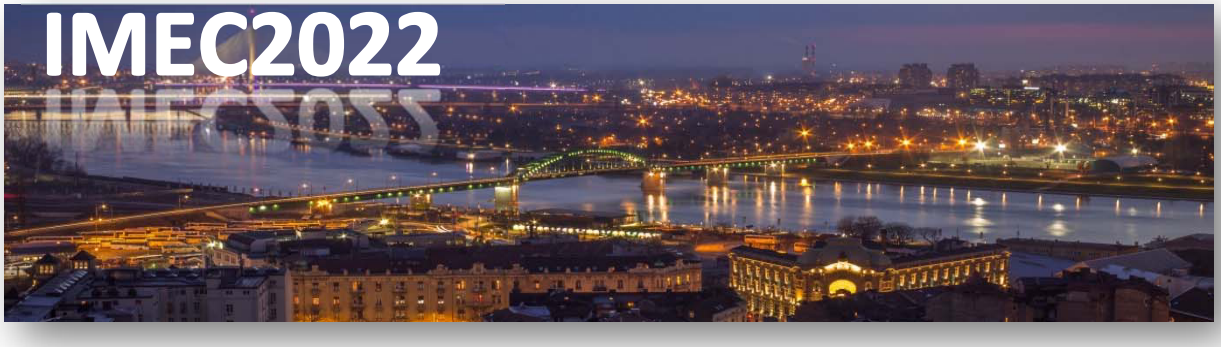
1st International Conference on Innovative Materials in Extreme Conditions



PROGRAM

and

BOOK OF ABSTRACTS

22-23 March 2022

Belgrade, Serbia

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Program and Book of Abstracts of The 1st International Conference on Innovative Materials in Extreme Conditions (IMEC2022) publishes abstracts from the field of material science, physics, chemistry, earth, and computation science on the phenomena arising during the processing and/or exploitation of the innovative materials, which are presented at the international conference on innovative materials in extreme conditions.

Editors-in-Chief
Dr. Rer. Nat. Branko Matović
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Publisher
Vinča Institute of Nuclear Sciences - National Institute of the Republic of Serbia, University of Belgrade
Serbian Society for Innovative Materials in Extreme Conditions (SIM-EXTREME)

Printing layout
Dr. Ivana Cvijović-Alagić
Dr. Jelena Erčić

Press
Donat Graf d.o.o., Vučka Milićevića 29, 11306 Grocka, Belgrade, Serbia

ISBN 978-86-7306-158-0

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

66.017/.018(048)

INTERNATIONAL CONFERENCE ON INNOVATIVE MATERIALS IN EXTREME CONDITIONS
(1 ; 2022 ; BEOGRAD)
Program and book of abstracts / 1st International Conference on Innovative Materials in Extreme Conditions [i. e.] [(IMEC2022)], 22-23 March 2022 Belgrade, Serbia ; [organizers Serbian Society for Innovative Materials in Extreme Conditions [i. e.] (SIM-EXTREME) ... [et al.]] ; [editors-in-chief Branko Matović, Ivana Cvijović-Alagić, Vesna Maksimović]. - Belgrade : University, Vinča Institute of Nuclear Sciences, National Institute of the Republic of Serbia : Serbian Society for Innovative Materials in Extreme Conditions (SIM-EXTREME), 2022 (Belgrade : Donat Graf). - 65 str. : ilustr. ; 30 cm

Str. 3: Preface / editors. - Bibliografija uz pojedine apstrakte.

ISBN 978-86-7306-158-0 (VINS)

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

COBISS.SR-ID 60606985

Preface

Dear conference participants and readers, we have the pleasure to welcome you all to Belgrade, Serbia as the venue for the 1st International Conference on Innovative Materials in Extreme Conditions (IMEC2022). This event is jointly organized by the Serbian Society for Innovative Materials in Extreme Conditions (SIM-EXTREME), the Center of Excellence "Center for Synthesis, Processing and Characterization of Materials for Application in Extreme Conditions - CEXTREME LAB", University of Belgrade, the Faculty of Science and Mathematics, University of Niš, and the Faculty of Mechanical Engineering, University of Belgrade.

The scope of the IMEC2022 is to become the worldwide forum for discussion of experts and young researchers on the phenomena arising during the processing and/or exploitation of the innovative materials. The IMEC2022 conference is focused on the current research in the field of material science, physics, chemistry, earth, and computation science. Experimental and computational investigations of materials obtained or operated under extreme conditions presented during the conference are highlighting recent progress in the development of the innovative materials at high pressures, under high magnetic and electric fields, over a wide range of temperatures, radiation conditions, corrosive environments, under extreme mechanical loads and non-equilibrium thermodynamic conditions. The interrelation between external effects, microstructural characteristics, and material properties is considered on the experimental and theoretical level to obtain new or enhanced insights into the material behavior and their application.

We want to use this opportunity to thank our sponsors and co-organizers for helping us to successfully organize the IMEC2022 conference. First of all, we want to mention that the Ministry of Education, Science and Technological Development of the Republic of Serbia recognized our conference as an important event and gave their financial endorsement. Also, we want to thank the Vinča Institute of Nuclear Sciences – National Institute of the Republic of Serbia, University of Belgrade, for their strong financial support. In the end, we would like to thank all the members of the Conference Advisory Board, the Conference International Scientific Committee, and the Conference Organizing Committee who participated in the preparations of the IMEC2022 conference.

Editors

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Investigation of Yb^{3+}/Er^{3+} doped $SrGd_2O_4$ up-conversion nanomaterial obtained via combustion synthesis

Tijana Stamenković, Nadežda Radmilović, Maria Čebela, Marija Prekajski Đorđević, Vesna Lojpur

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Nanopowders of a new up-conversion materials, $SrGd_2O_4$ co-doped with different Yb^{3+} (1, 2.5 and 5 at%) and constant Er^{3+} (0.5 at%) concentrations were prepared by combustion method. X-ray powder diffraction (XRPD) showed that nanoparticles have orthorhombic structure (Pnma), assigned to the JCPDS Card No:01-072-6387. Rietveld refinement indicated a decrease in the size of the unit cell, lattice parameters, and cell volume, due to successful doping of Yb^{3+} and Er^{3+} ions into the host structure. Transmission electron microscopy (TEM) revealed that obtained nanostructure is composed of agglomerated nanoparticles, while energy dispersive spectroscopy (EDS) confirmed uniform distribution of all constituting elements in them. Up-conversion (UC) luminescence spectra measured in function of laser pumping power indicated that two-photon UC process is established in nanoparticles as a result of the trivalent erbium f-f electronic transitions: two green emission bands at 523 and 551 nm ($^2H_{11/2}$, $^4S_{3/2} \rightarrow {}^4I_{15/2}$) as well as a red emission band at 661 nm ($^4F_{9/2} \rightarrow {}^4I_{15/2}$). The rise of Yb^{3+} concentration from 1 to 5 at% provokes a significant change of the green to red ratio showing the ability to fine-tuning the color output.

ISBN 978-86-7306-158-0