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$BaTiO_3$-CERAMICS ELECTRORESISTIVITY AND HAYWANG INTERGRANULAR CAPACITY FRACTALS MODEL

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BaTiO3-ceramics is very well known electroceramics material and has a more than 300, now a days, very advanced applications. The atomic structures packed by Euclidian geometry, up to the nano sizes, are not suitable for particles flows and irregular structures. In order to analyze more originally these structures, apply fractal nature approach. There is existing trend in the now a days literature that a wide range of disordered systems can be characterized by the fractal nature over a microscopic correlation length. The modern ceramics science, faces with very important priorities of the future frontiers which opens new directions within higher knowledge structure even down to nano and due to lack of energy, towards new and alternative energy sources. There is a fact, that energy transformations are permitted on a small scale. Through our actual research we recognize that BaTiO3 and other electronics ceramics have fractal configuration nature based on three phenomena. Ceramic grains have fractal shape seeing as a contour in cross section or as a surface; the other one phenomena is related to so called “negative space” made of pores and inter-granular space. The porosity is extremely complex and has very important role in microelectronics, micro-capacity, PTC, piezoelectric and other phenomena. The third, there is Brownian process of fractal motions inside the material, during and after sintering, in the form of micro-particles flow (ions, atoms and electrons). These is important phenomenology based on inter-granular micro-capacity and super micro-capacitors in function of higher energy harvesting and storage. Fractal nature theory allows recognizing micro-capacitors with fractal electrodes. The method is based on iterative process which is compatible with the grains and pores model. In this paper, based on fractals corrected Heywang model, we analyse the electroresistivity as a part of intergranular micro-impedance. Also, we successfully applied the complex fractal correction on thermodynamic parameters, especially the temperature. On this way we continue to open the new fractal nature frontiers within the electro parameters, like elastoresistivity.

Keywords: ceramics, intergranular resistivity, fractals

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