



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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Biosynthesis of ZnO nanoparticles using agro-waste with antibacterial and antioxidant activity

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Green synthesis is a more sustainable option using renewable biomass such as plants as reducing or stabilizing agents compared to toxic chemical compounds. These biological substances also behave as capping agents, which control the size and shape of the nanoparticles. In this work, ZnO nanoparticles (NPs) have been prepared *via* a simple, low cost and ecofriendly method using citrus fruit peel and extracts as biological reducing agents. Zinc nitrate and zinc acetate were used as a source of zinc ions. XRD analysis revealed the formation of a ZnO wurtzite phase without impurities. Synthesized ZnO NPs with an average electronic band gap ~ 3 eV were obtained and found to have round-like, hexagonal-like or needle-like structures depending on precursor type. EDS analysis showed a homogeneous distribution in Zn and O elements, attributed to single-phase ZnO constituents. Antibacterial and antioxidant activities of synthesized NPs were evaluated. Obtained results showed that ZnO synthesized from nitrate precursors are more effective in inhibiting growth of *Salmonella* and *Staphylococcus Aureus*. Antioxidant activity of ZnO NPs determined using CUPRAC and ABTS assays showed higher activity of ZnO obtained using nitrate precursors. The maximum scavenging activity of 90% was observed at the concentration of 10 mg/ml.