Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION XI
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, 18-20. September 2023.

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former (banana peel) content and sintering temperature was an effective way to control the thermo-mechanical properties of the obtained anorthite ceramics. Samples with open porosity (1.4 – 45%), compressive strength (>15 MPa), bulk density (1.87-2.62 g/cm^3), and thermal conductivity (0.097-3.67W/mK) were obtained after sintering of samples with different percent of banana peel at 1100–1200 ˚C. It suggests that the obtained porous ceramics can be used for cost-effective thermal insulation of buildings.

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Tailoring the ZnO/RuO_2 ratio in composite electrocatalysts for efficient HER and OER

Katarina Aleksić[1], Ana Stanković[1], Ljiljana Veselinović[1], Srečo Davor Škapin[2], Ivana Stojković Simatović[3], Smilja Marković[1]

[1]Institute of Technical Sciences of SASA,Belgrade, Serbia,
[2]Jožef Stefan Institute, Ljubljana, Slovenia,
[3]Faculty of Physical Chemistry, University of Belgrade, Belgrade, Serbia

The increasing demand for efficient catalysts has raised concerns about the limited availability and high cost of platinum group metal (PGM) catalysts. Ruthenium dioxide (RuO_2) has shown remarkable catalytic activity; however, its extensive use is hindered by its high cost. To tackle this challenge, we investigated the utilization of zinc oxide (ZnO) as a promising alternative to reduce reliance on expensive RuO_2 catalysts while maintaining catalytic performance by synthesizing ZnO/RuO_2 composites in various mass ratios (1:1, 2:1, 10:1) through microwave processing of a precipitate, followed by calcination at temperatures of 300 and 600 ^{o}C. The crystallinity and phase purity of the particles were analyzed using X-ray powder diffraction (XRD) and Raman spectroscopy. Surface chemistry was examined by Fourier-transform infrared (FTIR) spectroscopy. Field emission scanning electron microscopy was employed to investigate the morphology and particle size. Photoluminescence and UV-Vis diffuse reflectance spectroscopy were utilized for analyzing the optical properties. The electrocatalytic activity of the materials were evaluated via linear sweep voltammetry in both acidic (0.1 M H_2SO_4) and alkaline (0.1 M NaOH) electrolytes. The ZnO/RuO_2 composites exhibited outstanding catalytic performance for both the hydrogen evolution reaction (HER) and the oxygen evolution reaction (OER) in both types of electrolytes.