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# STUDIES ON PHASE AND MORPHOLOGY INVESTIGATION OF $Ba_XSr_{1-X}TiO_3$ (X = 0.6, 0.70.8, and 0.9) CERAMIC POWDERS

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## ABSTRACT

This study aims to understand thoroughly the effects of calcining and sintering conditions on the relative permittivity and sintering behaviors of the solid solution method of preparing BSTs. BST ($Ba_xSr_{1-x}TiO_3$, x = 0.6, 0.7,0.8 and 0.9) was synthesized using an established solid-state reaction method [R.K. Roeder, E.B. Slamovich, Stoichiometry control and phase selection in hydrothermally derived $Ba_xSr_{1-x}TiO_3$ powders, J. Am. Ceram. Soc. 82 (7) (1999) 1655, R. Ganesh, E. Goo, Microstructure and dielectric characteristics of $Pb_xBa_{0.5-x}Sr_{0.5}TiO_3$ ceramics, J. Am. Ceram. Soc. 79 (1996) 225, J.W. Liou, B.S. Chiou, Effect of direct-current biasing on the dielectric properties of barium strontium titanate, J.Am. Ceram. Soc. 80 (12) (1997) 3093, T. Noh, S. Kim, C. Lee, Chemical preparation of barium–strontium titanate, Bull. Korean. Chem. Soc. 16 (1995) 1180]. From XRD, the tetragonal perovskite phase formation was confirmed. The lattice parameters a and c were calculated from the XRD data. As a function of frequency and temperature, the dielectric constant and dielectric loss were studied in the frequency range 1 kHz to 1 MHz. When the strontium content in the sample increases, unit cell volume decreases.

**KEYWORDS:** X-Ray Diffraction, Dielectric Constant, Dielectric Loss, Calcining, Sintering