

Optimization of Milling Duration of SBT Nanocrystalline Ferroelectric Ceramic

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CERTIFICATE

This is to certify that the dissertation on the topic entitled “**Optimization of Milling Duration of SBT Nanocrystalline Ferroelectric Ceramic**” has completed the work by Mr. Manish Dwivedi (2K10/NST/09) carried out under my supervision in partial fulfilment of the requirement towards the degree of Master of Technology (M.Tech.) in Nano Science and Technology of Department of Applied Physics, Delhi Technological University, New Delhi.

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ABSTRACT

Nanocrystalline ferroelectric ceramics are important electronic materials having a wide range of scientific and industrial applications such as high dielectric constant capacitors, piezoelectric transducers, pyroelectric sensors, non volatile ferroelectric random access memories, etc. It is well known that performance of any material is closely related to its synthesis process. The methods of synthesis of ferroelectric powders play a significant role in determining the microstructural, electrical and optical properties of these materials. In the present work, nanocrystalline specimens of Strontium Bismuth Tantalate (SBT) ferroelectric ceramics has been synthesized by two technique 1) Solid State reaction Method 2) Mechanical activation process using a high energy planetary ball mill. The powders has been milled for different milling durations (5, 10, 20 hours, etc.), keeping the milling speed fixed at 300 rpm. Microstructural characterizations were performed using X-ray diffraction, scanning electron microscopy. Detailed dielectric study as a function of temperature has been carried out. The observed results have been explained in terms of increased number of grain boundaries due to the reduction of granular size. In the present work, milling hours has been optimized to get enhanced microstructure and dielectric constant of the prepared specimen

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