ABSTRACT BOOK

INTERNATIONAL E-CONFERENCE ON RECENT ADVANCES IN MATERIAL SCIENCE AND NANOTECHNOLOGY

(RAMAN-2021)

7th - 9th February 2021

Organised by

Department of Physics, Arts, Commerce and Science College, Maregaon, Maharashtra, India

&

Department of Physics, P. N. College, Pusad, Maharashtra, India

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MESSAGE

I am extremely happy to know that the Department of Physics is organizing an International e-Conference in association with Department of Physics, Phulsing Naik Mahavidyalaya, Pusad on Advances in Material Science and Nanotechnology (RAMAN-2021) on February 7-9, 2021 and bringing out e-proceeding on the occasion. I hope that the conference will be meaningful, purposive, relevant and credible worth remembrance and will be the best platform for dealing with all issues related to the field.

The format of the conference will provide immense opportunities for interaction among the participants and the resource persons and detailed discussion in the conference will motivate the young, budding scientists, research scholars and students.

I convey my best wishes to the organizers and all those who are associated with this conference.

I wish the conference a grand success.

Mr. Jivanpatil Kapse
President
Shetkari Shikshan Sanstha, Maregaon

MESSAGE

I am immensely delighted to know that the Department of Physics is organizing an International e-Conference in association with Department of Physics on Recent Advances in Material Science and Nanotechnology (RAMAN-2021) during February 7-9, 2021 and bringing out e-proceeding to commemorate the occasion.

This conference will provide a unique platform to all the participants to widen their knowledge domains and to explore and exchange new ideas, techniques and models in the area of material Science. It will motivate young scholars and researchers in a meaningful way. It is indeed a fulfilling and enriching experience to organize an event of this scale on e-platform where great minds will come together. The conference will offer opportunity for in depth talks and discussions which will go a long way to help create an academic ambience in the Department and the college.

Further, this conference will also bring together the renowned experts from the core field and other allied areas to a common platform to deliberate on such an important theme and forge linkages and bonds for mutual research benefits.

I congratulate the Department of Physics for organizing RAMAN-2021 and wish them all success in this scientific endeavour.

Dr. A. N. Gharde
Chairman, RAMAN-2021
Principal
Arts, Commerce & Science College
Maregaon

MESSAGE

I am extremely delighted to welcome you to International **e-Conference on Recent Advances in Material Science (RAMAN-2021)** being organized by the Department of Physics, Arts, Commerce & Science College, Maregaon in association with Department of Physics, Phulsing Naik Mahavidyalaya, Pusad during February 7-9, 2021.

This conference will provide an opportunity on a vibrant and dynamic e-platform to all participants to exchange information and new advancements of the concerning fields among scientists, engineers, industrialists, researchers and academicians. The conference is focus mainly on Material Science and potential applications of Nanotechnology in everyday life for the betterment of human society. I hope this conference will provide a unique opportunity for teachers, educators, experts and scholars of higher education from all over the world to convene and share novel ideas on the field and trends in higher education development.

Further, the conference is organized with an aim, to exchange new thoughts and share the latest knowledge in field of material science and Nanotechnology by the eminent experts and to motivate budding Scientist and young researchers. I trust all the participants and delegates would be with some value addition to their current knowledge after attending the conference.

It has been my personal endeavour in a very small way by organizing this conference to highlight the importance of the field. The Proceedings brought out include a number of original research papers received from various regions of the world. It is heartening to note that conference has excellent response. We have received more than 115 full length papers of high standard in addition to keynote address, 4 plenary talk and 9 invited talks by the experts. More than 160 papers will be displayed for interactive oral presentation.

I wish the RAMAN-2021 will be an enjoyable, memorable and productive for the participants. I believe all delegates will benefit substantially from the conference through the presentations of expert speakers and exchanges of ideas with one another.

I am grateful to all the renowned speakers and delegates for their participation that makes this conference possible. I thank the management and all who have contributed in their own way to make this conference a success.

Looking forward for you all to come enhance your experience and to make this conference a success!

Dr. N. R. Pawar
Convener, RAMAN-2021

DR. F. C. RAGHUWANSHI

Dean, Faculty of Science & Technology

SGB Amravati University

MESSAGE

I am pleased that Department of Physics, Arts, Commerce and Science College, Maregaon in Association with Department of Physics, Phulsing Naik Mahavidylaya, Pusad is organizing an International e-Conference on "Recent Advances in Material Science and Nanotechnology (RAMAN-2021) on February 7-9, 2021.

The conference will provide a unique platform for students, academician and researchers in the field of Material Science and Nanotechnology to interact and update themselves with the recent advancements. Novel research is being carried out in this field worldwide and I am sure it will revolutionize the areas of material science.

The conference will also provide immense opportunities for interaction among the participants and the resource person and learning experience for students and academician and enable them to move forward in the field of material science and nanotechnology.

RAMAN-2021's goal is to bring together scientists, researchers and academician from all over the world to present and exchange their knowledge, thoughts and novel ideas relating to the materials. It promotes top level research and to globalize the quality research in general, thus making discussions, presentations more internationally competitive and focusing attention on the recent outstanding achievements in the field of Material Science and Nanotechnology, and future trends and needs.

On behalf of the Conference, it is my pleasure to invite all of the great scientists, academicians, young researchers, Business delegates and students from all over the world to attend the International e-Conference RAMAN-2021 on February 7-9, 2021

I wish the Conference a grand success.

MESSAGE

Dr. Mahavir Singh

Chief Scientist, CSIR-National Physical Laboratory, Dr. K. S. Krishnan Road, New Delhi

Welcome Message

International E-Conference on Recent Advances in Material Science and Nanotechnology, February 7-9, 2021 | Maregaon, Maharashtra, India

It is with great pleasure that I extend a warm welcome to all the participants of RAMAN 2021 International E-Conference on Advances in Material Science and Nanotechnology to be held in the beautiful city of Maregaon, Maharashtra, February 7-9, 2021. Just to underline how Materials and Nanotechnology represent a very promising role to develop novel economic and environmentally friendly industrial processes. Thus, the adjective sustainable appears more appropriate for novel industrial processes, for which both economic and environmental aspects must be considered if we want to remove relevant drawbacks of some current processes, preserving the added value and having real application perspectives. To achieve this goal, a multidisciplinary approach is necessary to be able to revise critically the existing literature and develop new ideas and collaborations focused to open new scientific courses.

The quest for knowledge has been from the beginning of time but knowledge only becomes valuable when it is disseminated and applied to benefit humankind. It is hoped that Raman 2021 will be a platform to gather and disseminate the latest knowledge in recent advancements in emerging areas of diversified research fields covered during this conference. Academicians, Scientist, Researchers will be able to share and discuss new findings and applications of engineering and science. I hope that participants enjoy the conference and have a memorable experience at Maregaon. It is envisaged that the intellectual discourse will result in future collaborations between universities, research institutions, and industry both locally and internationally. From this point of view, Raman 2021 represents an exciting opportunity to meet different competencies and establish contacts focused to develop new research collaborations, Thus, welcome and enjoy the Meeting!

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
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Date: 06/ 01 /2021

MESSAGE

I am happy to know that Department of Physics, Arts, Commerce & Science College, Maregaon in association with P. N. College, Pusad are organizing 3 days International E-Conference on Recent Advances in Materials Science and Nanotechnology (RAMAN-2021) on 7-9 February 2021. I am also pleased to know that the organisers are bringing out a souvenir & publication of research papers from well reputed journal on this occasion and invited the applications for Outstanding Academic Excellence award from young researchers. This would motivate the researcher of young minds.

I hope that the deliberations by the learned & eminent speakers are bound to bring well-meaning thoughtful preposition which will be of long-term relevance to the society. The modern invention in the advanced field of science & multidisciplinary nature of applications will be discussed in the conference. I sure that the sessions will add to the knowledge of the participants & also give them modern view to look at the field & it would be applicable to betterment of society.

I extend my best wishes for successful International E-Conference.

Dr. S. K. Omanwar
UGC-BSR-Fellow
Sr. Professor
(HAG Scale)

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MESSAGE

At the outset I congratulate the organizing team led by Dr. N. R. Pawar for the unique and ever charming event RAMAN-21. I reminded Sir C V Raman the first Nobel Laurette of our land. Here, the RAMAN-21 stands for ***Advances in Material Science and Nanotechnology-2021.*** *I strongly feel that in the changing global economic scenario, there is a need of organizing such a conference on the emerging issue like* ***'Recent (RAMAN-2021)'.***

I am confident that this event will deliberate over the challenges, opportunities and new gateways for innovation and invention in the field of research and development under the umbrella of materials Science and Nanotechnology. The development of recent advanced materials with desired characteristics has been playing a critical role in the growth of material science and Nanotechnology. India is currently developing highly talented human resource to meet future challenges in the area of Material science and Nanotechnology. The aim of RAMAN-2021 is to promote and encourage research activities in our country in the field of Material Science and Nantechnology.

I am confident that the participants and experts will take into consideration the various aspects of global as well as local challenges, and come forward with enduring, fruitful result so that the expectations of the organizers get fulfilled with regard to making this event as a vibrating and dynamics platform for the Scientist, academia and researchers. I convey my gracious wishes to the organizing team, participants and delegates of the conference for a grand success.

Last but not least, I appreciate the efforts of the team led by Dr. N. R. Pawar to schedule this event since "Good Planning is half done". Congratulations.

Regards,

S. K. Omanwar

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MESSAGE

It gives me immense pleasure to know that Dr. N. R. Pawar is organising International e-Conference on Recent Advances in Material Science and Technology (RAMAN-2021) at Art, Science and Commerce College, Maregaon, Yavatmal, M.S. during 7th to 9th February, 2021.

The topic of e-conference is of much importance and relevance today as new materials have developed for the technological development. There is need to develop an atmosphere among budding researchers, scientists and technocrats. I do hope that deliberations of the e-Conference would be able to present a definite action plan in this context.

I am sure that this conference brings together the knowledge and novel research with diverse experiences and orientations. I wish to inform that the young researchers and academia to explore new ideas and links that will Wisden our research collaborations.

The conference will also provide an opportunity to the scientific community to deliberate at the international level over a wide range of topic.

My sincere and best wishes for the success of the e- Conference.

Devraj Singh
Director & Professor
Prof. Rajendra Singh (Rajju Bhaiya)
Institute of Physical Sciences for Study and Research
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Message

I am glad to know that Department of Physics, Arts, Commerce and Science College, Maregaon (Road) organizing the International Conference on 'Recent Advances in Material Science and Nanotechnology (RAMAN-2021)' during February 7-9, 2021.

Today the problem of Society based research is the major concern for the India as well as for the world. Researchers in the field of Materials Science can open the gateway of innovation and theymay help to solve these problems.Such types kind of conferences regarding these current issues are appreciable. I hope RAMAN-2021 will discuss the various related issues and bring out the fruitful discussions, conclusions and innovative suggestions.

I am also certain that RAMAN-2021 is going to form new multicultural and interdisciplinary scientific bonding's amongst the Indian andworld community which make them as whole.

My heartily congratulation to the organizers of RAMAN-2021 and my best wishes to them.

As a Chairman of BoS Physics, SGB Amravati University I welcome all the delegates and I wish them all the success of RAMAN-2021.

With Best Regards

(Dr. Ajay Lad)

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CGPA 2.29

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Date 05.02.2021

Message

It gives me immense pleasure to know that **Shetkari Shikshan Santha's Arts, Commerce And Science College, Maregaon** is organizing the **'International E – Conference On Recent Advances In Material Science And Nano-Technology'** in association with the **Department Of Physics, Phulsing Naik Mahavidyalaya, Pusad**. It is a matter of appreciation that the college in a rural and tribal region is endeavoring to provide an international platform to publish the research work of science community in this pandemic situation of Covid 19.

In this background the deliberation of the conference will definitely bring out recent advances in material science and nano-technology.

I congratulate all the members of the society, the principal and all faculty members who are associated with the most excellent academic activity. I extend my warm greetings to the delegates and the orgenisers and wish the conference and souvenir a grand success.

(Prof. Dr. A B Patil)
Offg. Principal
Phulsing Naik Mahavidyalaya
Pusad

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Our Guests, Resource Persons and Eminent Experts

About College

Arts, Commerce and Science College, Maregaon is a premier college of excellence, engaged in knowledge building for inclusive social development and molding globally competent and socially sensitive professionals towards social transformation and enlighten students of rural and tribal area and to contribute their services for universal development by promoting education. The college had a meteoric rise and developed into an excellent institution for education. The college impart knowledge in various disciplines to meet global challenges of the 21st century. Giving appropriate emphasis on curricular and co- curricular activities, college attempts to develop rounded personalities through teaching, learning and evaluation and committed to empowering students to think independently. The college outreaches to the widest range of students from backward as well as tribal area. College is situated in an eco-friendly environment which makes students happy and energetic. Upholding the noble traditions lay down by the founders, the institution surges ahead towards excellence.

Conference Structure

Conference will have key note lectures, Plenary talk, Invited talk and Oral Presentation
Hardcopy of the certificate will be posted on the institutional registered address of the participants

Background

Recent Advances in Material Science and Nanotechnology has borne fruit in bringing together young and dynamic researchers, academicians and industrialists to explore, their knowledge and novel ideas to improve the concepts in this vital multidisciplinary area of research for economic growth and sustainable development of the society. 'RAMAN-2021' is timely need to produce many need-based products in different industrial sectors. The conference aims to provide open discussion forum through e-platform and bringing together academicians, young scientists, researchers and technologists to meet the global demand of novel materials and challenges in the field of Material Science and Nanotechnology.

Outstanding Academic Excellence Award

Applications are invited for 'Outstanding Academic Excellence Award' along with the following documents
Photocopy of PhD degree obtained Teaching and research experience Publication details (Papers, Books, etc) Awards at National/International level Talk delivered/Chaired session in National/International conferences PhD awarded under supervision

Conference Topics

The focus of the conference will be on Recent Advances in Material Science and Nanotechnology and related issues like:

- ✓ Nanomaterials and Applications Nanoscience & Nanotechnology Material Science
- ✓ Ultrasonics and Acoustics Luminescent materials Thin film and polymers
- ✓ Semiconductor materials and devices Ceramic Advanced smart materials Chemical materials and its characterization Bio-materials and Biosensor
- ✓ Cosmetic materials
- ✓ Ultrasonic transducers materials
- ✓ Non-destructive Testing and evaluation Laser and X-rays
- ✓ Mathematical Physics Green chemistry

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KEYNOTE ADDRESS

Role of Nano-phase Luminescent Materials for Environment Friendly Development

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ABSTRACT

Unless we promote research in the innovative materials, devices, and technologies for sustainable development (Means taking in to pollution free environment in consideration), it will be very difficult to sustain the life of new forthcoming generations with charm. During last 5-years, it is observed that India is positively making the effort in this direction and in recent years government is making measurable specific budget provisions and also funding for innovative technologies, functional materials and systems. During 2021-22 budget major education budget is enhanced for creative, productive and innovative ideas. Looking at the response at the online platform during last 10 months in various events, it is witnessed that nowadays, talented students are showing interest in this area and this will be the big investment for the bright future of the country.

Luminescence is an interdisciplinary field of research. Developing Luminescent Materials becomes now a backbone of all such devices that are playing very important role in diverse field of applications such as lighting, display, radiation dosimetry, solar PV conversion, diagnostic, phototherapy, guided drug delivery, sensing/actuation devices, etc.

The presentation gives emphasis on synthesizing innovative materials at lower cost yet improved performance. Further it refers to the innovative ideas that includes advances in luminescent materials for beneficial applications to the society in future. Few examples will be delt.

- Efficient solar energy utilization for photovoltaic conversion using QC-phosphor materials,
- Developing radiation dosimetry sensor materials for safety aspects that are import substitute,
- Innovative materials for future phototherapy devices which are not only portable but programmable also with regard to power and selection of wavelength
- Innovative biomaterials for various application
- Innovative techniques of electro-spin processing for the better performance and making devices to work in adverse situation
- New media for carbon quantum dots for medical and advance applications at low cost.

The theme of talk would be the witnessed findings which will encourage the new generations to accept the challenges under present scenario of work culture with reference to India and suggestions for its remedy for betterment of future of the country.

Keywords: Luminescence, functional materials, import substitute, Sustainable development, radiation dosimetry, spectral matching, phototherapy electro-spin processing, quantum dots.

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PLANARY TALK

Optoacoustics. Instrumentation for energy input and output

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ABSTRACT

Optoacoustics, as a science has more than 140 years history starting from the scientific discovery of photo effect by A. Bell in 1880 and its further experimental investigation by A. Bell, J. Tindall, W. Roentgen in 1881.

Modern optoacoustics has found application in wide range of scientific and technical fields. Thanks to the use of high-quality lasers and wideband and sensitive acoustical receivers, it became possible to carry out optoacoustical studies in different optical spectrum and in a wide range of ultrasonic frequencies. Some of application areas of Optoacoustics are: Photo acoustical spectroscopy and microscopy; Optico-acoustical tomography; Laser-ultrasonic structuroscopy and others.

The main advantages of optoacoustics (in comparison to other methods) are: 1) High contrast (because it utilizes the optical contrast) and 2) High resolution (due to ultrasound waves detection) taking into account for example insignificant Ultrasonic Wave Scattering compared with Light Wave Scattering in Tissues.

The most important parts of optoacoustical set up are devices for the input of optical radiation to the investigating object and for the output of ultrasonic laser generated waves.

In present report several approaches for laser radiation input and ultrasound waves output devices are considered and some recent results of such devices application are presented.

In particular, the features of the reception of surface ultrasonic waves generated by laser are discussed. Same construction variants of the combination in one device of laser input and bulk ultrasound output are presented and discussed.

The recently developed opto-acoustical tomography system is presented and the main abilities of such a system are considered.

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Enhanced dual-mode luminescence via energy transfer in Er^{3+}, Yb^{3+} co-doped phosphors

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ABSTRACT

Fundamental understanding of the down/upconversion (DC/UC) luminescence and its mechanism is crucial for different technological applications. Llanthanide-ion (Ln^{3+}) doped luminescent materials (phosphors) have received widespread attention because of their potential applications in various fields, including photonic devices, bio-imaging, medical diagnostics, etc. The lanthanide ions can show both DC and UC luminescence. Up to now, the researchers mainly focused on either DC or UC, i.e., single-mode luminescence. However, the realization of the dual-mode luminescence in single host phosphors is crucial but challenging. The phosphors capable of emitting dual-mode luminescence can expand their application in anti-counterfeiting, photocatalysis, 3D displays, temperature sensors, bio labels, and so on. We report the dual-mode luminescence in a single host phosphor and its mechanistic investigations. The phosphors produced NIR DC emission at 1535 nm (under 380 and 980 nm excitation) and an intense red UC emission at 655 nm (under 980 and 808 nm excitations). Co-doping Yb^{3+} ions further improve the dual mode emission via energy transfer from Yb^{3+} to Er^{3+}. The mechanism of energy transfer from Yb^{3+} to Er^{3+} by considering different emission pathways viz: ground state absorption (GSA), excited-state absorption (ESA), energy transfer up conversion (ETU), cooperative energy transfer (CET), back energy transfer (BET), and cross-relaxation (CR) is investigated.

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PLANARY TALK

"Acoustical metrology and materials for different applications"

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ABSTRACT

Numerous manufactures have become wise of the drawbacks regarding the noise of their products. If too high, the noise may even harm their own businesses, they may over time lose their ability to compete. Noise, has become an important competition parameter for many types of products, such as the advanced industrial machinery and to means of transportation. For these reasons, acoustic measurement and acoustic metrology have become very important activities for the modern society. NIS is considered as the Egyptian metrological institute that give the traceability for all types of measurements and in various application. At the acoustics laboratory, we carry out researches concerning noise control especially passive noise control. In some cases, passive noise control is more economical and energy efficient technique than active noise control. the limitation of the passive noise controlling materials within the low frequency domain which is still challenging. We need serious investigation for sound absorbing materials, which can be realized through the use of different types of composite materials as the passive noise controllers. Sound absorption coefficient measured using two microphones impedance tube according to ASTM E1050-08. Composites of polyurethane foam is considered to be effective, so applying appropriate types and contents of filler particles (e.g. Sawdust wood, silica fumes) is critical to accomplish improved sound absorption properties in PU composites. Sound absorption up to more than 0.7 obtained at low frequency regions below 500Hz. Interestingly, selecting the optimum amount of a filler used to improve the sound absorption performance.

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PLANARY TALK

Light-emitting nanocrystals for lighting and display applications

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ABSTRACT

Recently, solid state lighting techniques using white light emitting diode (WLED) have emerged as an effective solution in the field of general lighting-based applications owing to their several practical and environmental concerns, ranging from enhancing energy efficiency to throttling CO2 emission. Phosphors are the indispensable component of today's WLEDs. However, the low efficiency of red phosphors constitutes a principal bottleneck for commercialization of such devices. Thus, development of a newer generation of highly luminescent nanophosphors presently defines a critical juncture for further development of this still somewhat-nascent field. Keeping these points in mind I have focused on achieving improved luminescence efficiency from the existing nanophosphors as well as designing some cost-effective solution of current rare earth-based phosphors. The charge compensation strategy has been successfully implemented in achieving two-fold enhancement in PL intensity in Eu^{3+}-Li^{+} co-doped MgAl2O4 nanophosphors. The same idea has been established in another nanophosphor (CaSnO3:Eu^{3+}) using Na^{+} co-activator where a fourfold enhancement of PL intensity has been realized. Introduction of of Na^{+} co-activator is found to enhance the thermal stability of the nanophosphor with higher activation energy. On the other hand, rare-earth free novel CuI nanophosphor was also developed and it was also conclusively verified that excess iodine in the octahedral site is the origin of red defect band in CuI. Realization of ultra-bright red emission from CuI nanophosphors is successfully demonstrated both in film and powder form. The work is further extended to the composite formation of CuI with reduced graphene oxide (RGO). A fourfold enhancement of the CL intensity is also demonstrated with the incorporation of RGO within the CuI matrix. The developed nanophosphors could be highly promising for applying in lighting and display applications.

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INVITED TALK

Role of Ultrasound for Materials Characterisation

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ABSTRACT

The ultrasonic wave propagation mechanism has been applied using theoretical approach. Before study the wave propagation directly through a particular material, it is necessary to investigate some of the elastic, mechanical and thermo-physical properties must study necessarily. In this talk, I will focus first intrinsic properties of some materials, then step by step elastic, mechanical, thermal and ultrasonic properties will be explained.

Keywords: Elastic constants, mechanical constants, thermal properties, ultrasonic properties

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INVITED TALK

Radiation and safety

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ABSTRACT

Amongst the various renewable and non-renewable sources of energy, nuclear energy must be part of energy solution being the clean source. However, public perception related to risk of accidents and disposal of waste fuel materials need to be removed. Nuclear power contributes to many applications ranging from medical field to space exploration.

Different types of radiations associated with nuclear power plant need to be understood. Various units of radiations, their beneficial effects, possible damage caused by the radiations, safety measures to be followed, instruments and materials used for measurement of radiation dose are considered.

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INVITED TALK

Advances in evanescent wave-based fiber optic intrinsic biosensors

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ABSTRACT

High risk diseases such as diabetes and cardiovascular diseases those occur due to imbalance of blood substances and considered as dangerous threats to human health. It needs to monitor blood substances such as glucose, cholesterol, urea etc for early precautions. The technique for rapid detection of this substances is needed, numerous techniques are already developed. Biosensor technique is found to be best alternative for rapid and realistic detection and proved it's important in many other areas such as food industry, agriculture, environmental monitoring etc. Biosensor is device which converts the output of interaction between target element and bio-reorganization element to a detectable signal. There is no doubt that the progress of biosensor technology in recent years makes an important contribution to protect human health and local ecosystems but there is a challenge to creating improved, cost-effective, and more reliable instruments. Optical biosensors have proven advantages over other types of biosensors for multi-target sensing and continuous monitoring. Development of new functional materials allows the optical biosensor to have applications that are more practical. Fiber optic intrinsic biosensors based on evanescent wave interaction (FOIB) provide numerous advantages over conventional sensors, which include immunity to electromagnetic interference, small and compact size, sensitivity, remote sensing, ability to be multiplexed and the ability to be embedded into various textile structures. The FOIBs have the characteristics of high sensitivity, selectivity, and reliability and can perform measurements in specific-sites and real time.

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INVITED TALK

Scientific challenges and achievements of 21st century: A perspective

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ABSTRACT

The 21st century poses many great challenges for global sustainability. Amongst them, the most terrific challenge, the human race will encounter scarcity of raw materials and conventional energy resources. India and China may have to take the brunt of these problems as it is going to be the most populated region of the world with concomitant increase in energy demand and requirement of other resources. India will be the testing ground for introducing newer ways of green technology and innovative principles of resource management and utilization. With the vagaries of potential climate change gathering clouds in the background, Earth sciences will have a special and predominant role in guiding the society in prioritizing our resource discovery, utilization and their consumption and the upkeep of environment.

On the fundamental level, Earth sciences are going through a most exciting phase of development as a born-again science. Technological breakthroughs including the satellite-based observations augur well for gaining new insights into Earth processes. A set of exciting fundamental problems that are globally identified will set the stage for an exhilarating period of new discoveries. Improvements in numerical and computer-based techniques will assist in modelling of Earth processes to unprecedented levels. India will have to take special effort in improving the existing experimentation facilities in the Earth science departments of the country, and also the general level of Earth science education to meet the global standards.

Keywords: Environmental pollution, climate change, global warming, greenhouse effect, fundamental research, etc.

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INVITED TALK

Green synthesis of nanoparticles for biomedical applications

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ABSTRACT

Metal and metal oxide nanoparticles and their application in field of medical, cosmetic, catalyst, packaging, photonics, agriculture and electronics are now a days very potential area of research. However, these nanoparticles show toxicity to the environmental, human and animal health. The toxicity effects of nanoparticles are mainly due to its size which can be easily pass-through physiological barriers and the other due to the synthesis procedure. Nanoparticles are shown pioneer work in field of medicine such as treating stem cells to damaged heart tissue, detecting blood cancer cells and treating antibiotic resistant infections. The application of nanoparticles of biological nature is an emerging field. However, the applications in these fields are constraint due to toxicity of nanoparticles or toxicity due to toxic residuals of the chemical reducing agents. These toxicities may be due to synthesis approach especially chemical approach. The toxic chemicals left residues with the nanoparticles.

Therefore, preparation of nanoparticles of metal is great challenges with nontoxic nature. To prepared metal nanoparticles free from toxic chemical components, presently, prepared metal nanoparticles using biological method. The purpose of the work is to study the effect of different biological plant's leaf extract, as a reducing and stabilizing agent to prepare metal nanoparticles.

Conventional approaches such as physical and chemical methods are proposed for the synthesis of metal nano particles. However, these methods are associated with the use of heavy equipment, huge amount of energy input, highly toxic and dangerous chemical compounds that generate biological hazards and most of the times these methods are not ecological and safe. Apart from these methods, Plant-mediated synthesis of metal nano particles seems to be very rapid, simple, dependable, non-toxic and eco-friendly. The synthesis of metal nanoparticles using plant extracts deliver beneficial over other biological synthesis methods which are associated with very difficult procedures such as maintaining microbial cultures. In this present work I am trying to discuss the biosynthesis of metal nanoparticles and their bio-applications.

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INVITED TALK

Solar Cell Application of Silicon Decorated Copper Sulfide Nanocomposites

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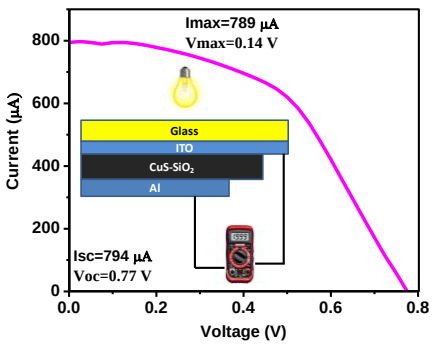
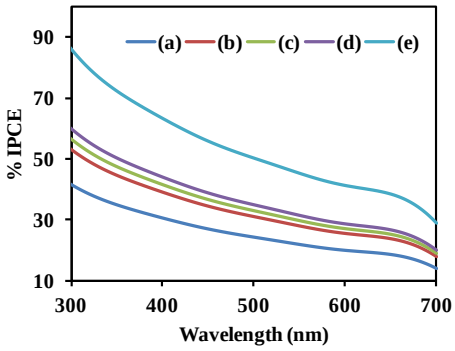
ABSTRACT

Conversion of abundant sunlight on earth in to electrical energy is a solution to problems such as pollutions and global warming. Presently, silicon based solar cells acquired 85 % of market in generation of energy from solar to electric energy with significant and stable efficiency. In this regard, nano is playing vital role which can be used for diverse applications. In the experimentation, the photovoltaic properties of CuS incorporated SiO_2 nanocomposites were investigated. The nanocomposite between CuS and SiO_2 were prepared by solid state diffusion method. During the process of solid-state diffusion, silicic acid was used as source of silicon. The prepared composites characterized by X-ray diffractions, scanning electron microscopy, Ultraviolet–visible spectrophotometers, Raman spectroscopy, Photoluminescence spectroscopy and thermal analysis and photovoltaic measurements. IV characteristics of PV cell shows that performance of cell is sensitive to concentration of CuS in composite. The optimized power conversion efficiency was 1.11 % found to be for 15 wt.% CuS loaded SiO_2 composite having fill factor 0.189 under the power incidence of 0.0104 Watt/m^2.

Key words: copper sulfide; photovoltaic; silicon rich





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INVITED TALK

RE (Rare Earth) Doped Phosphor for Enhancing Photocatalytic Activity

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ABSTRACT

This talk focuses on the importance of photo catalysis techniques for the waste water treatment process. From past few years semiconductor photo catalyst such as ZnO, TiO_2 are used for this purpose, but they are not efficient to capture the visible component of solar radiation. To improve the catalytic performance of these type photo catalyst an alternative approach has been proposed that uses rare earth doped phosphor coupled with semiconductor metal oxide photocatalyst to improve their activity under sun light illumination to degrade some kind of chemical dye in waste water. Thus, photo catalysis is a simple, low-cost techniques that fulfil the demand of industries. Also, rare earth doped phosphor is in ideal materials that shows interesting optical properties and applicable in many fields like optoecltronics devices, hydrogen production etc. Hence, rare earth doped phosphor finds potential applications in the development of environment friendly technology.

Keywords: Photocatalyst, Phosphor, Properties, Applications

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INVITED TALK

Multicolored and White-Light Pyrophosphates Phosphors for Eco Friendly Lighting Applications

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ABSTRACT

Present work reports $Zn_2P_2O_7:Eu^{3+}$ and Dy^{3+} activated phosphor for eco-friendly lighting applications. A powder X-ray diffraction (XRD) analysis confirms the formation of desired compound which is well matched with PDF file No. 00-007-0152. SEM investigation confirms that average particle size is about 400-900 nm. FTIR Spectra confirms the structure and molecular environment of prepared phosphor. Photoluminescence (PL) properties were investigated under ultraviolet (UV) ray excitation. Under the excitation of 351 nm, only the characteristic transition emissions of Dy^{3+} can be observed which gives emission at around 480 nm (blue) and 575 nm (Yellow). Under the excitation of 395 nm, only the characteristic transition emissions of Dy^{3+} can be observed which gives emission at around 595 nm (Orange) and 614 nm (Red). In the view of the broad excitation band and excellent luminescent properties, $Zn_2P_2O_7:Eu^{3+}$ and Dy^{3+} is expected to be a potential candidate for application in n-UV white LEDs and solid-state lighting because of its cost-efficient manufacturing, mercury free excitation and eco-friendly characteristics

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INVITED TALK

Ultrasonic Waves: An advanced NDT tool for the Characterization of different Materials

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ABSTRACT

As per the current scenario there are several tools available for characterizing the different materials such as solids, liquids and gases. Also, it is the demand of the today's need to characterize them for their several industrial applications. Some examples of Characterization tools are SEM, TEM, FTIR, AFM, XRD, etc. Here, most specifically the Acoustical wave such as Ultrasonic wave is described on behalf of its various Non-Destructive testing applications for characterization of several materials such as polymers, organic liquids, different solids etc.

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ORAL PRESENTATIONS

Study of Conduction Mechanism in Polypyridine - Poly (Vinyl Acetate) Films by Transference Number

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ABSTRACT

The effect of concentration of ferric chloride ($FeCl_3$) oxidant on transference number of polypyridine-polyvinyl acetate films has been described. Polypyridine (PPY) and poly vinyl acetate (PVAc) composite films were synthesized by chemical oxidative polymerization method with the solution of ferric chloride ($FeCl_3$) oxidant in methanol. The transference number for PPY-PVAc films synthesized with different concentration of $FeCl_3$ was determined by Wagner's dc polarization technique. The transference number for the films prepared with 10, 20, 25, 30 and 40 wt% of $FeCl_3$ lies between 0.51 to 0.80. It is found that, the transference number increases with the increase in concentration of $FeCl_3$. This increase is due to increase of ion concentration in PPY-PVAc composite.

Keywords: PPY-PVAc composite, Chemical oxidative polymerization, Transference number.

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Wet Chemical Synthesis, Characterization and Biocompatibility Study of Hydroxyapatite used as Biomaterials

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ABSTRACT

Calcium phosphate based bioceramics are promising candidates as biomaterials for tissue engineering. The wet chemical method is used for synthesis of hydroxyapatite which is calcium based bioceramic used for orthopaedic and dental applications. This paper discusses the synthesis and characterization of hydroxyapatite which has shown good in vitro bioactivities. Hydroxyapatite was synthesized from aqueous solutions that contain calcium nitrate and di-ammonium hydrogen orthophosphate. X-ray diffraction identified HAp as crystalline phase with hexagonal structure. X-Ray diffraction of HAp is in good agreement with the standard of lattice constant a = b = 9.418 Å, c = 6.884 Å with space group P63/m. The Fourier transform infrared spectra of the sintered HAp shows the absorption bands characteristic to hydroxyapatite. Scanning electron microscopy revealed that the surface morphology was spherical with particle sizes in range of micrometer. The hydroxyapatite was evaluated for the biocompatibility characteristics such as antimicrobial activity, cytotoxicity and biodegradation.

Keywords: Hydroxyapatite, bioceramic, wet chemical, antimicrobial activity, cytotoxicity orthopaedic.

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Enlisting Some Ethnic Plants Species in Ner Region Dist. Yavatmal (M.S.) India

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ABSTRACT

Present paper deals with some ethno medicinal uses of 20 plant species, by the tribal of Ner region, in Yavatmal district of Maharashtra. A number of villages were visited in this region. The information was documented involving field study by contacting and interviewing traditional healers for plants used in cure of various diseases. This region is inhibited by tribal communities like Banjara, Gond, Mang, Paradhi etc. The ethno botanical information on plants viz., botanical name, family, local name, plant part used and mode of administration is enumerated.

Keywords: Tribal People, Medicinal Plant, Ner region, Yavatmal district.

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Novel molten salts synthesis and photoluminescence properties of Eu (III) doped Y_2O_3 phosphor

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ABSTRACT

A novel molten salt method used for the synthesis of Eu^{3+} doped yttrium-based phosphor. It is well known that $Y_2O_3:Eu^{3+}$ is highly efficient red phosphors used for Lamp phosphor. The $Y_2O_3:Eu^{3+}$ phosphor was synthesized by reactions in molten salts method. The red emitting phosphor characterized through powder X-ray diffraction (XRD), and PL spectra. A novel molten salt is one step method and decrease calcining temperature.

Keywords: $Y_2O_3:Eu^{3+}$, Molten salts method, PL spectra.

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Aldo-keto Gel Synthesis and Photoluminescence Properties of $YVO_4:Eu^{3+}$ Microsphere

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ABSTRACT

The Eu^{3+} doped YVO_4 phosphor synthesized via simple aldo-keto gel method by using Benzaldehyde and Acetone which then compared with conventional solid-state diffusion. Powder X-ray diffraction (XRD) and field emission scanning electron microscopy (FE-SEM) studies indicate that the prepared samples were well crystalline and free from organic impurities. However, the nature of as-prepared phosphor by using aldo-keto gel method does not having any agglomeration. Further photoluminescence (PL), photoluminescence excitation (PLE) spectra and decay curves were superior as compared to solid state diffusion method.

Keywords: Aldo-keto gel method; aldehydes and ketones; spherical particle, PL properties; CIE diagram.

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Solid Waste Management in India: Current Situation and Opportunities

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ABSTRACT

India's solid waste management system is the big hurdle in the way of India's development. This inadequate managements system is because of high rate of population growth and quantum population specially in metro cities. Also, the unawareness of people is responsible for this. There is a need to upgrade solid waste management systems. The informal sector can be used as resource. This paper covers such challenges and some future opportunities for the sustainable development of India's solid waste management systems.

Keywords: Waste Management, Sustainable Development, India, Population Growth

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Thermoluminescence Properties of $KAl(SO_4)_2$: Eu^{3+} Phosphors

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ABSTRACT
In the present work, a series of Eu^{3+} activated $KAlSO_4$ phosphors were synthesized by solid state reaction method. The present paper reports thermoluminescence (TL) glow curves of the synthesized Eu^{3+} activated $KAlSO_4$ phosphors. TL glow curves were recorded for different concentration of Eu^{3+} ions by gamma exposure at a heating rate of 5 °C s^{-1}. The TL glow curve shows broad emission band at 6200 Gy irradiation of gamma rays in the temperature range of 50° to 400°C. It was found that the TL emission intensity increases linearly up to 0.7 mol% and then decreases with increasing concentration of Eu^{3+}. The TL glow curves show linearity with increasing exposure. The response curve of the synthesized phosphor showed linearity in the range 800–9300 Gy. All these results represent synthesized phosphor may be useful for future work in field of dosimetric application.

Keywords: Solid state reaction method; Thermoluminescence (TL); Gamma rays; TL response curve

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Locally Rotationally Symmetric Bianchi type-I Cosmological Models with Modified Holographic Ricci Dark Energy in f(T) Theory

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ABSTRACT

The paper is devoted with a class of solutions of field equations in $f(T)$ gravity for a Locally Rotationally Symmetric (LRS) Bianchi type I space-time within the presence of dark matter and Modified Holographic Ricci Dark Energy (MHRDE). Exact solutions of field equations are obtained with volumetric power and exponential expansion laws. The physical and geometrical parameters of the models are also discussed in details. The state finder diagnostic pair and jerk parameter are analysed to characterize completely different phases of the universe.

Keywords: LRS Bianchi type- I space time, MHRDE, $f(T)$ gravity, stability factor.

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White Light Emission from $La_2(MoO_4)_3:Dy^{3+}$ Phosphor

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ABSTRACT

White light-emitting Dy^{3+} activated $La_2(MoO_4)_3$ phosphor was successfully synthesized by a solid-state reaction method. Their structural, morphological, and luminescence properties were characterized by Photoluminescence techniques. Under ultraviolet (UV) and blue excitation, synthesized phosphor exhibits two emission band sat blue (484nm) and yellow (575 nm), which correspond to $^4F_{9/2} \rightarrow {}^6H_{15/2}$ and $^4F_{9/2} \rightarrow {}^6H_{13/2}$ transitions of Dy^{3+}, respectively. The optimized concentration of Dy^{3+} ions is 0.7mol% after the concentration quenching takes place. The CIE chromaticity coordinates for the optimized phosphor are (0.329, 0.377), and they lie in the white light region. The above-mentioned results demonstrate that Dy^{3+} activated $La_2(MoO_4)_3$ is a potential phosphor for solid-state lighting applications.

Keywords: Solid-state reaction method; Photoluminescence; Concentration quenching; Solid-State lighting application

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Synthesis & Electrical Properties of Spinel Ferrites

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ABSTRACT

During the last few decades magnetic materials like cubic spinel ferrites nanomaterials find wide technological application. Recent developments and trends of Sol-Gel Auto combustion method for Spinel ferrite nanomaterials synthesis are briefly discussed and critically analysed. The Spinel ferrites are unique materials exhibiting ferromagnetic and semiconductor properties & can be considered as magnetic semiconductors. This work reports the Synthesis and Studies of Semi-Soft Ferrimagnetic Cobalt Spinel ferrite i.e. $CoFe_2O_4$ and Nickel doped Cobalt Spinel Ferrite i.e. $Co_xNi_{1-x}Fe_2O_4$ (x = 0.0 - 0.5) by Sol-Gel Auto combustion Method. Sample of Co were prepared by conventional Sol-Gel Method with the stoichiometric amounts with urea as fuel dissolved in distilled water. The X-ray Diffraction Patterns confirmed the formation of Cubic Spinel $Co\ Fe_2O_4$ nanoparticles. The average crystallize size was found from the XRD data. The morphological analysis of all the samples were done by using Scanning Electron Microscopy. The High-resolution Transmission Electron Microscopy analysis incorporated to check crystallinity of synthesized compounds. The Electrical Properties of the synthesized nanoparticles were investigated by using impedance spectroscopy.

Keywords - Sol-gel, CoFe2o4, Ferrimagnetic, XRD, Impedance, Spectroscopy

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Synthesis and Spectroscopic Characterization of Silicon Carbide (SiC) nanoparticles

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ABSTRACT

Silicon carbide (SiC) nanoparticles have been synthesized via sol-gel method. The size, morphologies and bonding states of synthesized SiC nanoparticles were investigated by X-ray diffraction (XRD), scanning electron microscopy (SEM) and Fourier transform infrared spectroscopy (FTIR). The results show that the synthesized SiC nanoparticles are high-quality crystals with high aspect ratios. The thermodynamics analysis of SiC nanoparticles in organic base fluids were studied with purpose of applications in various fields. X-ray diffraction (XRD) results indicated the major phases of SiC. Scanning electron microscopy (SEM) images shows that SiC particles mainly composed of crystalline nanoparticles. FTIR provides valuable and practical information about the chemical bond states of the materials. FTIR spectra of the SiC nanoparticles have revealed strong absorption bands with a very small variation [1-5].

Keywords: SiC nanoparticles; Sol-gel technique; XRD; SEM.

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Stability and Zeta Potential measurement of Nanofluids of Ag Nanoparticles

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ABSTRACT

The silver nanoparticle was synthesized via thermal decomposition method at 700°C. Reducing agent NH_2CONH_2 is added to the mixture of $AgNO_3$ in order to form the silver nanoparticle. In the present work we have prepared the silver nanoparticle in powder form from silver nitrate of AR grade by thermal decomposition method. As silver is monovalent therefore 3gm $AgNO_3$ is taken in crucible then it is grinding and mixed at atomic level with 0.8834 gm of urea used as a fuel. Then combustion was taking place in furnace at 700°C. Then sample was again grinding in crucible. Attempt has been made to characterize the nanoparticle by XRD. Nanofluids of Ag Nanoparticles were prepared by two step method in methanol base fluid and study its stability by measuring thermal conductivity and Zeta potential and predicts the surface of nanoparticle and nanoparticle surfactant interactions [1-4].

Keywords: Ag Nanoparticle, XRD, Thermal Conductivity, Zeta Potential.

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Luminescence Characteristic of LiMgBO3 Phosphor

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ABSTRACT

The present paper reports the combustion synthesis of $LiMgBO_3$ phosphor with Dy and Mn dopants. During the combustion synthesis we have used Dy and Mn activators so as to explore the possible compound for TL glow curve analysis and their application for TL dosimetry. The combustion synthesis method, though tricky but it is very simple and time saving method. This work deals with detail procedure for synthesis of $LiMgBO_3$ phosphor with Dy and Mn dopants. We have also studied their TL glow curve analysis and luminescent characteristics for TL dosimetry. Preparation of Lithium Borate host materials is tricky work. The synthesis is not straightforward. We became successful in synthesizing few mixed borate compounds by combustion synthesis method. Thermoluminescence studies were carried out on all the possible combinations of $LiMBO_3$:Re (M = Mg, Ca, Sr, Ba & Re = Ce, Eu, Dy, Mn). The TL sensitivity of $LiSrBO_3$:Dy is comparable with the $CaSO_4$:Dy. We have successfully achieved the 71% TL sensitivity in this phosphor however it has high Z_{eff} value because of Strontium. Whereas the TL peak temperature was found to be 178°C, lower than that of $CaSO_4$: Dy.

Keywords: LiMgBO, combustion method, TL intensity, TL

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Dielectric Relaxation Study of 2-Pentenenitrile and 1, 2 Dichloroethane at 450c Temperature Using TDR

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ABSTRACT

The dielectric relaxation study of 2-pentenenitrile with 1, 2 dichloroethane mixture has been carried out at temperature 45^{0}C. The dielectric relaxation study of solute-solvent mixture at microwave frequencies gives information about the formation of monomers and multimers as well as interaction between the molecules of the mixture. The dielectric parameters viz. static dielectric constant (ε_0) and relaxation time (τ) have been obtained by the least squares fit method. The static dielectric constant increases and relaxation time decreases with increase in concentration of 2-pentenenitrile in 1, 2-dichloroethane in the system. The time domain reflectometry (TDR) has been used for the study of dielectric relaxation spectra of 2-pentenenitrile (PN) and 1,2 dichloroethane (DCE) binary mixtures. The frequency range has been used as 10 MHz to 20 GHz. The relaxation in this system can be described by a single relaxation time using the Debye model. The Excess parameters such as excess permittivity (ε^E) and excess inverse relaxation time $(1/\tau)^E$ of the mixtures have been determined. In the mixtures excess permittivity (ε^E) found positive and the excess inverse relaxation time $(1/\tau)^E$ found negative.. The investigation shows that the effective dipoles of the system increase. It also shows that due to the hindering field between the constituent molecules the dipole rotates slowly.

Keywords: TDR, Nitrile, Chlorine, Excess permittivity, Excess inverse relaxation time.

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A Discussion of Acoustical Parameters in Binary Mixtures at different Temperatures: An Ultrasonic Study

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ABSTRACT

In this analysis, the ultrasonic velocity, density and viscosity of DMSO were measured at different temperatures of 308K, 313K, 318K, 323K, 328K and 333K with butanol. Acoustical parameters such as acoustic impedance (Z), adiabatic compressibility (β_α), Intermolecular freelength (L_f), relaxation time (τ), internal pressure (π_i) have been determined from these. The variety of derived parameters was used to analyze the form and scope of interactions between the binary molecules.

Keywords: Ultrasonic velocity, DMSO, Alcohol, Acoustical parameters, free length, adiabatic compressibility

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Ultrasonic Characterization of different Polymers and Organic Liquids: A Review

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ABSTRACT

A review on ultrasonic characterization of different polymers and organic liquids gives a perception into the physico-chemical and thermal properties of base liquid. In this present review we have reviewed some research papers for understanding the same. Several acoustical parameters like Adiabatic compressibility (β), acoustic impedance (Z), relaxation time (t), ultrasonic attenuation (α / f^2), free path length (L_f) have been evaluated. From the experimental values of ultrasonic velocity (v), densities (d) and viscosity of base liquids and the investigation about ultrasonic techniques gives an information and idea to understand the molecular responses and intermolecular arrangement of liquids and polymers. The ultrasonic interferometer is used for measuring the ultrasonic velocity while Ostwald viscometer and Pyknometer (specific gravity bottle) are used to determine the viscosity and density respectively.

Keywords: Ultrasonic velocity, Adiabatic compressibility, Acoustic impedance, Relaxation time, Ultrasonic attenuation

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Comparison of Free Length Thermodynamically and Acoustically of alpha-Alumina (α-Al_2O_3) Nano Suspension in Ethanol Base Fluid

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ABSTRACT

The present paper reports the comparison of free length thermodynamically and acoustically of alpha alumina (α-Al_2O_3) nano suspension in ethanol base fluid. α-Al_2O_3 nanoparticles were synthesized through alkoxide route using sol-gel method. Intermolecular free length has been calculated by thermo acoustical method at different temperatures over the entire range of concentrations and compared with the valued obtained from well-established thermodynamic method. The ultrasonic velocity measurement at 4 MHz with an interferometric technique has been made on alpha alumina (α-Al_2O_3) nano suspension in ethanol base fluid. Measurement was taken for the density. The intermolecular free length was calculated from the velocity and density measurements. Free length is related with the surface of nanoparticles and nanoparticle surfactant interactions and help for the study of thermo acoustic and thermodynamic properties of nanosuspension.

Keywords: α-Al_2O_3, Ethanol, Free Length, Nanosuspension

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Structural, Morphological and Super capacitive Performance of Electrodeposited PPy/Co_3O_4 Thin Film

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ABSTRACT

The PPy/Co_3O_4 thin film was deposited by electrodeposition method for supercapacitor application. The structural, surface morphological and super capacitive study of PPy/Co_3O_4 thin film was carried out with the help of X-ray diffraction (XRD) and Scanning Electron Microscopy (SEM) study. The structural study of PPy/Co_3O_4 thin film show cubic crystal structure. The super capacitive study of electrodeposited PPy/Co_3O_4 thin film was carried out with the help of cyclic voltammetry (CV), charging-discharging (CD) and electrochemical impedance Spectroscopy (EIS) study. The PPy/Co_3O_4 thin film gives maximum specific capacitance of 435 $F.g^{-1}$ at 5 $mV.s^{-1}$ in 0.5M Na_2SO_4 aqueous electrolyte solution. The PPy/Co_3O_4 thin film shows coulombic efficiency of 98% while specific energy and specific power was observed to be 80.4 Wh. kg^{-1} and 20.4 kW kg^{-1} respectively. From EIS study, PPy/Co_3O_4 thin film has values of R_s and R_{CT} to be 0.62 Ω and 2.22 Ω respectively at 1V.

Keywords: Supercapacitor, Electrodeposition, PPy/Co_3O_4, XRD, SEM, EIS.

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Stability of α-Alumina Nanofluids in Organic Base Fluid

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Highlights

- The thermoacoustic parameters of nanofluids are highly dependent on specific surface area to volume ratio of the nanoparticles in nanofluids.
- α- Alumina nanoparticles were synthesized via sol-gel method.

ABSTRACT

Nanoparticles of alpha alumina (α-Al_2O_3) was prepared via sol-gel method from Aluminium isopropoxide [Al $(OC_3H_7)_3$] and aluminium nitrate. Starting solution was prepared by adding aluminium isopropoxide [Al $(OC_3H_7)_3$] gradually in 0.2 M aluminium nitrate and solution continuously stirred for 48 hours. Later, Sodium dodecylbenzen sulfonate (SDBS) was added and stirred for one hour. Now this solution was heated up to 60°C and stirred constantly for evaporation process. Now the paste so obtained was heated at 90°C for 8 hours, we get nanoparticles of alpha alumina (α-Al_2O_3) in powder form. The prepared sample was characterized by X- ray diffraction (XRD), Scanning electron microscopy (SEM), thermal conductivity and Zeta potential. Average particle size has been estimated by using Debye-Scherrer formula. It was found to be in the range of 20-30 nm. Nanofluids of α-Al_2O_3 in methanol base fluid were prepared by two step method.

Keywords: α-Al_2O_3 Nanofluids; XRD; SEM; Zeta potential; Thermal conductivity

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Advantages and Applications of Nanotechnology in Energy Sector

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ABSTRACT

Nanotechnology in energy sector is an interesting topic for research. Use of Nanotechnology in energy sector has the capability of improving life all over the world. Nanotechnology plays very interesting and important role in energy sector at different stages such as production, storage and transmission. Use of Nanotechnology in conventional and non-conventional energy sources is the fascinating topic for research and development of new technologies. Nanotechnology innovations could impact different fields such as energy conservation, development in available energy sources and energy usage. This paper highlights the advantages, applications of nanotechnology in Energy sector, different nanomaterials used in energy sector and recent development of nanotechnology in Energy sector.

Keywords: Nanotechnology, nanomaterials, energy sector, conventional and non-conventional energy sources.

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Synthesis and Characterization of Dy^{3+} Activated $Ca_2Al_2SiO_7$ Nanophosphors for Environment Friendly Lighting

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ABSTRACT

In the present study Dy^{3+} activated $Ca_2Al_2SiO_7$ phosphors were synthesized by combustion synthesis. Formation of crystalline phases were identified by X ray diffraction (XRD) pattern and their photoluminescence (PL) properties were investigated using excitation and emission spectra under ultraviolet (UV) ray excitation ranging from 200 to 400 nm. When $Ca_2Al_2SiO_7:Dy^{3+}$ phosphor was excited at 350 nm, the emission spectrum showed intense bands at 480 nm (blue) and 575 nm (yellow) emission due to Dy^{3+} ions. The external morphology of $Ca_2Al_2SiO_7$ phosphor has been studied by SEM. The results obtained showed that phosphors have the promising applications for solid state lighting and near-UV white light-emitting diodes (LEDs).

Keywords: Photoluminescence, Light-Emitting Diodes, Lamp Phosphor, Silicate

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Microwave Assisted Synthesis and Antimicrobial Activity of Some New Thiopyrimidine Derivatives

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ABSTRACT

4-(4-chlorophenylamino)-6-(4-substitutedphenyl)-5,6-dihydropyrimidin-2-thiones (3a-d) were synthesized by condensation of (E)-N-(4-chlorophenyl) 3-(4-substitutedphenyl) acryl amide (2a-d) with thiourea in the presence of catalytic amount of 40% KOH respectively. The antimicrobial evolutions have been performed for their antibacterial activity and antifungal activities.

Keywords: Microwave Synthesis, Thiopyrimidine Antimicrobial.

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Synthesis and Photoluminescence of Lithium Aluminium Borate Phosphors $LiAlB_2O_5:Eu^{3+}$

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ABSTRACT

The Lithium mixed Borates are good host materials for luminescent ions. The powder sample of the Eu^{3+} doped Lithium Alumino-Borate Phosphor $LiAlB_2O_5:Eu^{3+}$ has been prepared by solution Combustion method. The phase and structure of the as prepared material was confirmed by powder XRD technique. The photoluminescence properties of $LiAlB_2O_5:Eu^{3+}$ have been investigated. The phosphor $LiAlB_2O_5:Eu^{3+}$ exhibits strong absorption over a wide UV range from 300 – 500 nm. It can be seen clearly that the charge transfer transition from the O^{2-} to Eu^{3+}excitation line at 254 nm wavelengths is very stronger than the intra configuration $4f^6$ excitation lines (394 nm, 382 nm). The phosphor $LiAlB_2O_5:Eu^{3+}$ shows intense red emission 614 nm corresponds to 5D0→7F2 when excited by 254 nm radiation. The red emission could be excited by NUV radiation of 390 nm. The phosphor $LiAlB_2O_5:Eu^{3+}$ could be a potential red emitting component in lamps and display applications and also in solid state lighting.

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

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Sample Holder for the Measurement of AC conductivity of Solid Electrolyte

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ABSTRACT

The development alternative energy source is a race among the researchers from last five decades. Even today the scientist and labs are trying to find the competitive materials which will have high reliability in energy source like Solid state battery. The materials used in solid state battery called as solid electrolytes. The high ionic conductivity is the dior and prior need of this solid electrolyte. The measurement of ionic conductivity is always a challenging for the researcher, where a good sample holder satisfying the requirement of the AC conductivity measurement is the need. The effect of pressure, frequency and temperature are the common parameters of measured to understand the properties of the solid electrolyte. In the present paper the design of sample holder and various properties related to sample holder are discussed.

Keywords: AC Conductivity, Alternative Energy Source, Solid Electrolytes

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Structural and Thermogravimetric Analysis of Piezoelectric KNbO3

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ABSTRACT
Piezoelectric ceramic $KNbO_3$ powder was prepared by hydrothermal reaction using Nb_2O_5 in K_2CO_3 solution. A single phase of $KNbO_3$ was obtained when the molar ratio of K_2CO_3/Nb_2O_5 was above 1.2. It shows the orthorhombic structure at room temperature from XRD analysis. The morphology of the prepared ceramic is done using SEM analysis. Two dips in DTA at 70°C and 1080°C indicate the absorption of energy. At temperature up to 100°C the crystal shows endothermic behaviour, while above 100°C, the behaviour is exothermic up to 1000°C. After 1000°C the crystal shows the endothermic behaviour again with a valley at near 1080°C.

Keywords: Piezoelectric, Ceramic, XRD, $KNbO_3$, Endothermic.

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Synthesis and Photoluminescence study of Gd^{3+} doped YP_3O_9 phosphor prepared by Citric sol-gel method

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ABSTRACT

Gd^{3+} doped YP_3O_9 phosphor was synthesized by Citric sol-gel method. The phosphor was characterized by X-ray diffraction (XRD), Photoluminescence (PL). The Phase purityand crystallinity of phosphor is confirmed by X- ray diffraction (XRD)analysis while surface morphology studied by scanning electron microscopy (SEM). The photoluminescence properties of the $Y_{0.99}P_3O_9{:}_{0.01}Gd^{3+}$ sample was investigated by excitation and emission spectra. The PL excitation spectra of $Y_{0.99}P_3O_9{:}_{0.01}Gd^{3+}$phosphor exhibits broad spectra having high intense peak at 275 nm. Under UV excitation (275 nm), $Y_{0.99}P_3O_9{:}_{0.01}Gd^{3+}$ shows emission peak at 312 nm. The obtained results show that the prepared phosphor is suitable for Phototherapy application.

Keyword: XRD, Photoluminescence, SEM, UV excitation

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Effect of Methanolic Extract of Achyranthes Aspera Linn on the Larvae of Silkworm, Bombyx Mori L

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ABSTRACT

Some medicinal plants are widely used in the field of agriculture to protect the crops from the insect pests. In the present study the Achyranthes aspera is used to find out the larvicidal and antifeedants activity on the larvae of silkworm, Bombyx mori. The silkworm B. mori L.is used in the study as an experimental model as an insectlarvae.

The crude methanolic extract of Achyranthes aspera Linn. Seeds, foliar spray was used in different concentration on the leaves of mulberry and fed to fifth instar larvae of Bombyx mori. The growth rate, feed consumption index, approximate digestibility, Efficiency of Conversion of Ingestion (E.C.I.), Efficiency of Conversion of Digestion (E.C.D.) of food and the Mortality rate of the larvae are recorded.

The result of plant extract reveals that, there is marked decrease in the Growth rate, E. C. I. and E.C.D. as compare to control group. The feed Consumption rate of the larvae was increased in 25% and 75% concentration; whereas E.C.D. decreased value was observed in 75%. During the overall study period, in experimental group showed less mortality, whereas 30% mortality was observed in 75%concentration. The details are explained in the text.

Keywords: Achyranthes Aspera, Bombyx Mori, Methanolic Extracts, Growth Rate, Mortality, Digestibility

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Investigation of Thermo-Acoustic Properties of Water-1-Propanolbinary Mixture at Different Temperatures

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ABSTRACT

Ultrasonic velocity, density and viscosity have been measured using Anton Paar DSA 5000 M in the binary mixtures of 1-Propanol with water at various mole fractions from 0.1 to 0.9 with temperature ranging from 288K to 318K. Various derived parameters like adiabatic compressibility, acoustic impedance, free length and relaxation time have been calculated using standard formulae. Non covalent interaction taking place in the liquid mixture has been discussed on the basis of the values obtained from experimental parameters and derived parameters.

Keywords: Binary Liquid Mixtures, Ultrasonic Velocity, Density, Viscosity, Adiabatic Compressibility, Acoustic Impedance, Relaxation Time, Free Length, Intermolecular Interactions.

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Determination of Secondary Forces in Polar Organic Binary Mixture by Refractivity Method

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ABSTRACT
Densities and Refractive indices have been experimentally determined for the binary mixture of Methanol-Water at room temperature over the entire range of mole fraction. The experimental values of densities and refractive index are utilizing to calculate excess refractive indices, molar refractions, excess molar refractions, excess molar volume and calculated molar refractions. Outcome obtained indicate that the refractive method is more useful as compare to the volumetric method. From the result it is found that strong association is observed in studied system.

Keywords: Mole Fraction, Density, Refractive Index, Excess Refractive Indices, Molar Refractions, Excess Molar Volume.

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Drug Design and Medicinal Chemistry of Thiourea Derivatives: A Review

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ABSTRACT

The literature concerning thiourea and its derivatives is voluminous. These compounds have found their way into almost every branch of chemistry. In the academic field thioureas are of great value in the characterization of organic compounds and great medicinal applications as well as non-medicinal activities in industry, analytical chemistry and metallurgy. This review is a sight of methods of synthesis and applications of thioureas in the field of medicine and agriculture. thioureas have a number of medicinal applications and a number of thioureas are in clinical use. Medicinal applications of thioureas are increasing with the passage of time. In the field of agriculture, Thiourea has been investigated for its multiple desirable properties as a fertilizer especially under the condition of environmental stress and are used as insect growth regulator, anti-fungal agents and herbicides.

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Acoustical Properties of Binary Mixture at 298k and at 2 MHz Frequency

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ABSTRACT
Measurements of ultrasonic velocity, density and viscosity have been carried out in Acetonitrile in 1,4 Dioxane at different concentrations at 298 K temperature and 2 MHz frequency. Ultrasonic studies may throw more light on the molecular interaction to know the behaviour of solute and solvent molecules in liquid mixtures and solutions. Acoustical parameters as adiabatic compressibility (β_a), intermolecular free length (L_f) and free length (τ)for Acetonitrile in 1,4 Dioxane were calculated from ultrasonic velocity and effect of concentration on molecular interaction was predicted.

Keywords: Acetonitrile, Concentration, 1,4 Dioxane, Molecular, Ultrasonic

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Synthesis and Characterization Zinc Oxide Thin Films Prepared by Chemical Bath Deposition

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ABSTRACT

In the present work, zinc oxide thin films were prepared by simple chemical bath deposition (CBD) method. The deposition conditions such as pH and temperature were optimized to obtain well adherent uniform thin films. The prepared zinc oxide thin films were characterized for structural and morphological studies. The structural characterization was carried out by using X-ray diffraction (XRD) and Fourier transform Infra-Red (FTIR) spectroscopy. The structural characterization indicates the uniform deposition of zinc oxide thin films onto glass substrate. The X-ray diffraction pattern of chemical bath deposited zinc oxide shows all the characteristic peaks related to wurtzite phase of zinc oxide. Further, structural characterization was carried out using FTIR spectroscopy which also confirms the deposition of zinc oxide thin films. The morphology study of zinc oxide thin film was carried out using scanning electron microscopy (SEM). The SEM micrograph show granular structural morphology of zinc oxide thin films. In conclusion, zinc oxide thin films were successfully prepared by chemical bath deposition technique and the films shows uniform well adherent morphology.

Keywords: Zinc Oxide, Thin Films, Chemical Bath Deposition, Structure, Morphology

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Study of Morphological and Dielectrical Properties of Zr-Co Doped Barium Hexaferrite

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ABSTRACT
A sequence of hexaferrite specimen with a molecular formula $BaFe_{12-2x}Co_xZr_xO_{19}$ were synthesised using a traditional Microwave assisted Sol-gel auto-combustion process, where ferrites powder was processed by continual heat in the form of radiation through microwave. All the required nitrates were taken in stoichiometric proportion along with Urea, which provide requisite energy during the exothermic reaction in order to form ferrites materials powder. Microwave used in these methods provide uniform heating leads to the ultrafast morphological transformation which results into nano-sized ferrites powder obtained. The structural and morphological properties studied by using X-ray diffractometer and Scanning Electron Microscope which reveals the prevalent hexagonal structure of space group symmetry $P6_3/mmc$. The dielectric features of the ferrites powder were studied at a frequency ranging from 100 Hz to 1 MHz at room temperature. The dielectric observation of synthesized hexaferrites reveals a drop in dielectric constants and a rise in dielectric loss with an increase in Co-Zr substitutions.

Keywords: XRD; SEM, Dielectric Properties, Ba- hexaferrites

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Thermal Behaviour of Polythiophene Composite Thin Films doped with Iodine

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ABSTRACT

Synthesis of polymer composites poly (vinyl acetate) (PVAc) and polythiopene (PTh) was done by chemical oxidative method using ferric chloride oxidant in methanol. Thin films with PTh-PVAc polymer composite were prepared for 5.5, 10.4, 14.9, 18.9 and 22.5 wt % of Iodine as a dopant. Dielectric relaxation activation energy and relaxation time is found to be maximum for 10.4 wt% of Iodine. Bulk capacitance is found to be maximum for 5.5 wt % of Iodine.

Keywords: Poly (vinyl acetate) (PVAc), Polythiophene (PTh), Iodine, dc, ac.

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Composites: Poly Aniline–Polyvinyl Alcohol- Cuprous Chlorides Applied Different Temperature for Gas Detector

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ABSTRACT

In our present study, we have developed Polyaniline –Polyvinyl alcohol -Cuprous chloride doped thin films polymeric composites. These films were synthesized by chemical oxidative polymerization in aqueous medium. These polymeric composites were characterized by U. V. -visible, FTIR, surface morphology by Scanning electron microscope (SEM). Their electrical conductivity was measured by four probe techniques. The ohmic behaviour observed by I-V characteristics. Gas monitoring properties of the sensor was checked against hazardous gases like Ammonia. The sensor shows almost stable and repeatable response for minimum 5 ppm and maxmum 500 ppm for at varies at 25-40 degree temperate.

Keywords: Polymer, Polyanailine, Cuprous Chloride, Conducting Polymer, Ammonia Gas Sensor.

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Physico-Chemical Analysis of Soil Samples from Area near Wardha River, Maharashtra, India

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ABSTRACT

An investigation was carried out for characterization of soils of areas near Wardha river. The selected area includes villages of Yavatmal, Chandrapur and Wardha district. Standard analytical methods and procedures were followed for analysis of physico-chemical parameters of soils. Total 9 samples of soil from Patala, Kapasi and Pohana were analyzed for pH, Phosphate, hardness, alkalinity, chloride, sulphate, Calcium, Magnesium, and the results were compared with the limits of Indian Standards: 10500.

Keywords: Physico-Chemical, Ph, Phosphate, Potassium, Sulphate, And Cloride, Soil Analysis, Wardha River

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Structural and Electrical Properties of Nano [Ni 0.6 Zn 0.4 Fe2 O4] Spinel Ferrite

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ABSTRACT

Nano Ni-Zn ferrite with composition $Ni_{0.6}Zn_{0.4}Fe_2O_4$ is prepared by using sol-gel auto-combustion method with citric acid as a fuel. The structural properties of synthesized nano-ferrite is characterized by powder X-ray diffraction (XRD) technique while the electrical properties have been studied using two probe method. The X-ray diffraction study confirms that, there is a formation of single-phase cubic spinel with most intense peak at [311] having lattice constant of 8.3585 A^0 and the average particle size is found to be 45.63 nm. In addition to this, the electrical resistivity of Ni-Zn Ferrite decreases with increase in temperature which exhibits semiconductor nature.

Keywords: Nano Ni-Zn ferrite, sol-gel technique, XRD, Electrical Resistivity.

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Using Fourier Transform Technique Investigate of Temporal and Spatial Coherence of Radiative Material

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ABSTRACT
Fourier transform spectroscopy has progressed in research area like molecular structure examination and analyses. This type of spectroscopy is a measurement technique in which spectra are collected with respect to the measurements of the temporal coherence of radiative materials. We investigate the Coherence lengths of a light source, which is obtained by dc glow discharge of different electrolytic solution in the interface of solid and liquid with the help of Fourier Transform Spectroscopic method. The respective coherence time and fringe width (spectral width) of the 16 sources has been calculated from the measured respective coherence length.

Keywords: Radiative Materials, Dc Glow Discharge, Coherence Length, Fringe Width

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Selective Photo thermolysis Induced by Solid State Diode Laser for Permanent Hair Reduction

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ABSTRACT

We used pulsed laser emitting 20 msec pulses at 800 nm wavelength having peak power 1600 W (Frequency=2Hz) for removing the hairs from the human face. The energy density of the pulse used for removing hair is about 30 J/cm^2. The size of the laser beam utilized was about 9mm^2. About six or more sessions are essential for reducing the number of hairs. [1] In an average 650 to 950 pulses were used per patient per laser treatment session corresponding to 20.8 to 30.4 kJ energy. The number of hairs exponentially decreased as a function of sessions. (A gap of about 1-month is essential between two consecutive sessions for allowing the possible wounds to heal.) We utilize the diode laser for removing the hairs of about 300 patients. It is observed in many cases that the hair are either completely reduced or the hair become thinner. The method has very less side effect.

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Structural and Morphological Characterization of Ni1-Xcoxo-SDC Nano-Powder Synthesized by Glycine – Nitrate Combustion Synthesis for Its Application in IT-SOFC

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ABSTRACT

$Ni_{1-x}Co_xO$-SDC nano-composite powder was synthesized by single step Glycine Nitrate Combustion Process (GNP). In case of GNP, glycine to nitrate ratio (g/n) plays an important role in deciding the powder characteristics. In the present study, selected (g/n) ratio is 0.97. The powder properties were studied by using X-ray Diffraction Technique (XRD), Scanning Electron Microscope (SEM) and Energy Dispersive X-ray Analysis Technique (EDAX). XRD study revealed, the formation of composite powder consisting of separate phases corresponding to cubic NiO, cubic SDC and cubic Co_2O_4. Crystallite size of the powder is found to increase with the increase in annealing temperature. Calculated crystallite size of the as synthesized powder by using XRD technique is found to be 4.7 nm and 7.5 nm for powder heated at 600 ºC for 2hr. XRD studies confirmed the formation of nano-crystalline powders. SEM studies revealed the highly porous nature of the powder. No other impurity peaks were detected from the EDAX study. Thus nano-crystalline, composite, $Ni_{1-x}Co_xO$-SDC powder was synthesized successfully by using environmentally friendly, inexpensive, rapid, single step glycine nitrate combustion method for its possible application to fabricate an anode for Intermediate Temperature Solid Oxide Fuel Cells (IT-SOFCs).

Keywords: $Ni_{1-x}Co_xO$-SDC, Glycine Nitrate Combustion Process, intermediate temperature solid oxide fuel cells, Nickel based anodes

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Photoluminescence Properties of Some Molybdate Phosphors Containing Bismuth

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ABSTRACT

Eu^{3+}- doped Molybdate Phosphors Containing Bismuth are prepared by a combustion method and characterized by X-ray diffraction (XRD) patterns, photoluminescence (PL) spectroscopy. PL properties have an impact on factors along with molar ratio of Bismuth (Bi^{3+}) and Molybdate (Mo^{6+}) ions, dopants concentration are Studied. The results show that Molybdate Phosphors Containing Bismuth can act as a useful host for Eu^{3+} ions doping, and energy transferring from Bi^{3+} to Eu^{3+} achieved efficiently hence this phosphor displayed intense red color emission under ultraviolet light excitation.

Keywords: Combustion Method, Molybdates, Photoluminescence, Phosphor.

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Optically Stimulated Luminescence (OSL) properties of CaF_2: Ce phosphor for radiation dosimetry

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ABSTRACT

OSL technique is a now well-developed for its application in radiation dosimetry. Antonov Romanovskii *et al.* were firstly suggested use of OSL for personal dosimetry. However, compared to thermoluminescence (TL) technique, Optically Stimulated Luminescence (OSL) is becoming more popular in radiation dosimetry. The polycrystalline CaF_2:Ce phosphor was successfully synthesized via Reactive Atmosphere Process (RAP). The structural properties of prepared phosphors were evaluated X-ray diffraction (XRD) technique. The XRD pattern of prepared phosphor well match with ICDD (International centers for diffraction data) file and synthesis methods were not affected on XRD pattern. The $CaF_2:Ce^{3+}$ phosphor show good CW-OSL response under γ irradiation. The CW-OSL decay pattern of prepared $CaF_2:Ce^{3+}$ phosphor is similar to the CW-OSL decay pattern of commercially available α-Al_2O_3:C phosphor. The photoluminescence (PL) excitation and emission spectra were observed at 305 nm and 338 nm, respectively. The effective atomic number (Z_{eff}) of $CaF_2:Ce^{3+}$ is 16.3 and the phosphor is a candidate for radiation dosimetry.

Keywords: Reactive Atmosphere Process, Γ Irradiation, Effective Atomic Number, $Caf_2:Ce^{3+}$ Phosphor.

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Ultrasonic Investigation of Aqueous Ascorbic Acid in Koh At Temperature 308.15K

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ABSTRACT

For the study of molecular interaction of aqueous ascorbic acid in KOH solution using ultrasonic at temperature 308.15K, we measure three impartment parameters that are ultrasonic velocity (U), density (ρ) and viscosity (η). The measurement of ultrasonic velocity was carried out by using the ultrasonic pulse eco overlap (PEO) technique at frequency 5 MHz. The measurement of density has been carried out by using hydrostatic plunger method and viscosity by Oswald's viscometer. The temperature 308.15K have been kept constant using thermostat by circulating water. Experimental data have been used to calculate the thermo-acoustical parameters such as adiabatic compressibility (β), acoustic impedance (Z), free length (L_f), free volume (V_f), wada's constant (β_m) and Rao's constant (R). These parameters have been used to give the interpretations of solute- solvent interaction of aqueous ascorbic acid and KOH molecules. This study also shows the nature of molecular interaction and complex formation in the given solution. It also provides important information regarding molecular properties of a mixture of solute and solvent.

Keywords: Ultrasonic velocity, adiabatic compressibility, free volume, Wada's constant, Rao's constant and ascorbic acid.

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Synthesis and Photoluminescence Properties of White Emitting CaS Phosphor doped with Sn for Solid State Lighting

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ABSTRACT

We have synthesized Sn^{2+} doped CaS white emitting phosphors by carbo-thermal reduction method. In this method special requirement such as H_2S gas flow is not required as a source of sulphur and is comparatively easy method to prepare sulfides. The phase purity and surface morphology of prepared material was investigated by using X-ray diffraction (XRD) and Scanning Electron Microscope (SEM). Phosphor exhibit broad band excitation which has excellent spread over nUV as well as Blue region. Emission is in the form of characteristic broad band of Sn^{2+} covering entire regions of visible spectrum with HWFM of 60 nm. The XRD pattern of prepared phosphor well matches with ICDD (International center for diffraction data) file. Synthesized phosphor particles are of different sizes, with smooth surfaces, from less than 1 micron to few microns. CIE coordinates are (0.304, 0.361) under the excitation at 469 nm. The prominent excitation peaks located at 370 nm (nUV) and 469 nm (blue light i.e. 440–480 nm), which indicates that the phosphors are promising material for a color converter using blue LED as the primary light (pumping) source in phosphor converted white LED (pc wLED) for solid state lighting.

Keywords: Solid State Lighting, Carbo-Thermal Reduction Method, White Phosphor, Photoluminescence

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High Frequency Dielectric Properties of DMA with 1, 4-Dioxane using picosecond Time Domain Reflectometry

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ABSTRACT

The Complex dielectric spectra $\varepsilon^*(\omega)=\varepsilon'-j\varepsilon''$ of binary mixture of N, N –dimethylaniline (DMA) with 1,4 Dioxane were obtained in the frequency range 10 MHz to 30 GHz using Time Domain Reflectometry (TDR) technique. The static dielectric constant (ε_0) and relaxation time (τ) have been obtained. On the basis of dielectric parameters intermolecular interaction are predicated.

Keywords: Time Domain Refelctometry, Complex Dielectric Spectra, Relaxation Time.

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Measuring Diversity: Importance of Species Distribution by Using Mathematical Methods

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ABSTRACT
The calculation done according to Shannon Wiener Diversity Index, quadrant method use for the calculation for the concentration of diversity, Wiener index showing varies according to different habitats, so calculation explore on the possibility of ecological value, The measurement of diversity of species of four sampling stations varies according to habitat such as mangrove habitat, rocky substrata, sandy shore, and muddy habitat, present data statistically analysis done given time period, so that the index is useful for practical applications.

Keywords: Diversity, Shannon Wiener Index.

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Underwater-Coastal Diversity, Statistical Analysis of Species Distribution

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ABSTRACT

Diversity of bivalve and Gastropod molluscs was studied twice in each season monsoon, post monsoon, winter and summer July 2016 to June 2017. At each locality diversity of species were collected from Bhatye estuary, Shirgaon creek, Mirya, Bhawati-bander and local markets. From various locality like rocky habitat, Muddy habitat, Sandy beaches including Mangrove areas, these study localities are a wide chance of research to further explore both on the possibility of commercial value and ecosystem conservation.

Keywords: Edible Bivalve, Gastropod Molluscs, Diversity.

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Diversity of Snake Species from Pusad Region, Maharashtra, India

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ABSTRACT

The study of venomous, semi venomous and Non venomous snakes' species by different habitat from the Pusad region (Vidarbha), and common species found like Common kukri, Common Wolf snake, Green keelback, Russell's viper, Worm snake, Bamboo pit viper, Common trinket, Indian rat snake, total seventeen species observed survey conduct day time and night time, from study period during July 2016 to August 2017. The study is essential for the enrichment of the individual species survival and will helps to provide information, awareness and conservation of snake species from Pusad Tahasil of Maharashtra state, India

Keywords: Snakes, Pusad Region, Common Kukri, Common Wolf Snake, Green Keelback, Russell's Viper, Worm Snake, Bamboo Pit Viper

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Comparison of Ac Conductivity of PVC-PS Blend and PANI Doped PVC-PS Blend

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ABSTRACT

The polyblend of polyvinyl chloride (PVC) and polystyrene (PS), in the weight ratio 5: I was prepared by using 1.25 gm of PVC and 0.25 gm of PS. Polyaniline (PANI) has been used as dopant with 2.5 % of the total weight of the two polymers. The ac conductivity of polyaniline doped PVC-PS thin films have been investigated in the temperature range 313 K -353 K and in the frequency range 0.5 KHz - 200 KHz. Plot between log σ_{ac} and 1000/T is used to calculate activation energy.

Keywords: Polyblend, PVC, PS, PANI, ac conduction.

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Effect of Co-Doping on Structural and Optical Properties of ZnO Thin Films

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ABSTRACT

Here, we report the effect of Co-doping on structural and optical properties of ZnO thin films prepared via simple and cost-effective spray pyrolysis technique. The x-ray diffraction (XRD) confirmed the formation of the hexagonal wurtzite structure of undoped and Co-doped ZnO thin films with preferential growth along c-axis and had no phase impurity. The average crystallite size of prepared films calculated by Scherrer's formula and found to be 18.11 nm for ZnO and 14.12 nm for Co doped ZnO films. The calculated energy band gap exhibited a red shift upon doping with energy band gap reduced from 3.20 eV to 3.12 eV for the studied doping content. These studies show that the synthesized films have the potential to be used as a transparent electrode in optoelectronic devices such as solar cells.

Keywords: Thin Films, Zno, Spray Pyrolysis, X-Ray Diffraction, Uv-Vis Spectroscopy.

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Aeromycological Investigations of Intramural Environment of Hospital and Library in Nagpur City (M.S.) India

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ABSTRACT

An intramural aeromycoflora of two different sites viz. Hospital (Bhoyar Hospital) and Library (RTMNU, University Library) at Nagpur city was carried out for two consecutive years September 2007 to August 2008 by sampling air with the help of rotorod air sampler, to study the incidence of fungal spores.

Total airspora concentration 48065 spore /m^3, were observed at both the sites. Although the composition of aeromycoflora of both environments were more/less similar. 59 types of fungal spores were identified from the total catch of indoor environments from hospital 26485 spores /m^3 and 21580 spore /m^3 from Library by using rotorod sampler. The different fungal spores in both the sites are in the order of dominance are *Aspergilli* (11.44%, 12.27%), *Cladosporium* (8.53%, 10.98%) *Curvularia* (8.08%, 8.89%), *Alternaria* (5.87%, 6.32%), *Nigrospora* (2.68%, 5.25%), *Smuts* (2.05%, 1.69%) *Helminthosporium* (4.00%, 4.0%) and Other types (28.84%, 20.18%) in including pollen grains and unidentified spores respectively. Among the fungal groups, *Deuteromycotina* in Hospital and in Library contributed most at both the sites viz. Hospital (54.20%) & Library (62.92%) followed by *Ascomycotina* (8.53%, 11.49%), *Basidiomycotina* (7.30%, 4.54%) & *Zygomycotina* (1.11% ,0.85%) respectively.

The occurrence of different spore types was co-related with the meteorological parameters. Airborne fungal spores are known to cause allergy in human beings. Hence efforts were also taken to survey of allergy patients in the study area.

Keywords: Aspergilli, Intramural aeromycoflora, allergy, meteorological parameters. (Note: Aspergilli was a group having the spores of similar appearance i.e., small and rounded e.g., *Aspergillus, Penicillium, Rhizopus Mucor Tricoderma* etc.)

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Thermo-Acoustical and Excess Parameters in Ternary Mixture of Containing Aqueous KOH in Dimethyl Sulfoxide at Different Temperatures

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ABSTRACT

The thermo-physical parameters such as density (ρ), ultrasonic velocity (U) and viscosity (η) are determined for a ternary mixture (n=3) of aqueous potassium hydroxide (aq. KOH) and dimethyl sulfoxide (DMSO) system at 0.0% to 100% (v/v) and at different temperatures. Using the experimental data, adiabatic compressibility (β), free length (L_f) and free volume (V_f) are evaluated at different temperatures. The excess values of adiabatic compressibility (β^E), excess free length (L^E_f) and free volume (V^E_f) have also been computed by using the experimental data. The behaviour of these parameters with composition of the mixture has been discussed in terms of molecular interaction between the components of the liquids. The deviation in the excess values reveal that intermolecular interactions obtaining in the solution.

Keywords: Ultrasonic velocity, acoustical parameters, molecular interactions, aqueous potassium hydroxide (aq. KOH) and dimethyl sulfoxide (DMSO).

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Enhancement of Efficiency of Solar Plate Receiver Using Selective Coating of TiO_2 Nanofluids

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ABSTRACT
The main objective of this paper is to minimize irradiative heat loss and to enhance absorption of incoming solar radiation as much as possible using TiO_2 nanofluids. The cavity receiver is an important part for solar energy collection. Currently efficiency of solar cell is very less around 10 percent. The performance of solar system can be improved by effective coating of TiO_2 nanoparticles at receiver end. The utilization of sunlight from UV to visible range or near IR range is an active issue in this field. The energy transfer process activates the photo catalytic reaction on the surface of TiO_2. On the other hand, plasmonic materials show size dependable surface Plasmon resonance. Due to oscillations of free electrons in the plasmonic metals, strong light absorption take place and can generate large electric field near the surface. Quantum confinement plays the role with particle size reduction thereby causing changes in energy band. Combining both effect using semiconductor nanoparticles (TiO_2) is effective to enhance the efficiency of solar plate receiver.

Keywords : Solar Energy, Tio_2 Nanoparticles, Surface Coating, Quantum Confinement

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Thermal Characterisation of Polypyrole/Rhodamine-B Dye Composite Synthesized by Simple Chemical Method

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ABSTRACT

In-situ chemical oxidative polymerization of pyrrole (Py) was carried out by doping it with xanthene dyes such as Rhodamine-B in the presence of oxidizing agent ammonium peroxydisulphate to synthesize polypyrrole/Rhodamine-B composites. The PPY Rhodamine-B composites were synthesized with various compositions 0.0001 M and 0.00001 M Rhodamine-B in pyrrole. Thermal characterization of synthesized composites was carried out by TGA and DTA analysis. These studies suggest that they exhibit amorphous behavior and change in surface morphology due to insertion of dopant molecules.

Keywords: PPy, PPy, Rhodamine-B, APS.

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Determination of Phytoconstituents of Blepharis Repens (VAHL) Roth. Stem Through GC-MS

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ABSTRACT

Phytochemical constituents are responsible for medicinal activity of plant species. Hence in the present study phytochemical constituents presents in the *Blepharis repens* (Vahl) Roth stem. The shade-dried stem of *Blepharis repens* were extracted with methanol, the concentrated extracts was further subjected to GC-MS. The GC-MS analyses determined the presence of 13 different phytochemical compounds in the methanol stem extract of *Blepharis repens*. The phytochemical compounds were found in the mass spectra was matched with the National Institute of Standards and Technology (NIST) library. In methanol extract of stem 13 compounds were detected. The major phytoconstituents are vitamin-E (20.77%), squalene (18.77%), stigmasterol (23.36%), β-sitosterol (21.31%). The results of the present study reveal that the stem of *B. repens* having effective potential bioactive compounds, which may be leads to the formulation of new drugs to treat various diseases.

Keywords: *Blepharis repens*, phytomedicines, phytoconstituents, GC-MS, secondary metabolites.

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Biosensors in Medicine

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ABSTRACT
Biosensors devices have attracted the attention of many researchers across the world. They have the capability to solve a large number of analytical problems and challenges. They are future ubiquitous devices for disease diagnosis, monitoring, treatment and health management. Biosensors and their role in medical science including early-stage detection of human interleukin-10 causing heart diseases, rapid detection of human papilloma virus, etc. are important aspects. In this research paper we have been highlighted applications of biosensors in medicinal field.

Keywords: Biosensors, Biosensors in Medicine, Environmental Monitoring, Genetic Enginnering.

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Analysis of Water Quality Using Physico-Chemical Parameters, Jamwadi Reservoir in Yavatmal District, MS, India

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ABSTRACT
Jamwadi Reservoir is a small local reservoir located in the village, Jamwadi, District Yavatmal, Maharashtra, India, is a construction above the water flow of Yavatmal apart from the surrounding areas. Physico-chemical character of the Jamwadi reservoir, pollution studies have been studied from February 2021 to March 2021. Apart from disinfectants in the reservoir, it is nutritious as well as sufficient for the growth of aquatic plants. The above study suggests that the Jamwadi reservoir tends to atrophy somewhat below the class of mesotrophic water bodies. Therefore, apart from the administration of this water body, management is also needed. At this time, we will study about chloride, total hardness MIG hardness, CA hardness, alkalinity, temperature, pH parameters.

Keywords: quality, tropic status, physicochemical, chloride content, hardness.

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Bianchi Type-VIh Cosmological Model with Quadratic EOS in f(R, T) Theory

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ABSTRACT

In this paper, we study the spatially homogenous and anisotropic Bianchi type-VIh cosmological model in $f(R,T)$ modified theory with variable cosmological term Λ. Solutions are found by assuming forms of the function $f(R,T)$ as $f(R,T) = f_1(R) + f_2(T)$ and with a quadratic equation of state. It is found that some of which are decelerating and others accelerating. Here, the cosmological parameter is not constant, but it is taken as variable, which can solve the cosmological constant problem.

Keywords: Cosmological Model, Equation of State, f(R, T) Theory, Bianchi Type VIh.

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Ultrasonic Investigations of Substituted 2-oxo-2H-Chromene-3-Carbohydrazide Derivatives in 80% (DMF + Water) Mixture at 305K

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ABSTRACT

Ultrasonic study of substituted 2-oxo-2*H*-chromene-3-carbohydrazide derivatives is done. In the present work, different properties such as apparent molal volume (ϕ_v), apparent molal compressibility (ϕ_k), relative association (R_A) and solvation number (S_n) have evaluated for following substituted 2-oxo-2*H*-chromene-3-carbohydrazide derivatives in 80% (DMF+water) mixture at 305K in different concentrations of ligands.

Keywords: Substituted 2-oxo-2*H*-chromene-3-carbohydrazide derivatives, apparent molal volume (ϕ_v), apparent molal compressibility (ϕ_k), relative association (R_A) and solvation number (S_n).

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Determination of Adiabatic Compressibility, Intermolecular Free Length and Specific Acoustic Impedance of Substituted 2-oxo-2H-Chromene-3-Carbohydrazide Derivatives in 60% (DMF + Water) Solvent at 305K

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ABSTRACT

Investigation of adiabatic compressibility (β_s), intermolecular free length (L_f) and specific acoustic impedance (Z) of substituted 2-oxo-2H-chromene-3-carbohydrazide derivatives in 60% (DMF + water) Solvent at 305K. The solute solvent interaction is understood from the magnitude of partial molar volume and partial molar compressibility at various concentration.

Keywords: Substituted 2-oxo-2H-chromene-3-carbohydrazide derivatives, Apparent molal compressibility, Solvation number, Apparent molal volume and Adiabatic compressibility.

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The Role of Mathematics for Scenarios of Gastropod Diversity and Ecosystem Services

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ABSTRACT
A present study was carried out on marine gastropod accessibility among coastline to collection, taxonomical identification and diversity by using some mathematical methods Shannon Wiener Diversity Index, One-way ANOVA, α diversity, data obtained from rocky platform, boulder field, some sheltered areas sandy beaches, and muddy habitat, SCUBA used for sampling-data collection, The molluscan fauna is rich in prevalence of various habitats, so there is urgent need to taxonomical study of species and mathematical analysis for more accuracy for current status and future planning as well as sustainable utilization in the point of view of biodiversity conservation.

Keywords: Quadrat Method, Diversity, Shannon Wiener Index.

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Determination of Synthesized 1-Phenyl Naphthaoic Acid Lignan (PNAL) By Using Analytical Techniques HPLC

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ABSTRACT

Determination of 1-phenyl naphthalene and lignans by analytical techniques are used High Performance liquid chromatography.1-phenyl naphthalene has been synthesis via friedel craft acylation and Perkin–Oglialoro reaction followed by cyclization reaction. The key precursor uses for synthesis of foresaid product by β -benzoyl propionic acid (β-BPA) through friedel craft acetylating reaction by mixture of succinic anhydride, benzene and its derivative with zeolite at streamline time to obtain blended accumulation followed by work-up with cold acid-water (1:1) treatment. The obtained accumulation distillation eliminates benzene liquor and obtained the crude mass. It was dissolved in aqueous solution of sodium carbonate (1:10) and acidification by hydrochloric acid to form crude β-benzoyl propionic acid (β-BPA) and their derivatives, perkin acid synthesize by two steps in which butenolides are prepared by β-BPA and aryl aldehyde using weak base catalyst pyridine and followed by cleavage of lactone ring methanolic base hydrolysis to form perkin acid. The perkin acid undergoes cyclization using zeolite gives 1-phenyl naphthalene. All the compounds are determined by HPLC.

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Green Synthesis of Silver Nanoparticles by Flowers and It's Application

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ABSTRACT

Green synthesis of silver nanoparticle by flowers is an easy, efficient, economical, ecofriendly, biological synthesis approach. The biological synthesis of nanoparticle has provided a means for improved technique compared to the traditional method that uses the harmful reducing agents. Flowers have unique properties that are useful to synthesis nanoparticles. Chemical and physical Methods of synthesis are toxic and costly that reduce medicinal application. As compared to microbial nanoparticles are more stable and monodispersed and plant extract takes less time to reduce metal ions. Chemical and physical methods for the synthesis are toxic and very costly affects the medicinal application. Biogenic method of silver nanoparticle synthesis is eco-friendly and produced nanoparticle with the precise shape and size. To form the green synthesized silver nanoparticle by flower extract and used it in various application.

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A Parametric Study of Acoustical Properties of Salicylamide Drug at Different Temperature

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ABSTRACT

This research paper is to pin out the various molecular interactions of molecules in the alcoholic salicylamide drug at the different temperature. Evaluations of molecular interactions of alcoholic salicylamide drug at different temperature have been investigated under ultrasonic technique at 2MHz. Ultrasonic data of drug solutions has been estimated at various desired thermo-acoustical parameters. A significant existence of solute-solvent and solute-solute interactions present in the system. Hence it is evident that the ultrasonic velocity measurement in the given medium serves as a careful probe in characterizing the physico-chemical properties of the medium

This research paper has said the various types of possible molecular interaction in the drug solution. This investigation has been thoroughly analysed and eventually interpreted at the possible molecular interactions such as structure making and structure breaking effect and also solute-solvent, ionic interaction, H-bonding effect in the alcoholic salicylamide drug solution. The results obtained from these studies can thus be helpful for pharmacological application of drugs.

Keywords: Ultrasonic velocity, Density and Acoustical parameters, Salicylamide drug, Alcohol

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X-Ray Diffraction Study of Polypyrrole/Fluoroscein Composite Synthesized by Chemical Method

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ABSTRACT

In-situ chemical oxidative polymerization of pyrrole (Py) was carried out by doping it with Fluoroscein in the presence of oxidizing agent ammonium peroxydisulphate to synthesize polypyrrole/Fluoroscein dye composites. The PPY/ composites were synthesized with various composition of fluorescein dye in pyrrole. Morphological characterization of synthesized composites was carried out by powder X-ray diffraction (XRD) analysis. These studies suggest that they exhibit amorphous behavior and change in surface morphology due to insertion of dopant.

Keywords: PPy, APS.

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Synthesis and Characterization of ZnO Thin Films Using Advance SILAR Method

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ABSTRACT
ZnO thin films were prepared by advance SILAR method using 0.1 M Ammonium Zincate bath. The coated films were annealed 2hr at 400 °C. The structural and optical properties were studied by X-ray diffraction and UV– vis spectroscopy respectively. The hexagonal Wurtzite structured ZnO thin films were confirmed by X-ray diffraction (XRD) and preferential orientation along the (101) plane was confirmed from structural analysis. The crystallite size is found to be in range 29-31 nm and which is increases with no. of dipping cycles. The optical properties of the ZnO thin films were estimated using the absorption spectrum in the range of 400 –700 nm.

Keywords: Ammonium Zincate bath, Structural property, Optical property, Advance SILAR.

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Molecular Interactions by Ultrasonic Measurements in Aqueous and 10% Ethanol-Water Solutions of MYO-INOSITOL at 298.15K

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ABSTRACT
Density(ρ), ultrasonic velocity(U) and viscosity(η) have been measured experimentally for aqueous solution of myo-inositol at concentration range (0.1 M- 0.9 M) and 10% ethanol-water solutions of meyo-inositol at concentration range (0.05M-0.45M) at temperature (298.15K). The acoustic parameters such as adiabatic compressibility(β),free length(L_f), free volume(V_f), relaxation time(τ) and internal pressure have been worked out. The results are correlated in terms of non-covalent molecular interaction between the constituents of solutions.

Keywords: Ultrasonic velocity, Acoustic parameters, Meyo-Inositol

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Thermodynamic Characterization of Dimethyl Formamide and Ethylamine by Using Ultrasonic Techniques at Different Temperatures

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ABSTRACT

Ultrasonic technique provides the interaction of high frequency sound wave with matter resulting to generation of information about physico-chemical properties. Many researchers have been studying the application of ultrasonic waves in different areas like medicines, oceanography, aerospace, navy and material science. Nowadays Ultrasonic became a multidimensional area of study due to its different industrial and medical field. In present research paper, the Ultrasonic velocity (U), density (ρ) and viscosity (η) of binary liquid mixtures of Dimethylformamide (DMF) and Ethylamine (EA) have been measured using Ultrasonic Interferometer at frequency 7MHz and at different temperature (298K-308K). From the measured data of ultrasonic velocity, density and viscosity at different temperatures the acoustical parameters such as adiabatic compressibility(β_a), Free Length(L_f), Acoustical Impedance(Z), Internal Pressure(π_i), Relaxation time(τ), Free Volume(V_f), Molar Volume(Vm), Rao's Constant(R), Wada's Constant (W), Vander Waal's Constant(b), Gibb's Free Energy(ΔG), Classical Absorption(α/f^2), Isothermal Compressibility(β_i), Enthalpy(H) and Internal Latent heat of Vaporization (ΔH_i) of binary liquid mixture dimethylformamide in ethylamine at temperature range 298K-308K and frequency at 7MHz are with mole fraction and some probable reasons on the increase or decrease of acoustic and thermodynamic parameters with temperature change are also have been studied.

Keywords: Ultrasonic Velocity, Physico- Chemical, Thermodynamic, Hydrogen Bonding

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DC Conductivity and XRD of Solid Polymer Electrolytes

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ABSTRACT

A solid polymer electrolyte of polyvinyl alcohol with ammonium bromide having different composition have been prepared by solution cast technique. We have measured the DC electrical conductivity of solid polymer electrolyte at different temperature. The dc conductivity was obtained from current-voltage characteristics by using two probe technique in the different temperature range. The addition of salt in the polymer PVA increases the ionic conductivity. XRD analysis reveals the complex formation between the polymer and salt.

Keywords: Polyvinyl alcohol, Ammonium bromide, XRD, DC electrical conductivity.

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Frequency and Temperature Dependence of Ultrasonic Properties of Aqueous PVA solutions Using Pulse-Echo Technique

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ABSTRACT

Molecular interaction study in polymers provides valuable information regarding internal structure, molecular association, etc. Ultrasonic investigations of polar- polar or polar- non-polar components are important in understanding the intermolecular interaction between component molecules. The ultrasonic pulse echo technique provides an effective and reliable tool to investigate properties of polymer solutions in the light of phase separation studies. The propagation of ultrasonic waves and the measurement of ultrasonic properties in solution form an important tool for the evaluation of various acoustical and thermo- dynamical parameters which give an insight into the nature of miscibility/compatibility and molecular interactions in polymer solution. The phenomenon polymer- solvent miscibility may arises due to any specific molecular interactions such as hydrogen bonding, dipole- dipole interactions and charge transfer complexes for homogeneous polymer- solvent mixture. Miscibility is an important phenomenon in polymer solution to achieve mechanical integrity, better adhesion, better processing and optimum property gain. Recently the use of ultrasonic waves has shown a great potential for characterization of polymer solutions.

In present work, aqueous PVA (Polyvinyl alcohol) are often used due to various useful properties in medical field. However, temperature changes also affect these properties. In this paper we present a method for measuring ultrasonic velocity, density, viscosity and ultrasonic absorption of polymer solutions. We also give experimental values for PVA solutions for temperatures between 288K to 308 and for 2 MHz ultrasound frequency.

Keywords: Ultrasonic, acoustic and optical parameters, PVA-polyvinyl alcohol, molecular interactions, pulse echo technique

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Copper-Silver Bimetallic Nanoparticles Synthesized by Electrochemical Reduction Method

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ABSTRACT
Copper-Silver bimetallic nanoparticles were synthesized by electrochemical reduction method which is environmental benign. The tetra butyl ammonium bromide (TBAB) used as stabilizing agent in an organic medium *viz.* tetra hydro furan (THF) and acetonitrile (ACN) in 4:1 ratio by optimizing current density. The parameters such as current density, solvent polarity, distance between electrodes, and concentration of stabilizers are used to control the size of nanoparticles. The synthesized copper-silver bimetallic nanoparticles were characterized by using UV-Visible, FT-IR, XRD, SEM-EDS and TEM analysis techniques.

Keywords: Electrochemical cell, Tetra butyl ammonium bromide, Copper-Silver bimetallic nanoparticles, SEM, TEM and XRD.

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Electron Temperature as Well as Radial Profile of Spectral Emission Also Change Due to Formation of a Laser Pulse

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ABSTRACT
The radial profile go on changing the shape as a function of time. During the formation of a laser pulse the electron temperature dose not remain same consequently the radial profile of spectral emission also changes. In some cases when the electron temperature is relatively low, the radial profiles are almost Gaussian at all the times, however the peak height goes on changing. We compute the temporal profiles of the spectral emission of the discharge for the initial electron temperature It is found that the diameter of the ring of the radiation is determined by the initial electron temperature at the axis. If the electron temperature is increased the diameter of the ring increases.

Keywords: dc glow discharge, radial and temporal profile, electron temperature.

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Dielectric Relaxation Study of Liquid Polymers of Ethylene glycol oligomers using Picosecond Time Domain Reflectometry

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ABSTRACT

The dielectric relaxation measurement of polymers in water mixtures have been carried out over entire concentrations, at temperatures 25^0C using picoseconds time domain reflectometry technique in the frequency range of 10 MHz to 30 GHz. The complex permittivity spectra of polymer - water mixtures were fitted using Havriliak-Negami equation. The static dielectric constant (ε_0), high frequency permittivity (ε_∞) and relaxation time(τ) for all concentrations have determined using least square fit method. The variations in dielectric parameters with molecular size is studied.

Keywords: Polymers, Dielectric Relaxation, time domain reflectometry, static dielectric constant (ε_0), high frequency permittivity (ε_∞), relaxation time (τ) etc.

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Energy Transfer Process in MgF_2: Gd^{3+}, Eu^{3+} Phosphor : Application to Visible Quantum Cutting

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ABSTRACT

Visible quantum cutting (QC) is observed in MgF_2 Co-doped with Gd^3, Eu^{3+} phosphor synthesis via wet chemical method. Powder X-ray diffraction analysis shows structural purity. The emission and excitation spectra of MgF_2:Gd^{3+}, Eu^{3+} were investigated using the VUV beam line of the Beijing Synchrotron Radiation Facility (BSRF). Energy transfer in gadolinium compounds from the Gd^{3+} ions to Eu^{3+} through cross relaxation occurs in this process. Quantum efficiency was found to be greater than 100% under the excitation of 172 nm and 203 nm corresponding $^8S_{7/2}$ ^6G_J transition of Gd^{3+} ions. The synthesized phosphor material is potential candidates for the applications of plasma display panel and mercury free fluoresce lamps.

Keywords: Quantum Cutting, Plasma Display Panels (PDPs), VUV Spectroscopy

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Impact of Cobalt Doping on Structural and Optical Properties of ZnO Thin Films

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ABSTRACT

Cobalt doped zinc oxide thin films have deposited on glass substrate via spray pyrolysis techniques. The structural and optical properties of prepared thin films are characterized by Xray diffraction and UV-Vis spectrophotometer. From Xray diffraction pattern conforms single phase hexagonal wurtzite structure with c axis orientation. The average crystalline size of thin films calculated from Scherrer equation and found to be decrease with cobalt doping. The absorbances value is found to be high for cobalt doped ZnO as compared to undoped ZnO. Also, the optical characterization reveals the decrease in Energy band gap with cobalt doping.

Keywords: Semiconductor, Zinc oxide, Thin films, Xray diffraction, Absorbance.

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Mechanical and Thermophysical Properties of Mg3TH7 (T= Mn, Tc, Re) Complex Hydrides

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ABSTRACT
The Mg_3TH_7 (T= Mn, Tc, Re) compounds are hexagonal ternary complex hydrides. The characteristic features of high-temperature ternary complex hydrides are investigated by the theoretical evaluation of thermophysical and ultrasonic properties at room temperature using interaction potential model approach. From elastic constants calculations, it is noted that Mg_3MnH_7, Mg_3TcH7 and Mg_3ReH_7 brittle. With the help of second order elastic constants other elastic moduli, elastic stiffness constants and Poisson's ration are estimated at room temperature for elastic and mechanical characterization. The ultrasonic velocities and thermal relaxation time of these ternary complex hydrides are evaluated utilizing evaluated values of elastic constants and lattice parameters within the same physical conditions. The orientation dependent ultrasonic velocities and thermal relaxation time have been also evaluated for the determination of anisotropic behaviour and thermophysical properties. The obtained results are analysed to explore the characteristic of complex hydrides compounds.

Keywords: Ternary Complex Hydrides, Elastic Properties, Ultrasonic Velocity, Thermal Relaxation Time

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Preparation and Luminescence Characteristics of Eu2+ Doped $SrAL_2B_2O_7$ Ceramic Phosphor

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ABSTRACT
Preparation of Eu^{2+} ions activated strontium alumino-borate phosphor using the low cost and time saving combustion technique has been described. Powder X-ray diffraction (XRD) and field effect scanning electron microscope (FE-SEM) analysis were used to characterize the as prepared phosphor. The luminescence properties have been investigated by photoluminescence (PL) spectra. $Sr_xAl_2B_2O_7:_xEu^{2+}$ phosphor shows a stronger excitation band near 400 nm as well as enhanced blue emissions observed under 397 nm excitation wavelength. Optimum concentration and critical transfer distance of the synthesized phosphors were determined.

Keywords: Alumino-Borate, Combustion Synthesis, Photoluminescence.

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Green Synthesis of Silver Nanoparticles Using Apple and Banana Peel Extract, Their Characterization and Optimization

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ABSTRACT
Since last decade, green synthesis of metal nanoparticles such as silver nanoparticles is emerging as a new path to stand against various infections. The present study aims to synthesize silver nanoparticles by a green biological route, using an extract derived from apple (AE) and banana peel waste (BPE), which acts as a reducing and capping agent for reduction of Ag^{+} into Ag^{0} derived from silver nitrate ($AgNO_3$) showing development of reddish-brown and yellowish-brown colour respectively. Process of synthesis was optimized using several parameters. Optimum concentration of $AgNO_3$ was found to be for AE: 1.25mM; BPE: 0.75 mM, concentration of extract for AE: 500 µl; BPE: 200 µl, pH was for AE: 9.0 and BPE: 9.0, temperature for AE: 50° C and BPE: 50° C and incubation period for AE: 96 hr; BPE: 24 hr for optimum synthesis of silver nanoparticles. Characterization of the synthesized nanoparticles with UV-Visible spectroscopy reveals a characteristic absorption of surface plasmon resonance (SPR) peak at 422 nm and 422.4 nm respectively. Fourier transform infrared spectroscopy (FT-IR) affirmed the role of AE and BPE as reducing and capping agent of silver ions.

Keywords- Silver nanoparticles, Green synthesis, Characterization, FTIR.

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Nanocrystalline $Mg_{0.6}Cd_{0.4}Al_2O_4$ Thick Film Gas Sensor for the Detection of LPG, CH_4, CO_2

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ABSTRACT

This paper reports that $Mg_{0.6}Cd_{0.4}Al_2O_4$ nano-powders can be used as a gas-sensing material for detecting LPG, CH_4, CO_2, gas. Powder was prepared by the co precipitation method. The powder was characterized by X-ray diffraction (XRD) and XRD pattern showed that $Mg_{0.6}Cd_{0.4}Al_2O_4$ was still cubic spinel phase with orthorhombic structure and its crystallite size is about 9.7 nm. The thick film was prepared by screen printing technology. The gas sensitivity of $Mg_{0.6}Cd_{0.4}Al_2O_4$ based sensor was investigated. The sensor exhibited high sensitivity and good selectivity towards LPG gas.

Keywords: Nanomaterial, $MgAl_2O_4$, doped $MgAl_2O_4$, X- ray diffraction, FTIR, SEM- EDS, Co precipitation, Screen printing, gas sensor.

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Simple Route Synthesis of 3-Cynocoumarin by Knoevengel Condensation of Benzaldehyde with Ethyl Cynoacetate over Si-Al-MCM-41

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ABSTRACT
The objective of the present study is to provide Si-Al-MCM-41 as catalyst for the Knoevengel condensation of benzaldehyde with ethyl cynoacetate. Aluminum was dopped in MCM-41 via ion exchange method and the catalytic performances of the samples were investigated for an efficient, high-yielding, one-pot synthesis of 3-cynocoumarine. The influence of aluminum loading on the basic properties of MCM41 was also studied.

Keywords: MCM-41, Si-Al-MCM-41, Knoevengel condensation reaction, 3-cynocoumarin, solid base catalyst

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Structural analysis of Lead Titanate Prepared by Wet Chemical Method

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ABSTRACT
While preparing $PbTiO_3$ [usually referred as PT nanocrystalline particles, $PbTiO_3$ was prepared from Lead Nitrate [Pb $(NO_3)_2$] and Titanium Isopropoxide [$C_{12}H_{28}O_4Ti$] by wet chemical technique. Thus, synthesized $PbTiO_3$ nanoparticles were kept at different temperatures of 650 ° C, 700 ° C, 750° C for 4 hours. The particle size of the sample was estimated to be between 25 and 55 nm by the Scherer's formula. Also, $PbTiO_3$ has been investigated using x-ray powder diffraction data to confirm the phase formations and phase purity. Also, microscopic structural analysis of the sample was done using scanning electron microscopy. It showed that when the sintering temperature increases, the grain size of the particle decreases. Infrared Transmittance behavior with respect to sintering temperature of the samples sintered has been studied. The effect of sintering temperature on microstructure and other parameters have also been studied using TEM Analysis.

Keywords: Wet Chemical Route, $PbTiO_3$, XRD, FTIR, SEM, TEM.

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Current and Upcoming Innovations in Spintronics

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ABSTRACT

In the present paper, authors briefly discussed the field of spintronics which has explored new spin related physics, including giant magnetoresistance, tunnelling magnetoresistance, and spin transfer torque, which led to spin-based device applications.

Spintronics is a field of concentrate that exploits the intrinsic spin angular momentum of an electron. In conventional electronics, the charge degree of freedom of electron is considered and it focuses on improving the mobility or conductivity of the charge carriers. Whereas in spintronics, the spin degree of freedom of an electron in addition to its charge state is considered and it focuses on generation or manipulation of a spin polarized population of electrons, aiming at using the electron spins for efficient data storage and communication methods.

Keywords: Spintronics, Spin-based device, Spin angular momentum, Giant Magnetoresistance.

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Synthesis, Characterization and CO_2 Gas Sensing Response of 5% SnO_2 Doped Polyaniline Nano Composite

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ABSTRACT

Polyaniline and its nano-composites are synthesized using in-situ chemical oxidative polymerization technique using aniline. Nano sized SnO_2 is used as received from the manufacturer. Ammonium Per Sulphate is used as oxidizing agent for polymerization. Crystalline SnO_2 is embedded in amorphous Polyaniline. The structure of the composite was confirmed by the characterization techniques FTIR, UV Visible and XRD.

Average particle size and chain separation is determined using XRD. The little shifting of the wavelengths towards higher values in FTIR confirms the formation of Polyaniline. UV Visible studies show that the composite exhibit absorption peaks at 614 nm, 328 nm and 263 nm; which corresponds to band gap energies 2.02 eV, 3.78 eV and 4.71 eV respectively. V-I characteristic is plotted using two probe method, which indicate fairly linear or ohmic behavior of the sample with high resistivity. Gas sensing response to CO_2 is observed.

Keywords – Polyaniline, nano-composites, band gap energy, gas sensing, CO_2, SnO_2.

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Synthesis and Thermo Acoustical Dynamics of PMMA/Fe2O3 Nanocomposites

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ABSTRACT
Inorganic metallic nanoparticle's incorporation into polymer matrices allows the modification of physico-chemical properties and its specific implementation. This work put forth the conventional co-precipitation method for synthesis of polymethyl methacrylate enriched in ferric oxide at nanoscale. The synthesized matrix is then structurally determined using XRD. The magnetic behavior is analyzed by VSM. The molecular interaction study is carried out using ultrasonic pulse echo technique. The specific concentration of metal ion in polymer matrix with fixed geometry has optimum magnetic property.

Keywords: polymer matrix, nanocluster, XRD, PMMA, VSM

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Structural Characterisation of conducting PPy/Rhodamine- B dye Composites Synthesized by Simple Chemical Polymerization Method

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ABSTRACT

This research contribution deals with thesynthesis of modified polypyrrole by doping it withxanthene dyessuch as Rhodamine-Bat different concentrations by simple chemical oxidative polymerization method by using ammonium peroxydisulphate as an oxidant. The Monomer to oxidant ratio was taken as 1:1. The synthesized composite materials was characterised by FTIR spectral analysis. The characterisation studies reveal the interaction between polymer and incorporated dopant.

Keywords: Pyrrole, Ammonium Peroxydisulphate, Polypyrrole, Triply Distilled Water

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Solvent Extraction and Spectrophotometric Determination of Cobalt (II) With N, N'-BIS (Salicylaldehyde) Ethylenediamine [Salen]

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ABSTRACT
A method for solvent extraction and spectrophotometric determination of Cobalt (II) with N, N'-Bis(salicylaldehyde) ethylenediamine (salen) has been studied. The method is based on formation of Co - N,N'-Bis(salicylaldehyde) ethylenediamine (salen) complex. Here Co act as metal and N, N'-Bis(salicylaldehyde) ethylenediamine (salen) act as ligand. The absorption spectra of Co(II)-salen complex extracted at different pH and it was found to be maximum at pH 6 and measured against reagent blank. The light-yellow Co (II)-N, N'-Bis(salicylaldehyde)ethylenediamine (salen) complex solution show maximum absorption at 410 nm.

Keywords: Solvent extraction, Spectrophotometer, Cobalt, N, N'-Bis(salicylaldehyde) ethylenediamine (salen), pH.

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Preparation and Photoluminescence Properties of Eu^{2+} Doped Lithium Alumino-Borate Phosphor, $LiAlB_2O_5$: Eu^{2+}

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ABSTRACT
Blue luminescence with near UV excitation has observed in $LiAlB_2O_5:Eu^{2+}$ (LABO) phosphors. Eu^{2+} doped LABO has synthesized by the solution combustion method of corresponding metal nitrates (oxidizer) and urea (fuel) at furnace temperature as low as 550 ^{O}C. The phase purity and morphology of LABO samples has characterized by powder X-ray diffraction (XRD) and scanning electron microscopy (SEM), respectively. Photoluminescence properties of the phosphor has investigated by measuring the excitation and emission spectra using spectrofluorometer at room temperature. The excitation spectrum of the blue fluorescence (λ_{em}=469 nm) shows two bands with their peaks at about 207 and 288 nm, respectively, which are due to the crystal field splitting of the Eu^{2+} d orbital. Under the excitation of 207 and 288 nm, the emission spectrum shows a strong band with a peak at about 469 nm, which corresponds to 4f–5d transition of Eu^{2+} ions, and there is a shoulder emission which are very weak in the lower energy side peaking at 594 nm and 616 nm. The Commission International de l'Eclairage (CIE) coordinates (0.126, 0.053) evidence that the phosphors emit in the blue light region.

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

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Geochemical Evolution of Groundwater in the Purna Alluvial Basin, Maharashtra

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ABSTRACT

Groundwater qualities of Purna basin saline area have been extensively monitored in pre- and post-monsoon periods of the year 2006 to evaluate its groundwater chemistry. The interpretations on the based on a total of 94 samples each were collected in pre- and post-monsoon periods out of which, 24 belongs to dug wells and rest 70 to bore wells. Most of the samples are collected from the saline area and analyzed various physic-chemical parameters like pH, electrical conductivity (EC), total dissolved solid (TDS), alkalinity, sodium (Na), potassium (K), calcium (Ca), magnesium (Mg), hardness (TH), chloride (Cl), sulphate (SO4) and nitret (NO3). On the basis of physical and chemical parameters of groundwater of both borewells and dugwell in general, high to very high then the permissible limits of various constituents/parameters, as per the standard set by WHO (1984) and Indian Slandered (1991). In the study area the concentration pH, TDS, Na, NO_3 and total hardness show an increasing trend from pre-monsoon to post-monsoon period, in both shallow and deep aquifers. On the basis of mean value electrical conductivity and TDS are high recorded in deep aquifer.

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Cr^{3+} Emission in $Al_5GeO_{9.5}$ and $Al_5SiO_{9.5}$ Phosphors

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ABSTRACT

Combustion synthesis of Cr^{3+}activated $Al_5GeO_{9.5}$ and $Al_5SiO_{9.5}$ phosphors was attempted. XRD results indicated formation of alumina, while luminescence results showed profound changes from $Al_2O_3:Cr^{3+}$. $Al_5SiO_{9.5}:Cr^{3+}$a did not show any photoluminescence, while $Al_5GeO_{9.5}:Cr^{3+}$ showed very intense luminescence; almost 150% of that shown by $Al_2O_3:Cr^{3+}$.

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To Study Solvation of Polyols with 5% Ethanol-Water at Room Temperature

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ABSTRACT
Density (ρ) and viscosity(η) of Mannitol and Sorbitol have been measured in 5% Ethanol-Water solvent system in the concentration range 0.05-0.5M at room temperature 298K for the density data, apparent molar volume (Φ_v) and partial molar volume (Φ_v^0) were worked out. The viscosity coefficient B and A constants and Staurding Constant (kn) were calculated from the viscosity data by using Jone-Dole and Staurding equation. From viscosity coefficient constant B and partial molar volume, solvation number (B/Φ_v^0) of Mannitol and Sorbitol were worked out. From these parameters, results were associated with solute-solute, solute-solvent and solvent-solvent interactions.

Keywords: Polyols, Apparent Molar Volume, Partial Molar Volume, Association Number.

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Smart Sound Absorbing Material for Environmental Noise Reduction

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ABSTRACT

In the current scenario the insidiousness of noise issues regarded as fourth major environmental pollution in the world as per the data published by World Health Organization (WHO, 2011). In advanced countries the peripheral areas of highways, industries, airports and construction sites are well infected by the excessive sound causes significant negative impact on human's health. Thus, noise reduction is essential for the present and future generation and significantly increases the importance noise control technology. Due to much unsuitability associated with synthetic sound absorber materials it needs an alternative potential candidate which has improve noise reduction coefficient without producing further pollution in environment. In that context sustainable green acoustic materials like natural fiber composites offer a great opportunity to study the acoustic attenuation technique. Natural fiber composites are carbonaceous, high dielectric value and have good sense of acoustic. The present work encompasses a smart noise absorbing material from luffa cyllindrica which is mostly found in the rural areas of Odisha. The surface modification of the raw luffa fibers are performed with optimized tartaric acid blended alcohol with non-destructive ultrasonic technique. Scanning electron microscope image and energy dispersive spectroscopy analysis of the untreated treated and composite fabricated from luffa fibers indicated its potentiality as a sound absorber. The different layers of luffa cyllindrica composite controls the sound propagation in such a way that the noise reduction coefficient enhances to 0.85 making Class-B type sound absorber compared to that of single layered luffa. Further the thermal insulation and mechanical strength of the materials provides the significant support behind the enhancement of sound absorption coefficient of the luffa cyllindrica.

Keywords: Noise reduction coefficient, natural fiber, acoustic material, surface modification, ultrasonic technique

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Magnetoelectric Effects in LSMO - BCZT Multiferroic Composites

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ABSTRACT

$(Ba_{(1-x)}Ca_{(x)})(Zr_{(y)}Ti_{(1-y)})O_3$ (BCZT), for x= 0.05 and 0.075 & y = 0.075 and 0.10 is a ferroelectric material known to possess ferroelectric transition temperature Tc in the vicinity of room temperature is chosen to investigate their possible magnetoelectric (ME) applications. The $La_{0.67}Sr_{0.33}MnO_3$ (LSMO) is selected to be ferromagnetic phase. Hydroxide co-precipitation route is adopted so as to synthesis of LSMO phase and ceramic synthesis route is adopted for the synthesis of BCZT phase. Starting with the LSMO and BCZT powders, the composites yLSMO + (1 - y) BCZTx = yLBCZTx with y = 0.10, 0.15 & 0.20 and x = 1, 2 & 3. are synthesized for ME properties. The parent composition of LSMO as well as the BCZT are characterized for dielectric and magnetic properties to confirm the formation of desire ferroelectric and magneto strictive phases. The composites are investigated for the structural and microstructural analysis, dielectric, magnetoelectric properties. The results show that the composite yLBCZTx exhibit excellent ME properties.

Keywords: BCZT, LSMO, Ferroelectric, Magnetoelectric.

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An Ultrasonic Study of Molecular Interactions in the Leaf Extract Solution of Thuja Occidentalis

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ABSTRACT

Ultrasonic Velocity, density, viscosity have been measured experimentally for the solution of leaf extract of Thuja Occidentalis in 50% ethyl alcohol with various concentrations at 298.15 K, 303.15 K, 308.15 K keeping constant frequency of 2 MHz. As the acoustical parameters like adiabatic compressibility, intermolecular free length, relative association, relaxation time, specific acoustic impendence would prove to be more useful to predict and confirm the molecular interactions, these have been determined by measuring the Ultrasonic Velocity, density, viscosity of the prepared solution. A variation in these parameters will provide a strong information regarding the molecular interactions taking place in the solution.

Keywords: Ultrasonic Velocity, Adiabatic Compressibility, Relative Association, Intermolecular Free Length.

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Study of Optical, Electrical and Structural Properties of Spray Pyrolytically Deposited $CdZnSe_{2x}Te_{2(1-X)}$ Thin Films for X=0.25

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ABSTRACT

Spray pyrolysis is a simple, inexpensive and economical method to produce a thin film on large substrate area. Thin films of $CdZnSe_{2x}Te_{2(1-x)}$ for composition parameter, x=0.25 at a substrate temperature of 300^0C are prepared by spray pyrolysis technique. From the optical transmission and reflection spectra, absorption coefficient (α) was calculated and was of the order of 10^4 cm^{-1}. Band gap energy were determined from absorbance measurement in visible range as 2.27 eV using Tauc theory. It shows that the main transition at the fundamental absorption edge is a direct allowed transition. The refractive index(n) and extinction coefficient(k) both decreases as wavelength increases which shows that the optical constants are most suitable for many scientific studies and technological applications such as heat mirrors, transparent electrodes and solar cells. The activation energy increases at higher temperature may be due to attributed to the increase of band gap. Hence the grain size of the films increases. This effect reduces the grain boundary effect. The XRD pattern shows number of peaks indicating that the films are poly crystalline in nature. The analysis of spectrum indicated that the films are having throughout cubic structure. The value of lattice parameter 'a' is 6.3702 A°

Keywords: $CdZnSe_{2x}Te_{2(1-x)}$ thin films, spray pyrolysis, optical, electrical properties, activation energy, lattice parameter.

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Synthesis and Characterization of Pure and Ce Modified $SmFeO_3$ Thick Films

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ABSTRACT

In present work, $SmFeO_3$ perovskite oxide powder was synthesized by sol gel method. The crystalline structure and surface morphology were analyzed by X-ray diffraction and Scanning Electron Microscopy techniques. Pure $SmFeO_3$ thick films were then prepared onto a glass substrate in desired pattern by screen printing technique followed by firing at 500 ^{0}C for 30 min. As-prepared pure $SmFeO_3$ thick films were dipped into 0.1 M aqueous solution of Cerium Chloride for 1 min and fired at 550 ^{0}C for 30 min to obtained 'Ce modified $SmFeO_3$ thick films. Both pure and surface modified $SmFeO_3$ thick films were characterized by Energy Dispersive X-Ray Analysis (EDAX) and Field Effect Scanning Electron Microscopy (FE-SEM) techniques. The effect of cerium doping on microstructure and surface morphology of pure $SmFeO_3$ thick film was discussed.

Keywords: $SmFeO_3$, Surface modification, Perovskite, Gas sensor.

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Novel Synthesis and Characterization of PANi/ Sodium Superoxide Composites

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ABSTRACT

The sodium superoxide was prepared by heating sodium nitrate (NaNO3) in an oxygen-rich environment in a single step process. Using the Ex-situ technique, the PANi/ NaO2 composites were prepared range from 5-20 w t %. The crystallinity and structure morphology of the samples were characterized by X-ray diffraction, Scanning electron microscopy. The peak positions appear in XRD pattern of as prepared Sodium superoxide exactly index to NaO2. The peaks of NaO2 are seen in XRD of PANi/a NaO2 composite suggests that NaO2 is present in the PANi matrix. The scanning electron microscope (SEM) shows that sample exhibit an irregular granular morphology. We investigate the DC conductivity of PANi/ NaO2 composites. Activation energy (EDC) is obtain from Arrhenius plots of temperature-dependent DC conductivity, and it is found to be 0.56 eV for 20 wt. % of NaO2.

Keywords: Superoxide, DC Conductivity, Arrhenius Plots.

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Perspectives of Substituted Ferrites in Current Scenario

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ABSTRACT
During last few decades, there has been a growing degree of interest in ferrites. The magnetic, electrical, optical and other properties of ferrites gain attention due to their use in various applications such as medical diagnostics, rechargeable lithium batteries, high frequency media, solar energy devices and magnetic fluids. The high resistivity and low eddy currents makes ferrites the better choice over metals. The aim of this review paper consists of an overview on the ferrites, classification of ferrites, synthesis methods and its potential applications in different fields of technology as well as summarize the major researches in the field of Mn-Zn ferrites on one platform.

Keywords: Ferrites, Magnetic Fluids, Spinel, Retentivity, Nanoparticles

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Synthesis, Characterization and LPG Gas Sensing Response of 5% TiO_2 Doped Polypyrole Nano Composite

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ABSTRACT

Polypyrole and its nano-composite is synthesized using in-situ chemical oxidative polymerization technique using pyrrole monomer. Crystalline nano sized TiO_2 particles are embedded in amorphous Polypyrole. Ammonium Per Sulphate is used as oxidizing agent for polymerization. The structure of composite was confirmed by the characterization techniques XRD, FTIR and UV Visible spectra. V-I characteristics and gas sensing response to LPG at room temperature is investigated.

Average grain size and chain separation is determined from XRD. UV-Visible studies show that the composite exhibit absorption peak at 278 nm; which corresponds to band gap energy 4.4633 eV. V-I characteristic is plotted using two probe method, which indicate fairly linear or ohmic behavior of the material with very high resistivity. Gas sensing response to LPG is also observed.

Keywords: Polypyrole, nano-composites, band gap energy, LPG gas sensing, TiO_2

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Thermal Annealing Effect on Improved Structural, Morphological, Optical and Electrical Properties of Cu_2ZnSnS_4 Thin Film

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ABSTRACT

Low-cost Cu2ZnSnS4 (CZTS) absorber layer thin films have been prepared by Successive Ionic Layer Adsorption and Reaction method (SILAR). CZTS thin film prepared at room temperature without any toxic components or precursors. After synthesis thin films have annealed at 250 ºC for 60 min to remove defects and improve the crystallinity. The crystal structure was studied by X-ray diffraction (XRD) characterization equipment. The as-grown CZTS thin films have shown amorphous structure but due to annealing effect improvement in crystallinity with a slight increase in peak intensity were observed. CZTS annealed thin film crystallite size is 15nm. A porous and granular structure of morphology of as-grown CZTS thin film has been confirmed by Scanning Electron Microscopy (SEM). Annealing effect decrease porosity and increase compact of the surface of a thin film. Optical properties show the increases the absorbance and decrease the band gap of as-grown and annealed samples respectively. Enhancement of current under the light condition has confirmed by I-V characteristics method. Higher optical absorption in visible light and enhancement of current up to mA is suitable characteristics of good absorber layer for solar cells application.

Keywords: Low Cost, CZTS, Absorber, Porous, Solar Cells.

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Thermo Acoustic Study of Different Parameters for Ternary Mixture of Aqueous Potassium Hydroxide & 1, 4 Dioxane Using Ultrasonic Interferometer

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ABSTRACT

An analysis of different thermodynamic properties as a function of temperature provides valuable information about their characteristics. The concentration and temperature dependence of acoustic and volumetric properties of multi component liquid mixtures has proved to be a useful indicator of the existence of significant effect resulting from intermolecular interactions. The thermo-acoustic parameters such as density (ρ), ultrasonic velocity (U) and viscosity (η) are determined for the ternary mixture of aqueous potassium hydroxide and 1,4 dioxane system at 0.0% to 100% (v/v) and at different temperature. These experimental data have been used to estimate the acoustical parameters such as, adiabatic compressibility (β_a), free length (L_f), free volume (V_f), internal pressure (π_i), and Gibb's free energy (ΔG). The present paper represents the nonlinear variation of ultrasonic velocity and the thermo-acoustical parameters lead to dipole- ion interaction between 1,4 dioxane and 1N aqueous potassium hydroxide is stronger than dipole- ion interaction between water and aqueous potassium hydroxide.

Keywords: Ultrasonic velocity, acoustical parameters, molecular interactions, ternary mixtures, aqueous potassium hydroxide (aq. KOH) and 1,4 dioxane.

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Electrical Conductivity of Cr(III), Mn(III) And Fe(III) Metal Complexes of 2-Hydroxy-5-Methyl-3-Nitroacetophenone Thiazole Schiff Base

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ABSTRACT
The newly coordinating metal complexes of Cr(III), Mn(III) and Fe(III) have been synthesized using 2-hydroxy-5-methyl-3-nitro acetophenone thiazole Schiff base ligand was derived from the condensation of 2-hydroxy-5-methyl-3-nitro acetophenone and thiazole. The Schiff bases behaved as charge bidentate ligand. The ligand was characterized by elemental analysis and spectral methods. Metal complexes characterized by elemental analysis, conductance measurements, molecular weight determinations and spectral studies. The synthesized products are coloured solids, soluble in DMF, DMSO and THF. The Schiff base and their metal complexes have been studies by electrical conductivity

Keywords: Schiff Base, Magnetic Susceptibility, Electrical Conductivity

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Estimation of Hydration Number and Apparent Molar Volume of Ternary Liquid Mixtures by Ultrasonic Studies at Different Temperatures

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ABSTRACT

In the development of molecular sciences, the studies of intermolecular interaction in binary and ternary mixtures of polar and non-polar liquids play a key role. It also helps to understand the nature and behavior of solute in particular solvent. The ultrasonic velocity measurement is one of the most important and accurate technique to observe inside of the liquid mixtures. The ultrasonic velocity of liquid and liquid mixtures is fundamentally related to the attractive or repulsive forces between atoms or molecules in the system. Present study discusses about the experimental results of ultrasonic velocity (v), density (ρ) and viscosity (η) along with estimated parameters like hydration number, apparent molar volume (φ_v) for the ternary liquid mixture of sodium-2-hydroxy benzoate in 50% ethanol at 0.1M, 0.01M and 0.001M concentration range. The temperature range selected for all investigations is 298.15K, 303.15K and 308.15K. The thermo-acoustic studies are made on these liquid mixtures to access the intermolecular interactions in the liquid mixtures.

Keywords: Ultrasonic velocity, Molecular interactions, Molar cohesive energy, Apparent molar volume and molar hydration number.

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Study of Doped Blend Film and Its Application as a Sensor Material

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ABSTRACT

In this paper the results of thermally stimulated discharge current (TSDC) of thermoelectric of cinnamic acid doped polyvinyl chloride (PVC) polymethyl methacrylate (PMMA) blend film is presented. TSDC has been carried out in a temperature range 303K to 383K and at five different polarizing fields. Results are discussed on the basis of space charge polarization. these are further extended to the probable used as a sensor material.

Keywords: Polyvinylchloride (PVC), Polymethyl-methacrylate (PMMA), TSDC, Thermoelectric.

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Synthesis and Characterization of CuO Nanoparticles Prepared with Coffee Extract and To Study Its Electrical Conductivity

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ABSTRACT

Oxides of copper have unique semiconducting and optical properties. Very few reports are available on the synthesis of copper oxide nanoparticles using plant extract. CuO Nanoparticles have tremendous applications due to their semiconducting nature. It can be prepared by different methods. In this work CuO nanoparticles were synthesis with coffee bean extract and also used to study its electrical conductivity by Four probe method. The prepared CuO nanoparticles were characterized by uv-visible spectra and XRD.

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Conventional Method of Cancer Diagnosis: Biopsy

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ABSTRACT
Biopsy is the conventional cancer diagnostic technique. In this paper, some literature survey has been done and it is observed that the conventional method of cancer diagnostic has got some drawbacks and limitations. More research work in spectroscopic techniques can lead to improvised method to detect cancer.

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Studies of Molecular Interactions of Sugar Alcohols in Water by Volumetric and Viscometric Measurement

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ABSTRACT
In this paper, Densities (ρ) and Viscosities (η) of sorbitol and mannitol have been measured in aqueous solution in the concentration range 0.05-0.5 M at 296 K. Apparent molar volume and partial molar volume were determined from the density parameter. Using Jones-Dole equation, viscosity coefficient A and B were calculated for sorbitol and mannitol solutions from the obtained viscosities. The results obtained from the parameters were correlated with solute-solute and solute- solvent interactions.

Keywords: Apparent molar volume, Partial molar volume, Jones-Dole equation, Sugars alcohols, Staurding equation

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Different Dielectric properties of Synthesized Mesoporous Molecular Sieves Rice Husk Ash -SBA-16

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ABSTRACT
Rice Husk is the by-product produce during rice milling. Sustainable use of Rice Husk Ash (RHA) and Rice Husk (RH) in Industrial Sector and other fields depends upon its physical and chemical properties. This research contributes holistic approach to the potential use of rice husk towards synthesis of meso-porous material than the traditional uses of husks. It not only reduces the cost of material but also results in the reduction of the environmental greenhouse effects. Attempts have been made to investigate crystallization kinetics of SBA -16. The various synthesis parameters were investigated during crystallization of SBA -16. The activation energy of crystallization kinetics of SBA -16 was calculated using Arrhenius equation and found to be 184.62 kJ / mole in the present system of synthesis.
Keywords. Rice Husk Ash, Pluronic F127, Crystallization Kinetics, Dielectric properties.

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Temperature Dependent Conductivity of Solid Polymer Electrolyte Based on Polyvinyl Alcohol

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ABSTRACT

Solid polymer electrolytes have number of advantages over the conventional liquid electrolyte such as longer life, easily fabricate in desirable shape and leakage free and so on. The attempt has been made in this study with polyvinyl alcohols (PVA) doped with different percentage of Ammonium Iodide (NH_4I) were prepared by solution casting technique. It is revealing that electrical conductivity of polyvinyl alcohol doped with ammonium iodide increases with increasing salt concentration as well as temperature. The temperature dependent conductivity shows Arrhenius behaviour.

Keyword: Solid polymer electrolyte, Electrical conductivity, Polyvinyl alcohol.

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Acoustic and Thermal Study of Biomolecule in Aqueous Potassium Chloride

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ABSTRACT
The ultrasonic velocity (u), density (ρ) and viscosity (η) of Glycine in 2% of aqueous solutions of potassium chloride have been measured. Thermoacoustic parameters like adiabatic compressibility, intermolecular free length, acoustic impedance, internal pressure was calculated. It was found that there is certain degree of variation in these parameters with change in concentration and temperature. The variations of acoustic parameters with concentration and temperature indicate the existence of intermolecular interaction in the present systems.

Keywords: Glycine, Ultrasonic Velocity, Thermodynamic Parameters, Molecular Interactions

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A Comprehensive Review on Eu Doped Zinc Aluminate Phosphor for Solid-State Lighting

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ABSTRACT
Zinc based aluminate materials are the member of spinel oxide. Zinc Aluminate is a wide bandgap semiconductor. In this report, rare earth Eu doped zinc aluminate phosphor is discussed in detail. Eu3+ doped $ZnAl_2O_4$ phosphor with efficient orange-red light emission is useful for solid-state lighting and optoelectronic devices. Therefore, it is important to discuss the properties and utility of the material for phosphor applications. Different synthesis routes have been used for the preparation of Eu doped $ZnAl_2O_4$. The effect of doping concentration, calcination time, duration, and various other parameters affect the crystal structure and luminescence properties of Eu doped $ZnAl_2O_4$ spinel. The effect of doping concentration, calcination temperature, and synthetic route on luminescence properties are discussed in brief. The review explains the luminescence mechanism, their emission spectrum and potential application for Eu activated $ZnAl_2O_4$ phosphor.

Keywords: Zinc Aluminate, Luminescence, Rare Earth Ions, Eu Doped, Synthesis Method

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Thermoluminescence in Copper Doped Potassium Tetraborate Phosphor

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ABSTRACT

We have prepared copper doped $K_2B_4O_7$ phosphor by using simple and modified solution combustion method. This sample is confirmed with the help of X-ray diffraction (XRD). Apart from this, Scanning Electron Microscope (SEM) and FTIR studies of the prepared sample were carried out. Thermoluminescence properties of $K_2B_4O_7$: Cu phosphor is observed. Two distinct peaks at 235 ˚C and 340 ˚C with a shoulder at 420 ˚C were witnessed. The kinetic parameters and the effect of dose variation on $K_2B_4O_7$: Cu phosphor is also studied.

Keywords: Borates, Luminescence, Copper doping, Activation Energy

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Sr-doped $LaCoO_3$ perovskite as a promising electrode material for supercapacitor application

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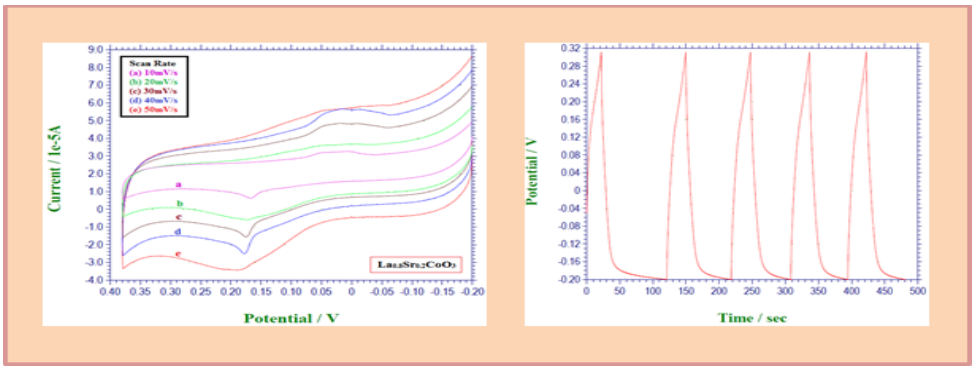
ABSTRACT

The scarcity of fossil fuels and the increasing awareness of the environmental and geopolitical problems associated with their use have encouraged significant efforts towards the development of advanced energy storage and conversion systems using materials that are cheap, abundant and environmentally benign. A major thrust in the field of renewable energy has been to develop higher power and more energy-dense storage devices like supercapacitors. The performance and efficiency of supercapacitor depends directly on the electrode materials. The oxides of transition metals are highly explored as pseudo capacitors material. In the present work, we prepared $La_{0.8}Sr_{0.2}CoO_3$ (LSCO) nanocrystals by sol-gel method. LSCO is an attractive material are of considerable industrial interest due to their high electrical and ionic conductivities, has been widely used as a cathode material in solid oxide fuel cells, oxygen permeable membranes and active catalysts. The structure and morphology of the synthesized material were characterised by X-ray diffraction (XRD), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM) techniques. The average crystallite size of the nanoparticles was found to be 13.1 nm and XRD revealed the formation single perovskite phase product with a cubic structure after calcined the precursor at 550 °C for 6 h. The electrochemical performance has been evaluated by using cyclic voltammetry (CV), Galvanostatic charge discharge (GCD) and Electrochemical impedance spectroscopy (EIS). Maximum specific capacitance obtained for LSCO electrode was 557.10 Fg^{-1}, at the scan rate of 10$mVs^{-1}$from cyclic voltammetry. EIS curve shows very smaller values of equivalent series resistance in the range of 1.62 Ω. After number of cycle-life testing, this supercapacitor exhibits a charging and discharging capacitance retention of ~97% at a current density of 2×10^{-5} A/cm^2. This result indicates the excellent capacitive behaviour and high-rate capability of the LSCO electrode.

Keywords: supercapacitor, cyclic voltammetry, $La_{0.8}Sr_{0.2}CoO_3$.



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Solving Transportation Problems Solve Using Various New Approach Method

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ABSTRACT
In this paper, we study the optimization processes in Mathematics, Computer Science and Economics are solving effectively by choosing the best element from set of available elements. Finding an initial basic feasible solution to obtain an optimal solution for the Transportation Problems. The most importance and successful application in the optimization refers to Transportation Problem. The main objective of Transportation Problem solution method is to minimize the cost or the time of transportation. Most of the currently use methods for solving is to transportation problem are trying to reach the optimal solution, the method is also illustrated with numerical examples.

Keywords: Transportation Problem, Transportation Cost, Optima Solution, Solving Optimization, Initial Basic Feasible Solution and Objective Function.

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Photo Luminescent Properties of Dysprosium -Dy^{3+} Doped $Ba_3Y(BO_3)_3$ Phosphor

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ABSTRACT

$Ba_3Y_{1-x}(BO_3)_3:xDy^{3+}$[$0.005 \leq x \leq 0.03$] phosphor is synthesized by solution combustion method. Photo-luminescence in the range 400nm to 700nm is recorded which shows two major peaks at 485nm [$^4F_{9/2} - {}^6H_{15/2}$], 575nm [$^4F_{9/2} - {}^6H_{13/2}$] and minor peak at 622nm $^4F_{9/2} - {}^6H_{11/2}$. Under UV excitation of 349nm it shows white luminescence. Intensity ratio of Blue line of 485nm to yellow line of 575nm is calculated which also confirms the emission of near white light. The optimal doping concentration of Dy^{3+} in $Ba_3Y_{1-x}(BO_3)_3$ host matrix is found to be 2 mole percentage. The 1931-CIE colour coordinates and the CCT value of phosphor is also calculated using McCamy empirical formula. All the results indicate that Dy^{3+} doped $Ba_3Y_{1-x}(BO_3)_3$ powder phosphor could be used as an efficient luminescent material for solid state lighting as well as NUV based w-LEDs.

Keywords: Photoluminescence, White Light Emitting Diodes, Solution Combustion Synthesis

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Bouncing Cosmology with General Relativistic Hydrodynamics in extended theory of gravity

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ABSTRACT
The work is devoted to a bouncing cosmological model for flat FRW universe within the presence of General Relativistic Hydrodynamics (GRH) in the frame work of an extended theory of gravity. The energy density of the fluid decreases with contraction is constant at the bouncing point and then increases with subsequent expansion. At the bounce, violation of NEC is guaranteeing violation of SEC. It is observed that the model starts from the aggressive phantom region $\omega << -1$ and finally approaches to quintessence region. The EoS parameter of the derived model corresponds to phantom era of the universe which is a favourable sign to pilgrim DE conjecture. The physical and kinematical properties of the model are discussed in detail.

Keywords: FRW metric, Extended Gravity, Bouncing scale factor.
PACS number: 04.50kd.

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Synthesis of Polyaniline - CdO Nano Composite and Study of A. C. Conductivity

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ABSTRACT

In this present paper, CdO nanopowder were synthesized by a simple soft chemical route using cadmium acetate dihydrate as the precursor salt. we report A C conductivity on the composite of conducting polymer Polyaniline- CdO powder. The A C conductivity of PAni- CdO composite has been investigated. The PAni- CdO samples are prepared with 5 and 10 wt%. The structural changes of prepared composite materials were carried out by X-ray diffraction (XRD) tool.

Keywords: PANI, CdO, XRD

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Synthesis of Polyaniline - CuO Nano Composite and Study of A. C. Conductivity

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ABSTRACT
In this present paper, Nano crystalline and bulk CuO are prepared by thermal decomposition of freshly prepared Cu $(OH)_2$ we report A C conductivity on the composite of conducting polymer Polyaniline-CuO powder. The A C conductivity of PAni- CuO composite has been investigated. The PAni- CuO samples are prepared with 10 and 35 wt%. The structural changes of prepared composite materials were carried out by X-ray diffraction (XRD) tool.

Keywords: PANI, CuO, XRD

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MnO_2 based Electrochemical Portable Resistive Sensor for detection of Pb (II) in water

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ABSTRACT
Rapid industrial growth is preferably good for the world but on the other hand it's also doing harm on the environment. The occurrence of heavy metal ions in food chain is appearing to be a major problem for mankind. The traces of heavy metals, especially Pb (II) ions present in water bodies remains undetected, untreated and it remains in food cycle leading to severe ecological and physiological complications to environment and humans respectively. Electrochemically, we can detect the heavy metal ions onsite that too in real time and cost effectively compared to other detestation techniques. Electrochemical impedance spectroscopy is a well-known method for estimating precise detection limit, sensitivity, accuracy and superior action for determination of heavy metal contamination. In this study, the analysis of heavy metals present in aqueous medium has been carried out using electrochemical impedance spectroscopy on Nanofibrous manganese dioxide (MnO_2) and Graphene Quantum Dots (GQD) coated Au electrodes. In this study an electrochemical sensor is developed for detecting Pb (II) in water. The developed portable sensor required low sample volume (200µL) and was assessed within Pb (II) concentration range of 0.001 nM to 1uM. The calculated Limit of Detection (LoD) and sensitivity was calculated to be 0.81 nM and 1.05 kΩ/nM/mm^2, and was validated with commercial impedance analyser. The shelf-life of the portable sensor was found to be ∽ 45 days.

Keywords: Electrochemical, sensor, metal oxides, heavy metals

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Morphological and Electrical Properties of spray deposited $CdSe_{0.3}Te_{0.7}$ thin film

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ABSTRACT

The $CdSe_{0.3}Te_{0.7}$ thin film was deposited by using spray deposition techniques having substrate temperature 300°C. We studied morphological and electrical properties of deposited $CdSe_{0.3}Te_{0.7}$ thin film through SEM, EDAX and two probe measurements techniques. The SEM micrograph of $CdSe_{0.3}Te_{0.7}$ thin film looks leaf like structure composed of number of flake-like thin micro-particles. From EDAX analysis conform that, the presence of Cd, Se and Te in prepared film with elemental stoichiometry of Cd, Se and Te were 54.49%, 9.12% and 36.39% respectively. The electrical resistivity of the film at room temperature was 1 $x10^6$ Ωcm.

Keywords: Morphological, Electrical, Spray techniques.

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Synthesis and Characteristics of MgO Doped Polyaniline Nano Composites

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ABSTRACT

In this paper, Magnesium oxide nano particles were prepared by sol-gel technique. In this synthesized using magnesium nitrate as a precursor. The PAni- MgO samples are prepared with 30 and 40 wt%. The structural changes of prepared composite materials were carried out by X-ray diffraction (XRD) tool.

Keyword: PAni, MgO, XRD

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Arm Rehabilitation Assistive Device

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ABSTRACT
This work proposed an Arduino based arm rehabilitation assistive device. The proposed approach helped us in identifying the problems that a stroke patient might suffer during their rehabilitation and how they can be helped by developing such a device. Certain perimeters that we took into consideration were the angular movement of the arm, the angular movement of fingers and the muscle strength of the forearm. These are some of the basic parameters that can be used to determine the movement of the arm. Presently the devices that are being used by doctors are very expensive and complex, this idea can revolutionize the process of the treatment of the stroke patients. The device designed is cheap and less complex which can easily be used by the patient at their home.

Keywords: Arm Rehabilitation, diagnostic tools, Arduino, Sensors, Treatment

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Synthesis of Polyaniline-In_2O_3 Composite and Study of A. C. Conductivity

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ABSTRACT

In this present paper, we report A C conductivity on the composite of conducting polymer Polyaniline-In_2O_3 powder. The A C conductivity of PAni- In_2O_3 composite has been investigated. The PAni- In_2O_3 samples are prepared with 5 and 10 wt%. The polyaniline- In_2O_3 conducting polymer is synthesized by chemical oxidation method using ammonium persulfate as oxidizing agent. The structural changes of prepared composite materials were carried out by X-ray diffraction (XRD) tool.

Keywords: PANI, In_2O_3, XRD

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High Gas Sensor Performance of Spinel-Type $Zn_{0.7}Mg_{0.3}Co_2O_4$ Nanoparticles Prepared by sol-gel method

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ABSTRACT

This work devotes to investigate synthesis of spinel $Zn_{0.7}Mg_{0.3}Co_2O_4$ structure was successfully synthesized by sol–gel method. Surface morphology was examined by means of Scanning electron microscopy (SEM). The gas sensing investigations revealed that $Zn_{0.7}Mg_{0.3}Co_2O_4$ nanostructures-based gas sensor exhibited high response (50 ppm) and selectivity towards hydrogen sulfide. Besides, enhanced gas sensing properties of $Zn_{0.7}Mg_{0.3}Co_2O_4$ nanostructures are observed. The excellent gas sensing characteristics of $Zn_{0.7}Mg_{0.3}Co_2O_4$ nanostructures might be attributed to their high porosity and large specific surface area. Moreover, hydrogen sulfide gas sensing mechanism was proposed to explain the high sensor response.

Keywords: Sol–gel; Oxalic acid; Spinel; $Zn_{0.7}Mg_{0.3}Co_2O_4$; XRD.

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Using Some Transform Techniques to Find Thermal Stresses and Temperature of An Annular Disc

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ABSTRACT
In this paper, an attempt has been made to solve problems of thermo elasticity and determine the unknown temperature, displacement and stress components. In this problem the zero temperature is maintained on the curved surface and third kind boundary condition is maintained on lower and upper surface. The governing heat conduction has been solved by using finite Hankel transform technique. The results are obtained in series form in terms of Bessel's functions and have been computed numerically and illustrated graphically.

Keywords: Hankel transform, Thermoelastic problem, Annular Disc, Third kind boundary value Problem, Steady- state.

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The Development of PVA Based Proton Conducting Solid Polymer Composite Electrolyte System

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ABSTRACT

In this Study the attempt was to improve the proton conductivity by dispersing the Nano sized GDC to obtain (100-x) (80PVA:20AN) (x)(GDC) Nano-composite system. X-ray diffraction (XRD) study shows that the addition of filer GDC in polymer not only reduces the intensity of the characteristic (110) peak but also broadens which is an indication of the increase in amorphousness. The Arrhenius plots for different concentrations of GDC in (80PVA:20AN) polymer blend shows the initial increase in ionic conductivity of the composite polymer electrolyte upto 20 wt% filler GDC. The proton conductivity increases with increased relative humidity within entire studied range of H_2 partial pressures.

Keywords: Nano Composite System, XRD, polymer blend, proton conductivity.

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Study of chemical bath deposited Cadmium Sulphide thin films

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ABSTRACT
Chemical bath deposition technique is used to deposit Cadmium sulphide (CdS) thin films for different deposition time. Thin films were deposited onto the glass substrate at 70^0 C. Thickness of the film formed is 6.3 - 4.2 μm, the band gap varies in the range of 2.42 – 3.4 eV. XRD analysis shows the cubic crystal structure with lattice constant 5.32 Â and average grain size 34 nm.

Keywords: Chemical bath deposition, CdS thin film.

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Synthesis and Transport Properties of Polythiophene Polymer Composite

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ABSTRACT

Polythiophene-Polyethylene oxide (PTh-PEO) polymer composite was synthesized using Ferric Chloride (FeCl3) as oxidant by in situ chemical oxidative polymerization method. The polymerization was carried out at room temperature. Attempts were made to increase the electrical conductivity by using various concentration of Li2SO4. PTh-PEO polymer composite was characterized using FTIR for confirmation of successful polymerization of polymer composite. The transference numbers of PTh-PEO composite films, synthesized with different wt. % of Li2SO4 were investigated by dc polarization techniques. The value of transference number of all polymer composite samples was found to be in the range of 0.80 to 0.89. This suggests that the charge transport in the PTh-PEO composite doped with different wt. % of Li2SO4 is predominantly due to ions only.

Keywords: Ferric Chloride (FeCl3), Lithium sulphate (Li2SO4), and transference number

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Ultrasonic Wave Propagation in Hexagonal $SrMnO_3$ Compound

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ABSTRACT

In the present study, the ultrasonic attenuation due to phonon-phonon interaction has been investigated in hexagonal $SrMnO_3$ compound. Higher order elastic constants have been computed at temperature dependent following the Lenard-Jones Potentials. Second order elastic constants are used for the determination of other ultrasonic parameters. The temperature variation of the ultrasonic velocities is evaluated along different angles with unique axis of the crystal using the second order elastic constants. Temperature variation of the thermal relaxation time and Debye average velocities is also calculated along the same orientation. The temperature dependency of the ultrasonic properties is discussed in correlation with elastic, thermal and electrical properties. It has been found that the thermal conductivity and thermal relaxation times is the main contributor to the behaviour of ultrasonic attenuation as a function of temperature and the responsible cause of attenuation is phonon-phonon interaction. The mechanical properties of $SrMnO_3$ material at low temperature (50K) are better than room temperatures because at this temperature it has low ultrasonic attenuation

Keywords: Elastic constants, Ultrasonic velocity, Ultrasonic attenuation, Thermal properties

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Ecological potential of plants for sustainable phytoremediation of mine wastes

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ABSTRACT

Mining wastes are major environmental pollution sources in mining areas. Mine wastes are released into soil, air, and water presenting a global threat to the surrounding environment and human health. Mining waste disposal and its treatment is one of the widespread ecological, economic, and social problems around the world. Mining activities such as crushing grinding, washing, smelting and all the other processes generate a large amount of waste products and tailings. Bare tailings are very prone to erosion and often cause leaching of toxic metals from tailings to soil and natural reservoir. Metal contaminated soil and water causes negative impacts on cultivated land, production, biodiversity, ecological interactions and economic wealth. Therefore, decontamination of heavy metal contaminated soils is very important to reduce the associated risks and for maintenance of environmental health and ecological restoration.

Phytoremediation is an emerging and sustainable solution to clean up the environment from contaminants and has been considered as a cost-effective and non-invasive alternative to the conventional remediation approaches. It is a green technology with good public perception.

Phytoremediation technology, where living plants are used to Phytoremediation is a promising approach and green technologies uses plants to clean up the impacted sites or to stabilize mine tailings to safe levels. Phytoremediation combats pollution in an environmentally-friendly and aesthetically pleasing manner. There are many molecular studies carried out to improve the efficacy of Phytoremediation. Phytoremediation technologies includes phytostabilization, phytostimulation, Phytodegradation, phytotransformation, phytofiltration and phytoextraction of soil heavy metal contaminant by some hyper accumulators' heavy metal tolerant plant species. It can be concluded that phytoremediation of heavy metal contaminated soils is a reliable tool and necessary for making the land resource accessible for habitat restoration.

Keywords: Mining wastes, hyper-accumulators, Phytoremediation

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Oblique Chiral Nematic phase in Hybrid Bent-core-rod Trimer Mesogens

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ABSTRACT

Since last more than a decade, oblique chiral nematic (twist-bend nematic, N_{tb}) phase is remained a hot topic of research in the field of liquid crystals [1, 2]. Due to unique features of N_{tb} phase, it holds a great promise for its potential application in ultra-fast electro-optical devices [3]. In this study, three newly synthesized achiral hybrid bent-core-rod trimer mesogens (namely, Trimer 1, 2 and 3) are investigated in detail using the crossed-polarised optical microscopy and x-ray diffraction (XRD) techniques. Trimer 2 and 3 are produced via the lateral substitution of chlorine (-Cl) and methyl (-CH3) groups in the bent-core part of Trimer 1 [4], respectively. The presence of two distinct nematic phases: (i) regular nematic (N, Schlieren texture with strong director fluctuations) and (ii) N_{tb} (rope-like texture, hallmark of N_{tb} phase) at higher and lower temperature regimes of phase sequence, respectively are primarily confirmed in Trimer 1 using crossed-polarised optical microscopy. To get more details about two distinct N phases in Trimer 1, high-resolution 2D XRD patterns are recorded and critically analysed. With the help of numerical inversion method [5], orientational order parameters (OOPs; $\langle P_2 \rangle$, $\langle P_4 \rangle$, and $\langle P_6 \rangle$) are calculated from the wide-angle reflection of 2D XRD patterns in both N phases of Trimer 1. Below clearing temperature, $\langle P_2 \rangle$ decreases monotonically but both $\langle P_4 \rangle$ and $\langle P_6 \rangle$ increase in N phase. However, $\langle P_2 \rangle$ increases but $\langle P_4 \rangle$ and $\langle P_6 \rangle$ decreases significantly with decrease in temperature in N_{tb} phase. The simultaneous decrease in $\langle P_4 \rangle$ and $\langle P_6 \rangle$ values clearly suggests that orientational distribution function (ODF) is becoming broader as expected due to the onset of helical structure in N_{tb} phase. Interestingly, the monitored changes in OOPs of N_{tb} are consistent with its accepted microscopic structure. Unlike Trimer 1, OOPs of Trimer 2 and 3 increase with decrease in temperature confirming the presence of only regular N phase and also corroborates well with microscopic textures [6]. Our results clearly show that N_{tb} phase formation could be easily tuned by altering the substituents in the bent-core part of trimer mesogen. In other words, the shape of the mesogen certainly plays important role in the formation of newly discovered N_{tb} phase.

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Synthesis, Spectral and Thermal Degradation Kinetics Studies of Copolymer Resin

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ABSTRACT

Terpolymer (PTFM-II) has been synthesized by using the three monomers pthalic acid, melamine and formaldehyde in 2:1:4 molar proportions. The structure of PTFM-II copolymer has been elucidated on the basis of elemental analysis and various physicochemical techniques, i.e. UV–Visible, FT-IR and H^1-NMR spectroscopy. Thermal degradation study of the new copolymer has been carried out for its thermal stability. The activation energy (*Ea*) and thermal stability calculated by using the Sharp-Wentworth and Freeman-Carroll methods. Thermodynamic parameters such as entropy change (ΔS), apparent entropy change (S^*) and frequency factor (z) have also been evaluated on the basis of the data of Freeman-Carroll method.

Keywords: PTMF-II, copolymer; Synthesis; characterization; Sharp–Wentworth method; Freeman–Carroll method Thermal degradation.

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Study on Ce^{3+}/Dy^{3+} co-doped $Sr_2Al_2SiO_7$ phosphor for WLEDs

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ABSTRACT
Ce^{3+}/Dy^{3+} co-doped $Sr_2Al_2SiO_7$ were synthesized using high temperature solid-state reaction method and structural characterization was done by XRD for crystallinity confirmation and for optical characterization photoluminescence studies were performed. In emission spectra of prepared phosphors, a bell-shaped broad band corresponds to Ce^{3+} along with the sharp peak, which attributes to Dy^{3+} transition, were observed. Phenomenon of energy transfer, which occurs between Ce^{3+} and Dy^{3+} was also studied.

Keywords: Energy transfer, photoluminescence, XRD

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Eco-friendly Green Synthesis and Physical Characteristics of Multifunctional Rare-earth Dysprosium incorporated $Ba_{0.7}Sr_{0.3}TiO_3$ Nanoceramics

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ABSTRACT

Now a days, much attention has been focused to multiferroic nanocrystalline materials possessing ferroelectric and ferromagnetic characteristics. These features are of realistic interest for microelectronics, magnetic memory, sensor and spintronics devices. In this report, rare earth Dysprosium (Dy^{3+}) doped barium strontium titanate ($Ba_{0.7}Sr_{0.3}Ti_{0.7}Dy_{0.3}O_3$) nanocrystals were produced via facile and eco-friendly wet chemical type sol-gel auto combustion route using coconut water as a fuel. Coconut water is an exceptional natural source of sucrose and glucose is used in this reaction as a both chelating agent and firing agent. X-ray diffractogram (XRD) confirmed the existence of tetragonal phase perovskite structure with no impurity phases. Transmission electron microscopy (TEM) technique shows the homogeneous and well-defined surface morphology in the nano-dimension (~34 nm). The magnetic property was studied through a Vibrating sample magnetometer (VSM) technique at room temperature. The M-H curve demonstrates a characteristic hysteresis loop indicating the ferromagnetic nature of the prepared sample. The ferroelectric property was studied by a P-E hysteresis loop tracer and well-behaved ferroelectric loop was observed. The obtained ceramics nanopowders can be valuable for memory devices and bio-medical applications.

Keywords: Multiferroic, green synthesis, nanoceramics, ferroelectric, magnetic properties.

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Industrial Applications of Self-cleaning Superhydrophobic Coatings

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ABSTRACT

Water drop acquires perfect spherical shape on lotus leaf surface with water contact angle higher than 150° and eventually roll off at less than 10°. Inspiring from an extraordinary water-repellent behavior of lotus leaves, herein we artificially fabricated superhydrophobic surface by near perfectly mimicking the water-repellent properties of the lotus leaves. The solid substrates like sport shoes, fabric, paper, windshields of home door and car, wooden materials, metals and sponges coated by commercially available silica nanoparticles (size ∽ 50 nm) by simple dip and spray coat technique and drying at 100ºC. Such types of coating on various substrate are more essential application in industrial field. The prepared superhydrophobic coating showed water contact angle greater than 160º and sliding angle less than 8º with good durability. This is one of the simple and low-cost method for deposition on large scale.

Keywords: Contact angle, Sliding angle, Superhydrophobic, Self-cleaning, Air-trapping

Acknowledgment

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Redox Mediators in Aqueous Electrolyte for Enhancement of Capacitance of Supercapacitors - A Brief Review

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ABSTRACT

Supercapacitors, also known as electrochemical capacitors, are a promising field in the area of energy storage. Supercapacitors are exciting much research consideration due to their high-power density, long-term cycling stability, safety as compared to the rechargeable batteries. In the recent years, different types of carbon-based materials like activated carbon, Templated Carbon, Carbon Nanotube (MWCNT/SWCNT), Carbon aerogels, Graphene, reduced graphene oxide etc., conducting polymers, metal oxides, and their various nano-composites have been used as electrodes materials to advance the energy performance of Supercapacitors. To increase the electrochemical performances of supercapacitors numerous methods have been employed. But newly by a few researchers, another method has been introduced and alternative approach has been proposed wherein the performance of the Supercapacitors can be increase by introducing redox mediators in the electrolytes. This new method is simple, safe and cost effective as compared to the others. Here, we present brief review of different types of redox mediators and its classification, difficulties and outlooks of Redox Mediators in Aqueous Electrolyte for Enhancement of Capacitance of Supercapacitors.

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Green synthesis of luminescent carbon quantum dots and its applications

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ABSTRACT

Carbon quantum dots (CQDs) and graphene quantum dots (GQDs) are the new genera of modern nanotechnology which has numerous practical applications. Graphene is a thinnest and strongest form of a carbon, discovered recently. But despite of all the excellent properties that these quantum dots possess, there is a challenge of synthesizing the zero-dimensional QDs as a stable product. Formation of luminescent CQDs via green synthesis is nowadays an alternative method to a conventional synthesis of luminescent materials. Also, it is preferable if synthesis method is cost effective and uses green precursors which are natural source of carbon thus minimizing the use of hazardous chemicals. Keeping this in mind, a present proposed work focuses on the synthesis method of carbon and graphene quantum dots by taking organic juice and residues as prominent precursor and source of hydrocarbon. It seems that some of the natural residue obtained from trees and plants show a potential to synthesize new form of carbon dots if investigated and experimented further deeply. Such obtained luminescent CQDs and GQDs are then may be implemented as an application for bio-imaging, sensors, organic solar cells, agriculture, integrated circuits and many more when gives compatible luminescent and optical properties.

Keywords: Carbon and graphene quantum dots; green synthesis; bio- imaging.

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Study on Structural, Magnetic and Electrical Properties of Zr doped Spinel Ferrite Prepared by Sol-Gel Auto Combustion Method

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ABSTRACT

Zirconium (Zr4+) doped nickel- zinc ferrite nanoparticles with chemical composition of ZrxZn0.5-xNi0.5-xFe2O4 (0.1≤x≤0.30) have been synthesized successfully by sol–gel auto combustion method using urea as a fuelling agent. XRD study confirms the single-phase formation of composite ferrite which belongs to cubic spinel structure and the lattice parameter found to be a= 8.417, 8.44 and 8.452Å for the respective values of x = 0.10, x = 0.20, x = 0.30. TEM study reveals the morphology of Ni-Zn ferrite nanoparticles are well spread over wide area. The saturation magnetization gradually decreases with the increase in Zr substitution and reaches minimum when x=0.30 whereas the coercivity value reaches minimum when x=0.10. DC electrical resistivity has been found to vary with increasing Zr content. The good electrical resistivity of ceramic material more than 125 MΩ cm was used for high frequency transformer applications.

Keywords: XRD, TEM, spinel ferrite, sol–gel auto-combustion method, resistivity (ρ) and saturation, magnetization

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Formulation and evaluation phytosomes loaded thermosensitive nasal in-Situ gel for the treatment of thrombosis

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ABSTRACT

The present research works include the formulation and evaluation of Physalis Minima phytosomes loaded thermo-sensitive nasal In-situ gel for the treatment of Thrombosis. Thrombosis is the process of a blood clotting in blood vessels. This clot can block blood flow in the affected area and also cause serious complications if the clot moves to a crucial part of the circulatory system, such as the brain or the lungs. For the treatment of thrombosis, thrombolytic drugs were used. Thrombolysis is the breaking of blood clots in blood vessels. Active moieties of Herbal extract protected by phytosomes formulation. A phytosome is a complex of a phyto active ingredient and a phospholipid. To reach the systemic circulation it has ability to transition from hydrophilic to lipophilic environment of the cell membrane. Phytosomes have improved pharmacokinetic and pharmacological parameter. Thermosensitive nasal In-situ gel, a new technology used brain targeting. Different phytosome complexes containing molar ratio of 1:1, 1:2, and 1:4 of extract of Physalis minima and phospholipid were prepared by the solvent evaporation technique. The phytosome was characterized by SEM, XRD and FTIR, drug content, entrapment efficiency. In In-vitro thrombolytic activity test of phytosomes was carried out, Streptokinase used as a positive control and water used as a negative control. Phytosomes loaded in thermo-sensitive nasal In-situ gel prepared by cold method and evaluate for clarity, pH, viscosity, gelation study mucoadhesive strength, drug content, In-vitro permeation studies using diffusion cell. From the research work it was concluded that the prepared phytosomes loaded thermo-sensitive nasal in-situ gel used for brain targeting drug delivery in the treatment of thrombosis. It reduces dose and avoid first fast metabolism because of nasal drug delivery, gives safe herbal treatment by reducing side effects and increase bio efficacy.

Keywords: Phytosomes, Thrombosis, Thrombolytic

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Enhancement of Antibacterial activity of Chenopodium album using Piperine

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ABSTRACT
The present research work deals with enhancement of antimicrobial activity of Chenopodium album with Piperine as a bioenhancer so as to enhance its bioefficacy and reduce dose. Preformulation studies were carried out for the confirmation. Then drug-excipients compatibility was determined by DSC and SEM, which showed that drug is compatible with piperine. The *in vitro* antibacterial activity was evaluated against bacteria based on minimum inhibitory concentration (MIC). The antibacterial activity was assessed using well plate method and were examined for the size of zone of inhibition. The physical mixture of extract and Piperine was prepared by kneading method in the ratio of 1:0.5, 1:1, 1:1.5, 1:2, 1:3,1:4 and zone of inhibition was determined against Staphylococcus aureus and Escherichia coli. From the research work, it can be concluded that out of all the ratios 1:2 ratio showed maximum activity after which constant zone of inhibition was observed. Thus, 1:2 was the optimized ratio and was used for future formulation development.

Keywords: Chenopodium album, Piperine, E. coli, S. aureus

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Synthesis and Study of Silver Nanoparticles for Antibacterial Activity against Escherichia Coli

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ABSTRACT

In recent day's Multi-drug resistance is a rapidly growing problem over the entire world in the treatment of infectious diseases. However currently, nanotechnology research has been empowering more in medicinal industries with a number of benefits due to the fact that the surface area to volume ratio of nanoparticles. Advances in nanotechnology have opened new horizons in nanomedicines. Nanotechnologies reduces the dose of drugs and also have a superior bioavailability than larger particles, resulting in greater utilization in targeted organs or cells. The antibacterial properties of silver have been known for thousands of years.

In addition, the prepared silver nanoparticles are attracting much interest because of surface area to volume ratio and antibacterial activity. In this research work, silver nanoparticles are prepared by using silver nitrate as a precursor. In addition, the silver nanoparticles are attracting much interest because of their potent antibacterial activity. So, for that, the activity of prepared silver nanoparticles was evaluated against E Coli. In conclusion, silver nanoparticles are formulated characterize successfully and it shows antibacterial activity against the bacteria E Coli

Keywords: Metallic Nanoparticles, Synergism, Antibacterial agent

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Preparation and characterization of Cadmium doped Indium oxide by Combustion method

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ABSTRACT

This paper describes the preparation of cadmium doped indium oxide by using indium (III) nitrate and urea (fuel) as starting chemicals in combustion method. The obtained powder samples were characterized by X-ray diffraction and Fourier transform infrared spectroscopy (FTIR). Thick film of Cd doped In_2O_3 was fabricated by using screen printing technique. The average crystallite size of Cd doped Indium Oxide from XRD was estimated 12.65 nm by using Scherrer's equation. Cd doped In_2O_3 is widely used in gas sensing technology.

Keywords: Indium oxide, cadmium, combustion method, XRD, FTIR

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Molecular interaction in aqueous solution of Ceftriaxone sodium and Cefotaxime sodium: An ultrasonic study

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ABSTRACT

Ultrasonic velocity, viscosity and density have been measured for antibiotic Cefotaxime sodium and Ceftriaxone sodium in water at different concentrations, temperatures and frequency at 2MHz. As the acoustical parameters like relative association, specific acoustic relaxation time and free volume would be more useful to predict the molecular interaction. By using ultrasonic velocity, viscosity and density of the prepared solution of Cefotaxime sodium and Ceftriaxone sodium in water these acoustical parameters have been determined. It has been identified that the molecular interactions in aqueous solution of Cefotaxime sodium were stronger than that of in aqueous solution of Ceftriaxone sodium. And also, there is a strong solute - solvent interaction occurring in aqueous solution of Cefotaxime sodium than that of aqueous solution of Ceftriaxone sodium.

Keywords: Viscosity, density, Ultrasonic velocity, Cefotaxime sodium, Ceftriaxone sodium

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Ultrasonic study of Ocimum Tenuiflorum (Holy Basil) leaf extract at 6 MHz

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ABSTRACT

Ultrasonic technique is a powerful technique for providing the information regarding molecular behavoiur of liquids, polymer solutions and mixtures. Ultrasonic velocity, density, viscosity have been measured experimentally for the solution of leaf extract of Ocimum Tenuiflorum in double distilled water with 1%,0.5%, 0.25%,0.125% concentrations at 298.15 K, 303.15 K, 308.15 K keeping constant frequency of 6 MHz. As the acoustical parameters like adiabatic compressibility, intermolecular free length, relative association, relaxation time, specific acoustic impedence would prove to be more useful to predict and confirm the molecular interaction, these have been determined by measuring the Ultrasonic Velocity, density, viscosity of the prepared solution. A variation in these parameters will provide a strong information regarding the interactions taking place in the solution of leaf extract of Ocimum Tenuiflorum. It has been observed that the ultrasonic velocity increases with decrease in concentration for the leaf extract solution of Ocimum Tenuiflorum which indicates that molecules of solution forms strong hydrogen bonds with the solvent. Evaluation of adiabatic compressibility, specific acoustic impedence, relative association, relaxation time, intermolecular free length clearly shows strong solute – solvent interaction.

Keywords: Ultrasonic study; Ocimum Tenuiflorum; adiabatic compressibility, specific acoustic impedence

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Nano size strontium hexaferrite application and dopant effect on magnetic properties

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ABSTRACT

The M-type strontium hexagonal ferrite widely used permanent magnet due to its excellent magnetic and electrical properties. Many studies have been made attempts to improve its magnetic properties by cationic substitution of magnetic, non-magnetic and rare earth ions at both Fe and Sr site simultaneously or by simply at Fe site or Sr site. This substitution tunes their changes in properties such as saturation magnetization, coercivity, remnant magnetizations which are useful in large number of applications such as chemical sensing, biomedical application, recording media and microwave device design. The combined substitution of divalent metals with rare-earth ions has been modify the electromagnetic properties of nano hexagonal ferrite and successfully improves the crystalline anisotropy with no decrease in saturation magnetization. Several papers have reported the effect on the magnetic properties o rare–earth substitution in Sr nano hexagonal ferrite. It was found that La substitution in Sr ferrite increases magnetic properties, while Ce and Sm increases the coercivity in comparison with pure Sr nano hexagonal ferrite.

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Raman Spectroscopic technique as an effective method for detecting adulteration in an Ayurvedic fungal medicine Phansomba (*Phellinus* spp.)

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ABSTRACT

Phansomba (Phellinus spp.) is a traditional fungal medicine used in the western parts of Maharashtra. The authenticity of this medicine is in question. Hence, the samples sold under the name phansomba were screened using Raman spectroscopy. The spectra of these samples were compared with the spectra of genuine sample. The spectroscopic study was followed by multivariate analysis using PCA and MDS. The spectral data, after transformation into a binary matrix used to construct neighbor joining and maximum likelihood tree. The results indicated clear separation of phansomba samples and the adulterated samples. It is further revealed that bands at 487, 528, 786, 892, 915, and 1436 cm^{-1} are characteristic of Phellinus.

Keywords: Adulterants, Ayurveda, Phansomba, Phellinus, RAMAN Spectroscopy

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Hydrophobic SiO_2 – Polystyrene Nanocomposite coated PU sponge for Oil-Water Separation

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ABSTRACT
The lotus leaf-inspired superhydrophobic coated polyurethane (PU) sponge has attracted in oil-water separation application in industries as well as academic research. In the present study, the hydrophobic SiO_2 nanoparticles (NPs) particles are synthesized by polymethylhydrosiloxane (PMHS) via sol-gel process. The nanocomposite solution was prepared by adding hydrophobic SiO_2 NPs in polystyrene solution and applied on PU sponge by dip coat technique. The superhydrophobicity was achieved by varying concentration of hydrophobic SiO_2 NPs in nanocomposite solution. As prepared superhydrophobic PU sponge revealed water contact angle ~ 161° and oil contact angle ∽ 0°, therefore such PU sponge easily remove oil from oil-water and oil-muddy water mixture. The prepared superhydrophobic PU sponge has showed highly stable under cross sectional cutting, pressing and twisting, and different pH environment. Such superhydrophobic sponge may be used for large scale application.

Keywords: Lotus leaf, Oil-water separation; Superhydrophobic; PU sponge.

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A Nano Analytical attempt on Hibiscus Rosa-Sinensis Pollens Using Scanning Electron Microscopy (SEM) and the UV-Vis Spectroscopy

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ABSTRACT

Mother Nature has the best of the solutions for today's rising pathological problems that often make the world hazardous, putting the life forms at stake. This study includes the characterisation of the pollen grains of Hibiscus Rosa-Sinensis using Scanning Electron Microscope (SEM) and the UV- Visible Diffuse Reflectance Spectroscopy. The attempt made is to characterise and study the Nano-Particle analysis of the Pollen grains. HRS (Hibiscus Rosa Sinensis) has a lot of medical applications and it has received a great attention all over the world in its taxonomical studies. Especially, the pollen studies are important for assessing the biodiversity of life, and the sexual reproduction of plants and plant-pollinator interactions. Pollen morphology on the other hand is one of the significant tools in solving some taxonomic problems on the family, and has become a part of the multidisciplinary and a collaborative approach in plant systems and their evolution. The result suggests that the pollens have a strong symmetry regarding the distribution of its spines over the spherical grain. The work on the pollen morphology of Hibiscus Rosa-Sinensis is an inter-departmental venture combining both life and physical sciences.

Keywords: Hibiscus Rosa-Sinensis (HRS), pollen grains, SEM analysis, UV analysis

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Formulation and Evaluation of Polyherbal Nutraceutical capsules

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ABSTRACT

Nutraceuticals are available in the form of isolated nutrients, herbal products, processed foods and dietary supplements in the form like capsules, tablets, etc. Formulation of nutraceutical into capsules and tablets is a tedious process and it should be carried out under carefully controlled conditions. The objective of this study was to formulate and evaluate a nutraceutical polyherbal capsule containing Amla extract powder, Broccoli extract powder and spinach extract powder were blended and filled into capsules. They were subjected to several evaluation parameters such as physical appearance, weight variation, hardness and friability. The results of all evaluation parameters of the formulated nutraceutical capsule were within the acceptable limit. Precompression studies also had shown satisfactory results. The thickness, hardness, weight variation friability and stabillity studies etc. were found to be in acceptable range. The finding of the present study assures that the formulated nutraceutical capsules meet the quality standards and is having a good antioxidant activity.

Keywords: Nutraceutical, Polyherbal Capsule, Antioxidant.

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Preparation and Evaluation of Crossandrainfundibuliformis, Passiflora incarnata and Ixora coccinea pigment-basedDye-Sensitized Solar Cells

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ABSTRACT

Rapid depletion in conventional energy sources due to the overuse and adverse impact on the environment has led to the use of alternate energy sources. Solar energy is one of the most promising amongst them. Over the past years, various types of solar cells have been developed. Crystalline, polycrystalline, and amorphous silicon solar cells have been used in many countries due to their high efficiency. These cells directly convert solar radiation into electricity without affecting the environment. However, due to their rigidity, very high production cost and very limited application to space industry, dye-sensitized solar cells have been investigated intensively during the last three decades. The present study evaluates potential of dye obtained from Crossandrainfundibuliformis, Passiflora incarnata and Ixora coccinea using TiO_2 thin film. Parameters like UV-Vis absorption maxima, Isc (mA) and Voc (V) were determined. Results revealed that Passiflora incarnata flower dyehad comparatively higher λ_{max} (580.71 nm) and Voc(0.458V) values followed by Ixora coccinea 440.66nm and 0.41V and Crossandrainfundibuliformisdye showed comparatively low λ_{max} (439.71nm) and Voc (0.04V) values. While, Isc values for Ixora coccinea, Passiflora incarnata and Crossandrainfundibuliformis were 0.005, 0.003 and 0.002 mA respectively.

Keywords: Crossandrainfundibuliformis, Passiflora incarnata, Ixora coccinea, dye sensitized solar cell, non-conventional energy.

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Synthesis and Characterization of NiO and G/NiO Thin Films for Supercapacitor

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ABSTRACT

Nickel oxide (NiO) and Graphene /Nickel oxide (G/NiO) thin films were deposited by spray pyrolysis at temperature 400°C. The graphene was prepared using Hummers's method from graphite. The deposited NiO and GO films were characterized by X-ray technique, Scanning Electron Microscope (SEM). NiO showed cubic phase comprising a strong reflection to (111) plane. The characteristics peak (001) of GO observed at 11.36°due to the oxidation of the graphite. It was found that d spacing of GO was increased than that of graphite (0.34mm). The electrochemical study of NiO and G/NiO were carried out using three electrode configurations. The specific capacitance of NiO and G/NiO were found to be 360 F/g and 520 F/g respectively.

Keywords: Nickel oxide, Spray pyrolysis, Electrochemical study.

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Synthesis and Structural, Optical Characterization of Polyaniline Prepared by Chemical Route Method

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ABSTRACT

In the present research module, we focus on Polyaniline (PANI) was synthesized by chemical route methods. The PANI was characterized by X-Ray diffraction, FT-IR and UV Visible spectroscopy, for investigating the structural and optical properties of pure PANI. From the XRD pattern we notice that PANI has purely amorphous in nature with the chain separation length 4.371 Å The presence of nanoparticles in the PANI material was clearly observed from the XRD studies. Fourier transforms infrared spectra of pure PANI were recorded in the range of 400–4000 cm^{-1} and we got the characteristic absorption spectrums which confirming the formation of pure PANI. The two characterizations absorption bands were noted at 256 nm and 600 nm in the UV-VIS spectra.

Keyword: Structural, X-ray diffraction, Functional, Optical, PANI.

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A systematic analysis on organochlorine and organophosphorus pesticides content in Natural water resources of Ralegaon region

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ABSTRACT

Natural water reservoirs are useful for various purposes such as drinking, farming, domestic, industrialized, business, recreational activities etc. Agriculturalists started using pesticides in large quantities to increase farm income. Pesticides used extensively in agriculture are carried away in pond along with rain water and its adversely effects on human as well as animal health. Water resources contamination by unrestrained usage of pesticides is one of the most serious health and eco-friendly problems. However, to protect the ecosystem network and to design approach plans, it is essential to obtain statistics on type and amount of pesticide residues in water resources. The present study presents an overview of two important pesticides: organo-chlorine and organo-phosphorus in water resources. Due to lack of information among farmers in Ralegaon region we have chosen this topic for studying.

Keywords: Pesticides, Natural water reservoirs, Organochlorine, Organo-phosphorus, Agriculture.

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Physicochemical analysis of water sample for Uranium and trace elements in Water

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ABSTRACT

In physico-chemical analysis our principal element to identify was Uranium. Uranium is present in all environmental matrices such as water, soil, sedimentation etc. in some concentration. For analysis water samples are taken from hand pumps, tube wells and ground water. The water sample collected should be almost half way between the surface of the water and bottom of the reservoir as we know water mineral content is homogenous. With Uranium other metals, rare metals, minerals etc. are also present in water sample in homogenous phase. Along with Uranium trace elements such as Ti, V, Cr, Co, Ni, Cu, Zn, Mo, Sn and Pb are helpful as pathfinder elements in Uranium exploration. Water profiling includes assessing and modelling the impacts of changes in water samples including pH, organic and inorganic materials, metals etc. for it Fluorimetry, Titrimetric analysis, Flame photometry, ICP-OES, Atomic Absorption Spectrometry

Keywords: Fluorimetry, uranium, water, minerals

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Synthesis of Tagetes Leaves Extract Loaded Nanoparticles for Antibacterial Activity

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ABSTRACT

In current research areas the field of Nanotechnology is enormously active in various aspects of drug discovery and innovation. Purpose of present study to increase the intensity of action of Tagetes leaves extract by complying with metallic nanoparticles. The aqueous silver ions when exposed to leaves broth were reduced and silver nanoparticles were prepared. Synthesis of silver nanoparticles with the active constituents of Tagetes leaves were evaluated for skin related or bacterial related infections.

Marigold leaves can be used to Heals Skin Wound infections of bacteria, Burns and rashes. Green synthesis method was used for preparation of Nanoparticles of Marigold leaves extract. Prepared silver nanoparticles characterised by UV visible Spectroscopy Zeta Potential and FTIR. Synergistic antimicrobial potential of silver nanoparticles was evaluated against Gram positive (Staphylococcus aureus and Bacillus cereus). Silver nanoparticles are applied here to reduce microbial pressure and to an increase the activity outcomes from synthesis.

Keywords: Marigold, Nanoparticles, wound healing, Antibacterial activity.

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PL Characteristics of Europium Doped $NaSrPO_4$ Phosphor

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ABSTRACT
A series of $NaSrPO_4$: xEu^{3+} (x = 0.3, 0.5, 0.7, 1 %) compound have been synthesized by the wet chemical method. The phase purity of a phosphor and its photoluminescence properties were studied and understood by X-ray diffraction and their observed emission and excitation spectra. The phosphor exhibited red luminescence under the near-UV excitation of 395 nm, corresponding to the transition of Eu^{3+} ions, which matched well with the excitation wavelength of near-UV LED chips. It can be predicted that $NaSrPO_4$: Eu^{3+} phosphor has potential application in white light-emitting diodes (WLEDs).

Keywords: RE; Phosphate; LED

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Synthesis and Surface Morphological Properties of Unmodified and CuO Modified Nanocrystalline Cr_2O_3 Based Thick Films

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ABSTRACT

Pure Cr_2O_3 powder was synthesized by a chemical co-precipitation method. The coprecipitation method is simple with a low-cost method and can be synthesized on a huge scale. The screen-printing method was used for a fabrication of unmodified Cr_2O_3 thick films. XRD analysis confirms the synthesis of nanocrystalline Cr_2O_3. This is followed by surface morphology and elemental analysis of pure Cr_2O_3 and CuO activated nanocrystalline Cr_2O_3 thick films by using Field Effect Scanning Electron Microscopy (FE-SEM) and Energy Dispersive X-ray Spectroscopy (EDAX). The structural information of pure Cr_2O_3 powder was obtained from FT-IR spectroscopy.

Keywords: Cr_2O_3; XRD, Thick films, Unmodified, CuO

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An investigation of thermophysical and ultrasonic behaviour of B1 phase MoN

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ABSTRACT
In this study, we have investigated elastic, thermophysical properties and ultrasonic attenuation of MoN having B1 phase structure. Second and third order elastic constants have been evaluated at 0K and 300K using Born model of ionic solids. These elastic constants have been utilized for calculating mechanical constants such as bulk, shear and Young's moduli and Poisson's ratio. Ultrasonic velocities along <100>, <110> and <111> directions have been calculated using second order elastic constants. Further, specific heat per unit volume, thermal conductivity and energy density have been estimated. Finally, acoustic coupling constants and ultrasonic attenuation due to phonon-phonon interaction and thermoelastic mechanism in B1 MoN have also been investigated.

Keywords: Elastic properties, thermal properties, ultrasonic attenuation, MoN

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Formulation and evaluation of Chitosan nanoparticle based in-Situ nasal gel for Parkinson's disease

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ABSTRACT

Parkinson's disease is chronic progressive neurodegenerative disease. As the disease affects the central nervous system drug delivery has to cross blood brain barrier. Intranasal delivery to brain via olfactory region is best way to treat CNS diseases. Here we formulated chitosan nanoparticles by ionic gelation technique which then incorporated into the in-situ nasal gel. In the formulation Poloxamer 407 was used for thermosensitive gelling mechanism. Chitosan nanoparticles were evaluated for particle size, PDI, Zeta potential, percentage entrapment of drugs. Further chitosan nanoparticles incorporated into the in-situ gelling formulation. The prepared in-situ gel formulation was evaluated for viscosity measurement, in-vitro diffusion study, ex-vivo drug permeation study and stability study. In-vivo pharmacodynamic study on female wistar rats were performed; in that locomotion activity by open field test, grip strength and akinesia test had significant results which indicates that formulation had dynamic effect on the Parkinsons disease.

Keywords: Chitosan, Nanoparticles, Parkinson's disease, In-situ gel

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Optical properties of Eu^{2+} doped ZrO_2 Nano-phosphors

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ABSTRACT

Nano-phosphors has unique properties than its bulk form, solid state reaction method is used to synthesized Eu doped ZrO_2 nanophosphors. For the characterization of the phosphor materials XRD, FTIR, FESEM and EDS study was carried out. FTIR confirms the presence of conventional impurities (such as NO_3, OH-) present in the prepared sample. Structural characterization technique (XRD) shows the monoclinic formation and reveals the average grain size in the nano region. EDAX study confirms the chemical composition and through FESEM morphological status is studied. For kinetic parameters study thermoluminescence studies is carried out and try to correlate the XRD results with thermoluminescence behavior of prepared phosphors. Photoluminescence emission spectra show the broad emission peak around 480 nm, ascribed by the electric dipole transition $4f^6 5d^1 \rightarrow {}^8S_{7/2}$ ($4f^7$) blue emission band of Eu^{2+} in ZrO_2 phosphors.

Keywords: Phosphors, Ionic Radii, solid state reaction, Kinetic parameters.

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Study of Structural, Electrical and magnetic properties of Bi^{+3} Substituted Calcium Hexaferrite

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ABSTRACT
Calcium hexaferrite have a narrow particle size distribution size and because of their good magnetic, electrical, mechanical and magneto-optical properties as well as perfect thermal and chemical stability, offer promising materials for industrial applications. TheBi^{+3} substituted calciumhexaferrite was synthesized by microwave-assisted sol-gel auto combustion technique. XRD, SEM, FTIR and VSM techniques were used to study structural morphological and magnetic characteristics. The effect of sintering temperature on $CaFe_{12}O_{19}$ hexaferritehas been studied. The sintering temperature shows the variation in their structural property when calcium is replaced by Bismuth in synthesized hexaferrite. VSM analysis revealed the ferromagnetic behaviour of the synthesized hexaferrite applicable in fabrication of permanent magnets.

Keywords: Hexaferrite, XRD, SEM, VSM, sol-gel

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Magnetic and Structural Behaviour of Nickel Substituted Zinc Ferrite

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ABSTRACT

$Zn_{1-x}Ni_xFe_2O_4$ nanoparticles were prepared by sol–gel method using urea as a neutralizing agent. The evaluation of XRD patterns and TEM images indicated fine particle nature. The average crystallite size increased from 10 to 24 nm, whereas lattice parameters and density decreased with increasing Ni content (x). Magnetic measurements through VSM revealed a maximum saturation magnetization for $Zn_{0.5}Ni_{0.5}Fe_2O_4$ however, reduced value of magnetization is attributed to the canted spin structure and weakening of $Fe^{3+}(A)$–$Fe^{3+}(B)$ interactions at the surface of the nanoparticles.

Keywords: Sol–Gel, spinel, XRD, VSM, Magnetization.

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Effect of Nano clay on the Mechanical properties of Polyester and S-Glass Fiber (Al)

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ABSTRACT

Composite materials play a vital role in many industrial applications. Researchers are working on fabrication of new composite materials worldwide to enhance the applicability of these materials. In view of this, the objective of the present work is to analyze the effect of nanoclay content on the mechanical and morphological behavior of S-glass fiber, reinforced in Polyester with nanoclay as filler. Five different types of composites are fabricated by hand layup technique using 0 wt% nanoclay,1 wt% nanoclay, 3 wt % nanoclay, 5 wt% nanoclay and 7 wt% nanoclay with 40% wt fiber, and polyester. The results of the study show that the incorporation of nanoclay has a significant effect on the mechanical behavior of composites. The optimum loading of clay in the Polyester /glass fiber composites was attained at 3wt%, where the improvement in tensile and bending properties was seen.

Keywords: Nanoclay, S-Glass fiber (AL), Polyester etc

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Structural, Electrical and Magnetic Properties of Calcium Hexaferrites

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ABSTRACT

The Samples of Calcium Nano Hexaferrites $CaLaFe_{12}O_{19}$ were prepared by Sol-gel auto combustion technique using urea as a fuel. The synthesised compound was characterized with X-ray diffraction analysis, which revealed the formation of mono phase M-type hexagonal ferrite with space group P_{63}/mmc. The Surface electron microscopy (SEM) and Transmission electron microscopy (TEM) were incorporated to confirmed that the sample exhibit relatively well-defined hexagonal grains with average particle size. The values of the lattice parameters support this confirmation. DC conductivity of bulk samples have been investigated as a function of reciprocal temperature. The measurements were carried out at constant frequency (100Hz). The Activation energies were calculated at both ferri-magnetic and paramagnetic regions. The enhanced resistivity of Lanthanum doped calcium hexaferrite is a prospective application in microwave devices. The magnetic measurements were carried by using Vibration Sample Magnetometer (VSM). Results of VSM studies shown that, the La-doped sample indicate rise in saturation magnetization, significant increase in the coercive field and magnetic remains. Increase in coercivity and retentivity illustrate that they are hard ferrite materials. It is known that the nano-hexaferrites with special magnetic properties are highly useful in Data storage applications.

Keywords: Nano-hexaferrite, Sol-gel Auto-combustion process, Transmission electron spectroscopy, XRD, Magnetic properties, Activation energy, etc .

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Growth and characterization of Glycine doped ADP crystal

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ABSTRACT

Amino acids play an important role in the field of non-linearity. However, the SHG efficiency and optical parameters of glycine doped ADP crystal has not been reported, which is key factor for NLO applications. In this work Ammonium Dihydrogen Phosphate (ADP) doped crystal with Glycine has been grown by three different methods i.e., Conventional Slow Evaporation Method, Crystal Rotation Method and Sankaranarayanan Ramasamy (SR) Method. Crystals grown by Rotation were found to have Good SHG efficiency than the conventional method. ADP crystals have wide range of applications in integrated and non-linear optics because of their piezo-electric and non- linear optical properties. The grown crystals were characterized by powder XRD, FTIR, Thermal analysis, Optical and Dielectric techniques and the results were compared with pure ADP crystal.

Keywords: ADP, glycine, NLO, SHG, XRD.

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Growth and characterization of glycine doped potassium dihydrogen phosphate (KDP)

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ABSTRACT

Potassium dihydrogen phosphate (KDP) is a well-known nonlinear optical (NLO) material for various optoelectronics application. Since amino acids exhibits NLO property, it is of interest to dope them in KDP. In present study single crystal of pure and amino acid, Glycine doped Potassium dihydrogen phosphate (KDP) has been grown by crystal rotating method. The SHG efficiency of Glycine doped KDP crystal was found to be 1.36 times more than pure KDP. The crystallinity and cell parameters were characterized by X-ray diffraction analysis, the shifting in frequency assignment of functional group of KDP due to addition of Glycine were analysed by FFTIR analysis. The enhancement in transmittance of grown KDP crystal with addition Glycine was determined by UV-visible spectral analysis. The presence of dopant in the sample of grown crystal was confirmed by energy dispersive x-ray analysis (EDAX). The grown crystal was subjected to thermo gravimetric analysis (TGA) and Differential Scanning Calorimetry (DSC) Analysis to observe the thermal decomposition and weight loss.

Keywords: Potassium dihydrogen phosphate (KDP), Glycine.

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Effect of l-lysine on growth and characterization of Ammonium dihydrogen Phosphate

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ABSTRACT
Single Crystal of ADP doped with 1% of l-lysine, a semi-organic optical (NLO) material, have been grown by slow evaporation method. Good optical quality single crystals with dimension up to 20*5*15 mm^3 are obtained. It is observed that growth rate of doped ADp is higher than pure ADP. The grown crystals were characterized by FTIR, UV absorption and microhardness studies. The thermal stability of the crystals was studies by thermo-gravimetric analysis (TGA).

Keywords: ADP-L-Lysine doped crystal; FTIR, TGA, microhardness, uv analysis.

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Preparation of Potassium dihydrogen phosphate doped l-lysine crystal by rotating method

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ABSTRACT
The solubility, induction period and nucleation parameters of pure and amino acids like L-lysine doped potassium dihydrogen phosphate (KDP) crystals have been determined. Solubility study of pure and amino acids doped KDP crystals were carried out for different temperatures. The induction period was measured at different super saturation level. The nucleation parameters like interfacial tension, radius of critical nucleus and energy of formation were calculated based on the classical theory of nucleation. Values of different parameters were found to be larger for amino acid doped crystals than pure KDP crystal.

Keywords: Non-Linear Optical Materials, Solubility; Induction Period, Nucleation

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Study of Structural, Electrical, and Magnetic Properties of Bismuth substituted Calcium – Lead M- Type Hexaferrite

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ABSTRACT

M-type calcium-lead Hexaferrites with substitution of trivalent bismuth were prepared by sol-gel technique using metal nitrates as oxidants. The powders were characterized with XRD, SEM, TEM and VSM. XRD analysis indicated the formation of single-phase substituted M-type calcium-lead hexaferrites. The average crystallite size was calculated and found to be in Nano size. The dielectric measurements were carried out in the frequency range of 10^3-10^5 Hz at room temperature. Activation energies were calculated at both ferrimagnetic and paramagnetic regions. Magnetic properties were studied with the help of vibrating sample magnetometer (VSM). Results of VSM studies showed the decrease in saturation magnetization with the increase of Bi concentration. Increase in coercivity and Retentivity illustrated that these are hard ferrite materials. The enhanced resistivity of bismuth doped calcium lead hexaferrite is a prospective application in microwave devices

Keywords: Ferrite, sol-gel, XRD, TEM, VSM. coercivity

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Synthesis and characterisation of calcium doped nickel ferrite

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ABSTRACT

Due to the vast survey on calcium-based ferrite materials with the existing ferrites, it was found that the research on calcium ferrite is scanty compared to another ferrite. Moreover, there is no report available on Calcium doped with nickel ferrite materials. $Ni_{0.3}Ca_{0.7}Fe_2O_4$ and $Ni_{0.9}Ca_{0.1}Fe_2O_4$ have been prepared by sol-gel combustion technique using urea were used as the burning agent. The average crystallite size of the prepared ferrite was in the order of ~50-70nm. The structural, morphology and the identification of functional groups of the calcium-doped nickel ferrite were analysed systematically using XRD, TEM and FTIR. The crystalline phases of the present sample were investigated.

Keywords: Calcium ferrite, sol-gel, crystallite, XRD, TEM, FTIR.

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Structural and Magnetic Studies of Ba^{2+} Substituted Nickel Ferrite by Sol-Gel Auto-Combustion method

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ABSTRACT
Nickel Ferrite have a narrow particle size distribution and because of their good magnetic, electrical, Structural and magneto-optical properties with perfect thermal and chemical stability due to that the material will be promising for industrial application. The Ba substituted Nickel Ferrite was synthesized by the Sol-Furnace auto combustion method. The Material will have characterized by using different techniques like XRD, VSM, SEM and electrical study of the material by using impedance analyzer. The Nickel Ferrite shows the variation in their structural property, based on characterizing result that the material will be targeted for the application like microwave absorbing material, transformer core etc.

Keywords: Ni-Ba-ferrite; Sol-Furnace auto combustion method, XRD; SEM, VSM, FTIR.

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Investigation of Structural, Electrical, Microwave absorption property of Bismuth substituted lead hexaferrite

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ABSTRACT

The lead ferrite ($PbFe_{12}O_{19}$) nanoparticles were prepared by a simple and short time microwave method. Lead nitrate, iron nitrate, Bismuth and Urea were used as precursor materials. The effect of surfactants on the morphology and particle size of the magnetic products was investigated. The prepared magnetic products were studied by X-ray diffraction, scanning electron microscopy, and Fourier transform infrared spectroscopy. Single phase hexagonal ferrite nanoparticles with average particle size of 50 nm were obtained in synthesize temperature of 850^0C. VSM analysis confirmed the magnetic property of the hexaferrite nanostructures. The values of both saturation magnetization and coercivity strongly depended on the particle sizes. The obtained hexagonal ferrite nanoparticles exhibited a hard magnetic behaviour with a suitable saturation magnetization.

Keywords: Lead Ferrites, Nanocomposites, X-ray diffraction, VSM, FTIR, coercivity

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Synthesis and thermoacoustic characterization of ZrO_2 and Al_2O_3 nanofluids for heat transfer

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ABSTRACT
Nanofluids are prominent agents in future as coolants in heat transportation systems. It attracted many researchers and the progress in this field has been tremendous because of the high thermal properties and probable applications in some areas like aerospace, transportation industry, medical regions and also as microelectronics. These fluids are having conjoined properties of base fluid and nano particles. This work reports the thermo physical properties of ZrO_2/water and Al_2O_3/Water -based nanofluids. The synthesized nanoparticles have been characterized by XRD techniques. From the ultrasonic velocity, density, viscosity and thermal conductivity measurement, various molecular interaction is explained to analyze the nature of nanofluids.

Keywords: Coolant, nanofluids, molecular interaction, viscosity, ultrasonic

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Synthesis and thermo acoustical dynamics of PMMA/Fe_2O_3 nanocomposites

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ABSTRACT

Inorganic metallic nanoparticle's incorporation into polymer matrices allows the modification of physico-chemical properties and its specific implementation. This work put forth the conventional co-precipitation method for synthesis of polymethyl methacrylate enriched in ferric oxide at nanoscale. The synthesized matrix is then structurally determined using XRD. The magnetic behavior is analyzed by VSM. The molecular interaction study is carried out using ultrasonic pulse echo technique. The specific concentration of metal ion in polymer matrix with fixed geometry has optimum magnetic property.

Keywords: Polymer matrix, nanocluster, XRD, PMMA, VSM

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Green synthesis of ZnO nanoparticles and its antibacterial activity evaluation

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ABSTRACT

The synthesis of metal oxide nanoparticles with the use of plant extract is a promising alternative to the conventional chemical method. This work aimed to synthesize zinc oxide nanoparticles (ZnO NPs) using plant extract of olive leave (Olea europaea) and red tomato fruit (Lycopersicon esculentum M.). The synthesized ZnO NPs were characterized by UV-Visible spectroscopy, Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD) and scanning electron microscopy (SEM). This study also evaluated the antibacterial activity of the synthesized ZnO nanoparticles against clinical and standard strains of Escherichia coli. The antibacterial effect of ZnO NPs synthesized by Olea europaea on, zinc oxide nanoparticles are promising biocontrol agents that can be used to combat bacterial diseases.

Keywords: Nanomaterials; ZnO; olive leave; XRD; antibacterial activity.

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Biological synthesis of ZrO_2 nanoparticles using Aloe vera leaf extract

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ABSTRACT
The development of nanomaterials has attracted increasing attention recently. The study of new technologies to obtain these materials becomes extremely important since the majority of the nanomaterials synthesized require reagents and solvents. These reagents and solvents are sometimes toxic and may generate harmful residues to the environment and the health of living beings. The green biogenic synthesis of nano particles using plant extracts is always eco-friendly and attractive This study developed a method of synthesizing the green of zirconia (ZrO_2) nanoparticles using Aloe vera plant extract. The XRD pattern and FTIR analysis have been used to characterize the structure, size and presence of functional groups in ZrO_2 nanoparticles. The Scanning Electron Microscope with the Energy Dispersive X-ray studies provided the size and the elemental composition of the synthesized ZrO_2 nanoparticles. Hence the biogenic synthesis of ZrO_2 nanoparticles using Aloe vera is put forth as an eco-friendly synthesis over other methods.
Keywords: nanomaterials; green biogenic; Aloe vera; XRD; FTIR

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Biosynthesis of Al_2O_3 nanoparticles and its antibacterial activity evaluation

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ABSTRACT
In the current scenario, biosynthesis has a major trend in the world due to its eco-friendly approach, effectiveness and low cost. In this study, the green treated aluminium oxide nanoparticles (Al_2O_3 NPs) were synthesized through simple biological reduction method. Green synthesis of Al_2O_3 NPs from tea leaf extract is used for removal of nitrate and antibacterial activities. Structural characterization was studied using x-ray diffraction that showed semi-crystalline and possibly, amorphous structure. Fourier infrared spectroscopy was used to determine Al-O bond and functional groups responsible for synthesis of nanoparticles. FTIR confirmed existence of Al-O band and bio-functional groups, originated from plant extract. Morphology and size of nanoparticles were investigated using scanning electron microscopy. The synthesized Al_2O_3 NPs was found to have effective antibacterial activity against gram-negative Escherichia coli (E. coli). Hence, these green synthesized Al_2O_3 NPs is found to have promising applications in pollutant ion removal in aquatic systems.

Keywords: Nanomaterials; Al_2O_3; Tea; XRD; antibacterial activity

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Synthesis, X-RD and photoluminescence properties of material Calcium aluminate phosphor ($CaAl_{12}O_{19}$) doped in Eu^{3+} by using combustion method

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ABSTRACT
Luminescence investigation of calcium aluminate phosphors was prepared using the combustion method are described. Preparation of europium-doped calcium aluminate phosphor was prepared by this method at reaction temperature low as 500° c in a few minutes without the need for calcination. The structural properties of prepared compound were investigated by X-ray diffraction (X-RD) technique. XRD result confirms hexagonal magneto plumbite structure with a space group P63/mmc. The optical properties were studies by photoluminescence (PL) spectroscopy. The prepared phosphor shows a strong luminescence.

Keywords: XRD, Photoluminescence (PL) spectroscopy, $CaAl_{12}O_{19}$,

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Synthesis, XRD and Photoluminescence Properties of Ce^{3+} Doped Sr_2SiO_4 and Ca_2SiO_4 Phosphor by Sol-gel Auto Combustion

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ABSTRACT

Ce^{3+} activated Sr_2SiO_4 and Ca_2SiO_4 nanophosphors were prepared by low temperature solution combustion method using urea $[CO(NH_2)_2]$ as a fuel. This mainly reports an investigation about structure and Photoluminescence properties of a Ce^{3+} doped phosphor material. The Prepared phosphor was well characterized by powder X-ray diffraction and PL. The photoluminescence properties of the nano-size Sr_2SiO_4 : Ce^{3+} phosphors excited under NUV, showed intense emission in violet region and Ca_2SiO_4: Ce^{3+} phosphors excited NUV showed intense emission in blue region. The intense emission upon NUV light excitation suggest that Ca_2SiO_4:Ce^{3+} can be used as a Potential blue-emitting phosphor for NUV white LEDs and the intense emission upon NUV light excitation suggest that Sr2SiO4:Ce3+ can be used as a potential violet-emitting phosphor for NUV white LEDs.

Keywords: Photoluminescence, X-ray, Combustion Method, nanocrystalline materials

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Synthesis, XRD and Photoluminescence properties of $SrAl_2O_4$ phosphor doped with Eu^{3+} by using Combustion Method

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ABSTRACT

The Structure of strontium aluminate ($SrAl_2O_4$) has attracted extensive interest because of its potential luminescent applications. In this work Different phosphor colours of $SrAl_xO_y$: $Eu^{2+}_{0.01}$. nano powder and pellets have been synthesized via citrate combustion technique and their structural and luminescent properties were investigated. XRD results revealed that monoclinic $SrAl_2O_4$ was the major phase and hexagonal $SrAl_{12}O_{19}$ was the minor phase.

Keywords: strontium aluminate, luminescent, evaporation method, phosphor, XRD

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Synthesis and structural study of strontium and calcium trisilicate synthesis Using Combustion method

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Abstract: Synthesis of strontium and calcium trisilicate $SrSiO_3$ and $CaSiO_3$ Synthesis using combustion method. The $SrSiO_3$ And $CaSiO_3$ were Characterized by powder X-Ray diffraction (XRD). Silicate materials are useful for various applications. It is argued that the combustion synthesis is a simple and fast method for preparing silicate materials.

Keywords: Combustion method, $SrSiO_3$ and $CaSiO_3$

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Morphological and Electrical behaviour of spinel type ferrite

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ABSTRACT

Spinel ferrite is a class of magnetic materials which derives this name due to its similarity with the naturally occurring $MgAl_2O_4$ mineral. Also known by the name of 'cubic ferrites', these ferrites have been the center of attraction for material scientists ever since their discovery. Among these spinel ferrites, nickel ferrites have become one of the best options for usage in different applications such as medical treatment, electronic devices, electromagnetic wave absorption materials and water purification. The popularity of these ferrites is due to their favourable properties such as high permeability, high resistivity and high saturation magnetization.

The major research findings are tabulated and briefly summarized. The various electrical properties of magnesium ferrites, which have been commonly studied are also reported in this paper.

Keywords: Spinel ferrite, XRD, Electrical conductivity, Dielectric constant, Cubic structure, etc.

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Dielectric and characterization study of $BaNb_2O_6$ nanoparticles synthesized by sol-gel method

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ABSTRACT

The $BaNb_2O_6$ (BN) is synthesis by sol-gel method in Nanoscale. The Particle sized was rod like structure with diameter ∽100nm. The X-ray diffraction patterns of $BaNb_2O_6$ powder is used for the identification of tetragonal Phase by indexing of the peak in predominant tetragonal phase using list square fit method and Bragg's relation. The dielectric property of material has studied with various temperature and frequencies.

Keywords: Sol-gel method, $BaNb_2O_6$, Bragg's relation

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Diversity of Butterflies in Wani, District-Yavatmal (M.S.)

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ABSTRACT

The present paper deals with a study of the diversity and abundance of butterflies in and around Wani city, district Yavatmal (M.S.), India. A Total 34 species of butterflies belonging to 26 genera and 05 families, namely, Hesperiidae, Lycaenidae Nymphalidae, Papilionidae and Pieridae were recorded from different habitats, urbanized habitat i.e. Wani locality (Site I) and less urbanized habitat (Agricultural area) (Site II). The family Nymphalidae (44.11%) was found abundant and family Hespiridae (2.94%) was found least abundant among all the families. The study area is rich in butterfly diversity and further research could be conducted to obtain more details and documentation on butterfly diversity for the conservation

Keywords: Wani, Butterfly, Diversity, Habitat, Shannon Index

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Synthesis and Spectroscopic Characterization of Modified Schiff Bases Derived from 2,4-Dinitro Phenyl Hydrazine

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ABSTRACT

Ambient synthesis of modified Schiff bases derived by condensation of 2,4-dinitro phenyl hydrazine has refluxing with aryl aldehydes such as veratraldehyde (3,4-dimethoxybenzaldehyde), 3-nitrobenzladehyde, Anisaldehyde (4-Methoxy Benzaldehyde) and Furfuraldehyde (Furan-2-carbaldehyde) followed by magnetic stirring gives derivatives of Schiff bases. All the modified Schiff bases has analysing by Spectroscopic technique including FTIR, H1NMR and LCMS were used to identify the desired products.

Keywords: Schiff base, 2,4-dinitrophenylhydrazine, FTIR, H^1NMR, Schiff bases and LCMS.

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Microwave absorption efficiency of CNBs synthesized from Brassica nigra oil

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ABSTRACT

Spherical carbon nano beads (CNBs) were synthesized by pyrolysis of brassica nigra oil at 850°C in hydrogen atmosphere in presence of transition metal powder as a catalyst. Micro-Raman spectrum exposes the graphitic nature of material. Scanning electron microscopy (SEM) and Transmission electron microscopy (TEM) illustrate that CNBs are interconnected with outer shell of thickness around 100 nm. A microwave reflection measurement explores an ability of CNBs as an absorber with absorption up to 89% corresponds to reflection coefficient about ∽ -22dB for maximum band width of 0.8GHz in Ku-band.

Keywords: Carbon nano-beads, Pyrolysis, Natural oil vapour deposition, Microwave absorption