



**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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**Book title:** Serbian Ceramic Society Conference - ADVANCED CERAMICS AND APPLICATION XI Program and the Book of Abstracts

**Publisher:**

Serbian Ceramic Society

**Editors:**

Dr. Nina Obradović

Dr. Lidija Mančić

**Technical Editors:**

Dr. Adriana Peleš Tadić

Dr. Jelena Živojinović

**Printing:**

Serbian Ceramic Society, Belgrade, 2023.

**Edition:**

120 copies

CIP - Каталогизacija y публикацији  
Народна библиотека Србије, Београд

666.3/.7(048)

66.017/.018(048)

**SRPSKO keramičko društvo. Conference Advanced Ceramics and Application : New Frontiers in Multifunctional Material Science and Processing (11 ; 2023 ; Beograd)**

Program ; and the Book of abstracts / Serbian Ceramic Society Conference Advanced Ceramics and Application XI New Frontiers in Multifunctional Material Science and Processing, Serbian Academy of Sciences and Art Serbia, Belgrade, 18-20. September 2023. ; [editors Nina Obradović, Lidija Mančić]. - Belgrade : Serbian Ceramic Society, 2023 (Belgrade : Serbian Ceramic Society). - 90 str. : ilustr. ; 30 cm

Tiraž 120.

ISBN 978-86-905714-0-6

a) Керамика -- Апстракти б) Наука о материјалима -- Апстракти

COBISS.SR-ID 122849545

is in good agreement with the value obtained by XRD-structural analysis (0.51). Raman spectrum is fitted with 7 Lorentzian peaks. To analyze the IR spectra, we used *Kramers-Krönig* analysis. Measurement of magnetization, i.e. coercivity, enable the calculation of the anisotropy coefficient  $K_1 = 4.02 \cdot 10^5 \text{ J cm}^{-3}$ , which is very high in cobalt ferrite. The  $^{57}\text{Fe}$ -Mössbauer spectrum of the  $\text{CoFe}_2\text{O}_4$  sample was measured at room temperature in  $\pm 12 \text{ mm s}^{-1}$  Doppler velocity range. The  $^{57}\text{Fe}$ -Mössbauer spectrum of the  $\text{CoFe}_2\text{O}_4$  sample was fitted with the extended Voigt-based fitting method.

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### Photocatalytic activity of $\text{SrGd}_2\text{O}_4$ down and up-converter systems

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Issues with air and water pollution have become a worldwide problem. Photocatalysis is a technique that holds promise for resolving these urgent issues due to its sustainability, affordability, and environmental friendliness. Recently, anti-Stokes and Stokes luminescence materials have been identified as potentially efficient candidates for photocatalysis exploitation. Under irradiation, doping different  $\text{Ln}^{3+}$  ions in an inorganic host will induce designable down and up-conversion emissions beginning in the UV and extending to the NIR region. This investigation will examine the photocatalytic application of the chosen samples. All samples were successfully prepared *via* sol-gel assisted combustion method. X-ray Powder Diffraction pattern proved that all samples crystallize as a pure orthorhombic phase of  $\text{SrGd}_2\text{O}_4$ . Scanning and transmission electron microscopy was used for morphology characterization and it revealed the existence of porous agglomerated round-shaped particles favorable for photocatalytic application. Energy Dispersive X-ray Spectroscopy showed the presence of dopant ions and even distribution of all constituting elements. Under simulated solar light irradiation, the photocatalytic characteristics of down-convertors were investigated in the photocatalytic degradation of organic dye methyl orange (MO). During the experiment, a UV/Vis spectrometer was utilized to measure a drop in MO concentration in water solutions. Aliquots of the working solutions were taken at precise time intervals, and the results show that the dye breakdown rate was successful after 4 hours. Methylene blue (MB), as a test pollutant, was used to investigate its photocatalytic efficiency under irradiation of simulated sunlight of up-conversion samples. The obtained results were encouraging because more than 50% of the starting dye concentration was mineralized after 4 hours of exposure to the simulated Sun irradiation.