Department of Physics

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ThreeDays

4 th International Conference on

Advanced Functional Materials for Sustainable Energy Application(ICAFMSA-2023)

6th–8thDecember2023

ABSTRACT BOOK

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Organized by

Department of Physics

KONERU LAKSHMAIAH EDUCATION FOUNDATION

(Deemed to be University)

Green fields, Vaddeswaram, Guntur, Andhra Pradesh, India – 522302

Abstract Book of 4 th International Conference on Advanced Functional Materials for Sustainable Energy Application (ICAFMSA-2023)

6th–8thDecember2023

Edited by

Dr. K. Swapna – HOD
Conference Chairman - General Chair

Dr. S. Shanmugan
Convener Program Chair

Co-Conveners

Dr. K. Raghavendra Kumar

Dr. A. Venkateswara Rao

Dr. Mahamuda Shaik

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I am pleased to pen a few words to share the joy with the Department of Physics, Koneru Lakshmaiah Education Foundation (Deemed To be University) as they are organizing 4th International Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA-2023).

As I understand it is a humble step towards a noble goal, to be an acknowledged global forum for researchers working in materials science. This may facilitate researchers coming together with their ever-inquistive minds, bring together their vast experiences and share their expertise. This is to be appreciated and acknowledged because the matter of science is collaboration for the betterment of this universe and everyone and everything in it. Creation of a better world and its progress require teamwork, partnerships and collaboration. Isaac Newton gladly accredited the assistance he received and said "If I have seen further, it is by standing on the shoulders of giants." "Coming together is a beginning, staying together is progress, and working together is success," says Henry Ford. Let us come together, think together and work together. Hope and pray that the small seed sown now may bloom and our dreams blossom.

From what I gather, it's a modest first step toward a commendable objective: becoming a recognized worldwide platform for materials science experts. This could make it easier for researchers to pool their wide experiences, exchange their expertise, and get together with open minds. This is something that should be recognized and valued because science is about working together to improve the universe and all living things inside it. Progress toward a better society requires cooperation, partnerships, and teamwork. With pleasure, Einstein acknowledged that Imagination is more important than knowledge. Knowledge is limited. Imagination encircles the world.

4th International Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA-2023) has been organized by Department of Physics, Koneru Lakshmaiah Education Foundation (Deemed To be University) a prestigious institution in Andhra Pradesh. There has been overwhelming response to the conference from all over the world. ICAFMSA 2023 offers a platform to the researchers and scientists for exchanging the latest research outputs and sharing the most modern research methods as well. Over the course of the conference, internationally – renowned speakers will enlighten the researchers with their wisdom and experience related to the contemporary challenges in the field of material science. ICAFMSA 2023 intends to foster avenues to collaborative interdisciplinary research in materials

science and it s applications. The conference has brought together number of experts, scientists and professionals to share not only their knowledge, but also their findings in the development of material science, properties and applications. I would like to congratulate the organizers, the Research and Post graduate Department of Physics and I wish great success to the event.

Advances in materials research are key to the rapid technological advances that the world has endured over the last two centuries. Our knowledge and understanding of materials is being updated every moment through the work of thousands of materials scientists and engineers in academia, research organizations and industry.

The scope of materials research is very broad in which can perhaps categorise it based on state, properties, applications and form or type. In this conference we aim to bring together researchers to present and discuss latest research and innovations in selected applications areas of materials such as Renewable energy conversion technology, Sustainable materials for energy efficiency, Hybrid energy storage and thin film technologies, Energy policy and Climate Impacts on Energy,Environment Sustainable materials for fuel cells, Sustainable materials for supercapacitors.

Over the last two years, our world has experienced difficulties of a pandemic which our generation never imagined. This has led to new challenges for the world in terms of sustainability, energy, the environment, and healthcare. Materials play an important role in current and future needs for sustainable development. It has also changed the way we meet, interact and share our thoughts and opinions.

Therefore, this conference is organized as a webinar to provide an opportunity for young researchers and graduate students to listen to leading scientists in the form of a number of invited and plenary talks. It will also provide for young researchers to present their research as oral and poster presentations. We are determined to provide a great opportunity for participants and presenters to share the latest research in their respective fields of materials science and engineering. We are thankful to all plenary and invited speakers for accepting our invitation to present at this conference. As chairs we take this opportunity to thank all those who are serving as members of different committees, conference proceedings editorial board and in particular the conference convenor and organizers for their efforts to make ICAFMSA 2023 a success.

Er. Koneru Satyanarayana

President

MESSAGE

Warm greetings to all

It gives me immense pleasure to learn that the ***International Conference on Advanced FunctionalMaterials for Sustainable Energy Applications (ICAFMSA – 2023)*** *to emphasize the benefits of Innovations and Challenges in MaterialScience for a wide variety of applications at the* ***KLEF (Deemed to be University),Vaddeswaram, Guntur, Andhra Pradesh*** *from 6th – 8thJanuary 2024. Department of Physics, K L Deemed to be University continues to march on the way to successwith confidence. I am sure this conference will enforce the frontline aspects and substantially enrichthe educational and R&D experiences in green energy emerging technologies. It is gratifying that ourInstitute in its academic, research and social corporate activity has received encouragement fromoutstanding academicians and senior representatives from industry covering many emerging topics ofscience and technologies.*

I wish all the delegates, attendees, and sponsors of ***ICAFMSA – 2023****a pleasant stay in K L Deemed to beUniversity to lead fruitful outcomes.*

Er. K. Satyanarayana

Sri Koneru Raja Karin

Vice-President

MESSAGE

I am very happy to hear that the Department of Physics, K L Deemed to be University is organizing the ***International Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)*** *and is going to discuss a collection of technical papers in proceedings.*

It is heartening to know that the International Conference (ICAFMSA – 2023) is being organized with the objective to focus on the benefits of innovations and challenges in materials science for sustainable energy and some various applications providing a platform for academicians, researchers, industrialists, scholars and students to interact with distinguished scientists worldwide. Researchers are invited to submit original research contributions and present innovative products, services and research results.

I wish the conference all success.

Er. K. Raja Karin

Er. K. L. Havish

Vice – President

MESSAGE

It is heartening to know thatDepartment of Physics, K L Deemed to be University is organizing the ***International Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)*** *and is going to discuss a collection of technical papers in proceedings.*

It's uplifting to hear about the upcoming International Conference (ICAFMSA – 2023), which aims to spotlight the advantages of innovations and obstacles in materials science for sustainable energy and various applications. This conference provides a platform for academicians, researchers, industrialists, scholars, and students to engage with distinguished scientists from around the globe. Researchers are encouraged to submit original research contributions and showcase innovative products, services, and research findings. I extend my best wishes for the success of the conference.

Er. K. L. Havish

Dr. G. Pardha Saradhi Varma

Vice-Chancellor

MESSAGE

It gives me an immense pleasure to welcome you all to the prestigious ***International Conference on Advances Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)*** *to discuss a collection of technical papers in proceedings.*

The conference will be multidisciplinary congress that will offer a splendid opportunity for researchers and academicians to network with professionals form a multiplicity of perspectives and disciplines and showcase their work to a nationwide audience. During the conference,participation of people from different disciplines is expected on a common platform and hencethere would be sharing of views with eminent speakers from all over the country.The conference theme will be explored through international keynote speakers, invitedtalks, paper presentations and poster presentations.

I exhort you to join us in the marvellous city of Andhra Pradesh for the conference

Dr. G. Pardha Saradhi Varma

Dr. K. S. Jagannatha Rao

Pro Chancellor

MESSAGE

I am delighted to note that Dept of Physics, K L Deemed to be University is organizing a ***International Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023).*** *The conference aims to highlight the benefits of innovations and challenges in material science for various applications. It will provide a platform for academicians, researchers, industrialists, scholars, and students to interact with distinguished scientists worldwide. Researchers are invited to submit original research contributions related to primary research areas of ICAFMSA-2023 for oral and poster presentations. The conference will also allow institutes and companies to present their innovative products, services, and research results.*

I congratulate the Convener and the team ***ICAFMSA-2023****, Department of Physics, K L Deemed to be University for choosing a topic of current interest. I wish that this conference will create a vibrant platform for fruitful discussion on various aspects related to the subject and give necessary inputs for future research in renewable energy.*

Dr. K. S. Jagannatha Rao

Dr. A.V.S Prasad

Pro-Chancellor-I

MESSAGE

*The **International Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)** has a theme that aligns perfectly with the current global context, focusing on recent scientific advancements and discoveries that have significantly influenced humanity in the modern era. The conference promotes global collaboration and the exchange of ideas to tackle worldwide challenges and advance scientific knowledge. It expresses optimism regarding the potential outcomes and groundbreaking discoveries that could positively impact various sectors, such as healthcare and renewable energy. The organizers, speakers, and attendees of the conference are commended for their valuable contributions. I extend congratulations to the Convener and the team behind **ICAFMSA - 2023**, Department of Physics, K L Deemed to be University, for selecting a topic of such relevance, and I wholeheartedly wish the conference every success.*

Dr. A.V.S. Prasad

Dr. N. Venkatram

Pro-Vice Chancellor

MESSAGE

I am rejoiced to note that Dept of Physics, K L Deemed to be University is organizing International ***Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)****.The conference emphasizes the importance of functional materials and photonics in fostering research collaborations and innovation. The conference encourages global collaboration to address global challenges and enhance scientific understanding. It expresses optimism about future discoveries and applauds organizers, speakers, and attendees for their contributions.*

I congratulate the Convener and team ICAFMSA - 2023, Department of Physics, K L Deemed to be University for choosing a topic of current interest. I wish that this International conference will create a vibrant platform for fruitful discussion on various aspects related to the subject and give necessary inputs for future research.

Dr. N. Venkatram

Dr. K. Subba Rao

Registrar

MESSAGE

I am delighted to learn that the Department of Physics at K L Deemed to be University is hosting the International Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023). The conference underscores the significance of functional material in fostering research collaborations and innovation. It promotes global cooperation to tackle worldwide challenges and advance scientific comprehension. It expresses confidence in forthcoming discoveries and commends the organizers, speakers, and participants for their contributions.

I extend my congratulations to the Convener and the ICAFMSA - 2023 team from the Department of Physics at K L Deemed to be University for selecting a topic of contemporary interest. I hope that this International conference will establish a dynamic platform for meaningful discussions on various facets related to the subject and provide essential inputs for future research endeavors.

Dr. K. Subba Rao

Dr. A. Jagadeesh

Director - FED

MESSAGE

I am rejoiced to note that Dept of Physics, K L Deemed to be University is organizing an International ***Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)****.This conference brings together domain experts, researchers, scientists, professors, industry representatives, post-doctoral fellows and students from around the world, providing them with an innovative opportunity to report, share, and discuss scientific questions, achievements and challenges in the field. I sincerely hope that the deliberations during the conference would pave a way for new directions in meeting the challenges in the areas of functional materials with a focus on advanced technologies.*

I wish the conference a grand success.

Dr. A. Jagadeesh

Dr. A. Srinath

Dean Skill & Student Progression

MESSAGE

I am pleased to learn that the Department of Physics at K L Deemed to be University is hosting the ***International Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)****. The conference underscores the importance of convening experts, researchers, and scholars in the fields of functional materials to exchange knowledge, ideas, and advancements. It highlights the role of such conferences in facilitating research collaborations, exploring new avenues of study, and fostering innovation in these areas. The conference promotes global collaboration and idea exchange to tackle global challenges and enhance scientific understanding. It expresses optimism about the potential outcomes and groundbreaking discoveries that can positively impact various sectors, including healthcare and renewable energy. The contributions of the conference organizers, speakers, and attendees are commended. Therefore, I wholeheartedly extend my best wishes for the success of the conference.*

Dr. A. Srinath

Dr. K. Ramakrishna

Dean-Quality

MESSAGE

I am delighted to note that the Department of Physics at K L Deemed to be University is hosting the ***International Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)****. The conference emphasizes the importance of bringing together experts, researchers, and scholars in the fields of functional materials to exchange knowledge, ideas, and advancements. It underscores the role of such conferences in facilitating research collaborations, exploring new avenues of study, and fostering innovation in these domains. Furthermore, the conference advocates for global collaboration and idea exchange to address worldwide challenges and advance scientific understanding. It expresses optimism about the potential outcomes and groundbreaking discoveries that could positively impact various sectors, including healthcare and renewable energy. The contributions of the conference organizers, speakers, and attendees are lauded. Therefore, I extend my sincere best wishes for the success of the conference.*

Dr. K. Ramakrishna

Dr. M. Kishore Babu

Dean MHS

MESSAGE

I am delighted to learn that the Department of Physics at K L Deemed to be University is organizing an ***International Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)****. The conference's theme is highly relevant to the present scenario, focusing on the current scientific inventions and discoveries that have significantly impacted mankind in the modern world. It emphasizes global collaboration and the exchange of ideas to tackle global challenges and advance scientific understanding. The conference expresses optimism about its outcomes and the potential for groundbreaking discoveries that can positively impact various sectors, including healthcare and renewable energy. The contributions of the conference organizers, speakers, and attendees are commended. I extend my congratulations to the Convener and* ***the ICAFMSA - 2023*** *team at the Department of Physics, K L Deemed to be University, for choosing such a timely topic, and I wholeheartedly wish the conference every success.*

Dr. M. Kishore Babu

Dr. K. Subrahmanyam

Principal

MESSAGE

I am rejoiced to note that Dept of Physics, K L Deemed to be University is organizing an ***International Conference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023).*** *The theme of the conference is very much befitting to the present scenario and appropriately chosen the current scientific inventions and the discoveries that have changed mankind in the modern world. The conference encourages global collaboration and exchange of ideas to address global challenges and enhance scientific understanding. It expresses optimism about the outcomes and potential for groundbreaking discoveries that can positively impact various sectors, including healthcare and renewable energy. The conference organizers, speakers, and attendees are praised for their contributions. I congratulate the Convener and team ICAFMSA - 2023, Department of Physics, K L Deemed to be University for choosing a topic of current interest and wholeheartedly wish the conference all success.*

Dr K. Subrahmanyam

Dr. Jayakumar Singh

Dean R & D, KLEF

MESSAGE

I am rejoiced to note that Dept of Physics, K L Deemed to be University is organizing an ***InternationalConference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)****. The conference emphasizes the importance of bringing together experts, researchers, and scholars in functional materials and photonics to share knowledge, ideas, and advancements. It emphasizes the role of such conferences in fostering research collaborations, exploring new avenues of study, and promoting innovation in these fields. The conference encourages global collaboration and exchange of ideas to address global challenges and enhance scientific understanding. It expresses optimism about the outcomes and potential for groundbreaking discoveries that can positively impact various sectors, including healthcare and renewable energy. The conference organizers, speakers, and attendees are praised for their contributions.*

Hence, I whole heartedly wish the conference all success.

Dr. B. Jayakumar Singh

Dr.K.Swapna

HoD, Dept. of Physics

MESSAGE

Dear Esteemed resource persons, participants and other colleagues, I am thrilled to announce the upcoming ***InternationalConference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)****, scheduled to take place from 6 - 8 December 2023 at K.L. University. This conference promises to be an enlightening and collaborative platform that will bring together leading experts, researchers, and enthusiasts from diverse backgrounds to explore the latest advancements and discoveries in this rapidly evolving field. Our department is honored to host this prestigious event, which will serve as a nexus for the exchange of innovative ideas, cutting-edge research findings, and invaluable networking opportunities.*

We have curated an exceptional lineup of keynote speakers, panel discussions, paper presentations, and poster sessions to facilitate insightful discussions and collaborations among attendees. Additionally, there will be ample opportunities for participants to interact, share their research, and establish connections that could potentially lead to groundbreaking collaborations and discoveries.

I encourage all faculty members, researchers, and students passionate about functional materials and to actively participate in this conference. Your involvement will not only contribute to the success of the event but also provide a platform to showcase our department's commitment to advancing knowledge and fostering innovation in this field.

Let us come together to make this ***International Conference on Advanced Functional Materials for Sustainable Energy applications*** *a resounding success, further cementing our department's position as a hub for pioneering research and academic excellence.*

Best Regards,

Dr. K. Swapna

Foreword

Dear Esteemed speakers and Participants,

It is with immense pleasure and gratitude that I extend my heartfelt appreciation to all of you who have made the ***InternationalConference on Advanced Functional Materials for Sustainable Energy Applications (ICAFMSA – 2023)*** *an outstanding success. This conference stands as a testament to the collaborative spirit, unwavering dedication, and relentless pursuit of knowledge within our community. The insightful discussions, innovative research presentations, and exchange of ideas have undoubtedly contributed to the advancement of our understanding in the dynamic realms of advanced functional materials. I extend my deepest gratitude to our distinguished keynote speakers, esteemed panelists, and presenters whose expertise and contributions have illuminated our discussions and inspired us to explore new horizons in this ever-evolving field. Your insights have been invaluable in shaping the discourse of this conference. I also wish to express my sincere thanks to the organizing committee, volunteers, sponsors, and partners whose tireless efforts and support have been instrumental in bringing this event to fruition. Your dedication and hard work have ensured the seamless execution of this conference, providing an enriching experience for all participants. To the researchers, scholars, and students who shared their groundbreaking work through paper presentations, posters, and discussions, your commitment to advancing the frontiers of knowledge in functional materials is commendable. Your contributions have added depth and diversity to our collective understanding. As we conclude this memorable event, let us carry forward the inspiration, connections, and insights gained during this conference. May the collaborations seeded here blossom into impactful research endeavors and innovations that shape the future of our field.*

I invite you to reflect on the moments of learning, collaboration, and inspiration from thisconference as we continue our journey towards further discoveries and advancements in functional materials. Thank you once again for your participation, enthusiasm, and dedication. Together, we have created a remarkable milestone in our pursuit of scientific excellence.

With warm regards,

Dr. S. Shanmugan

Conference Convener

About the Conference

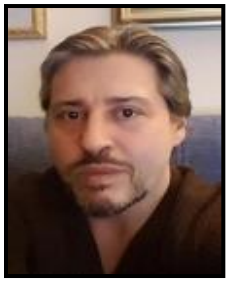
Energy is a part of science in which materials and Technology plays an important role as Advanced Functional Materials to meet the needs of the future environment. The increasing ecological problems such as energy storage, generation and conservation are the major drivers of functional materials and Technology. There is a need of developing sustainable energy production and consumption to achieve the socio-economic and environmental targets. The major significance of Energy sources helps in strengthening the research and advancement of materials towards sustainable development and relevant applications. The universal emphasis on energy is to develop materials for energy generation, low energy processing, energy conservation and conversion to meet the increasing energy demand of the country. Advanced Functional Materials provides a wide range of applications that discourse the current innovations and novel approaches for the expansion of energy materials to meet global desires. ICAFMSA-2023 covers major interdisciplinary subjects such as Nanomaterials and devices, Fuel cells, Organic and inorganic Solar Energy, Batteries storage devices, Glass Science and Technology, Photocatalytic methods, Green energy, Photonic devices and Environmental sustainability.

We assure that, this conference will provide a platform to Academicians, Researchers, Industrialists, Scholars and students to interact with distinguished and eminent Scientists all around the globe of diverse fields. The conference also aimed to understand the latest developments in the field of advanced functional materials through hybrid mode. It also aims at kindling interest in the minds of young students to pursue research as higher career. It is anticipated to widen the scope of interdisciplinary research among academicians and researchers.

Interested researchers are invited to submit their original research contributions in the following themes related to the primary thematic research areas of ICAFMSA 2023 for Oral and Poster presentations. We also provide space for Institutes and companies to present their innovative products, services, and research results.

LIST OF SPEAKERS PRESENTED

International Speakers

<table>
<tr><td rowspan="2">1.</td><td colspan="2">Dr. Prasad Jaladi: Social Entrepreneur, Foundation and Chief Facilitator of Suraksha based in Austin, Texas, USA</td></tr>
<tr><td>  </td><td>Education:
Master’s degree in organic chemistry from Bhavnagar University, Gujarat, India.
Experience:
Prasad has worked in pharmaceutical industry, managed QA, R&D, pilot, commercial manufacturing and consulting for the manufacturing of bulk active pharmaceutical ingredients. He obtained professional training in ERP and CRM. Prasad managed IT consulting and bio-IT businesses from Silicon Valley and Texas.He has executive experience in life sciences and IT, including emerging technology.</td></tr>
<tr><td rowspan="2">2.</td><td colspan="2">Dr. Pasquale Cavaliere:Professor of Metallurgy,University of Salento, Lecce – Italy.</td></tr>
<tr><td>  </td><td>Education:
Doctor of Philosophy (PhD) at University of Rome.
Experience:
Worked as Metallurgy Researcher at University of Salento.
Working as Professor of Metallurgy at University of Salento.</td></tr>
<tr><td rowspan="2">3.</td><td colspan="2">Dr. Karthik Kannan:Professor,ACSDRI, Adelaide SA, 5000, Australia.</td></tr>
<tr><td>  </td><td>Education:
Doctor of Philosophy (PhD), Physics at Bharathidasan University, Thiruchirapally.
Experience:
Worked as Postdoctoral Researcher at Kumoh National Institute of Technology, South Korea.
Working as Postdoctoral Scientist at Ariel University, Isreal.</td></tr>
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<tr><td>4.</td><td colspan="2">Dr. Loganathan Veeramuthu:Research Assistant Professor, National Taipei University of Technology, Taipei, Taiwan.</td></tr>
<tr><td></td><td>  </td><td>Education:
Master’s degree in chemistry at Ramakrishna Mission Vivekananda College
Doctor of Philosophy (PhD) in Organic and Polymeric materials at National Taipei University of Technology, Taiwan.
Experience:
Worked as Project Assistant at CSIR – Central Leather Research Institute, Chennai, India.
Working as Research Assistant Professor at National Taipei University of Technology, Taiwan.</td></tr>
<tr><td>5.</td><td colspan="2">Dr. B. Kiran Naik: Visiting Researcher at Gerogia Institute of Technology of Technology, Atlanta, USA and Assistant Professor at NIT Rourkela. Odisha, India.</td></tr>
<tr><td></td><td>  </td><td>Education:
Obtained his M-Tech degree in (Fluid & Thermal), Maintenance Technology at Indian Institute of Technology, Guwahati.
Doctor of Philosophy (PhD) in Liquid sorption cooling systems at Indian Institute of Technology, Guwahati.
Experience:
Queen Elizabeth Postdoctoral Fellow at Simon Fraser University, Canada.
Working as Assistant Professor in National Institute of Technology, Rourkela.</td></tr>
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National Speakers

6.	**Dr. V. Rajkumar:**Professor,Mechanical Engineering, Indian Institute of Technology Jammu, India	
		**Education:** Obtained Master of Engineering in Mechanical Engineering, Engineering Design at PSG College of Technology. Doctor of Philosophy (PhD) in Mechanical Engineering at Auckland University of Technology, New Zealand **Experience:** Worked as Technician – 3D Lab – SLS System, Auckland University of Technology, Auckland, New Zealand. Worked as Research Assistant at Auckland University of Technology, Auckland, New Zealand. Worked as Post Doctoral Research Fellow at Singapore University of Technology and Design. Worked as Visiting Research Associate at University of Michigan. Working as Assistant Professor at Indian Institute of Technology, Jammu, Jammu & Kashmir, India.
7.	**Dr. D. Narayana Rao:**Professor, Department of Physics, University of Hyderabad, Gachibowli, Hyderabad, Telangana.	
		**Education:** Obtained Under graduation and Post-graduation from Sri Venkateswara University, Tripathi. Doctor of Philosophy (PhD) was completed at Indian Institute of Technology, Kanpur. **Experience:** Fellow of Academics of both Telangana and Andhra Pradesh. Elected as Distinguished Fellow of Optical Society of India. Guided 23 PhD students. Research Experience in Spectroscopy and Non-linear Optics including Microwave spectroscopy, Development of laser, Fluorescence spectroscopy, crystal growth, Spectral Interferometry, Incoherent laser spectroscopy, Ultrafast Dynamics, Transient Grating spectroscopy and more.

8.	**Dr. Janarthanan:**Karpagam Academy of Higher Education,Coimbatore.	
		**Education:** Obtained his post graduate degree in physics at Sri Ramakrishna Mission Vidyalaya college of art and science, Coimbatore. Doctor of Philosophy (PhD) in Physics at Sri Ramakrishna Mission Vidyalaya college of arts and Science, Coimbatore. **Experience:** 14 years of Teaching experience. 66 Publications, in that 18 SCI/Wos, 35 Scopus, and 13 Peer reviewed journals.
9.	**Dr. Easwaramoorthi Ramasamy:**Professor,International Advanced Research Center for Powder Metallurgy and New Materials / ARCI, Center for Solar Energy Materials, Hyderabad.	
		**Education:** Obtained post graduation degree in physics at Bharathiar University, Coimbatore. Doctor of Philosophy (PhD) in Energy engineering at Korea University of Science and Technology. **Experience:** Worked as Project Associate in Department of Physics, Indian Institute of Technology, Madras, India. Worked as Visiting Fellow at Weizmann Institute of Science, Israel. Worked as Researcher at Advanced Materials and Application Research Division, Korea Electrotechnology Research Institute, Korea. Brain Korea 21-Post doctoral fellow in department of chemical engineering at Pohang University of Science and Technology (POSTECH), Korea. Working as Scientist-D at Center for Solar Energy Materials, ARCI, Hyderabad, India.

10.	**Dr. Ravinder Kumar:**Professor,Mechanical Engineering, Lovely Professional University, Punjab	
		**Education:** Doctor of Philosophy (PhD) in Mechanical Engineering atDeenbandhu Chhotu Ram University of Science and Technology, India **Experience:** Worked as Associate Professor in Lovely Professional University, Punjab. Working as a Professor in Lovely Professional University, Punjab.
11.	**Dr. Arunkumar Jayakumar:**Associate Professor,St. Peter Institute of Higher Education and Research, Chennai	
		**Education:** Obtained M.S. Energy engineering at Anna University, Chennai. Doctor of Philosophy at Auckland University of Technology, New Zealand. **Experience:** Worked as Research Scientist at GasHub Technology, Pte Ltd. Worked as Research Scientist at ZECA POWERS. Worked as Associate Professor at Chennai Institute of Technology. Worked as Research Fellow at Auckland University of Technology, New Zealand. Founder of 3D-4S Systems. Working as Associate Professor at St.Peter Institute of Higher Education and Research, Chennai.
12.	**Dr. D. Paul Joseph:**Professor, Department of Physics,National Institute of Technology, Warangal	
		**Education:** Obtained post graduate degree in physics at Loyola College, Chennai. Doctor of Philosophy (PhD) at University of Madaras, Chennai. **Experience:** 15 years of teaching and Research Experience. 74 Research Publications.

13.	**Dr. Hitesh Panchal:**Government Engineering College,Patna.	
		**Education:** Obtained Masters degree in Thermal Engineering at L D College of Engineering. Doctor of Philosophy (PhD) in Solar Energy at Kadi Sarva Vishwavidyalaya University, Gandhinagar **Experience:** 8 Years of teaching experience. Working as Assistant Professor at Government Engineering College, Patna
14.	**Dr. Kedar Singh:**Professor, School of Physical Sciences,JNU, New Delhi.	
		**Education:** Doctor of Philosophy (PhD) at University of Rajasthan, Jaipur. **Experience:** Worked as Assistant Professor at Banaras Hindu University, Varanasi. Working as Professor in School Science, Jawaharlal Nerhu University.
15.	**Dr. Rajesh Punya:**Associate Professor, Center for Emerging Materials, Maharshi Dayanand University, Rohtak.	
		**Education:** Obtained Master's degree in physics at University of Delhi. Doctor of Philosophy (PhD) in Physics at Guru Jambheshwar University of Science and Technology. **Experience:** Worked as Faculty of Physical Sciences at Chaudhary Ranbir Singh University, Jind. Working as Professor & Head in Department of Physics, Maharishi Dayananda University, Rohtak.

<table>
<tr><td>16.</td><td colspan="2">Dr. N. Vijayan:Sr. Principal Scientist & Professor. Mln-House BND group,NPL, New Delhi.</td></tr>
<tr><td></td><td>  </td><td>Education:
Doctor of Philosophy (PhD) at Manonmanian Sundaranar University, Tirunelveli, Tamilnadu.
Experience:
Ex-Indian Air Force Personnel.
Founder Chairman and Senior Principal of Zion & Alwin Group of Schools.
More than 30 years of teaching experience.
Chaired the committee for 10th class Physics book under Tamilnadu Matriculation Syllabus.
Authored 11th and 12th class Physics books.</td></tr>
<tr><td>17.</td><td colspan="2">Dr. D. Haranath:Professor, Department of Physics,National Institute of Technology, Warangal.</td></tr>
<tr><td></td><td>  </td><td>Dr D Haranath is a Professor of Physics at National Institute of Technology (NIT) Warangal, India.He is recipient of many awards and honors in Physical Sciences, including NPL's Young ScientistAward in 2003, CSIR Young Scientist Award in 2004, DST's BOYSCAST Fellow Award inPhysical Sciences in 2006, VIRA Distinguished Scientist of the year 2016, Fellow ofLuminescence Society of India in 2017, Academic Audit Member of VNIT (Nagpur)-2017,Transfer of Technology Award (2018), Visiting Scientist for Nanotheranostics Inc.- USA (2019-2024), Grassroot Innovators Virtual Mela Award (2020), National Innovative Research ExcellenceAward-2022 in Physics etc. He has 14 years of Teaching Experience and 28 years of ResearchExperience and supervised 8-Ph.D., 2-M.Phil. and 25 M.Tech. theses. He has 11-granted patents,15-Chapters in Books, more than 200 research papers in SCI journals of repute, 25-virtual journalpapers, more than 250 national and international conference papers, 3-general articles.</td></tr>
</table>

18.	**Dr. Narendra Kurra:** Assistant Professor of Chemistry, Indian Institute to Technology Hyderabad.	
		**Education:** Doctor of Philosophy (PhD) at Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore. **Experience:** Research experience at Materials (electro)chemistry, Two-dimensional materials, Energy storage, Materials Processing. Working as Assistant Professor at department of chemistry, Indian Institute of Technology, Hyderabad.
19.	**Dr. Ramudu Machavarapu:** Assistant Professor, School of Sciences,NIT Andhra Pradesh, India.	
		**Education:** Doctor of Philosophy (PhD) at University of Hyderabad. **Experience:** Working as National Institute of Technology, Andhra Pradesh. Published 18 research publications, 7 International Conference proceedings and two book chapters. Life membrane at Magnetic Society of India.
20.	**Dr. V. Chithambaram:** Professor, Karpaga Vinayaga College of Engineering and Technology, Chennai.	
		**Education:** Obtained Master's degree at Vellore Institute of Technology, Vellore, India. Doctor of Philosophy (PhD) at AMET University, Chennai. **Experience:** Worked as Associate Professor at Sri Krishna Engineering College. Worked as Professor, Head/R&D at PERI Institute of Technology. Working as Professor at Karpaga Vinayaga College of Engineering and Technology, Chennai.

Oral Presentation Chair

Session-1: Renewable energy conversion technology

Chair:

Dr. Karthik kannan,

Australian Center for Sustainable Development Research and Innovation (ACSDRI), Adelaide SA, Australia.

Dr. V. Chithambaram,

Karpaga Vinayaga College of Engineering and Technology,

Tamilnadu, India.

Co-Chair:

Dr. K. Swapna, KLEF.

Dr. S. Shanmugan, KLEF.

Session-2:Sustainable materials for energy efficiency

Chair:

Dr.Easwaramoorthi Ramasamy,

ARCI · Centre for Solar Energy Materials, Hyderabad, India.

Dr. V. Rajkumar,

IIT,Jammu, India.

Dr. Arunkumar Jayakumar,

St. Peter's institute of higher education and research, Chennai, India.

Co-Chair:

Dr. Sk. Mahamuda, KLEF.

Dr. A. Venkateswara Rao, KLEF.

Session-3: Hybrid energy storage and thin film technologies

Chair:

Dr. V. Rajkumar, IIT,Jammu, India.

Dr. Hitesh Panchal, Government engineering college, Patna, India.

Dr. Ravinder Kumar, Lovely Professional University, Punjab, India

Co-Chair:

Dr. K. Raghavendra Kumar, KLEF.

Dr. G. Sunita Sundari, KLEF.

Session-4: Energy policy and Climate Impacts on Energy

Chair :

Dr. Karthik kannan,

Australian Center for Sustainable Development Research and Innovation (ACSDRI), Adelaide SA, Australia.

Dr. D. Paul Joseph,

National Institute of Technology, Warangal, Telangana, India.

Co-Chair:

Dr. M. Gnana Kiran, KLEF.

Dr. N. S.M. P. Latha Devi, KLEF.

Session-5: Environment Sustainable materials for fuel cells

Chair:

Dr. Loganathan Veeramuthu,

National Taipei University of Technology (NTUT), Taipei, Taiwan.

Dr. B. Kiran Naik,

Georgia Institute of Technology, Atlanta, USA.

Co-Chair:

Dr.M.Venkateswarlu, KLEF.

Dr. Sonali Biswas, KLEF.

Session-6: Sustainable materials for supercapacitors

Chair:

Dr.P. Selvaraj,

Saveetha University, Tamilnadu.India.

Dr. B. Janarthanan,

Karpagam Academy of Higher Education, Tamilnadu, India.

Co-Chair:

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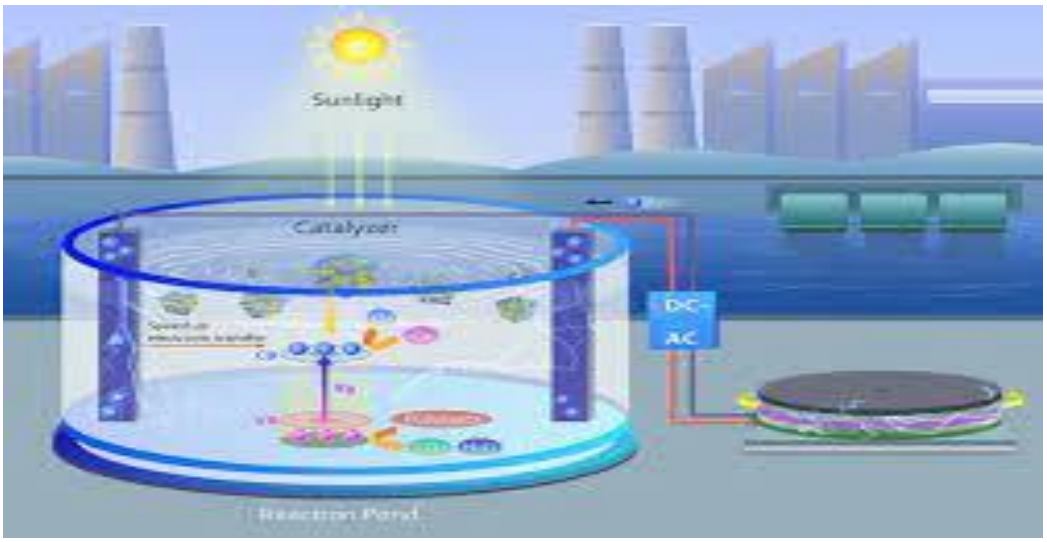
India Time is 10 AM to 5 PM

INAUGURATION - ICAFMSA-2023

Time	Name	Talk
9.45AM–9.50AM	**Dr.K.RaghavendraKumar (Co-Convener)**	Welcomeaddress
9.50AM– 9. 55AM	**Dr.M.V.V.K.SrinivasPrasad**	Prayersong
9.55AM– 10.00AM	**Dr.K. Swapna(HoD)**	IntroductionforDepartment
10.00AM– 10.05AM	**Dr.S.Shanmugan(Convener)**	ThemesofConference
10.05AM– 10.10AM	**Dr. G. Sunita Sundari**	IntroductionaboutICAFMSA 2023 International Keynote Speakers
10.10AM-10.15AM	**Dr. Shaik Mahamuda (RPAC)**	R&DThemes
10.15 AM-10.25AM	**KLEF-ChiefPatron**	(Co-Ordinator- FED,Director, Dean, Principal(MHS),R&DDean,VC)
10.25 AM-10. 30 AM	**Dr.A.VenkateswaraRao (Co-Convener)**	VoteofThanks



DAY-1 (06-12-2023) OFFLINE

Speakers Diary Lamp

IntroductionDr. N. S.M. P. Latha Devi; **Vote of thanks**: Ms. G. Dedeepya		
10:30AM - 11:00AM	**Dr. Easwaramoorthi Ramasamy**	Professor, International Advanced Research Centre for Powder Metallurgy and New Materials ARCI • Centre for Solar Energy Materials, Hyderabad
BREAK(11:00AM to 11:15AM)		
IntroductionDr. M Venkateswarlu; **Vote of thanks**: Mr. V. Parthiban		
11:15AM - 11:45AM	**Dr. V. Rajkumar**	Professor, Mechanical Engineering, IIT, Jammu, Jagti Campus, Jammu & Kashmir, India.
IntroductionDr. M. Gnana Kiran; **Vote of thanks**: Mrs. A. Sangeetha		
11::45AM - 12:15PM	**Dr. Karthik Kannan**	Professor, Australian Center for Sustainable Development Research and Innovation (ACSDRI),5000, Australia
IntroductionDr. Shaik Babu; **Vote of thanks**: Mr. Pelati Althaf		
12:15PM - 12:45 PM	**Dr. V. Chithambaram**	Professor of Physics, Karpaga Vinayaga College of Engineering and Technology,Chennai, Tamilnadu
(12:45PM TO 1:45PM) LUNCH BREAK		
IntroductionDr. Sonali Biswas; **Vote of thanks**: Mrs. D. Naga Prasuna		
1:45 PM - 2:15 PM	**Dr. Arunkumar Jayakumar**	Associate Professor, Electrical and Electronics Engineering, St. Peter's institute of higher education and research, Chennai.
IntroductionDr. S. Shanmugan; **Vote of thanks**: Chennamsetti Pravallika		
2:15 PM - 2:45 PM	**Dr. B. Kishore Babu**	Associate Professor, Department of Engineering chemistry Andhra university,Visakhapatnam

PAPER PRESENTATIONS (10) 2:45PM - 4:15PM		
2:45 PM - 2:55 PM	**ICAFMSA 2023 – 59** **Firoz Shaik**	Performance enhancement and evaluation of cost-efficient, concrete-insulated solar still using novel spinel nanoparticles coated absorber plate
2:55 PM - 3:05PM	**ICAFMSA 2023 – 75** **Kiran Manikanta Peddireddi**	Solar and Wind Based Wireless Charging Station
3:05 PM - 3:15PM	**ICAFMSA 2023 – 76** **Thota Sada Siva Surya Prakash**	Performance analysis of an induction motor for different materials (steel_1010, Ag, Al, Be, Cu, Mg, W, and Zr) using Ansys Maxwell RMxprt
3:15 PM - 3:25PM	**ICAFMSA 2023 – 106** **Arunkumar Jayakumar**	Can Fuel Cell Based EV kill Battery Based EV? A SWOT Assessment from the Indian Context
3:25 PM - 3:35PM	**ICAFMSA 2023 – 109** **M.Gnana Kiran**	Structural and Electrical Properties of TSP: NaNO Based Bio Polymer Electrolyte
3:35 PM - 3:45PM	**ICAFMSA 2023 – 133** **Prathipati Ramesh**	Revolutionizing Energy Storage: Unraveling the Recent Marvels of Mxene Materials
3:45 PM - 3:55PM	**ICAFMSA 2023 – 144** **P. Kiran Kumar**	Thin layer drying characteristics of onion (allium cepa l.)
3:55 PM - 4:05PM	**ICAFMSA 2023 – 146** **Ammati Pavan**	Analysis of Performance and Emissions in a 4-Stroke CI Engine Fueled by Waste Plastic Oil Blended with Diesel
4:05 PM - 4:15PM	**CERTIFICATE DISTRIBUTION AND CULTURAL PROGRAMME**	

	DAY-2 (07-12-2023) ONLINE	
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10:00 AM - 10:30 AM	**Dr. Prasad Jaladi** - USA **Introduction**Dr. M Venkateswarlu; **Vote of thanks**: Mr. V. Parthiban	**Dr. A. E. Kabeel** - Egypt **Introduction**Dr. S. Shanmugan; **Vote of thanks**: Ms. G. Dedeepya
10:30 AM - 11:00 AM	**Dr. Pasquale Cavaliere** - Italy **Introduction**Dr. M. Gnana Kiran; **Vote of thanks**: Mrs. A. Sangeetha	**Dr. Ammar Elsheikh** - Japan **Introduction**Dr.M.V.V.K.SrinivasPrasad; **Vote of thanks**: Mr. Pelati Althaf
11:00 AM - 11:30 AM	**Dr. Ravinder Kumar - India** **Introduction**Dr. Shaik Babu; **Vote of thanks**: Mr. Pelati Althaf	**Dr. Mahamuda Shaik - India** **Introduction**Dr.K.RaghavendraKumar; **Vote of thanks**: Mrs. D. Naga Prasuna
11:30 AM - 12:00 AM	**Dr. D. Paul Joseph - India** **Introduction**Dr. Sonali Biswas; **Vote of thanks**: Mrs. D. Naga Prasuna	**Dr. N. Vijayan – India** **Introduction**Dr. Shaik Mahamuda; **Vote of thanks**: Mr. V. Parthiban
12:00 PM - 12:30 PM	**Dr. Ramudu Machavarapu - India** **Introduction**Dr. S. Shanmugan; **Vote of thanks**: Ms. Chennamsetti Pravallika	**Dr. D.Haranath - India** **Introduction**Dr.A.VenkateswaraRao; **Vote of thanks**: Mrs. A. Sangeetha
12:30 PM - 1:00 PM	**Dr. K. Swapna - India** **Introduction**Dr. N. S.M. P. Latha Devi; **Vote of thanks**: Ms. G. Dedeepya	**Dr. Kedar Singh - India** **Introduction**Dr. G. Sunita Sundari; **Vote of thanks**: Mr. Pelati Althaf
(1:00 TO 2:00PM) LUNCH BREAK		

PAPER PRESENTATIONS (2:00 TO 5:00PM)

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2:00 PM - 2:10 PM	ICAFMSA 2023-51 Redrothu Hanumantha Rao	ICAFMSA 2023 – 97 Sachin Kumar
2:10 PM - 2:20 PM	ICAFMSA 2023-53 S. Ravi Kumar	ICAFMSA 2023 – 100 G. Muralidhar
2:20 PM - 2:30 PM	ICAFMSA 2023-54 S. Ravi Kumar	ICAFMSA 2023 – 102 P. Satyanarayana
2:30 TO 2:40	ICAFMSA 2023 – 68 Sethu Narayanan Tamilselvan	ICAFMSA 2023 – 105 Abhinandan Jain
2:40 PM – 2:50 PM	ICAFMSA 2023 – 71 Karthik Dilly Rajan	ICAFMSA 2023 – 114 B. Himabindu
2: 50 PM - 3:00 PM	ICAFMSA 2023 – 74 A. Naveen	ICAFMSA 2023 – 117 N. Srinivasan Arunsankar
3:00 PM - 3:10 PM	ICAFMSA 2023 – 77 Jayalakshmi G	ICAFMSA 2023 – 118 K.Seshulatha
3:10 PM - 3:20 PM	ICAFMSA 2023 – 78 Vaishnavi R	ICAFMSA 2023 – 122 Lalitha Ammadu Kolahalam
3:20 PM - 3:30 PM	ICAFMSA 2023 – 79 B. SundaraPandian	ICAFMSA 2023-98 Dr. G. Ramanathan
3:30 PM - 3:40 PM	ICAFMSA 2023 – 80 S. Rajeswari	ICAFMSA 2023 – 127 P. K. Sudhakar
3:40 PM - 3:50 PM	ICAFMSA 2023 – 86 C. Suresh	ICAFMSA 2023 – 130 Supriya Janga
3:50 PM - 4:00 PM	ICAFMSA 2023 – 89 Jobanpreet Singh	ICAFMSA 2023 – 131 M. Aruna
4:00 PM - 4:10 PM	ICAFMSA 2023 – 92 V. Harish	ICAFMSA 2023 – 154 Yeshwanth H Reddy

4:10 PM - 4:20 PM	**ICAFMSA-2023-132** **Sneha Hoskeri**	**ICAFMSA 2023 – 136** **V. Sivan**
4:20 TO 4:30	**ICAFMSA 2023 – 95** **Gyan Prakash Kumar**	**ICAFMSA 2023 – 137** **Kuppan A**
4:30 PM - 4:40 PM	**ICAFMSA 2023 – 96** ***Gunjan Mahajan***	**ICAFMSA 2023 – 138** **F. K. Konan**
4:40 PM - 4:50 PM	**ICAFMSA 2023 – 57** **Bhavani.S**	**ICAFMSA 2023 – 139** **V.Satya Aruna**
4:50 PM - 5:00 PM	**ICAFMSA 2023 – 58** **V. Ragavarshini S.Bhavani**	**ICAFMSA 2023 – 140** **Maharshi Singh**
5:00 PM - 5:15 PM	**ICAFMSA 2023 – 99** **G. Dedeepya**	**ICAFMSA 2023 – 104** **V. Murali Krishna**

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10:00 AM - 10:30 AM	**Dr. Vasanthan Thirunavukkarasu** - Singapore. **Introduction**Dr. M Venkateswarlu; **Vote of thanks**: Mr. V. Parthiban	**Dr. Loganathan Veeramuthu** –Taiwan **Introduction**Dr. S. Shanmugan; **Vote of thanks**: Ms. G. Dedeepya
10:30 AM - 11:00 AM	**Dr. B. Kiran Naik** - USA **Introduction**Dr. M. Gnana Kiran; **Vote of thanks**: Mrs. A. Sangeetha	**Dr. Fadl Abdelmonem Essa** –Egypt **Introduction**Dr.M.V.V.K.SrinivasPrasad; **Vote of thanks**: Mr. Pelati Althaf
11:00 AM - 11:30 AM	**Dr. Hitesh Panchal - India** **Introduction**Dr. Shaik Babu; **Vote of thanks**: Mr. Pelati Althaf	**Dr. D.Narayana Rao – India** **Introduction**Dr. G. Sunita Sundari; **Vote of thanks**: Mr. Pelati Althaf
11:30AM - 12:00 PM	**Dr. B. Janarthanan - India** **Introduction**Dr. Sonali Biswas; **Vote of thanks**: Mrs. D. Naga Prasuna	**Dr. Y.Sundariah – India** **Introduction**Dr. Shaik Mahamuda; **Vote of thanks**: Mr. V. Parthiban
12:00 PM - 12:30 PM	**Dr. Rajesh Punya** **Introduction**Dr. S. Shanmugan; **Vote of thanks**: Ms. Chennamsetti Pravallika	**Dr.Narendra Kurra – India** **Introduction**Dr.A.VenkateswaraRao; **Vote of thanks**: Mrs. A. Sangeetha
12:30 PM - 1:00 PM	**Dr. G. Sunita Sundari** **Introduction**Dr. N. S.M. P. Latha Devi; **Vote of thanks**: Ms. G. Dedeepya	
(1:00 TO 2:00PM) LUNCH BREAK		

PAPER PRESENTATIONS(2:00 TO 5:00)		
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2:00 PM -2:10 PM	**ICAFMSA 2023-120.** **Ephrald Jebishkumar**	**ICAFMSA 2023 – 61** **T. Sowmya Keerthi**
2:10 PM - 2:20 PM	**ICAFMSA 2023 – 142** **Dr. S.SHARMILA**	**ICAFMSA 2023 – 62** **KOTA DINESH**
2:20 PM -2:30 PM	**ICAFMSA 2023 – 145** **V. Lakshmi Savithri Vatsalya**	**ICAFMSA 2023 – 63** **A. Sangeetha**
2:30 PM -2:40 PM	**ICAFMSA 2023 – 147** **Omkar P. Sunkarwar**	**ICAFMSA 2023 – 93** **V.Parthiban**
2:40 PM - 2:50 PM	**ICAFMSA 2023 – 149** **SK. RAZIYA**	**ICAFMSA 2023 – 115** **J. Sunil Kumar**
2:50 PM - 3:00 PM	**ICAFMSA 2023 – 150** **B.SWARNA LATHA**	**ICAFMSA 2023 – 124** **D. Naga Prasuna**
3:00 PM - 3:10 PM	**ICAFMSA 2023 – 151** **Lakshmikaanth**	**ICAFMSA 2023 – 128** **PK Sudhakar**
3:10 PM - 3:20 PM	**ICAFMSA 2023 – 152** **Manish Sonkar**	**ICAFMSA 2023 – 87** **Payal Sengupta**
3:20 PM - 3:30 PM	**ICAFMSA 2023 – 141** **Dr. M.Anto Bennet**	**ICAFMSA 2023 -143.** **Madhu yadav**
3:30 PM - 3:40 PM	**ICAFMSA 2023-156** **PARVATHI GORANTLA**	**ICAFMSA 2023 161** **P.K.S. Tejes**
3:40 PM - 3:50 PM	**ICAFMSA 2023 – 148** **Kishore Babu**	**ICAFMSA 2023-155** **Fadl A. Essa**
3:50 PM - 4:00 PM	**ICAFMSA 2023-158** **Fazal Noorbasha**	**ICAFMSA 2023-159** **Fazal Noorbasha**
4:00 PM - 4:10 PM	**ICAFMSA 2023-160** **Kakarla Hari Kishore**	**ICAFMSA 2023 – 162** **Pethuru Raj**
4:10 PM - 4:20 PM	**ICAFMSA 2023 – 121** **N. Abhiram**	**ICAFMSA 2023 – 163** **Sivanantham Nallusamy**
4:20 PM - 4:30 PM	**ICAFMSA 2023 – 164**	**ICAFMSA 2023 – 165**

	V. Kannan	**Berbeth Mary**

Chair: and Co-Chair:

Day-1 (06-12-2023) 2.00-3.30 PM	Session-1Renewable energy conversion technology Chair: Dr. Karthik kannan Dr. V. Chithambaram Dr. B. Kishore babu Co-Chair: Dr. K. Swapna, Dr. S. Shanmugan,	Session-2Sustainable materials for energy efficiency Chair: Dr.Easwaramoorthi Ramasamy Dr. V. Rajkumar Dr. Arunkumar Jayakumar Co-Chair: Dr. Sk. Mahamuda, Dr. A. Venkateswara Rao
Day-2 (07-12-2023) 2.00-3.30 PM	Session-3: Hybrid energy storage and thin film technologies Chair: Dr. V. Rajkumar Dr. Hitesh Panchal Dr. Ravinder Kumar Co-Chair: Dr. K. Raghavendra Kumar, Dr. G. Sunita Sundari	Session-5: Energy policy and Climate Impacts on Energy Chair : Dr. Karthik kannan Dr. D. Paul Joseph Co-Chair: Dr. M. Gnana Kiran, Dr. N. S.M. P. Latha Devi
Day-3 (08-12-2023) 2.00-3.30 PM	Session-5: Environment Sustainable materials for fuel cells Chair: Dr. Loganathan Veeramuthu Dr. B. Kiran Naik Co-Chair: Dr.M.Venkateswarlu, Dr. Sonali Biswas	Session-6: Sustainable materials for supercapacitors Chair: Dr.P. Selvaraj Dr. B. Janarthanan Co-Chair: Dr.M.V.V.K.Srinivas Prasad, Dr. Shaik Babu

Valedictory Ceremony:

Conclude

- **Dr.K.Swapna,(HOD)**

  (Fewwordsabout–ICAFMSA-2023)

- **Dr. Mahamuda Shaik,(RPAC)**

  (Fewwordsabout featureresearch ideas- ICAFMSA-2023)

- **Dr. Kannike Raghavendra Kumar,(Co-Convener)**

  (Highlights–ICAFMSA-2023)

- **Dr.SShanmugan,(Convener)**

  (FuturethemesofICAFMSA-2023)

- **Dr.A. VenkateswaraRao, (Co-Convener)**

  (VoteofthanksforICAFMSA-2023).

Head&Department of Physics,

Dr.K.Swapna

PLENARY TALKS

ICAFMSA 2023_51

Magnetostriction effect in Nd doped L-Threonine Single crystal

Redrothu Hanumantha Rao[1], Bijaylaxmi Biswal[2], CHVV Ramana[1,3], Dilip Kumar Mishra[2]

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ABSTRACT

Single crystals of pure and Nd: L-Threonine (LT) has been grown by slow evaporation method. XRD studies confirm the Orthorhombic phase of crystal structure in both pure and Nd doped L-Threonine. FTIR studies confirm the presence of all functional groups associated with L-Threonine. The magnetic behaviour of pure L-Threonine is diamagnetic whereas Nd doped L-Threonine shows ferromagnetic nature with zero coercivity. The hysteresis curve clearly indicates the existence of two different magnetic domains with opposite spin orientations in Nd doped LT crystal. The observation of magnetostriction effect is an interesting feature in Nd doped LT crystal for which these materials can be used as soft magnetic materials as semiconductor storage devices.

Keywords: Single crystal, L-Threonine, FTIR, XRD, Hysteresis.

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Qualitative Interpretation of Oceanic Crust of Central Indian Ocean Basin As Inferred From Gravity Data

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ABSTRACT

Entrenched in the characteristics pattern of free-air gravity anomaly in the crust of the Central Indian Ocean, the free-air gravity data, which lie between 77° E - 90° E longitudes and 6° N - 6°S latitudes, are qualitatively interpreted to detect tectonic structures. Various filtering methods such as horizontal gradient, vertical gradient, upward and downward continuation, analytical signal, and tilt derivative are utilized to identify the tectonic features. The upward continuation data show that the attenuation of high wave number anomalies increases and broadens with increasing altitude. A horizontal gradient of 0.00071mGal/m indicates a linear topographic trend, and a large horizontal gravity gradient of 0.00090 mGal/m is observed in the vertical derivative map corresponding to linear tectonic features. The downward continuation of the free air gravity anomaly grid data shows the change in anomalies with increasing observation altitude. The free-air gravity anomaly varies positively from 9 - 15 mGal and negatively from 76 - 82 mGal for the observation height (H= 100 m). The analytical signal map shows a high analytical signal of 0.0027 mGal/m observed along with tectonic features at shallow depths. The tilt derivative technique was used to find linear, sharp tectonic features corresponding to free-air gravity anomalies.

Keywords: Analytical signal, free-air gravity anomaly, tilt derivative, tectonic map, upward continuation

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Analysis of Air Pollutants in Visakhapatnam during 2019- 2022: A Case Study

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ABSTRACT

Objective:

The objective of the present study is to explain the impact of particulate air pollution (PM10) from 2019 to 2022 in the industrially developed coastal city.

Methods:

In recent times, pollution is due to population growth, growth of industries, and rapid urbanization. Air pollutants can be classified into primary and secondary pollutants. Fine particles below 100µm (RSPM) and coarse particles > 100µm (TSPM), sulphur, and nitrogen compounds are known as primary pollutants. Secondary pollutants are produced by the chemical and photochemical reactions of the primary pollutants.

Findings: It can be seen that the dispersion and dilution of pollutants in the atmosphere mainly depend on meteorological and topographic factors. The obtained results show that high PM10 mass concentrations in winter exceed the NAAQS limit and better air quality is observed especially in summer and during monsoon seasons.

Novelty: The main air pollutant is particulate matter (PM10) in Visakhapatnam city due to rapid industrialization and its variations are explained during 2019-22.

Keywords: particulate matter, dispersion, pollution, anthropogenic.

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SCREENINGANDPRIORITIZING THE POTENTIAL HOSPITAL BY EMPLOYING FUZZY TECHNIQUES

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ABSTRACT

Beinginthe hospital is scary.Infact, the choice of hospital canmean the difference between life and death. Choosingthe best hospital is a difficult task as it has to analyze various criteria such as availability of basicequipment,healthinsuranceconcerns,presence of specialists/doctorswealth of experience,patientexperience/reviews,availabilityofhigh-techequipment and laboratories. The above criteria havebeen discussed in this article and will help you make an informed decision about the best hospital. This study examined a choice help model for determination of best medical clinic to get better treatment and speed recuperation by employing Fuzzy Analytical hierarchy approach (AHP). The proposed assessment measures give a reference to the patients for the determination of best medical clinic utilizing AHP.

Keywords: Fuzzy AHP, linguistic variables, medical clinic.

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NANOTECHNOLOGY: TRANSFORMATIVE INNOVATIONS FOR THE FUTURE

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ABSTRACT

In the fields of physics, chemistry, biology, and engineering, nanotechnology has become a ground-breaking catalyst for scientific and technological advancement. This academic article provides an in-depth analysis of the current state of nanotechnology and its impact on a range of industries. Materials and devices at the nanoscale exhibit remarkable properties and phenomena, enabling unprecedented manipulation of substances at the atomic and molecular levels. The article explores notable developments in the synthesis of nanomaterials, methods for characterizing them, and their diverse applications. It highlights the contributions of nanotechnology in the areas of medicine, electronics, energy, and environmental management.

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Performance Enhancement And Evaluation Of Cost-Efficient, Concrete-Insulated Solar Still Using Novel Spinel Nanoparticles Coated Absorber Plate

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ABSTRACT

The scarcity of safe drinking water poses a formidable challenge to the well-being and progress of numerous developing nations.Solar desalination is a well-known and promising renewable energy conversion technology that produces fresh water from vast available saline water. The current research aims to develop a solar still that is easy to install and operate in remote areas, withpromising working efficiency. A double-sloped single-basin solar still (DSSBSS) was constructed of size 0.49 sq.m. with cost-effective and thermal insulating materials like coconut shell and Geopolymer concrete. The efficiency of the solar still was studied by varying the gap between the absorber plate and water and the surface conditions of the absorber plate. A cost-effective absorber coating was developed using spinel-structured transition metal oxides by combining wet chemical and spray coating techniques. The influence of the spinel oxide nanoparticles-coated absorber plate in the working performance of the solar stills has been explored over a duration of seven effective hours (10:00-17:00). On evaluating the performance of the solar still in various conditions, applying the spinel-oxides nanoparticles-based coating on the absorber plate yields ~40% efficiency due to its high solar absorption property (~95%) whereas the non coated absorber plate yields only 28% efficiency. The study demonstrated the application of spinel oxide-based coating in solar stills with enhanced performance, exceptional robustness, and low maintenance requirements.

Keywords: Solar still; Desalination; Geopolymer Concrete; Spinel Oxide; Absorber plate.

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Analysis of solar cooking food with safety food packing using ZnO nanocomposite materials

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ABSTRACT

The human self-life has been increased from solar cooking food with active packing with benefit of Zinc Oxide nanocomposite materials. The optimize of food packing good materials have been prepared and developed from Lichen with effect of crystal structure improve ZnO nanoparicles. The long time this food packing materials were used travelling, professional same departure of the food. XRD, FTIR & SEM used to analyze the structure, chemical bonding and morphology of the material. Gram-negative Escherichia coli (E. coli) and Gram-positive staphylococcus aureus antibacterial activity resist by the prepared ZnO nanocomposite.The enhanced performance and easy degradation enables the biocomposite to be a prospect material in the packaging industry.

Keywords: zinc oxide; UV shielding; antibacterial activity, food packing, biocomposite

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Performance of nanocomposite materials with solar absorber using tubular solar still

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ABSTRACT

Now a days more problem water treatment not good drinking water more backlog for industrial. We overcome of the population will be develop in nanocomposite material using solar absorber plate in the solar tubular still. The solar still is analyzed with weather condition of summer and winter in KLEF solar laboratory from Januray 2023 – November 2023. The TSS is studied with different ratio of 10%,20%,30%, 40% nanocomposite with benefit of 20% thermal performance is 57.3% and conventional solar still is 23.4%. XRD, FTIR & SEM used to analyze the structure, chemical bonding and morphology of the material. The tubular solar still with nanocomposite provided the productivity of 6650mL/m2.day.

Key words: Tubular solar still, Nanoparticles

Boosting Heat Transfer in U-Shape Double Slope Solar Still with Sugarcane Bagasse Enhancement

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ABSTRACT

The present study focuses on the production of sugarcane bagasse-based activated carbon (SBAC) employing a chemical activation method with potassium hydroxide (KOH). Comprehensive analyses, including X-Ray Diffraction, scanning electron microscopy, Brunauer–Emmett–Teller surface area, and Fourier-transform infrared spectroscopy, were conducted to assess the physical and chemical properties of the activated carbons (ACs). The investigation explores the impact of varying weight ratios (5 wt%, 10 wt%, 15 wt%, 20 wt%, 25%) and examines the influence of incorporating prepared activated carbon with U-shaped solar distillation (USD). Experimental data indicate that the 30% weight ratio achieves optimal USD performance when coated with activated carbon. The constructed and synthesized materials contribute to a remarkable increase in water temperature, reaching up to 26%. Notably, compared to traditional solar distillers, the novel USD, coated with BPZZM, exhibits a notable efficiency improvement of up to 14.54%. This enhancement is attributed to the thermal conductivity of BPSBAC blended with the USD, substantiated by both theoretical and experimental results. The novel design attains a productivity rate of 8.53 l/m2 day.

Keywords: U-shape basin; sugarcane bagasse waste; Efficiency; Double slope

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Lignocellulosic fibres from Pineapple Crown Leaves Extract for Interfacial Bonding with TiO_2 in Photanode of DSSC and Simulation Modelling using PCL

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ABSTRACT

The crown leaves of pineapple are rich in smooth and glossy silk medium length fibres comprising of cellulose and lignin along with fat, wax, pectin, uronic acid, anhydride, pentosan, colour pigment and inorganic substance. The anisotropic nature of the fibre with hydrogen bonding is effective in tie with semiconductor oxide (TiO_2) by its cellulosic fibrils. The dye extracted from the Pineapple Crown Leaves (PCL) using ethanol and subjected for FTIR and UV-Visible spectroscopy. The absorption peaks observed at 3268 cm^{-1} and 2922 cm^{-1} in FTIR confirms the -OH and -CH stretching due to the fibrils in the dye. The UV-Visible spectroscopy shows the absorption in the visible region of the electromagnetic spectrum. Photoluminescence study of the dye has shown the emission in the visible region of the electromagnetic spectrum. The solar cell with the incorporation of the dye is subjected for JV characterization study and given an efficiency of 1.0034% with fill factor, open circuit voltage and short circuit current density of 0.40644, 0.7058V and 3.4906 mA/cm^2. A simulation model using PC1D has been proposed to study the influential parameters of the solar cell and optimization for large scale installations.

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Boosting piezo-photocatalytic activity in CuBi2O4/NaNbO3 by coupling it with PVDF for organic pollutant degradation

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ABSTRACT

This work reports a piezo-photocatalytic film, which is easily synthesised and retrievable from water with an environmentally friendly composition exhibiting higher reaction kinetics for degradation of dye using polyvinylidene-fluoride (PVDF), copper bismuth oxide (CuBi2O4) and sodium niobate (NaNbO3). XRD confirmed the structure of CuBi2O4 and NaNbO3, and FTIR was used to confirm β-PVDF, while HR-SEM was used to study morphology. The prepared film displays excellent stability in piezo-photocatalytic conditions. It degrades rhodamine B (RhB) with 98% efficiency within 30 min in piezo-photocatalysis mode and 113 times faster than CuBi2O4/NaNbO3. This enhanced performance is due to the synergistic piezocatalytic effect of PVDF and NaNbO3. Further, to understand the catalytic nature of the ultrasonic-induced piezo-photocatalytic effect for dye degradation, scavenger studies were performed to identify the radicals generation. Reusability tests revealed no loss in efficiency for five consecutive runs. The strategy outlined here can be used to treat industrial effluents containing various complex dyes.

Keywords: Piezo-photocatalyst, ultrasonic vibrations, NaNbO3, CuBi2O4, dye degradation.

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Concentration dependence and luminescence studies of Dy^{3+} ion doped Antimony Oxyfluoroborate glasses for White Lighting Emitting Devices

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ABSTRACT

Dysprosium oxide-doped with a composition of Antimony Oxyfluoroborate glasses were prepared using a conventional melt-quenching technique for solid-state lighting device applications. The glasses were characterized through various analytical investigations such as X-ray diffraction (XRD), Fourier transform infrared (FTIR) spectroscopy, refractive index, density, optical absorption, excitation, photoluminescence (PL) studies, and decay measurements. The amorphous nature of the prepared samples was confirmed by XRD. FTIR studies revealed the stretching and bending vibrations of the borate units. The density and refractive index increased with an increase in the Dy_2O_3 concentration. From the absorption spectra, the Judd-Ofelt (JO) intensity parameters and oscillator strengths were calculated. The optical bandgap energy was determined using the Tauc plot. The excitation wavelength ranged from 320 to 480 nm and was used to study the emission. The excitation wavelength of 351 nm, and 0.5 mol% glass results in an intense emission peak. The emission spectra of the prepared glass samples showed four intense emission bands corresponding to $^4F_{9/2} \rightarrow {}^6H_{15/2}$, $^4F_{9/2} \rightarrow {}^6H_{13/2}$, $^4F_{9/2} \rightarrow {}^6H_{11/2}$, and $^4F_{9/2} \rightarrow {}^6H_{9/2}$, respectively. The CIE coordinates were calculated from the emission intensities. All the results for the prepared glasses were suitable for white-light-emitting device applications.

Keywords: Dy^{3+} ion, absorption, J-O parameters, PL Studies, wLEDs.

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Influence of Europium ions on structural and Optical properties of Aresenic antimony Alumina Boro Lead Oxide glasses

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ABSTRACT

Europium ions-doped Arsenic Antimony Alumina Boro Lead Oxide (AAABPbO) glasses have been synthesized by melt quenching technique. To investigate the optical properties, spectroscopic methods including absorption, photoluminescence (PL) excitation, PL emission and PL decay spectrum measurements were performed. The types of bonds and bonding characteristics of the glasses are identified by FT-IR analysis, and the phonon energy of the transitions is determined by Raman spectra analysis. The prepared AAABPbOEu glasses, Judd-Ofelt(J-O) parameters are calculated. The J-O parameters were computed using the PL emission spectral data instead of the absorption spectral data. The obtained J-O values of AAABPbOEu glasses are all in the same trend of $\Omega_2 > \Omega_4$. At a wavelength of 613nm, the prepared glasses exhibit a prominent peak in the reddish-orange region. The J-O analysis is used to analyse the radiative parameters, including the transition probabilities, branching ratios, quantum efficiency and emission cross-section. The maximum quantum efficiency and stimulated emission cross section values are found in the AAABPbOEu2.0 glass when the decay curves are determined experimentally across their lifetimes. These glasses also fall inside the reddish-orange region of the CIE coordinates analysis. Therefore, the ideal optical material for the emission of reddish-orange light is AAABPbOEu2.0 glass.

Keywords: Eu^{3+} ion, absorption, J-O parameters, CIE coordinates.

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Effect of Dy^{3+} concentration on structure and photoluminescence of $Li_4Zn(PO_4)_2$ phosphor

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ABSTRACT

A novel Dy^{3+} activated $Li_4Zn(PO_4)_2$ phosphor successfully prepared and characterized using various spectroscopic techniques. X-ray diffraction (XRD) patterns confirmed the single phase $Li_4Zn(PO_4)_2$ structure, which was in good agreement with the standard data. Energy dispersive X-ray spectroscopy (EDS) also confirmed the presence of elements as per composition. Photoluminescence (PL) excitation spectra showed strong and narrow peaks in the ultraviolet (UV) region due to 4f-4f transitions of the dopant ions. PL emission in the visible region with two intense emission lines clearly showed concentration quenching of Dy^{3+} ions on emission intensity upon excitation $Li_4Zn(PO_4)_2$:0.05 Dy^{3+} was optimized as a potential candidate for white light emission applications with multipole interaction. Decay profiles were also studied for all the concentrations of Dy^{3+}. Calculated colour co-ordinates were well positioned in white light region.

Keywords: Phosphates; Phosphor, White Light Generation; Photoluminescence; Decay Profiles

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Solar and Wind Based Wireless Charging Station

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ABSTRACT

Wireless power transfer is one of the simplest and inexpensive ways of charging as it eliminates the use of conventional copper cables and current carrying wires. This paper majorly focuses on renewable energy sources through wireless transmission to vehicles and some wireless applications.Wind power is a big and increasing source of clean energy. Large wind turbines are installed in many places to generate power.A solar panel is a tool that converts sunlight into electricity. The solar generation station generates the DC electrical energy, and at the same time, the wind generation station generates the AC electrical energy. The wind energy is converted into DC current by using Inverter. By using controllers and convertors, it stores the total energy into batteries, so that it is easy to transfer energy wirelessly to Electric vehicles (EVs) and some wireless applications. In this paper, solar energy and wind energy is used to generate power and is transferred to an investor or battery for wireless transmission. To reduce the transmission losses, charging of multiple devices and eliminating charging cords, can provide power for compact and portable devices. The inductive coupling technique is used, since it is the easiest method of wireless power transfer, because of high efficiency and a large amount of the energy transferred using renewable sources (solar energy and wind energy).

Keywords: Wind generation, Solar generation, Maximum power point tracking (MPPT), Inductive Coupling Method

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Performance analysis of an induction motor for different materials (Steel_1010, Ag, Al, Be, Cu, Mg, W and Zr) using Ansys Maxwell RMxprt

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ABSTRACT

Electric vehicle usage is increasing rapidly, but its good performance mainly depends on electric motors. Using an induction motor is a good choice for electric vehicle performance. Induction motor performance mainly depends on its design structure and materials. Analyzing the performance of the motor by using the Ansys Maxwell RMxprt analytical software is a good choice. This software generates the characteristics of torque, slip, efficiency, input power, power factor, and weight of the material used for the designed motor. The design of the motor totally depends on the structure measurements like the outer and inner diameter of the stator and rotor, slot count and shape of the stator and rotor slots, voltage, frequency, poles, output power, material used, etc. This paper presents the analysis and behavior of 415 volts and 50 Hz frequency induction motor operating at 75 degrees centigrade by fixing the frame material steel_1010 and different materials for winding i.e silver (Ag), aluminum (Al), beryllium (Be), copper (Cu), magnesium (Mg), tungsten (W), and zirconium (Zr) using Ansys Maxwell RMxprt (AMR) software. Combination of steel_1010 (frame) and Ag (winding) has the better efficiency (90.377%) and break-down torque (79.6834 N.m) among all other materials.

Keywords: Ansys Maxwell RMxprt (AMR), silver (Ag), aluminum (Al), beryllium (Be), copper (Cu), magnesium (Mg), tungsten (W), zirconium (Zr)

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Topological Indices for Generalized Hierarchical Product of Graphs for Chemical Applications

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ABSTRACT

A topological representation of molecule is called molecular graphs. A molecular graph is a collection of points representing the atoms in the molecule and set of lines representing the covalent bonds. These points are named vertices and the lines are named edges in graph theory language. The Wiener index is one of the oldest and most widely used Topological indices. Originally the wiener index is defined as the sum of the distances between any two carbon atoms in an alkane, interms of carbon-carbon bonds and is also called path number. This wiener index was motivated by various mathematical properties and chemical applications. In this paper we study wiener index for generalized hierarchical product of graphs.

Index Terms- Molecular Graph, Wiener Index, Chemical Applications

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GROUPOID ACTION ON t-FUZZY NEUTROSOPHIC SUBRING

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ABSTRACT:

In this paper we introduce the notion of t-fuzzy Neutrosophic subring by using Chakraborty and Khare definition of fuzzy homomorphism and algebraic structures was developed and investigate their relative properties with respect of some definitions. We are introduced some algebraic properties of Union, intersection, homomorphic image and inverse of t-fuzzy Neutrosophic subring. Finally we investigate some basic properties of t-fuzzy Neutrosophic subring

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Investigation of radiation shielding and optical properties of Neodymium doped Bismuth Boro tellurite glasses for solid state device applications

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ABSTRACT

In this work, a variety of glass samples with different chemical profiles for optical applications were synthesized, and characterized. The thermal properties of the prepared glass are investigated through Differential Thermal Analysis (DTA) and we have observed the endothermic peak at 894.9˚C and exothermic peak at 1066˚C. The optical properties were investigated using a UV-Visible-NIR Spectrophotometer, and the radiation shielding properties were reported using the Phy-X/PDS software. The optical property results show that when the amount of Nd^{3+} ions in a glass structure grows, the oscillator strengths also increase. The Photoluminescence (PL) analysis of Nd^{3+} ions doped prepared glass samples are recorded at 808nm laser diode. The emission spectra for every Nd^{3+} ion concentration exhibit three distinct emission peaks at wavelengths of 902 nm, 1064 nm, and 1339 nm. The investigation of luminescence kinetics revealed the development of neodymium ion clusters commencing at a neodymium concentration of $1.006*10^{20}cm^{-3}$. In terms of the glasses' ability to absorb charged particles, the Nd_2O_3 addition also made a difference in Half Value Layer, Mean Free Path, and Effective atomic number. The research shows that the glass samples are non-toxic, visible light transparent, and radiation-efficient.

Keywords: Neodymium, Borate glasses, optical properties, radiation shielding parameters

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Improving diesel engine performance and emissions reductions under the effect of graphene with HHO gas addition to waste fish biodiesel

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ABSTRACT

Research on alternative fuels is now underway due to exhaust pollution regulations, the depletion of fossil fuels, and the increasing need for energy. Fish oil residue was transesterified to create methyl ester. Biodiesel and diesel fuel were mixed at 20 percent volume ratio. ASTM was used to assess the properties of the biodiesel. Graphene was mixed with the biodiesel mixture at 25, 50, and 100 mg/l concentrations. We Characteristics of grapheme were evaluated using TEM and SEM. At 0.5 LPM, the dry alkaline electrolyzer produced oxyhydrogen gas. The studies were conducted at different loads and rated speed of 1500 rpm without modifying the diesel engine. The aim of this project is to investigate the effects of graphene supplemented with HHO on emissions and engine performance of diesel engines running on waste fish biodiesel. Methyl ester combinations including graphene (WF20G25, WF20G50, and WF20G100) increase the thermal efficiency of the biodiesel blend by 5%, 7%, and 9%, respectively, with the addition of HHO. Decreases of 12%, 15%, and 21% in CO emissions for WF20 were achieved by adding 25, 50, and 100 ppm of graphene to the biodiesel mixture including oxyhydrogen. There was a significant decrease in HC emissions of 16%, 20%, and 28%, as well as a noticeable decline in smoke concentrations of 14%, 17%, and 28% for methyl ester mixture for WF20G25 + HHO, WF20G50 + HHO, and WF20G100 + HHO. 10%, 13%, and 19% more NOx emissions resulted by adding HHO to methyl ester containing 25, 50%, and 100% of graphene in the biodiesel blend, respectively. It is recommended to utilize biodiesel from waste fish oil with 100 ppm graphene supplemented with HHO to minimize the exhaust emissions associated to improved engine performance.

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Effect of regenerative in single slope solar still using Tribulus terrestris doping silver nanoparticles

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ABSTRACT

This experimental investigation utilized Tribulus terrestrismaterials novel design single slope solar still for a regenerative process. Furthermore, the study incorporated a blend of Tribulus terrestriswith silver (Ag)nanoparticles, and extracts from Tribulus terrestris abbreviated to identify the most effective solar still for optimal performance under challenging conditions and compared to that of a conventional single distiller (CSS). Notably, the Tribulus terrestris with Ag configuration demonstrated the most substantial performance improvement, yielding productivity and thermal efficiency enhancements of 28.5% and 38.3% for PRC, 66% and 44% for ARC, and 96.5% and 48.5% for Ag Tribulus terrestris, respectively. Furthermore, a comprehensive analysis encompassing environmental and economic aspects of the solar still was undertaken, with a focus on its application in distilling natural water sources.

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A flexible piezo-triboelectric hybrid energy harvester employing $NdMnO_3$@PVDF composite: A promising lead free piezo-catalyst

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ABSTRACT

Self-poled hybrid piezo-triboelectric nanogenerators are fabricated using $NdMnO_3$ decorated PVDF films and PDMS that exhibit significant response under different kind of mechanical stress. The incorporation of $NdMnO_3$ nanoparticles within PVDF results in remarkable enhancement of β phase formation ~ 89.71 % that assures its utility as sensors and internet of things (IoTs). The 11.07 vol% of $NdMnO_3$ decorated PVDF film (NMO_11.07) affirms itself as a promising piezocatalyst in dark to degrade MB dye effectively. The fabricated nanogenerator using NMO_11.07 (PTNNG_11.07), remarkably stable even in water, is observed to produce open circuit voltage as high as 160 V, 30 □A short circuit current, and a maximum output power density of ~201 mW/cm^2 under free hand hammering. To store the generated power, PTNNG_11.07 was connected to a bridge rectifier circuit and a capacitor was charged up to maximum V_c^{max}(~6.6 V). Most importantly, the non-toxicity of the designed PTNNG_11.07 meets the eco-friendly need.

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Recent advancement of emerging nanomaterials

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ABSTRACT

Engineering materials play a pivotal role in creating devices that can replace or enhance various bodily functions. These materials are designed to be safe, reliable, and physiological acceptable for a wide range of applications. Biomaterials, which can be of natural or synthetic origin, serve as the building blocks for repairing tissues or fulfilling specific requirements. In recent years, considerable efforts have been directed towards the development of environmentally friendly and biodegradable materials with diverse properties, expanding their utility beyond medical applications. They exhibit biocompatibility and biodegradability, making them suitable for medical use. Furthermore, advanced materials are employed in conjunction with the human body, ensuring minimal adverse effects. The array of materials and devices encompass catheters, artificial tissues, and more. Biomaterials have evolved to the point where they can function as organs within living systems or work harmoniously with living tissues. Distinct categories of biomaterials include metallic, ceramic, polymeric, and composite biomaterials, each possessing unique properties suited for specific applications. This review aims to spotlight recent developments in materials applicable not only to the medical field but also to engineering and various industrial applications.Specifically, our focus extends to the latest innovations in designing, synthesizing, and characterizing novel materials, including biodegradable polymers, hydro gels, nanomaterials and porous materials. We explore their potential applications, highlighting their advantages and limitations across diverse sectors.

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Judd-Ofelt Parameters of Praseodymium ion doped Borate glasses for White Emission Application: W-LED

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ABSTRACT

Praseodymium ion doped borate glasses are prepared by melt quenching method. The investigating glasses are non-crystalline and having amorphous nature. These glasses having high density and refractive index which can be utilized for optical applications and devices. These glasses are having high thermal stability due to having high Hruby's criteria value so it can be used for solar cell as shield. These glasses are having in FTIR at frequencies it is observed B-O- Pr and B-O-B bonding with stretches and bending s. The absorption peaks are found in visible reason. The direct and indire energy band gap values are decreasing as the concentration of Praseodymium ion increases from 0.2 to 1.0 mol%. Judd-Ofelt results obtained from UV-VIS absorption measurements have been applied to photoluminescence spectra to evaluate radiative properties such as transition probability (A), radiative branching ratio (β_R) and the stimulated emission cross- section (σ_e) of the emission transitions. The obtained results show that the optical properties of the glass sample BPr4 found interesting towards the applications in optical systems. The CIE plot shows that the produced glass sample emits white light and these glares are utilized for white LEDs.

Keywords: Density, refractive index, Hruby's criteria, Judd ofelt, Emission, absorption

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Component Design and Strength Analysis ofChild Safety Seat Design and Testing

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ABSTRACT

Child safety seats play a crucial role in protecting young passengers during motor vehicle accidents. This ABSTRACT provides an overview of the design and testing aspects of child safety seats, highlighting their significance in ensuring the safety of children in automobiles. Child safety seat design begins with a deep understanding of the biomechanics of child passengers. These seats are meticulously crafted to cater to the specific needs of infants and young children, considering factors such as age, weight, and height. The design process involves engineering principles, ergonomics, and the incorporation of advanced materials to create seats that provide optimal protection and comfort. Testing child safety seats is a rigorous process involving regulatory standards and voluntary manufacturer-specific tests. Regulatory bodies such as the National Highway Traffic Safety Administration (NHTSA) in the United States and corresponding agencies in other countries establish safety standards that child safety seats must meet. These standards encompass various crash scenarios, including frontal, rear, and side impacts and rollover conditions. Manufacturers conduct extensive crash tests to ensure their products meet or exceed these standards.

Keywords: Vehicle Design, Child Safety, Safety seats, Test, Frontal and rear impacts.

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Polymer electrolyte based on plasticized-PVP for the study of electrochemical characteristics.

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ABSTRACT

Plasticized PVP based ion conducting polymer electrolyte was prepared in the method of solution casting technique. The electrolyte membrane was prepared in four different concentrations of Polymer:salt (100:00, 80:20, 70:30 and 60:40) and plasticizer has been doped for the concentration which is having high ionic conductivity. The prepared electrolyte membrane was studied through X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FT-IR) to understand the structural and functional characteristics and interaction of the positive ions with the particular functional group of the polymer chain has been analyzed. The surface morphology of the prepared electrolyte membrane was studied using FE-SEM analysis. AC Impedance has been studied for the prepared electrolyte membrane, from that ionic conductivity was calculated for the electrolyte membrane. The electrolyte membrane shows the ionic conductivity up to the range of 10^{-6} S/cm. From the study of AC Impedance analysis, dielectric characteristics of the material were studied to know about the charge storage capacity of the electrolyte membrane and electric modulus analysis of the prepared electrolyte membrane has been studied. Further, Linear sweep Voltammetry (LSV) has been studied for the prepared electrolyte material, which has been studied using two electrode coin cell set up. From the LSV the electrochemical operating window of the prepared electrolyte material is found to be 1.3V. Then Cyclic Voltammetry was studied for the prepared electrolyte membrane in the voltage range of 0 – 1V with the scan rate of 50 mV/s to confirm the red-ox reactions of the cell.

Key words: Polymer electrolyte membrane, FT-IR, AC Impedance, Dielectric Properties, Electrochemical operating window.

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TheoreticalStudyofOrganicDyeBasedonSevenColorasaPhotosensitizerforDye-sensitizedSolarCellsapplication

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ABSTRACT

A comparative study of natural organic Dye with seven colors of natural organic dyes. The bandgap of all seven organic dyes shows which color, structure and functional group of organic Dyeare responsible for the best"D-π-A system "usedin solar cells as organic dyes are sensitized.The ground state estimations are done using the hybrid functional "B3LYP" with a 6-311G basisset on the density functional theory (DFT) method in the gas phase. Besides, the TD-DFT wasselected with the same function to modulate the electronic absorption spectra and charge-transfercapabilities of the dyes analyzed in this study. The effects of introducing different groups as π-bridgeonthesematerials'propertieswereexaminedtoconfirmtheconnectionbetweencompound structure and its properties. In addition, various electronic, optical, chemical reactivityandopticalparametersweredeterminedfromthefullyoptimizedstructures.Theresultsdemonstrate these materials can be utilized as organic sensitizers for solar cells because of theirproperties and the probability of the electron injection process from each studied molecule to theECB"conductionband"of TiO_2.Thesubsequentregenerationispossible,andfinally,theelectrontransferwillbe straightforwardfromthe examineddyes toTiO_2.

Keywords: organic dye, π-bridge, DFT, chemical reactivity, optical properties, Dye-sensitizedSolarCells

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To explore photoluminescence effects of Samarium Doped Bismuth Antimony Fluoroborate Glasses

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ABSTRACT:

The traditional melt quenching method is used to synthesize the various trivalent samarium ion concentrations doped Bismuth-Antimony-Fluoroborate glasses (BISFB).Various physical parameters are assessed/estimated for the prepared glasses. Characterization for structural and photoluminescence properties of the glasses are done. XRD diffraction confirms the amorphous nature of the prepared glasses. From absorption spectra Judd-Ofelt (JO) intensity parameters Ω_2, Ω_4 and Ω_6 are evaluated and in turn used to estimate various radiative parameters such as transition probabilities (A_R), branching ratios (β) and radiative lifetimes (τ) for the fluorescent levels of Sm^{3+} ions in BiSFB glasses. The PL spectra show three emission bands, for which effective bandwidths and stimulated emission cross-sections (σ_p)have been determined. These bands are located in the yellow ($^4G_{5/2}\rightarrow{}^6H_{5/2}$), orange ($^4G_{5/2}\rightarrow{}^6H_{7/2}$), and reddish orange ($^4G_{5/2}\rightarrow{}^6H_{9/2}$) regions. Analysis has been done on the nature of the $^4G_{5/2}$level decay curves for various Sm^{3+} concentrations in BiSFB glass.CIE color co-ordinates are also measured to confirm the reddish orange emission from these glasses. Based upon luminescent properties, the present glasses could be found useful in optoelectronic devices and lasing purposes.

Keywords: Absorption, fluorescence, CIE color co-ordinates, decay

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CO_2based cascade refrigeration cycle: - A short review.

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ABSTRACT

The inability of conventional refrigeration cycles like an auto-cascade cycle, simple vapor compression cycle, absorption cycle, and vapor compression-absorption cycle, to produce simultaneously cold and heat effects, leads to the use of a double vapor compression cycle as a most appropriate cycle for the generation of cold and heat simultaneously. Much research has been done in this field to investigate the methods of increasing the COP of the cycle using an ejector mechanism, or expander as an expansion device. The present brief report on the cascade cycle represents how the trend of the refrigeration cycle changed in the past few years, and also enlightens the ways of improving the cyclic performances of the subcritical and transcritical cycles. The use of an ejector mechanism and expander increases the COP of the system. The internal heat exchanger can also improve the cyclic performance up to a significant point. Further, the use of these cycles in industrial refrigeration needs some design implementations.

Keywords:- Subcritical Cycle, Transcritical Cycle, Ejector expansion, Expander, Coefficient of Performance(COP), Internal Heat Exchanger.

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Dye Sensitized Solar Cell (DSSC) performance of Tin Oxide thin films deposited by dip coating and doctor blade technique

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ABSTRACT

In this work, we investigate two different approaches to the determination of tin oxide material's DSSC efficiency. Tin oxide thin-film coating is the first, and sol gel acrylamide (from gel precipitation) is the method used to create tin oxide nanopowder. The electrical, optical and structural properties of tin oxide films and tin oxide powder were investigated. Tin oxide films were sensitized in ruthenium (II) (R535,N_3-dye, Solaronix) bis (2,2-bipyridyl-4-4-di-carboxylate) dye solution for 12 hours at room temperature. The counter electrode was an FTO substrate coated with carbon paste. To build the dye-sensitized solar cell (DSSC), the carbon counter electrode was clamped against the dye-sensitized tin oxide photoelectrode. Using capillary force, the electrolyte containing 0.5 M KI, 0.05M I_2, and 0.05M 4-tert-butylpridine was then poured into the inter-electrode gap. The area of the active cell was 0.25 cm^2. The cell was exposed to radiation using a 250 W Xenon lamp fitted with an infrared and ultraviolet blocking filter.The average grain size in this work is 20 nm, which results in a conversion efficiency of 1.375%. At 100 mW/cm^2, the simulated incident light causes a short circuit current density exclusive of 0.475 V and 3.0 mA cm^{-2}.An alternative process involves depositing films on FTO substrates (5ohms/sq) using tin oxide nanopowder coated by doctor blade technique, using SnO_2 powder that is produced via the sol gel acrylamide procedure. It is feasible to produce films with varying grain sizes using this method. With an average grain size of 120 nm and a conversion efficiency of 3.84%, the best device found in this work has an open circuit voltage and short circuit current density of 0.75 V and 8.0 mA cm^{-2}respectively at 100 mW/cm^2 of simulated incident light. This result is comparable with earlier report on undoped tin oxide based DSSC.

Keywords: SnO2, dip coating method, doctor blade techniques, DSSC behaviour

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Effect of Dy^{3+} ions in Borate Glasses for W-LED Applications

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ABSTRACT

A new series of Dy^{3+} ions doped Borate glass samples were synthesized by melt-quench technique, focussed on achieving the white light emission. For the synthesized glasses structural and optical properties were studied to recognize their usefulness in photonic devices. The XRD spectrum reveals non-crystalline nature of synthesized glasses.. The PL spectra of synthesized borate glasses shows prominent transitions in bluish, yellowish and reddish regions related to the transitions $^4F_{9/2} \rightarrow {}^6H_{15/2}$, $^4F_{9/2} \rightarrow {}^6H_{13/2}$ and $^4F_{9/2} \rightarrow {}^6H_{11/2}$ under 483nm excitation respectively. The Yellow emission at 575 nm observed to be highly intensified compared with other two transitions. A range of radiative properties were measured through to identify the optimum glass suitable for photonics devices. The key parameter – quantum efficiency measured through PL decay spectral data to identify the suitable good optical material in the synthesized series of samples. Consequently, the CIE co-ordinates were also calculated to understand white light emission capacity of the synthesized glasses.

Keywords: Glasses, Dysprosium, J-O parameters, W-LED

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Spectroscopic studies of Dysprosiumions doped Alumino Borate Glasses for Yellow Laser Applications

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ABSTRACT

Spectroscopic properties of Alumino Borate (AB) glasses doped with varying concentration of dysprosium ions were studied using X-ray Diffraction (XRD), absorption, excitation and photoluminescence (PL) spectral studies. Judd-Ofelt (J-O) theory has been applied to the recorded absorption spectral features to evaluate various radiative parameters for the prominent fluorescent levels of Dy^{3+} ions doped AB glasses. Under 350nm excitation, intense blue and yellow emissions at 483nm ($^4F_{9/2}\rightarrow{}^6H_{15/2}$) and 575nm ($^4F_{9/2}\rightarrow{}^6H_{13/2}$) were observed respectively and show concentration quenching at 1 mol% of Dy^{3+} ions in AB glasses. Dexter theory applied to the PL spectra reveals dipole-dipole interaction responsible for energy transfer between the doped Dy^{3+} ions to show concentration quenching in the prepared glasses. The yellow to blue (Y/B) intensity ratio, CIE Chromaticity coordinates and color correlated temperatures (CCT) have been evaluated from the PL spectra for all the prepared glasses. The emission cross-sections, branching ratios and quantum efficiency evaluated for the OCBT glasses confirm the suitability of Dy^{3+} doped AB glasses for visible photonic device applications.

Keywords – Judd-Ofelt parameters; Dysprosium; Photoluminescence; Lifetime.

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Photoluminescence studies of Eu^{3+} ions doped BoroTellurite glasses for visible Photonic device applications

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ABSTRACT

Trivalent Europium (Eu^{3+}) ions doped Boro-Tellurite glasses were fabricated by melt quenching technique and characterizedwith absorption,excitation,emission,decay methods to analyze the suitability of the glasses for photonic device applications. Direct allowed, indirect allowed band gaps and Urbach energieswere estimated from an absorption spectra.Emission spectra recorded at an excitation wavelength of 362nm have been used to estimate JO-intensity parameters Ω_λ(where λ=2,4).The intensity parameters Ω_2 and Ω_4 are again used to evaluate various radiative properties for the emission transition$^5D_0 \rightarrow {}^7F_2$of Eu^{3+} ions doped OCBT glasses. Decay curves are well fitted by single exponential and in turn used to estimate experimental lifetime (τ_{exp}) of metastable state ($^5D_0$) of Eu^{3+}ions. The analysis on radiative properties show that 1.0 mol % of Eu^{3+} ions activated OCBT glasses for the emission transition $^5D_0 \rightarrow {}^7F_2$ is well suitable for visible red lasers and display applications.

Keywords: Europium,$^5D_0 \rightarrow {}^7F_2$ transition, Red Emission.

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Near-IR Luminescence in Nd^{3+} ions doped Na_2O-BaF_2-CaF_2-B_2O_3-TeO_2 glasses for 1064nm Laser and Fiber Amplifier Applications

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ABSTRACT

In the present research work, Nd^{3+} ions doped Oxy-Fluoro Boro Tellurite (OFBT) glasses were prepared by melt-quench method and their luminescence characteristics were investigated through UV-Vis-NIR absorption, luminescence and decay studies for the NIR laser and optical fiber applications. Judd-Oflet (J-O) theory used to find the key parameters which in turn used to evaluate various radiative parameters from the luminescence spectra. Using the T.S.Lomheim and L.G.DeShazer method, branching ratio's (β_R) were evaluated by incorporating the spectroscopic quality factor (χ). The stimulated emission cross-section (σ_{sec}) was computed and found high for $^4F_{3/2} \rightarrow {}^4I_{11/2}$ (1064 nm) transition for OFBTNd10 glass. Using decay curves, the effect of Nd^{3+} ions concentration on the lifetime of the $^4F_{3/2}$ luminescent level was studied. The quantum efficiency (η) for OFBTNd10 glass was calculated and found to be maximum as 88%. From the obtained results, it can be suggested that OFBTNd10 glass can be used as good optical gain material to produce laser at around 1064 nm.

Key words: Nd^{3+} ions, borate glasses, tellurite glasses, laser, fiber amplifier

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Performance Investigation of high k dielectric material on the electrical performance of a-ITZO Thin Film Transistor

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ABSTRACT

This study enhances observations by examining the impact of variations in dielectric thickness from 160 nm to 20 nm for the a-ITZO material.The TCAD Silvaco Atlas platform is used for the simulation of thin film transistor structure. The performance of the device is improved with the decrement of Si thickness of the dielectric material. The quantum tunneling effect is playing a significant role if the thickness of the dielectric material is decreased beyond a level.When the high k dielectric material is used as a dielectric material in the thin film transistor, the equivalent oxide thickness of the material is increased in spite of the material's physical thickness. The gate dielectric material is changed from SiO_2 to HfO_2, and the threshold voltage V_T and sub-threshold voltage S are decreased from -7.33 V to -0.18 V and 0.27 V/dec to 0.18 V/dec, respectively. When the dielectric material was changed from SiO_2 to HfO_2, the field effect mobility $\mu_{FE}$and I_{ON}/I_{OFF} current ratio increased from 13.85 $cm^2V^{-1}s^{-1}$ to 121.76 $cm^2V^{-1}s^{-1}$ and 1.18E+10 to 2.64E+11, respectively. The impact of channel length (L) on the performance of amorphous In–sn–Zn–O (a-ITZO) thin-film transistors is another aspect that is investigated in this work.

Keywords: Dielectric thickness, Channel length,a-ITZO

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Can Fuel Cell Based EV kill Battery Based EV? A SWOT Assessment from the Indian Context

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The upsurge in the use of Internal Combustion (IC) vehicles is causing prevalent environmental tribulations in our atmosphere due to the emission of noxious greenhouse gases, such as COx, SOx and NOx. In addition, due to low supply and high demand, the cost of petroleum-based products are significantly raising causing serious impact on the transportation sector from the perspectives of environment and economics; Hydrogen based Fuel cell systems are one of the reliable and renewable green power packs particularly attractive for use in vehicles and as a replacement to the ICE that feeds petroleum products. The overall transportation energy study, from "Well to wheel," confirms the benefits of fuel cell automotives as a clean alternative to the conventional IC engines. The low temperature operation of a PEMFC (typically <90˚C) allows for easy start up and good dynamic behavior and ability to withstand the shock and vibrations of the automotive environment [1]. Despite of its innumerable advantages PEM fuel cells has its own challenges pertaining to durability, hydrogen infrastructure, thermal and water management, sub-system design, hydrogen safety and market penetration issues, etc., that must be resolved before fuel cells can be made commercially viable. As a result, there has been an impetus to search for an efficient and renewable power system that can satisfy the global energy demand without the worry of depletion. In fact, these issues have brought in emission legislation all over the world requiring the induction of hydrogen-based Fuel cell vehicles. Fuel cells, in particular Proton Exchange Membrane Fuel Cells (PEMFC), are expected to play a major role in a future clean hydrogen economy. The purpose of the present assessment is to investigate the aforementioned technical issues both from the systems and market perspective and to provide cost effective feasible innovative solutions based on the interdisciplinary research in the field of Fuel Cell EVs against the counterpart Battery based EVs.

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Optical and Photoluminescence charactrizations of Dy^{3+} ions doped Alumino Tungsten Borate Glasses (AlWB) for w-LEDs applications

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ABSTRACT

Alumino tungsten borate (AlWB) glasses doped with various dysprosium ions are prepared by melt-quenching method and characterized using spectroscopic techniques such as optical absorption, photoluminescence, and decay spectral studies to understand the significance in photonic devices, solid lasers, and other applications. The non-crystalline nature of the prepared glass samples was confirmed by XRD studies. The oscillator strengths are measured by using absorption spectra are intern used to evaluate the three prominent parameters such as Judd-Ofelt Ω_2, Ω_4, andΩ_6 parameters. The photoluminescence (PL) spectra of the as-prepared glasses manifested three significant emission bands at 483 nm (blue), 575 nm (yellow) and 664 nm (red), and their corresponding electronic transitions are located at $^4F_{9/2}$ to $^6H_{15/2}$, $^6H_{13/2}$ and $^6H_{11/2}$. Various radiative parameters such as branch ratio (β_R), transition probability (A_R), radiative lifetime (τ_R), effective bandwidth ($\Delta\lambda p$), and stimulated emission cross-section (σ_{se}) have been calculated. It is understood that the fabricated glasses are more suitable for photonic devices such as white LED's.

Keywords:Alumino tungsten borate glasses, Judd-ofelt parameters, Optical absorption, Radiative parameters, CIE Chromaticity coordinates, PL decay

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Spectroscopic and discharge studies of TSP:CH_3COONa based polymer electrolyte Films

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ABSTRACT

Tamarind seed polysaccharide (TSP): Sodium acetate (CH3COONa) solid polymer electrolyte films with different weight percentages were made free-standing using the solution cast technique. Studies using Fourier transform infrared spectroscopy (FTIR) and X-ray diffraction (XRD) were used to examine the structural and chemical relationship between TSP and CH3COONa. The produced polymer films were tested for conductivity and dielectric characteristics using AC impedance spectroscopy. As the temperature rises, the conductivity increases. At room temperature (303 K), the maximum conductivity for the 80:20 (TSP:CH3COONas) weight percentage sample was determined to be 1.95×10^{-4} S cm^{-1}, which is three orders of magnitude higher than the conductivity of pure TSP (10^{-7} S cm^{-1}). These polymer electrolyte films exhibited temperature-dependent conductivity that was consistent with Arrhenius's behavior.Dielectric constants and dielectric loss are large at low frequencies and decrease at high frequencies, according to dielectric studies. Wagner's polarization method verified that ionic charge transfer accounted for the majority of the charge transport in these polymer electrolyte systems, with electrons contributing very little and the highest tion (~ 0.99). The cell's discharge investigation, with OCV at 1.68 V and SCC at 0.69 mA, demonstrated good stability and performance.

Keywords: Biopolymers; TSP; CH_3COONa; XRD; FTIR; Impedance analysis; Polarisation;

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Structural and Electrical Properties of TSP: NaNO Based Bio Polymer Electrolyte

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ABSTRACT

Tamarind seed polysaccharide (TSP): Sodium Nitrate (NaNO3) solid polymer electrolyte films with different weight percentages were made free-standing using the solution cast technique. Studies using Fourier transform infrared spectroscopy (FTIR) and X-ray diffraction (XRD) were used to examine the structural and chemical relationship between TSP and NaNO3. The produced polymer films were tested for conductivity and dielectric characteristics using AC impedance spectroscopy. As the temperature rises, the conductivity increases. At room temperature (303 K), the greatest conductivity for the 70:30 (TSP: NaNO3) weight percent ratio sample was found to be 1.14 x 10^{-4} S cm^{-1}. This is three orders of magnitude higher than the maximum conductivity for pure TSP (10^{-7} S cm^{-1}). These polymer electrolyte films exhibited temperature-dependent conductivity that was consistent with Arrhenius's behavior. Dielectric studies showed that dielectric constants and dielectric loss are high at low frequencies and decreased at high frequencies. The discharge study of the cell showed good stability and performance with OCV at 1.68 V and SCC at 0.69 mA.

Keywords: TSP, $NaNO_3$, XRD, FTIR, Impedance analysis, Cell discharge

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Effect of Ce^{3+} on Structural and Optical properties of ZnO Nanoparticles

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ABSTRACT

$Zn_{1-x}Ce_xO$ Nanoparticles (NPs) ($x = 0, 1$ and 2) synthesized via the chemical method were investigated in this paper. The impact of cerium (Ce^{3+}) ion on the ZnO NPs structural, morphological, and optical properties was investigated. From X-ray diffraction patterns it reveal wurtzite hexagonal crystal structure of ZnO NPs with one second phase of CeO_2. The impact Ce^{3+} of ions on the morphology of ZnO NPs were revealed by transmission electron microscopy analysis. Fourier transform infrared spectroscopy results indicate that Ce^{3+} ions induce a red shift in the vibrational mode of zinc–oxygen (Zn–O). Incorporating Ce^{3+} ions into the ZnO matrix extremely affected the optical properties of the NP. The synthesized NPs can be used for antibacterial applications to study the Inhibitory effect. The incorporation of Ce^{3+} ions into the ZnO matrix showed a remarkable impact on the ZnO NP optical properties. At room temperature, the M–H magnetic hysteresis of the synthesized samples reveal a combination of both diamagnetic and ferromagnetic contributions. The antibacterial properties of the synthesized NPs were also evaluated against six bacterial strains using the agar well diffusion method. The synthesized NPs suppressed the growth of the investigated bacteria with various degrees of toxicity.

Keywords: Nanomaterials; Rare earth elements; Chemical co-precipitation; Antibacterial

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Drug loading and release studies of Ce^{3+} doped ZnO nanoparticles embedded polymer

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ABSTRACT

In this paper, we investigated the drug loading and release behaviour of Ce^{3+} doped ZnO nanoparticles (NPs). The $Zn_{1-x}Ce_xO$ NPs, grown using chemical method, were embedded in an acrylic interpenetrating polymer network to make the sample application for biomedical purposes. The results of scanning electron microscopy showed that these NPs were well dispersed in the polymer. The grain size of these NPs lies in the range of 25–45 nm, as confirmed by transmission electron microscopy. The measurements of DC magnetization and hysteresis loops reveal that the basic magnetic behaviour of the $Zn_{1-x}Ce_xO$ NPs remained almost unaltered even after embedding in polymer but with a lower saturation value of magnetization. The grown sample's drug loading and release studies were carried out using an antibiotic, ciprofloxacin. The minimum inhibitory effect of the sample loaded with this drug has exhibited high activity against different strains of bacteria, comparable to the pure ciprofloxacin.

Keywords: Manganite; Nanoparticles; Magnetization; Biomedical applications.

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Comparative Study on Aluminium and Cobalt-Doped ZnO Nanostructures: Structural, Optical, and Surface Properties

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ABSTRACT

The present study investigates the impact of aluminium (Al) and cobalt (Co) doping on ZnO's structural, optical, and surface properties. The Al-doped ZnO (AZO) and Co-doped ZnO (CZO) nanoparticles were synthesized using a simple co-precipitation method, encompassing a range of dopant concentrations from 1wt.% to 4 wt.%. The synthesized samples undergo comprehensive analysis to evaluate their structural, morphological, optical, and surface properties. The structure and composition of the samples are confirmed by XRD, EDX, andfunctional groupsby FTIR spectroscopy. Further, to assess the physical properties of prepared nanoparticles, scanning electron microscopy (SEM), ultraviolet-visible diffuse reflectance spectroscopy (UV-DRS), atomic force microscopy (AFM), and Brunauer-Emmett-Teller (BET) techniques were used. Results indicate a distinct trend in crystallite size, optical band gap, surface roughness, and specific surface area of Aluminium and Cobalt-doped ZnO nanoparticles. The AZO crystallite size increased from 14.82 to 17.49 nm from the XRD analysis; the SEM pictures showed a flower-like morphology, and the energy gap reduced from 3.24 to 3.21 eV as Al doping increased. In contrast, the CZO crystallite size decreased from 16.92 to 15.39 nm, and the band gap increased from 3.18 to 3.23 eV. AFM studies revealed topographical information with significant roughness in the 230–430 nm and 435-700 nm rangefor AZO and CZO samples respectively. The BET investigation showed a mesoporous nature, with surface areas decreasing from 25.274 to 14.755 m^2/g. In contrast, the CZO with surface area increased from 18.657 m^2/g to 21.962 m^2/g.

Keywords: AZO, CZO, Dopants (Al, Co), structural, surface and optical properties.

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Reduction of Graphene Oxide Using Various Plant Extracts: A Comparative Study

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ABSTRACT

Graphene Oxide (GO) has garnered significant attention in recent years due to its unique properties and potential applications in various fields. One crucial aspect of harnessing its full potential lies in reducing GO to obtain reduced Graphene Oxide (rGO) while maintaining its structural integrity. In this study, Various Plant Extracts, including those from green tea leaves, grapefruit peel, and eucalyptus leaves, were utilized for the reduction process. The reduction efficiency and resultant properties of rGO were systematically investigated and compared. Fourier-transform Infrared Spectroscopy (FTIR), X-ray Diffraction (XRD), and Raman Spectroscopy were employed to characterize the chemical and structural changes during reduction. Additionally, the morphology and surface composition of rGO were analyzed using Scanning Electron Microscopy (SEM) and X-ray Photoelectron Spectroscopy (XPS). we explore the reduction of Graphene Oxide using different Plant Extracts as reducing agents, aiming to develop a sustainable and eco-friendly approach.

Key Words: Graphene Oxide, Plant Extracts, Reduction

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Synthesis and Characterization Study of Different Plant Extracts in Water treatment Application

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ABSTRACT

This study investigates the synthesis and characterization of nanomaterials derived from various plant extracts for their potential application in water treatment. The escalating global demand for clean water underscores the need for sustainable and effective water treatment methods. In this context, the utilization of plant extracts as reducing and stabilizing agents for the synthesis of nanoparticles presents an eco-friendly and economically viable alternative.Different plant extracts, such as Neem, Moringa Oleifera, and Aloe Vera, were employed in the synthesis of nanoparticles through a green and facile approach. The resulting nanomaterials were thoroughly characterized using techniques such as UV-Vis Spectroscopy, X-ray Diffraction (XRD), Fourier-Transform InfraRed Spectroscopy (FTIR), and Transmission Electron Microscopy (TEM). The study focuses on elucidating the role of plant extracts in the synthesis process and understanding the physicochemical properties of the synthesized nanomaterials.

Key words: Nanomaterials, Plant Extract, Water Treatment, Chemical Properties.

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g-C_3N_4 decorated SnO_2composite with enhanced visible-light photocatalytic activity

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ABSTRACT

Rapid industrialization and urbanisation pose significant challenges for the 21st century, including issues related to energy production, water scarcity, and environmental protection. The discharge of hazardous effluents from various industries has contaminated the aquatic system.As a result, water contamination issues associated with hazardous organic and inorganic effluent disposal must be addressed. In this regard, photocatalysis can be used as promising and eco-friendly technique for wastewater remediation. Tin dioxide (SnO_2) is a material with high electrical conductivity and optical transparency, making it ideal for photocatalytic applications. It is a semiconductor with a large band gap of 3.6 eV that cannot be used in visible light. In contrast, the band gap energy of g-C_3N_4 is 2.7 eV, which allows for visible light absorption. Various characterization methods, such as X-ray diffraction (XRD), Scanning and Transmission Electron Microscopy (SEM & TEM), UV–vis diffuse reflectancespectroscopy (UV-Vis DRS), Fourier Transform Infrared Spectra (FTIR) and Photoluminescence emission spectra (PL) were used to observe the heterojunction formed between the different weight % of g-C_3N_4 with respect to the SnO_2 nanoparticles. The enhanced catalytic activity of the samples was noticed for SnO_2/g-C_3N_4composites with a higher degradation rate constant compared with their individual counterparts.

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Spectroscopic properties of Dysprosium doped Lead Bismuth Titanium Fluoro Borateglasses for photonic and lasing applications

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Lead Bismuth Titanium Fluoro Borate (PBTFB) lasses oped with different concentrations of Dysprosium (Dy^{3+}) ions were prepared by using meltquenching technique and characterized for their lasing potential it ies in visiblere going by using the techniques suchasoptical absorption, emission and emission decay measurements. Radiative properties for various fluorescent levels of Dy^{3+} ions were estimated from absorption spectral information using Judd–O felt (JO) analysis. The emissions pectra and photoluminescence images obtained by 387 nm laser excitation demonstrates very distinct and intense yellow-blue emission at 575nm for all the doped glasses.The suitable concentration of Dy^{3+} ion sin the seglasses to act as an efficientlasing material has been discussed by measuring the emission cross-section and branching ratios for the emission transitions. The quantum efficiencies were also been estimated from emission decay measurements recorded for the $^4F_{9/2}$ level of Dy^{3+} ions. From them easured emission cross-sections, branching ratios, strong photoluminescence features and CIE chromaticity coordinates, it was found that 1mol% of Dy^{3+} ions doped PBTFB glasses are most suitable for photonic applications and also for the development of visible yellow-blue lasers.

Keywords

Fluoroborate glass, Dysprosium, branching ratios, CIE Chromaticity, yellow-blue lasers.

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Structural and cyclic voltammetry studies on Graphite/Polyvinyl Alcohol composite

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ABSTRACT

Graphite/Polyvinyl Alcohol (G/PVA) composite was prepared through mechanical blender at room temperature. The prepared composite was characterized by involving Powder X-ray diffraction, Fourier Transform Infrared and Electrochemical workstation. Powder X-ray diffraction studies revealed the incorporation of graphite and PVA in the prepared nanocomposite. All the expected functional groups of PVA were presented in the prepared composite. The cyclic voltammetry studies were carried out for different scan rate by preparing the electrode using G/PVA composite and measured with respected to platinum and calomel in the 6M KOH electrolyte. It is observed that the potential window increases with increasing the scan rate. The specific capacitance of the prepared G/PVA composite were determined and details are presented.

Key words: PVA, Graphite, Composite, PXRD and CV studies

Synthesis of Nanocomposite for effective Solar Cell Applications

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ABSTRACT

Hydrothermal method has emerged as pivotal in the fabrication of advanced nanocomposite materials for solar cell applications. This study investigates the synthesis and characterization of such nanocomposites, focusing on their applicability in enhancing solar cell efficiency. The hydrothermal synthesis process enables precise control over material morphology and composition, allowing for tailored properties crucial for solar energy conversion. Various characterization techniques, including spectroscopic, microscopic, and structural analyses, are employed to assess the nanocomposite's physical and chemical properties. The investigation delves into the correlation between the synthesized nanocomposite structures and their photovoltaic performance, providing insights into the mechanisms governing their efficiency enhancement in solar cell applications. The findings offer valuable insights into the design and optimization of hydrothermally synthesized nanocomposite materials for sustainable energy conversion technologies.

*Key words:*Hydrothermal,Nanocomposite, Solar Cell

Synthesis of Nanocomposite for photocatalytic application of Methyl orange dye degradation

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ABSTRACT

Sol-gel synthesis stands as a versatile technique for fabricating nanocomposite materials, particularly valuable in photocatalytic applications. This study delves into the synthesis, characterizations, and assessment of the photocatalytic capabilities of sol-gel derived nanocomposites. The controlled sol-gel process facilitates the integration of diverse components, leading to tailored nanocomposite structures crucial for efficient photocatalysis. Comprehensive characterizations employing spectroscopic, microscopic, and structural analyses are conducted to elucidate the physicochemical properties and structural characteristics of the synthesized nanocomposites. The investigation focuses on understanding the correlation between the unique structural features and the photocatalytic performance of these materials, shedding light on the mechanisms underlying their efficacy in pollutant degradation and energy conversion. This study contributes valuable insights into the design and optimization of sol-gel derived nanocomposite materials for environmentally sustainable photocatalytic applications.

Key points:Solgel - Nanocomposite - Characterizations – Photocatalysis Activity.

Synthesis and study of metal based Metal-Organic Frameworks for water treatment applications

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ABSTRACT

The present research offers a thorough examination of recent progress and applications of MOFs in the realm of water purification. New materials of a Metal-based metal-organic framework coated with reduced graphene oxide were synthesized with different ratios (KUT-1 and MOF-303). These compounds were synthesized by conventional solvothermal method and were characterized by X-ray diffraction, FT-IR spectroscopy, thermal analyses, Scanning Electron Microscopy, Transmission Electron Microscopy. The composites exhibit features similar to KUT-1 as well as MOF-303 with increased propertiescompared to the parent materials. These MOFs effectively removal of heavy metals from waste water.

Key words:

Metal-organic Frame work, water purification, heavy metals, organic dyes

Sequence Dependent in Upper Shoe Flow Shop Scheduling to determine the Takt Time and Production Target in R

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ABSTRACT

This Paper aims to formulate the Mathematical form of Time study in the upper shoe flow shop sequence-dependent and scheduling in the production unit. On the production floor, these Time studies have the potential to identify the significant categorical variable and improve the metrics in the production run. It would identify the appropriate changes that need to be done in this time study model, and these changes in the sequence lead to improving the production line, and this could be the root cause of enhancing the Production unit. It helps us to determine the Takt time, Process capacity and Production Target to cope with the customer demand. The main objective of this study is to find out the immediate approach to identify the improvement areas in the production line using the R language.

Keywords:upper shoe, sequence-dependent, scheduling, performance measure, capacity, Takt time, R Language

To enhance the Production Sequence Dependent in the Flow shop Scheduling on selection decision to reduce the subcontracting cost using R.

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ABSTRACT

This paper aims to formulate the Time Study of the Mathematical Model for the Upper Shoe in a flow shop footwear manufacturing industry based on the performance measure of a batch process. The production structure of this study is to develop a daily production sequence dependent-scheduling based on the time slab in the 8-hour production process depending on the number of styles and trends which are highly volatile in the production unit.

This mathematical model technique identifies the bottlenecks in the production process. It uses multi-linear regression optimization methods like backward elimination or forward selection, which could find the significant categorical variable to increase the machine productivity effectively in the production flow shop.

This time study reveals that powerful tools like linear regression would help the production unit make appropriate decisions and allocate limited resources, indicating improvements in sequence-dependent schedules to cope with the demand in the production line.

Thermal Impact on the Performance of Fly Ash – Steel Slag and Fly Ash – Glass Powder Hybrid Geopolymer Constructs

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ABSTRACT

The growing global awareness of environmental issues has prompted researchers to explore alkali-activated materials as possible alternatives to conventional building materials. While these materials exhibit lower CO_2 emissions compared to traditional counterparts, their overall environmental impact is influenced by sourcing factors.This study explores the impact of static thermal loadings on composites of Fly Ash – Steel Slag Geopolymer mortar (FA-SS) and Fly Ash – Glass Powder Geopolymer mortar (FA-GP). Following alkali activation, these geopolymer materials undergo controlled exposure to elevated temperatures at 200°C, 400°C, 600°C, 800°C simulating conditions relevant to fire-resistant construction materials. Through mechanical tests and microstructural analysis, encompassing compressive and flexural strength assessments, X-ray diffraction, FTIR and scanning electron microscopy, it is revealed that both FA-SS and FA-GP exhibit robust resistance to static thermal loadings. Their mechanical properties are found to be comparable to or even surpassing those of traditional cement-based materials. This research offers valuable insights into the thermal performance of geopolymer mortar blocks, affirming their potential as sustainable alternatives in construction applications necessitating resilience to elevated temperatures.

Keywords: Elevated temperatures, Static loading, Thermal performance, Geopolymer, Sustainability.

In the Presence of Rotation, the Hall and Dufour Effect on MHD Stream Past a Parabolically Accelerated Vertical Plate with Uniform Temperature and Variable Values of Mass Diffusion

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ABSTRACT

The paper that follows goes into greater detail about electrically conducting incompressible viscous fluid in an electrically conducting medium with no scattering qualities, as discussed below. This study used the Laplace Transforms Technique to conduct a comprehension analysis of the "Dufour Effect and the Hall Effect" on various components such as temperature, velocity, and concentration. The magnetohydrodynamic flow across a vertical plate with uniform temperature and multiple values of mass diffusion is graphically illustrated for a variety of parameters, such as the Schmidt number, magnetic field parameters, time, and Prandtl number. MATLAB software was also used to establish the principles of liquid stream equations, including the Grashof Number, which was used in the equations.

Keywords: Dufour effect, Hall Effect, MHD, Vertical plate, Parabolic, Rotation.

Microstructure, Zeta Potential and Enhanced Photocatalytic Dye Degradation Performances of Mesoporous Flower Shaped Nb Doped CeO_2 Bimetallic Oxide Nanostructures Decorated with Reduced Graphene Oxide

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ABSTRACT

The unique features of reduced graphene oxide (rGO) enable their applications in the field of photocatalysis as well as unique electrical properties. In the present research work, a novel series of Nb doped CeO_2 incorporated with various weight percentage of rGO (2, 8 and 12 wt %) were synthesized by hydrothermal method. The structural and morphological features of nanomaterials (NMs) investigated by using different analytical techniques namely, XRD (X-ray diffraction), UV-visible, SEM (scanning electron microscopy), EDX (energy dispersive X-ray), XPS (X-ray photoelectron spectroscopy), BET (Brunauer-Emmett-Teller). The XRD analysis present polycrystalline mixed phase of tetragonal/cubic crystal structure and microstructure analysis showed flower shaped morphology having mesoporous nature. The addition of rGO results in the increased specific surface area and pore diameter of the NC. Redshift in optical absorbance results with decrease in direct optical band gap as rGO concentration increases in NMs. The EDX/XPS studies showed the chemical composition and oxidation states of elements NB, Ce, O, C in NMs. Zeta potential studies showed increased poly disparity with increase in the mobility of the NMs. The zeta potential varies from 88.1 mV to 110.8 mV as the rGO concentration increases on bimetallic oxide NMs.

***Keywords*:** Hydrothermal synthesis; Zeta Potential; Photocatalysis; Nanomaterials; Mesoporous; Optical; Bimetallic oxide.

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Revolutionizing Energy Storage: Unraveling the Recent Marvels of Mxene Materials

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ABSTRACT

This review paper provides an in-depth analysis of the latest developments in energy storage applications facilitated by Mxene materials, which reflects a significant change in the sector. Mxenes, a group of 2D transition metal carbides and nitrides, have exhibited unique characteristics such as excellent electrical conductivity, exceptional mechanical durability, and remarkable electrochemical efficiency. The paper presents a comprehensive analysis of the many techniques used to synthesise Mxene, as well as the methods employed to characterise it. Furthermore, it explores the wide range of applications of Mxene in energy storage devices, including batteries and supercapacitors. The review seeks to provide guidance to the scientific community in fully using the potential of Mxene materials for the development of advanced and environmentally friendly energy storage technologies. This will be achieved by emphasising significant advancements and resolving existing challenges.

Keywords: Mxenes; Energy storage; Supercapacitors; Batteries

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A fuzzy EOP of double deteriorating items with mutually complementary Products of green environmental - price and time dependent demand using TFN with fully backlogging

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ABSTRACT

An inventory model to determine the optimal selling price and cycle time for two mutually complementary commodities with double deterioration. The green environmental demand is influenced by its own selling price over time, the selling price of the complementary product, and the passage of time. Two types of numerical sample examples, crisp and fuzzy, are applied, and the sensitivity analysis results using parametric changes are presented to demonstrate the trending of the inventory model. The sensitivity analysis examines the impacts of the changes in key parameters of the model on the decision variables and the objective function of the inventory system. The triangular fuzzy numbers are applied to get the fuzzy optimal solution. It is observed that as the deterioration rate of either item increases, the model proposes a shorter replenishment cycle length, which reduces the profit. This model's novelty is the inclusion of mutual complementarity in the fuzzy Economic Ordering Plan model, where both items are deteriorating and have price- and time-dependent demands. Finally, both crisp and fuzzy solutions are compared.

Keywords: Deteriorating items; Green environment; Fuzzy Economic Ordering.

Application of Network Energies in Neutrosophic Fuzzy Graphs

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ABSTRACT

In this paper, we discuss the new concept of neutrosophic fuzzy energy in graphs. Wiener energies in a neutrosophic fuzzy graph are defined. Several results related to the fuzzy energy of fuzzy networks are proven. Several upper and lower bounds for the energies of these fuzzy networks are also established in terms of parameters like, the number of nodes, links, minimum and maximum node and link membership, etc. Also, discuss the application of a neutrosophic fuzzy network to energy-based problems.

Emerging i-ZnO/ZnO:Al spin-coated materials deposition for renewable energy and sustainable environment

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ABSTRACT

In a solar cell structure: glass/Mo/CZTS/CdS/i-ZnO/ZnO:Al, zinc oxide-based materials are gaining increasing importance due to their properties and cost-effective processing. In this work, we present the microstructure and optical properties of i-ZnO/ZnO:Al materials prepared using sol-gel route with different precursor sources. X-ray diffraction results showed polycrystalline materials, exhibiting a preferential growth direction along the (002) plane without any detectable purity. A surface with ordered atomic nanograins was observed, and the different types of the as-grown materials have good adhesion to glass subtractes consisting of oxygen and hydrogen elements according to SEM/EDX analysis. From the optical spectra, all films showed high transparency of around 92% to 96% in the visible region. The optical band gap was between 3.29 eV and 3.31 eV. In summury, all the i-ZnO/ZnO:Al spin-coated materials exhibit good microstructure, high transparency, and excellent optical band gapsuch as the adequate direct bulk band gap of zinc oxide (3.37 eV). Therefore, these materials could be resources for optical window materials in renewable energiesfor sustainable environment.

Keywords: Sol-gel, i-ZnO/ZnO:Al, sustainable environment

SVM based Prediction model for Primary Open-Angle Glaucoma with Optic Nerve Vasoconstruction based on Age-Related Degeneration & Environmental Pollution

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ABSTRACT

This research aims to develop a predictive model for primary open-angle glaucoma (POAG) using the Support Vector Machine (SVM) algorithm. The study integrates age-related degeneration, pollution effects on eyes, and vasoconstriction at the optic nerve head. Diverse age groups will be analyzed using clinical records, imaging data, and environmental parameters. SVM will identify patterns and evaluate features such as optic nerve head morphology, intraocular pressure, age, pollution exposure, and vascular reactivity. The proposed model seeks to enhance early POAG detection and provide insights into the association between pollution and glaucoma. Anticipated outcomes include a robust SVM- based prediction model for POAG, facilitating risk assessment and early intervention. This research contributes to ophthalmology and machine learning, enabling personalized glaucoma risk assessment and targeted healthcare interventions.

Keywords: Support Vector Machine, Primary Open Angle Glaucoma, Age related Degeneration, Vasoconstriction, Optic Nerve Head Morphology, Intraocular Pressure, Vascular Reactivity, Environmental Pollution

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Evaluation of Magnetic and Electrical Performance of Copper Oxide Nanoparticles Prepared *viaMyristica Fragrans* (Mace) Extract

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ABSTRACT

The synthesis of metal oxide nanoparticles using natural extract encourages the futuristic design of an environmentally friendly system by getting rid of the dangerous, toxic substances. The food industry in India is paying a lot of attention to *Myristica fragrans*, often known as mace, due to its rich medicinal significance. In the current study, *Myristica fragrans* (Mace) aqueous extract was used to produce copper oxide (CuO) nanoparticles. Phytochemical screening confirms the presence of bioactive substances such as alkaloids, sterols, glycosides, and flavonoids in the extract. XRD and SEM measurements show that the nanoparticles have a monoclinic structure and polyhedral shape. Using the Debye-Scherrer formula, the material's average crystallite size was found to be 85 nm. Based on the Tauc figure, an optical band gap of 2.6 eV was calculated. At room temperature, the material's magnetic properties were investigated using VSM analysis. CuO nanoparticles' antibacterial activity was evaluated at various doses against *Pseudomonas aeruginosa* and *Bacillus cereus*. Moreover, research investigations using cyclic voltammetry were carried out to assess the produced nanoparticles' pseudocapacitive qualities. At a scan rate of 10 mV s^{-1}, the material produced a good specific capacitance of 233.8 F/g.

Keywords : Copper oxide, *Myristica fragrans,* Antibacterial, Electrochemical performance.

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Synthesis of 2D$Ti_3C_2T_X$ MXeneusing HCl+ LiF etchants and Characterization as Multifunctional Energy Materials

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ABSTRACT

We explored the production of two-dimensional Titanium carbide ($Ti_3C_2T_x$), known as MXene, by dissolving Ti_3AlC_2 in hydrochloric acid (HCl) and LiF, at room temperature (26 °C), 40 °C, or 60 °C. The effect of time and temperature on synthesis process were focused on this study. Titanium carbide $Ti_3C_2T_x$ (MXene) was synthesized by using chemical etching method. This synthesis method offers a safer route to produce the MXene as well as the avoidance of handling hazardous concentrated hydrofluoric acid. The phase, crystallinity and grain size were analysed by x-ray diffraction. The average grain size is observed to be 27 nm for the synthesized 2D MXene. A phase analysis shows hexagonal structure of $Ti_3C_2T_x$ MXene. The material is also characterized by Fourier Transform Infrared Spectroscopy (FTIR) which unveiled the chemical bonds between $Ti_3C_2T_x$ MXene, and Raman spectroscopyprovides information about the vibrational and rotational modes of MXene. The microstructural analysis was carried out under scanning electron microscopy (SEM) as well as transmission electron microscopy (TEM) which shows the multilayer structure of MXene. Direct band gap of investigated $Ti_3C_2T_x$ were measured with the help of absorption data obtained from UV-visible photo spectrometer. The direct band gap was found ≈2.01 eV. This study discusses the synthesis and characterization of MXene ($Ti_3C_2T_x$) as well as the relevant application in energy storage system as an electrode material.

Keywords: MXene; Synthesis and Characterization; Energy storage.

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THIN LAYER DRYING CHARACTERISTICS OF ONION (ALLIUM CEPA L.)

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ABSTRACT

The objective of the present study is to investigate the thin layer drying characteristics of onion while considering variables such as air velocity, slice thickness, temperature, and relative humidity. The experimental framework encompassed a range of parameters, including air velocity ranging from 0.5 to 1.5 m/s, slice thickness varying between 3mm to 7mm, temperatures are set within the range of 50°C to 80°C, and relative humidity levels are maintained between 10% to 30%. This analysis sought to comprehend the drying behavior and optimize the conditions required for the process. The results underscored a correlation between the drying rate and considered parameters, indicating an increase in drying rate with elevated air temperature and velocity, while higher relative humidity and thicker slices exhibited a decrease in drying rate. The culmination of these efforts yielded a notable reduction in the final moisture content from an initial 85% to a remarkable 5%. These findings carry substantial significance as they contribute valuable insights for the design and optimization of convective dryers, not only for onion slices but also for similar products in the agricultural and food processing domains.

Keywords: Thin layer drying; Convective dryer; moisture content; Drying kinetics; Onion slice.

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Gas sensing properties of certain doped nanophased Nickel – Zinc ferrites synthesized via hydrothermal route

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ABSTRACT

Spinel ferrites are a kind of magnetic materials having the typical chemical formula AB_2O_4, where A and B are metal cations and O is Oxygen. These materials have a cubic crystal structure and are noted for their versatile properties, which include magnetic, electrical and catalytic capabilities. One of the most recently discovered feature is gas sensing, in which they may be used to identify certain gases based on changes in their electrical properties. The gas sensing response of undoped $N_{0.65}Z_{0.35}F_2O_4$, $N_{0.65}Z_{0.35}Cu_{0.03}F_{1.97}O_4$ and $N_{0.65}Z_{0.35}Co_{0.04}F_{1.96}O_4$ samples synthesized hydrothermally is studied for hydrogen, acetone and ethanol gas atmospheres at various temperatures and concentrations through chemisorption mechanism. It is observed that the acetone gas exhibits a substantially greater response than the hydrogen and ethanol gas atmospheres for all the investigated samples. In an acetone environment, pristine sample (NZF), copper doped sample ($NZCu_{0.03}F$) demonstrated n-type behaviour, whereas, $NZCo_{0.04}F$ sample displayed n-type for < 250℃ and p-type behaviour above 250℃. In the present case, for 100 ppm Acetone concentration, at 325°C temperature, pristine sample (NZF) exhibited a response time of 25.8(s) and a recovery time of 76.9 (s), copper doped Ni-Zn ferrite exhibited a response time of 30.2(s) and a recovery time of 90 (s).

Key words: Gas sensor; Ferrite; hydrothermal synthesis, chemisorption

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Analysis of Performance and Emissions in a 4-Stroke CI Engine Fueled by Waste Plastic Oil Blended with Diesel

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ABSTRACT

Plastics have emerged as indispensable elements in human life, witnessing a relentless surge in industrial applications. This thesis aims to investigate the impact of blends comprising diesel and waste plastic oil on the overall characteristics of an engine. Experimental tests were conducted at a constant speed of 1500 RPM and across four distinct compression ratios to assess engine performance. Brake Specific Fuel Consumption (BSFC) and Brake Thermal Efficiency (BTE) were used to evaluate engine performance, while cylinder pressure and ignition delay (ID) were utilized to analyze engine combustion features. Emission characteristics, specifically NO, smoke, and CO_2, were assessed. The influence of waste plastic oil proportion in regular diesel fuel on BTE and BSFC was notably prominent, especially at higher compression ratios. The integration of Waste Plastic Oil (WPO or PB) resulted in a reduction of CI engine's ignition delay. Additionally, the formation of NO was mitigated, and CO_2 and smoke emissions from PB fuel blends were notably lower, particularly at lower compression ratios. Consequently, the use of PB in a diesel engine demonstrates the potential to enhance overall engine characteristics, albeit with limitations in effectiveness under certain operating conditions.

*Keywords:*Alternative Fuel; Waste plastic oil; Brake thermal efficiency; Brake-specific fuel consumption; hydrocarbon emissions;

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Experimental and Numerical Investigations on Parallel Flow Based Evacuated U-Tube Solar Collector System Integrated with Parabolic Reflector for With and Without the Effect of Particulate Matter

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ABSTRACT

The present study explores the system's performance under extreme hot tropical climatic conditions with and without the presence of particulate matter (PMT). In the experimental analysis, it was observed that under peak solar intensity (1017 W/m2) and an ambient temperature of 42 ℃, the heat transfer fluid (HF) experienced a temperature increase of 11.5 ℃, resulting in an HF heat gain of 1100 W. Moreover, the maximum thermal efficiency achieved in these extreme conditions was approximately 66% with PMT and 61% without PMT. The suspension of PMT on the outer surface of the evacuated tube led to a degradation in HF temperature rise (2 ℃), HF heat gain (200 W), and thermal efficiency (17%). Numerical models were developed to investigate the system's behaviour, focusing on achieving a steady-state condition and evaluating thermal performance throughout the day. The numerical analysis revealed that, during the peak hours of a sunny day, it took nearly 117 seconds to reach a steady state with PMT and 131 seconds without PMT.

Keywords: Experimental study; Evacuated U-tube; Numerical models; Parabolic reflector; Tropical climate; Parallel flow, and Particulate matter.

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Modern applications and current status of green nanotechnology

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Enhancing human welfare and health is the ultimate aim of any scientific advancement. Beyond the conventional therapeutic approaches, new approaches are needed to achieve safe and effective therapeutic outcomes. Additionally, as society moves toward clean and green technology development, new standards for new technologies are needed. A subfield of green technology that makes use of the ideas of green engineering and green chemistry is called green nanotechnology. It uses less material and, when possible, renewable inputs to cut down on fuel and energy consumption. Through the creation of nanomaterials and nanoproducts in phytoformulations, green nanotechnology considerably advances environmental sustainability without endangering human health or the environment. The justification for using plants in nanoparticle formulations is their accessibility and wide range of metabolites, including vitamins, antioxidants, and nucleotides. For example, the controllable size, shape, and surface properties of metal nanoparticles have garnered significant attention. Additionally, a range of metal and metal oxide nanoparticles made from plant extracts have been produced. Important metal oxide nanomaterials that have been produced from various plant extracts include metal oxide nanoparticles. To make laws both domestically and internationally more useful and to foster the commercialization of these nanoscale materials, government and private sector programs, regulations, and policies are being thoroughly examined and updated. Encouragement of the sustainable use of nanoscale products requires government initiatives and thought-provoking debates. We will talk about the potential application of plant extracts in the development of nanotechnology in this paper.

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METAL ORGANIC SYSTEMS AS AGENTS IN TREATING CYTOTOXIC PROBLEMS

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ABSTRACT

Cancer remains to be one of the leading causes of death around the world. Lung cancer (Hepato cellular carcinoma HepG-2) is the fifth most common cancer worldwide. Metal based compound like Cisplatin discovered by Barnett Rosenberg is used in the treatment of cancer, which led to the development of new metal based anticancer drug. Synthesis of new metal based complexes with copper as metal atom and Bipyridyl as biologically active ligand has been reported. The main focus of these studies is to find novel metal complexes which are potential to treat lung cancer diseases.

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EXPERIMENTAL AND COMPUTATIONAL STUDIES OF 2D-ZNO NANOPARTICLES FOR H2 GAS SENSORS

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ABSTRACT

The present study has devoted itself to the synthesis of ZnO nanoparticles using the Coprecipitation method and investigating the physical properties. In this Thesis, the main focusis on the Computational study of the structural and electronic properties of zinc oxide NP usingthe Density Functional Theorem (DFT). The DFT Calculations were performed using ABINIT Software. The formation of the ZnO NPs was confirmed by observing X-ray diffractions. The average crystallite size was calculated to be around 39nm. In addition, the properties of the synthesized ZnO NPs have been investigated with the aid of characterization techniques including Field Emission scanning electron microscopy (FE-SEM), X-ray diffraction (XRD), and Fourier transforms infrared (FTIR), and UV–Vis spectroscopy. Moreover, the obtained results revealed that the prepared ZnO NPs used in Gas Sensing applications.

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Hall And the Heat Source Effects of Flow State on A Vertically Accelerating Plate Experiencing Parabolic Acceleration in an Isothermal Environment Including Chemical Reactions, Rotation, Radiation, and the Dufour Effect with Variable Temperature and Constant Concentration.

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ABSTRACT

This research is centered on the examination of the collective impact of Hall current and radiation-enhanced thermal sources on the laminar flow of a first-order fluid. The fluid under investigation is incompressible, and the analysis pertains to the heat transfer and accumulation dynamics when this fluid flows over a uniformly heated vertical plate, which is in motion at an elevated speed with rotational motion and the inclusion of the Dufour (Df) effect. The researchers applied the Laplace Method to derive solutions for the pertinent mathematical expressions. Subsequent to the investigation, measurable data was obtained by analysing the accelerated flow, taking into account specific parameters such as Prandtl, Schmidt, thermal, and accumulation Grashof values. According to the findings, speed raises with higher values of heat source, Hall current and Grashof parameters, but reduces as radiation levels rises. Temperature similarly raises with a higher heat source and drops with increased radiation levels. Furthermore, with a raise in the chemical reaction rate, the concentration drops.

Keywords: Laplace, Parabolic flow, Rotational flow, Hall Current , Heat Source.

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Performance Investigation and Feasibility Analysis of Novel/Sustainable Wastewater Recovery System Employing Geothermal Energy

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ABSTRACT

In this study, a novel/sustainable wastewater recovery system employing geothermal energy has been proposed. The efficiency of the suggested novel/sustainable system has been modelled using heat transfer. Then, component-wise validation has been carried out with the existing data available in the literature wherever it is applicable and estimated an error of ±8%. The proposed novel/sustainable system's parametric and performance analyses have been carried out employing the developed model. From the parametric analysis, it is observed that hot spring temperature has a significant influence on novel/sustainable systems. Further, through performance investigation, it is understood that low dam/river/sea water temperature as well as enhancing the water condenser effectiveness and flow rate ratio, simultaneously improves the system performance. For different climatic regions of India, explored the feasible geothermal hotspots nearby dam/river/sea water and analysed that among the hot and dry, hot and humid, composite and cold regions, novel/sustainable system best suitable at a composite region with a maximum possible water extraction/freshwater generation rate of 0.22 L/h for the given specifications and operating range. Further, current study can be used as reference for understanding the phenomenon of potential geothermal hotspots for the wastewater recovery.

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Developments in the Synthesis of Fullerene C60 Doped Sm_2O_3@Eu_2O Hybrid Nanocomposites for Enhanced Electrical and Energy Storage Applications

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ABSTRACT

In the present research, we have synthesized Sm_2O_3@Eu_2O_3 nanocomposites (NCs) and anchored them on the surface of Fullerene C60 (2 wt%, 5 wt% and 10 wt %) by simple chemical precipitation procedure. The as-synthesized hybrid NCs characterized byXRD (X-ray diffraction), SEM (scanning electron microscopy), EDX (energy dispersive X-ray), UV-visible, XPS (X-ray photoelectron spectroscopy) to investigate crystal structure, morphology, optical and valence state of the elements. Mixed phase of monoclinic and cubic crystal structure was observed with irregular plate like morphology detected when decorated with Fullerene C60. The average crystallite size decreases from 30 nm to 25 nm as Fullerene C60 concentration increases. Redshift in optical and decrease in direct optical gap appeared with increase in Fullerene C60 content on Sm_2O_3@Eu_2O_3 NCs. As the next step electrochemical supercapacitive behaviour of the as-synthesized Sm_2O_3@Eu_2O_3 and Fullerene C60:Sm_2O_3@Eu_2O_3 NCs when used as electrode material investigated through cyclic voltammetry (CV), Galvanostatic charge discharge cycles (GCD), electrochemical impedance spectroscopy (EIS). The as synthesized Fullerene C60:Sm_2O_3@Eu_2O_3 NCs with high cycle stability and charge density can be a better candidate for high energy storage devices, supercapacitor applications.

Keywords: Nanocomposites, Fullerene C60:Sm_2O_3@Eu_2O_3, Supercapacitor, Cyclic Voltammetry, Galvanostatic Charge-Discharge, Optical.

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PERFORMANCE OF LINEAR AND STRETCHED CYLINDRICAL TROUGH SOLAR COLLECTORFOR LOW PRESSURE STEAM GENERATION

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ABSTRACT

An attempt has been made to compare the performance of five cylindrical trough collector (length 4m) connected in series (linear arrangement) and parallel (stretched arrangement) for the purpose of hot water and steam production. The proposed systems have experimented for both linear and stretched mode with water as heat transfer fluid. The aluminum receiver has been used for the study. In both the modes, thermal efficiency has been evaluated from experimental observations and it has been found that the daily average efficiency of 30.08% for stretched mode and 40.05% for linear mode respectively.

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Computational and Experimental Analyses on Three Fluid Operated Novel Hollow Fiber Membrane based Liquid Desiccant Dehumidifier

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ABSTRACT

In the present study, a three-fluid-operated novel hollow fiber membrane-based liquid desiccant dehumidifier has been designed and developed. A 2D numerical model based on the finite element method (FEM) based model to assess the energy and mass transfer capabilities for air conditioning/drying applications. A multi-component design analysis technique is considered for the temperature, flow, and energy/mass transfer across the membrane column using finite element method (FEM) by varying the design parameters such as length, diameter of shell, water jacket, membrane porosity, thickness for developing the novel dehumidifier and the absorption kinetics/characteristics is assessed to fabricate dehumidifier module. Further, the experiments are conducted on a laboratory scale to analyse the performance. The liquid desiccant and hydrophobic membrane used in the present study are Lithium chloride (LiCl) and Polyvinylidene fluoride (PVDF). The performance parameters considered for the present investigation are vapor absorption rate, energy exchange along the membrane column, thermal and moisture effectiveness respectively. A parametric study has been conducted by varying the inlet like air temperature and concentration, liquid desiccant concentration, cold water inlet temperature, cold water flow rate, length-to-diameter ratio for the given operating and inlet conditions, the maximum possible vapor absorption rate, energy exchange along the membrane column (Kw/m^2), thermal, moisture and air water energy effectiveness are observed to be 156 g/hr, 3.4 kW/m^2, 2.4 kW/m^2 0.78, 0.80 and 0.66 respectively. The obtained results conclude that the designed novel dehumidifier can be efficiently utilized for air conditioning/drying applications.

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AI enabled autonomous smart dustbin

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ABSTRACT

Improper indoor waste collection which leads to unhygienic conditions and hence proper disposal of indoor waste is essential for a cleaner, greener environment. This work proposes an autonomous smart dust bin system for indoor environment which comprises of automatic waste sorting, collecting cart and autonomous disposal system. Transformer based object detection framework was trained with trash image dataset to automatically detect and classify garbage class into wet waste, dry waste, sanitary waste and e-waste. Then, autonomous mobile robot base was developed to automatically dispose the trash into waste disposal unit. The efficiency of the proposed framework was evaluated through offline and real-time test cases using standard performance matrix. The experimental results show that the trained transformer-based object detection model scored 92% accuracy for automatically recognize the trash classes. Further, autonomous trash disposal mechanism was validated with different indoor environment and prove that our system can able to dispose the trash into given target place successfully.

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Effect of Bound Magnetic Polaron in various Organic Functionalized Ni doped ZnO Thin films for Storage Application

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ABSTRACT

Dilute magnetic semiconductors are one of the most prominent classes of materials in spintronics with certain interesting properties like magnetic, magneto-optical, and magneto-electronic, due to the combined effect of magnetic and semiconducting behavior memory device applications. Ni doped ZnO thin films are considered to be promising material due to its ferromagnetic behavior due to BMP. The ferromagnetism in Ni doped ZnO thinfilm can be enhanced by altering the electronic configuration of ZnO by surface functionalization/capping with organic molecules. Here, we present various organic ligand (Thiol, Amine, TOPO) functionalized Ni (5 mol %) doped ZnO thinfilms grown by RF magnetron sputtering. The heaxagonal wurtzite structure was confirmed by XRD analysis. The grain size was found to decrease from 44.35 to 27.21 at 5% doping concentration of Ni doped ZnO thin films. Oxygen vacancies may be the reason for generation for negative carrier, this is confirmed from the PL emission. The PL emission intensity at 2.8 eV reveals the presence of Oxygen vacancies which in Ni doped ZnO which in turn originates the ferromagnetism. The magnetic saturation of Ni doped ZnO thin films measured as 5.70emu/cm^3 to 9.78 emu/cm^3 and enhanced to 8.01emu/cm^3 to 13.03 emu/cm^3 for TOP functionalized thin films. This clearly shows the enhancement of ferromagnetism in due to functionalization. The Zn-P, Zn-N, Zn-S bond observed in the XPS spectrum reveals the formation of surface layer between Zn and P atom which could be the reason for the activated ferromagnetism.

Keywords: organic functionalization, ferromagnetism, Tm doped ZnO, BMP,

ICAFMSA 2023 – 164

High Temperature Structural and Optical studies of pyridine based nonlinear optical materials

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[a]Department of Electronics, VIT, Tamil Nadu, India

ABSTRACT

The organic nonlinear optical single crystals of 2-amino-6-methylpyridinium 4-hydroxybenzoate (2A6MP4HB) and 2-amino-5-methylpyridinium-4-aminobenzoate (2A5ClP4AB) were grown from methanol solvent using isothermal solvent evaporation technique. The 2A6MP4HB and 2A5ClP4AB have crystallized in monoclinic system with centrosymmetric space group $P2_1/c$ and $P2_1/c$ respectively. The phases of both the components have been analyzed using powder X-ray diffraction at higher temperatures. The high temperature Raman Spectroscopic studies evidence the molecular structural changes of the title components. The optical properties of 2A6MP4HB and 2A5ClP4AB at high temperature have been analyzed using Photoluminescence studies. All these studies have been performed for the first time and aimed to explore the useful and safe region of thermal and optical properties to enhance its usefulness for device fabrications.

Keywords: Crystal growth; XRD, Raman Spectroscopy, Photoluminescence, Molecular Structure

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ICAFMSA 2023 – 165

Investigation of the electrochemical performance of α-manganese oxide nanoparticles as electrode material for supercapacitors

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ABSTRACT

A growing number of supercapacitors are being developed using transition metal oxide nanoparticles as electrode materials. A hydrothermal method followed by an annealing step was used to prepare α-manganese oxide nanoparticles. A powder X-ray diffractometer (XRD), Raman spectroscopy, scanning electron microscopy (SEM) with energy dispersive X-ray analysis, Fourier transform infrared spectroscopy (FTIR), and UV-Visible spectroscopy were used to study the structure, surface morphology, function groups, and optical band gap. A study of the electrochemical performance of electrode materials was conducted using Cyclic Voltammetry (CV), galvanostatic charge-discharge (GCD), and electrochemical impedance spectroscopy (EIS). A XRD spectrum confirmed well crystalline α-manganese oxide nanoparticles with tetragonal structure. Active vibrational modes and distortions were observed by Raman spectra in the crystals. Observations from SEM images indicate that the addition of surfactants produces mesoporous with networked structure particles with large surfaces that result in high specific capacitance. Extrapolation of Tauc's absorption relation was used to calculate the optical band gap. Fingerprint peaks of metal oxide nanoparticles demonstrated the presence of nanostructured metal oxides without impurities. The specific capacitance of the supercapacitor shows better electrochemical reversibility and cycle life. These impressive results conclude that transition metal oxide nanoparticles are an efficient electrode material for supercapacitor energy storage applications.

Keywords: supercapacitor, electrode, hydrothermal, annealing, electrochemical, specific capacitance


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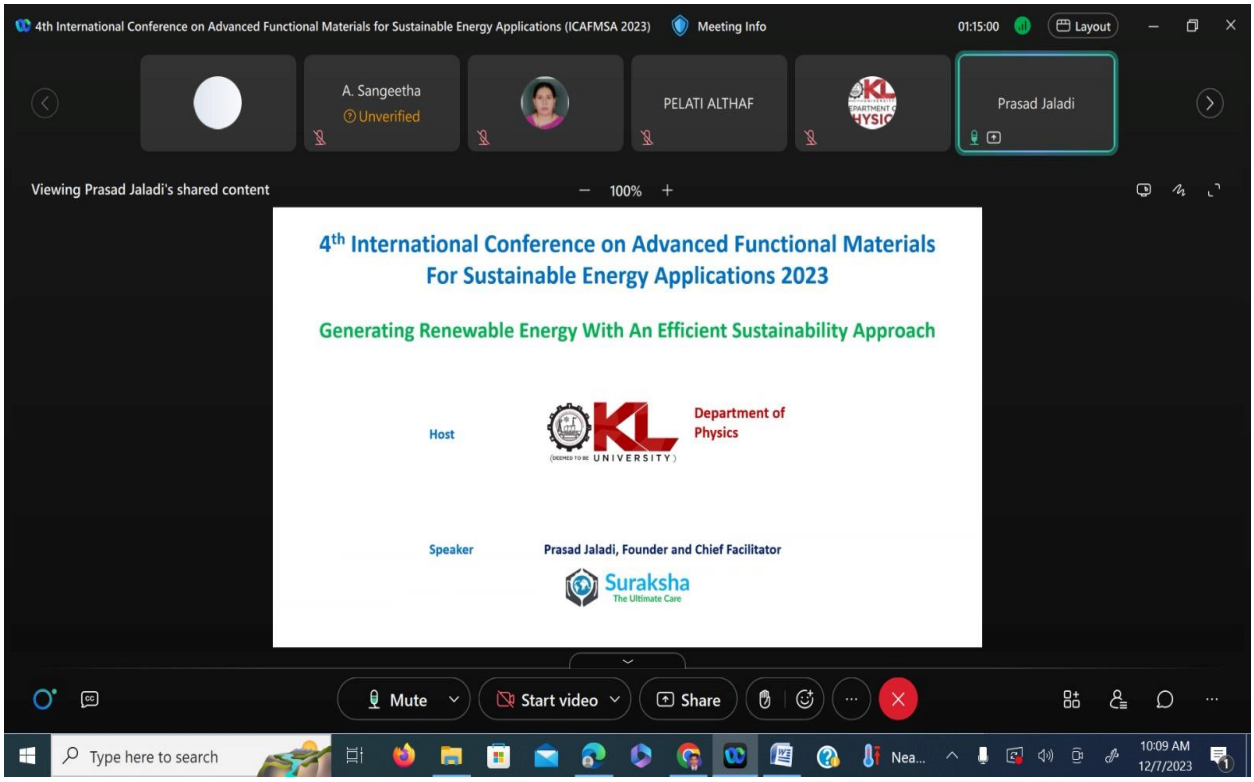
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Battery Vs Fuel Cell Technologies For EV Application: SWOT Assessment
Arunkumar Jayakumar,
Assoc. Professor,
Arunkumar.h2@gmail.com
ICAFMSA-2023
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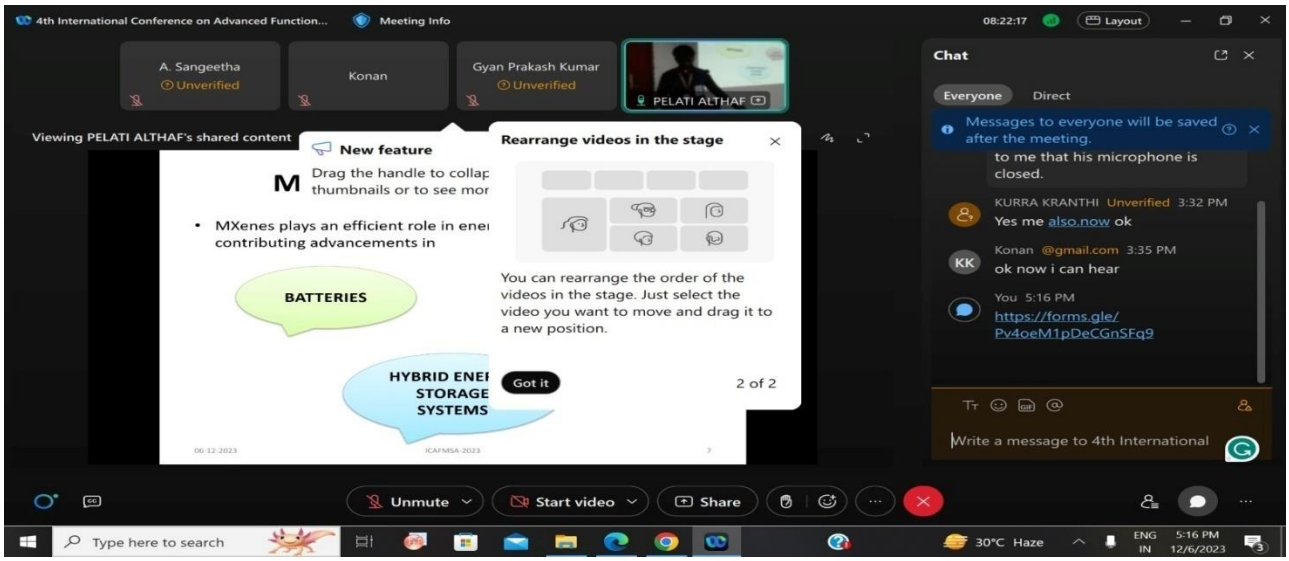
MOTIVATION
"Water, water everywhere, nor a drop to drink?"
Salt Water 97%
Polar Icecaps 2%
Available Fresh Water 1%
India on brink of worst-ever water crisis
FIG: INDIA – Water Demand and Supply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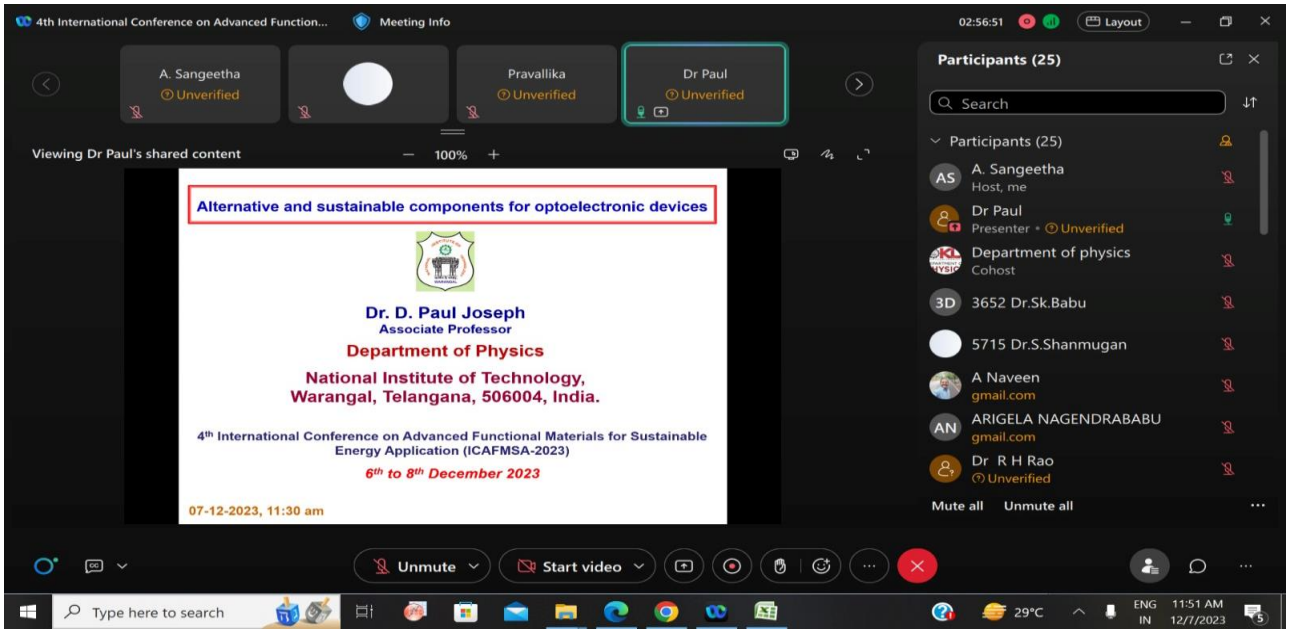
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Pravallika
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Dr Paul
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Alternative and sustainable components for optoelectronic devices
Dr. D. Paul Joseph
Associate Professor
Department of Physics
National Institute of Technology,
Warangal, Telangana, 506004, India.
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6th to 8th December 2023
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5715 Dr.S.Shanmugan
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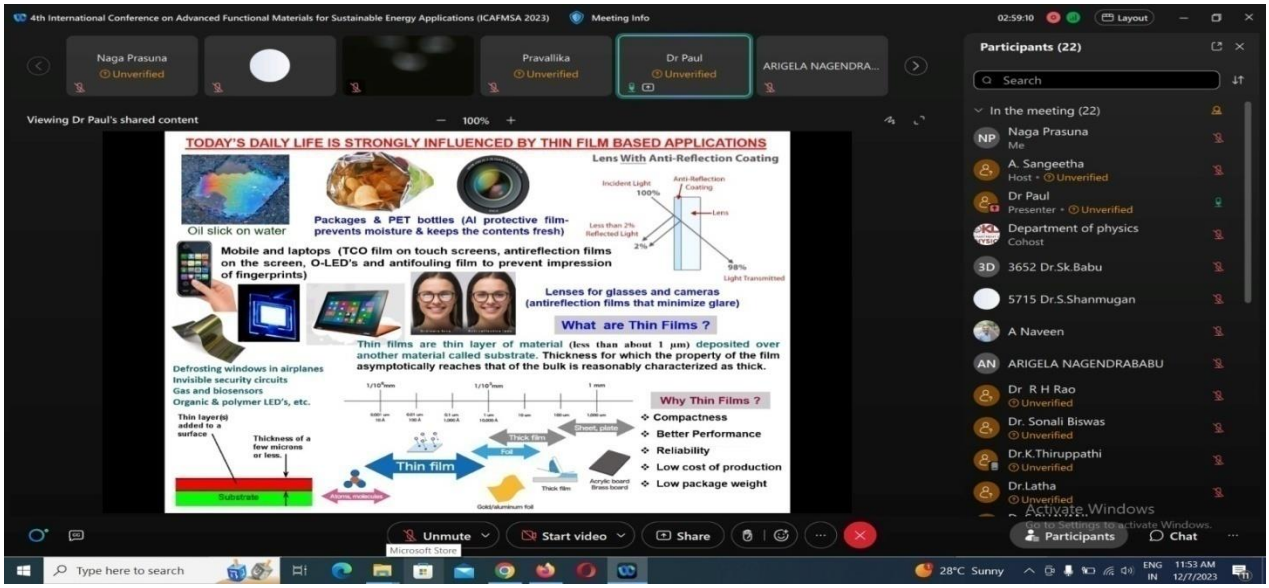
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Dr Paul
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TODAY'S DAILY LIFE IS STRONGLY INFLUENCED BY THIN FILM BASED APPLICATIONS
Oil slick on water
Packages & PET bottles (Al protective film- prevents moisture & keeps the contents fresh)
Lens With Anti-Reflection Coating
Mobile and laptops (TCO film on touch screens, antireflection films on the screen, O-LED's and antifouling film to prevent impression of fingerprints)
Lenses for glasses and cameras (antireflection films that minimize glare)
What are Thin Films ?
Thin films are thin layer of material (less than about 1 μm) deposited over another material called substrate. Thickness for which the property of the film asymptotically reaches that of the bulk is reasonably characterized as thick.
Defrosting windows in airplanes
Invisible security circuits
Gas and biosensors
Organic & polymer LED's, etc.
Thin layer(s) added to a surface
Thickness of a few microns or less.
Substrate
Thin film
Why Thin Films ?
Compactness
Better Performance
Reliability
Low cost of production
Low package weight
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Phosphors for the Identification of Invisible Fingerprints for Forensic Applications
by
Prof D HARANATH
Department of Physics
National Institute of Technology Warangal
Hanumakonda-506004, Telangana, INDIA
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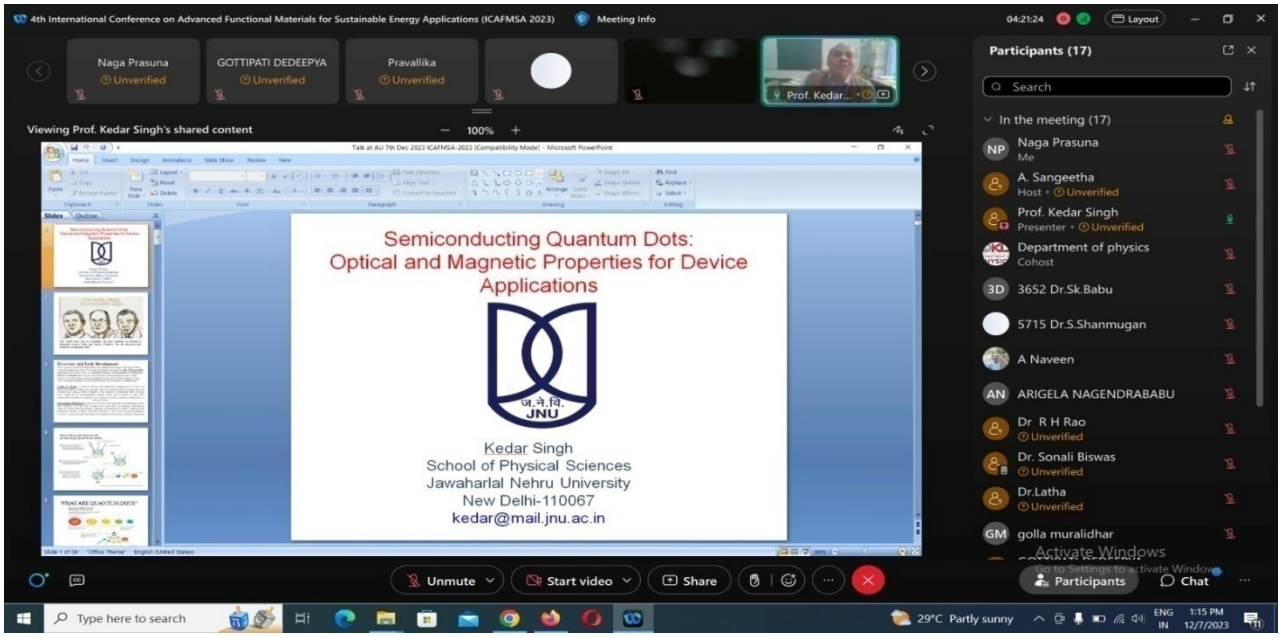
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Semiconducting Quantum Dots:
Optical and Magnetic Properties for Device Applications
Kedar Singh
School of Physical Sciences
Jawaharlal Nehru University
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kedar@mail.jnu.ac.in
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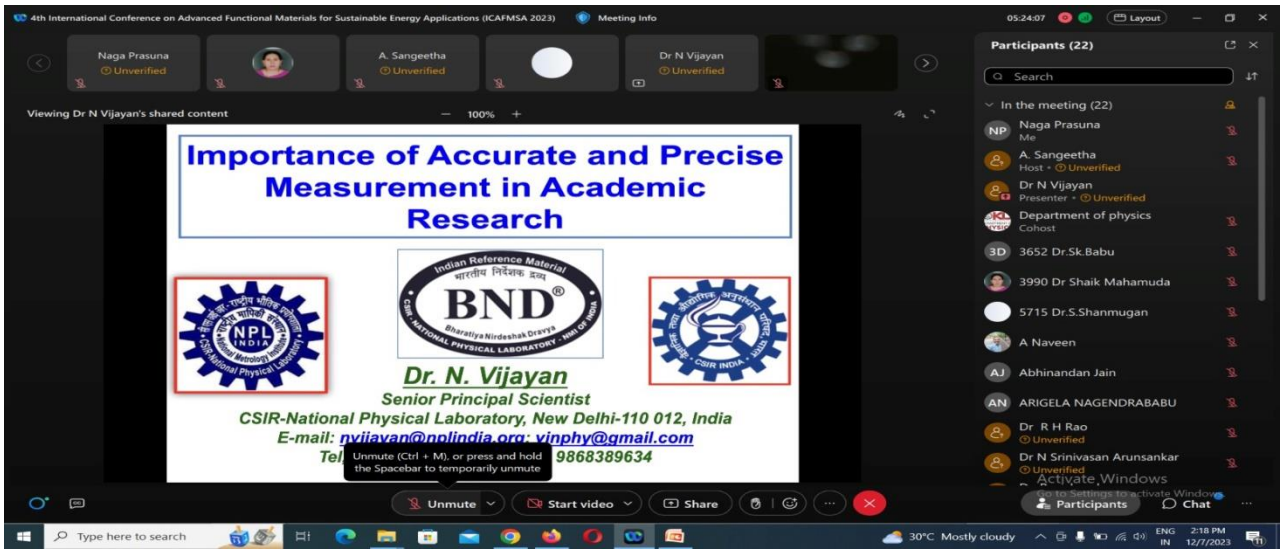
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Dr. N. Vijayan
Senior Principal Scientist
CSIR-National Physical Laboratory, New Delhi-110 012, India
E-mail: nvijayan@nplindia.org; vinphy@gmail.com
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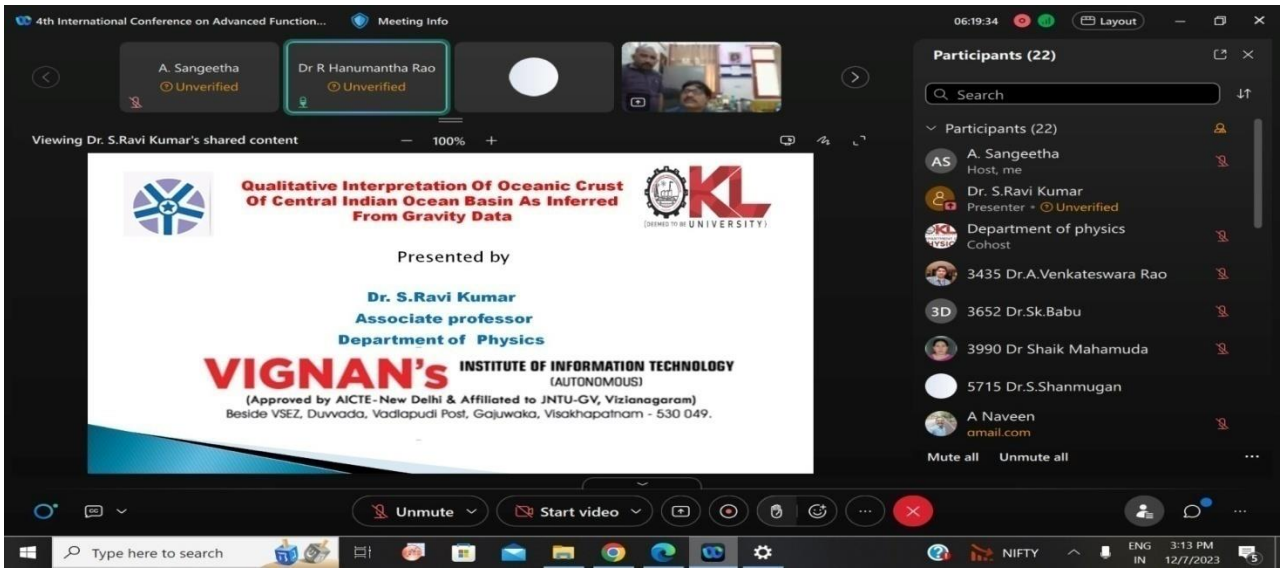
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Presented by
Dr. S.Ravi Kumar
Associate professor
Department of Physics
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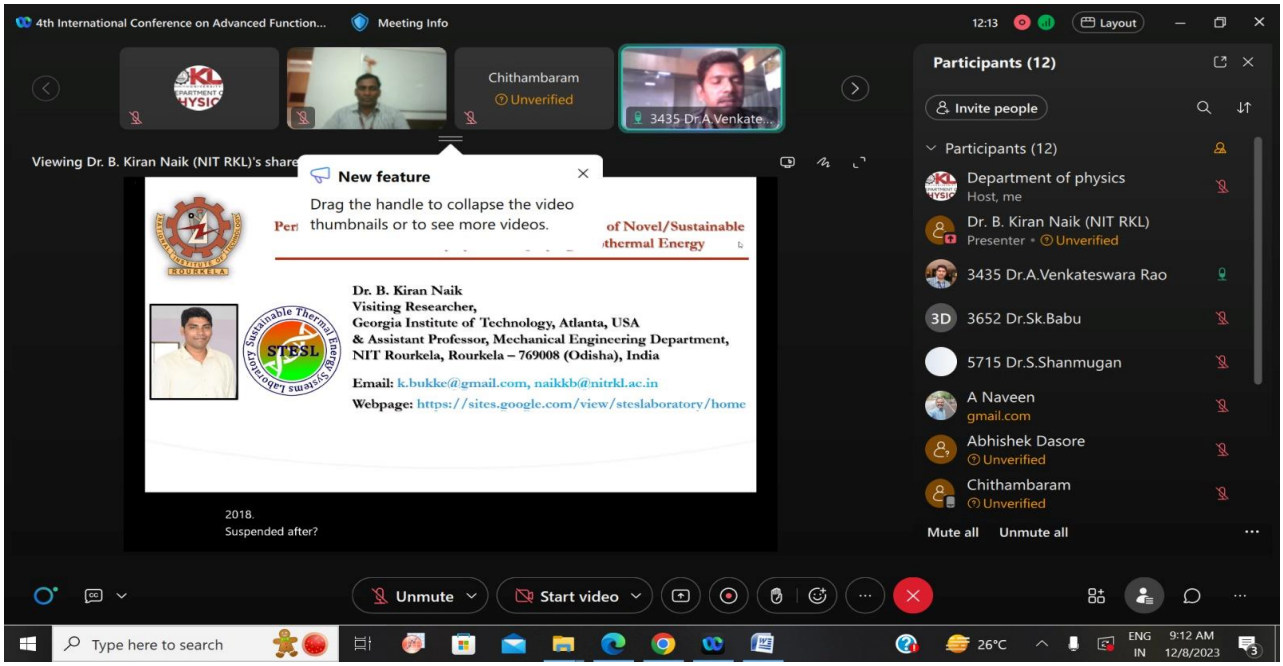

ఆంధ్రప్రభ

విద్యుత్ నిల్వలో భౌతిక శాస్త్ర సహకారమెంతో అవసరం

కేఎల్‌యూ మూడు రోజుల అంతర్జాతీయ సదస్సు ప్రారంభంలో వక్తలు

తాడేపల్లి, డిసెంబర్ 07(ప్రభ న్యూస్) : విద్యుత్ నిల్వ చేయడంలో భౌతిక శాస్త్ర సహకారం ఎంతో అవసరమని కెఎల్ డీమ్డ్ యూనివర్శిటీ ప్రో చాన్సలర్ డాక్టర్ కెఎస్.జగన్నాథరావు అన్నారు. వర్శిటీలోని భౌతిక శాస్త్ర విభాగం అద్వర్యంలో ప్రారంభమయిన 4వ అంతర్జాతీయ సదస్సుకు ముఖ్య వక్తగా హాజరయి ఆయన ప్రసంగించారు. మూడు రోజుల పాటు జరుగుతున్న ఈ అంతర్జాతీయ సదస్సుకు పలు దేశాల నుండి వక్తలు పాల్గొని విద్యార్థులకు దిశ నిర్దేశం చేస్తున్నారని భౌతికశాస్త్ర విభాగాధిపతి డాక్టర్ కె.స్వప్న తెలిపారు. ప్రో చాన్సలర్ డాక్టర్ కెఎస్.జగన్నాథరావు మాట్లాడుతూ ప్రపంచం ఎదుర్కొంటున్న విద్యుత్ సవాళ్లను పరిష్కరించడంలో అధునాతన ఫంక్షనల్ మెటీరియల్స్ యొక్క కీలక పాత్రపై సమావేశం కేంద్రీకృతమై ఉందన్నారు.సదస్సు కన్వీనర్ డాక్టర్ ఎస్.షణ్ముగన్ మాట్లాడుతూ భవిష్యత్తు తరాలకు విద్యుత్ కొరత అనేది లేకుండా చేయాలంటే ఇప్పటి నుండే స్థిరమైన విద్యుత్ వనరులను ఏర్పాటు దిశగా పరిశోధనలు జరగాలని ఆయన సూచించారు. సుస్థిర ఇంధన వనరుల ప్రాముఖ్యత మరియు సౌర ఘటాల వంటి మెటీరియల్ తయారీపై కీలక ఉపన్యాసాన్ని సమర్పించారు. జాతీయ, అంతర్జాతీయ స్థాయిలో మొత్తం 24 మంది రిసోర్స్ పర్సన్లు పరిశోధకులు, విద్యార్థులనుద్దేశించి ప్రసంగించారు. వర్శిటీ వైస్ చాన్సలర్ డాక్టర్ జి.పార్థసారదివర్మ, ప్రో వైస్ ఛాన్సలర్లు డాక్టర్ ఎవిఎస్.ప్రసాద్, డాక్టర్. ఎన్. వెంకట్రామ్, రిజిస్ట్రార్, డాక్టర్ కె. సుబ్బారావు, ఎఫ్ఇడి డైరెక్టర్ డాక్టర్ ఎ.జగదీష్, ఎం.హెచ్ఎస్ డీన్ డాక్టర్ ఎం.కిషోర్ బాబు, పరిశోధన, అభివృద్ధి డీన్ డాక్టర్ బి.జయకుమార్ సింగ్,సైన్స్ కళాశాల ప్రిన్సిపాల్ ప్రొఫెసర్ కె. సుబ్రహ్మణ్యం, ఎఫ్ఇడి కోఆర్డినేటర్ ప్రొఫెసర్ శివగంగా ప్రసాద్, సెంటర్ ఫర్ సోలార్ ఎనర్జీ హైదరాబాద్ నుండి ప్రొఫెసర్ ఈశ్వరమూర్తి రామసామి, భౌతిక శాస్త్ర విభాగ అధ్యాపకులు, పరిశోధనా విద్యార్థులు పాల్గొనారు.


సదస్సు ప్రారంభిస్తున్న ప్రో ఛాన్సలర్ జగన్నాథరావు

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Source : http://epaper.prabhanews.com/

స్థిరమైన విద్యుత్తు వనరులను ఏర్పాటు దిశగా పరిశోధనలు అవసరం

కెఎల్‌యూ మూడు రోజుల అంతర్జాతీయ సదస్సు ప్రారంభంలో వక్తలు

పద్దేశ్వరం, సెల్‌ఐటీ న్యూస్:- విద్యుత్తును నిల్వ చేయడంలో భౌతిక శాస్త్ర సహకారం ఎంతో అవసరమని కెఎల్ డీమ్డ్ యూనివర్సిటీ ప్రో చాన్సలర్ డాక్టర్ కెఎన్ జగన్నాథరావు అన్నారు. వర్సిటీలోని భౌతిక శాస్త్ర విభాగం ఆధ్వర్యంలో గురువారం ప్రారంభమైన 4వ అంతర్జాతీయ సదస్సుకు ముఖ్య వక్తగా హాజరైన ఆయన ప్రసంగించారు. మూడు రోజుల పాటు జరుగనున్న ఈ అంతర్జాతీయ సదస్సుకు పలు దేశాల నుండి వక్తలు పాల్గొని విద్యార్థులకు దిశ నిర్దేశం చేస్తున్నారని భౌతిక శాస్త్ర విభాగాధిపతి డాక్టర్ కె.స్వప్న తెలిపారు. ఈ సందర్భంగా ప్రో చాన్సలర్ డాక్టర్ కెఎన్.జగన్నాథరావు మాట్లాడుతూ, ప్రపంచం ఎదుర్కొంటున్న విద్యుత్ సవాళ్లను పరిష్కరించడంలో అధునాతన ఫంక్షనల్ మెటీరియల్స్ యొక్క కీలక పాత్రపై సమావేశం కేంద్రీకృతమై ఉందన్నారు. స్థిరమైన ఇంధన ఉత్పత్తి, నిల్వ, పరిరక్షణ, సాంకేతిక పురోగతిని సాధించడానికి అంతర్జాతీయ స్థాయిలో శాస్త్రవేత్తలు పరిశోధనలు చేస్తున్నట్లు తెలిపారు. తమ వర్సిటీలో ఇప్పటికే దీనిపైన పలు రకాల పరిశోధనలు జరిపినట్లు పేర్కొన్నారు. పర్యావరణ, సామాజిక-ఆర్థిక సుస్థిరతపై దృష్టి సారిస్తూ పెరుగుతున్న ఇంధన డిమాండ్లను తీర్చడానికి వినూత్న పదార్థాల అవసరాన్ని ఆయన వివరించారు. 4వ అంతర్జాతీయ సదస్సు స్థిరమైన ఇంధన పరిష్కారాల కోసం అన్వేషణలో ఒక మైలురాయిని చేరుకుందన్నారు. దానున్న రోజుల్లో ప్రపంచవ్యాప్తంగా ఉన్న రిసోర్స్ పర్సన్లు, ఆన్‌లైన్ ద్వారా పాల్గొనేవారు పెద్ద సంఖ్యలో ఉంటారని అన్నారు. సదస్సు కన్వీనర్ డాక్టర్ ఎస్.షణ్ముగణ్ మాట్లాడుతూ భవిష్యత్తు తరాలకు విద్యుత్ కొరత అనేది లేకుండా చేయాలంటే ఇప్పటి నుండే స్థిరమైన విద్యుత్ వనరులను ఏర్పాటు దిశగా పరిశోధనలు జరగాలని ఆయన సూచించారు. మొగ్గు నిక్షేపాల పైన అధారిత విద్యుత్ కాకుండా స్థిరంగా విద్యుత్తును అందించడంతో పాటు స్థిరంగా నిల్వ చేయగల వనరులను భవిష్యత్ తరాలకు అందించాలన్నారు. సస్టైనబుల్ ఎనర్జీ అప్లికేషన్స్ కోసం అడ్వాన్స్ డ్ ఫంక్షనల్ మెటీరియల్స్ పైన విస్తృత స్థాయిలో చర్చించడంతో పాటు సస్టైనబుల్ ఎనర్జీలో అవిష్కరణలను ప్రోత్సహించడం కోసం 4వ అంతర్జాతీయ సదస్సును కెఎల్‌యులో ప్రారంభోత్సవం చేసినట్లు పేర్కొన్నారు. సుస్థిర ఇంధన వనరుల ప్రాముఖ్యత మరియు సౌర ఘటాల వంటి మెటీరియల్ తయారీపై కీలక ఉపన్యాసాన్ని సమర్పించారు. జాతీయ మరియు అంతర్జాతీయ స్థాయిలో మొత్తం 24 మంది రిసోర్స్ పర్సన్‌లు పరిశోధకులు, విద్యార్థులనుద్దేశించి ప్రసంగించారు. కార్యక్రమంలో వర్సిటీ వైస్ చాన్సలర్ డాక్టర్ జి.పార్థసారథివర్మ, ప్రో వైస్ ఛాన్సలర్లు డాక్టర్ ఎవిఎస్ ప్రసాద్, డాక్టర్. ఎన్.వెంకట్రామ్, రిజిస్ట్రార్, డాక్టర్ కె.సుబ్బారావు, ఎఫ్ఇడి డైరెక్టర్ డాక్టర్ ఎ.జగదీష్, ఎంహెచ్ఎస్ డీన్ డాక్టర్ ఎం.కిషోర్ బాబు, పరిశోధన మరియు అభివృద్ధి డీన్ డాక్టర్ వి.జయకుమార్ సింగ్, సైన్స్ కళాశాల ప్రిన్సిపాల్ ప్రొఫెసర్ కె.సుబ్రహ్మణ్యం, ఎఫ్ఇడి కోఆర్డినేటర్ ప్రొఫెసర్ శివగంగా ప్రసాద్, సెంటర్ ఫర్ సోలార్ ఎనర్జీ హైదరాబాద్ నుండి ప్రొఫెసర్ ఈశ్వరమూర్తి రామస్వామి, భౌతిక శాస్త్ర విభాగ అధ్యాపకులు, పరిశోధనా విద్యార్థులు పాల్గొనారు.

December 08, 2023 | Guntur

కేఎల్‌యూలో అంతర్జాతీయ సదస్సు ప్రారంభం

అంతర్జాతీయ సదస్సును ప్రారంభిస్తున్న ప్రో చాన్స్‌లర్ జగన్నాధరావు

తాడేపల్లి, డిసెంబరు 7: తాడేపల్లి మండలం వడ్డేశ్వరంలోని కేఎల్ యూనివర్సిటీ భౌతికశాస్త్ర విభాగం ఆధ్వర్యంలో మూడు రోజులపాటు జరగనున్న అంతర్జాతీయ సదస్సును వర్సిటీ ప్రో చాన్స్‌లర్ కేఎస్ జగన్నాధరావు జ్యోతి ప్రజ్వలన చేసి ప్రారంభించారు. ఈ సందర్భంగా ఆయన మాట్లాడుతూ విద్యుత్‌ను నిల్వ చేయడంలో భౌతికశాస్త్ర సహకారం ఎంతో అవసరమన్నారు. సదస్సుకు పలు దేశాల నుంచి వక్తలు పాల్గొని విద్యార్థులకు దిశ నిర్దేశం చేస్తున్నారన్నారు. ఈ అంతర్జాతీయ సదస్సు స్థిరమైన ఇంధన పరిష్కారాల కోసం అన్వేషణలో ఒక మైలురాయిని చేరుకుందన్నారు. ప్రపంచం ఎదుర్కొంటున్న విద్యుత్ సవాళ్లను పరిష్కరించడంలో అధునాతన ఫంక్షనల్ మెటీరియల్స్ కీలకపాత్రపై సమావేశం కేంద్రీకృతమై ఉందన్నారు. ఈ కార్యక్రమంలో భౌతికశాస్త్ర విభాగాధిపతి కె.స్వప్న, సదస్సు కన్వీనర్ ఎస్ షణ్ముగం, ప్రో వీసీలు ప్రసాద్, వెంకటరామ్, వీసీ సారథివర్మ, రిజిస్ట్రార్ సుబ్బారావు, సైన్స్ కళాశాల ప్రిన్సిపాల్ ప్రొఫెసర్ కె.సుబ్రహ్మణ్యం, ఎఫ్‌ఈడీ కోఆర్డినేటర్ ప్రొఫెసర్ శివలింగప్రసాద్, సెంటర్ ఫర్ సోలార్ ఎనర్జీ హైదరాబాద్ ప్రొఫెసర్ ఈశ్వర్‌మూర్తి పాల్గొన్నారు.

సాక్షి

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క్లుప్తంగా

కేఎల్‌యూలో అంతర్జాతీయ సదస్సు ప్రారంభం

తాడేపల్లిరూరల్: తాడేపల్లి రూరల్ పరిధిలోని వడ్డేశ్వరం కేఎల్ యూనివర్సిటీలో మూడు రోజుల పాటు జరగనున్న అంతర్జాతీయ సదస్సు గురువారం ప్రారంభించారు. ప్రో.చాన్స్‌లర్ డాక్టర్ కేఎస్ జగన్నాథరావు, ప్రిన్సిపాల్ డాక్టర్ కె.సుబ్రహ్మణ్యం, విభాగాధిపతి డాక్టర్ కె.స్వప్న జ్యోతి ప్రజ్వలన చేసిన కార్యక్రమాన్ని ప్రారంభించారు. ఈ సందర్భంగా ప్రో.చాన్స్ లర్ డాక్టర్ కేఎస్ జగన్నాథరావు మాట్లాడుతూ విద్యుత్ నిల్వ చేయడంలో భౌతిక శాస్త్ర సహకారం ఎంతో అవసరమని అన్నారు. ప్రపంచం ఎదుర్కొంటున్న విద్యుత్ సవాళ్లను పరిష్కరించడంలో అధునాతన ఫంక్షనల్ మెటీరియల్స్ కీలకపాత్రపై సమావేశం కేంద్రీకృతమై ఉందన్నారు. స్థిరమైన ఇంధన ఉత్పత్తి, నిల్వ, పరిరక్షణ, సాంకేతిక పురోగతిని సాధించడానికి అంతర్జాతీయస్థాయిలో శాస్త్రవేత్తలు పరిశోధనలు చేస్తున్నారని వివరించారు. సదస్సు కన్వీనర్ డాక్టర్ ఎస్.షణ్ముగన్ మాట్లాడుతూ భవిష్యత్తు తరాలకు విద్యుత్ కొరత అనేది లేకుండా చేయాలంటే ఇప్పటి నుంచే స్థిరమైన విద్యుత్ వనరులను ఏర్పాటు చేసేదిశగా పరిశోధనలు జరగాలని అన్నారు. జాతీయ, అంతర్జాతీయ స్థాయిలో మొత్తం 24 మంది రిసోర్స్ పర్సన్‌లు, పరిశోధకులు, విద్యార్థులను ఉద్దేశించి ప్రసంగించారు. ఈ కార్యక్రమంలో వర్సిటీ వైస్ చాన్స్‌లర్ డాక్టర్ జి.పార్థసారధి వర్మ, ప్రో.వైస్ చాన్స్‌లర్లు డాక్టర్ వీవీఎస్ ప్రసాద్, డాక్టర్ ఎన్.వెంకటరామ్, రిజిస్ట్రార్ డాక్టర్ కె.సుబ్బారావు, ఎఫ్‌ఈడీ డైరెక్టర్ డాక్టర్ ఎ.జగదీష్, ఎంహెచ్ఎస్ డీన్ డాక్టర్ ఎం.కిషోర్‌బాబు, పరిశోధన, అభివృద్ధి డీన్ డాక్టర్ బి. జయకుమార్ సింగ్, సైన్స్ కళాశాల ప్రిన్సిపాల్ ప్రొఫెసర్ కె.సుబ్రహ్మణ్యం, ఎఫ్‌ఈడీ కో-ఆర్డినేటర్ ప్రొఫెసర్ శివగంగా ప్రసాద్, సెంటర్ ఫర్ సోలార్ ఎనర్జీ హైదరాబాద్ నుంచి ప్రొఫెసర్ ఈశ్వర మూర్తి రామస్వామి, తదితరులు పాల్గొన్నారు.

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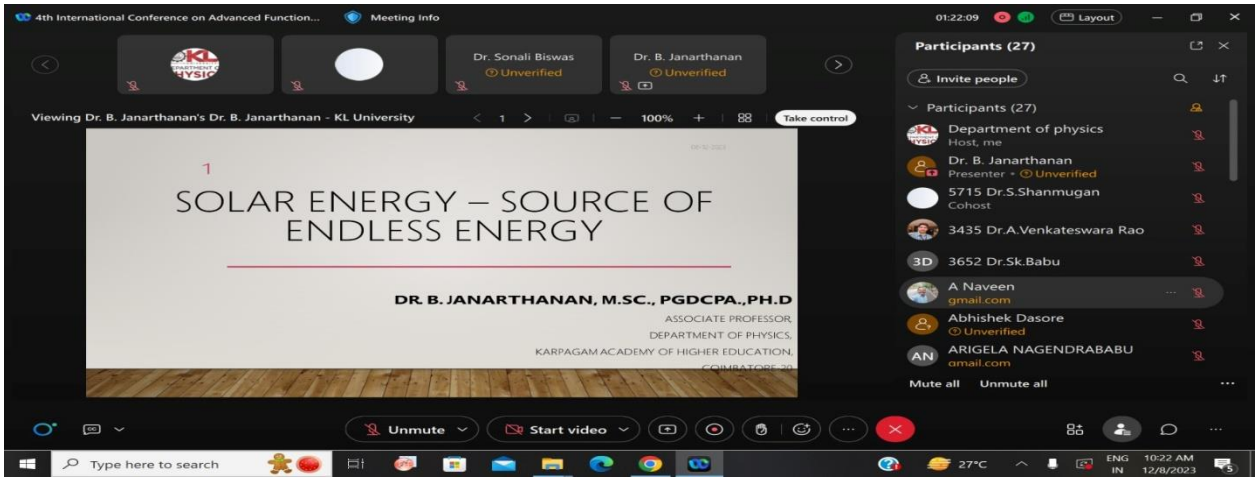
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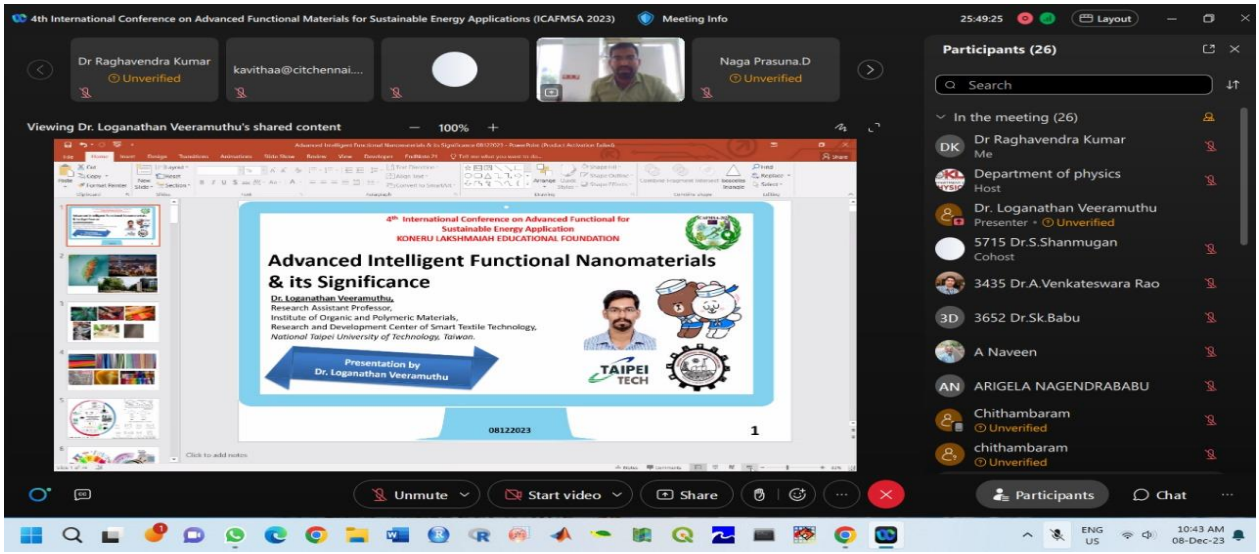
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Research and Development Center of Smart Textile Technology,
National Taipei University of Technology, Taiwan.
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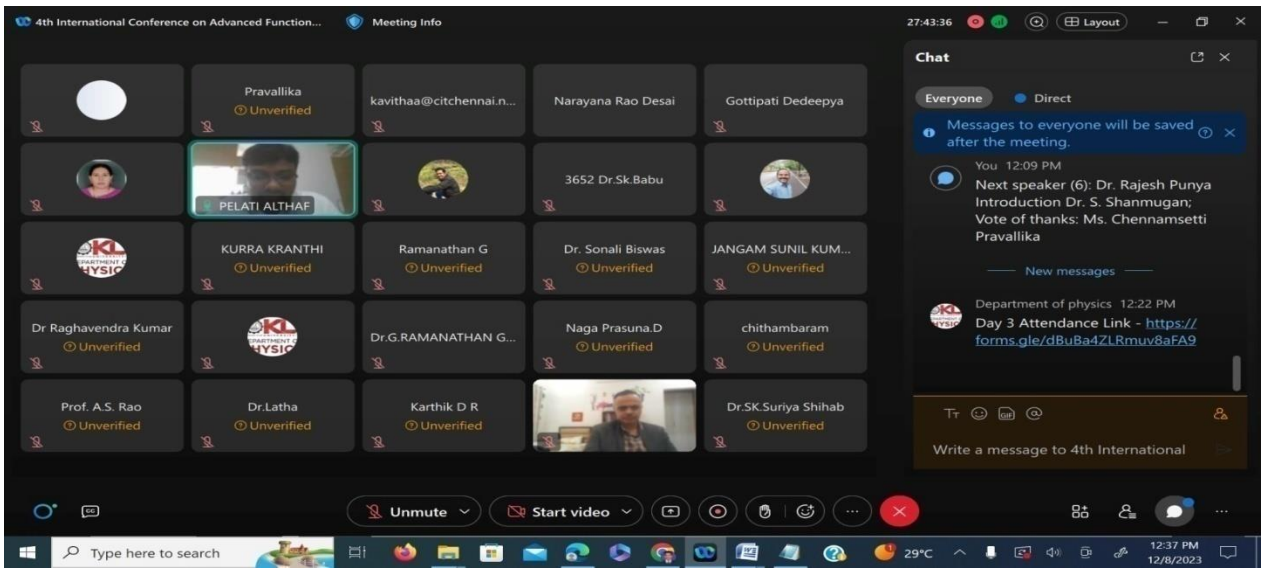
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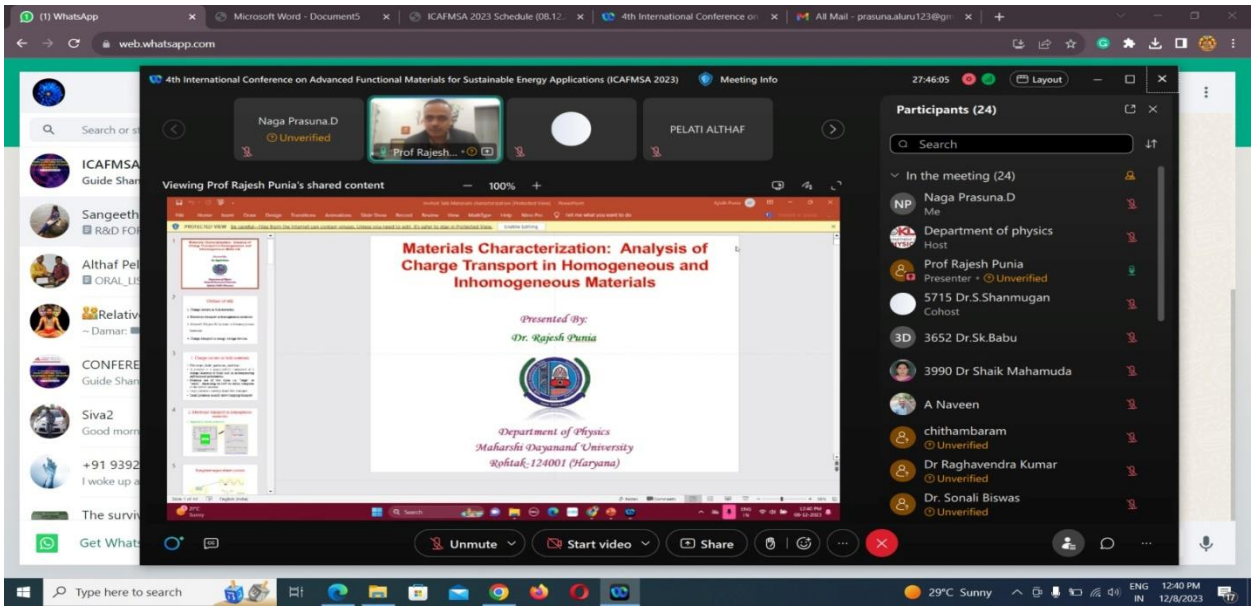
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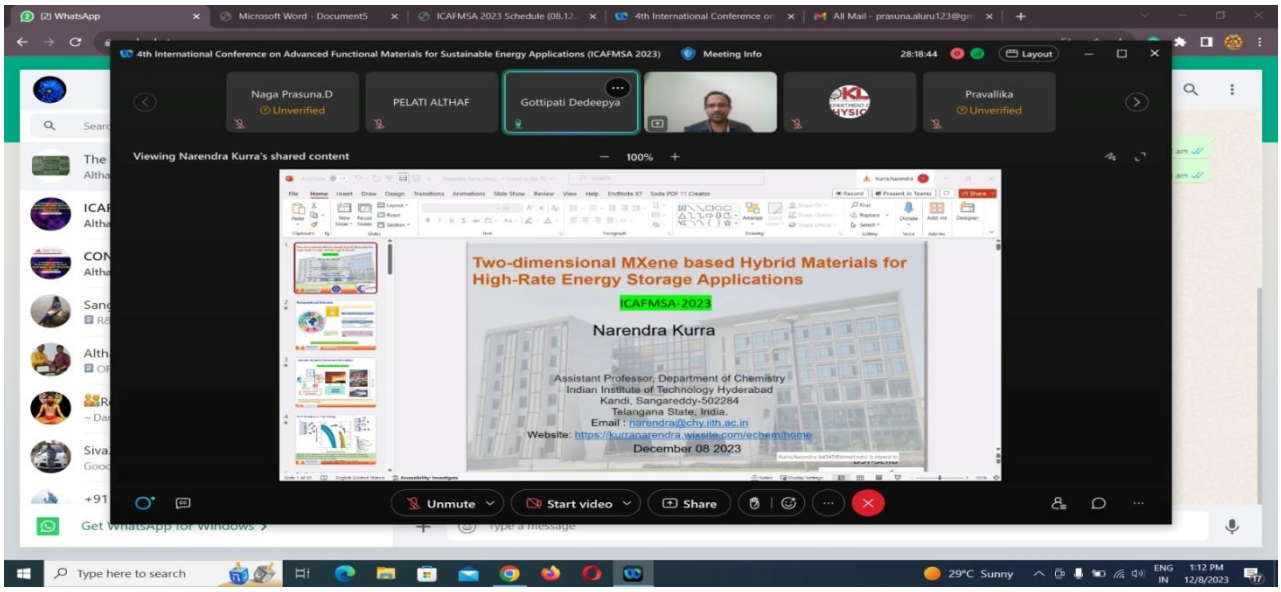
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[1]Department of Physics, Sri Sai Ram Engineering College, Chennai, Tamil Nadu, India
[2]Department of Theoretical Physics, University of Madras, Chennai, Tamil Nadu, India.
[3]Department Sri Sairam Homoeopathy Medical College and research centre, Chennai, India
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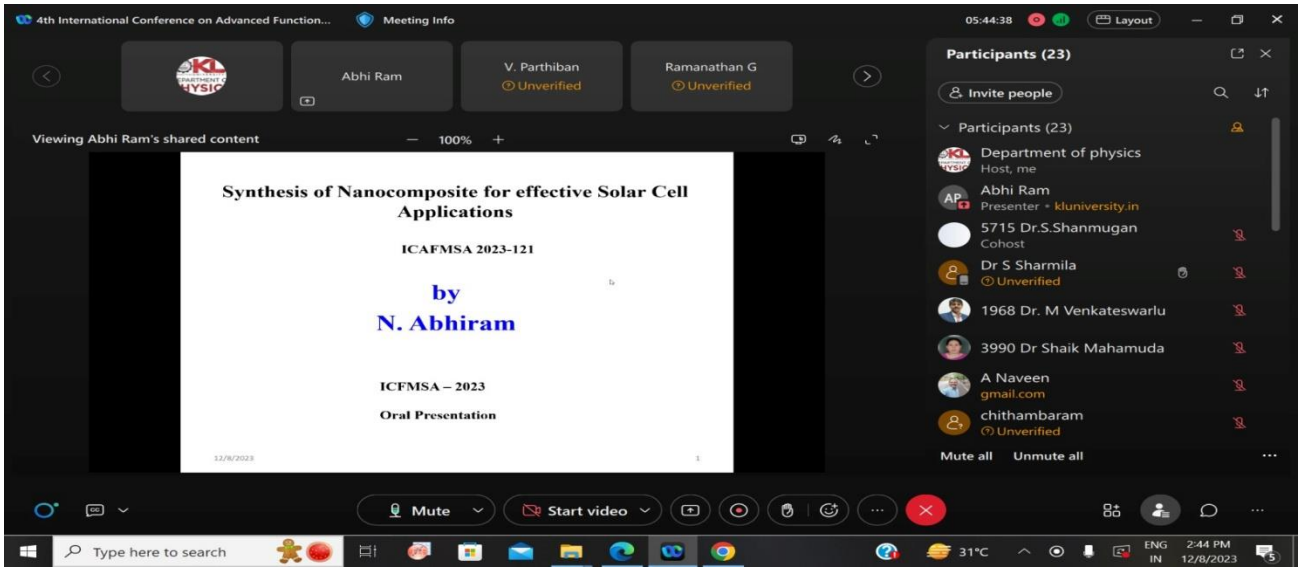
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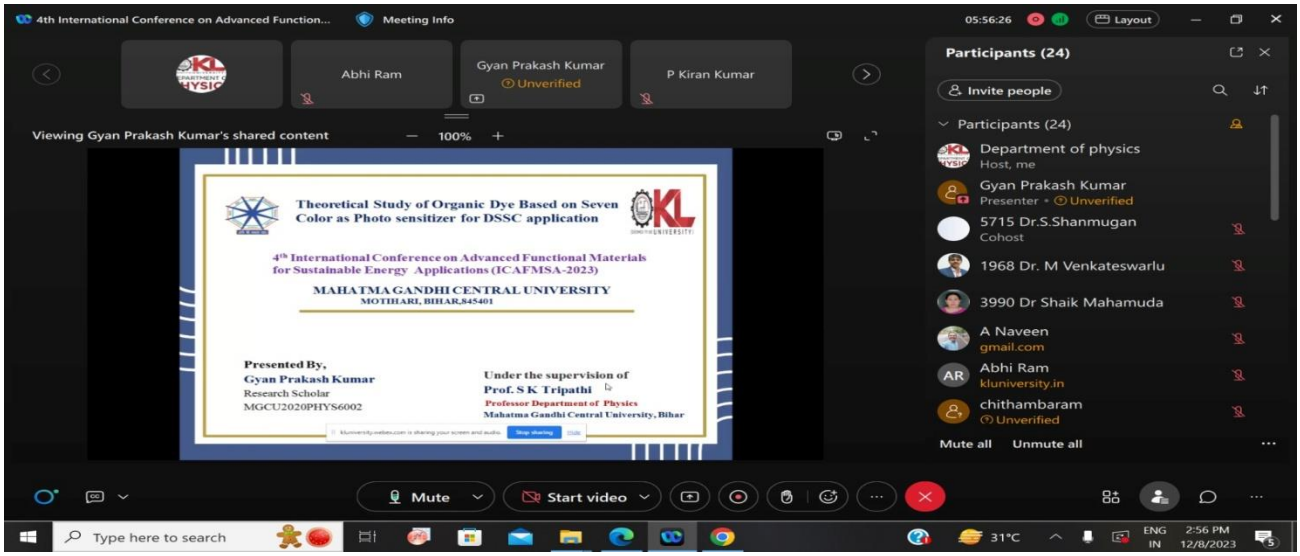
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Presented By,
Gyan Prakash Kumar
Research Scholar
MGCU2020PHYS6002
Under the supervision of
Prof. S K Tripathi
Professor Department of Physics
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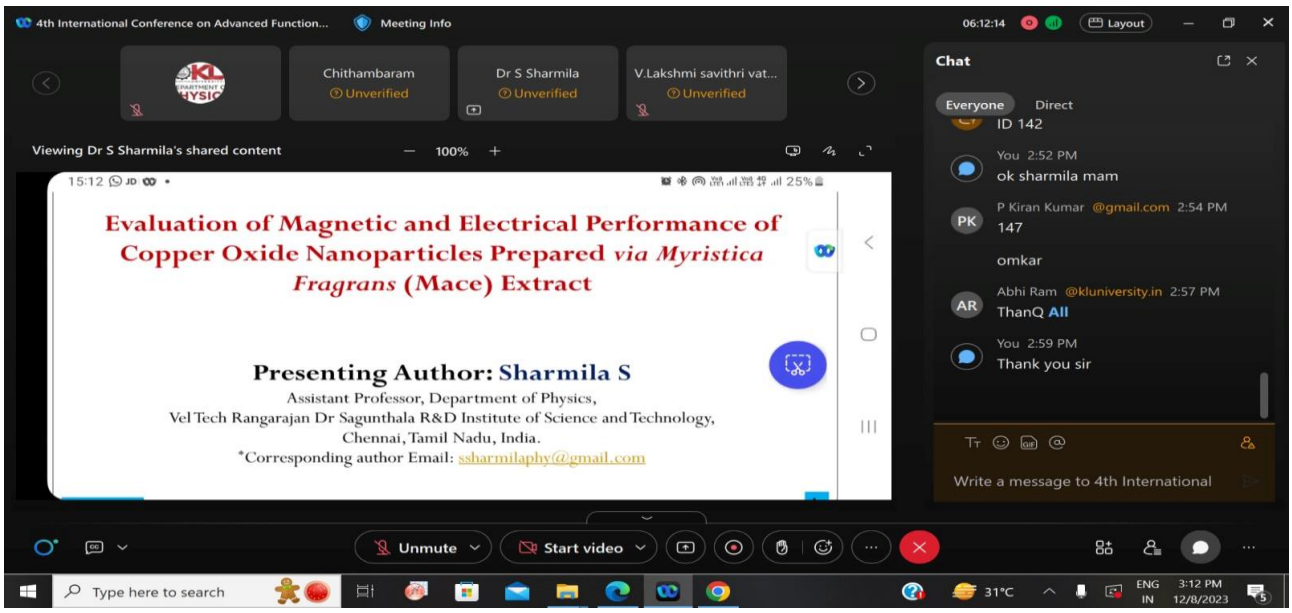
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Presenting Author: Sharmila S
Assistant Professor, Department of Physics,
Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science and Technology,
Chennai, Tamil Nadu, India.
*Corresponding author Email: ssharmilaphy@gmail.com
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P Kiran Kumar @gmail.com 2:54 PM
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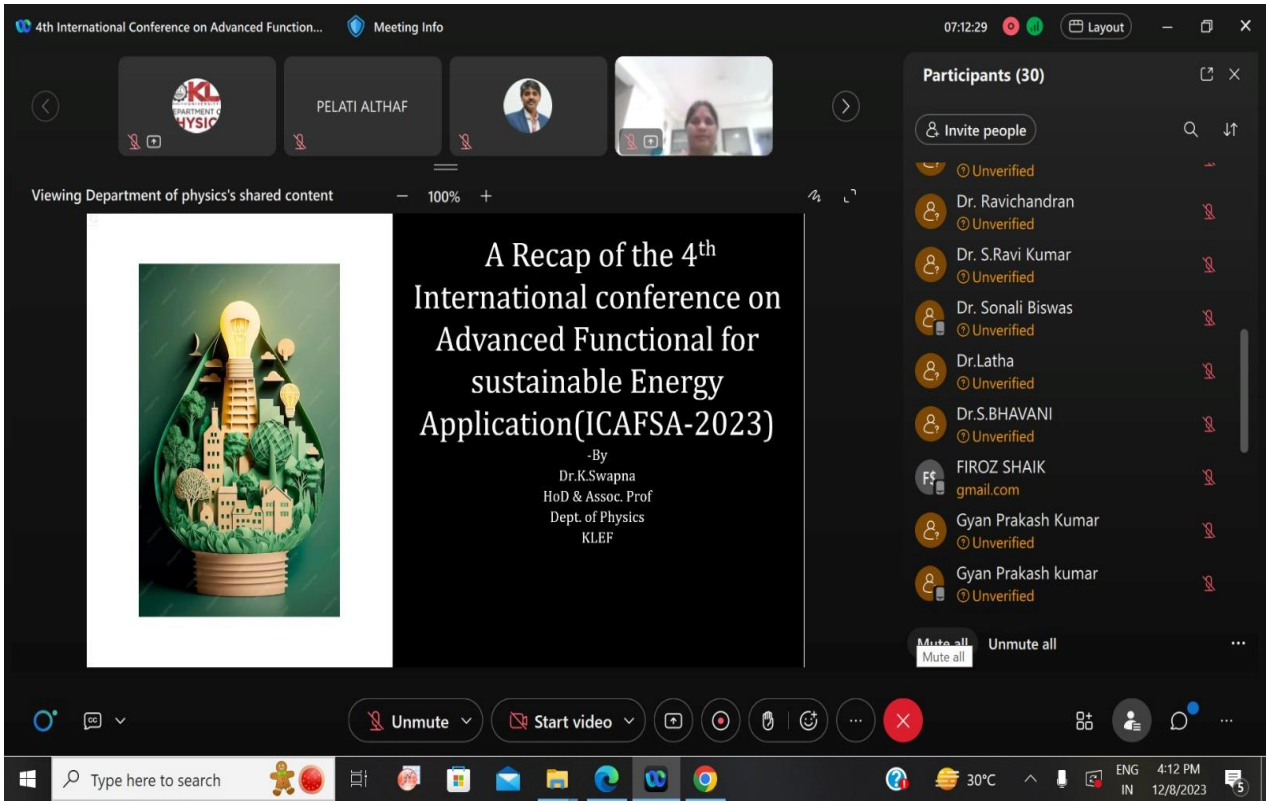
Valedictory Ceremony:

Conclude

- **Dr. K. Swapna, (HOD)**
  (Few words about – ICAFMSA - 2023)
- **Dr. Mahamuda Shaik, (RPAC)**
  (Few words about feature research ideas - ICAFMSA- 2023)
- **Dr. Kannike Raghavendra Kumar, (Co-Convener)**
  (Highlights – ICAFMSA - 2023)
- **Dr. S Shanmugan, (Convener)**
  (Future themes of ICAFMSA - 2023)
- **Dr. A. Venkateswara Rao, (Co-Convener)**
  (Vote of thanks for ICAFMSA - 2023).

Head & Department of Physics,

Dr. K. Swapna

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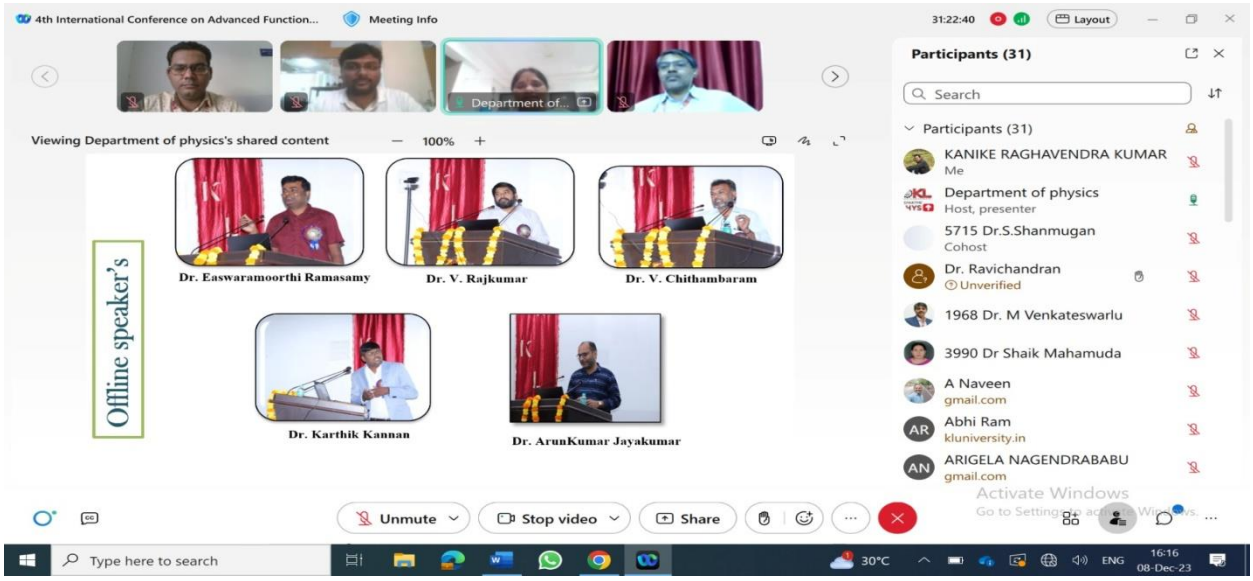
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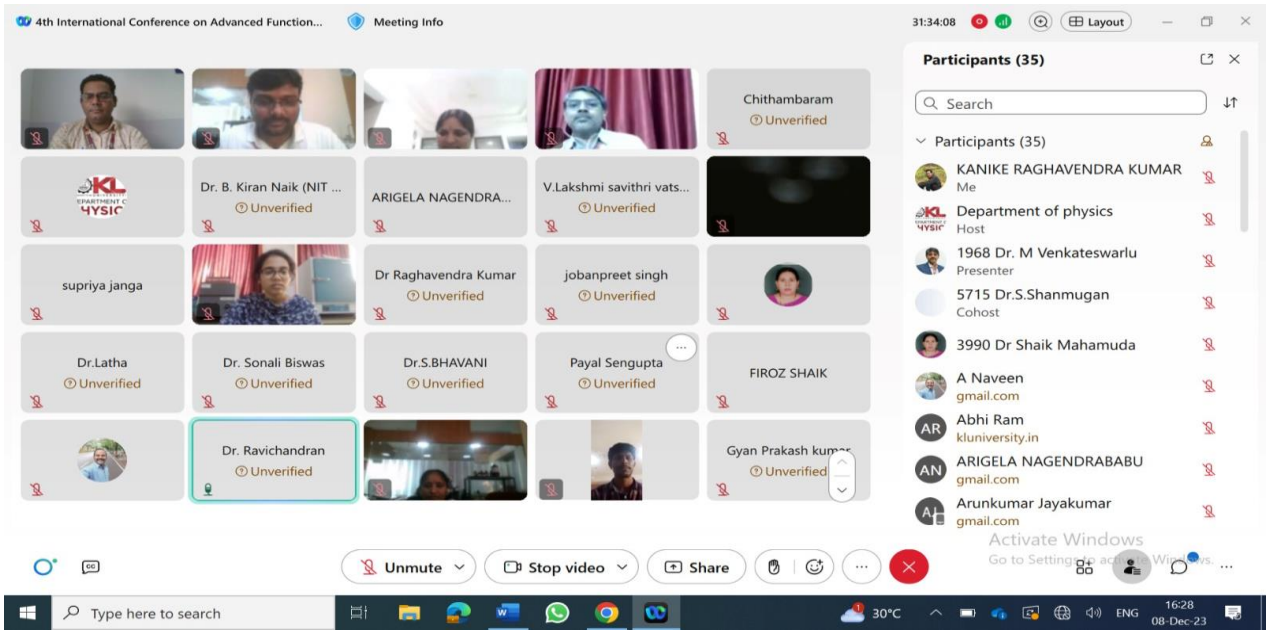
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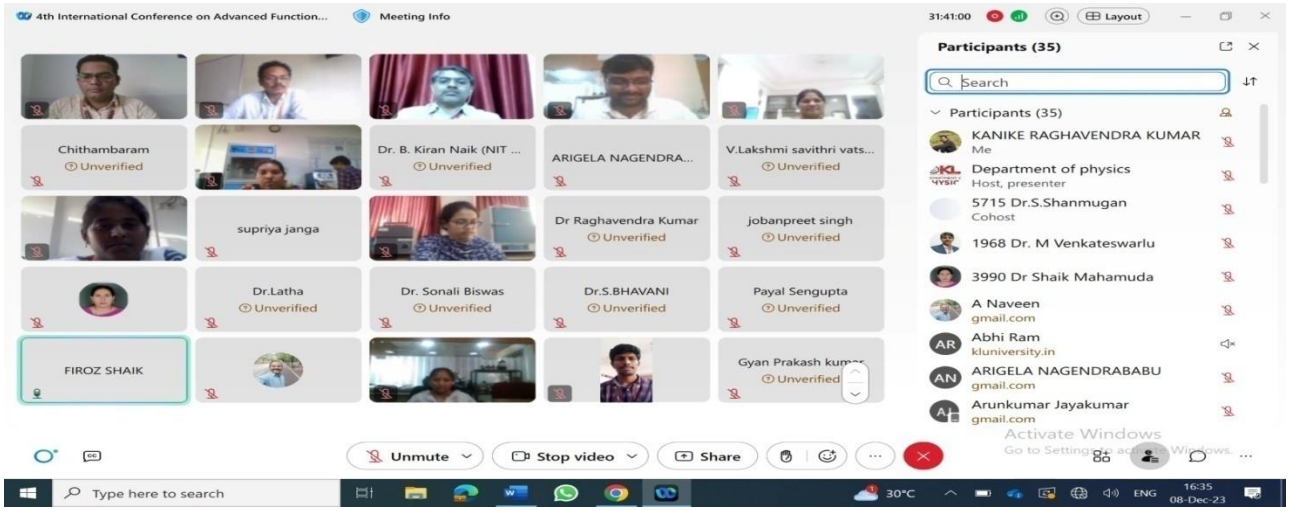
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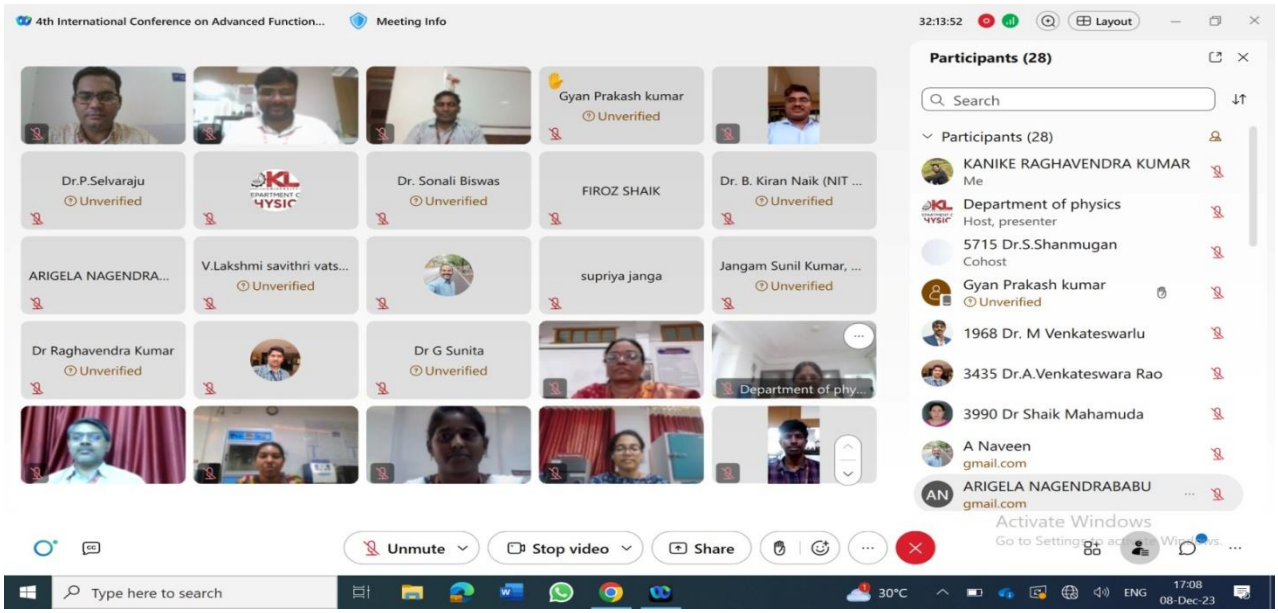
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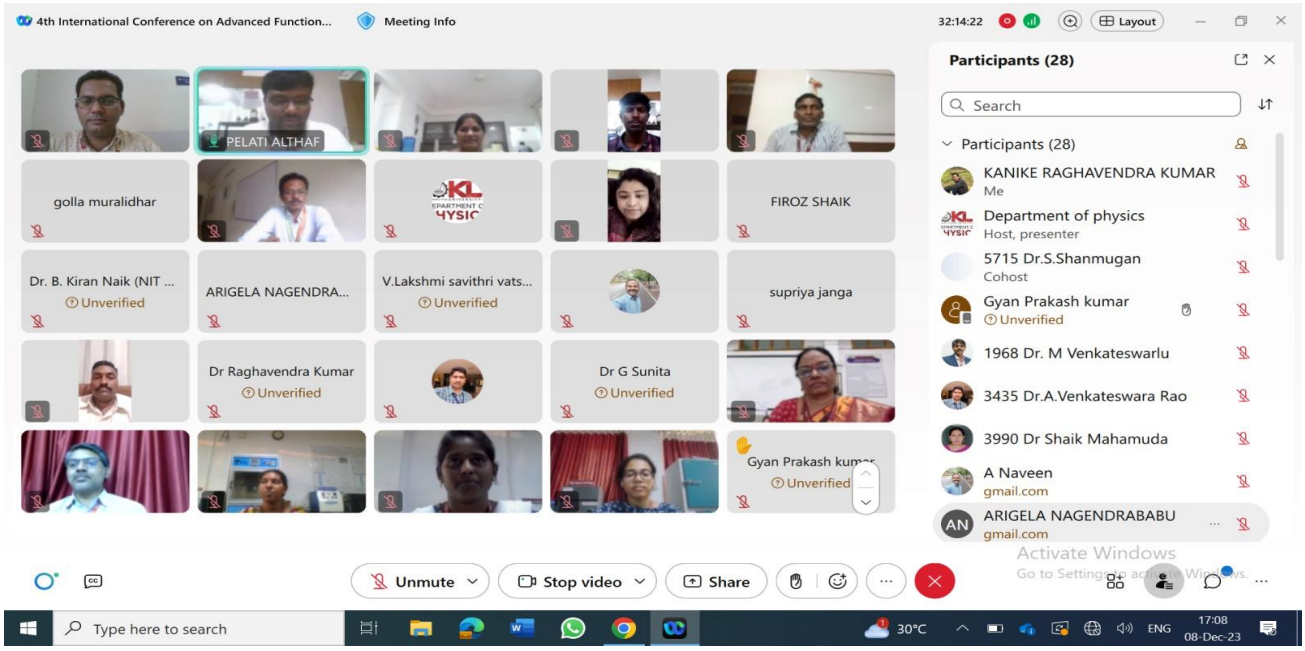
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