The Serbian Society for Ceramic Materials
Institute for Multidisciplinary Research (IMSI), University of Belgrade
Institute of Physics, University of Belgrade
Center of Excellence for the Synthesis, Processing and Characterization of Materials for use in Extreme Conditions "CEXTREME LAB" - Institute of Nuclear Sciences "Vinča", University of Belgrade
Faculty of Mechanical Engineering, University of Belgrade
Center for Green Technologies, Institute for Multidisciplinary Research, University of Belgrade
Faculty of Technology and Metallurgy, University of Belgrade
Faculty of Technology, University of Novi Sad

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NANOCRYSTALLINE SnO_2-Zn_2SnO_4 COMPOSITE THICK FILMS APPLIED AS HUMIDITY SENSORS

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Starting ZnO and SnO_2 nanopowders (<100 nm) were mixed in a suitable ratio and calcined at 1050 °C for 2 hours to obtain nanocrystalline SnO_2-Zn_2SnO_4 composite powder. Structural characterization performed by X-ray diffraction (XRD) and Scanning Electron Microscopy (SEM) showed that a nanocrystalline composite SnO_2-Zn_2SnO_4 powder was obtained. Thick film paste was made by adding organic vehicles to the powder. Screen printing of four and five layers of thick film paste was performed on two interdigitated test electrode configurations. They were calcined at 500 and 600 °C for 30 minutes. Impedance response was analyzed at several working temperatures (20-60 °C) in the relative humidity range 30-90% and frequency 42 Hz to 1 MHz. Increase in relative humidity lead to a decrease in impedance, especially at lower frequencies. The sensor time delay between absorption and desorption processes was low and the response and recovery times fast showing that the nanocystalline SnO_2-Zn_2SnO_4 composite has potential for application in humidity sensing.