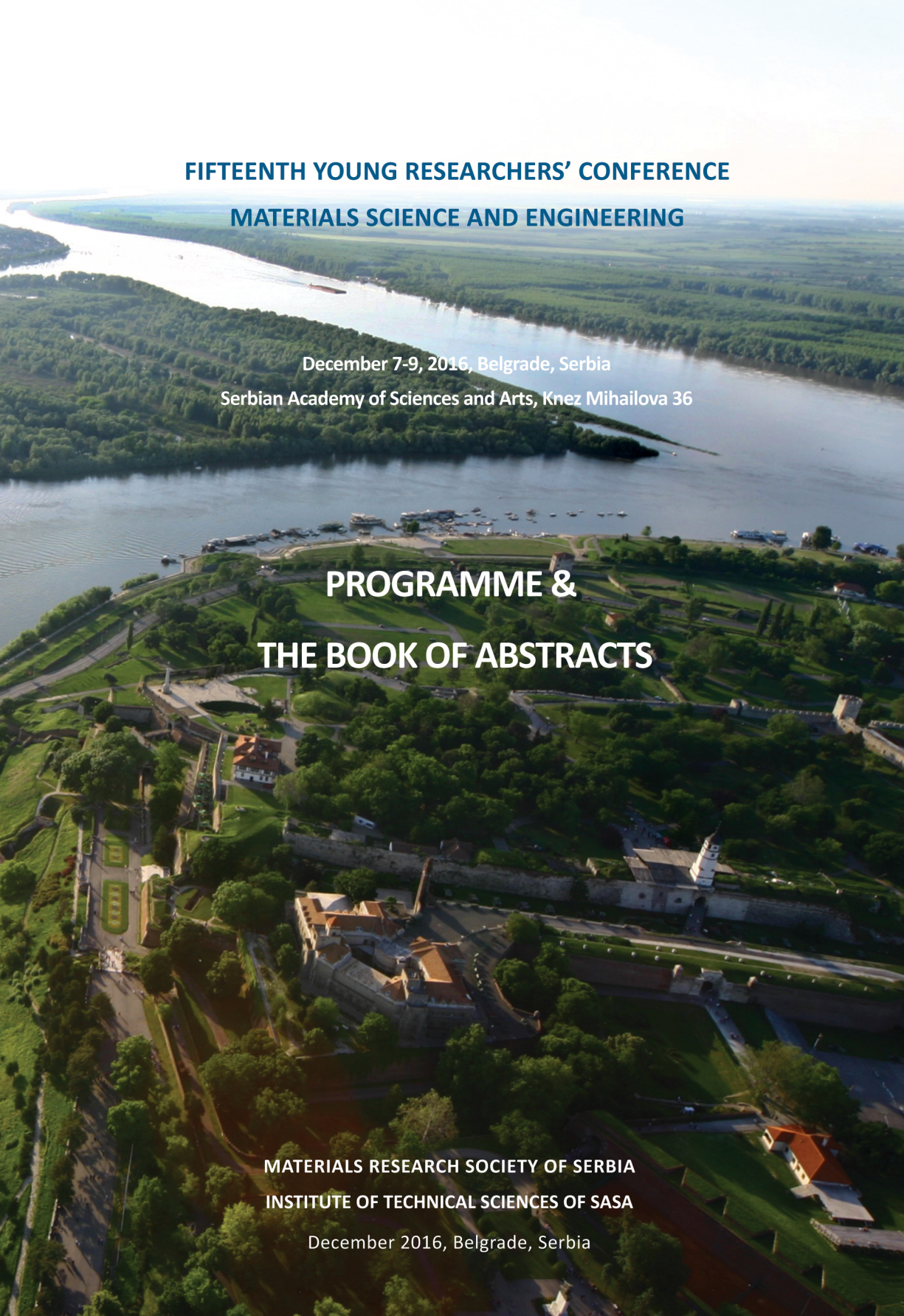

FIFTEENTH YOUNG RESEARCHERS' CONFERENCE

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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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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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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6-4

Micromechanical investigating of the critical parameter's influence on adhesive properties of porous EVA/PMMA polymer blends using finite element method

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Incompatible polymers can be processed in order to obtain improved mechanical or chemical properties of blends. Incompatibility causes formation of pores that are deteriorating mechanical properties and inducing porosity. Ethilenevynil acetate (EVA) and poly methyl metacrylate(PMMA) are two incompatible polymers exhibiting different behavior and their combination can give the material having improved ductility compared to PMMA and better strength compared to EVA. The mixture of those polymers results in a material having large pores and mechanical properties were not at expected level. Compatibilization of EVA/PMMA polymer blends with EVA-g-PMMA decreased pore diameter and improved mechanical properties.

Image analysis of SEM micrographs enabled statistical analysis of pore diameter and other morphological parameters including data about their positions. Positions of pores on the image enabled the calculation and creation of Voronoi diagrams and Delaunay triangulation analysis which was done by using Pythonlibraries. The coordinates of pores contours are processed by The Ramer–Douglas–Peucker algorithm (RDP) and used for establishing the proper models in Abaqus finite elements calculation software. This process is iterative and enables the parametric study of the problem. The aim of this analysis was to determine the area of regular pores that will correspond to the real structure. The relationship of experimental results and numerical simulation of parts identical to SEM images was confirmed.

Employed analysis of spherical pores by changing porosity and pore diameter showed that porosity and pore shape can change the slope of stress-strain curve (modulus of elasticity) and the maximal pore diameter affected the maximal shear stress.