A

Dissertation

On

Structural and Electrical Investigation of Iron Substituted Barium Titanate

Submitted in Partial fulfillment of the requirement

For the award of the degree of

MASTER OF TECHNOLOGY

In

(NanoScience and Technology)

Submitted by

Samidha

Roll No. 2K10/NST/12

Under the Guidance of

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DEPARTMENT OF APPLIED PHYSICS

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July 2012

Department of Applied Physics
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CERTIFICATE

This is to certify that **Miss Samidha**, a student of final semester M.Tech (Nanoscience and Technology), Applied Physics Department, during the session 2010-2012 has successfully completed the project work on ***"Structural and Electrical Investigation of Iron Substituted Barium Titanate"*** and has submitted a satisfactory report in partial fulfillment for the award of the degree of Master of Technology.

The assistance and help received during the course of investigation have been fully acknowledged. She is a good student and we wish her good luck in future.

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DECLARATION BY THE CANDIDATE

July 2012

Date: _____

I hereby declare that the work presented in this dissertation entitled **"Structural and Electrical Investigation of Iron Substituted Barium Titanate"** has been carried out by me under the guidance of Dr. Amrish Panwar, Assistant Professor, Department of Applied Physics, Delhi Technological University, Delhi and hereby submitted for the partial fulfillment for the award of degree of Master of Technology in Nanoscience and Technology at Applied Physics Department, Delhi Technological University, Delhi.

I further undertake that the work embodied in this major project has not been submitted for the award of any other degree elsewhere.

Samidha

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CERTIFICATE

It is to certify that the above statement made by the candidate is true to the best of my knowledge and belief.

Dr. Amrish Panwar

Assistant Professor

Department of Applied Physics

Dated:_____ Delhi Technological University, New Delhi-42

Dedicated to my

parents

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ABSTRACT

Ferroelectric ceramics have been found to be useful for various practical applications, such as high dielectric constant capacitors, piezoelectric sonar and ultrasonic transducers etc. Barium Titanate was the first ferroelectric ceramic material, which as discovered in mid 1940s. Barium Titanate is of perovskite type structured material. The ferroelectric properties of Barium Titanate may be efficiently controlled by substituting with different transition elements. It is possible to change the parameters such as maximum dielectric constant, transition temperature by suitable substitution. Doping at either Barium-site or Titanium-site modifies the properties of the material. In the present study, the Iron has been substituted at Titanium site and the change in the properties of material has been observed.

The dielectric property of ferroelectric material is greatly influenced by their particle size. Hence, in the present work, the samples of different sizes have been prepared by mechanical activation method and characterized. Also, the effect of sintering temperature has been studied.

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