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

PROGRAMME and the BOOK of ABSTRACTS

2CSCS-2013

2nd Conference of the Serbian Ceramic Society
June 5-7.2013. Belgrade Serbia

Edited by:
Snežana Bošković
Vladimir V. Srdić
Zorica Branković

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NANOSTRUCTURE AND PHASE ANALYSIS OF SPARK PLASMA SINTERED COMPOSITE POWDER OF ZrC AND β-SiC WITH $LIYO_2$

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The aim of this research is to evaluate the suitability of spark plasma sintering (SPS) in sintering of ZrC/β-SiC composite powder in the presence of $LiYO_2$ as sintering additive. The composite powder was obtained by carbothermal reduction of natural mineral zircon, $ZrSiO_4$. The composite material fabricated by SPS process was characterized by the X-ray diffraction (XRD) and Raman analysis. Microstructure/chemical analysis was conducted by using scanning electron microscopy (SEM) and electron dispersive spectroscopy (EDS). An insight into the phase composition change of material surface was obtained from AFM phase images by generating phase distribution. The material was homogeneously distributed and some grains were 10 to 15 nm in diameter. Fracture toughness and Vickers hardness of the composite material were found to be 5.07 $MPam^{1/2}$ and 20.7 GPa respectively. Based on the obtained results, it can be concluded that ZrC/β-SiC composite is promising material for structural application.

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THE INFLUENCE OF BORIC ACID ON SYNTHESIS OF POROUS SILICA CERAMIC

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Porous ceramics based on silicon dioxide was prepared using inexpensive method and starting raw material, clay (surface coal mine Kolubara, Serbia). Boric acid was used as binding and sintering aid. Content of boric acid was varied up to 1

wt%. Clay was purified using heat treatment (600 ºC, 2 h) and aqueous solution of HCl (weight ratio of 1:1). The powder was compacted using low different pressures of 20, 30 and 40 MPa. Pressed samples were sintered for 4 h at 850, 1000, 1150 and 1300 ºC.

X-ray diffraction (XRD) and scanning electron microscopy (SEM) measurements were employed to characterize the phases and microstructure of obtained ceramics. Also a measurement of densities and porosities by immersion technique according to Archimedes principle was used.

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BIOMIMETIC SYNTESIS AND PROPERTIES OF CELLULAR SiC

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Mechanical properties and microstructure of SiC ceramics derived from wood were investigated. Biomorphic silicon carbide were prepared by infiltration of tetraethyl-ortosilicate into a carbon template derived from five kinds of wood (alder, walnut, wild cherry, oak and ash) at room temperature. Infiltration was followed by carbothermal reduction at three temperatures in N_2. The carbon template and bioSiC samples were characterized by X-ray diffraction and scanning electron microscopy. Mechanical properties of biomorphic SiC were investigated by three-point bending, compression and hardness testing. Bending and compressive strength increased with increasing silicon content. The mechanical properties showed correlation with initial density of the wood.