# CHAPTER 55

# TECHNOLOGY
# APPLIED PHYSICS

## Doctoral Theses

613. JAIN (Sameer)
**Microstructural, Dielectric and Ferroelectric Investigations of Mo,V, Pb, and La Doped $SrBi_2Nb_2O_9$ Ferroelectric Ceramics**
Supervisor : Dr. A K Jha
Th 18226

*Abstract*

Investigats the effect of substitution at A and B sites in $SrBi_2Nb_2O_9$ ferroelectric ceramics. With the objective to enhance the dielectric and ferroelectric properties of SBN substitution of Mo6+ and V5+ at Nb5+ sites in SBN in undertaken. Samples are prepared through solid-state reaction technique and various structural, electrical and ferroelectric properties like X-ray diffraction (XRD), Scanning electron microscopy (SEM), Curie temperature, dielectric constant, dielectric loss impedance studies, dc conductivity, ac conductivity and PE Hysteresis loops are studied.

*Contents*

1. Introduction and background. 2. Characterization techniques of procedures. 3. Molybdenum substituted $SrBi_2Nb_2O_9$ -Structural, Electrical and Ferroelectric Properties. 4. Vanadium substituted $SrBi_2Nb_2O_9$ -Structural, Electrical and Ferroelectric Properties. 5. Lanthanum Substituted $Sr_{0.9}Pb_{0.1}Bi_2Nb_2O_9$ -Structural, Electrical and Ferroelectric Properties. 6. Conclusions and suggestions for future work.

614. RAWAL (Swati)
**Photonic Crystal Waveguides and Devices.**
Supervisor : Prof. R K Sinha
Th 18025

*Abstract*

In the present work the photonic bandgap (PBG) induced wave guiding applications of photonic crystals is exploited to design 2D dual band wavelength demultiplexer (DBWD) for separating the two telecommunication wavelength, 1.31 μm and 1,55 μm. Two designs are presented based on air bridge type photonic crystal structures in which both the upper and lower cladding is made up of air. Tolerance analysis is also performed to study the effect of the variation of air hole radius, etch depth and refractive index on the transmission characteristics of the proposed design of SOI based photonic crystal DBWD.

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615. SHEELA DEVI
**Structural and Electrical Investigations of Tungsten Substituted Barium (Strontium) Titanate Ferroelectric Ceramics.**
Supervisor : Dr. A K Jha
Th 18024

*Abstract*

In the present work, a systematic B-site substitution in barium (strontium) titanate is undertaken and their properties are investigated. The chemical fomulas are : $BaTi_{0.85}W_{0.15}O_3$ for optimization of synthesis parameters, $Ba(Ti_{1-x}W_x)O_3$x=0.0, 0.05, 0.15, 0.30 and $Ba_{0.8}Sr_{0.2}(Ti_{1-x}W_x)O_3$x = 0.0, 0.05, 0.075, 0.1, 0.15, 0.30. The samples are prepared by solid state reaction method at the optimized sintering conditions and studied for their structural, dielectric, ferroelectric, piezoelectric, dc conductivity and impedance properties. Also, Barium titanate and $BaTi_{0.95}W_{0.05}O_3$ are synthesized by mechanical activation technique by using planetary ball-mill and its structural and electrical properties have been investigated.

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