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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ORL-EC 2

Bimetallic CuNi/BCY15 cermet anode for proton conducting solid oxide fuel cell

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Nowadays, the ceramic–metal composites (cermets) containing Y-doped barium cerate, $BaCe_{0.85}Y_{0.15}O_{2.925}$ (BCY15) as anode ceramic matrix and metal nickel are utilized as proton conducting solid oxide fuel cell (pSOFC) anodes. An efficient mode to improve the electrocatalytic activity of Ni-cermets is to combine it with other transition metal.

A low-temperature wet chemical approach for simultaneously impregnation of BCY15 with Ni and Cu metallic particles was presented aiming to avoid the traditional ceramic high-temperature processes. The bimetallic (CuNi/BCY15) and monometallic (Ni/BCY15) powders were studied by XRD, TPR and SEM techniques. The electrochemical characterization of the produced anode cermets was performed by electrochemical impedance spectroscopy after high-temperature sintering followed by H_2-reduction.

The comparative study disclosed the positive effect of Cu presence in the bimetallic CuNi/BCY15 anode cermet that is related to (i) appearance of electronic conductivity still at the beginning of reduction under N_2 treatment followed by gradually increasing portions of H_2 and (ii) earlier start of the reduction as opposed to the monometallic Ni/BCY15.

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ORL-EC 3

Cobalt impregnated natural and acid modified montmorilloniteas catalysts in heterogeneous catalytic oxidation of nicotine in the presence of Oxone®

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Nicotine i.e. (S)-3-(1-methylpyrrolidin-2-yl) pyridine is an alkaloid present in significant quantities in tobacco leaves and can be found in wastewaters as an aftermath of tobacco manufacturing. Natural Wyoming originated montmorillonite (Wy-M) and acid modified montmorillonite (Wy-M_A) were impregnated by wetness capillary method using $Co(NO_3)_2$ solution. The amount of introduced cobalt corresponded to cation exchange capacity of each sample. The samples were calcinated at 450°C during 6 hours and denoted as Co/Wy-M and Co/Wy-M_A. These catalysts were used for nicotine degradation in the presence of Oxone® ($2KHSO_5 \cdot KHSO_4 \cdot K_2SO_4$). The changes in the chemical and phasecomposition ofWy-M, Wy-M_A,Co/Wy-M and Co/Wy-$M_A$were monitored using X-ray fluorescence (XRF) and X-ray diffraction (XRD), respectively.The powerful sulfate radicals for nicotine oxidation were generated by activation of Oxone®in the presence of transition metal cation (Co^{2+}) incorporated into the catalysts structure. The process of nicotine oxidation was investigated at 30° C and 50 °C, while thenicotine concentration was monitored