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*P.S.A.10*

## MECHANOCHEMICALLY ENHANCED LOW-TEMPERATURE SYNTHESIS OF Y-DOPED $BaTiO_3$ PTCR CERAMIC

Lj. Vulićević[1], N. Ivanović[2], M. Mitrić[2], Ž. Andrić[2], B. Andjelić[1], M. Plazinić[1], N. Oklobdžija[2], D. Marjanović[2], A. Savić[2]
[1]Technical Faculty- Čačak, Čačak, Serbia
[2]Institute for Nuclear Sciences "VINČA", Belgrade, Serbia

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%$Y_2O_3$ were weighted and milled in a planetary ball mill during various time of mehanochemical treatment. As obtained powder mixtures were uniaxially pressed (P=150MPa) and isothermally heated at T=1423K during one hour, in the presence $B_2O_3$ vapor phase, in a closed alumina crucibles. Under the defined (optimal) conditions of mechanochemical pretreatment, Y-doped $BaTiO_3$ PTCR ceramic was obtained, significantly bellow the commonly used sintering temperature, from 1570K to 1650K. On this way, high-temperature reaction step between the $BaTiO_3$ and $Y_2O_3$ can be replaced by appropriate mechanohemical treatment at room temperature. During heating of the mechanochemically treated, Y-doped $BaTiO_3$ powders, in the presence $B_2O_3$ vapor phase, the amount of boron oxide was kept constant: about 0.5 mol% $B_2O_3$ 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 $\rho<300\Omega m$, far bellow from ones characteristic for the undoped $BaTiO_3$ 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-$TiO_2$ SYSTEM

N. Obradović[1], S. Stevanović[1], V. Pavlović[2], M.M. Ristić[3]
[1]Institute of Technical Sciences SASA, Belgrade, Serbia, [2]Faculty of Agriculture, University of Belgrade, Serbia, [3]Serbian Academy of Sciences and Arts, Belgrade, Serbia

The influence of mechanical activation on BaO-ZnO-$TiO_2$ sistem was observed. Mixtures of BaO-ZnO-$TiO_2$ were mechanically activated using high-energy planetary ball mill during 0, 5, 10, 20, 40 and 80 minutes. XRD analyses were imployed 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.