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ABSTRACT BOOK*

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based on mixed transition-metal manganite electroceramics with a spinel structure are presented for the first time. The starting ceramic material was prepared via a conventional ceramic technology ute. The microstructure of the prepared ceramic samples were studied using the op microscopy, as well as the scanning electron microscopy techniques with the energy dispersive X-ray microanalysis system. Additional measurements were performed by thermogravimetry analysis. It is shown that the subsequent steps of screen-printing technology for thick-film preparation must be chosen as follows: 1. Possible agglomerates of ceramic powder must be destroyed in a ceramic drum mill "Fritch" to sizes less that 5 mm. 2. In order to obtain the paste, the mixture of the determined amount of ceramic powder, vehicle (organic solvent and organic binder) and glass powder must be used. 3. This paste must be printed onto alumina substrate, using a manual screen-printing device equipped with a steel screen. 4. The organic components of the printed thick films must be decomposed during an appropriate heat treatment (a sintering procedure) in conveyer furnace with smooth temperature rise up to 15 min horizontal shelf at 1123 K. The prepared thick-film samples showed a good morphology, high density, smooth surface and set of the well- pronounced thermoresistive properties.

Peculiarities of manganese ion distribution and their effect on the properties of PTCR ceramics

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Introduction of acceptor dopants improves electrophysical properties of PTCR ceramics based on barium titanate. In order to purposively control PTCR effect it is important to study the distribution of acceptor dopants within polycrystalline materials. The aim of the present work was to investigate the distribution of manganese ions and its influence on the properties of grains, outer grain surfaces and grain boundaries in PTCR ceramics. The characteristics of PTCR ceramics based on Y-doped barium titanate have been investigated over a wide temperature range by complex impedance methods. It has been found that the grain and surface layer resistances decrease with temperature, which is characteristic semiconductors. The temperature dependence of grain boundary resistance is of an anomalous character. In Mn-doped ceramics the magnitude of PTCR effect increases, and the magnitude of varistor effect greatly decreases. The average grain size, to which the magnitude of varistor effect is usually related, does not practically change. The grain resistance changes slightly up to 0.012 mol% manganese and decreases with temperature, whereas the grain boundary resistance greatly increases. This may be accounted for by the fact that manganese ions are not part of the grain lattice, and that the temperature dependence of resistance is mainly determined by the grain surface and grain boundary characteristics. Manganese ions are located at grain boundaries and in the grain surface layer, producing acceptor centers and improving properties of PTCR materials. Thus, in the work the contribution of grains, outer grain surfaces and grain boundaries to the temperature dependence of resistance of Mn-containing PTCR ceramics has been shown.