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ADVANCED CERAMICS AND APPLICATION III
New Frontiers in Multifunctional Material Science and Processing

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Institute of Chemistry Technology and Metallurgy
Institute of Physics
Institute for Technology of Nuclear and Other Raw Mineral Materials
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Targeted Synthesis of Ceramic-Polymer Nanocomposites

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It is well known that materials used in nano-electro-mechanical systems (NEMS) must simultaneously satisfy numerous requirements for chemical, structural, mechanical and electrical properties. Taking into account that the application of targeted synthesis principles is fundamental for development of these materials, in this article the results of the investigation of the nano-scale grain size effects, grain/particle size induced structural transformations, the evolution of the particle structure during targeted synthesis process and microstructure modeling of ceramic-polymer nanocomposites, has been presented. The nanocomposite BT,ST/PVDF films were prepared by pulsed laser deposition (PLD) method and investigated by X-ray diffraction (XRD) method and Raman spectroscopy, while the microstructure morphology has been analyzed by scanning electron microscope (SEM). It was found that PLD of BT,ST on PVDF substrate offers a new set of opportunities for development of advanced flexible piezo-films for the next generation of NEMS, which applications span the aero-space industry, communications, defense systems, national security, health care, information technology and environmental monitoring.