



FIFTEENTH YOUNG RESEARCHERS' CONFERENCE
MATERIALS SCIENCE AND ENGINEERING

December 7-9, 2016, Belgrade, Serbia
Serbian Academy of Sciences and Arts, Knez Mihailova 36

PROGRAMME &
THE BOOK OF ABSTRACTS

MATERIALS RESEARCH SOCIETY OF SERBIA
INSTITUTE OF TECHNICAL SCIENCES OF SASA

December 2016, Belgrade, Serbia

**FIFTEENTH YOUNG RESEARCHERS' CONFERENCE
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Program and the Book of Abstracts

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

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Book title:

Fifteenth 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, fax: 2185263
<http://www.itn.sanu.ac.rs>

Editor:

Dr. Smilja Marković

Technical Editor:

Aleksandra Stojičić

Cover page: Aleksandra Stojičić and Milica Ševkušić

Cover photo: Modified photo by Magelan Travel; Flickr

(<https://www.flickr.com/photos/whltravel/4275855745>) ; [CC BY-NC-SA 2.0](https://creativecommons.org/licenses/by-nc-sa/2.0/)

Printer:

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

Edition:

120 copies

CIP - Каталогизacija у публикацији - Народна библиотека Србије, Београд

66.017/.018(048)

YOUNG Researchers Conference Materials Sciences and Engineering (15 ; 2016
; Beograd)

Program ; and the Book of Abstracts / Fifteenth Young Researchers'
Conference Materials Sciences and Engineering, December 7-9, 2016,
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, 2016 (Beograd : Gama
digital centar). - XX, 82 str. ; 23 cm

Tiraž 120. - Registar.

ISBN 978-86-80321-32-5

1. Materials Research Society of Serbia (Beograd)

a) Наука о материјалима - Апстракти б) Технички материјали - Апстракти
COBISS.SR-ID 227315468

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 materials
Materials for high-technology applications
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 journals “Tehnika – Novi Materijali” and “Processing and Application of Ceramics“. The best presented papers, suggested by Session Chairpersons and selected by Awards Committee, will be proclaimed at the Closing Ceremony.

Sponsors



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Београда



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of Belgrade

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 Fifteenth Young Researchers' Conference - Materials Sciences and Engineering, held in Belgrade, Serbia.

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Electrical efficiency of anode- and electrolyte-supported SOFCs

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Solid oxide fuel cell is considered now as a promising technology for reliable and environmentally safe energy generation. SOFC convert chemical energy of fuel and oxidant directly into electrical energy through electrochemical reactions.

The applications of fuel cells vary depending of the type of fuel cell to be used. Since fuel cells are capable of producing power anywhere in the 1 W to 1 GW range they can be applied to almost any application that requires power. On the smaller scale they can be used in cell phones, personal computers, and any other type of personal electronic equipment. The SOFC technology is an interesting building block. It has high efficiency and is virtually free from green-house gas emissions. The efficiency, lifetime and cost of the fuel cells are getting closer to the target, but there are still some issues left to solve. For a commercial using of SOFC its electrical efficiency must be improved, which still remain development issue for some of the possible SOFC applications. A lot of efforts have focused on improving properties of SOFC materials, such as power density, catalysts activity, electrolyte conductivity etc., but operation and control of SOFC have not been study captiously, understanding of SOFC working dynamics is very necessary to achieve the new objective. In this paper the cell performances of two different cells tested under the same conditions are presented. Anode- and electrolyte-supported SOFCs were tested to evaluate advantages of different construction and materials for different SOFCs application.

Electrolyte-supported SOFC consisted of: 10Sc1CeSZ – electrolyte, NiO-10Sc1CeSZ - anode, LSCF ($\text{La}_{1-x}\text{Sr}_x\text{Co}_{1-y}\text{Fe}_y\text{O}_{3-\delta}$) - cathode. Anode-supported SOFC consisted of: 8YSZ – electrolyte, 8YSZ-NiO – anode, LSCF ($\text{La}_{1-x}\text{Sr}_x\text{Co}_{1-y}\text{Fe}_y\text{O}_{3-\delta}$) – cathode. SOFC of type 1 showed efficiency on 27% higher than type 2 cell due to 10Sc1CeSZ provides the highest ionic conductivity, despite of the more thick electrolyte. The SOFC of type 1 showed the best result among others types of the cells, but still structure (anode permeability, thicknesses of all layers etc.) needs to be optimized to get high performances.