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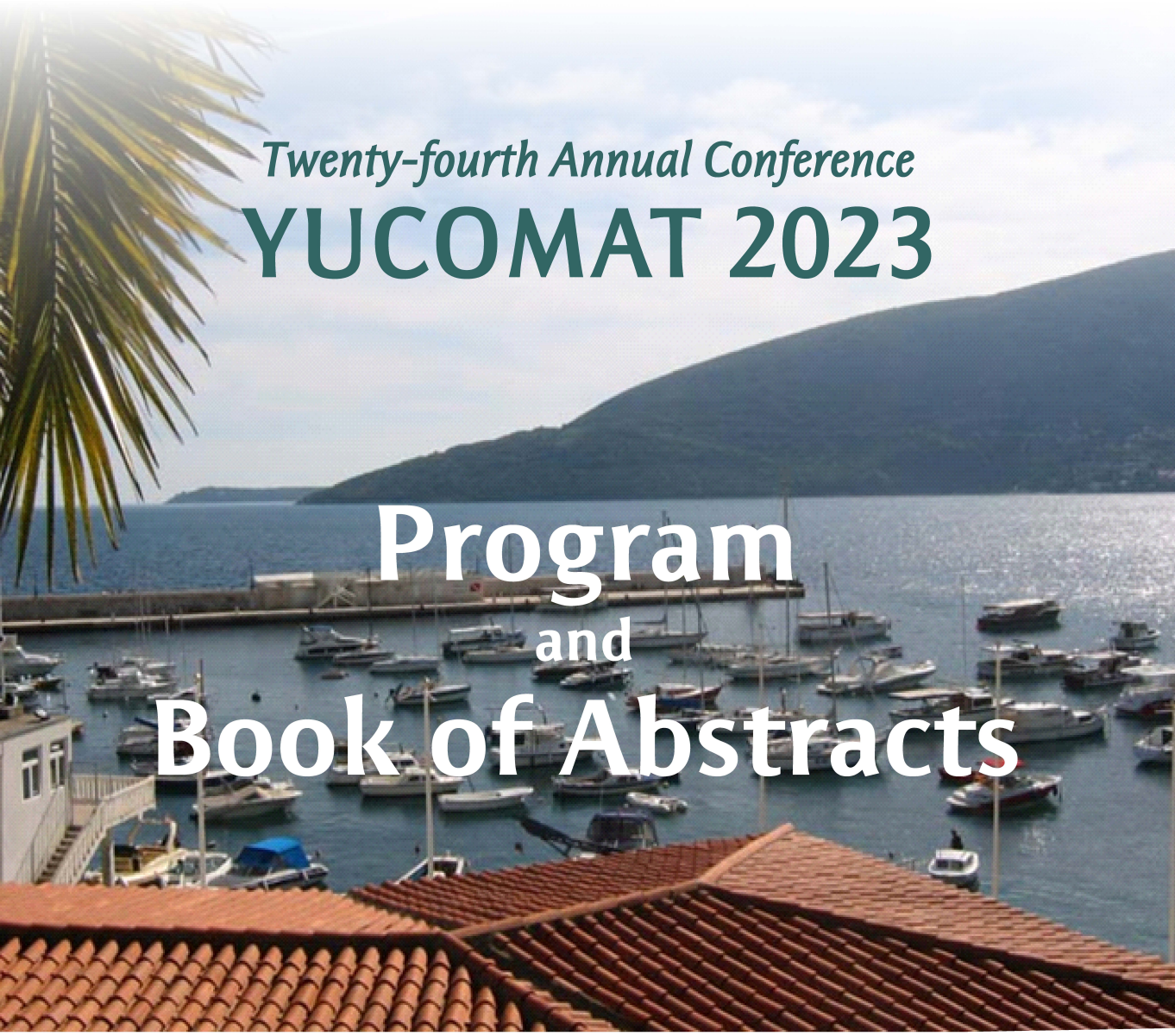

Twenty-fourth Annual Conference

YUCOMAT 2023

Program and Book of Abstracts

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FEDERATION OF EUROPEAN MATERIALS SOCIETIES

Materials Research Society of Serbia

24 conference

SERBIA MRS

YUCOMAT 2023

Herceg Novi, Montenegro :: September 4-8, 2023

TWENTY-FOURTH ANNUAL CONFERENCE

YUCOMAT 2023

Hunguest Hotel Sun Resort, Herceg Novi, Montenegro
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ZnO/RuO_2 nanostructured composites with enhanced bifunctional photo-electro catalytic activity toward water splitting

Katarina Aleksić[1], Ivana Stojković Simatović[2], Smilja Marković[1]

[1]Institute of Technical Sciences of SASA, Belgrade/Serbia,
[2]University of Belgrade, Faculty of Physical Chemistry, Belgrade, Serbia

The demand for affordable and accessible catalysts to replace the expensive and scarce resourced platinum group metals (PGMs) has become increasingly vital. Since they combine different properties such as electrochemical activities, chemical and photochemical stability, non-toxicity, etc. ZnO-based materials have been examined for potential applications in electronics, opto-electronics, sensing in environmental applications as well as catalysis. This study focused on cost reduction of PGM materials by introducing RuO_2 as a substitute for Ru and decreasing the amount of RuO_2 through the incorporation of abundant and versatile ZnO. A composite of ZnO/RuO_2 in a 10:1 molar ratio was synthesized using a microwave proccessing of a prepcipitate. To enhance its catalytic properties, the composite was subsequently annealed at 300 and 600 °C. The physico-chemical characteristics of the ZnO/RuO_2 composites were analyzed using X-ray powder diffraction (XRD), Raman and Fourier transform infrared (FTIR) spectroscopy, field emission scanning electron microscopy (FESEM), UV-Vis diffuse reflectance spectroscopy (DRS), and photoluminescence (PL) spectroscopy. Furthermore, the electrochemical activity of the samples was assessed through linear sweep voltammetry in both acidic (0.1 M H_2SO_4) and alkaline (0.1 M NaOH) electrolytes. Remarkably, the ZnO/RuO_2 composites exhibited excellent bifunctional catalytic activity for hydrogen evolution reaction (HER) and oxygen evolution reaction (OER) in both types of electrolytes.