

MATERIALS RESEARCH SOCIETY OF SERBIA  
INSTITUTE OF TECHNICAL SCIENCES OF SASA

*Programme and the Book of Abstracts*

**NINETEENTH YOUNG RESEARCHERS' CONFERENCE  
MATERIALS SCIENCE AND ENGINEERING**

Belgrade, December 1-3, 2021



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**Materials Research Society of Serbia  
&  
Institute of Technical Sciences of SASA**

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## **Aim of the Conference**

Main aim of the conference is to enable young researchers (post-graduate, master or doctoral student, or a PhD holder younger than 35) working in the field of materials science and engineering, to meet their colleagues and exchange experiences about their research.

## **Topics**

Biomaterials  
Environmental science  
Materials for high-technology applications  
Materials for new generation solar cells  
Nanostructured materials  
New synthesis and processing methods  
Theoretical modelling of materials

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### Results of the Conference

Beside printed «Program and the Book of Abstracts», which is disseminated to all conference participants, selected and awarded peer-reviewed papers will be published in journal “Tehnika – Novi Materijali”. The best presented papers, suggested by Session Chairpersons and selected by Awards Committee, will be proclaimed at the Closing Ceremony. Part of the award is free-of-charge conference fee at YUCOMAT 2022.

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**ANALYSIS**  
LABORATORY EQUIPMENT

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6-1

**Effect of processing parameters on NaGdYF<sub>4</sub>:Yb,Er UCNPs structural, morphological and optical properties**

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Synthesis of monosized and spherical Up-Converting NanoParticles (UCNPs) with biocompatible surface are of a great interest because of their potential application in biomedicine as biomarkers or drug delivery systems. Among different synthesis routes reported in the literature, a hydro/solvo thermal method is consider to be most potential one for scaling-up due fact that is simple and economically cost-effective. In this work the synthesis of NaY<sub>0.65</sub>Gd<sub>0.15</sub>F<sub>4</sub>:Yb,Er UCNPs were performed through chitosan assistant solvothermal synthesis at 200°C. Variation of precursors concentration, type of solvent and synthesis time were performed in order to explore their influence on the structural, morphological and optical properties of the UCNPs. The XRD analysis showed that with a smaller surplus of fluoride ions the formation of Y<sub>0.65</sub>Gd<sub>0.15</sub>F<sub>4</sub>:Yb,Er orthorhombic phase occurs, while the increase of fluoride content or reaction time leads to NaY<sub>0.65</sub>Gd<sub>0.15</sub>F<sub>4</sub>:Yb,Er cubic phase formation. Along with it, the changes of UCNPs morphology from spindle to spherical shape is detected. All samples emit intense green emission due to the (<sup>2</sup>H<sub>11/2</sub>, <sup>4</sup>S<sub>3/2</sub>) → <sup>4</sup>I<sub>15/2</sub> electronic transitions, after been excited with infrared light (λ=978 nm).