

Effects of Pulsed Current Sinter-Forging Parameters on the Performance of Ba_{0.6}Sr_{0.4}TiO₃ Ceramics

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Pulsed Current Sinter-Forging also known as Spark Plasma Texturing (SPT), a derivative of Spark Plasma Sintering (SPS), is an edge-free method in which a pre-sintered pellet undergoes radial deformation during sintering, leading to distinct grain growth behaviour. This work investigates the influence of key SPT processing parameters on the microstructure and dielectric performance of Ba_{0.6}Sr_{0.4}TiO₃ (BST) ceramics. The study focuses on the effects of the pre-sintering route and onset pressure temperature on densification, grain size, and tunable dielectric properties. All SPT-processed ceramics achieved near-theoretical densities (>98.6%) and fine microstructures (0.44-0.76 µm), demonstrating the effectiveness of this method to enhance BST properties. Among all SPT approaches, the combination of conventionally pre-sintered pellets prepared at 800 °C for 2 h, along with pressure applied from room temperature, resulted in BST ceramics with the highest tunable dielectric performance. This optimized condition led to enhanced dielectric permittivity, tunability, and k-factor while minimizing dielectric losses, establishing it as the optimal route for SPT processing of BST ceramics for tunable devices.

Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

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