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CHARACTERIZATION SOLID, VISCOELASTIC AND LIQUID MATERIALS BY OPTO-MAGNETIC SPECTROSCOPY

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Optomagnetni fingerprint (OMF) is a new method of surface material investigation, which is based on light-matter interaction. Valence electrons and their electrical and magnetic forces are starting point of departure. Light-matter interaction will be different depending of covalent bonds, ion-ion, ion-dipol, dipol-dipol interacions presence in material surface (thin layer).

In order to investigate different types of materials we have investigated the solid materials (metal), viscoelastic matter (skin) and liquid (water). For each sample we took 300 digital images under the influence of white light and the white light under the Brewster angle. Using spectral convolution algorithm we made intensity-wavelength difference diagrams. Analyzing them it has been shown that average value (AV) and standard deviation (SD) are different for those three material types'. AV and SD are more compact for metal, water and skin, respectively.

P.S.B.47.

RIETVELD REFINEMENT OF BARIUM TITANATE STANNATE CRYSTAL STRUCTURE

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The barium titanates have wide application in electronic industry as a dielectric and ferroelectric materials.The $BaTiO_3$ doped with Sn is important for practical application in ceramic capacitors as well as in functionally graded materials. It is known that $BaTiO_3$ materials have the typical perovsikite crystal structural. Their ideal crystal structure is a centrosimetric cubic structure with $Pm\bar{3}m$ space group. However, the changes in temperature, pressure, and composition lead to phase transitions and crystal structure transformations.

In this study using by Rietveld refinement, we resolved crystal structure of barium titanate stannate (BTS) $BaTi_{1-x}Sn_xO_3$ (x = 0, 0.025, 0.05, 0.07, 0.10, 0.12, 0.15 and 0.20) solid solutions. The powders were prepared by simple solid state reaction at 1420 ^oC, in air for 2 hours. The structural investigations of the BTS samples were done at room temperature using an X-ray diffraction, Raman spectroscopy and TEM micrograph. The Rietveld refinement of the X-ray diffraction data was used to analyze the structural changes depending on amount of the Sn^{4+} ions in the BTS. Obtained data show that increasing of Sn amount in the structure provokes the transformation of crystal structure from tetragonal to cubic one. We suppose that the absence of orthorhombic and rhombohedral phases is probably a consequence of phase ($0.025 \leq x < 0.20$) stabilization caused by method of sample preparation (high temperature solid state reaction).