

**14<sup>th</sup> ECerS CONFERENCE for  
YOUNG SCIENTISTS in CERAMICS**

**PROGRAMME  
and  
BOOK OF ABSTRACTS**

**October 20-23, 2021  
Novi Sad, Serbia**

**Programme and Book of Abstracts of The ECerS 14<sup>th</sup> Conference for Young Scientists in Ceramics (CYSC-2021)** publishes abstracts from the field of ceramics, which are presented at traditional international Conference for Young Scientists in Ceramics.

***Editors-in-Chief***

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***Publisher***

Faculty of Technology, University of Novi Sad  
Bul. cara Lazara 1, 21000 Novi Sad, Serbia

***For Publisher***

Prof. Dr. Biljana Pajin

***Printing layout***

Vladimir V. Srdić, Marija Milanović, Ivan Stijepović

***Press***

SAJNOS, Novi Sad

CIP – Каталогизacija у публикацији  
Библиотека Матице српске, Нови Сад

666.3/.7(048.3)

**CONFERENCE for Young Scientists in Ceramics (14 ; 2021 ; Novi Sad)**

Programme and book of abstracts / 14th ECerS Conference for Young Scientists in Ceramics (CYSC-2021), October 20-23, 2021, Novi Sad ; [editor-in-chief Vladimir V. Srdić, Andraž Kocjan, Maria Canillas Perez]. - Novi Sad : Faculty of Technology, 2021 (Beograd : Službeni glasnik). - XX, 142 str. : ilustr. ; 24 cm

Tiraž 130. - Registar.

ISBN 978-86-6253-136-0

a) Керамика - Технологија - Апстракти  
COBISS.SR-ID 48093961



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**SOLVOTHERMAL SYNTHESIS OF NaGdYF<sub>4</sub>:Yb,Er UCNP<sub>s</sub> WITH  
DIFFERENT STRUCTURAL, MORPHOLOGICAL AND OPTICAL  
PROPERTIES**

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Up-Converting NanoParticles (UCNPs) with biocompatible surface and unique optical properties, low phonon energy (350 cm<sup>-1</sup>) and high chemical stability attract a great interest as potential biomarkers or drug delivery systems. The hydro/solvo thermal method, as one of the most economical method which do not include the use of toxic precursors, was applied here for the synthesis of NaY<sub>0.65</sub>Gd<sub>0.15</sub>F<sub>4</sub>:Yb,Er nanoparticles at 200°C. Chitosan is used as surfactant and structural directing agent. In addition, different processing parameters (precursor concentration, solvent type, and synthesis time) were applied to investigate their influence on the structural, morphological, and optical properties of UCNP. 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).