

Nanocomposites and nanomaterials

Evolution of grain growth and porous structure of ceramics based on the BaTiO₃ nanopowder during sintering

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Barium titanate (BaTiO₃) is one of the most studied electronic ceramic materials. It has a high dielectric constant at room temperature, which makes it most widely used material in ceramic capacitors, especially for the manufacturer of multilayer ceramic capacitors (MLCCs) [1,2].

BaTiO₃ has also been widely used in multilayer capacitors (MLCs), PTC thermistors, piezoelectric transducers, and a variety of electro-optic devices. BaTiO₃ adopts the perovskite structure, and has been widely investigated because of its dielectric and ferroelectric properties.

Porosity is an important factor because it has a significant impact on the electrical characteristics of sintered ceramic based on the BaTiO₃ nanopowder.

The aim of this research is a study of grain growth and evolution of porous structure of ceramics based on the BaTiO₃ nanopowder during sintering. Sintering will be conducted at speeds ranging from 5 to 15 °C/min in the dilatometer. Investigation of grain growth and porous structure will be carried out at various stages of sintering in temperatures range from 800 to 1300 °C.

1. *Park, K.* Characteristics of porous BaTiO₃-based PTC thermistors fabricated by adding graphite powders, *Materials Science and Engineering B*, 2004,- 107, pp. 19-26.
2. *R. Chaim , M. Levin , A. Shlayer and C. Estournes* Sintering and densification of nanocrystalline ceramic oxide powders: a review, *Advances in Applied Ceramics*, 2008, - 107, pp 159-169.