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Characterisation of pellets and beams from barium titanate perovskite granulates

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The main aim of this investigation is to manufacture the barium titanate powder by solid state, fabricate the barium titanate granulate material and finally sintered material in order to verify if this material can be successful utilised for manufacturing the general part of the stacked-disk multilayer actuators. The pellets were performed by spilling the mould for uniaxial pressing of the external diameter of 11.5 mm with $BaTiO_3$ granulate of the weight of 0.6 g and uniaxial pressing under the pressure of 1 MPa. It was found that the values of water absorbability and the apparent porosity grow together with the maximal sintering temperature. To determine the grain size of sintered materials, photos of SEM microstructure of barium titanate after sintering were prepared. The microstructure is composed of both great grains of the dimension from 50 to 100 μm and smaller one of the dimension from 1 to 3 μm. The grains boundaries are very well foreshadowed and the only slender pores can be noticed in the photos. Although, in this approach the obtained microstructure of sinters is very similar to this presented in literature by other authors, in order to receive better result of the barium titanate dielectric constant, the microstructure of sinter must be improved in the direction of the smaller grains getting. In order to verify whether the special designed sintering curves brought the expected grains size of sintered material at high relative density, photos of microstructure and stage of densification were determined and the results were discussed.

Biography

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