



**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

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**Program and the Book of Abstracts**

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&  
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 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.

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LABORATORY EQUIPMENT

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**Decomposition mechanism and kinetics of zinc–isophthalate complex  
with 2,2'-dipyridylamine as a precursor for obtaining nanosized zinc oxide**

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Studies related to the synthesis of nanosized ZnO as the antibacterial agent have become an interdisciplinary area gathering chemists, physicists, biologists, and medics. The broad scope of materials based on ZnO resulted in the development of various techniques for its preparation. Considering the dependence of particle shape and size onto physical and chemical properties of ZnO, the synthesis procedure is of major importance. In this work, an unconventional methodology of synthesis is proposed for obtaining nanosized ZnO. Polymeric zinc complex containing 2,2'-dipyridylamine (dipya) and dianion of 1,3-benzenedicarboxylic acid (ipht), [Zn(dipya)(ipht)]<sub>n</sub>, was used as precursor. Besides the crystal structure of [Zn(dipya)(ipht)]<sub>n</sub> which was already published [1], the luminescent properties are presented in this work. Also, the amazing antibacterial activity of this precursor prompted us to investigate the relationship between the crystal structure and thermal properties, especially if we bear in mind the lack of similar studies in the literature. Therefore, the mechanism and kinetics of its degradation was investigated under non-isothermal conditions in nitrogen and air atmospheres.

Degradation enthalpies, thermodynamic activation parameters, pre-exponential factor, A, and the apparent activation energy, E<sub>a</sub>, were determined for each step using Kissinger's and Ozawa's equations. The complexity of degradation steps has been analyzed using isoconversional methods. TG/DCS data were collected at four different heating rates: 10, 15, 20 and 25 °C min<sup>-1</sup>, while the formation of nanosized ZnO was confirmed using XRPD and FESEM techniques. The influence of precursor on the crystallite size and morphology of the resulting ZnO along with its antibacterial activity was examined. The obtained results will be discussed and compared.

[1] L. Radovanović, J. Rogan, D. Poleti, M. Milutinović, M.V. Rodić, Polyhedron 112 (2016) 18.