Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION VIII
New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute of Technical Sciences of SASA
Institute for Testing of Materials
Institute of Chemistry Technology and Metallurgy
Institute for Technology of Nuclear and Other Raw Mineral Materials

PROGRAM AND THE BOOK OF ABSTRACTS

Serbian Academy of Sciences and Arts, Knez Mihailova 35
Serbia, Belgrade, 23-25. September 2019.

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P17

Collagen production and tissue infiltration in hydroxyapatite-based implants loaded with macrophages and blood clot

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Bone tissue engineering is promising tool for large bone defects' healing. It provides possibility to use biomaterials in combination with cells and growth factors in order to facilitate bone reparation process. Reparation is initiated by blood clot (BC) formation and cells' infiltration, whereby macrophages are considered to be alpha and omega in controlling all successive events. Goal of entire process is to establish normal tissue architecture which refers to appropriate collagen production and cell colonization. We used experimental approach where BMM combined with BC and macrophages was imitating conditions in damaged bone to see whether initially inclusion of these component in ectopic implants would improve collagen production and tissue infiltration compared to implants consisted of BMM and BC. Histological and histomorphometrical estimation of implants was carried out. More organized collagen fibers and higher tissue ingrowth along with more pronounced tissue vascularization was noticed in implants which initially consisted of all three components compared to other implant type. Obtained results indicate that growth factors and cells from BC as well as macrophages' secretory products can assist BMM in leading bone tissue reparation toward direction that suits bone healing.

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P18

Characterization of $MgAl_2O_4$ sintered ceramics

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Single crystalline phase $MgAl_2O_4$ is made from the predetermined composition of MgO-Al_2O_3 powder mixture by using ball-milling. Mixtures of MgO and Al_2O_3 are treated in planetary ball mill for 30, 60, 90 and 120 minutes, in air. The aim of this experiment was to examine phase composition, microstructure, and densification behavior of all sintered samples and to find out which sample has the best features for further use. After sintering in dilatometer at 1500 °C, XRD patterns and SEM images were recorded. The results show that mechanical activation is an efficient method to improve the densification behavior of $MgAl_2O_4$ sintered specimens. With the prolonged milling time, densities increased, reaching the maximum value of 2.8 g/cm^3 for sample activated 120 minutes.