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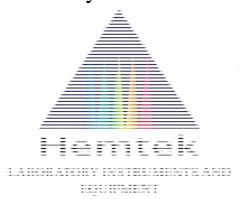
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P.S.A.10

MECHANOCHEMICALLY ENHANCED LOW-TEMPERATURE SYNTHESIS OF Y-DOPED BaTiO₃ PTCR CERAMIC

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The positive-temperature-coefficient-resistivity (PTCR) effect is characterized by a rapid increase of the resistance (several orders of magnitude) when the temperature is raised through the ferroelectric–paraelectric phase transition temperature (Curie point). The barium titanate powders can be modified with some additives (dopants) in order to obtain ceramic products with a PTCR behavior during heating in the vicinity of their Curie temperature. The reagent grade BaTiO₃ and 0.3mol% Y₂O₃ were weighted and milled in a planetary ball mill during various time of mechanochemical treatment. As obtained powder mixtures were uniaxially pressed (P=150MPa) and isothermally heated at T=1423K during one hour, in the presence B₂O₃ vapor phase, in a closed alumina crucibles. Under the defined (optimal) conditions of mechanochemical pretreatment, Y-doped BaTiO₃ PTCR ceramic was obtained, significantly bellow the commonly used sintering temperature, from 1570K to 1650K. On this way, high-temperature reaction step between the BaTiO₃ and Y₂O₃ can be replaced by appropriate mechanochemical treatment at room temperature. During heating of the mechanochemically treated, Y-doped BaTiO₃ powders, in the presence B₂O₃ vapor phase, the amount of boron oxide was kept constant: about 0.5 mol% B₂O₃ powders were placed beside the samples obtained after various time of mechanochemical treatment under the bottom-up alumina crucible. On this way, sintering in the presence of the liquid phase allow to obtain some samples with the electrical resistivities $\rho < 300 \Omega \text{m}$, far bellow from ones characteristic for the undoped BaTiO₃ dielectric ceramics. This value was obtained only for the some samples mechanochemically treated under defined (optimal) milling conditions.

P.S.A.11

INFLUENCE OF MECHANICAL ACTIVATION ON BaO-ZnO-TiO₂ SYSTEM

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The influence of mechanical activation on BaO-ZnO-TiO₂ sistem was observed. Mixtures of BaO-ZnO-TiO₂ were mechanically activated using high-energy planetary ball mill during 0, 5, 10, 20, 40 and 80 minutes. XRD analyses were employed in order to give information about powder's phase composition. Microstructure parameters were revealed from an approximation method. As the time of mechanical activation increased, the decrease in particle size was observed. The effect of milling on microstructure was investigated by scanning electron microscopy as well.