National Seminar on Nanomaterials: Synthesis and Application
(NSNSA – 2013)

04 – 06 March, 2013

Book of
ABSTRACTS

Dr. P.R. Chandelkar
(Patron and Principal)

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Organized by

Department of Physics
Govt. Autonomous Post Graduate College
Chhindwara(M.P.) 480001

Shivraj Singh Chouhan
Chief Minister

Government of Madhya Pradesh
BHOPAL - 462 004

No.181, 20 February, 2013

Message

I am happy to know that the Department of Physics, Government Post Graduate Autonomous College, Chhindwara is organizing a national seminar on "Nanomaterials : Synthesis & Applications-2013."

India has experienced enviable scientific advancement. Indian society has always been scientific in temperament and organic texture. The scientific acumen of India's genius has been eloquently displayed in popular sciences. The knowledge of science must benefit the people while inspiring them to know the Reason.

I hope conference would be a source of new knowledge on the subject.

I wish the conference grand success.

(Shivraj Singh Chouhan)

सत्यमेव जयते
शहरी विकास मंत्री
भारत
MINISTER OF URBAN DEVELOPMENT
INDIA

Date- 20.02.2013

Dear Mr. Chandelkar,

I am pleased to know that Department of Physics in Govt. P.G College Chhindwara is organizing a National seminar on Nanomaterials: Synthesis & Application (NSNSA-2013).

I hope and trust this occasion would be a source of inspiration and beneficial for the students of the college.

I wish the success of the seminar and my sincere thanks and blessings to the organizers.

Thanks

Yours

(KAMAL NATH)

To,
Dr. P. R. Chandelkar
Principal
Govt. Autonomous P.G College
Chhindwara (M.P.)

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Massage

It gives me immense pleasure to I note that institution's department of Physics is holding national seminar on 'Nanomaterials synthesis & applications matching face of the global scientific development is the need of the hour. I hope this thought provoking seminar would not only be beneficial for upcoming research scholors, also provide an opportunity to set higher aims taking a glimps of latest development in concerning field.

Wishing very best for the huge success of the seminar.

(Laxmikant Sharma)

Principal
Govt. Autonomous Post Graduate College
Chhindwara M.P.

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विधायक वि.स.–126 छिन्दवाड़ा
प्रदेशाध्यक्ष कमलनाथ प्रशंसक फोरम

सदस्य एपीडा
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दिनांक 25/2/13

शुभकामना–संदेश

बडे हर्ष का विषय है कि छिंदवाडा शासकीय स्वशासी स्नातकोत्तर महाविघालय छिंदवाडा के भौतिक शास्त्र विभाग द्वारा तीन दिवसीय राष्टीय सेमीनार का आयोजन किया जा रहा है । सेमीनार में भाग ले रहे विशेषज्ञों द्वारा दी जा रही जानकारी छात्र–छात्राओं के विकास में मील का पत्थर साबित होगी। कार्यक्रम की सफलता एवं त्रिदिवसीय संगोष्ठी के कार्यक्रम को सफल बनाने के संपूर्ण भौतिक विभाग के स्टाफ को माननीय श्री कमलनाथ जी एवं मेरी ओर से हार्दिक शुभकामनाएं,,

आपका

दीपक सक्सेना

प्रति,

डॉ श्री पी आर चंदेलकर जी,
प्राचार्य,
शासकीय स्वशासी स्नातकोत्तर महाविघालय
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सन्देश

मुझे यह जानकर अत्यन्त प्रसन्नता हो रही है कि गवर्न्मेंट आटोनोमस पोस्ट ग्रेजुएट कालेज, छिंदवाड़ा (म. प्र.) के भौतिक विभाग द्वारा दिनांक 4–6 मार्च 2013 को नेशनल सेमिनार (NSNSA-2013) का आयोजन तथा इस अवसर पर एक स्मारिका का प्रकाशन किया जा रहा है।

मुझे आशा ही नहीं वरन् पूर्ण विश्वास है कि उक्त सेमिनार के आयोजन से सम्बन्धित शिक्षकों तथा छात्र – छात्राओं का ज्ञानवर्द्धन होगा।

मेरी ओर से सेमिनार के आयोजन तथा स्मारिका के सफल प्रकाशन हेतु शुभकामनायें प्रेषित हैं।

शुभकामनाओं सहित,

(प्रो. अविनाश चन्द्र पाण्डेय)
कुलपति

प्राचार्य
गवर्न्मेंट आटोनोमस पोस्ट ग्रेजुएट कालेज,
छिंदवाड़ा (म. प्र.)

Dr. B.P.Chandra
Ex-Vice-Chancellor
Pt. Ravishankar Shukla University, Raipur (C.G.)

MESSAGE

It is a matter of great pleasure that Department of Physics, Government Autonomous Post Graduate College, Chhindwada (M.P.) is going to organize a National Seminar on "Nanomaterials: Synthesis and Application". The subject of nanomaterials is an interdisciplinary subject of research and it is attracting the worldwide attention of a large number of scientists in recent years.

I hope that the National Seminar will serve as a forum for exchange of ideas, experiences, collection and dissemination of information and would focus on various aspects of the topic.

I congratulate the organizers of National Seminar on "Nanomaterials: Synthesis and Application" and wish the seminar a grand success.

(B.P.Chandra)

Government Autonomous Post Graduate College
Chhindwara (M.P.)

Dr.P.R.Chandelkar
Principal & Patron

Date-28/2/2013

This gives me immense pleasure to know that the Department of Physics, Government Autonomous Post Graduate College Chhindwara is going to organize a National Seminar on **Nanomaterials: Synthesis and Application** (NSNSA-2013) from 4 th - 6th March 2013. I would like to extend my best wishes and heartiest congratulations on this glorious occasion.

I take this opportunity to welcome all the delegates. I am sure that the delebrations at the seminar would be productive and valuable. I hope that the Seminar will also provide an opportunity for younger researchers to interact with eminent scientist.

I wish the Seminar a great success.

Dr.P.R.Chandelkar

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KEY NOTE
STRONG LUMINESCENCE INDUCED BY ELASTIC DEFORMATION OF NANOPARTICLES

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The phenomenon of cold light emission induced by elastic deformation of solids is known as elastico mechanoluminescence (EML). As the EML occurs in the non-destructive region, it has great potential for its applications in several mechano-optical devices. When $SrAl_2O_4$:Eu and ZnS:Mn nanoparticles are deformed in the elastic region by the stress initially increasing with time and then attaining a fixed value or by the stress initially increasing and then decreasing with time or by the impact stress, then after a threshold pressure, initially the EML intensity increases with time, attains a maximum value and later on it decreases with time. In the first case, the fast decay time of EML is related to the machine - constant, that is, the time-constant for the rise of the applied pressure; however, the slow decay time is related to the lifetime of the charge carriers in the shallow traps lying in the region where the piezoelectric field is negligible. For the pressure initially increasing and then decreasing with time, only one decay time of EML is observed, which is equal to the rise time of the applied pressure. For the fast-deformation caused by impact stress, the fast decay time of EML is equal to the rise time of impact stress, and the slow decay of EML is equal to the lifetime of retrapped electrons in the shallow traps lying in the region where the piezoelectric field is negligible. For $SrAl_2O_4$:Eu and ZnS:Mn nanoparticles, at a fixed strain rate, the EML intensity increases linearly with the applied pressure; however, the total EML intensity increases quadratically with the applied pressure. The diminished EML intensity of $SrAl_2O_4$:Eu nanoparticles caused by the number of pressings can be recovered by exposing the sample to UV-radiation. The EML spectra of $SrAl_2O_4$:Eu and ZnS:Mn nanoparticles are similar to their photoluminescence and electroluminescence spectra. The piezoelectrically-induced detrapping model is found to be suitable for the EML of nanoparticles and the expressions derived on the basis of this model, are able to explain satisfactorily the characteristics of the EML of nanoparticles. The EML of nanoparticles is useful in stress sensor and for the visualizations of stress distribution in solids, stress field near crack-tip and quasidynamic crack-propagation in solids. The EML of nanoparticles can also be used in safety-management monitoring system for structures. The EML intensity of nanoparticles is so intense that it is able to drive a solar cell system and it can be used as a light-source for specific applications. Several parameters of nanoparticles can be determined from their EML measurements. In addition to the mechanical displays, the coating of mechanoluminescent nanoparticles has opened a window for developing new smart systems and opto-mechanical devices. Conclusively, it may be said that the door of EML research on nanophosphors is wide open and it looks very promising.

INVITED TALKS

IT-1
Nanotechnology: towards development of efficient Diagnosis and Therapeutic

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Nanotechnology like any technology makes use of the existing modalities for the enhancement in diagnosis and therapeutics, paving the way for targeted imaging and therapy of prevailing diseases, such as cancer, atherosclerosis and diabetes etc. Nanotechnology application centre aims at synchronized detection and therapy of diseases through the development of a wide range of such nanomaterials for example nanomagnets for Magnetic Resonance Imaging (MRI) and drug delivery. Nanomagnets synthesized at NAC show a very high contrast of tumor at lower then recommended doses for conventional contrast agents. Nanomagnets showed extraordinary details of the tumor upon application of external magnetic field, which could also be employed for hyperthermia by modulation of the magnetic field. For which rare earth based novel nanomagnets were synthesized and functionalized with several ligands/drug molecules, eg- folic acid as a ligand for several over expressed folate receptors on cancer cells and *methotrexate (MTX*) as a dihydrofolate reductase inhibitor. *MTX* is a chemotherapeutic drug that can target many cancer cells whose surfaces are over expressed by folate receptors. Curcumin functionalized Gadolinium nanoparticles have been successfully designed, which demonstrated that they could be used for imaging of cancer in mice through MRI and brain imaging as they are capable of crossing the blood brain barrier.

Other applications of these magnetic nanoparticles have been investigated for applications, such as sensing, cell sorting, bio-separation, hyperthermia, etc. *In-vitro* studies of the nanomagnets modified with cytosine show better accumulation of blood platelets as compared to unmodified one posing them a potential candidate for platelet isolation from the plasma for different applications and a way for easy separation and simultaneous visualization of blood platelets from the mice-blood platelet rich plasma is proposed. The low-temperature synthesis of quantum size gadolinium monosulfide nanoparticles has been

achieved and their pathogen capture efficiency has been demonstrated. Furthermore, a novel procedure for visual detection and separation of thiols and disulfides has been described.

We also demonstrated an effortless novel route of synthesizing MD-bf-G at large scale. Further we will demonstrate how easily MD-bf-G could be transformed into nano scrolls opening another dimension for drug delivery. A novel methanol derived graphene (MDG) and gentamicin sulfate nanohybrid was prepared, and the loading and release behaviour of gentamicin on MDG is investigated. An efficient drug loading of 2.57 mg $mg^{-1}$was obtained at pH 7. By applying release kinetic models, the mechanism of release of the drug from the MDG matrix was found to be following the Korsmeyer–Peppas model. However, the diffusional release exponent (*n*) value lies below 0.5 demonstrating that the mechanism controlling the drug release is the Fickian diffusion.

These functionalized nanomaterials with strong magnetic moment and magnetic anisotropy make them feasible candidates for simultaneous use in bio-imaging and targeted drug delivery and seize great potential in bio-medical applications, underlying the importance of the current work.

IT-2

Syntheses of Phosphors for LEDs

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The syntheses of phosphors and display phosphors of various host matrices by different preparative methods are very import in the LED phosphor industry. Role of preparative variables in synthesis of phosphors and display phosphors along with basic requirements are discussed in the present paper. Nano phosphors are preferred over micron size phosphors in a number of applications not only due to their particle size but also better optical properties. Some of the techniques such as solid state diffusion, flame and laser pyrolysis and sol-gel process are being employed to manufacture. The main advantages nanophosphors in potential applications such as solid state lighting, medical, security, displays, remote thermometry and thermoluminescence radiation dosimetry. The present paper discusses the synthesis of display phosphors applicable in Phosphor coated LEDs (PLED) for lighting applications. Light emitting diodes and white light emitting diodes lamps having a life of 1,00,000 hours

are going to replace the present existing lamps soon. LED lamp (LED light bulb) is a solid-state lamp that uses light-emitting diodes (LEDs) as the source of light. The LEDs involved may be conventional semiconductor light-emitting diodes, organic LEDs (OLED), or polymer light-emitting diodes (PLED) devices, although PLED technologies are currently commercially available.

Light from individual light-emitting diodes is small compared to incandescent and compact fluorescent lamps, multiple diodes are often used together. In recent years, as diode technology has improved, high power light-emitting diodes with higher lumen output are making it possible to replace other lamps with LED lamps. One high power LED chip used in some commercial LED lights can emit 7,500 lumens for an electrical power consumption of 100 watts. LED lamps can be made interchangeable with other types of lamps. Diodes use direct current (DC) electrical power; to use them from standard AC power they require internal or external rectifier circuits. LEDs are damaged by operating at high temperatures, so LED lamps typically include heat management elements such as heat sinks and cooling fins. LED lamps offer long service life and high energy efficiency, but initial costs are higher than those of fluorescent and incandescent lamps.

IT-3

ELECTROLUMINESCENCE IN NANOSTRUCTURES

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Nanometer sized semiconductor clusters are representative of a state of matter intermediate between molecules and bulk matter. This new class of material shows a number of striking effects such as surface effect, size quantization, lattice contraction, unusual fluorescence and enhanced oscillator strength, which are potentially useful for technological applications. The hybridization of organic and inorganic semiconductors is expected not only to permit wide range selection of emitter and carrier transport materials, but also provide a new approach to construct high performance electroluminescent (EL) devices taking advantage of high photoluminescence efficiency of organic materials and high carrier density and low resistivity of inorganic semiconductors. The incorporation of nanocrystals in polymer is expected to increase the life of the device and enhance the brightness of emission.

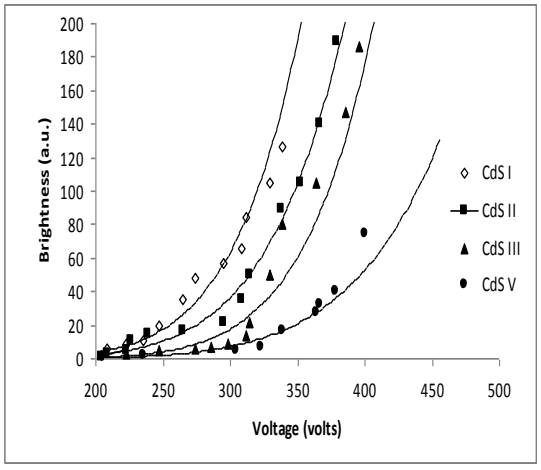
Nanocrystalline powder samples of II-VI compounds with different doping as well as their nanocrystal-polymer composites have been prepared by chemical technique. SEM, TEM and AFM images indicate agglomeration of particles and particle size in 2- 20 nm range.

The XRD studies indicate that the sample have cubic or hexagonal structure depending on preparation conditions. The XRD peaks are broadened by reducing particle size. In nanocomposites, XRD shows halo due to amorphous polymer and nanocrystallite's peaks are superimposed on it. The lattice constants have been found in close agreement with the standard ones.

Absorption spectra of nanocrystals have shown blue shift in absorption edge or first absorption peak, as compared to their bulk counterpart indicating increased band gap energy. The absorption edge or peak is found to shift towards higher energies by reducing the particle size. No effect of doping has been observed on the absorption spectra. In case of nanocomposites, absorption due to nanocrystals is superimposed over the absorption of pure polymer.

The EL studies on nanocrystalline powder samples and nanocrystal/polymer composites have shown that the light emission starts at certain threshold voltage, different for different specimens, and then usually increases rapidly with increasing voltage. It is found that for smaller nanocrystals, threshold voltage is lower and EL brightness (B) increases rapidly with voltage. The relationship between applied voltage (V) and current is found to be linear indicating ohmic nature. In general, higher brightness is obtained at higher frequencies.

Similar results are obtained for nanocrystal/polymer composites. By increasing nanocrystalline loading, EL starts at lower threshold voltages and higher intensity is obtained. Higher EL brightness is obtained in case of composites as compared to the nanocrystalline powder of same material and same size. This shows that such composites can be easily used for EL devices with advantage of better flexibility and good quality films.



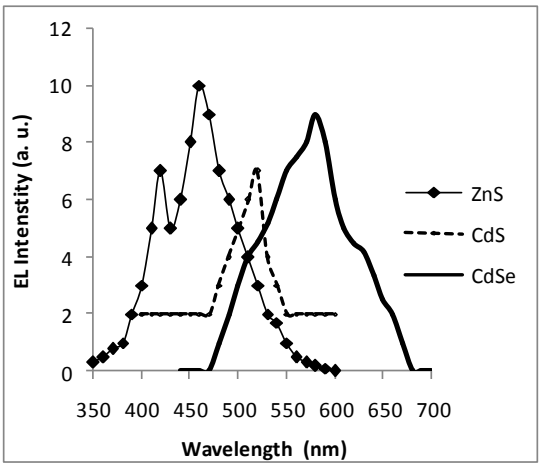


Fig.1Voltage dependence of EL Brightness *Fig.2 Electroluminescence spectra*

It is observed that CdS nanoparticles give bluish light emission where as purple-green emission has been obtained in case of ZnS nanoparticles and orange emission from CdSe nanoparticles. In case of doped samples the colour depends on doping and the maximum EL brightness is obtained at a particular doping concentration.

The investigations have revealed that EL is enhanced by reducing the size of nanocrystals. Electroluminescence is enhanced by embedding nanocrystals in polymer matrix. Different materials or different sized nanoparticles in polymer matrix may be used for light emission of different colors.

IT-4

NIR Emitting Phosphors

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Phosphors which emit visible light are described more frequently as they find applications in lighting, displays and other common opto-electronicdevices. Indian phosphor community is less acquainted with other types of phosphors such as UV emitting, which can be useful in photocopying, phototherapy,etc. and IR emitting. Particularly, the phosphors emitting in near infrared (NIR) are becoming more important in view of the applications in less common fileds like solar photovoltaics and bio-imaging. Some such applications and the phosphors needed for them are discussed here.

Keywords : phosphors, solar energy, bio imaging, photoluminescence

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IT-5

X-ray absorption spectroscopy using synchrotron radiation

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The modern and most intense source of X-rays is a synchrotron radiation source. In a synchrotron, the electrons are accelerated and are directed into storage ring which has auxiliary components such as bending magnets and insertion devices (undulators or wigglers). These supply the strong magnetic fields perpendicular to the beam which are needed to convert the high-energy electron energy into light or some other form of

electromagnetic radiation. The electrons can be maintained for many hours in the storage ring. In a synchrotron storage ring, in which the electrons have more than 1 GeV energies, radiations are obtained in the X-ray region.

The most important property of synchrotron radiation is its brightness. Apart from this, the broad spectral range, pulse time structure, natural collimation, high vacuum environment, high polarization, small source-spot size and stability make synchrotron radiation a unique and rather extraordinary source for a wide variety of science and technological experiments.

An important point which should be noted is that the synchrotron radiation consists of only continuous X-rays and no characteristic X-rays. With these characteristics, the synchrotron radiation has become extremely useful for X-ray absorption spectroscopic work.

The EXAFS process can be thought of as an in situ electron diffraction, in which the X-ray absorbing atom is the photoelectron source. When the kinetic energy of the ejected photoelectron is great enough to enable it to escape the bound state, it interacts with electrons in the bound states of other atoms within the local chemical environment surrounding the absorber. Energetically, the 'continuum' is up to several hundred electron volts (eV) above the absorption edge. Interactions between the ejected photoelectron and other electrons produce secondary sources of scattering and interference on return of the backscattering waves to the absorber. Interferences between outgoing scattering and incoming backscattering waves result in low frequency oscillations between ~50 and ~1000 eV above the absorption edge. These oscillations constitute EXAFS and are of interest as they contain structural and chemical information specific to the scattering atomic shells.

IT-6

Ion Implantation techniques in semiconductor plasma

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Ion implantation is a material engineering process by which ions of a material can be implanted into another solid, thereby changing the physical properties of the solid. In this process ions are accelerated to a target at energies high enough to bury them below targets surface. Ion implantation is used in semiconductor

device fabrication and in metal finishing as well as various applications in material science research. The ions introduce both a chemical change in target; in that they can be different element than the target and a structural change in that the crystal structure of the target in that structure can be damaged or even destroyed.

IT-7

Spintronics using Quantum dots

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The talk introduces frontline areas of technological importance which have their foundations in nanostructured materials. A brief introduction of quantum dots (QDs), specifically pure and magnetic impurity doped II-VI semiconductor QDs is given.

In the field of Spintronics, it is the spin of the electron that carries the information. In II-VI semiconductor QDs, the right and left circularly polarized photons are capable of exciting spin up/ spin down electrons in the excited state. This property can be utilized in generating spin polarized current which can have further implications in spintronic devices.

In magnetic impurity doped semiconductor QDs, the degeneracy of spin states is lifted and a differential phase shift occurs between the spin up and spin down states of electrons. The spin of a single electron can be used to encode binary logic bits 0 and 1. This aspect forms the basis of quantum computation. The two-level system can be used as a quantum bit and the interaction between the qbits can be used to implement quantum logic gates.

We have been working in the above areas and have briefly discussed the work carried out by us in the preparation and characterization of QDs, Exciton/Biexciton binding energies, role of shell thickness on them, spin splitting of states in QDs and formation of CNOT gate using QDs.

IT-8

SOLAR CELL, LPG SENSOR AND SUPERCAPACITOR BASED ON NANOMATERIALS BY USING SIMPLE CHEMICAL ROUTES

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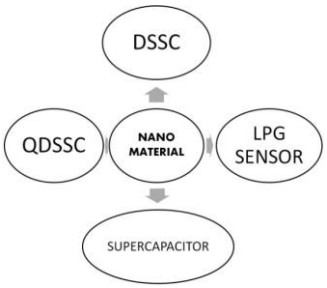
Direct fabrication of complex nanostructure with controlled morphology and surface architecture has renowned due to its numerous applications in the different fields. Environmentally benign and low temperature processes for the synthesis of nanomaterials are plus in this concern. Commercially available nanomaterials are costly and it is quite difficult to use directly or assemble them in thin film form or for coating purpose for diverse applications.



In this concern, the attempt is made to demonstrate the low cost techniques can be applied to synthesize the nanomaterials by using simple chemical method mostly at room temperature at laboratory level. These methods include chemical bath deposition, successive ionic layer adsorption and reaction, dip coating, spin coating and doctor blade. Variety of nanomaterials were prepared not to just characterize it but targeted to use them for diverse device grade applications. The applications are mainly concerned to

(i) Solar cell: To develop colorful dye sensitized and quantum dot sensitized solar cell

(ii) Sensor: Room temperature LPG sensor based on heterojunction mechanism, and

(iii) Supercapacitor: Based on hybrid thin film developed by using commercially available carbon nanotubes with inorganic semiconducting nanoparticles or polymer.

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IT-9

Coherent Transient Nonlinear Optical Effects in Semiconductor Quantum Dots

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The supremacy of the artificially fabricated direct bandgap semiconductor quantum dots is well accepted in the general area of optical information processing. However, to achieve ultrafast optical switching with femtosecond switching times and femtojoule energy requirements, it has become critical to understand the nonlinear optical response of the materials when shined by moderately intense near band-gap resonant lasers with pulse duration of few tens of femtoseconds. Starting with a general introduction to the evolution of semiconductor nanostructures, I propose to discuss the development of a theoretical model to analyse transient nonlinearities in both refractive index and absorption coefficient using the semiclassical treatment. The near band gap resonant excitation, including the excitonic effect, is considered for the semiconductor quantum dots under strong confinement regime. The numerical estimates for the occurrence of transient nonlinear optical effects have been made for III-V and II-VI semiconductor quantum dots duly irradiated by 150fs Ti:Sapphire lasers.

IT-10

Enhancement in the electrical conductivity of lithium borate glasses due to nanocrystallization

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The ion conducting glasses and glass-ceramics have attracted a great deal of interest for their variety of application like high energy density batteries, electrochemical sensors and other electrochemical devices. Lithium conducting glasses owing to their light weight and most electropositive nature, offer good prospects in high energy density batteries. Hence they have been studied widely over last three decades. The ionic conductivity of glasses is generally higher than that of crystalline glass ceramic due to their open structure but glass ceramics are more stable. The efforts to enhance ionic conductivity of lithium conducting glasses have lead to instability. The conversion of glass into glass-ceramics is expected to increase the stability. Most of the studies of lithium conducting glasses carried out so far have been restricted to temperature range below the glass transition temperature Tg . On the other hand the electrical conductivity of glass- ceramics has been studied, after the conversion of glass into glass ceramic. The conductivity of these glass ceramics is found to be less than 3-4 order of magnitudes than that of glasses. We have reported that the enhancement in the conductivity of glasses above glasses transition temperature. When these samples were held at this temperature for 3 hrs and cooled subsequently. The values of conductivity during cooling have been found to be higher than those observed during heating cycle by more than two orders of magnitude. This enhancement in the conductivity during cooling cycle has been attributed to nanocrystallization. The XRD pattern of heat treated sample provided the information on the presence of crystalline phases, their identification and average crystalline size. Observation of microstructure was done by SEM. From this study it can be concluded that the controlled nucleation and crystallization could be a novel method for obtaining nanocrystallization in the lithium conducting glasses.

IT-11

Role of computer in materials research

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Using computer and internet it has became quite easy to obtain the details about article and information about authors and literature survey. Computer helps to organize vast number of literature in perfect order and easy accessible manner. If one is interested researcher, always in touch with the update literature, essential INFONET Digital Library Consortium internet facility provided by of UGC, New Delhi at College as well as University level and same time google scholar, scopus webpage is the most important in laboratory. Searching of new compounds and calculation of starting compounds for synthesis of materials are also solved by using softwares of computer. Manual confirmation of synthesized material is very difficult and laborious work but the great efforts and time have been reduced by computer confirmation which can be done by comparing the experimental XRD with ICDD/JCPDS standard pattern. Even the comparison with standard pattern can tell us the solubility of particular doping atom in the host lattice.

Experimental result analysis has never been so easy without the help of computer. Computer is not only used in result analysis, but also helps to organize the vast number of research fields. Manual analysis of experimental results such as XRD, SEM, TEM, PL, TL, FT-IR, etc. in the field of material research are very laborious and time consuming but development of specialized software application for analysis of particular result laid us to save our precious efforts and time. Day to day growing demand of phosphor for lamp industry, one should have to study the PL emission and excitation properties of RGB phosphors which has became much easier and less time consuming due the aid of computer. This could be possible only by analysis of PL emission curve by CIE diagram which is much easier with the computer programme to calculate color chromaticity, to study the PL properties of phosphors. Imaging the crystal structure and the band diagram energy levels of the material can be done on computer by using various simulations which powers the researcher to tailor the material with desired properties with good accuracy. Communicating paper became very much faster and easier than the earlier, which results into publishing research papers and progress of research became much faster than ever.

Overall views of computerize analysis is at high demand today for research in material science for development of experimental as well as theoretical approach towards the

discussion and understating of mechanisms and industry oriented research. Computer based research is mainly motivated innovative idea for material research. Therefore, computer is not list but important requirement of research in material science.

IT-12

Smart Nanomaterials in Medicine and Pharmacy

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Recent past has witnessed a tremendous change in materials science as the increasingly small size of matter has greatly revolutionized almost all dimensions of life. Whereas the large size of molecules has dramatically replaced metals and many other materials by polymers, the small size of matter has radically changed the scenario of medical and pharmaceutical sciences. At present the nanomedicine has become a potential tool to treat many complex diseases including all type of tumors and cancers. The key parameters that only determine the suitability of nanoparticles to biomedical fields are their size and nature that eventually decides where the nanoparticles have to be used and where not. The advancement in techniques of synthetic chemistry has provided wide options to design nanoparticles of desired size, shaper and charge so as to make them tailorable to specific and desired properties and applications. The present talk aims to focus on various issues like synthesis of nanoparticles by common techniques, their size dependent properties, polymer nanoparticles, nanoparticles with responsive character and some selected applications of nanoparticles in medicine and pharmacy.

IT-13

Optical properties of II –VI semiconductor nanoparticles

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Recently there has been substantial interest in the preparation and characterization of materials consisting of particles with dimensions in the order of a few nanometers so-called “nanocrystalline materials”. One factor driving current interest in nanoparticle research

is the perceived need for the further miniaturization of both optical and electronic devices. Most semiconducting materials, such as the II/VI or III/VI compound semiconductors, show quantum confinement behavior in the 1-20 nm size range, a smaller size that can be achieved using present lithographic methods. Herein we discuss the chemical methods to prepare semiconductor nanoparticle material. As the particle sizes become smaller, the ratio of surface atoms to volume increase, leading to the surface properties playing an important role in the properties of the material. This paper reports the methods of surface characterization as well as optical characterization of ZnS and CdS nannoparticles doped with metal ions (Mn/Cu).The photoluminescence, thermoluminescence and the mechanoluminescence of these nanoparticles are also discussed.

IT-14

Quasicrystals: Materials with forbidden symmetry

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This paper discusses a class of materials with forbidden rotational symmetries, called quasicrystals. Structures of different quasicrystals and their applications are discussed with chronological development in this area.

IT-15

Photoemission studies using laboratory and synchrotron sources.

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ABSTRACT

Synchrotron radiation sources, providing intense, polarized and stable beams of ultra violet, soft and hard x-ray photons, are having great impact on physics, chemistry, biology materials science and other areas research. In particular synchrotron radiation has revolutionized photoelectron spectroscopy by enhancing its capabilities for investigating the electronic

properties of solids. The first Indian synchrotron storage ring, Indus-1 is in operation at RRCAT, Indore. The UGC-DAE CSR with the help of university scientist had designed and developed an angle integrated photoelectron spectroscopy (PES) beamline on this 450 MeV storage ring. A storage ring of this kind is most suitable for investigation in the energy range from few electron volts to around five hundred electron volts. In this lecture we will describe the details of PES beamline and its experimental station. Till date the different university users carried out photoemission measurements on variety of samples. Some of the spectra recorded by users will be presented in order to show the capability of this beamline. In the later part we will report a review of our recent research work carried out on dilute magnetic thin films using this beamline.

IT-16

Depth Profiling in Nanometer Range Thin Films & Multilayers Using X-ray/Neutron Reflectivity & Secondary Ion Mass Spectroscopy

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UGC-DAE Consortium for Scientific Research, University Campus, Khandwa Road, Indore 452 001 Recently nanometer (nm) range thin film and multilayers have attracted extensive attention because of their underlying fundamental physics and applications in spin valves, sensors, read heads and x-ray/neutron optics. In order to design and understand properties of thin films, it is required that the in-depth information about the thin films and multilayers should be probed. Various phenomenon such as interdiffusion, roughness etc. takes place at buried interfaces and it is very difficult to probe them, especially in case of nm range thin films and multilayers. Depth profiling of thin films allows probing various properties of thin films as a function of depth of the film and it can be done using direct or indirect methods. In this presentation general description about preparation of thin films will be presented. Thereafter, both direct and indirect methods of depth profiling will be introduced and discussed in detail. For example reflectivity techniques using x-rays or neutrons are of indirect techniques and provide an excellent opportunity to measure depth profile with a depth resolution of about 0.1 nm. On the other hand secondary ion mass spectroscopy (SIMS) is a direct method and provides a depth resolution of few nm. Examples of depth profiling using these techniques will be presented. In addition, limitations and benefits of these techniques will be discussed.

IT-17

Liposomal Nanomedicine for Breast Cancer Treatment

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Liposomes are well-established nanocarriers for improving the therapeutic index of anticancer agents. A remarkable understanding in the pathophysiology of breast cancer progression has emerged with information on the involved specific biomolecules, which may serve as molecular targets for its therapy. Hormonal and nonhormonal receptors can both be exploited for targeting to breast cancer cells. Targeted delivery of cytotoxic drugs using liposomes is a novel approach for breast cancer therapy. Cell surface receptors and tumor environment factors provide unique opportunities to target anticancer drugs to the breast cancer cells. Several clinical and preclinical experiments confirm tremendous potential of liposomes in breast cancer treatment. Novel concepts using liposomes include receptor mediated drug delivery, hyperthermia, gene therapy, pH sensitivity, and use of cell penetrating peptides for cytosolic delivery of biomacromolecules.

IT-18

Long Afterglow Silicate Based Phosphors

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Long persistent phosphors are phosphors that have very long afterglow emission or phosphorescence. Afterglow is caused by trapped electrons produced by an excitation source. Long persistent phosphors are also called long lasting, long duration, long lived or long afterglow phosphors. Long afterglow materials absorbs light, store the energy under excitation and release the energy as visible light for several hours after the removal of the excitation source in a room temperature. In recent years these materials have drawn much attention because of the great potential application. The rare earth doped silicate based phosphors shows long afterglow properties will be discussed in this presentation.

IT-19

Functional Nanomaterials in New Era of Medicine: Nanomedicine

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Nanotechnology, biology and medicine together at one platform provide a new form of medicine, which is known as nanomedicine. Nanocarriers composed of biomaterials, inorganic materials or synthesized polymers or lipid further strength the egularly of loaded medicines i.e. drugs, vaccines, genetic material or diagnostic agents in exerting their pharmacological/biological action. Several attempts have been made to engineer a cargo using nanomaterials followed by anchoring of targeting ligand for their subsequent action on specific site within the body without exerting side effects of allophathic medicines. Functional nanometrials are upcoming trend setters in drug delivery and drug discovery. Liposomes, Polymeric Nanoparticles, SLNs, Nanosuspension, Dendrimer, Gold Nanoparticles, Carbon Nanotubes, Quantum dots and many more egularly forms of nanoparticles are egularly being explored in this field.

IT-20

Luminescence of Alkaline based Aluminates

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There are unprecedented opportunities today for new materials and for the novel processing of existing materials. Material science is a key of technology, to make it possible to design and researcher makes a material for a scientific need. The ideas and opportunities for new materials have never been greater. The reason for which is a combination of science and engineering push and market pull. Science and engineering have taken materials from the

apparent plateau of the fifties and sixties of well-defined classes of homogenous materials developed principally for their mechanical properties, into the exciting world of composites, laminates and surface coating and into the miniature world of microprocessors, memories, super-conducting filaments and **nano-technology**. The area of application of materials is vast and varied, so is the need for material development suited for that application.

Luminescence is defined as the emission of light by bodies which is in excess of that attributable to black body radiation; and persists considerably longer than the periods of electromagnetic radiations in the visible range after the excitation stops.

Luminescence is traditionally classified as fluorescence and phosphorescence. However, according to modern conventions fluorescence refers to emission of relatively short persistence (10^{-6} -10^{-12} seconds), whereas the phosphorescence persists considerably longer (sometimes even for seconds). The line of demarcation is rather arbitrary. A further classification of the phenomenon is made on the basis of source of excitation. A prefix is added to indicate the source of excitation. Thus, photo-luminescence refers to the luminescence excited by photons, chemi-luminescence to that excited by chemical reaction, radio-luminescence to that excited by ionizing radiations, etc. Thermoluminescence, however, is an exception to this nomenclature-rather it is a misnomer. Thermoluminescence is the thermal stimulation of luminescence excited by other means, and thermal energy is not the source of excitation.

IT-21

Microbial Synthesis and characterization of Silver Nanoparticles using Aspergillus flavus.
(Synthesis of Silver Nanoparticles by Microbial Method and Their Characterization)

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The silver nanoparticles are synthesized by using microbial reduction of silver ions in the presence of fungus Aspergillus flavus . The fungus , Aspergillus flavus when challenged with silver nitrate solution accumulated silver nanoparticles on the surface of its cell wall in 96 hr. The silver nanoparticles synthesized are characterized by using UV-spectroscopy. Absorption peak at 420 nm in UV-visible spectrum corresponds to the Plasmon resonance of silver

nanoparticles. The presence of protein as a stabilizing agent which surrounds the nanoparticles was confirmed by FTIR spectroscopy. The structural properties of silver nanoparticles were confirmed using XRD technique. The surface morphology of silver nanoparticles was studied using SEM. From SEM images grain size of silver nanoparticles is determined up to nano level.

IT-22

RADIATION MEDIATED PROPERTY AUGMENTATION IN CORE-SHELL TYPE MAGNETIC NANOPARTICLES

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As a rule the only control one can exercise over major properties of magnetic nanoparticles is constrained to the circumstances or the preparative conditions that subsist during the synthesis/preparation of the material. Many a times deliberate or unintentional minor alterations in the environment beyond control can hamper the production of nanoparticle sample with a class desired. The handle on control of material property is lost in totality once the material is formed using any conventional materials preparation technique. The method of using high energy radiation provides an effective tool by which one can change the major, like physical, structural, magnetic and electrical properties of the magnetic nanoparticle material even after formation of the nanoparticle sample. A series of core-shell type ferrite nanoparticles were prepared and radiated with high energy radiation to establish the method. Corresponding experimental data obtained and supplemented by related calculations established the fact that property changes are due to radiation induced alterations produced in ionic distribution without affecting the crystal structure in general. Thus high energy radiation can be used as an efficient tool to substantially control the physical, magnetic and electrical properties of the nanoparticles even after synthesis or preparation.

IT-23

RISE AND DECAY OF PHOTOLUMINESCENCE OF SEMICONDUCTOR NANOPARTICLES

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Presently, the science and technology of nanomaterials are the fast growing fields of research. Global interest in nanomaterials has been stimulated not only by their technological applications but also by their interesting scientific investigations. Nano-stuctural semiconductors with spatial dimension of few nanometer and less show certain optical properties that are intermediate between those corresponding to the bulk solids and molecules. These low dimensional systems show optical and electronic properties which are strongly size-dependent and are related to confinement, surface as well as strain effects. The optical spectroscopy, being the non-contact method, has proved to be the most suitable technique to probe the size evolution of the electronic structure in nanoparticles. It has elucidated interesting properties like blue-shift of the optical absorption spectrum, size-dependent luminescence, effect of surface states, oscillator-strength enhancement, interesting nonlinear optical effects and several other fascinating optical properties of nanoparticles. The present paper reports the Kinetics of temporal behavior of photoluminescence of semiconductor nanoparticles. The kinetics of temporal behavior of monomolecular fluorescence and monomolecular phosphorescence are discussed and the expressions are derived for the rise and decay of the fluorescence and phosphorescence of nanoparticals and the theoretical result are compared with the experimental results. The rise and decay of luminescence from the centers lying inside the bulk and on the surface of nanocrystals should show their own identity in the kinetics of the temporal behaviour of PL. In the monomolecular recombination based fluorescence and phosphorescence the temporal evolution of emission should exhibit double exponential decay processes, where one may be related to the traps lying in the bulk and other may be related to traps lying on the surface of nanocrystals. The reduction in the decay time may be due to the overlapping of the wavefunction of the forbidden states (traps or triplets) and allowed states (conduction band or singlet). A good agreement is found between the theoretical and experiments results.

Oral-1

CHARACTERIZATION AND LUMINESCENCE PROPERTIES OF $SrCaMgSi_2O_7$ PHOSPHORS

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A pure alkaline earth silicate based phosphors namely $SrCaMgSi_2O_7$ were prepared by the high temperature solid state reaction method, boric acid (H_3BO_3) was added as flux. The crystalline phase structures of the phosphors were analyzed by the XRD. The phase structure of the silicate based phosphors is akermanite type structure which belongs to the tetragonal crystallography with space group $P\bar{4}2_1m$, this structure is a member of the melilite group and forms a layered compound. The band gap energy of the silicate based phosphors is 5.11 eV which is calculated by absorption spectra. The Thermoluminescence property of $SrCaMgSi_2O_7$ phosphors were investigated for different UV irradiation time. The maximum TL intensity have been found at 15 min UV irradiation time. The Mechanoluminescence property of $SrCaMgSi_2O_7$ phosphors were investigated for without UV radiation and different UV irradiation time. The Mechanoluminescence intensity is increases proportionally with the load. The photoluminescence of $SrCaMgSi_2O_7$ phosphors were investigated under 361 nm excitation, besides the emission band found at 650 nm. FTIR spectroscopy has been done. The FTIR confirm the component of $SrCaMgSi_2O_7$.

Keywords: Phosphors, XRD, FTIR, Thermoluminescence, Photoluminescence, Mechanoluminescence.

Oral-2

CdSe/ZnSe based Multijunction PEC Solar Cell

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Multijunction solar cell technology (MJSCT) is that very scientifically advanced technology, which is to completely overcome cost obstacles and further improve performance of photo-electrochemical solar cells (PEC) for generation of electricity. Multilayer films of CdSe/ZnSe have been deposited on titanium substrate by electro-co-deposition technique in an aqueous acidic electrolyte in a $CdSO_4$(0.1M)/SeO_2-(0.3M) and $ZnSO_4$ (0.1M)/SeO_2 (0.3M) and H_2SO_4 (0.5M) employing different current density (J_d), different deposition time periods(T_m) and annealation with different temperature. We found that the multilayer layer photo-electrode of CdSe/ZnSe gave a best performance compare to the single layer photo-electrode of CdSe and ZnSe PEC solar cell.

Keywords: Multijunction solar cell, electro-co-deposition, current density, deposition time duration, and annealation.

Oral-3

Fe MODIFIED $BaTiO_3$: INFLUENCE OF DOPING ON FERROELECTRIC PROPERTY

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A finest sample of Iron doped particles of $BaTiO_3$ (BTO) with possible tetragonal structure via a solid state route was prepared. Modified sample of $BaTi_{1-x}Fe_xO_3$ (x=0.01 and 0.02) were structural characterized by X-ray diffraction (XRD) using a Bruker D8 Advance XRD Instruments, the value of 2Ɵ is in between 20^0 to 80^0. Fourier transform infrared spectroscopy (FTIR) by using a Bruker, vertex Instruments, has been performs to obtain Ti-O bonding in the modified sample, the region of wavenumber is from 400 cm^{-1} to 4000 cm^{-1}. P-E ferroelectric hysteresis loop measurements have been traced for different applied voltage-100V, 300V and500V.

Oral-4

CHARACTERIZATION OF II - VI NANOMATERIALS

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Nano - materials are currently gaining a lot of prominence due to their unique properties and applications in various fields. Much information is available in the literature on the synthesis and applications of these materials such as carbon nanotubes, nano capsules for drug delivery, bio-synthesized nanoparticles, gold and silver nanoparticles etc. However, in each case, characterization carries a lot of importance, particularly, validation by transmission electron microscopic techniques. Advanced materials - based research and development is a critical component of a wide variety of traditional and emerging research fields. New and innovative materials, including nanomaterials, are at the heart of recent efforts to develop alternative energy sources, as well as more established industries such as automotive and packaging. A central requirement of advanced materials research is the characterization of materials properties.

Much progress in nanoscience and nanotechnology has been made in the past few years thanks to the increased availability of sophisticated physical methods to characterize nanomaterials. Characterization of nanomaterials includes the determination not only of size and shape, but also of the atomic and electronic structures and other important properties. The optical and electrical properties of nanomaterials are of great interest because these may find wide applications in a number of devices.

Keywords : Nanomaterials , Characterization techniques , Material properties.

Oral-5

SYNTHESIS AND CHARACTERIZATION OF SILVER DOPED ZnS /PVK NANOCOMPOSITE

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The thin film of of silver doped ZnS/PVK nanocomposites were prepared by using chemical root technique and characterized by electroluminescence techniques are reported in this paper. The EL intensity of ZnS:Ag/PVK nanocomposites with change in doping(Ag) concentration observed, no effect of doping has been observed on the absorption spectra and XRD. It is seen that electroluminescence (EL) investigations of nanocomposites, Log B vs. $1/\sqrt{V}$ curve is a straight line with negative slope. This indicates that EL is produced by acceleration-collision mechanism.

Keywords: Nanocomposites; absorption spectra; XRD; Electroluminescence

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Oral-6

LUMINESCENT PROPERTIES AND SPECTROSCOPIC INVESTIGATION OF NOVEL RED PHOSPHORS $(Y_{1-x-y}, Gd_x)BaB_9O_{16}:Eu^{3+}_y$ UNDER UV EXCITATION PREPARED BY SOLUTION COMBUSTION SYNTHESIS.

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The Novel orange red emitting borate host phosphor **$(Y1-x-y,Gdx)BaB_9O_{16}: Eu^{3+}y$** has been prepared by a novel solution combustion technique for different combination of host ($0 \leq x \leq 0.97, y=0.03$). The synthesis is based on the exothermic reaction between the fuel (Urea) and Oxidizer (Ammonium nitrate). The Heat generated in reaction is used for auto combustion for precursors. The photoluminescence properties and spectroscopic studies of the powder samples of **$(Y,Gd)BaB_9O_{16}: Eu^{3+}$** has been investigated under UV excitation. The phosphor shows strong & broad absorption of 200-300 nm in UV region and exhibits intense orange red emission peaking around 614 nm upon excited by 254 nm of UV radiation. The phosphors shows two sharp emission peak around 593 nm , 611 nm and very weak suppressed shouldered peak at 627 nm which corresponds to transition of $^5D_0 \rightarrow {}^7F_1$, $^5D_0 \rightarrow {}^7F_2$and $^5D_0 \rightarrow {}^7F_3$, respectively. Amongst the different composition the phosphor matrix composition **$(Y_{0.87},Gd_{0.1})BaB_9O_{16}: Eu^{3+}_{0.03}$** Shows maximum intensity with colour purity and could be efficient UV excited phosphor for Solid state lighting and lamp phosphors applications.

Keywords: Inorganic Borates, Combustion Synthesis, UV Excitation, Emission, Lamp phosphors **.**

Oral-7

FABRICATION OF CdS NANOSTRUCTURED SURFACES FOR TUNING THE WETTABILITY

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A low temperature chemical bath deposition is employed for the fabrication of cadmium sulphide (CdS) nanostructures with marigold, honeycomb like, interconnected wall like morphologies for tuning the wettability from hydrophilic to superhydrophilic with a contact angle change over 80^o to 35^o. The wetting behaviors of these forms of CdS nanostructures are deploy to tune the contact angle. These morphologies are achieved by using various surfactants such as polyethylenimine (PEI), polyvinyl pyrrolidone (PVP), sodium dodecyl sulfate (SDS) and polyethylene glycol (PEG), Triton X 100 (TX).

Oral-8

COMBUSTION SYNTHESIS AND THERMOLUMINESCENCE STUDIES OF UV-IRRADIATED $CaAl_2O_4$: Eu NANOPHOSPHOR

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$CaAl_2O_4$: Eu nanophosphor prepared by combustion synthesis method using urea as a reducer at initiating temperature of 600 ˚C. Thermoluminescence (TL) properties of UV-irradiated Eu doped Calcium Aluminate was studied. The nanophosphor was characterized using X-ray diffraction and ultraviolet-visible absorption spectroscopy. The XRD studies indicate that the samples are monoclinic in nature. It was found that the TL intensities increases with increase in UV-dose.

Keywords: Combustion synthesis, Thermoluminescence, Calcium Aluminate, Nanophosphor, XRD and UV

Oral-9

LUMINESCENCE IN $Ca_7(SiO_4)_2Cl_6$: Eu^{2+}

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Divalent europium is an important activator for luminescent materials, which have been extensively studied for years. The luminescence of Eu^{2+} activated phosphors usuallyresults from the ground 4f7 levels to the excited $4f^6$5d configuration.

Through literature survey it is found that Eu showed a long afterglow characteristic in alkaline earth silicates. Alkaline earth chlorosilicates are suitable hosts as useful luminescent materials because they have the property of high chemical stability and various crystal structures. In present work, $Ca_7(SiO4)_2Cl_6$: Eu^{2+} is prepared through solid state reaction. Ingredients used were $CaCl_2$, Eu_2O_3 (2 mole %) and $CaCO_3$. All constituents in the required proportions were mixed together. The mixture on thoroughly grinding was transferred to furnace for heating at 800 C for 12 to 14 hrs. The powder so obtained was reduced at 800 C in a covered crucible under reducing atmosphere provided by burning charcoal to convert Eu^{3+} to Eu^{2+}.

To confirm the structure of the synthesized phosphors, powder photographs were obtained using Philips diffractometer, PW 1710. Photoluminescence spectra were recorded on Hitachi F-4000 spectro-fluorimeter with spectral slit width of 1.5 nm in the range 220-700 nm. The excitation peak is observed at 365 nm and emission is obtained at 507 nm. The position of excitation and emission wavelength may be useful for solid state lighting. The long after glow characteristics are also studied.

Oral-10

MECHANOLUMINESCENCE OF $SrAl_2O_4$: Eu, Dy NANOPHOSPHORS INDUCED BY LOW VELOCITY IMPACT

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Strontium aluminate is vastly superior phosphor than its predecessor copper activated zinc sulphide. It is about 10 times brighter, and 10 times longer glowing than ZnS:Cu. It is frequently used to glow in dark, where it displaces the cheaper but less efficient ZnS:Cu. In recent years, europium doped strontium aluminates powders and films have received considerable interest, because they have some important properties such as high efficiency photoluminescence and excellent chemical stability. The present paper reports the impulsive excitation of mechanoluminescence (ML) in $SrAl_2O_4$:Eu,Dy nanophosphors prepared by combustion technique. The phosphors prepared exhibit such as intense ML that can be seen in day light with naked eye. When a sample powder is deformed impulsively by the impact of

a moving piston, then initially the mechanoluminescence (ML) intensity increases linearly with time, attains a peak value I_m at a particular time t_m, and later on it decreases with time, initially at a fast rate and then at a slow rate. The peak ML intensity I_m and total ML intensity I_T increase quardratically with the applied pressure and impact velocity. The ML intensity decreases with successive impact of the load onto the phosphors, whereby the diminished ML intensity can be recovered approximately by UV- irradiation. The values of t_m, fast decay time and slow decay time do not change significantly with the impact velocity v_o. The day light visible mechanoluminescence in $SrAl_2O_4$:Eu,Dy nanophosphors may be used for designing the impact stress and impact velocity sensors. Furthermore, the present investigation may be useful for determining the rise time of unknown pressure pulses and for determining the lifetime of charge carriers in shallow traps.

Oral-11

NANOPARTICLES IN HEALTH AND POLLUTION

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Atmospheric aerosols in heavily polluted areas have the potential to accelerate ozone formation reactions and because they are respirable, they could represent a health hazard. These aerosols generally contain two major components;one is composed of amorphous carbon that has fullerene like particles dispersed in it. The second is inorganic and consists of oxides and sulphides supported on clay materials. In particular, the iron oxide,manganese oxide and iron sulphide nanoparticles have band gaps that could enhance the photocatalytic adsorption of solar radiation

Different airborne irritants,car exhaust can trigger negative responses from the body's immune system. NRDC conducted two experiments:one in mice,other in human cells they exposed both models to ultrafine carbon black,silicon dioxide and carbon nanotubes. Results showed that in both models, nanoparticles may potentially trigger an immune response.

In free form, nanoparticles can be released in air or water during production or as waste byproduct of production and ultimately accumulate in the soil,water or plant life. In fixed form,where they are part of a manufactured substance or product,they will ultimately have to be recycled or disposed of as waste.

To properly assess the health hazards of engineered nanoparticles the whole life cycle of these particles needs to be evaluated including their fabrication, storage and distribution,application and potential abuse and disposal.Studies of the health impact of airborne particles are the closest thing we have to a tool assessing potential health risks from free nanoparticles. These studies have generally shown that the smaller the particles get the more toxic they become. This is due in part to the fact that given in the same mass per volume the dose in terms of particle numbers increase as particle size decreases.

Oral-12

NANOTECHNOLOGY FOR ENERGY SOURCES

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Energy production involves basic challenges like cost, mass production and useful efficiencies. Nanotechnology provides most promising solutions to these problems. Solar cells which use silicon through vacuum deposition suffer from losses and high costs. These can be replaced by plastic solar cells that use nanorods. Quantum dots for solar cells provide

better efficiencies. Nanoparticle inks with the use of cadmium indium gallium diselinide provide thin film photo voltaic cells which are printable solar cells. Researchers believe that the use of nanotechnology in solar panels, photovoltaic would bring a revolution where roofs will allow solar power generation.

Nanotechnology provides new approaches to fundamental questions about the interaction of hydrogen with nanomaterials Applications of nano-technology help us to make solar energy more economically. Nanoscience photovoltaic cells are used to improve the efficiency for creating efficient systems for conversion cost, efficient solar energy storage systems, or solar energy on a large scale. Nanotechnologies provide the potential to enhance energy efficiency among all branches of industry and to economically leverage renewable energy production through new technological solutions and optimized production technologies.

The other energy source that can be made possible with the help of nanotechnology is hydrogen fuel cell. Hydrogen fuel cells are the devices which convert hydrogen directly into electricity. Designing a safe compact fuel tank for these is a problem which can be solved by nanotechnology.

Keywords: Nanotechnology, Solar cell, Energy sources.

Oral-13

NANOTECHNOLOGY IN AYURVED

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erNano means small but of high potency, and emerging with large applications piercing through all the discipline of knowledge, leading to industrial and technological growth. In other words nano-sized structure needs to be magnified over 10 million times before we can easily appreciate its fine detail with the naked eye. Nanotechnology is already having its impact on products as diverse as novel foods, medical devices, chemical coatings, personal health testing kits, sensors for security systems, water purification units for manned space craft, displays for hand-held computer games, and high-resolution cinema screens. Nanotechnology is expected to have an impact on nearly every industry. The field of nanostructure science and technology is a broad and interdisciplinary area of worldwide research and development activity that has been growing explosively in the past few years. While an understanding of the range and nature of functionalities that can be accessed through nanostructuring is just beginning to unfold, its tremendous potential for revolutionizing the ways in which materials and products are created is already clear. The bhasmas' used in Ayurveda for treatment of various diseases for the past several centuries is the oldest form of nanotechnology.While the concept of reduction in particle size of metals is prevailing since Charak Samhita, the oldest classical text in ayurveda, the recent studies has claimed the herbo-mineral formulations of ayurveda constituting 'bhasma' to be equivalent and in tune with nanotechnology The studies have confirmed that Bhasmas, which are unique Ayurvedic metallic/mineral preparations are biologically produced nanoparticles (NPs) prescribed with several other medicines of ayurveda witnessing production of nanoparticles in contemporary era. Though, herbo-mineral formulations (bhasmas of metals and minerals) are used since seventh century, it was only assumed that these medicines have superior level of efficacy in comparison to other ayurvedic dosage forms. Now, studies have also established that manufacturing methods of Bhasma are in tune of nanotechnology of modern era and bhasmas are nearer to nanocrystalline materials, similar in physico-chemical properties.All 'bhasmas' have some common properties like 'rasayana' (immuno-modulation

and anti-aging quality) and 'yogavahi' (ability of drug carry and targeted drug delivery). These are prescribed in very minute dose (15 to 250 mg/day) and if prepared properly they are readily absorbable, adaptable and assimilate in the body without being toxic. These attributes of bhasmas are comparable with the action of NPs in the body which are also biodegradable, biocompatible and non-antigenic in nature.

Key words:
Nanotechnology, Nanoparticles, Nano, Nanomaterials, Nanostructures

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Oral-14

OPTICAL PROPERTIES OF Y_2O_3: Tb NANOPHOSPHOR

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The characteristics and luminescent properties of nanophosphors, Y_2O_3: Tb, are reviewed and summarized in this work, with focus on the results obtained. In this work, Trivalent Terbium (Tb)-doped cubic Yttrium oxide (Y_2O_3) nanophosphors for different concentration of doping material were synthesized by combustion synthesis method using urea as fuel. The prepared sample were characterized by X-ray diffraction (XRD), Transmission electron microscopy (TEM), Fourier transfom infrared spectroscopy (FTIR) .The as synthesized powders gave a very sharp peak in the X-ray diffraction suggesting crystalline particles with average particle size 30-40 nm for Tb^{+3} doped Y_2O_3 nanoparticle. XRD studies also confirmed the body centered cubic structure of Tb doped Y_2O_3 nanophosphors.FTIR also confirmed the formation of these compound. .Optical absorption spectral study was also done. Transmission electron micrograph investigation of the particles shows the uniform, spherical morphology and significantly aggregated. In the optical properties, photoluminescence (PL) measurements were performed.PL excitation spectra at room temperature consist of two overlapping band centered at 276 and 302 nm,whereas emission spectra comprise several groups of lines corresponding to the $^5D_4 \rightarrow {}^7F_J$(=1-6) 4f electronic transitions of the Tb^{+3} ions.

Oral-15

STUDY OF DIELECTRIC AND AC CONDUCTIVITY PROPERTIES OF NANO ALUMINA ADDITION ON SISAL FIBRE POWDER FILLED POLYVINYL ALCOHOL (PVA) COMPOSITES

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This paper reports the Dielectric, and ac conductivity results of chemically treated sisal fibre powder filled polyvinyl alcohol (PVA) biocomposites with nano alumina. Films of biocomposites were prepared by solution casting technique. Dielectric measurements were performed on these composites. Effects of temperature and frequency variation on dielectric constant (ε'), dielectric dissipation factor (tan δ) and ac conductivity were determined. With the increase of nano alumina content, the dielectric constant increased increases. . tan δ peak temperature shifts towards higher temperature side for all samples in both the cases of dielectric and ac conductivity .This shows that increase in nano alumina concentration initially increased the relaxation temperature towards higher temperature.

Keywords :PVA, sisal fibre powder, nano alumina, composite.

Oral-16

FUTURE STRATEGIES OF NANOTECHNOLOGY IN PREVENTION OF TUBERCULOSIS

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Scientific community believe that nanotechnology offers new ways to address residual scientific concerns for Mycobacterium tuberculosis (TB). Nanoparticle-based systems have significant prospective for diagnosis, treatment and prevention of tuberculosis (TB). Treatments with improved sustained release profiles and bioavailability can increase compliance through reduced drug requirements and there in minimize Multi-Drug resistance tuberculosis (MDR-TB). Chemotherapy of TB is complex due to the requirement of multi drug regimens that need to be administered over long periods. The Poor patient compliance is the single most common reason for chemotherapy failure in TB. The micro-encapsulation of pharmaceutical substances in biodegradable polymers used in controlled drug delivery has seen as an emerging technology. Carrier or delivery systems such as liposomes and microspheres have been developed for the sustained delivery of anti-TB drugs and have found better chemotherapeutic efficacy when investigated in animal models (e.g. mice). Scientific developments and increasing international attention have promoted our ability to work with and understand the nanoscale. Nanotechnology provides a new focus for research through its aim to manufacture from the 'bottom-up' rather than from the 'top down'. It also demands an unprecedented collaborative and integrated approach to science and technology. In an area such as tuberculosis, nanotechnology has the potential to empower a local response to challenges such as the diagnosis and treatment and prevention of this deadly disease and we can see its as a better approach to solve out the all problems.

Keywords: Nanotechnology, Nanoparticles, Tuberculosis treatment, Chemotherapy.

Oral-17

SYNTHESIS AND CHARACTERIZATION OF II-VI SEMICONDUCTOR NANOPARTICLES

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The manganese doped ii-vi semiconductor nanoparticles synthesized by a chemical route technique at room temperature by mixing aqueous solutions of cadmium chloride/Zinc chloride and sodium sulphide (Na_2S) in presence of capping agent mercaptoethanol. The crystallites are capped with C_2H_5OSH. The crystallites range between 36 nm to 500 nm. The variation of particle size dependent on concentration of mercaptoethanol used for synthesis of CdS: Mn^{+2} phosphor is reported. Though fractals appear but when viewed in high magnification they are found to consist of several crystallites.

Oral-18

ELECTROLUMINESCENCE IN SOME SELENIDE NANOCOMPOSITES

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In recent years, much attention has been paid on the preparation methods, performances and applications of selenium based nanoparticles and thin solid films. Semiconductor nanocrystals exhibit many unique properties, which are promising for the improvement of electroluminescence (EL) devices. The incorporation of nanocrystals in polymer is expected to increase the life of the device and enhance the brightness of emission. In the present study, $Zn_{1-x}Cd_xSe$ /PVA and ZnSe:Mn/PVA nanocomposites have been prepared via chemical technique with changing value of x and PVA concentration respectively. Samples were characterized by absorption spectra. For EL study, the EL cells were prepared as a triple layer structure namely a nanocomposite emission layer sandwiched between two electrodes. A.C. voltage of various frequencies was applied and EL brightness was measured. For $Zn_{1-x}Cd_xSe$ /PVA it was observed that the thin film was transparent with x = 0.2, as the value of x increased, it transformed into light-red color then dark-red with x = 1.0. Mn doped ZnSe/PVA was transparent and color was not affected by change in concentration of PVA. Blue Shift was observed in the absorption peak of ZnSe:Mn/PVA as compared to bulk ZnSe and increased with PVA concentration. It indicates increase in effective band gap and hence decrease in particle size. It was observed that for higher PVA loading, EL intensity is increased and emission of light starts at lower voltage i.e. smaller ZnSe:Mn particles emit more light. For $Zn_{1-x}Cd_xSe$ /PVA EL intensity is reduced and turn on voltage is increased by increasing Cd content. Only one emission peak at 410 nm was found in the EL spectra of $Zn_{1-x}Cd_xSe$ /PVA with x = 0.2 indicating defect related emission. The investigations show that selenium based nanocrystals in PVA matrix can be used for efficient large area display devices.

Oral-19

THE STRUCTURAL AND OPTO-ELECTRIC PROPERTIES OF ZnO THIN FILMS DEPOSITED BY SPRAY PYROLYSIS: EFFECT OF SOLUTION MOLARITY

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The present work deals with the preparation of zinc oxide thin films (ZnO) by the spray pyrolysis method. The starting solution was zinc acetate. Effect of solution molarity on film properties was investigated. All films deposited were characterized by various techniques such as X-ray diffraction for structural characterizations, weight difference density method for thickness measurement, UV–VIS transmission spectrophotometer for optical properties

and the two probe conductivity measurements for electrical characterization. The X- ray diffraction (XRD) patterns showed that the films deposited are polycrystalline with preferential orientation along (002) plane. The optical study showed that films are highly transparent in the visible region with an average transmission of about ~85%. The optical band gap decreased from 3.25 eV to 3.02 eV, on increase in molar concentration from 0.1 M to 0.75 M. As the solution molarity increases, the electrical conductivity increases, reaches to a maximum value of 3.22×10^{-1} $(\Omega\text{-cm})^{-1}$, for as-grown films at 0.5 M.

Keywords: Zinc oxide; spray pyrolysis; X-ray diffraction; optical properties; electrical properties.

Oral-20

STUDIES ON PHOTOVOLTAIC EFFECT OF CdSe BASED NANOCRYSTALLINE MULTILAYERED PHOTOELECTRODES IN PHOTOELECTROCHEMICAL SOLAR CELL

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Multilayered films of CdSe nanocrystals of different size have been prepared onto titanium substrate by pulsed electro deposition technique. The electrolyte solution was kept at 80ºC during the deposition process. The current density was 7 mA/cm^2. The multilayered films are used as photoelectrodes in photoelectrochemical (PEC) cell. Use of nanostructures in the PEC cell has potential to provide high conversion efficiency. Various solar cell parameter I_{sc}, V_{oc}, FF and η are evaluated. It is observed that multilayer prepared with 1:0/1:1 duty cycle give best performance.

Keywords: Nanocrystalline CdSe Multilayer, Pulse electrodeposition, Photoelectrochemial solar cells.

Oral-21

EFFECT OF TEMPERATURE ON THE SYNTHESIS OF ZnO NANOPARTICLES AND ITS ANTIMICROBIAL ACTIVITY

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In this work, ZnO nanoparticles were synthesized by using zinc chloride as the precursor at different temperatures. The ZnO nanoparticles obtained were characterized by X-ray diffraction (XRD), Scanning Electronic Microscopy (SEM), Energy Dispersive X ray Spectroscopy(EDAX) and Uv-vis spectroscopy. Antibacterial studies were done on gram positive (S.aureus) and gram negative (E.coli) bacteria by well diffusion method. Antifungal studies were done against Candida albicans, Rhizopus stolonifer, and Penicillum sp. The ZnO powders have hexagonal wurtzite structure and nanometric-sized crystallites.

Herein, Zinc oxide nanoparticles were synthesized using the method described by Parthsarathi V.et al [1].. Five samples are prepared by changing temperature at 80^0, 85^0, 90^0, 95^0, 100^0.

The ZnO nanoparticles are formed at all temperatures except 100^0 where agglomerated zinc particles are obtained of the micron range while at other temperatures zinc nanorods are formed.

The XRD spectrum shows some prominent peaks with most prominent peak at 36.2682 corresponding to hkl (101).The crystal structure and orientation of ZnO nanoparticles have been investigated by X ray diffraction method using Panalytical Xpert Pro MPD using the software Panalytical Xpert High Score Plus Software. The sharp and intense peaks indicate that the samples are highly crystalline and ZnO nanoparticles have polycrystalline structure. The XRD peaks for (100), (002) and (101) plane indicates the formation of phase pure wurtzite structure of ZnO. The average crystalline size is found to be 59 nm. The UV VIS DRS gives the absorption exciton peak at 369 nm. The aim of this study was to evaluate the antimicrobial activity of synthesized ZnO NPs by well diffusion method and their dependency of that activity on selected bacterial species, S. aureus (12mm), E. coli (11mm). The standard antibiotic tetracycline was used as a control. The synthesized ZnO NPs was tested for antimicrobial and the results were compared with control. Each test was performed in triplicates. The well diffusion test was carried out in order to know the zone of inhibition (ZOI) of the respective bacterial species and zones were graphed. The clinical pathogens were tabulated for the antibiogram, showing the zone of inhibitions of gram positive bacteria larger than that of the gram negative bacteria. A further objective was to gain knowledge about synthesized ZnO NPs to appraise a possible application of this material as antimicrobial agents. Antifungal activity of synthesized ZnO nanoparticles.

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Oral-22

FABRICATION AND V-I CHARACTERIZATION OF FLEXIBLE TFT USING STACKED NANO ZrO_2/Al_2O_3

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The ever growing Semiconductor industry is turning today towards high-κ gate dielectrics in transistor manufacturing processes to meet the need for higher speed transistors while keeping power consumption under control. As transistor geometries scale to the point where the traditional silicon dioxide (SiO_2) gate dielectric becomes just a few atomic layers thick, tunneling current leakage and the resulting increase in power dissipation and heat become critical issues. A technique has been developed to fabricate a Thin Film Transistors (TFT) using stacked high- κ nanomaterials. Here in this work using stacked ZrO_2 and Al_2O_3 as high-κ dielectric nanomaterials, ITO/PET substrate which

is flexible, and CdS as a semiconducting layer provides high performance to the device. Through this proposed approach the above problems are solved and the transistor could be shrunk below 32 nm.
Keywords: TFT, high-κ dielectric, nano – Zirconia (ZrO_2), nano – Alumina (Al_20_3).

Oral-23

SYNTHESIS AND CHARACTERIZATION OF NANOPERVOSKITE - $Ba_3Sr_1Ta_2O_9$ FOR DIELECTRIC APPLICATIONS

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$Ba_3Sr_1Ta_2O_9$ nanoperovskite was synthesized by solid state reaction method. Nanosized $Ba_3Sr_1Ta_2O_9$ perovskites were obtained with a grain size around 20nm.The perovskite was characterized by using X-ray powder Diffraction (XRD) and High Resolution Transmission Electron Microscopy (HRTEM) for identification of crystal structure and morphology.

Oral-24

SYNTHESIS AND PHYSICAL PROPERTIES OF SPRAY DEPOSITED NANO-CRYSTALLINE CdO THIN FILMS.

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Nanocrystalline, uniform, dense, and adherent cadmium oxide (CdO) thin films have been successfully deposited by a simple and cost effective spray pyrolysis technique. The effect of deposition temperature (250-350 ˚C) on structural, compositional, morphological, and optical properties of CdO thin films were studied by X-ray diffraction (XRD), Energy Dispersive Analysis by X-rays (EADX), Scanning Electron Microscopy (SEM), and UV–visible Spectroscopy (UV–vis). X-ray diffraction characterization of as-deposited CdO thin films reveals that films are of cubic structure with a (111) preferred orientation. The crystalline quality of the CdO films improves and the grain size increases with deposition temperature. These modifications influence the optical properties. The SEM images confirmed these results and showed larger grains and more crystallization for the higher deposition temperature. It has been determined that Cd and O elements are present in the solid film by using EADX. Increase in deposition temperature increased the optical transmission of the films substantially. The optical properties revealed the presence of direct band gaps with energies varied from 2.46 to 2.38 eV.
Keywords: Thin films; Semiconductors; X-ray techniques; Optical properties; EADX.

Oral-25

XRD AND X – ray K-ABSORPTION NEAR EDGE STUDIES OF COBALT, NICKEL FERRITES.

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The Co-Ni ferrites with general formula Co1-xNix Fe2O4 (where x=0.0, 0.05, 0.10) were prepared by solid state root method. The X-ray diffraction (DAE-IUC, Indore) and X-ray, K-absorption near edge measurement (RRCAT, Indore) were carried out. XRD shows the structure of sample is the cubic with the help of PCPDF win/ JCPDS-ICDD 1997.

Keywords: Ferrite, XRD, XANES.

Oral-26

INVESTIGATION OF STRUCTURAL AND ELECTRICAL BEHAAVIOUS OF PPy/SWCNT/PVA NANOCOMPOSITES

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The nanocomposites of polypyrrole (PPy), single wall carbon nanotube (SWCNT) and polyvinyl alcohol (PVA) with different compositions were synthesized by the chemical oxidative polymerization and solution casting methods. The morphological and structural properties of the nanocomposites were investigated with the help of FTIR and SEM techniques. The DC conductivity of the nanocomposites was measured using the four probe setup. The Fourier transform infrared spectroscopy (FTIR) analysis showed the addition of PPy/SWCNT nanocomposite into PVA created interaction within the composite structure. SEM images revealed that the incorporation of SWCNT significantly altered the morphology of PPy and PVA. The PPy/SWCNT nanocomposites showed an enhanced electrical conductivity of 0.746 Scm^{-1} compared to 6.87 $\times 10^{-3}$ Scm^{-1} for PPy without SWCNT and 1.18 $\times 10^{-15}$ Scm^{-1} for neat PVA. However, the DC conductivity of PPy/SWCNT/PVA nanocomposite is found to drop a little giving a value of 2.44×10^{-4} S/cm^{-1}. PVA has been selected as the matrix for PPy/SWCNT nanocomposite in order to give mechanical stability to the PPy/SWCNT nanocomposites.

Key words: Polypyrrole, Single wall carbon nanotubes, Polyvinyl alcohol, conducting polymer, electrical conductivity.

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Oral-27

NMR STUDIES IN NANO FERROELECTRICS

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The overall nature of a system depends on the inter-grain as well as intra- grain behaviours. As the grain size approaches nanometer range drastic changes in the properties are observed which are found to be very promising for various technological applications. Ferroelectrics are materials having spontaneous polarization that can be reoriented by applying external electric field and are widely used in devices such as memories, IR sensors, capacitors etc. Enhancement in the properties leading to further miniaturization and power saving is being attempted by reducing the grain sizes to nanometer range. However , the exact mechanism of how the properties, that in turn also depend upon local structure and dynamics, are related to grain size is not very clear. NMR is an extremely powerful tool and great details of the local, structure and dynamics are obtained by line shape and relaxation studies. In this paper a review of NMR studies in nano ferroelectric materials are presented and an attempt is made to establish structure-property correlation.

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Oral-28

EFFECT OF AMMONIA CONCENTRATION ON CHARACTERIZATION OF CHEMICAL BATH DEPOSITED CdS THIN FILMS

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ABSTRACT

The growth of CdS film occurs either by ion-by-ion condensation of Cd and S ions on the substrate surface or by the adsorption of colloidal particles of CdS. The glass substrates were cleaned thoroughly and inserted in the deposition cell containing the required amount of de-ionized water. As-grown CdS layers are **hard and look yellowish, shiny and have a smooth surface.** The energy gap of as-doped CdS thin films in the present study shows that the energy gap is decreased from 2.7497 eV to 2.2122 eV when concentration is increased from 0.5M to 2.0M and becomes constant above 2.0M. The previously reported E_g values of CBD CdS thin films were in the range 2.42 – 2.62 eV. The deviation of these values from the standard bulk value of 2.37 eV is explained on the basis of the small grain size. It is observed that the surface morphology of as deposited films is almost smooth and no grains are observed clearly at low molar concentration. The size of the grain in the deposited films has been observed in the increase of concentration of ammonia. Also, the films deposited at 2.0 M concentration of ammonia are having predominant grains. The EDAX spectrum displays the characteristic peaks corresponding to the binding energy state of Cd and Oxygen ions. No other impurity peaks are detected in the spectrum which is an indication of chemical purity of

the sample. The estimated Cd to S ratio value is found to be 1.04 (Cd:S = 50.04:49.96). No, detectable change in the computational changes were observed during the increase of ammonia concentration. This is one of the parameter that influences the characterization of polycrystalline thin films.

Keywords: CdS thin films, CBD, Optical and SEM studies

Oral-29

STRUCTURAL, MORPHOLOGICAL AND ELECTRICAL PROPERTIES OF NANOCRYSTALLINE $BaSnO_4$ BY COMBUSTION ROUTE

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$BaSnO_4$ powder was synthesized by combustion method, having metal nitrates as precursors and urea as fuel, followed by a heat treatment 600^0C for 4 hr. The powders obtained have been characterized by thermal gravimetry differential analysis, X-ray diffraction, morphological of the powder was identified by high resolution- scanning electron microscopy and electric properties studied by DC measurement. X-ray diffraction results indicate that the resultant $BaSnO_4$ crystallites consist of spinal phase and average particle size of the nanomaterial $BaSnO_4$ calculated from XRD was found in the range ~ 47 nm. Electrical conductivity of the synthesized powder was studied by DC measurement. Electrical conductivity of the nanocrystalline $BaSnO_4$ was increased with increasing in temperature and semiconducting nature of $BaSnO_4$.

Keywords: TG/DTA, XRD, SEM, Combustion Method

Oral-30

STRUCTURAL AND OPTICAL PROPERTIES OF Pb DOPED NiS NANOPARTICLES

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Nanoparticles are novel materials which exhibit unique electrical, optical and magnetic properties not shown by their bulk counterparts. Band gap is an important optical property of materials. In this paper we report tuning of band gap of NiS nanoparticles by doping these with Pb. The $Ni_{1-x}Pb_xS$ nanoparticles were prepared following chemical route. These nanoparticles were characterized by XRD, and UV-VIS spectroscopy. The XRD records show well-formed nanocrystalline particles. The particle size of $Ni_{1-x}Pb_xS$ nanoparticles as determined using Scherrer formula is found to be between 24.97 nm to 26.37nm UV-VIS spectroscopy was used to determine the band gap of these nanoparticles. The band gaps are found to be ranging from 3.64eV to4.93eV.

Oral-31

DEVELOPMENT OF NANOSCALE ANTI-REFLECTION COATING FOR SOLAR CELLS

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Today, renewable energy resources like solar energy has become the most attractive component of the global energy production due to the increasing demand towards carbon free energy generation. Organic photovoltaics (OPV) has been emerged as the most promising candidate due to its advantages like low cost, high throughput, mechanical flexibility, low temperature, easy processing and reduced material usage. Despite being economically viable for large-scale power generation, the efficiency of the OPV cell is being found to be very low. A significant enhancement in the efficiency can be achieved with the utilization of carbon nanotubes in OPV cells. We have investigated the optical properties like reflectivity & transmittance of multiwall carbon nanotubes (MWCNTs) which can be incorporated in the organic solar cell by making a heterojunction of MWCNTs with the organic polymer thereby leading to the marginal improvement in the performance of the organic solar cell device. A successful CVD growth of vertically aligned CNTs of 10 μm length and Raman analysis of these CNTs also indicated these to be MWCNTs. Apart from this, study of optical characteristics of different metal thin layers and compound like Ni, Pd, Fe, TiN and ITO has been performed. The reflectivity and transmittance of MWCNTs with varying concentration has been investigated and the low reflectivity of the highest concentration MWCNTs onto ITO glass in the visible region depicts the utilization of MWCNTs as a high absorbing material in order to harvest the maximum solar intensity from the sunlight. The transmittance of the high concentration of MWCNTs drop casted onto the ITO glass has been observed to be very high which gives rise to the multiple exciton generation leading to better performance of the OPV cells and provides a very strong evidence of the potential use of MWCNTs in the enhancement of the efficiency of OPV cells. The resistance of increasing concentration of MWCNTs samples onto the ITO glass decreases thereby enhancing the conductivity for the hole transport in the donor layer of OPV device which strongly backs up the MWCNTs a promising candidate for the efficiency enhancement of OPV cells.

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Oral-32

Structural and Optical properties of Pure and Ni doped Nanostructured PbS films

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In this paper we present studies on the structural and optical properties of pure and Ni doped PbS thin films. PbS thin films were prepared by Chemical Bath Deposition (CBD) technique onto glass substrate at room temperature . The prepared film was characterized using XRD and UV-VIS spectroscopy. XRD pattern showed that the prepared PbS thin film possesses cubic phase with particle size about 23 nm. The Ni doped PbS films were prepared under the same conditions as used for the preparation of pure PbS film. These were also characterized using XRD and UV-Vis spectroscopy. The effect of doping Ni on the structural and optical properties of PbS thin films is discussed in the paper.

Oral-33

APPLICATION OF NANOMEDICINE IN DIABETES MELLITUS

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Nanotechnology is an advanced scientific technique that provides more accurate and timely medical information for diagnosing disease. Diabetes mellitus (DM) is commonly a chronic disease, which seriously threatens the health of human beings. Nanotechnology is a focal point in diabetes research, where nanoparticles in particular are showing great promise in improving the treatment and management of the disease. Nanotechnology offers sensing technologies that provide more accurate and timely medical information for diagnosing disease, and miniature devices that can administer treatment.It can now offer new implantable and/or wearable sensing technologies that provide continuous and extremely accurate medical information. Nanomedicine, the application of nanotechnology to medicine, has already offered some new solutions, and many pharmaceutical companies are trying to develop targeted drug delivery using nanotechnology and already existing drugs. The purpose of this review is to throw more light on the recent advances and impact of nanotechnology on biomedical sciences to cure diabetes. This review concluded that nanotechnology will be effective therapy in diabetes.

Keywords: Nanotechnology; Nanomedicine; Diabetes; Oral insulin; Nanoparticles; Pancreas

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Oral-34

SYNTHESIS OF SILICA NANOPARTICLES AND NANORODS USING sol gel METHOD AT ROOM TEMPERATURE

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In this work, we have synthesized silica nanoparticles and nanorods, which were confirmed by SEM measurements of silica powder. Researchers used sol gel process to prepare above material. In sol gel process TEOS as precursor, ethanol as suspending medium, water for hydrolysis of TEOS and ammonia as catalyst were used. Stirring was performed using ultrasonic bath sonicator at 36 kHz. After reaction in sonicator obtained sol was dried at 80^{o}C temperature, ground and calcined at 500^{o}C temperature in high temperature electrical furnace. Followed by calcinations SEM measurements were taken which confirm synthesis of silica nanostructures.

Keyword: SiO2, nanorods, sol-gel, sonicator

Oral-35

EFFECT OF MAGNETIC AND NONMAGNETIC DOPING ON MULTIFERROIC YMn_2O_5

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In this article polycrystalline YMn_2O_5 and the substituted Cr and Al in place of Mn was investigated. A Pyrophoric method was employed to synthesize the samples. $YMn_{1.925}Cr_{0.075}O_5$ and, $YMn_{1.925}Al_{0.075}O_5$ has orthorhombic structure (pbam) as that of the parent YMn_2O_5, determined from x-ray diffraction. Al substitution reduces the cell volume where as it doesn't change much with Cr substitution. Thermo-magnetization studies shows the decrease of Neel transition in case of Al where as it increases in case of Cr substitution. With Cr substitution, a significant decrease in coercivity (H_C) and remenant magnetization (M_r) are observed where as it doesn't change much with Al substitution on comparision to parent YMn_2O_5.

Oral-36

THERMOLUMINESCENCE GLOW CURVE STUDIES OF GAMMA-RAY IRRADIATED GADOLINIUM OXIDE NANOPARTICLES

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Gd_2O_3 nanoparticles were synthesized by combustion synthesis using gadolinium nitrate hexahydrate as precursor and urea as fuel. The combustion synthesis method which is reported here is advantageous from the perspectives of small size of the nanoparticle. The structure and Thermoluminescence (TL) property of sample was studies. Kinetic parameters such as activation Energy, order of kinetics and frequency factor of Gd_2O_3 nanoparticles under different gamma-ray exposure. From XRD data the crystal structure of prepared sample was found in monoclinic phase having size of 35 nm ranges.

Key words: Gd_2O_3, Thermoluminescence, Glow curve, Combustion synthesis, Kinetic parameters, XRD, SEM.

Oral-37

ROOM TEMPERATURE ELECTRO-SYNTHESIS OF NANOCRYSTALLINE NICKEL-ZINC FERRITE THIN FILMS

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Nickel zinc ferrite is ferromagnetic material having potential applications in electronic and magnetic industries. Also it is used as electromagnetic applications that require a high permeability, such as inductors and electromagnetic wave absorbers. Electrodeposition is one of the chemical methods for preparation of thin films. It is simple, convenient, less expensive among the various physical and chemical methods. One can deposit binary and ternary metal chalcogenides, oxides at room temperature by using this method.

In this work single step electro-synthesis of nickel zinc ferrite thin films from alkaline bath (which avoids anodization step for an incorporation oxygen species into deposit) has been carried out at room temperature. Atomic weight percentage of Fe in deposit was measured by Atomic Absorption Spectroscopy (AAS) studies. From AAS, it was observed that for mixture of 0.1 M $NiSO_4$, 0.1 M $ZnSO_4$ and 0.1 M $FeSO_4$ solutions in various volume ratios. solution gives stoichiometry as $Ni_{0.5}Zn_{0.5}Fe_2$. Cyclic voltametry technique was used for understanding of electrochemical-reaction mechanism during Nickel Ferrite Thin films. Small heat treatment converts this alloys into $NiZnFe_2O_4$.

The X-ray diffraction studies confirmed the formation of nickel zinc ferrite thin films with spinel cubic crystal structure. The standard and observed ‘d’ values are comparable. After heat treatment nickel zinc ferrite thin films shows properties like bulk nickel zinc ferrite. The SEM and AFM images shows smooth, uniform and homogeneous nickel zinc ferrite thin film formation.

Key words: Electrosynthesis, Nickel- Zinc ferrite, XRD, SEM, AFM.

Oral-38

NANOTECHNOLOGY RELEVANCE FOR MICROBIAL BIOTECHNOLOGY AS ANTIMICROBIAL AGENTS

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Nanomedicine involves utilization of nanotechnology for the benefit of human health and well being. Nanotechnology is expected to open some new aspects to fight and prevent diseases using atomic scale tailoring of materials. The ability to uncover the structure and function of biosystems at the nanoscale, stimulates research leading to improvement in biology, biotechnology, medicine and healthcare. The size of nanomaterials is similar to that of most biological molecules and structures; therefore, nanomaterials can be useful for both in vivo and in vitro biomedical research and applications. The integration of nanomaterials with biology has led to the development of diagnostic devices, contrast agents, analytical tools, physical therapy applications, and drug delivery vehicles**.** In all the nanomaterials with antibacterial properties, metallic nanoparticles are the best. Nanoparticles increase chemical activity due to crystallographic surface structure with their large surface to volume ratio. The importance of bactericidal nanomaterials study is because of the increase in new resistant strains of bacteria against most potent antibiotics. This has promoted research in the well known activity of silver ions and silver-based compounds, including silver nanoparticles. This effect was size and dose dependent and was more pronounced against gram-negative bacteria than gram-positive organisms.

Key words: Nanotechnology, Silver Nanoparticles, Nanomedicine, Antibacterial effect

Oral-39

DECAY TIME OF ELECTROLUMINESCENCE IN PULSED ORGANIC LIGHT EMITTING DIODES

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ABSTRACT

Organic Light Emitting Diode (OLED) is an optoelectronic device in which a single layer, bilayer or multilayer of organic materials is sandwiched between two electrodes, at least one of which is transparent. The working of OLEDs is based on several processes such as charge carrier injection, exciton formation, decay of excitons and light emission. Several transient characteristics such as delay time, rise time and decay time of OLEDs play very important role in understanding the processes involved in the working of OLEDs. When a rectangular voltage pulse of short duration is applied to an OLED, then initially the electroluminescence (EL) intensity increases with time and later on it attains a saturation value. Subsequently, when the applied voltage pulse disappear, the EL intensity decreases with time; either with one decay time or with two decay time involving fast decay and slow decay of EL brightness. In the single layer ITO/MEH-PPV/Ca:Al OLEDs, the fast decay τ_1 and the slow decay τ_2 are found to be 17.67 and 62.5 nanoseconds, respectively. The decay time τ_1 and τ_2 for ITO/BC_ZVBi/Mg:Ag OLEDs are found to be 9.08 and 127.39 nanoseconds, respectively. For ITO/PPV/Al, τ_1 and τ_2 OLEDs are found to be 21.74 and 125.31 microseconds, respectively. For ITO/Alq_3/Mg:Ag, OLEDs, the values of τ_1 and τ_2 are found to be 62.58 and 1492.53 nanoseconds, respectively. For the phosphorescent OLEDs, ITO/6%Ir$(ppy)_3$ in CBP/BCP/ETL/Mg:Ag, the fast decay time τ_1 and slow decay time τ_2 come out to be 3.60 and 12.78 microseconds, respectively. For $\beta\left(=\frac{1}{\tau_{ex}}\right) \gg \alpha\left(=\frac{1}{Cr_d}\right)$, (where C is the capacitance of the OLED and r_d is the differential resistance of the OLED), the decay time gives the time constant of the OLEDs. On the other hand, For $\beta\left(=\frac{1}{\tau_{ex}}\right) \ll \alpha\left(=\frac{1}{Cr_d}\right)$, the decay time gives the lifetime of excitons.

Oral-40

Molecular Interaction Studies in aqueous hydroxy cellulose derivatives

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Abstract

Ultrasonic and acoustic parameters are being used extensively to study molecular interaction in polymer & polymer blend solutions. This provides valuable information regarding molecular association & dissociation, molecular order, internal structure and compatibility of the polymer blend for industrial purpose. The internal pressure (P_i) , Free volume (V_f) , Vander Waals constant (b), Volume expansivity(α), Intermolecular energy(L_i), Molecular radius(r_o) etc. have been computed in the present aqueous hydroxy cellulose derivatives at various concentrations from the experimental values of density and ultrasonic velocity.

In Present work, we have discussed about the above thermoacoustic parameters in three polymers (HEC, HPC & HEPC) and its blends in aqueous medium. The structural changes in these aqueous hydroxy cellulose derivatives explained in the light of polymer-solvent or polymer-polymer interaction.

P-1

An Investigation of Ion Transport Properties in vanadate based glass system

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Abstract

The glass samples, obtained through melt quenching technique, with composition $60V_2O_5$-$(40-x)P_2O_5$-xB_2O_3, with $5 \leq x \leq 35$ mol%, were characterized by X-ray diffraction (XRD), thermo-gravimetric differential thermal analysis (TG-DTA). The glass transition temperature (T_g) and the peak temperature of crystallization (T_P) are evaluated. The DC electrical conductivity has been carried out in the temperature range 303-473 K. The ionic conductivity was found to be dominant over the electronic conductivity and varies between 80-95%.

P-2

Theoretical Study of Elastico Mechanoluminescence (EML) of $SrAl_2O_4$: Eu Nano Phosphor

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When $SrAl_2O_4$:Eu phosphor mixed in resin is compressed at a fixed pressing rate or fixed strain rate , its elastic ML intensity increases linearly with deformation time or pressure and attains a maximum value I_m at the time , at which the deformation is stopped. Under the pressed condition, the fast decay time of EML after t_m, gives the time constant for stopping the cross-head of the testing machine used to deform the sample, and the decay time of slow decrease of EML gives the life time of electrons in the shallow trap lying in the normal piezoelectric region of the crystals.

P-3

STRUCTURAL, ELECTRONIC, ELASTIC AND THERMAL PROPERTIES OF CURIUM MONO BISMUTHIDE: A FIRST-PRINCIPLES STUDY

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A theoretical study on structural, electronic, elastic and thermal properties of Curium monobismuthide (CmBi) at ambient as well as high pressure is performed using first-principles calculations based on density functional theory (DFT) within local spin density approximation (LSDA) along with Hubbard-*U* corrections and spin–orbit coupling. CmBi undergoes first order structural phase transition from their ambient NaCl (B_1) type structure to CsCl (B_2) type structure at 7.14 GPa. The structural parameters like lattice constant (a_0), bulk modulus (B) and pressure derivative of bulk modulus (B′) are reported for both B_1 and B_2 phases. Our calculated lattice constant and bulk modulus value for B_1 phase agree well with experimental and available other theoretical result. The calculated band structures clearly indicate that B_1 phase of CmBi compound is metallic for minority spin and less metallic or semi-metallic for majority spin due to small value of density of states at the Fermi level. The thermal and mechanical properties are predicted from the calculated values of elastic constants. The ductility of CmBi compound is also determined by calculating the bulk to shear ratio B/G_H.

P-4

STRUCTURAL, ELECTRONIC, ELASTIC AND THERMAL PROPERTIES OF $YbIn_3$ AND $LuIn_3$ INTERMETALLICS: A FP-LAPW STUDY

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First principles study of structural, electronic, elastic and thermal properties of non magnetic rare-earth intermetallics $YbIn_3$ and $LuIn_3$, which crystallize in $AuCu_3$-type structure, is performed using density functional theory based on full potential linearized augmented plane wave (FP-LAPW) method. The calculations are carried out within the generalized gradient approximation (GGA) for the exchange correlation potential. The calculated ground state properties such as lattice constants and bulk modulus agree well with the experiment as well as with other theoretical results. We report elastic constants for these compounds for the first time. Both these compounds are found to be ductile in nature in accordance with Pugh criteria. The electronic band structures of both compounds show similar behaviour except in the displacement of '*f*' states of Yb and Lu. The computed electronic band structures show metallic character. We also report thermal properties of these compounds for the first time.

P-5

STRUCTURAL, ELECTRONIC AND ELASTIC PROPERTIES OF RPd_3 (R=La & Y) COMPOUNDS BASED ON *Ab-initio* CALCULATION

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The structural, electronic and elastic properties of cubic non magnetic RPd_3 (R=La &Y) compounds which crystallize in the $AuCu_3$ structure have been studied using *ab-initio* full potential linearized augmented plane wave (FP-LAPW) method within density functional theory (DFT) using generalized gradient approximation (GGA) for exchange correlation potential. The ductility of these compounds has been analyzed using Pugh criteria. The ground states properties such as lattice parameter (a), bulk modulus (B) and pressure derivative (B') have been obtained using optimization method. The elastic properties such Young's modulus (E), Poisson's ratio (σ) and anisotropic ratio (A) are predicted for first time. The ductility of these compounds has been analyzed using Pugh criteria.

P-6

Mechanoluminescence, Thermoluminescence Studies of gamma irradiated Potassium Chloride crystals and powder doped with Europium

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Rare earth ions play an important role in modern technology as optically active elements in solid-state luminescent materials. In many of these materials, interactions between the electronic band states of the host crystal and the rare earth ion's localized $4f^N$ and $4f^{N-1}$ 5d states influence the material's optical properties. This paper reports the mechanoluminescence (ML) induced by impulsive excitation of ϒ- irradiated europium doped KCl single crystals and powder. The KCl crystals having different concentrations of europium were prepared by melt technique (slow cooling).The crystals of small sizes were cleaved from grown crystal block and crushed to obtain powder or microcrysttaline powder. The annealed samples were irradiated by gamma source with dose 0.930KGy. Mechanoluminescence is excited impulsively by dropping a load of 0.4 kg with impact velocity 313cm/sec on to it. Two peaks are observed in the ML intensity versus time curves for both single crystals and powder samples . It is found that the intensity of first peak is always greater than that of the second peak. The ML intensity increases with increasing concentration of dopant upto 1000 ppm and then ML intensity decreases with further

increase of concentration(concentration quenching). The total ML intensity of the powder samples is about half the intensity of the single crystal samples. It is also observed that the total intensity increases with impact velocity and the time corresponding to peak(t_m) shifts toward shorter time value with increase in impact velocity for all the samples. In thermoluminescence studies a two peaks for pure and doped samples are obtained around 120^0 C and 170^0C for single crystals and powder samples at heating rate of 90^0 C/min. In the ML spectra a broad band with single peak at 482 nm is obtained .

P-7

Spontaneous current emission in ferrocene doped poly (9- vinylcarbazole)

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In this study, spontaneous current emission (SCE) was observed for metal-polymer-metal sandwich configuration of pure and ferrocene doped poly (9-vinylcarbazole) in temperature range 40 C to 170 C. The peak value SCE during heating rate was found to be of the order of 10-10 A and its thermograms display only one SCE peak at around 95 C. It was observed that the position of SCE peak in thermogram shifts towards the higher temperature side with increasing heating rates. Furthermore the magnitude of SCE increases as concentration of doping molecules is increased. This type of SCE behavior may be attributed to water activation phenomenon of polymer, which is influenced by the phase transition changes of polymer. .

P-8

LOW TEMPARATURE RAMAN SPECTROSCOPIC STUDY OF PHASE TRANSITION IN POLYCRYSTALLINE $BaTiO_3$ AND $SrTiO_3$

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The Finest samples of polycrystalline $SrTiO_3$ (STO) with possible tetragonal & cubic structure were prepared by solid state method. Prepared samples were characterized by X-ray diffraction (XRD) using Bruker D8 Advance XRD instrument. The value of 2θ is in between 10 to 85^0 & Low temperature Raman spectroscopy using JOBIN-YOVN HORIBA LABRAM HR800 single monochromator. The region of wave number is from 100 to 850 cm^{-1}.

P-9

Mössbauer Study of Iron Complexes of Medicinal Interest

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The article deals with a study to synthesize transition metal complexes of iron with the ligand 6-methyl-5 arylhydrazono-2-thio-4-oxo-pyrimidine (MATOPyr). The synthesized metal complexes were characterized by X-ray diffraction (XRD), lattice parameters, particle size and hkl values of Fe complexes has been observed by the calculations of XRD data. Mössbauer measurements of O-Nitro-Fe and M-Nitro-Fe complexes has been taken to find out the oxidation state of Iron after complaxsation, it has been observed that it's been changed and the percentage of Fe of different oxidation state has been found by fitting the Mössbauer data.

P-10

Correlative study of short duration geomagnetic storms with solar wind plasma parameter during decline phase of solar cycle 23

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We have studied geomagnetic storms (Dst ≤-80) and short period of recovery duration, observed during the decline phase of solar cycle 23.with solar wind plasma parameters. We have inferred geomagnetic storms are closely related to disturbances in solar wind plasma parameters. We have determined positive co-relation with correlation coefficient 0.82 between magnitude of geomagnetic storms and maximum jump in IMF ,081 between magnitude of geomagnetic storms and magnitude of jump in IMF .Positive correlation with correlation coefficient 0.89 has also been found between magnitude of geomagnetic storms and maximum value of southward component of interplanetary magnetic fields (IMF Bz), and 0.53 between magnitude of geomagnetic storms and magnitude of jump in southward component of interplanetary magnetic fields. We have also found positive correlation with correlation coefficient 0.29 between magnitude of geomagnetic storms and magnitude of jump in solar wind velocity and 0.37 between magnitude of geomagnetic storms and magnitude of jump in solar wind plasma pressure .

P-11

Theoretical Calculation of EPR Spectral Parameter Hyperfine Coupling Constants of [$Ni(CO)_3H$], Transition Metal Complex

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Abstract

Experimental method based on electron paramagnetic resonance phenomena belongs to most widely experimental techniques for investigation of molecular and electronic structure .The difficulty with such experiments usually a proper interpretation of data obtained from high resolution spectra, opens new challenges for pure theoretical methods. One of these methods is density functional theory that now has an advanced position among the whole variety of computational techniques. For the validation of DFT theoretical method, the EPR spectral parameter hyperfine coupling constants of isotropic and dipolar metal complexes [$Ni(CO)_3H$], has been investigated using DFT functional BP86 and the results obtained has been compared with experimental value. It is seen that the results obtained from the density functional methods are in close agreement with the result obtained from the experiments. It is concluded that functional BP 86 may be used to study spectral parameter hyperfine coupling constant of transition metal complex [$Ni(CO)_3H$], without using any experimental techniques.

P-12

CHARGE CARRIER RECOMBINATION IN BILAYER ORGANIC LIGHT EMITTING DIODES

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ABSTRACT

A model of carrier recombination in organic double layer light emitting diodes is presented in this paper. An analysis of recombination in bilayer organic light emitting diodes is presented using numerical simulations and analytical model. By simulation it is shown that although recombination occurs close to the interface, the recombination peak can lie either in the hole transporting layer(HTL) or in the electron transporting layer(ETL) of the device.

The mechanism by which recombination shifts from HTL side of the organic-organic interface to the ETL side with increase in LUMO energy offset is described in detail. It is also shown that the magnitude of electric field and charge accumulated at the organic-

organic interface are determined by the interfacial barrier for electron or hole whichever is smaller. An analytical model is also presented which provides insight into charge accumulation across the organic interface.

P-13

THERMOLUMINESCENCE PROPERTIES OF γ -IRRADIATED Mn^{2+} ACTIVATED ALUMINATE BASED PHOSPHOR

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In this paper, Phosphor material $CaYAl_3O_7$ with Mn^{2+} were synthesized by combustion method at 500^0c.The characterization of prepared phosphor for their phase formation by X-ray diffraction with an average size of 31.5 nm. For the Thermo luminescence study,TL peak have been investigated for the $CaYAl_3O_7:Mn^{2+}$ (.05mol%) on different exposure range of the γ- ray irradiation from 1 to 100 Gy with heating rate 3.6^oc/min. The TL glow curve obtained between 180^0c to 190^0c.TL intensity increases upto 50 grey afterwards its decreases, this is the occurrence of dose response. The different trapping parameters order of kinetics and activation energy for $CaYAl_3O_7$ with Mn^{2+} have been determined.These results suggests that this phosphor material is useful for dosimeter purpose as well as solid state lighting.

P-14

ANHARMONIC ELASTIC PROPERTIES OF CERIUM CHALCOGENIDES

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Abstract: In the present paper we have investigated the high pressure, structural phase transition of cerium chalcogenides (CeS, CeSe and CeTe) using a three body interaction potential (MTBIP) approach, modified by incorporating covalency effects. The elastic properties of solids are studies through the stress strain relationship. Within elastic limit, the ratio of stress and strain defines the elastic constants. The third order elastic constants (TOECs) and fourth order elastic constants (FOECs) are the special interest because they are related to all the anharmonic properties of solids. The phase transition pressures and

associated volume collapses obtained from (TBIP) show a reasonably good agreement with experimental data.

P-15

The Effect of Solvents, Acetone, Water, and Ethanol, on the Morphological and Optical Properties of SiO_2 Film Prepared by Sol-Gel method

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Abstract

The present work deals with the synthesis and characterization of SiO_2 by sol-gel method and also provide a basic understanding of the effect of solvents on the growth of SiO_2 .The precursor solutions were made by mixing tetraethylorthosilicate (TEOS), acetone, ethanol and deionized water. The silica film formed in this study was found to be mesoporous in nature. In this work, we deals with different solvents, which are helpful for the enhancement of optical properties and surface morphologies. Growth rate of SiO_2 can be observed through scanning electron microscopy (SEM) and optical properties can be examined by using the UV-Visible spectroscopy. SEM and UV-Visible spectra analysis revealed that all the required morphologies and absorption spectra were observed which were indicative of the successful synthesis of silica particles.

P-16

FIRST PRINCIPLE CALCULATIONS OF PRESSURE INDUCED STRUCTURAL AND ELECTRONIC PROPERTIES IN AMERICIUM SULPHIDE

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Abstract

The tight-binding linear muffin tin orbital (TB-LMTO) with in the local density approximation is used to investigated the pressure induced structural and electronic properties of americium sulphide. It is found that americium sulphide is stable in NaCl – type structure under ambient pressure. We predict a structural phase transition from NaCl-type (B_1-phase) structure to CsCl-type (B_2-phase) structure for AmS in the pressure range of 26 GPa. We also calculate the lattice parameter (a_0), bulk modulus (B_0), band structure and density of states. From energy band diagram it is observed that AmS exhibit metallic behavior. The calculated equilibrium lattice parameter and bulk modulus is in general good agreement with available experimental data.

P-17

Some Optical studies of nanocomposite films

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ABSTRACT

Organic–inorganic hybrid materials have attracted considerable attention in recent years due to their novel physical and chemical properties. Incorporating nanoparticles into the polymer matrix becomes the most common method in producing these hybrid materials and can have specialized properties that cannot be found in their respective single phase. Hybrid materials with enhanced electrical, mechanical and optical properties have been reported. High refractive index nanocomposites have attracted considerable interests in light emitting diodes (LEDs) encapsulation. The nanocomposite films of CdSe and ZnSe nanocrystals in polyvinyl alcohol (PVA) matrix were synthesizes by chemical method. These composites were characterized by X-ray diffraction which indicates the hexagonal crystalline structure of CdSe as well as ZnSe with particle size up to 20 nm. The Particle size is found to decrease by increasing PVA Concentration. The photoluminescence properties of these composite films with varying concentreation of PVA have been investigated. The PL peak of CdSe and ZnSe were observed at 510 nm and 465 nm respectively. The higher intensity is observed by increasing PVA content in CdSe and ZnSe nanocomposite films without any change in position of PL peak. The PL emission may be attributed due to band to band transition which is greater than bulk band gap of ZnSe /CdSe. The blue shift could be attributed to size reduction of PVA matrix to ZnSe/CdSe nanoparticles.Due to proper passivation of surface states non-radiative transition are reduced which enhance the PL intensity. The polymer matrix acts to stabilize the nano particle. Due to the PL peak in green and blue region these composite films are promising materials for optical display devices. Optically transparent ZnSe/PVA composite Samples of comparatively larger thickness were prepared and obtained in thin film form. All prepared films exhibit excellent optical transparency in the visible region. The Refractive index of these composites was measured at sodium line (5893Å) with the help of Abee' refractometer and was found in the range of 1.695-1.730. It is seen that refractive index increases with polymer concentration. This may be useful for their potential application in anti-reflection coating, display devices and optical sensors.

P-18

MECHANOLUMINESCENCE OF FLUORESCENT CRYSTALS INDUCED BY THE APPLICATION OF PRESSURE PULSES

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The present paper reports the fracto-mechanoluminescence and fracture of solids and thereby provides a clear understanding of the physics of fracto-mechanoluminescence **.** One way to understand such complications is the measurement of the transient mechanoluminescence (ML) induced by the pressure pulses of short duration. The present paper reports the mechanoluminescence of fluorescent crystal induced by pressure pulse produced by the electrical hammer and makes a comparison between experimental and theoretical results. The time dependence of ML intensity of cinchonine sulphate crystals (fluorescent crystals) shows that, initially the ML intensity increases with time, attains a peak value and later on it decreases with time. It also shows that initially the ML intensity I increases linearly with time t. The plots of log I versus $(t-t_m)$ are straight lines with negative slopes for cinchonine sulphate crystals and the value of slope increases with increasing value of the impact velocity v_0. The value of ξ is determined from the slope of this plot for different values of impact velocity v_0. The value of I_m for cinchonine sulphate crystals increases linearly with impact velocity v_0. The total ML intensity I_T for cinchonine sulphate crystals initially increases with the impact velocity v_0 and then it tends to attain a saturation value. The total ML intensity I_T for cinchonine sulphate crystal increases with the volume of these crystals.T he value of t_m increases linearly with the logarithm of thickness of the cinchonine sulphate crystals. The value of t_m decreases with increasing value of the impact velocity for cinchonine sulphate crystals.

P-19

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Abstract

The structural properties of the actinide mono-arsenides (AnAs) have been investigated at high pressure by using the experimental technique such as X-ray diffraction. However, very little theoretical attempts have been made, to reveal the nature of bonding, ion-ion and ion-electron interactions etc. in these compounds. We have investigated the structural and

mechanical properties of actinide mono-arsenides (AnAs; An = Th, U, Pu) by using a two body interaction potential with modified ionic charge ($Z_m e$). The calculated equation of states curves of actinide mono-arsenides have been compared with high pressure X-ray diffraction data. We have predicted structural phase transition pressures (P_t) 18.1GPa, 9.4 GPa, and 5.6 GPa with associated volume collapse 10%, 9.4%, 5.6% for ThAs, UAs and PuAs, showing the compression due to which the NaCl (B1) structure becomes unstable at high pressure and transforms to CsCl (B2) structure, respectively. The present model has correctly predicated the stability of competitive phases in all the cases as the value of change in cohesive energy ΔU (= $U_{B2} - U_{B1}$) are positive, which is a required criterion. Also, the values of the equilibrium inter ionic separation (r_0) obtained by us from energy minimization technique are in good agreement with their experimental data. The trend of variation of transition pressure and volume in these compounds dictates that these compounds are moderately ionic. We have also reported the second elastic constants (C_{11} = 230.84, 208.26, 134.92; C_{12} = 39.88, 38.58, 28.24; C_{44}= 40.13, 38.87, 29.63) and bulk modulus (Bo =103.54, 95.15, 64.49) in GPa, for these compounds, respectively. The predicted results are agreed reasonably well with the measured values. In order to study the high pressure behavior of the AnAs, we have estimated the pressure variations of the SOEC ($C_{11,}$ C_{44}). We observed that C_{11} increases linearly with increase pressure but C_{44} decreases linearly, showing the reduction in resistance to shear as the phase transition is approached.

P-20

Pressure Induced Phase Transition and Mechanical Properties of NdP Compound

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Most of chalcogenides and monopnictides of rare-earth compounds crystallize in NaCl (B1) type structure with space group symmetry *Fm3m* at ambient pressure. At high pressure these compounds as a distorted to CsCl (B2) type structure and space group symmetry *P4/mmm*. The presences of 4f electrons in these compounds are responsible for their magnetic, electrical and structural properties. A theoretical studies of first order pressure induced structural phase transition, mechanical and thermal properties of NdP compound, using the modified inter-ionic potential theory (MIPT), which parametrically includes the effect of coulomb screening. The calculated result of phase transition pressure (31 GPa) and elastic properties are agree well with the available theoretical and experimental data. We have also

studied the variation of the second order elastic constants up to 30 GPa and we note that the C_{11} increases linearly with on increase of pressure away from zero at the phase transition pressures. C_{44} decrease linearly with increase of pressure. This feature is quite similar to the work earlier reported. Our calculated values of second order elastic constant C_{11}, C_{12} and C_{44} are 154.7, 29.8 and 31.3 GPa, This shows very good agreement with available theoretical data . We have also estimated Debye temperature (θ_D), Young's modulus (E), Shear modulus (G) Poisson ratio (ν) and Anisotropic ratio (A) are 269 K, 144.6 GPa, 43 GPa, 0.48 and 0.11 respectively.

P-21

CARRIER INJECTION IN ORGANIC LIGHT EMITTING DIODE

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Abstract

The essential feature of injection is that the concentration of mobile carriers in the surface region is much larger than that in the bulk of the sample. If the carriers trapped within the sample are taken into consideration, the condition for the current to be injection limited (ILC) is that the capacitor charge related to the unit volume must be much greater than the average concentration of the total charge in the sample. It follows that an ILC will be observed only for relaively low currents at high electric fields with high-mobiliy carriers and large-value dielectric permittivity materials formed into high chemical and structural perfection thin layers. The expression for **current density j** shows that charge injection at low applied bias is primarily due to thermal emission of charge carriers over the interface potential barrier when the barrier is not too high for thermal injection. It is reported that:carriers will backflow into the electrode at low applied field strength. When the electric field is increased, the efficiency of injection increment will be more significant than in the case when only image force is considered. When the forward field across the 100 nm thin OLED is increased, the triangular energy barrier becomes shallower . It is typically~2 nm wide at an applied field of 2 MV/cm, in which case the width is sufficiently thin for tunneling. For a triangular barrier, the Fowler-Nordhium (FN) current density is given by an exprission, which is a nonlinear function of field F through the image-force lowering effect.

Typically, for low fields (<2 MV/cm), the thermionic current dominates. For high fields (>2MV/cm), the tunneling current prevails. In general, at low field the charge injection in organic light emitting diodes (OLEDs) takes place by thermionic emission process and at high field the charge injection in OLEDs takes place by tunneling process process.

P-22

A STUDY OF SOLAR FLARES AND CORONAL MASS EJECTION DURING 2006-2011

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We know that the most intense explosion occurs during a CME. A CME is a large bubble of gas that is ejected from the Sun's corona into interplanetary space. Often CMEs originate from the same active region of the Sun as solar flares. In our study we have analyzed the data for solar flares and coronal mass ejection (CMEs) for the period 2006 to 2010 and we found that, total solar flares are positively correlated with total CMEs, with a good coefficient of correlation (r = 0.8442). We have also investigated Halo CMEs during 2006-2011, and found that ~ 1% of total CMEs are Halo CMEs, and ~ 56% Halo CMEs are associated with flares whereas ~ 44% Halo CMEs are not associated with flares during the period 2006-2011.

P-23

CORRELATIVE STUDY OF SUNSPOT NUMBER AND SOLAR FLARES

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As we know that, solar flare is a sudden brightness observed over the surface of the sun or the solar limb, and sunspot are magnetic storm on the surface of sun which is the region of intense magnetic field. These intense magnetic field regions appear like black spot in the surface of sun. In our present study we have analyzed the solar flare and sunspot number for ascending phase of solar cycle 24. We found that sunspot numbers are positively correlated with solar flares, with coefficient of correlation (r = 0.7833). It is notable that coefficient of correlation is positive and ~ (0.8) i.e., there exist a strong correlation between these parameters during the period 2006-2010.

P-24

Solar Energetic Particle (SEP) Events and their Geoeffectiveness

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The solar energetic particle (SEP) events are the energetic outbursts as a result of acceleration and heating of solar plasma during solar flares and coronal mass ejections (CMEs). The first observation of SEP events recorded by Forbush (1946) in the form of abrupt enhancement in the intensity in ground-level ion chambers during large solar flares that occurred in February and March 1942. SEP events associated with solar flares are called impulsive where as those associated with CMEs are gradual (Cliver, 1983, Cane et al., 1986 and Kahler, 1992). The solar cycle 23 contains many intense SEP events as reported by SOHO/CELIAS. In the present work, we have detailed analysed two SEP events observed during 15th July 2000 and 6th November 2001. Basic effect of these SEP events and their geoeffectiveness are investigated in the present work. Data of solar flare and CME obtained from geosynchronous satellite GOES-8, and LASCO instrument onboard SOHO near L1 point (GSE ~ 240 R_E), respectively. Interplanetary plasma and magnetic field data obtained from NASA's Advanced Compostion Explorer (ACE) located at L1 point (GSE ~ 240 R_E) and Wind satellite (GSE ~ 0.1 R_E to ~ 85 R_E). Actual CME onset time is taken as the time when CME is at the height of 1.1R_S. Proton flux data is taken from EPAM instrument of ACE. Hourly average values of storm time disturbance index D_{st} have been acquired from World Data Center, Kyoto.

P-25

THERMOACOUSTIC INVESTIGATION OF BINARY SOLUTIONS OF PETROLIUM AND ITS PRODUCTS

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Experiment values of densities and ultrasonic speed of petroleum product Gasoline(Petrol) and 2T Oil were taken in different volume concentrations from 5%, 10%-----, and 95% at different temperatures from 298.15K to 318.15K having difference of 5K. From the experimental data, Apparent Molar Compressibility (Φ_K), Relative Association (R_A), Solvation Number (S_n), Free Energy of Activation (ΔE), Excess Adiabatic Compressibility ($\beta_{ad}{}^E$), Excess Volume (V^E), Excess Free Length (L_f^E) have been computed. These parameters are used to focus light on the nature of component molecules of binary

liquids and the excess functions are found to be sensitive to the nature and extent of the intermolecular interactions taking place in these binary mixtures.

P-26

Threshold current density in Qwell and Qdot lasers

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The technology of quantum well and quantum dot lasers has attracted great attention recently due to its excellent properties and low threshold current density. At low temperature upto approximately 30^0k in quantum well lasers, threshold current density is fairly constant. Above 100^0K, J_{th} for lasers operation increases rapidly with increasing temperature. In Quantum dot lasers above 200^0K, J_{th} increases rapidly with increasing temperature. The temperature dependence of J_{th} for quantum well and quantum dot laser is usually described by a simple empirical formula

$$J_{th} = J_0\left(T/T_0\right)$$

Where T_0 is the characteristic temperature and J_0 is the empirical parameter. A number of studies were recently reported on comparing computed and measured threshold current density behavior as a function of temperature. The analysis reveals that as the temperature decreases, the reduction in electron momentum increases the effectiveness of the acceptor ions as traps. This paper presents the temperature dependence of threshold current in quantum dot and quantum well laser.

P-27

Electrical and Optical Properties of Single-Walled Carbon Nanotubes

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The element carbon can exist in several different forms .until the discovery of the fullerenes in 1998.only amorphous carbon, graphite and diamond were known. The most famous of this class of molecules is the spherical Buckyball C60, which has a bond structure analogous to the sphere. After this discovery, it became evident that graphene layers exist not only as planar honeycomb sheets like in graphite but also as spherically curved and closed cages.The carbon nanotube was discovered in 1991 by sumio Iijima. The carbon nanotube falls into two broad categories single-walled carbon nanotubes consisting of one graphene sheet rolled

into a cylinder and multi-walled carbon nanotubes made of several concentric single-walled carbon nanotubes are regular carbon clusters with attractive electronic and optical properties. A single nanotube can be used as a sensor and a nanorelay. It is possible to produce light sources and fibers with carbon nanotubes. An array of carbon nanotubes can act as a flat panel display.using their feature to act as field emitting devices.they can be used for the storage of hydrogen to store energy in electrochemical double layer capacitors or infuel cells.SWNTs are either metallic or semiconducting.metallic nanotubes with conducting wire whereas the semiconducting ones can be used as transistors. the limitation of using carbon nanotubes in any practical applications has been its solubility for example swnts have little to no solubility in most solvent due to the aggregation of the tubes.SWNTs achieve values of properties very close to their theoretical limits because of their molecular perfection of structure this infact is the unique feature of the single walled carbon nanotubes

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P-28

NANOTECHNOLOGY: FUTURE TRENDS OF RESEARCH IN SCIENCE AND TECHNOLOGY

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Carbon Nanomaterials are novel manufactured materials, having widespread potential applications. Absorption of hydrophobic organic (HOCs) by carbon nanomaterials may enhance their toxicity and affect the fate, transformation, and transport of HOCs in the environment. In this research, adsorption of naphthalene, phenanthrene, and pyrene onto six carbon nanomaterials, including fullerence, single-walled carbon nanotubes, and multiwalled carbon nanotubes was investigated, which is the first systematic study on polycyclic aromatic hydrocarbons (PAHs) sorption by various carbon nanomaterials. All adsorption isothermswere nonlinear and were fitted well by the Polanyi-manes model (PMM)

The unique and tunable properties of nanomaterials enable new technologies for identifying and addressing environmental challenges. This review critically assesses the contribution of nanomaterials to a broad range of applications in every area: environmental sensors, renewable energy technologies and pollution prevention strategies, aerospace, for better weapons, longer lasting satellite. This article also outlines future opportunities for nanomaterials current application like clays, paints remediation, fuel cells, displays catalyst, lubricant improving nation's economy and qualify of life for all citizens. In this seminar we are going to learn about nanotechnology and its various applications.

P-29

Nanomedicine : A transforming field of science

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Nanotechnology refers to the science and engineering activities at the level of atoms and molecules. It is an analytical advantage over conventional molecular based structure and approaches. Nanomedicine is the process of diagnosing, treating, preventing disease, traumatic injury for relieving pain, preserving and improving human health using molecular tools and molecular knowledge of the human body. It is expected that nanotechnology provides the field of medicine with promising hopes for assistance in diagnostic and treatment technologies as well as improving quailty of life. Normally, drugs work through the entire body before they reach the affected area. Using nanotechnology, the drug can be targeted to a precise location by using very effectively for drug delivery system called nanorobot. Most major and established pharmaceutical companies have internal research programs on drug delivery, that are on formulations containing components down to nano sizes. Nano robots to make repairs at the cellular level. Nanomedicine, the application of nanotechnology to healthcare, holds great promise for revolutionizing medical treatments and therapies in areas, such as imaging, faster diagnosis, drug delivery and tissue regeneration, as well as the development of new medical products. The goal of nanomedicine is to reduce the costs, provide more accurate and earlier diagnosis, effective deliveries and personalized care and standardized healthcare delivery. This review aims to analyze the most recent advances in biological applications of nanopartical and its derivatives, particularly those related to anti-inflammatory and antioxidant activities, antimicrobial effects, immunity-enhancing as well as antitumor effects and drug delivery in the field of biological medicine.

P-30

Silver Nanoparticles: Principle, Expectations and Challenges

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Nanotechnology is a developing field, making an impact on all over spheres of human life and creating a growing sense of excitement in the life sciences especially biomedical devices and biotechnology. Metallic nanoparticles are mostly prepared from nobel metals such as Silver, Gold, Platinum and Lead. Among the nobel metals, silver is the metal of choice in the

field of biological systems, living organisms and medicine. The silver nanoparticles act on a broad range of target sites both extracellularly as well as intracellularly. It is generally recognized that silver nanoparticles may attach to the cell wall, thus disturbing cell-wall permeability and cellular respiration. The nanoparticles may also penetrate inside the cell causing damage by interacting with phosphorus and sulfur containing compounds such as DNA and protein. Silver is more toxic element to microorganisms than many other metals in the following sequence: Ag > Hg > Cu > Cd > Cr > Pb > Co > Au > Zn > Fe > Mn > Mo > Sn. Nanomaterials such as Ag, Au, Pt and Pd have been synthesized by different methods including chemical method using bacteria, fungi and plants. There is substantial interest in exploiting silver nanoparticles as antimicrobial agents to prevent infections. One of the key issues related to chemical and physical synthesis of silver nanoparticles, it is cost and toxicity *in vivo*. To overcome this limitation plant/microbe mediated biocompatible silver nanoparticles have been developed, which hold the tremendous potential application in burn and traumatic wound dressings, diabetic ulcers, coating of catheters, dental works, scaffold, and medical devices.

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Nanoinformatics: A Consensus Approach

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Nanoinformatics is an emerging research field that uses informatics techniques to collect, process, store, retrieve data, information, and knowledge on nanoparticles, nanodevices and their potential applications. This method will be central to integrating many different methodologies involving discrete and continuous modeling, design, simulation, experimentation, visualization, and interpretation techniques. This challenges require adapting classical bioinformatics and computational chemistry tools to store, standardize, analyze, and visualize nanobiotechnological information. Challenges of nanoinformatics include, for instance, nanoparticle characterization and design, modeling and simulation, data integration and exchange, linking nanoparticles information to clinical data, semantic annotation and retrieval, domain ontologies, terminologies standards, data and text mining for nanomedical research. Nanoinformatics address two main issues: Managing changing sets of data results from nano-level experimentation, and the need for control of the systems themselves. Further, the elements that researcher aimed to manipulate dramatically increased the complexity of the research equipment itself and the refinement of the experiments. Further

research in this emerging nanoinformatics held may lead to the development of novel methods and tools that could assist researchers in managing data, information, and knowledge at the nanolevel, thus accelerating research. This review takes a second look at the continuous development of this new and exciting area as seen from the perspective of the evolution of nanobiotechnology applied to the life science.

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Nanoprobe : A Microscopic Robotic Device

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Nanotechnology refers to automated mechanical devices whose dimensions are measured in microns. The ongoing developments of molecular-scale electronics, sensors and motors are expected to make it possible to produce microscopic robots with dimensions comparable to bacteria. Such technology could be used to deliver chemotherapy or targeted-gene therapy into end organs or cells in remote parts of the body. Typical nanoprobes take the form of spheres, rods, shells, stars, cages, crescents, boxes and prisms with sizes ranging from 2 to 500 nm. Most probes used in biomedical and life sciences applications lie in the range between 10 and 100 nm. Unique size dependent electronic, optical, thermal and mechanical properties of nanomaterials are being exploited today in diverse areas ranging from computer chips to biology and medicine.In order to visualize physical and chemical dynamics within microscopic environments and even within living cells, a variety of nanoprobes have recently been developed.

Most fluorescent nanospheres and microspheres emit light uniformly in all directions. Nanoprobes are microscopic robotic devices for the primary purpose of assimilation and injected into a target's bloodstream via assimilation tubules. Nanoprobes immediately begin to take over the host cells and enter inside the body to repair the tissue. Nanoprobes have significantly improved sensing performance in a variety of optical and electronic biosensing systems. Today nanoparticals are used as sensor and drug delivers agent in application such as detection of pathogen and treatment of blood clotting related disorders. In the recent year nanoprobe derivative with thiol modified oligonucliotides for molecular recognition and have found wide applications in areas including molecular diagnostics, imaging and photothermal therapy, as drug delivery vehicles for targeted therapeutics, environmental monitoring, and antiterrorism.

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Nanobiosensor: Agriculture boon

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Nanotechnology offers solutions to various problems in agriculture such as reducing the use of fertilizer, pesticide, water, improvement of plants and animals breeding besides creating and making available nanobased bioindustrial products. The immobilization of nanomaterials onto sensing devices generate novel interfaces that enable the sensitive optical or electrochemical detection of physiomolecular and biomolecular analytes. Nanobiosensors are an important option in the agricultural and food sectors to control production processes and ensure food quality and safety by reliable, fast and cost effective procedures. As a result, farmers and processors are using technological tools to allow for the quick, effective and efficient determination of hazards inherent to safety and quality of products. Nanobiosensor can effectively used Pesticides, fertilizers, and heavy metals quickly detected in small quantities with biosensors, facilitating *in situ* implementation in pre and post-harvest processes. A whole range of intelligent nano-sensors is being developed that can be used to detect pests, diseases, or micro-organisms that damage plants. Using such sensors, pest problems can be detected much earlier, managed much more locally and focused, which results in lower losses and lower costs. Besides detecting growth-threatening factors, other nanosensors are being developed that detect and signal all possible local environmental factors ranging from nutrient deficiency to water stress and temperature sensitivity. The application of nanotechnology for the advancement of biosensor leads to an efficient nanobiosensor with miniature structure as compared to conventional biosensors. Nanobiosensors can be effectively used for sensing a wide variety of fertilizers, herbicides, pesticides, insecticides, pathogens, moisture, and soil pH. Taken together, proper and controlled use of nanobiosensor can support sustainable agriculture for enhancing crop productivity. Nanobiosensors have marked advantages such as enhanced detection sensitivity/ specificity and possess great potential for its applications in different fields including environ- mental and bioprocess control, quality control of food, agriculture and biodefence.

P-34

XRD studies of some copper complexes

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The present paper deals with the XRD studies of some Schiff base copper complexes with orthophenylenediamine as a ligand. The XRD measurements were carried out using Bruker D8 Advance X-ray diffractometer. The X-rays were produced using a sealed tube and the wavelength of X-ray was 0.154 nm. The x-rays were detected using a fast counting detector based on Silicon strip technology (Bruker LynxEye dtector). XRD analysis shows that sample is crystalline in nature and having particle size in the range of few micrometers. Particle size was calculated using Schrer's formula:

$$t = (0.9\lambda)/B\cos\theta$$

Where t is the crystal thickness (in the same units as λ), B is half width (in radians) of diffraction lines and θ is the Bragg angle and λ is the Wavelength.

P-35

Synthesis of borate based phosphors for mechanoluminescence dosimetry

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[3]Department of Physics, E. R. R. Government PG Science College, Bilaspur (C G) Ce, Dy and Eu doped BaB_4O_7 phosphors were synthesized by solid state diffusion technique. Formation of the sample was confirmed by recording X-ray diffraction pattern (XRD). It is found that small amount of impurity doped in the host, does not affect the XRD pattern of the sample. Mechanoluminescence (ML) was excitated impulsively by dropping a piston on the sample mounted on a transparent plate. A single peak is observed in the ML glow curve of the samples. Dy is the most efficient dopant to enhance the ML of BaB_4O_7 phosphors. ML intensity increases with increasing gamma ray doses given to the sample and then becomes saturated. This property suggests that the phosphors can be used as the ML dosimerty. Present paper reports a systematic study on ML of borate based phosphor and the possible reason for ML excitation is also discussed.

P-36

Intermolecular study of *Adansonia Digitata* (AnD) solution

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The resistance of a liquid to flow and the molecules of a liquid exhibit intermolecular attraction for one another are called its viscosity and surface tension. Surface tension is measured as the energy required increasing the surface area of a liquid by a unit of area. Viscosity is governed by the strength of intermolecular forces and especially by the shapes of the molecules of a liquid. The surface tension of a liquid results from an imbalance of intermolecular attractive forces, the cohesive forces between molecules. A thermo-dynamic quantity combining enthalpy and entropy into a single value called Gibbs free energy ΔG. The change of free energy is equal to the sum of its enthalpy plus the product of the temperature and entropy of the system. The characteristic time for a system to reach an equilibrium condition after a disturbance is called relaxation time. *Adansonia Digitata* (AnD) fruit collected from Mandav District Dhar (M.P.). The entire chemical used in this study analytical grade.

P-37

X-ray diffraction study of transition metal complexes of copper (II) with urea as a ligand

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XRD of six biologically important copper (II) complexes having urea as a primary ligand and sulphate, nitrate, acetate and chloride as secondary ligands have been studied using Bruker D8 Advance diffractometer at IUC, Indore. The synthesized metal complexes were characterized by XRD measurements in order to elucidate their geometry. The data obtained has been preceding using XRD data analysis program Origin 6.0 Professional. From the experimental measurements, various parameters, e.g., particle size, lattice parameter have been estimated. The XRD analysis revealed the crystalline nature of all the complexes.

P-38

Structural Properties of ErCu

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The intermetallic compounds exhibit a diverse range of fascinating chemical, electrical, physical, magnetic and mechanical properties that are superior to ordinary metals [1]. First principles density functional calculations were performed to study the structural properties of erbium copper intermetallic compound (ErCu). The exchange and correlation effects were treated using the generalized gradient approximation (GGA) in the scheme of Perdew *et al* [2]. Magnetically the ErCu compound is stable in ferromagnetic (FM) state and its crystal structure is CsCl-type. Ground state properties such as lattice constant (a_0), bulk modulus (B), its pressure derivative (B′) and magnetic moment (μ_B) are calculated. The lattice parameter is calculated to be 3.42 Å, which is in good agreement with the experimental value [3]. Our calculated bulk modulus for ErCu is 92.56 GPa. The equilibrium cell volume of ErCu in the ferromagnetic state is estimated to be 270 $a.u^3$. The magnetic moment of ErCu in the CsCl type structure is calculated to be 2.58 μ_B.

P-39

PHOTO-INDUCED PLASTICITY AND APPLICATIONS

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The PhE (Photo-Plastic Effect) denotes the reversible influence of light on the flow stress and hardness of a material and may be of two types-the positive PhE (if materials become stronger under irradiation) or negative one (if the light-induced softening takes place).The PhE in crystalline semiconductors it is assumed that the positive PhE (it dominates in II-VI group substances) occurs in the materials where charge carriers generated by irradiation modify the charging of dislocations or charge state of electrically active point defect, and the negative PhE (it dominates in III-V group substances) is explained in terms of non-radiative recombination at the energy of traps and the resulting local heating decreases the barriers of dislocation movement.

A possible application of the PhE can be the fields of data storage technology and nanoimprint lithography in which a laser-assisted photo-mechanical imprinting of amorphous chalcogenides film is capable of producing various nanostructures transferring them from the mold.

P-40

ELECTRIC-FIELD DEPENDENCE OF THE DELAY TIME OF ORGANIC LIGHT EMITTING DIODE

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The present paper reports the electric-field dependence of the delay time of Organic Light Emitting Diode (OLED).In fact, there is a time lag called delay time, t_d , between the time of application of a voltage pulse to OLED and the onset of EL emission. The EL delay time should depend on three components: (i) The charge injection time,t_{inj}, which is the time taken to charge the metal/organic interface to the threshold voltage (V_{th}) by the injection of the charge carriers from the electrodes by Richardson-Schottky model (at low voltage) or Fowler-Northeim tunelling model (at high voltage), (ii) the charge running delay, t_{run}, as the time when the charge carrier runs through the organic layer, and (iii) the recombination delay is the time when holes penetrating organic / organic interface are recombined with electrons . The EL delay time is equal to the sum of charge injection delay time, the charge running delay time and the charge recombination delay time. Whereas injection delay depends linearly on the device area, depending on the value of time constant of OLEDs, the charge running delay time may be independent or dependent on device area. It is shown that there exists a linear relation between the delay time and device area with a positive slope and positive intercept on the delay time axis, in which the values of both the slope and intercept decrease with increasing electric field. It is shown that the values of threshold voltage, time constant of OLEDs, zero-field charge carrier mobility and the electric field coefficient to the mobility can be determined from the measurement of the dependence of delay time on the strength of applied electric field.

P-41

Dispersive Parameter of the Electroluminescence Overshoot in Phosphorescent Organic Light-Emitting Diodes

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When a voltage pulse of short duration is applied to a phosphorescent organic light-emitting diodes (OLEDs) such as ITO/N, N-di (naphthalene-1-yl)-N,N-diphenylbenzidine (α-NPD)/beryllium bis(2-(2´- droxyphenyl)pyridine) ($Bepp_2$) or (4,4-N,N-dicarbazole) biphenyl (CBP) doped with tris (2-phenylpyridine) iridium(III) ($Ir(ppy)_3$)/LiF/Al, initially the EL intensity increases with time, attains a peak value, and then decreases with time. Subsequently, after turning off the voltage, the EL intensity increases again, attains a peak value and then it decreases with time. The second EL peak after the turning off the applied voltage pulse is known as EL overshoot. The decrease of the EL intensity after the second EL peak follows power law, in which the plot of the log of EL intensity versus log $(t-t_m)$ is a straight line with a negative slope γ, called as the dispersive parameter. The value of γ decreases as the lifetime of excitons increases and it increases with increasing temperature of the OLEDs. The dispersive parameter changes slightly with increasing value of the pulse height and pulse-width. The temperature dependence of $(\gamma-1)$ follows the relation, $(\gamma-1) = Z \exp(-E_a/kT)$, where Z is a constant. The values of the activation energy E_a for dispersion E_a are found to be 0.131, 0.098 and 0.046 eV for the $Bepp_2$:$Ir(ppy)_3$ 1% OLED, $Bepp_2$:$Ir(ppy)_3$ 8% OLED and CBP:$Ir(ppy)_3$ 8% OLED, respectively. On the basis of the detrapping of the charge carriers, generation of excitons, and radiative decay of excitons, expressions are derived for the rise of the intensity of EL overshoot, time t_m and intensity I_m of the peak of EL overshoot, decrease in the intensity of EL overshoot with time, and for the dispersive parameter γ of organic light-emitting diodes (OLEDs), which are able to explain satisfactorily the experimental results. The present investigation may be useful in fabricating the OLEDs having desired EL overshoot.

P-42

"Nanotechnology and its Application"

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A nanometer is one billionth of a meter (10-9 m)—about one hundred thousand times smaller than the diameter of a human hair, a thousand times smaller than a red blood cell, or about half the size of the diameter of DNA. For the purpose of this document, nanotechnology is defined as: research and technology development at the atomic, molecular, or macromolecular levels using a length scale of approximately one to one hundred nanometers in any dimension; the creation and use of structures, devices and systems that have novel properties and functions because of their small size; and the ability to control or manipulate matter on an atomic scale.

There is potential for nanotechnology to contribute to reductions in energy demand through lighter materials for vehicles, materials and geometries that contribute to more effective temperature control, technologies that improve manufacturing process efficiency, materials that increase the efficiency of electrical components and transmission lines, and materials that could contribute to a new generation of fuel cells and a potential hydrogen economy. Nanotechnology has the potential to contribute to long-term water quality, availability, and viability of water resources, such as through advanced filtration that enables more water reus recycling, and desalinization. For example, nanotechnology-based flow-through capacitors (FTC) have been designed that desalt seawater using one-tenth the energy of state-of-the art reverse osmosis and one-hundredth of the energy of distillation systems. One of the near-term research products of nanotechnology for environmental applications is the Development of new and enhanced sensors to detect biological and chemical contaminants. Nanotechnology offers the potential to improve exposure assessment by facilitating collection of large numbers of measurements at a lower cost and improved specificity. It soon will be possible to develop micro- and nanoscale sensor arrays that can detect specific sets of harmful agents in the environment at very low concentrations. Provided adequate informatics support, these sensors could be used to monitor agents in real time, and the resulting data can be accessed remotely.In addition to increasing energy efficiency, nanotechnology also has the potential to contribute to alternative energy technologies that are environmentally cleaner. For example, nanotechnology is forming the basis of a new type of highly efficient photovoltaic cell that consists of quantum dots connected by carbon nanotubes. Nanotechnology is also used for Organic Light Emitting Diodes (OLEDs).

OLEDs are adisplay technology substitute for Cathode Ray Tubes, which contain lead. OLEDs also do notrequire mercury, which is used in conventional Flat Panel Displays (Frazer, 2003). The OLEDdisplays have additional benefits of reduced energy use and overall material use through the lifecycle.

P-43

Synthesis, spectral and theoretical studies of Cu (II) andCo (II) Complexes with newer reagents

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Metal –legend complexes were synthesized by some newer reagents like purrolidine di thiocarbamide,thiourea and methyl thymol blue. The metal and legend ratio found to be 1:1 and in some cases 1:2.The structure of complexes was studied by IR and XRD. The analytical data of complexes are also shown in this paper.The complex of this legend was synthesized by refluxing the respecting mixture of metal and legend in the stoichiometric ratio and precipitate are washed with alcohol. The structuralfeatures of the complexes are characterized by IR techniques. IR spectral measurements have been very helpful in deciding the actual sites of the coordination of the legend to the ion. The infrared spectrum of the coordinated legend differs sufficiently from that of the free legend and it is possible to correlate changes in the spectra with the changes in the structure of the legend. In this way information regarding the structure of the complex and the coordination of particular legend may be obtained from the infrared data and X-ray diffraction studies.

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Long-term variation of cosmic ray intensity during solar cycle 22, 23.

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Long-term variation in cosmic ray intensity modulation is one of the major fields of study & causes of long-term variation of cosmic radiation are still an unsolved problem. In this work we have done a systematic study to verify the long-term profile of cosmic ray intensity in

relationship with solar activity from 1986 to 2009, which cover the solar cycles 22 & 23. We have considered the Moscow (2.39 GV) neutron monitor data for the analysis. Moscow neutron monitor is well maintained station & provides reliable cosmic ray data for variation studies. Shape of the time profiles of cosmic ray intensity varies cycle to cycle. Sunspot numbers show anti phase relation with cosmic ray intensity.

Cosmic ray intensity (CRI), Sunspot number (Rz) & long term variation.

P-45

MAGNETOGRAVITATIONAL INSTABILITY OF A THERMALLY CONDUCTING ROTATING PLASMA WITH HALL CURRENT

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The problem of stability of a self gravitating, infinite homogenous gas in the presence of magnetic field is investigated. The medium is assumed electrically and thermally conducting. The effect of electrical conductivity, thermal conductivity, rotation and Hall current is investigated on the self-gravitating plasma. The relevant linearized equations of the problem are stated and dispersion relation is obtained. The effect of hall current and rotation on the condition of the instability of the system is examined for both longitudinal and transverse mode of propagation for both the direction of rotation and found that for longitudinal propagation viscosity, magnetic field. Hall current rotation and electrical conductivity have damping effect but Jeans criterion remains unaffected. Thermal conductivity modifies the Jeans condition of instability in the velocity term. Whenever for transverse mode of propagation rotation plays an important role. Rotation produces stabilizing influence for longitudinal propagation, viscosity has damping effect and thermal conductivity modifies the Jeans condition. Electrical conductivity does not affect the condition of instability. For transverse mode of propagation electrical conductivity reduces the magnetic field effect in Jeans condition.

P-46

Ab-initio calculations of Structural, Electronic, Thermal and Elastic properties of CuX (X= Pd and Sc) Intermetallics

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A theoretical investigation of structural, electronic, thermal and elastic properties of AB type non magnetic intermetallics compounds with cubic CsCl (B-2 type, Pm3m, space group, 221) structure were performed using *ab-initio* density functional theory (DFT) based upon full potential linearized augmented plane wave (FP-LAPW) method. The exchange correlation energy is described in generalized gradient approximation by both PBE-GGA.We have calculated the ground state equilibrium properties such as lattice constant (a_0), bulk modulus (B) and pressure derivative of bulk modulus (B'). The three independent cubic elastic constants (C_{11}, C_{12} and WCGGA. and C_{44}) are reported first time and compared with available data. Our all outcomes are agreed well with the experimental and other theoretical data. From Band structure and DOS, it is observed that these intermetallic compounds are metallic in nature. We report first time Mechanical and Thermal properties which are predicted from the calculated values of elastic constants.

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Spontaneous current emission in ferrocene doped poly (9- vinylcarbazole)

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In this study, spontaneous current emission (SCE) was observed for metal-polymer-metal sandwich configuration of pure and ferrocene doped poly (9-vinylcarbazole) in temperature range 40 C to 170 C. The peak value SCE during heating rate was found to be of the order of 10-10 A and its thermograms display only one SCE peak at around 95 C. It was observed that the position of SCE peak in thermogram shifts towards the higher temperature side with increasing heating rates. Furthermore the magnitude of SCE increases as concentration of doping molecules is increased. This type of SCE behavior may be attributed to water activation phenomenon of polymer, which is influenced by the phase transition changes of polymer. .

P-48

STRUCTURAL, ELECTRONIC, ELASTIC AND THERMAL PROPERTIES OF CURIUM MONO BISMUTHIDE: A FIRST-PRINCIPLES STUDY

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A theoretical study on structural, electronic, elastic and thermal properties of Curium monobismuthide (CmBi) at ambient as well as high pressure is performed using first-principles calculations based on density functional theory (DFT) within local spin density approximation (LSDA) along with Hubbard-*U* corrections and spin–orbit coupling. CmBi undergoes first order structural phase transition from their ambient NaCl (B_1) type structure to CsCl (B_2) type structure at 7.14 GPa. The structural parameters like lattice constant (a_0), bulk modulus (B) and pressure derivative of bulk modulus (B′) are reported for both B_1 and B_2 phases. Our calculated lattice constant and bulk modulus value for B_1 phase agree well with experimental and available other theoretical result. The calculated band structures clearly indicate that B_1 phase of CmBi compound is metallic for minority spin and less metallic or semi-metallic for majority spin due to small value of density of states at the Fermi level. The thermal and mechanical properties are predicted from the calculated values of elastic constants. The ductility of CmBi compound is also determined by calculating the bulk to shear ratio B/G_H.

P-49

FIRST PRINCIPLES STUDY OF ELECTRONIC, ELASTIC AND THERMAL PROPERTIES OF YX_3 (X = In and Tl) INTERMETALLIC

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The electronic, elastic and thermal properties of YX_3 (X = In and Tl) intermetallic compounds crystallizing in $AuCu_3$ – type structure have been studied using first principles density functional theory within generalized gradient approximation (GGA) for the exchange correlation potential. Both YX_3 compound is stable in $AuCu_3$ structure at ambient condition. The ductility of these compounds has been analysed using the Pugh criteria. Our calculated results indicate that YTl_3 is more ductile than YIn_3. The elastic and thermal properties such as Young's modulus (E), Poisson's ratio (σ), anisotropic ratio (A) and Debye temperature (θ_D)

are also predicted for the first time. The values of elastic moduli and bulk modulus as a function of pressure are also reported.

P-50

Mechanoluminescence, Thermoluminescence Studies of gamma irradiated Potassium Chloride crystals and powder doped with Europium

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Rare earth ions play an important role in modern technology as optically active elements in solid-state luminescent materials. In many of these materials, interactions between the electronic band states of the host crystal and the rare earth ion's localized $4f^N$ and $4f^{N-1}$ 5d states influence the material's optical properties. This paper reports the mechanoluminescence (ML) induced by impulsive excitation of ɤ- irradiated europium doped KCl single crystals and powder. The KCl crystals having different concentrations of europium were prepared by melt technique (slow cooling).The crystals of small sizes were cleaved from grown crystal block and crushed to obtain powder or microcrysttaline powder. The annealed samples were irradiated by gamma source with dose 0.930KGy. Mechanoluminescence is excited impulsively by dropping a load of 0.4 kg with impact velocity 313cm/sec on to it. Two peaks are observed in the ML intensity versus time curves for both single crystals and powder samples . It is found that the intensity of first peak is always greater than that of the second peak. The ML intensity increases with increasing concentration of dopant upto 1000 ppm and then ML intensity decreases with further increase of concentration(concentration quenching). The total ML intensity of the powder samples is about half the intensity of the single crystal samples. It is also observed that the total intensity increases with impact velocity and the time corresponding to peak(t_m) shifts toward shorter time value with increase in impact velocity for all the samples. In thermoluminescence studies a two peaks for pure and doped samples are obtained around 120^0 C and 170^0C for single crystals and powder samples at heating rate of 90^0 C/min. In the ML spectra a broad band with single peak at 482 nm is obtained

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P-51

Computer Abetted Drug Design:Application of drug-target like protein prediction using learningalgorithms of support vector machine

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Target discovery constitutes one of the main components of today's early stage pharmaceutical research. The aim of target discovery is to identify and validate suitable drug targets (i.e. proteins or nucleotides to which drug binding produces therapeutic effects) for therapeutic interventions. Only a small fraction of proteins are actually targeted by today's drugs. The discovery of targets that are sufficiently robust to yield marketable therapeutics is an enormous challenge. In this paper, we explore the use of statistical learning approaches to predict drug-target like proteins from their primary sequences in order to facilitate the rapid discovery of new potential therapeutic targets from the large quantity of sequences in human genome. It was found that the Support Vector Machine (SVM) algorithm with a fine-tuned Gaussian kernel was able to make reasonably accurate prediction, which showed its potential to be used in the genome scale rapid drug target discovery, as a novel *in silico* approach supplementary to the conventional experimental approaches.

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Theoretical Study of Elastico Mechanoluminescence (EML) of $SrAl_2O_4$: Eu Nano Phosphor

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When $SrAl_2O_4$:Eu phosphor mixed in resin is compressed at a fixed pressing rate or fixed strain rate , its elastic ML intensity increases linearly with deformation time or pressure and attains a maximum value I_m at the time , at which the deformation is stopped. Under the pressed condition, the fast decay time of EML after t_m, gives the time constant for stopping the cross-head of the testing machine used to deform the sample, and the decay time of slow decrease of EML gives the life time of electrons in the shallow trap lying in the normal piezoelectric region of the crystals.

P-53

"Long-term cosmic ray modulation during odd and even solar cycles"

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Long-term cosmic ray modulation during odd and even solar cycles were studied and reported time to time by several investigators. The 11-year solar activity cycle primarily refers to the rise and fall of the number of Sunspots, but there are other solar features which vary in phase with Sunspots through they provide separate indices the solar variability. In this work, we have studied and compared the long-term variation profiles of cosmic ray intensity during odd and even solar cycles. The pressure corrected yearly average cosmic ray intensity values of Kiel (2.36GV) neutron monitor have been used for the period of 1964 to 2008, which cover the four successive solar cycles 20 to 23. It is known that cosmic ray particles are affected by the electromagnetic disturbances while transporting from galactic space to the Earth. Cosmic ray intensities are modulated by solar activity cycle from one to another. It is also known that the 11-year solar activity cycles differ in some cases from one cycle to another. To observe correlative variation between cosmic ray and solar flux, we have plotted the count rates of yearly mean of cosmic ray intensity of Kiel neutrons for odd number cycle 21 and 23. Thin and narrow loops are seen for even solar cycles. The formation of wider and thinner loops in odd-even solar cycles is known as odd-even hypothesis in long-term solar modulation of cosmic ray intensity. Odd-even phenomena in cosmic rays modulation is caused due to different magnetic behaviors of interplanetary medium along with solar heliosphere during the span of total 22-year magnetic cycle.

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Study of spectroscopic and acoustical properties of $CaCo_3$ nanofluids

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Numerous studies have shown that nanofluids have superb physical properties, among which thermal conductivity has been studied most extensively but remains controversial. Now a day's nanofluids have attracted much interest because of their reported superior acoustic and electrical performance for many potential applications. In this study, the methanol-based $CaCo_3$ nanofluids are prepared by dispersing a $CaCo_3$ nanoparticles in pure methanol using ultrasonic equipment under stirring process. The main objective of this paper is to measure the acoustic parameter using pulse echo technique operated at 1MHz frequency and electrical conductivity of the methanol-based $CaCo_3$ nanofluids for industrial and medical purpose. The particle size using X-ray Diffractometer, FTIR and pH of the present nanofluids are also characterized. The result shows that the ultrasonic velocity increases with increasing nanoparticle weight fraction in methanol and enhancement is due to aggregation of $CaCo_3$ nanoparticles in methanol-based nanofluids at a temperature ranges from 25^oC to 45^oC.

P-55

Lyoluminescence characterization of gamma irradiated polycrystalline powder of KCl:NaCl phosphor for dosimetry of ionizing radiation

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The lyoluminescence (LL) in γ-irradiated KCl, NaCl and KCl:NaCl phosphors are reported in this paper. Lyoluminescence of all phosphors has been recorded for different γ-doses. The peak LL intensities of KCl and NaCl phosphors varies sublinearly, whereas it is found that the peak LL intensity of KCl:NaCl sample varies linearly with γ-irradiation dose. The fading is found to be minimum in KCl:NaCl material. The prepared KCl:NaCl sample may be useful for dosimetry of ionizing radiation.

P-56

SYNSTHESIS AND CHARACTERIZATION OF POLYPYRROLE COMPOSITE THIN FILM

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The poly(vinyl acetate)- polypyrrole-chromium chloride (PVAc-PPy-$CrCl_3$) composite films has been investigated for alternate current (ac) electrical conductivity at different temperatures at a frequency ranging from 20 Hz to 1 MHz. The electrical conductivity of the composite increased with increasing temperature and it obeys power law. The direct current (dc) electrical conductivity increases with increasing temperature and would be attributed to high mobility of free charges (namely polarons and free ions) at higher temperature.

P-57

LYOLUMINESCENCE OF GAMA-IRRADIATED SCCHARIDES

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The present paper reports the Lyoluminescence (LL) characteristics of gama irradiated Sccharides namely Maltose,Fractrose,Frustrose and Dextrose.The effect of particle size,mass of the solute,pH of the solvent and effect of temperature of solvent on the lyoluminescence yield in Sccharides have been studied using LL reader. The CO-60 is used for irradiating the powered Sccharides and distilled water is used as a suitable solvent. It is found that LL intensity is more for Maltose at 1.0 mg of mass with 1.0 ml solvent for 180-212 μm particle size. It has also found that LL intensity does not change appreciably with pH of the solvent in the range 4-9 and LL intensity is maximum for Ph=12.It is observed that LL yield decreases with increase in temperature of the solvent. An attempt has been made to explain the results on the basis of free radical combination, rate of dissolution and molecular structure.

P-58

Intermolecular Interaction in Soybean oil+2-Propanol by ultrasonic measurements

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Ultrasonic velocity measurement is a reliable procedure that allows a quick and easy determination of solvent concentrations in the structures that

appear in oil technology. Density, viscosity and ultrasonic velocity are measured at a frequency of 2MHz and in the temperature range 303-318K in the mixture of soybean oil in 2-propanol. Ultrasonic velocity has been observed to be decreasing with increasing in temperature. Ultrasonic velocity is attributed to change in intermolecular distance with temperature and the nature of variation depends on the intermolecular dynamics. The nature of variations in the related acoustical parameters i.e. adiabatic compressibility, relaxation time, free length, acoustic impedance, Moelwyn-Hughes parameter, Bayer's non-linearity parameter, Sharma parameter etc. have been calculated by using the value of volume expansivity. In the present system phase transition occurs, a greater immiscibility being observed in the beginning of the functional series due to the higher polar activity of hydroxyl functional group.

P-59

LONG-TERM RELATIONSHIP BETWEEN SOLAR PARAMETERS AND GEOMAGNETIC ACTIVITY DURING SOLAR CYCLE 23

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The sun emits a variety of radiations and corpuscular material, much more so near the maximum of an 11-year cycle. The geomagnetic disturbances are caused by sun outputs, which produce reconnection in magnetosphere and energy release from this in turn geomagnetic disturbances.

We have studied the long term relationship between various solar parameter i.e. sunspot number, grouped solar flare, solar flux for the whole solar cycle 23 (1996 to 2007) , ascending phase of solar cycle 23 (1996 to 2001) and descending phase of solar cycle 23 (2002 to 2007).

We have obtained different correlation during ascending and descending phase of solar cycle 23 & for whole solar cycle 23 also.

Result of the analysis in all the cases that the correlation are found to be higher in ascending phase in comparison to that of descending phase.

P-60

TEMPERATURE EFFECT ON ELECTROLUMINESCENCE OF Tb DOPED ZnS PHOSPHORS

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ABSTRACT :-

Study of Temperature effect on Electroluminescence brightness of Zns:Tb,Cl phosphors. It is found that initially the EL brightness increase with temperature , attains a maximum value and finally it decreases with temperature. The peak corresponding the EL brightness versus temperature curve shift towards higher temperature values with increasing frequencies. It is also found that higher heating rates shifts the peak towards lower temperature side. It is concluded that when the temperature of phosphors are increased the number of excited as well as recombining electrons in the available frequency interval increases and hence brightness increases. If the temperature further increases the EL brightness fall down because of the thermal quenching.

P-61

Recent Trends on Nanotechnology

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Nanotechnology is achieving importance rapidly as a most powerful technology now a days. Its vast potential promises the possibility of significant changes in near term future in all aspects of life, once the most essential machines-called the Universal Assembler and the Nano-computer are built. The present paper focuses on the previous work done and recent advancements in the field of nanotechnology. Today the products made using nano-materials having general as well as special applications like treating various desieses , detection of gases, energy harvesting for self powered nano-systems, chip fabrication, batteries, aerospace materials etc.

The research in the area of carbon nano-tubes, nano-polymers,nano-vectors,nano-composites,nano-crystals,nano-fibers, nano-clays, nano-tubes, nano-filters, nano-horn, nano-wires, nano-springs, nano-rods and

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P-62

Molecular interaction studies in binary liquid mixtures; comparison based on free length theory & revised free length theory.

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Abstract

The sound velocity (u) and density (ρ) of binary liquid mixtures of 1-butanol+pyridine , tolune + pyridine have been measured over the entire range of composition at temperatures, 303K, 313K, 332K. These data have been utilized to estimate free length (L_f), excess parameters ie. excess volume (V^E) , excess adiabatic compressibility (β_a^E) and excesses free length (L_f^E) These excess values have been found to be useful in estimating the strength of the molecular interaction in the mixtures. The values of sound velocities and free length are also calculated theoretically by using Jacobson free length theory (flt) and Kalidoss revised free length theory(rflt) The comparison between theoretical and experimental values shows that , revised free length theory(rflt) is applicable to both liquids mixtures.

P-63

Extended X-ray Absorption Fine Structure Studies of Some Copper Salts using Synchrotron Radiation Source

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Abstract

X-ray Absorption Spectroscopy included the Extended X-ray Absorption Fine Structure (EXAFS) studies of four Copper salts are presented using by FEFFIT (Fitting of EXAFS by Fast Fourier Inverse Transform) programming. Bond lengths is nearest neighbors distances from metal-salt are determined in present study have also been compared with three conventional methods with IFEFFIT methods. The names of these methods are LSS, Levy's, and Lytle methods. EXAFS measurement were carried out Dispersive EXAFS Beamline (BL -08) Indus -2 synchrotron radiation source at RRCAT Indore,India.

P-64

Thin Film Preparation Of PVDF Doped With Different Ratio Of Tio_2 Particles By Solution Cast Technique And Its Application

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ABSTRACT

The comparison of the performance and morphology properties along with mechanical properties of PVDF doped with TiO_2 particles on the membrane performance and structure to explore the possible interaction between TiO_2 particles and PVDF polymer prepared by Solution Cast Technique. PVDF composite film with TiO_2 particles of different ratios get affected the performance and structure of PVDF film due strong crystalline effects PVDF molecules.

P-65

VARIABILITY IN SOLAR WIND VELOCITY AND IMF B INTENSITY AND THEIR RELATIONSHIP WITH GEOMAGNETIC ACTIVITY

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Abstract

Solar wind is a dominant feature in interplanetary space at 1AU. In present analysis we have examing the product of B and V using the averages of events period of HSSW streams. Similarly we have taken the Vmax.Bmax and Ap max during the events period. This analysis has been performed for the ascending and descending phases of solar cycle 23.

We have now done a slight different analysis and taken the Ap (avg) values for each event. We have also calculated the product of Bavg and Vavg for each event. Result of present analysis suggest that the product of V and B (total interplanetary electric field) is very effective in large scale geomagnetic disturbance.

P-66

"XRD AND FTIR INVESTIGATION OF Cu (II), Co (II), Ni (II) AND Fe (II) SCHIFF BASE COMPLEXES''

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Abstract

The Schiff base of transition metal i.e., Cu (II), Co (II), Ni (II) and Fe (II) complexes were synthesis by chemical root method. The samples were analyzed by X-ray diffraction (XRD), and Fourier Transform Infrared radiation analysis (FTIR). XRD analysis shows that sample is crystalline in nature and having particle size and lattice parameter. FTIR for finding the molecular orbital's bands. All experimental work has been done at UGC-DAE, DAVV, Indore (MP)

P-67

NEAR UV TO GREEN CONVERTED LED'S BY COATING EUROPIUM ACTIVATED CALCIUM ZINC CHLOROSILICATE PHOSPHOR

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Abstract

Solid state lighting based on high-brightness LEDs' has emerged as a new potentially revolutionary technology that could save up to half of energy used for lighting applications[1]. White LEDs, based on blue LED chips coated with a yellow emitting phosphor (YAG:Ce), were first reported in 1997[2]. The blue chip/YAG:Ce system has many advantages. But the lamps fabricated in this manner give a poor colour rendering because the resulting light is typically deficient in the green and red colours. There are two approaches which are being followed to overcome this problem. In the first approach, white LEDs are made by coating blue chip with yellow emitting phosphor like YAG:Ce. The second approach uses near ultraviolet (n-UV) emitting LED with a mixture of high efficiency red, green and blue emitting phosphors[3], analogous to the fluorescent lamp. This method yields lamps with better colour rendition. It is therefore necessary to develop phosphors with near UV excitation and emission in one of the primary colors.

Synthesis and characterization of green emitting, near UV excitable europium activated calcium zinc chlorosilicate phosphor are described here. Polycrystalline Calcium Zinc Chlorosilicate was prepared by a solid-state reaction, following recipe given by Lu et al[4]. The phosphor in desired quantity was dispersed in a transparent silicone resin (Wells Electronic Materials Company, 5012-2A and 5012-2B), and coated on LED chip (CREE 400 nm). Emission spectra were recorded on USB-2000 fiber optic spectrofluorimeter. Fig.1 shows the EL spectra of near UV LED coated with calcium zinc chlorosilicate phosphor, curve 5 represents total conversion of near UV (400nm) to green (500 nm), which can be useful as a green diode or can serve as one of the component for white LED.

P-68

Isotope effect in alkali metal intercalated fullerenes: Rb_3C_{60}

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Abstract

The studies of the superconducting properties of fullerenes are briefly reviewed. Theoretical calculations of the electron - phonon coupling, in particular for the intermolecular and intramolecular phonons, are discussed extensively. The calculations are compared with coupling constants deduced from a number of different experimental techniques. Estimates of the Coulomb pseudo potential μ^* and isotope exponent α describing the effect of the Coulomb repulsion on the superconductivity, as well as possible electronic mechanisms for the superconductivity, are reviewed. The influence of inter and intramolecular phonons on the nature of pairing mechanism and the superconducting state parameters of alkali metal intercalated fullerenes is investigated using the strong coupling theory. It is shown that the electrons in the unfilled band of C_{60} develops due to intercalation of alkali metal distort the

Rb_3C_{60} lattice and yield low energy intermolecular vibrations. The incorporation of the intramolecular phonons in the transition temperature enhances to about 33 *K*.

P-69

Bioluminescence

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Abstract

Bioluminescence is a phenomena of luminescence by biological organisms. It occurs by an enzyme-catalyzed reaction, wherein the pigment luciferin is oxidised by the enzyme luciferase, and light is emitted. This phenomena is exhibited by many living organisms of different groups viz. algae, fungi, bacteria, jelly fish, etc.

P-70

Iridium based emitter materials for phosphorescent organic light emitting devices

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Abstract

We have synthesized series of new phosphorescent cyclometalated iridium (III) complexes Ir (Br-DPQ)$_2$(acac), with 2-(4-Bromo-phenyl)-4-phenyl-quinoline (Br-DPQ) ligand and Ir(Cl-BrDPQ)$_2$ (acac) with 4chloro 2-(4-Bromophenyl)-4-phenyl quinoline (Cl-BrDPQ) ligand. Synthesized complexes and ligands were characterized by X-ray diffraction, elemental analysis, infrared spectroscopy (FTIR) and thermal analysis (TGA/DTA, DSC). UV-vis absorption and emission spectroscopy. Photoluminescence (PL) emission peaks of Br-DPQ and Cl-BrDPQ in different solvents such as chloroform, dichloromethane, THF, acetic acid and formic acid. is between 425 to 460 nm The metal complex display pure red luminescence in solution and in powder states in the range of λmax 615-630 nm. The iridium metal complex Ir(Br-DPQ)$_2$(acac) where (Br-DPQ=2-(4 Bromo Phenyl)-4 Phenyl quinoline shows strong ^{1}MLCTand ^{3}MLCT absorption peak at, 227, 265, 283, 346, and 432 nm in tetrahydrofuran (THF) solution and Ir(Cl-BrDPQ)$_2$(acac) where (Cl-BrDPQ)=4chloro2-(4-Bromo phenyl)-4-phenyl quinoline shows strong ^{1}MLCTand ^{3}MLCT absorption peak at, 262,330,438,476,505,535 nm in dichloromethane solution. It is proposed that the synthesized iridium complexes may be efficiently used as the emissive dopants in Phosphorescent Organic Light-Emitting Devices PhOLEDs. It is promising candidates for potential applications in Phosphorescent organic light-emitting diodes PhOLEDs, light-emitting electrochemical cells and solid-state organic lighting applications.

P-71

Nanocarb Filtres *vs* regular RO filtres

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Abstract

NanoCarb filters perform throughout their service life, which ends when the filter no longer permits water to pass.They are simple and safe. Regular carbon block matrix filters are manufactured through the continuous extrusion method. This method produces carbon block material with ratings of 1 to 20 micron(s). These filters are rarely identified as either nominal or absolute. These carbon block types are then wrapped (covered) with a layer of absolute membrane material in order to then claim to be 1.0 to 0.5 to 0.2 micron absolute. So the actual viral barrier is assured by a thin membrane material which is put under full force of the water entry. These are merely attempts to delay the inevitable passage of micro-organisms. Regular carbon block filters generally have a notice on the label in very small print indicating that "the filter should not be used where the water may be of micro-biologically unknown quality".Nanocarb filters have a radial matrix thickness rated at 0.45 microns absolute.This means bacteria,viruses ,cists and other micro organisms cannot pass through. It is manufactured by sintering a coconut carbon powder bound by micro-particles of food grade polymer (gur). This precision batch process produces a carbon block material that is very dense, this would explain why a 10" NanoCarb filter actually weighs in at a hefty 1.50 lbs. This carbon density, bound by the micro polymers, forces water through restricted avenues in the carbon matrix. With an unequaled and generous radial depth of 7/8", and NanoCarb's absolute rating of 0.45 micron, NanoCarb means no bacteria and viruses. Such organisms simply cannot make their way through every nick and cranny to then pass through. They get caught inside the filter and eventually, unable to grow because of such tight quarters, most will simply die. Hence, and not surprisingly, Polio virus (the smallest known virus) lab testing has shown during a six month study that no passage was evident under normal, on/off real life conditions. Also, since the NanoCarb system does not waste water like reverse osmosis does (5:1 ratio), the prefilters will not be over taxed. What you consume is what is filtered, when you wish to consume. So all filters last much longer.

P-72

5d → 4f transition of Ce^{3+} ions in $Na_{15}(SO_4)_5F_4Cl$ halosulphate phosphor

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Abstract

Traditionally, inorganic materials have played an important role in the detection and visualization of high-energy radiation. Applications in medical diagnostics and dentistry are only a few examples in which inorganic scintillators are used. Ce^{3+} is a low cost material, which can provide strong absorption of UV and an efficient conversion to longer wavelengths. Considering that halosulphate phosphors can be easily prepared by wet chemical method and large number of sulphates with well characterized structure is known, it was decided to study the emission of Ce^{3+} in halosulphate materials. The luminescent properties of Ce^{3+} compounds have been of considerable interest in recent years. Photoluminescence (PL) of Ce^{3+} ion in $Na_{15}(SO_4)F_4Cl$ phosphor prepared by solid state diffusion method is reported in this paper. The phosphor is studied for its photoluminescence (PL) characteristic. Photoluminescence excitation spectra of $Na_{15}(SO_4)_5F_4Cl:Ce^{3+}$ phosphor observed at 247 nm with a prominent shoulder around 230 nm, 260 nm and 290 nm The emission spectra of Ce^{3+} show dominant peaks at 341 nm for the same excitation of 247 nm due to 5d→ 4f transition of Ce^{3+}. The aim of this study is just to report preliminary and qualitative results, related to PL behavior of this type of material. Further study should be carried out to understand the mechanism of the occurrence of PL in this material.

P-73

POLYMER NANOCOMPOSITE ELECTROLYTES

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Abstract

Solid Polymer electrolytes (SPEs) formed by dissolving salt or acid in macromolecule typically PEO, PPO, PVDF have received much promising materials for electrochemical device application such as batteries, fuel cells, supercapacitors, hybrid power sources, display devices and sensors. The area of polymer electrolytes has gone through various development stages such as from dry solid polymer electrolytes system to plasticized gels rubbery to micro/nano composite polymer electrolytes. As it is well known solid polymer electrolytes (SPEs) have several advantages over the liquid, gel counterpart such as desirable shape mouldability, free from leakage, mechanical strength and flexibility of design thereby permitting miniaturization.The polymer gel electrolytes incorporating organic solvents, exhibit room temperature ionic conductivity as high as 10^{-3} S/cm while dry SPEs still suffer from poor ionic conductivity lower than 10^{-5} S/cm. The ionic conductivity of SPEs are strongly affected by various factors such as (i) crystallinity of material (ii) simultaneous cation and anion

motion (iii) ion pair formation. These factors reduce the cationic conductivity therefore this act as a barrier for potential application.

To overcome these problems, the realization of single ion conduction is fascinating is alternative. Recently an innovative approach was made to use inorganic nano particle such as SiO_2, nano ferrite powder TiO_2 etc based nano composite to reduce crystallinity of the material. Other most successful approache is to increase amorphous nature and hence ionic conductivity of SPEs by incorporating suitable plasticizer into the polymer electrolytes. The essence of plasticization is to enhance the conductivity of solid polymer electrolytes using low molecular weight and high dielectric constant additives such as propylene carbonate (PC), ethylene carbonate (EC), polyethylene glycol (PEG) etc. These additives amorphous content of the polymer matrix and tend to dissociate ion-pairs into free cations and anions thereby leading to an overall enhancement in conductivity.

P-74

Photoluminescence in $NaMgSO_4Cl$ activated by cerium

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Abstract

Alkaline-earth sulphates activated with rare earth ions are known as phosphors for use in thermoluminescence dosimetry, imaging plates, and thin film electroluminescence displays. Alkaline-earth sulphates activated RE^{3+} ions are promising candidates for optical information storage. $NaMg(SO_4)Cl$: Ce mixed sulphate phosphor for different concentrations has been prepared by wet chemical method and characterized for its photoluminescence study. It is clear that for 0.5 mole % concentration of the phosphor, highest intensity is observed (PL emission). PL emission spectra of above phosphor show Ce^{3+} emission due to 5d $\rightarrow$ 4f transition of Ce^{3+} ion. The emission spectra of Ce^{3+} show dominant peaks at 346 nm for an excitation of 270 nm due to 5d$\rightarrow$ 4f transition of Ce^{3+}. In this host very low concentration of cerium is used. PL emission spectra has been reported first time in present (hosts) halosulphate phosphor. The aim of this study is just to report preliminary and qualitative results, related to PL behavior of this type of material. Therefore the new route opens for investigation of new halosulphate materials. Further study should be carried out to understand the mechanism of the occurrence of PL in this material. The detail PL characterization should be investigated.

P-75

Physical and Chemical Properties of Impurity Doped II-VI Semiconductor Nanomaterials

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ABSTRACT

The physical and electronics properties of manganese doped II-VI semiconductor nanocrystals are reviewed. Several semiconductor host materials such as CdS, ZnS, ZnSe and CdSe have been used for Mn-doped nanocrystals. The materials prepared by chemical route technique at room temperature. The nanocrystals exhibit the "quantum size effect" which results in unique characteristics different from host materials. The present paper describe synthesis of CdS:Mn and ZnS:Mn nanocrystals and analysis of their absorption spectra in uv-visible region. The particle size was estimated at 2 nm to 20 nm. In this size regime the optical properties of the particles are governed by the size quantization effect. All nanocrystals structure synthesized being to the cubic crystal structure. Some applications of this class of materials are outlined.

P-76

The Influence of FLR Corrections with Finite Electrical and Thermal Conductivities on the Magnetogravitational Instability of Hall Plasma in the Presence of Rotation.

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Abstract

The problem of self-gravitational instabiliuty of an infinite homogeneous medium is investigated taking into account the finite electrical and thermal conductivity, the effect of finite ion Larmor radius (FLR) and Hall current. A general dispersion relation is obtained from the linearized set of equations. The particular cases of the effect of rotation along and perpendicular to the direction of the magnetic field are considered. The stability and instability of the medium are discussed. When the axis of rotation is along the magnetic field, rotation decreases the Larmor radiuswhich depends upon the critical wave number. The adiabatic sound velocity isreplaced by isothermal one due to thermal conductivity in both the direction. When axis of rotation is perpendicular to the magnetic field, we find that electrical conductivity reduces the effect of magnetic field. Hall current does not change the condition of instability in longitudinal direction and it does not appear in transverse mode of propagation.

P-77

Luminescence Properties of UV Excited Strong Green Emitting Phosphor $NaAlO_2$: Tb

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Abstract

Sodium Aluminate ($NaAlO_2$) polycrystalline Photo luminescent phosphor doped with rare earth (Tb^{3+}) elements has been synthesized by solution Combustion Synthesis. The prepared sample was characterized by using XRD and FTIR Techniques. The photoluminescence measurement was done on HITACHI- F7000 fluorescence spectrometer. The PL and PLE spectra indicate that the main emission wavelength of $NaAlO_2$: Tb is at 544 nm for 236 nm Excitation.

P-78

Combustion Synthesis and Photoluminescence of UV emitting Phosphor $KCaBO3:Pb^{2+}$

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Keywords: Borate, Red Phosphor, Combustion synthesis, Photoluminescence.

Abstract

The powder samples of $KCaBO_3:Pb^{2+}$ have been prepared by a novel method which is slight variation of solution Combustion Synthesis Method. The synthesis is based on the exothermic reaction between the fuel and Oxidizer. The powder XRD pattern of the powder samples was compared with ICDD file and found in agreement. The photoluminescence properties of $KCaBO_3:Pb^{2+}$ have been investigated with the help of Hitachi F-7000 Flurospectrometer. In $KCaBO_3:Pb^{2+}$, intense UV emission of Pb^{2+} at 335 nm have been observed under UV excitation of 260 nm.

P-79

"SYNTHESIS AND CHARCTERIZATION OF $BaTiO_3$ HIGH-K NANOMATERIAL"(review)

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- **Abstract**
- Synthesis of Cubic barium titanate(BaTiO3) powder by heating barium titanyloxalatehydrate(BTO) precursor in microwave heating system in air . Heating BTO in microwave yielded tetragonal form of BaTiO3.

P-80

Sheer Elasticity of Orientationally Disordered $(NH_4Br)_x(KBr)_{1-x}$ Mixed Crystals

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Abstract

An enormous amount of research has been devoted in the recent past to investigate the static and dynamic behavior of the mixed molecular crystals. Most of the experimental and theoretical studies are focused on the orientational disorder and glassy behaviour of these materials. They represent a new class of disordered materials which serve as a conceptual link for an understanding of the dynamic processes in glasses. When tetrahedral NH_4^+ molecules in ammonium bromide are statistically diluted by spherical K^+ions, the mixed crystals $(NH_4Br)_x(KBr)_{1-x}$ exhibit an orientational glass state at low temperatures. Mixed crystals (NH4Br)x(KBr)1-x possess rocksalt (NaCl) structures at room temperature and over certain concentration (x) range. This NaCl phase is characterized by a dynamical disorder of the NH_4 molecules. In the dynamically disordered phase, distortions are introduced due to non-equivalence of N-H bonds, which induce elastic quadrupolar moments of NH_4^+ in $(NH_4Br)_x(KBr)_{1-x}$ mixed systems. Although the average symmetry of these crystals is cubic, but the orientational disorder locally breaks the cubic symmetry and the anomalous behavior of sheer elastic constant C_{44} is observed. The reason for the same has been attributed to the coupling of rotator function to the long wavelength acoustic displacements, popularly known as the translation-rotational (TR) coupling.This theoretical approach is motivated from the anomalous softening in sheer elastic constant C_{44} found at lower temperatures due to translation-rotational (TR) coupling. In order to depict the temperature variations of SOECs of the orientationally disordered ammonium halide mixed crystals we have applied the extended three body force shell model (ETSM). Earlier it has been applied successfully to explain the elastic, thermal and phonon properties of the orientationally disordered ammonium halides and their alkali halide mixed crystals.

P-81

Structural Phase Transition in $DyP_{1-x}As_x$ Alloys at High Pressure

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In the present paper, we have investigated the structural stability, structural properties and pressure induced phase transition ($B1 \rightarrow B2$) of $DyP_{1-x}As_x$ alloys by using three body force potential ($TBFP$) model calculation with modified approach. The more accurate description of inter ionic spacing (r_0) of these alloys confirms that the interactions considered in the present modified computation approach are capable of correctly predicting the minimum cohesive energy (U) of $DyP_{1-x}As_x$ alloys for both B1(B2) type phases. The computed transition pressures (P_T) are 58.9, 57.4, 55.9, 54.3, 52.8 GPa for DyP, $DyP_{0.75}As_{0.25}$, $DyP_{0.50}As_{0.50}$, $DyP_{0.25}As_{0.75}$ and $DyAs$ compounds, respectively. The result observes a linear variation of inter ionic spacing (r_0), cohesive energy (U) and transition pressure (P_T) as a function of As composition in $DyP_{1-x}As_x$ alloys, under the compression. The computed results for the end point members of inter ionic spacing (r_o) and structural phase transition (P_T) of binary DyP, $DyAs$ and their ternary compound $DyP_{1-x}As_x$ are in agreement to their available theoretical and experimental data. The Born criterion for stability is found to be valid in $DyP_{1-x}As_x$ alloys when we considered the different input parameters to generation of model parameters.

P-82

Nanostructured materials : An Overview

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Abstract

Strictly speaking, a *nanostructure* is any structure with one or more dimensions measuring in the nanometer (10−9m) range. Nanostructured Materials are a new class of materials which provide one of the greatest potentials for improving performance and extended capabilities of products in a number of industrial sectors, including the aerospace, tooling, automotive, recording, cosmetics, electric motor, duplication, and refrigeration industries. Encompassed by this class of materials are multilayers, nanocrystalline materials and nanocomposites. Their uniqueness is due partially to the very large percentage of atoms at interfaces and partially to quantum confinement effects. Nanostructured materials may be defined as those materials whose structural elements - clusters, crystallites or molecules - have dimensions in

the 1 to 100 nm range. The explosion in both academic and industrial interest in these materials over the past decade arises from the remarkable variations in fundamental electrical, optical and magnetic properties. A biomaterials which are matters such as surface, or construct that interact with biological system. A biometrical comes under the specification as the size of nanoscale. It has vast applications in medicine , biology, chemistry, tissue engineering and material science. In the discussion of biomaterials, certain aspects such as biomineralization, nanosized particle(magnetosome), magnetotaxis,magnetoception. In nature on a super cellular scale ,the moll-usca formation is based on the biomineralization .Magnetosome crystals are typically 35-120 nm long , which makes them single domain crystals have their maximum possible magnetic moment per unit volume. Magnetotaxis bacteria orient to the earth's magnetic field even when they are dead. Magnetoception is a sense which allows an animal to detect a magnetic field to perceive direction , altitude or location .The home piegions probabely use tiny magnetic particles in their beak to sense our planet's magnetic field. Self-assembly is the most common term in use in the modern scientific community to describe the spontaneous aggregation of particles without the influence of any external force .Biomaterials have so many applications such as joint replacement, bone plates, bone cement, heart valves, contact lenses and breast cancer etc.

P-83

Events wise analysis of high speed solar wind stream with interplanetary Cosmic rays and geomagnetic parameters during solar cycle 23

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Abstract

In solar terrestrial studies high speed solar wind stream produce significant effect in interplanetary space. We have studied the effect of individual HSSW streams on geomagnetic field. We have also considered along with HSSW stream, the plasma density of solar wind, IMF Bz ,geomagnetic Dst. Values and daily count rates of cosmic rays.In this analysis we have taken the different events of ascending and descending phase of solar cycle 23 and also for whole solar cycle 23.

We have found the significant changes in almost every geomagnetic cosmic rays, HSSW streams and interplanetary parameters during events wise period of solar cycle 23 The observational data helped in establishing much useful statistical correlation among HSSW streams and geomagnetic parameters.

P-84

CHEMISTRY IN NANOSCIENCE AND TECHNOLOGY

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Nanotechnology is the science of the extremely tiny. It involves the study and use of materials on an unimaginably small scale. Nano refers to a nanometer (nm). One nanometre is a millionth of a millimeter or about one eighty thousandth the width of a human hair.

Nanotechnology describes many diverse technologies and tools, which dont always appear to have much in common! Therefore it is better to talk about nanotechnologies, in the plural.One thing that all nanotechnologies share is the tiny dimensions that they operate on . They exploit the fact that, at this scale, materials can behave very differently from when they are in larger form. Nanomaterials can be stronger or lighter, or conduct heat or electricity in a different way. They can even change colour ; particles of gold can appear red , blue or golden , depending on their size. These special attributes are already being used in a number of ways, such as in making computer chips, CDs and mobile phones. but researchers are progressively finding out more about the nanoscale world and aim to use nanotechnologies to create new devices that are faster ,lighter, stronger ot more efficient. Nanotechnologies are widely seen as having huge potential in areas as diverse as healthcare, IT and energy storage. Government and businesses across the world have started to invest substantially in their development. However, alongside this excitement some people have started to ask how these technologies will contribute to shaping the world we live in. Some nanotechnologies have been around for hundreds of years; for example nano-sized particles of gold and silver have been used as coloured pigments in stained glass since the 10^{th} century AD.Many chemicals and chemical processes have nanoscale features . Chemists have been making polymers, large molecules made up of nano-sized components , for many decades. Computer chips have nano-sized features etched in to their surface , and nanotechnologies have enabled computers to be made smaller and faster over the last thirty years. More recently, researchers have produced nanosized wires and tubes . nanowires have remarkable optical , electronic and magnetic properties , so its hoped they will prove useful in stroing

computer data . Carbon nanotubes may lead to new building materials , being much stronger and lighter than steel .Nanoparticles –tiny particles with special properties- have also found some areas of application nanoparticles of titanium dioxide have been added to some suntan lotions and cosmetics. These tiny particles are transparent on the skin and can absorb and reflect ultra- violet rays.In contrast to their use in cosmetics, where they are free to move around nanoparticles can also be fixed in to layers on surfaces , to give them new properties . Tiny particles of titanium dioxide, for example, can be layered on to glass to make selfcleaning windows – windows wich repel water and use sunlight to break down dirt, so the rain washes it away and the glass is left pristine

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P-85

FRACTO-MECHANOLUMINESCENCE INDUCED BY SLOW DEFORMATION OF FLUORESCENT AND PHOSPHORESCENT CRYSTALS

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Abstract

The present paper gives study of Fracto-mechanoluminescence induced by slow deformation of fluorescent and phosphorescent crystals. In slow deformation of a crystal, the number of ML pulses emitted indicates the number of cracks moved in the crystal. Thus, there is one-to-one correspondence between the number of cracks formed and the number of ML pulses emitted during the deformation of crystal. The study of fracto-ML gives important information that the number of cracks increases linearly with the deformation of crystals and the area of newly created surfaces at slow strain increases linearly with the strain of crystals.

P-86

Frequency dependent Electrical Impedance Spectroscopy of Biological Tissues at various Temperatures [30 ^{0}C to 150 ^{0}C]

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Abstract

The aim of this study was to investigate the Electrical Impedance Properties of Biological tissues (bones and scales) ex vivo using Electrical Impedance Spectroscopy (EIS). Bones and scales were harvested from two fish catla-catla (cytriniae) and common carp (cyprinus carpio), their electrical impedance were measured using a Impedance Analyzer and LCR meter. The resistance (Real Z' ohm) and the reactance (Im Z") magnitudes and hence the Cole Cole (Real Z' v/s Im Z") plot are different for the different Bones and Scales samples. The results confirm the close relationship between the structure and the functional characteristic. These also very for the different Biological tissues studied. The impedance values were higher at low frequencies compared to those at high frequencies. This study is of practical interest for Biological application of electrical pulses, such as electroporation whose efficiency depends on cell type and its electrical impedance characteristics.

P-87

Temperature dependence of Biological tissues complex permittivity at different frequencies

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Abstract

Overviews of polarizing mechanisms with an emphasis on dipolar materials as the investigation are regarded. Experiment apparatus is presented with giving its dielectric properties as well as the complex permittivity. The experimental part is aimed at temperature dependence of complex permittivity measurement of fish biological tissues (Bones and Scales) with different properties. Experimental results are presented graphically with the commentary for courses of particular tissues,

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P-88

Dielectric properties of Biological tissues (*Bones and Scales*) at room temperature.

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Absract

In our study describes a method for determining the dielectric constant of a Biological tissue. A suitable way to make a dielectric measurement that is nondestructive techniques for the biological tissues (Bones and Scales) and broadband at the frequency range(10 Hz to 10 MHz) of the impedance analyzer and LCR meters is to use a dielectric properties of fish biological tissues(Bones and Scales) under investigation and also a calibration technique and the behavior of discrete elements in an equivalent circuit of an analyzers. Information about the magnitude and phase of the dielectric constant and dielectric loss on the interface between a Biological tissues (Bones and Scales) sample and a measurement is applied with the aid of

an electromagnetic field. The different biological tissue measurement modeling is compared presented.

P-89

Low frequency Dielectric Properties of Biological tissues: A Review and New Insights

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Abstract

Low-frequency dielectric properties of Biological tissues, characterized by α- dispersion and β-dispersions, are reviewed with emphasis on polarization mechanism. A new mechanism association with Biological tissues the polarization phenomenon is discussed. Which always causes problem with low-frequency dielectric measurements, is also discussed?

P-90

Tb^{3+} Luminescence in $NaCa_{0.5}Al_2B_2O_7$ Inorganic Borate Phosphor

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ABSTRACT

In the present work we report the preparation and photoluminescence characteristics of Tb3+ doped borate phosphor $NaCa_{0.5}Al_2B_2O_7:Tb^{3+}$. The fine polycrystalline powder samples of $NaCa_{0.5}Al_2B_2O_7:Tb^{3+}$has been prepared by a novel combustion technique. This method is based on the exothermic redox reaction involves, metal nitrates and organic fuel (urea). The formation of samples was confirmed by powder XRD technique. The photoluminescence properties of borate phosphors have been investigated on fluorescence spectrometer (F-7000). The PL excitation spectra of $NaCa_{0.5}Al_2B_2O_7:Tb^{3+}$ consists of one band peaking at 232 nm. The emission spectrum monitored at 232 nm excitation consists of bands peaking at 488 nm, 543 nm, 584 nm and 522nm.

P-91

Variation of Geomagnetic Activity Kp index with Solar and Solar wind Plasma Parameters During Period 2000-2007

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Abstract

We have studied the relation between yearly average of geomagnetic activity parameter Kp indices and various solar and solar wind plasma parameters e.g sunspot numbers (SSN),solar flare index(SFI),coronal index (CL) solar wind velocity, density and interplanetary magnetic field observed during the period of 2000-2007.It is observed that that yearly average of Kp index is well correlated with yearly average of sunspot numbers, solar flare index coronal index and solar wind plasma parameters solar wind plasma velocity, density and interplanetary magnetic fields.. We have found positive correlation with correlation coefficient 0.46 between yearly average of Kp index and solar flare index, 0.48 between yearly average of Kp index and sunspot numbers and 0.43 between yearly average of Kp index and solar coronal index. From the analysis of yearly average of Kp index and solar

wind plasma parameters, we have obtained negative correlation with correlation coefficient -0.82 between yearly average of Kp index and solar wind plasma density, positive correlation with correlation coefficient 0.85 between yearly average of Kp index and solar wind plasma velocity and positive correlation with correlation coefficient 0.84 has been found between Kp index and interplanetary magnetic field.

P-92

Plasma techniques for nanotechnology

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ABSTRACT

Recently developed technique for synthesis large quantities of metal oxide nanoparticles is presented. Metal samples in the form of thin wires or foils are exposed to low-pressure oxygen plasma with a low neutral gas kinetic temperature, high density of neutral oxygen atoms exceeding $10^{20}m^{-3}$ and a rather low density of charged particles with the order of 10^{16}m-3. Oxygen radicals readily interact with metal foils forming metal oxide nanoparticles of various different size and shape, depending on the flux of O atoms onto the surface. The technique is demonstrated for the case of niobium foils. Rather small flux of O atoms causes formation of spherical grains that accumulate on the surface in cauliflower-like objects. Increased O atom flux causes formation of rather rectangular features, which may form algae-like structures, while at high flux dense bundles of nanowires are grown on the surface. Nanoparticles of metal oxide grow spontaneously on the surface of metal foils exposed to weakly ionized highly dissociated oxygen plasma. The phenomenon has been described for the case of niobium oxide. We concluded that the shape and size of nanowires depend on the flux of O atoms onto the surface of the sample.

P-93

TRANSIENT RESPONSE OF ORGANIC LIGHT EMITTING DIODES

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ABSTRACT

In this paper a theoretical approach to the charge carrier recombination and transient electroluminescence of a bilayer Organic Light Emitting Diode (OLED) is described . It emphasizes the role of the interface between Hole Transporting Layer (HTL) and Electron Transporting Layer (ETL) inside the OLED . Interfacial layer allows both electrons and holes to transport, the structure of such a layer is difficult to analyze in its original place and forms, and can be visualize as interpenetrating hole and electron transporting polymer chains or cord stick out from a surface on both sides towards the bulk of ETL and HTL, respectively. Under electrical field, holes or electrons can freely migrate along their respective chains, without any significant energy barrier, well inside the ETL or HTL; whereby they accumulate, due to the existence of energy barriers for hole (electron) migration from HTL (ETL) to ETL (HTL).In this report, kinetic equations which govern the time, carrier densities and electric fields inside the device is calculated numerically, considering charge carrier densities as a function of applied voltage, transient response of light emission is calculated . From the evolution of electric fields and charge densities, the existence of unipolar and bipolar injection thresholds is shown, which determine three operating modes of the device; each mode corresponds to an accumulation of charge carriers in specific parts of the structure. Calculated external current as a function of applied voltage shows clearly that the device can be seen as two parallel plate capacitors below its EL threshold. This capacitive behavior of the device is discussed . A relation between the External, Leakage and the Recombination current has been investigated.

P-94

Silicon Based Moleculer Nanotechnology

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ABSTRACT

One potential application of molecular nanotechnology is the integration of molecular electronic function with advanced silicon technology. This paper reports a theoretical approach to understand the mechanism of individual organic molecules on H-passivated Si surfaces . Molecular electronics is currently one area being studied as a potential successor to conventional silicon-based electronics technology. One aspect of molecular electronics is the fabrication of devices whose function is governed by single molecules. Though quite promising single molecule devices present fundamental new challenges thereby placing estimates of their mainstream applications around the middle of the 21st century. Nevertheless, tools are available to begin exploring this fascinating field. This paper describes a new theoretical approach for understanding the kinetics of charge carriers in the arrays of individual molecules with atomic precision on the technologically important Si surface. The merger of molecular electronics with silicon-based technology represents a hybrid approach with potential nearterm applications. The approach described in this paper is that of utilizing the chemical contrast between clean and hydrogen passivated Si to create templates for molecular adsorption.

P-95

Size Dependence Effective Band Gap in Silicon Nano-film

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Abstract

In the present paper we have studied the size dependence effective band gap of semiconductor Silicon (Si) nano-film. The band gap is one of the most significant electronic parameters of semiconductor material. The band gap of semiconductor dependents on the temperature, pressure, composition, number of atoms as well as size of the solid. In this paper the effective band gap for Silicon nano-films have been calculated at different size using input parameters such as lattice constant (a), energy band gap (E_g), dielectric constant ($\in$) and effective mass of electron (m_e^*) and hole (m_h^*) of the bulk Si materials. The effect of size on band gap of Si semiconductor nano-film is reported. Result shows that the quantum confinement increases the band gap as size of nano-film decreases, more abruptly with a smaller size. It is also seen that the higher temeprature appears to lead to proportionally lower effective band gap of Si nano-film.

P-96

Energy source with emphasis on photoelectrochemical solar cell based on nanocrystalline CuSe thin film

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Abstract

.The development of thin film solar cell is an active area of research at this time. Much attention has been paid to the development of low cost high efficiency thin film solar cell. The new and emerging technology is 'nano crystalline thin film technology.

Nanocrystalline thin films of copper selenide have been grown on glass and tin doped-indium oxide substrates using chemical method. At ambient temperature, golden films have been synthesized and annealed at 200 ºC for 1H, and were examined for their structural, surface morphological and optical properties by means of X-ray diffraction (XRD), scanning electron microscopy and UV–vis spectrophotometry techniques, respectively. Conductivity in copper selenide thin films make it a suitable candidate for solar cells. The investigation may be useful in obtaining efficient, stable and low cost solar cell to compete with the existing technology.

P-97

Events wise analysis of high speed solar wind stream with interplanetary Cosmic rays and geomagnetic parameters during solar cycle 23

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Abstract

In solar terrestrial studies high speed solar wind stream produce significant effect in interplanetary space. We have studied the effect of individual HSSW streams on geomagnetic field. We have also considered along with HSSW stream, the plasma density of solar wind, IMF Bz ,geomagnetic Dst. Values and daily count rates of cosmic rays.

In this analysis we have taken the different events of ascending and descending phase of solar cycle 23 and also for whole solar cycle 23.

We have found the significant changes in almost every geomagnetic cosmic rays, HSSW streams and interplanetary parameters during events wise period of solar cycle 23

The observational data helped in establishing much useful statistical correlation among HSSW streams and geomagnetic parameters.

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NANOPARTICLES AND THIER USES IN HUMAN BODY

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Abstract:

Nanotechnology and nanoscience refers to research and development of technologies at the atomic, molecular, or macromolecular levels. Nanotechnological research provides a fundamental and basic understanding of phenomena and materials, which are range between 1 nm and 100 nm. These understandings enable the creation and use of structures, devices and systems that have novel properties and functions because of their extremely small size. Nanoparticles have emerged as tools of imaging features within the brain. It may also significantly improve the prevention, detection, diagnosis and treatment of diseases and adverse medical conditions. An advancements in nanotechnology, one could envision a world, where diseases are diagnosed and prevented or treated at early stages. Implanted nanotechnological materials would become part of the body and therapeutic agents would be delivered in the precise amount and at the site of action where they are needed. Effective detectors of specific molecules can be developed and integrated into compact devices. Such devices can be used to provide rapid information about diseased cells or tissues, and can be used to determine treatment options. Nano devices would be implanted in patients bodies to provide real-time records for monitoring disease progression and therapeutic efficacy. Large quantities of nanoparticulates are manufactured for incorporation into other products, what will be the direct heath effects? What will be their environmental impact on biological systems of the human body.

P-99

Synthesis and Characterization of Nanocrystalline CoS Thin Films

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ABSTRACT

Green coloured Cobalt sulphide (CdS) thin films were deposited by chemical deposition method onto the plastic and titanium (Ti) substrates from an aqueous alkaline both (PH~12) at room temperature (300K). $CoSO_4$ and thiourea were used as Cd^{2+} and S^{2-} sources, respectively. Ethylenediaminetetraacetic acid (EDTA) was used as strong complexing agents. The as-grown films were characterized by Atomic force microscopy (AFM) and UV-vis spectroscopy. Atomic force microscopy of the films exhibit well covered grains of CoS onto substrate. UV-vis spectroscopy of the CoS film shows the nanocrystalline nature of material.

P-100

NANO-STRUCTURAL PHASE MORPHOLOGY OF VINYL POLYMER BASED THIN FILMS

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Abstract

The ever increasing use of polymers in our day to day life has given rise to quest for developing polymeric materials suitable for various applications. The content work describes the synthesis of a novel semi-IPN in the form of hydrogel comprising of polyvinyl alcohol (PVA) and acrylonitrile (AN), in various proportions, by redox polymerization method. Structure formation of the end product in the form of gel matrix has been confirmed by FTIR spectrophotometry that confirms the formation of a physical gel with polymer chains held to each other via hydrogen bonding. Phase morphology of the semi-IPNs in various proportions has been studied with scanning electron microscopy and atomic force microscopy; while X-ray diffraction technique has been utilized to detect the crystalline and amorphous characteristics of the synthesized gels. Their SEM images show single phase morphology with a less rough surface indicating a better compatibility of the content polymers. The AFM images in tapping mode gives a nano-structural insight and the XRD patterns of synthesized gels indicate that the crystallinity in the membrane is mainly due to PVA. The approach seems to be beneficial for various bioengineering and bioindustrial applications.

P-101

NANO-TECHNOLOGY FOR SOLAR ENERGY APPLICATIONS

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ABSTRACT

As the world faces serious energy challenges, the development and implementation of renewable energy technologies become increasingly important. The role nanotechnology, in particular, innovations of nanostructures and nanomaterials, is playing in the development of selected renewable energy technologies. These technologies, based on, (1) Converting the energy of sunlight directly into electricity using solar cells; (2) Converting solar energy into hydrogen fuel by splitting water into its constituents; (3) Storing hydrogen in solid-state forms; and (4) Utilizing hydrogen to generate electricity through the use of fuel cells. It is clear that nanotechnology-enabled renewable energy technologies are starting to scale up dramatically. As they become mature and cost effective in the decades to come, renewable energy could eventually replace the traditional, environmentally unfriendly, fossil fuels. Nanotechnologies provide the potential to enhance energy efficiency across the branches of industry and to economically leverage renewable energy production through new technological solutions and optimized production technologies. In the long term run, essential contributions to sustainable energy supply and the global climate protection policy will be achieved. Here, nanotechnological inventions are brought to bear on each part of the value-added chain in the energy sector.

P-102

Nanofoods: Potential Nutraceutial and dietary exploration of Nanobiotechnology

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ABSTRACT

'Nanofood' has been cultivated, produced, processed or packaged using Nanotechnology techniques or tools, or to which manufactured nanomaterials have been added. Nanoadditives are now found in some margarine/soft drinks/dairy products/sausages, Bakery products, and other processed foods like cereals, breads and beverages are now fortified with vitamins, minerals such as Fe, Mg or Zn, probiotics, bioactive peptides, antioxidants, plant sterols and soy. Some of these active ingredients are now being added to foods as nanoparticles or particles a few hundred nanometres in size. Nano-ingredients and manufactured nanomaterial additives include nanoparticles of Fe or Zn, and nano-capsules containing ingredients like co-enzyme Q10 or Omega 3. Recently the term Nanotechnology is moving out of the laboratory and concern into every sector of food production. Nanomaterials are used in some food/nutritional supplements, many packaging and food storage applications and some agricultural inputs e.g. fertilizers and pesticides. Edible nano-coatings could be used on meats, cheese, fruit and vegetables, confectionery, bakery goods and fast food. They provide a barrier to moisture and gas exchange, act as a vehicle to deliver colours, flavours, antioxidants, enzymes and anti-browning agents, and could also increase the shelf life of manufactured foods, even after the packaging is opened

P-103

Nanotechnology an exciting frontier tools for sustainable agriculture practices and business development

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ABSTRACT

Nanotechnology tools are recently introducing a new array of potentially more toxic pesticides, plant growth regulators and chemical fertilizers commonly increasing our/ farmers support for more sustainable agriculture cultivation systems. By providing new tools for gene manipulation, nanotechnology is also likely to expand the genetic engineering of crops. Nano-based interactive farm surveillance and management systems remain a long way off commercialization. However in their further automation of farm management, ssuch systems may also result in larger scale agribusiness employing ever fewer agri-workers. Nano agrochemicals, formulations are commercially use in development of existing pesticides, fungicides, plant, soil and seed treatments. Nano-particles and emulsions used in agrochemicals are intended to make them more potent for Indian agricultures/crops which directly and indirectly provide a malt angular support for sustainable agriculture practices and business development worldwide.

P-104

Nanotechnology for Energy (Fuel cell, Solar cell)

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Abstract

Nanotechnology, and Nanofabrication, offers a variety of tools to contribute to solving the energy Crisis, since creating materials and devices smaller than 100 nanometers (nm) offers new ways to capture, store, and transfer energy. The level of control that nanofabrication provides could help solve many of the problems that the world is facing related to the current generation of energy technologies, including the array of alternative, renewable energy approaches. Nanotechnology research which can contribute to solving future needs for energy technologies, especially in new generations of solar photovoltaics, the hydrogen economy, The relevant technologies and applications include: solar cells, hydrogen and fuel cells, batteries, improvement of light bulbs, fossil fuel etc with nanostructured materials and nanopowders, isolation materials.more efficient conventional energy production and energy saving for industry as well as consumers.

P-105

Applications of Optical properties of Nanomaterials

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Abstract

Researchers have been proven that nanomaterials show improved properties and performances over bulk materials. The large surface area offered by nanomaterials is advantageous in various nanodevices. One of the major advantages of nanomaterials over bulk crystalline materials is the processibility over large areas at low cost. Overall, the applications of nanomaterials are vast, diverse and fast changing. But optical properties of nanomaterials would be changed the current status of electronics industry.

Nowadays, by taking the advantage of optical properties, both semiconductors and metal nanostructures have been used extensively for chemical and biomedical detection. Among the detection techniques the luminescence based detection is the most popular. The luminescence based detection is highly sensitive, ubiquitous and easy to detect.

Besides detection application, nanomaterials have been explored as therapeutic agents. Concern with use of optical properties of nanomaterials, photodynamic therapy (PDT) medical technique is used for cancer treatment. All over the world researchers have been attempted for preparation of low cost solar cells by using the unique optical properties of nanomaterials. Moreover, by using the optical properties of nanomaterials various electronic elements such as OLEDs have been synthesized for large commercial purpose.

P-106

Comparison of dye-and CdS-sensitized ZnO solar cells

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ABSTRACT

Semiconductor sensitize and dye sensitized solar cells both are considered the most promising photovoltaic devices architecture. The low manufacturing cost and high light to electrical power conversion efficiency make them attractive for producing electricity in large scale.

Chemical bath deposition (CBD) technique is a simple solution approach to synthesis various nanostructure at low-temperature. It provides a low-cost, simple, and large-scale route for growing semiconductor nanostructure directly on the transparent substrate. Thus, it has the great potential of application of metal oxide based photoelectrode in semiconductor-or dye-sensitized solar cell.

In the present paper, we report the two different type architecture of ZnO based solar cells. Thin films of ZnO were synthesized by CBD onto fluorine doped tin oxide (FTO) coated glass substrates by CBD technique. ZnO thin films were sensitized by CdS and a low cost dye Eosin-Y.

For dye-sensitized solar cell (DSSC) application, the dye-sensitized solar cell structure was constructed as FTO/ZnO/Eosin-Y/electrolyte/Pt counter electrode whereas for semiconductor sensitized solar cell construction it was FTO/ZnO/CdS/electrolyte/Pt. The iodide-triiodide solution was used electrolyte in DSSC, whereas polysulfide solution used as electrolyte in semiconductor sensitized solar cell. It was found that semiconductor sensitized solar cell shows superior photovoltaic power output characteristics than dye sensitized solar cells.

P-107

Luminescence studies of lanthanide ions (Eu^{3+}, Dy^{3+}) doped magnesium aluminate phosphor

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Abstract

The doping of lanthanide-ions (Eu^{3+}, Dy^{3+}) in $MgAl_2O_4$ is found to alter its luminescent behavior. Magnesium aluminate doped with lanthanide ions was synthesized using solid state diffusion and combustion synthesis methods. Phosphors prepared through both the methods showed nearly same photoluminescence (PL) properties. X-ray diffraction is used to characterize the sample. The doping of europium in $MgAl_2O_4$: Dy^{3+} phosphor is found to alter its luminescence behavior. Dysprosium doped samples were very sensitive to the presence of europium. In codoped samples, at lower europium concentration of $15x10^{-3}$ mole %, the PL emission of host at 421 nm was dominant while at higher concentration of europium the PL emission of Eu^{3+} at 615 nm was observed. Hence there is a finite possibility of an energy transfer from Dy^{3+} to Eu^{3+}.This paper presents the results of absorption and PL studies made on magnesium aluminate doped phosphors and found that PL is helpful in understanding the process of luminescence.

P-108

Extension of nanotechnology towards multidisciplinary approach

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Abstract

Nanotechnology is an interdisciplinary venture-field that converge science, engineering, and agriculture, livestock and food systems into one. It will raise new science and policy questions and lead to new strategic linkages that will have a major impact on the futures of these nations for decades to come. A renaissance in organismal biology has been sparked by recent conceptual, theoretical, methodological and computational advances in the life sciences, along with an unprecedented interdisciplinary integration with Mathematics, Engineering, and the physical sciences. It can provide new tools for molecular and cellular biology, biotechnology, physiology, genetics, reproduction etc. which will allow researchers to handle biological materials such as DNA, proteins or cells in minute quantities usually nano-liters or pico-liters. Nanotechnology tools like microfluidics, nanomaterials, bioanalytical nanosensors, etc. has the potential to solve many more puzzles related to animal health, production, reproduction and prevention and treatment of diseases. The analysis is based on the NanoBank bibliographic database of 287,106 nano articles published between 1981 and 2004. We perform multifaceted analyses of title words, focusing on 100 most frequent words or phrases (terms). Hierarchical clustering of title terms reveals three distinct time periods of cognitive development of nano research: formative (1981–1990), early (from 1991 to 1998), and current (after 1998). Currently, only 5% of articles are published in dedicated nano-only journals. We find that some 85% of nano research today is multidisciplinary. The case study of the diffusion of several nano-specific terms (e.g., “carbon nanotube”) shows that concepts spread from the initially few disciplinary components to the majority of them in a time span of around a decade. Early period is characterized by the introduction of thin film deposition techniques, while the current period is characterized by the increased focus on carbon nanotube and nanoparticle research. We introduce a method to identify disciplinary components of nanotechnology. It shows that the nano research is being carried out in a number of diverse parent disciplines. Research and development at the nanoscale requires a large degree of integration, from convergence of research disciplines in new fields of enquiry to new linkages between start-ups, regional actors and research facilities. Nanotechnology will have a profound impact, but not in the

immediate future as it is in the early stages of its development and needs to equip scientists, engineers and biologists to work at the cellular and molecular levels for significant benefits.

P-109

Determination of 8-hydroxy-2'-deoxyguanosine, lipid peroxidation and antioxidant enzymes induced by Hydroxyapatite nanoparticles

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The safety and toxicity of nanomaterials are of growing concern despite their significant scientific interest. Their biological activity and biokinetics depends on various parameters. In the present study Hydroxyapatite nanoparticles (HANPs) was synthesized and characterized using standard techniques. The present study also focused on the cytotoxicity, antioxidant defense mechanism, lipid peroxidation (LPO) and 8-hydroxy-2'-deoxyguanosine (8-OHdG) for DNA damage by an *in vitro* approach. It is well known that oxidative stress is involved in diverse biological phenomenon and is caused by the imbalance between reactive oxygen species (ROS) and antioxidant defense system. 8-OHdG is the biomarker to estimate ROS induced DNA damage. Rat blood was used for the detection of 8-OHdG. Similarly liver homogenate (10%) of rats was used for estimating the antioxidant enzymes, LPO and protein content. The antioxidant enzymes evaluated were reduced glutathione (GSH), glutathione reductase (GR), glutathione peroxidase (GPx) and superoxide dismutase (SOD). The results of the study demonstrated that the HANPs has a particle size less than 50nm and is non cytotoxic and did not significantly alter the level of LPO, GSH, GR, GPx, SOD and 8-OHdG. Hence, it can be concluded that the HANPs is non toxic in *in vitro* conditions simulated.

P-110

Combustion Synthesis and Luminescence Properties of UV- irradiated Calcium Alumino Silicate ($Ca_2Al_2SiO_7$) Phosphor

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Abstract

Calcium alumino silicate ($Ca_2Al_2SiO_7$) phosphor was synthesized by combustion method at initiating temperature of 600 ^{0}C, using urea as a reducer. Thermoluminescence, absorption spectra, XRD and FTIR were recorded. The X-ray diffraction pattern indicates that the crystal structure of $Ca_2Al_2SiO_7$ is mainly tetragonal. The absorption spectra shows that the absorption edge is at λ = 230 nm. The TL property of $Ca_2Al_2SiO_7$ phosphor has been investigated for different UV exposure time. The TL intensity increases with increasing the UV exposure time and it is maximum for 5 min UV exposure. Further increasing the UV irradiation time the TL intensity decreases. The Thermoluminescence glow curve has maximum peak at 121^{0}C for 5 min UV irradiation. The TL intensity increase with increase in UV exposure time indicates that the concentration of traps increases with UV exposure time.

P-111

SYNTHESIS, CHARACTERIZATION AND STUDY OF THERMOLUMINESCENCE PARAMETERS OF LANTHANIDE (Er^{3+}) DOPED YTTRIUM OXIDE.

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Abstract

The synthesis and characterization of rare earth (RE) doped yttrium oxide (Y_2O_3) nanophosphors were undertaken in the current work. RE dopants such as Erbium (Er^{3+}) were successfully doped. Trivalent rare earth Er^{3+} ions doped Y_2O_3 nanophosphors were prepared by combustion synthesis method using urea as an oxidizing fuel. The structural properties of Y_2O_3: 1% Er^{3+} nanophosphors were characterized with X ray diffraction(XRD), Fourier Transform infrared spectroscopy(FTIR) and scanning electron microscopy(SEM). The optical Absorption spectra was also studied for pure Y_2O_3 and Y_2O_3:Er^{3+} and band edge (E_g) was calculated. Thermoluminescence (TL) characteristic of the sample for different radiation time was also done and maximum TL intensity was found for 20 minutes exposure time.

P-112

Synthesis, Characterization and Photoluminescence of ZnS:Cu Nanoparticles

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Abstract

In the present work ZnS:Cu nanoparticles were synthesized by wet chemical method using Sodium Hexa Meta Phosphate (SHMP) as a capping agent. The characterization of the sample by XRD, UV Visible Spectrophotometer, Spectroflurophotometer & FTIR spectroscopy has been done. XRD studies shows the phase singularity of ZnS particles having zinc-blend (Cubic) structure and line broadening indicates that average particle size in nano range between 3nm to 8nm. Optical absorption spectra show the blue shift with change in capping agent concentration. FTIR study confirms the presence of element in the samples. Photoluminescence spectra confirm the reveals emission related to copper concentration at fixed excitation wavelength 254nm, the emission peak observes at 420nm and 510nm. 420nm is related to host ZnS and 510nm related to Cu.

nano-particles, etc. have been reported. Various risks involved in using nanotechnology are also discussed because it is believed that the most disruptive future changes may occur as a result of molecular manufacturing, an advanced form of nanotechnology.

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GRAPHENE TECHNOLOGY - AN OVER VIEW

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ABSTRACT

Nanoscale science has presented a new center of interest with material properties. Graphene, the two dimensional form of Carbon provides hopes for revolution in the field of material science and application. Graphene is a real atomic monolayer of carbon atoms organized into a honeycomb lattice. It is only the thinest material ever fabricated with amazing material properties.

Besides its physical properties (Young's Modulus ≈ 1100GPa, thermal conductivity ≈ 5000W/mk and high surface area), it has exceptional electronic properties too, as electron mobility is about 100 times that of Silicon which never falls to zero and it's crystalline structure provides no space for scattering of charge carriers present. These two facts suggest the use of graphene in microchips used in many electronic/ communication systems to get efficiently clear output over the conventional Silicon-based technology.

The process of fabrication of graphene for research grade application is not sufficient to meet the requirement for commercial purposes. Kit, K.S. et al. has proposed the advantage of CVD method over other (Mechanical peel-off, Epitaxial growth and Collidial suspension) processes to get ideal graphene. But a lot of work of researchers is to be needed to explore very unique properties of graphene at large scale for the fabrication of graphene-based nano-devices.

Refrences:- Kit, K.S. et al. – Nature Technology, 10.1038/07719

Roitter, K.A et al.-Nature Material 10.1038/2378

L. Tetard/2009

P-114

PL of Sr_2CeO_4:Dy Phosphor

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Abstract

The present paper reports the Synthesis, Photoluminescence study and other characterizations of Dy doped Sr_2CeO_4 Phosphor. The phosphor was successfully synthesized using Solid State Reaction method at 1200^0C for three hours with 0.5 mol% concentration of Dy. The sample was characterized for X-ray diffraction (XRD), SEM, PL, FTIR and Particle Size Analysis. Rare earth doped matrices have many optical properties because of their special electronic transitions among 4f energy level. Satisfactory red and green commercial phosphors are being produced, but comparable materials for the blue emission are still lacking or not available for practical applications. The blue emitting Sr_2CeO_4 phosphor is receiving the attention of several workers due to low voltage operation for CRT applications and convincing efficiency. At present photoluminescence and other characterizations of Sr_2CeO_4:Dy 0.5% phosphor prepared by Solid State Reaction technique has been reported.

P-115

PL Study of SrS : Eu Phosphor

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Abstract

The present paper reports the Synthesis and Photoluminescence study of SrS Phosphor doped with Eu ions synthesized under reduced atmosphere at 950^0C for one hour. The phosphor was characterized for XRD, SEM,FTIR and particle size analysis The work presented in this Paper consists of the experimental results of the SrS : Eu phosphors synthesized using Solid State Reaction. The present display phosphor requirement are for energy saving lamps of LEDs which are widely used globally. Therefore it is considered the present phosphor synthesis will help the local industry to use the indigenously developed materials. By considering the application potential, the following phosphor was prepared and studied for photoluminescence and characterized.

P-116

Thermoluminescence studies on rare earth doped $K_2Ca_2(SO_4)_3$ phosphors

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In order to have a better thermoluminescencedosimetry phosphors Ce, Dy and Eu doped $K_2Ca_2(SO_4)_3$ phosphors were synthesized by solid state diffusion technique. Thermoluminescence (TL) was recorded using TLD reader. To understand the center responsible for TL emission spectra were also recorded. A main peakaround 120 °C is observed in all the samples. It is found that intensity of the TL glow peak varies with the dopant. Eu is found most suitable dopant to enhance the TL intensity of$K_2Ca_2(SO_4)_3$ system. Spectral study of rare earth doped $K_2Ca_2(SO_4)_3$ shows characteristic emission. Dependence of TL of $K_2Ca_2(SO_4)_3$ phosphors on various parameters as dopant concentration, gamma doses given to the sample, fading over time is studied and it is found that $K_2Ca_2(SO_4)_3$:Eu is suitable for TLD phosphors.