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MECHANOCHEMICALLY-ASSISTED SYNTHESIS AND CHARACTERIZATION OF Zr-DOPED HYDROXYAPATITE NANOPOWDERS

M.J. Lukić[1], A. Stanković[1], Lj. Veselinović[1], S.D. Škapin[2], S. Marković[1], D. Uskoković[1]
[1]*Institute of Technical Sciences of SASA, Belgrade, Serbia*
[2]*Jožef Stefan Institute, Ljubljana, Slovenia*

Hydroxyapatite (HAp) bioceramics attract researches' interests over the decades as a candidate for ideal bone tissue reconstruction material. Its excellent biocompatibility and bioactivity, originating from chemical similarity to the mineral part of the bones, make this material perennial fountain of inspiration and application of wide range of experimental approaches to improve its properties, mainly that of mechanical nature. Doping the crystal lattice of HAp with various ions, while preserving pure apatite crystal structure, seems promising way for alteration of its biological and mechanical properties.

This study deals with mechanochemically-assisted synthesis of Zr-doped HAp with different amounts of Zr ions. Reactants mixture was activated in a planetary ball mill using a wessels and balls made of zirconia. The frequency of the rotation of wessels around the common axis was 260 revolutions per minute, reaction time was 3 h.

The influence of mechanical treatment on final phase purity, chemical composition, morphology and particle size was investigated. The comparison of incorporation efficiency between mechanochemical treatments and pure chemical precipitation is made.