CHAPTER 57

TECHNOLOGY
APPLIED SCIENCES & HUMANITIES

Doctoral Theses

620. MANCHANDA (Rachna)
Electrical Characteristics of Advanced Semiconductor Heterostructures.
Supervisors : Dr. O. P. Thakur and Dr. R. K. Sharma
Th 16904

Abstract

This work focuses on the aspect by carrying out advanced electrical characterization of bare/passivated HgCdTe. Hall/ Resistivity measurements are carried out for the evaluation of electrical properties of HgCsTe. The measurement setup is upgraded for automated variable temprature and variable magnetic field Hall measurements with the incorporation of a temprature controller and a d.c power supply for the electromagnet using IEEE-4888 bus. Control software for the interfacing of instruments and for the data acquisition is developed in Visual BASIC. Automated Hall measurement setup is further used for the measurement in the low temprature range with magnetic range of 0.01 to 0.8 Tesla.

Contents

1. Background and scope of thesis. 2. Transport measurement methodology. 3. Multi-Carrier transport in HgCdTe. 4. HgCdTe - Passivant interface. 5. Ion implantation in HgCdTe. 6. Summary and future directions. Bibliography.

621. RAWAT (Aruna)
Development of PVC Membrane Electrodes Based on Multi-dentate Ligands and their Complexes.
Supervisors : Dr. Anjana Sarkar and Dr. Sulekh Chandra
Th 16809

Abstract

This study embodies the synthesis and characterization of Schiff's bases, macrocyclic ligands and their complexes and then their application as ion sensors or Ion Selective Electrodes. The work is focused on the synthesis of the chemicalsensors so as to detect chemical species in any test solution (sample) and its estimation at a very low concentration levels. Several ligands and complexes have been synthesized so as to incorporate them as ionophore in ion detection techniques by ion selective electrodes study.

Contents

622. SINGH (Anjani Kumar)
Dielectric and Electro-Elastic Properties of Materials.
Supervisor : Dr. O. P Thakur
Th 16586

Abstract

Describes work dielectric relaxation in polar liquids, interfacial nanometric dielectrics and elastic dielectric materials along with electrostriction based solid state capacitive sensors. Electrostriction phenomena along with mathematical modeling in respect of capacitive sensor filled with elastic dielectric materials have also been described. A comparative theoretical analysis of the traditional air gap capacitive sensor with the electrostriction based solid-state capacitive sensor has been carried out thoroughly. Difficulties and limitations with air gap capacitive sensor are highlighted. Solid-state capacitive sensor with elastic dielectric material sandwiched between the compliant electrodes exhibits higher mechanical and electrical stability, sensitivity, higher tolerance with environment and withstands large load in comparison to the air gapcapacitive sensor. An electronic experimental circuit has been suggested for the measurement of relative capacitance variation with proper solution.

Contents

polar liquid. 4. Features of interfacial nanometric dielectrics. 5. Electromechanical coupling in elastic dielectrics. Summary and conclusions. Bibliogaraphy.

623. SRI KRISHNA JAYADEV M.
Molecular Basis of Anti-Cancer Effects of Phyllanthus Emblica L. Fruit.
Supervisor : Prof. A. K. Dubey
Th 16903

Abstract

The present study aims at deciphering the molecular basis of the anticancer effects of *phyllanthus emblica* L. fruit (amla). Anticarcinogenic and antitumor effects of *P. emblica* extracts have already been established. The molecular basis of the anticancer activity of this medicinal plant has been envisaged as the main focus of the present investigation. The effects of the emblica extract on cell proliferation, morphology and the molecular basis of these effects has been studied.

Contents

1. Introduction. 2. Review of literature. 3. Aims and objectives. 4. Materials and methods. 5. Results and discussion. 6. Conclusion. Bibliography.

624. SURESH KUMAR
Study of Homogeneous Relativistic Models Using Variation of Cosmological Parameters.
Supervisor : Dr. Chandra Prakash Singh
Th 16707

Abstract

The work is mainly based on two different methods, which have been used to solve the field equations exactly. The evolution of early universe has been discussed within the framework of a flat FRW model by using 'gamma-law' EoS, where the adiabatic parameter gamma varies with cosmic time to give rise to two early phases of the universe. The varying adiabatic parameter describes a unified description of the early phases of the evolution of universe with variable G and Λ in the presence of bulk viscosity. A number of solutions have been presented by taking phenomenological assumptions on G and ξ. A law of variation for the Hubble parameter, in case of anisotropic Bianchi type-I

space-time, has been studies that yields a constant value of the DP.

Contents

1. Introduction. 2. Early viscous universe with variable G and Λ. 3. Anisotropic model with a law of variation for hubble parameter. 4. Bianchi-I space-time with variable G and Λ. 5. Viscous fluid cosmology in bianchi-I space-Time model. 6. Bianchi-I perfect fluid model in scalar-tensor theories gravitation. 7. Anisotropic dark energy models with constant deceleration parameter. 8. Final concluding remarks and further scope. Bibliography.