

**Serbian Ceramic Society Conference  
ADVANCED CERAMICS AND APPLICATION**

Organized by  
**Serbian Ceramic Society  
&  
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**PROGRAM AND THE BOOK OF ABSTRACTS**

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### **Structural Investigations of Polyvinyliden Fluoride Thin and Thick Films**

V.B. Pavlović<sup>1,2</sup>, D.K. Božanić<sup>3</sup>, V.P. Pavlović<sup>4</sup>, R. Dojčilović<sup>3</sup>,  
J. Pajović<sup>3</sup>, M. Dukić<sup>5</sup>, B. Vlahović<sup>5,6</sup>

<sup>1</sup>FoA, Department of Physics and Mathematics, University of Belgrade, Serbia, <sup>2</sup>Institute of Technical Sciences of SASA, Belgrade, Serbia, <sup>3</sup>Vinča Institute of Nuclear Sciences, University of Belgrade, Serbia, <sup>4</sup>Faculty of Mechanical Engineering, University of Belgrade, Serbia, <sup>5</sup>North Carolina Central University, Durham, NC, USA, <sup>6</sup>NASA University Research Center for Aerospace Device Research and Education and NSF Center of Research Excellence in Science and Technology Computational Center for Fundamental and Applied Science and Education, North Carolina, USA

Polyvinyliden fluoride (PVDF) is a low-density fluoropolymer that exhibits piezoelectric and pyroelectric properties. It can be used in the chemical, semiconductor, medical and defense industries, as well as in aviation and aerospace applications. Crucial factors that lead to the PVDF ferroelectric properties and determine its piezoelectric, mechanical, optical, electrical and thermal properties are its polar conformations, crystal structure, and crystallinity. These characteristics of the material significantly depend on the conditions used in the processing of polymer films. Therefore, we investigated structure and morphology of thin and thick PVDF films obtained by spin coating and solution casting methods, respectively. Structural investigations of PVDF thin and thick films were performed by the X-ray diffraction (XRD), differential scanning calorimetry (DSC) and Fourier transform infrared spectrometry (FTIR) methods, while microstructure morphology has been analyzed by scanning electron microscope (SEM), transmission electron microscopy (TEM) and atomic force microscopy (AFM). Present results will enable optimization of PVDF processing techniques for the production of pressure and IR sensors.

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### **A Matlab/Simulink 3D Model of Metal Rings and Discs for Ultrasonic Sandwich Transducer Design**

Igor Jovanović<sup>1</sup>, Dragan Mančić<sup>1</sup>, Vesna Paunović<sup>1</sup>,  
Milan Radmanović<sup>1</sup>, Vojislav V. Mitić<sup>1,2</sup>

<sup>1</sup>University of Niš, Faculty of Electronic Engineering, Niš, Serbia,  
<sup>2</sup>Institute of Technical Sciences of SASA, Belgrade, Serbia

Metal-endings are integral part of different ultrasonic sandwich transducers. In this paper a new Matlab/Simulink 3D model of the finite metal rings and discs of various dimensions is realized. With this model, which describes both the thickness and the radial resonant modes, and the coupling between them, mechanical impedance of the sample can be easily computed. Resonance frequency-length curves for rings and disks with various materials and for different selected dimensions are given. Also, comparisons of the different approaches in determining of their resonant frequencies are shown. The proposed Matlab/Simulink model requires simpler implementation than other analytical models. That enabled modifying of 1D theory and simplified modelling and projecting of the ultrasonic sandwich transducers with short-endings. Finally, the computed and experimental results are compared.