cations. The final products showed different phase composition, crystallinity and microstructure. With Li^+ and Ca^{2+} anatase forms different titanate structures while with Na^+ and K^+ it mainly retain original anatase structure.

P-7

SYNTHESIS AND CHARACTERISATION OF Sr-SiO₂ POWDERS WITH ORDERED MESOPORES AND IT POTENTIAL APPLICATIONS IN DRUG DELIVERY

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Mesoporous SiO₂ has a highly ordered structure, large surface area and pore volume – qualities that gives it an excellent drug release profile.

The aim of this study was to incorporate Sr²⁺ into mesoporous SiO₂ in order to develop a bioactive mesoporous material with an improved drug delivery profile.

A series of mesoporous SrO-SiO₂ species with different chemical compositions were prepared by a template-induced self-assembly method. As SiO₂ source, tetraethylortosilicate (TEOS) was used in the presence of Pluronic 123 template agent. The chemical and structural characterization of the obtained materials was realized by X-ray diffraction, scanning electron microscopy, transmission electron microscopy, thermal analysis, infra-red spectroscopy, specific surface measurements, pores size distribution and Raman and FTIR spectroscopy.

One described the effect of Sr cations on mesoporous structure and its suitable properties for drug delivery applications.

Keywords: mesoporous materials; SrO-SiO₂; drug delivery