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Electrical characterization of BaTiO₃ and Ba_{0.77}Ca_{0.23}TiO₃ ceramics synthesized by the proteic sol–gel method

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Abstract

In this work, we introduce a simple, low-cost, and ecofriendly method for producing barium titanate (BaTiO₃–BT) and barium calcium titanate (Ba_{0.77}Ca_{0.23}TiO₃–BCT) powders. The synthesis was performed by using a proteic sol–gel route which use coconut water in the polymerization step of the metallic precursor. We investigated the effects of the processing parameters with the density, microstructure, and (di)electric properties as sample quality indicators. The sintered ceramics exhibit single crystalline phase, relative density of 95%, a homogeneous microstructure, and an average grain size of 4 μm. The respective dielectric constants of 1200 (BT) and 700 (BCT), measured at room temperature, and the activation energy values for the conductive process are according to those reported in the literature for conventionally prepared ceramics.

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