Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION VII
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, 17-19. September 2018.

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P12

Effects of ball-milling on properties of sintered alumina doped with Mn_2O_3

S. Filipović[1], N. Obradović[1], S. Marković[1], M. Mitrić[2], A. Đorđević[3,4], A. Dapčević[5], J. Rogan[5], V. Pavlović[1]

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Recently, with the huge use of smart gadgets, developing of smart jewelry represents a very interesting segment in material science, as well as in electronic science. Alumina is widely used ceramic in many industrial fields as pigments, catalysis, microelectronics, etc., mostly because of its low cost and appropriate mechanical and electrical properties, high surface area and thermal stability. Also, modified alumina could be applied in production of smart jewelry. Thus, the main objectives of this investigation is to improve features of sintered alumina doped with Mn_2O_3 along with mechanical treatment, in order to obtain strong ceramic with low values of dielectric loss and low relative dielectric permittivity, as well as esthetic. Commercial alumina powder was doped with 1 wt % of manganese oxide and treated in planetary ball mill for an hour. Characteristic temperatures of both powders (non-activated and activated one) were investigated in detail by DTA and TG analyses. After sintering at 1200, 1300, and 1400 °C for 2 h, XRD patterns and SEM images were recorded. Furthermore, mechanical and electrical properties were examined for all sintered samples.

P13

Cobalt impregnated acid modified smectite in heterogeneous catalytic oxidation of azo dye using Oxone®

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The starting clay from Bogovina (Serbia) rich in smectite was submitted to acid modification in order to improve textural properties. The acid modified sample was further impregnated with cobalt using 1 mol dm^{-3} solution of $Co(NO_3)_2$ followed by calcination at 450°C during 6

hours and used as heterogeneous catalyst. It was reported that sulfate radicals have high oxidation potential and should be considered as efficient oxidants. The potassium peroxymonosulfate (Oxone® i.e. $2KHSO_5 \cdot KHSO_4 \cdot K2SO_4$) was used as radical source. Radicals were generated by presence of transition metal cation (Co^{2+}) incorporated into smectite structure of the synthesized catalyst. The obtained catalyst was investigated in decolorization of azo dye Acid Orange 10 (AO10) in the presence of Oxone® at 30 and 50 °C. Kinetic of catalytic process was studied up to 4h. The AO10 concentration monitored using UV–Vis spectrophotometry, λ_{max}=478 nm. The obtained results confirmed that cobalt impregnated acid modified smectite can be successfully applied as catalyst in heterogenous Fenton-like reaction of azo dye and corresponding aromatic amines.

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P14

Spectroscopy Study of Nd^{3+} Doped Calcium Tungstate

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Nd^{3+} doped calcium tungstate single crystals were grown from melt using the Czochralski method in air. The obtained transparent light blue single crystal and powdered sample were characterized by X-ray diffraction, Raman and FTIR spectroscopy. The XRD confirms that sample is monophasd, and that it crystallized in scheelite type of structure in 88. space group, *I* 41/*a*. A good correlation was found between the experimental and theoretical Raman and infrared active modes. FTIR confirmed the occurrence of all the functional groups and bonds in this material. From the FTIR spectrum, a strong peak of 862 cm^{-1} has been obtained due to the stretching vibration of WO_4^{2-} in scheelite structure, and a weak but sharp band at 433 cm^{-1} has been noticed due to the metal, oxygen (Ca-O) band. Micro hardness was measured with the Vickers pyramid. Anisotropy in [001] direction was not observed. The crystal showed a micro hardness of 1.5 GPa.

P15

Drug Delivery with Bioconjugated Nanomaterials

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Paclitaxel-conjugated nanoparticles (NPs) of three different types have been synthesized in our laboratory by use of Fe_3O_4 and Au as the cores. Possessing the polyethylene glycol (PEG)-SH spacer and the phosphate join unit, the new paclitaxel-P(=O)(OH)-PEG-S-Fe-NP nanomaterials functioned as a prodrug of paclitaxel, which was liberated in the presence of phosphodiesterase. A new class of targeted anti-cancer drugs is thus established by exploitation of these