

INM-KOLLOQUIUM

“FROM BATiO₃-CERAMICS TO FRACTAL NATURE IN CERAMICS AND MATERIALS SCIENCES”

Prof. Dr. Vojislav V. Mitić

University of Niš, Faculty of Electronic Engineering, Niš, Serbia
Institute of Technical Sciences of SASA, Belgrade, Serbia

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Gastgeber: Dr. Peter W. de Oliveira

BaTiO₃-ceramics is very “exciting” and actual material for nowadays research with permanent applications growth (over three hundred different applications).

The samples used in our research were prepared by a conventional solid state sintering procedure starting from reagent grade powder BaTiO₃ (Murata, Rhone Poulenc Ba/Ti=0.996±0.004) doped with different additives: CeO₂, Bi₂O₃, Fe₂O₃, MnCO₃, CaZr₂O₃, Nb₂O₅, Er₂O₃, Yb₂O₃, Ho₂O₃, La₂O₃, Dy₂O₃, Sm₂O₃. The content of additive ranged from 0.01 to 1.0 wt%. Starting powders were ball milled in ethyl alcohol. After milling powders were drying for several hours, and pressed into pellets 2 mm thick and 7 mm in diameter at a pressure from 35 to 150 MPa. The pellets were sintered in air from 1180°C to 1380°C for 2 and 4 hours. The microstructure of BaTiO₃ doped samples was investigated by scanning electron microscope, JEOL, SEM-5300 equipped by EDS (Energy Dispersive Spectrometer) system. The electrical characteristic were measured using LCR meter Agilent 4284A, in frequency range from 20 Hz to 1MHz. Most of microstructures have been done with selection of some grains and pores with minimum five magnifications. Which is important, because microstructure fractal nature analysis.

Multistep method and materials sintering consolidation. Materials consolidation and sintering in the light of fractal nature analysis. Modified Coble’s model and fractal nature. Heywang model of intergranular capacity and fractal correction. Grains and pores reconstruction by fractal nature analysis. BaTiO₃-ceramics porosity fractal structured approach. Fractal nature structure method in designing micro/nano-structure properties. The role of pores in the frame of fractal nature analysis of sintered ceramics materials. Structure and Voronoi cells reconstruction method - microstructure properties prognosis. Thermodynamics parameters and fractal nature (Gibbs energy, entropy ...). Some other ceramics samples and fractal applications. Micro synthesized diamonds and fractals. Brownian Motion Fractal Nature in Material Structure. Improved intergranular impedance of doped BaTiO₃-ceramics based on Curie-Weiss Law fractal modification. Fractal dimension and fractal tensor product. Meso-Kinetics of one time relaxation electrical processes in BaTiO₃-ceramics. Clausius-Mossotti relation fractal modification. Ceramics materi-

als energy storage and fractal intergrain contact distribution. Sustainable energy, fractals and micro-nano sizes. Alternative energy (electrochemical, solar, wind) sources and fractal nature corrections. New ceramics Tesla fontaine and fractal simulator. Materials properties prognosys, designing predicting, programming and new simple materials properties modelling within the fractal nature perspective applications. Microelectronics, micro-impedances-intergranular and packaging fractal nature frontiers. Higher level microelectronics circuits integrations and fractal microelectronics frontiers.

Wir laden 15 Minuten vor Beginn zu einem Get-together mit dem Referenten ein.