

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

**December 1-3, 2021, Belgrade, Serbia**

**Program and the Book of Abstracts**

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

**2021**

Book title:

Nineteenth Young Researchers' Conference - Materials Science and Engineering:  
Program and the Book of Abstracts

Publisher:

Institute of Technical Sciences of SASA  
Knez Mihailova 35/IV, 11000 Belgrade, Serbia  
Tel: +381-11-2636994, 2185263, <http://www.itn.sanu.ac.rs>

Conference organizers:

Materials Research Society of Serbia, Belgrade, Serbia  
Institute of Technical Sciences of SASA, Belgrade, Serbia

Editor:

Dr. Smilja Marković

Technical Editor:

Aleksandra Stojičić

Cover page: Aleksandra Stojičić and Milica Ševkušić

Cover: Milica Ševkušić

Printing:

Gama digital centar  
Autoput No. 6, 11070 Belgrade, Serbia  
Tel: +381-11-6306992, 6306962  
<http://www.gdc.rs>

Publication year: 2021

Print-run:

120 copies

CIP - Каталогизacija у публикацији  
Народна библиотека Србије, Београд  
66.017/018(048)

**YOUNG Researchers Conference Materials Sciences and Engineering (19 ; 2021 ; Beograd)**

Program ; and the Book of abstracts / Nineteenth Young Researchers' Conference Materials  
Science and Engineering, December 1-3, 2021, Belgrade, Serbia ; [organized by] Materials Research  
Society of Serbia & Institute of Technical Sciences of SASA ; [editor Smilja Marković]. - Belgrade :  
Institute of Technical Sciences of SASA, 2021 (Belgrade : Gama digital centar). - XVIII, 86 str. : ilustr.  
; 23 cm

Tiraž 120. - Registar.

ISBN 978-86-80321-36-3

а) Наука о материјалима -- Апстракти б) Технички материјали – Апстракти

COBISS.SR-ID 51231241

## **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

## **Scientific and Organizing Committee**

### Committee President

Smilja Marković                      Institute of Technical Sciences of SASA, Belgrade, Serbia

### Vice-presidents

Dragana Jugović                      Institute of Technical Sciences of SASA, Belgrade, Serbia  
Magdalena Stevanović              Institute of Technical Sciences of SASA, Belgrade, Serbia  
Đorđe Veljović                        Faculty of Technology and Metallurgy, Belgrade, Serbia

### Members

Tatiana Demina                      Enikolopov Institute of Synthetic Polymeric Materials,  
Russian Academy of Sciences  
Jasmina Dostanić                      Institute of Chemistry, Technology and Metallurgy, Belgrade,  
Serbia  
Xuesen Du                              Chongqing University, Chongqing, China  
Branka Hadžić                        Institute of Physics, Belgrade, Serbia  
Ivana Jevremović                      Norwegian University of Science and Technology, Trondheim,  
Norway  
Sonja Jovanović                      Institute of Nuclear Sciences “Vinča”, Belgrade, Serbia  
Snežana Lazić                        Universidad Autónoma de Madrid, Spain  
Lidija Mančić                        Institute of Technical Sciences of SASA, Belgrade, Serbia  
Marija Milanović                      Faculty of Technology, Novi Sad, Serbia  
Miloš Milović                        Institute of Technical Sciences of SASA, Belgrade, Serbia  
Nebojša Mitrović                      Faculty of Technical Sciences, Čačak, Serbia  
Irena Nikolić                        Faculty of Metallurgy and Technology, Podgorica, Montenegro  
Marko Opačić                        Institute of Physics, Belgrade, Serbia  
Vuk Radmilović                        Faculty of Technology and Metallurgy, Belgrade, Serbia  
Tatjana D. Savić                      Institute of Nuclear Sciences “Vinča”, Belgrade, Serbia  
Ana Stanković                        Institute of Technical Sciences of SASA, Belgrade, Serbia  
Srečo Škapin                        Institute Jožef Stefan, Ljubljana, Slovenia  
Boban Stojanović                      Faculty of Sciences, Kragujevac, Serbia

Ivana Stojković-Simatović Faculty of Physical Chemistry, Belgrade, Serbia  
Konrad Terpiłowski Department of Interfacial Phenomena, Institute of Chemical Sciences, Faculty of Chemistry, Maria Curie-Skłodowska University in Lublin, Poland

Vuk Uskoković TardigradeNano, Irvine, CA, USA  
Rastko Vasić Faculty of Physics, Belgrade, Serbia  
Ljiljana Veselinović Institute of Technical Sciences of SASA, Belgrade, Serbia  
Siniša Vučenović Faculty of Sciences, Department of Physics, Banja Luka, B&H  
Marija Vukomanović Institute Jožef Stefan, Ljubljana, Slovenia

Conference Secretary

Aleksandra Stojić Institute of Technical Sciences of SASA, Belgrade, Serbia

### Conference Technical Committee

Milica Ševkušić, Ivana Dinić, Marina Vuković, Vukašin Ugrinović, Tamara Matić

### 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.

### Sponsors



**ANALYSIS**  
LABORATORY EQUIPMENT

### Acknowledgement

The editor and the publisher of the Book of abstracts are grateful to the Ministry of Education, Sciences and Technological Development of the Republic of Serbia for its financial support of this book and The Nineteenth Young Researchers' Conference - Materials Sciences and Engineering, held in Belgrade, Serbia.

7-1

### **Graphene quantum dots with amino groups as a potential photoluminescent probe for Fe(III) ions**

Slađana Dorončić<sup>1</sup>, Olivera Marković<sup>2</sup>, Duška Kleut<sup>1</sup> and Svetlana Jovanović<sup>1</sup>

<sup>1</sup>*Vinča”-Institute of Nuclear sciences - National Institute of the Republic of Serbia,  
University of Belgrade P.O. Box 522, 11001 Belgrade, Serbia,*

<sup>2</sup>*University of Belgrade-Institute of Chemistry, Technology and Metallurgy, Department of  
Chemistry, Njegosëva 12, 11000 Belgrade, Republic of Serbia*

In the era of pollution and hazardous materials, new methods for the detection of pollutants in the environment are urgently needed. Due to their specific features such as photoluminescence (PL) in the visible part of the spectrum, dispersibility in water, and organic solvents, nontoxicity, and biocompatibility, graphene quantum dots (GQDs) attract attention in optical sensing of various ions and molecules. In this study, pristine graphene quantum dots (p-GQDs) were produced in a simple single-step electrochemical top-down approach using graphite electrodes as a starting material, and dispersion of sodium-hydroxide in 96% ethanol as a medium for electrochemical reaction. These p-GQDs were gamma-irradiated in a dose of 25 kGy in presence of ethylenediamine in Ar medium to introduce amino groups in their crystal lattice. Results obtained from AFM microscopy indicate the height-uniformity of irradiated GQDs. The presence of amino groups in GQDs was confirmed by FTIR, XPS, and UV-Vis spectroscopies. According to results obtained from PL spectroscopy, a significant narrowing of emission band in irradiated GQDs was observed. In further research, these GQDs were investigated as a potential PL sensor for iron which is one of the most abundant heavy metal in the environment. In the preliminary investigation, a water dispersion of irradiated GQDs was mixed with Fe(III) solution in concentrations of 50 and 100  $\mu\text{M}$ . Using a PL spectroscopy the PL intensity of irradiated GQDs in presence of Fe (III) was measured. From the obtained results, it can be seen that Fe(III) ions lead to quenching of GQDs PL intensity. Then, PL intensities were measured in presence of Fe(III) ions in concentration range 0-100  $\mu\text{M}$ . With an increase of Fe(III) concentration, the PL intensity of GQDs decreased. It can be concluded that gamma-irradiated amino-doped GQDs have significant potential in the so-called „turn of“ detection of Fe(III) ions in the aqueous medium.

Acknowledgments: This work was financially supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Grant No. 451-03-9/2021-14/200017, 451-03-9/2021-14/200026).