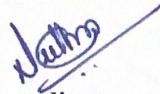




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3.3.2 RESEARCH PAPERS IN JOURNAL



Academic Year	No:of Papers Published
2023-2024	46


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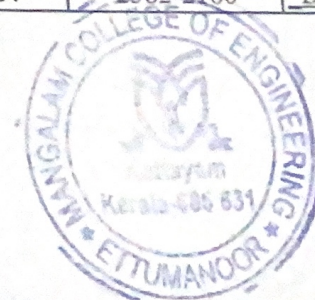
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"3.3.2 Number of research papers per teachers in the Journals notified on UGC website during the year

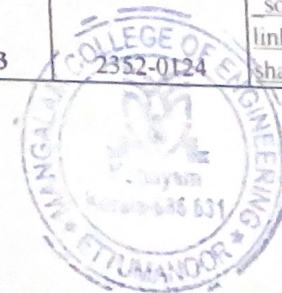
SL NO:	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal
1	Fresh and Hardened Properties of Self-Compacting Concrete Comprising a Copper Slag.	Dr. D RameshKumar	Civil Engineering	Buildings	2023	2075-5309	https://doi.org/10.3390/buildings12070965
2	Fresh and Hardened Properties of Self-Compacting Concrete Comprising a Copper Slag.	Dr. Swaminathan P	Civil Engineering	Buildings	2023	2075-5309	https://doi.org/10.3390/buildings12070965
3	Experimental and Statistical Investigation to Evaluate Impact Strength Variability and Reliability of Preplaced Aggregate Concrete Containing Crumped Rubber and Fibres	Dr.Swaminathan P.	Civil Engineering	Materials	2023	1996-1944	https://doi.org/10.3390/ma15155156
4	Parametric study on the performance of industrial byproducts based geopolymer concrete blended with rice husk ash & nano silica,	Dr. K Arun Kumar	Civil Engineering	Research on Engineering Structures and Materials (RESM),	2023	2148-9807	http://dx.doi.org/10.17515/resm2023.809ma0703
5	Robust fuzzy logic schemes for cooperative spectrum sharing in 5G networks with uncertain channel conditions, Computers & Electrical Engineering, Elsevier, Volume 114, March 2024, https://doi.org/10.1016/j.compeleceng.2023.109060	Vinodh P Vijayan	Computer Science & Engineering	Computers & Electrical Engineering	2024	0045-7906	https://mjl.clarivate.com:/search-results?issn=0045-7906&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal



SL NO:	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal
6	Enhancing the accuracy of target detection in remote video surveillance analytics through federated learning. Optical and Quantum Electronics, 56, 185 (2024), https://doi.org/10.1007/s11082-023-05664-1	Vinodh P Vijayan	Computer Science & Engineering	Optical and Quantum Electronics	2024	0306-8919	https://mjl.clarivate.com/search-results?issn=0306-8919&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-this-journal
7	Path indexed energy MANET routing protocol(PiEER), SSRG International Journal of Electronics and communication Engineering(July 2023), https://doi.org/10.14445/23488549/IJECE-V10I7P105	Sijimol A S	Computer Science & Engineering	SSRG International Journal of Electronics and communication Engineering	2023	2348-8549	https://www.scopus.com/sourceid/21101150690
8	Securing the skies: Cybersecurity strategies for smart city cloud using various algorithms, International journal on Recent and innovation Trends in computing and communication (September2023), https://doi.org/10.17762/ijritcc.v12i1.7969	Dr.S Padmalal	Computer Science & Engineering	International journal on Recent and innovation Trends in computing and communication	2023	2321-8169	https://ijritcc.org/index.php/ijritcc/article/view/7969
9	Breast cancer diagnosis and prognosis using triple hybrid deep learning approach, , International Journal for multidisciplinary Research(IJFMR, 2024), https://doi.org/10.36948/ijfmr.2024.v06i03.21520 .	Mr.Jayakrishnan B	Computer Science & Engineering	International Journal for multidisciplinary Research	2024	2582-2160	https://www.ijfmr.com/research-paper.php?id=21520&gad_source=1&gclid=CjwKCAjwx4O4BhAnEiwA42SbVM5uUWpXq5SDHQviOkbyEixlzXtvIUkTki--BDEzV7XhJ4H1ykr4PRoCvFQOAvl_BwE



SL NO:	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal
10	Skin Cancer detection: Improved deep belief network optimal feature selection, Multiagent and grid systems(October 2023), https://doi.org/10.3233/MGS-230040 .	Ms.Jinu P Sainudeen	Computer Science & Engineering	Multiagent and grid systems	2023	1574-1702	https://www.scopus.com/sourceid/21100199780
11	A Hybrid Model of Random Forest Ensemble and Resample for Cardiotocography Data Classification	Deepthy Mary Alex,	ECE	Sigma Journal of Engineering and Natural Sciences,	2024	1304-7205	https://mjl.clarivate.com
12	A Multirole IoT Based Bot for Geriatric Care	Reneesh C Zacharia	ECE	Journal of Engineering and Technology Managemen	2024	1879-1719	https://jet-m.com/wp-content/uploads/50-JETM8117.pdf
13	A Multirole IoT Based Bot for Geriatric Care	Jyothisree K R	ECE	Journal of Engineering and Technology Managemen	2024	1879-1719	https://jet-m.com/wp-content/uploads/50-JETM8117.pdf
14	Optimal reconfiguration, renewable DGs, and energy storage units' integration in distribution systems considering power generation uncertainty using hybrid GWO-SCA algorithms	R Reshma Gopi	Electrical&Electronics Engineering	International Journal of Modelling and Simulation TJMS	2024	0228-6203	https://doi.org/10.1080/02286203.2024.2363605
15	Optimization of Lead-Free Cs ₂ TiBr ₆ Green Perovskite Solar Cell for Future Renewable Energy Applications	Jeepa K J	Electrical&Electronics Engineering	Current Nanoscience	2024	1875-6786	10.2174/0115734137286096240320075126
16	Buckling, bending and dynamic analyses of laminated three-phase polymer/graphene/carbon fiber composite rectangular plates https://doi.org/10.1016/j.istruc.2023.105129	Dr Manuel George	Mechanical Engineering	Structures	2023	2352-0124	https://mjl.clarivate.com/home?issn=2352-0124&hide_exact_match_fi=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-these-results



SL NO:	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal
17	Enhancement of vibrational characteristics of rotating CFRP composite tapered plates reinforced by graphene nanoparticles https://doi.org/10.1002/pc.27685	Dr Manuel George	Mechanical Engineering	Polymer Composites	2023	0272-8397 / 1548-0569	https://mjl.clarivate.com/search-results?issn=0272-8397&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-these-results
18	Characterization of material, mechanical, static bending and vibration properties of glass fiber composite panels reinforced with graphene nanofillers https://doi.org/10.1016/j.jmapro.2023.05.028	Dr Manuel George	Mechanical Engineering	Journal of Manufacturing Process (SRL)	2023	1526-6125 / 2212-4616	https://mjl.clarivate.com/search-results?issn=1526-6125&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-these-results
19	Tribo-Mechanical Behavior of	Dr K. Pratheesh	Engineering	(SRL)	2023	6667	results?issn=0218-
20	BIPV System-Liquid Earth-Based	Abhinand Vijay, Akshay	Engineering	Conditioning, Heating and	2023	2394-1952	x/13909/journal-of-refrigeration-air-
21	https://doi.org/10.37591/tmet.v1	Joel Jaimon, Kiran E.P.,	Engineering	Engineering &	2023	2231-1793	earch/details?id=42790
22	Intervention of a Chapati Making	Adithya Shine, Ajith Joy,	Engineering	Research &	2023	2249-4766	s/abstractingjournals
23	Platforms for Industrial Elevation	Sreenath A	Engineering	Manufacturing and Materials	2023	2582-5046	earch/details?id=124943
24	https://doi.org/10.37591/joprm	Begin Abraham Ninan,	Engineering	Research &	2023	2249-4766	s/abstractingjournals
25	Cylindrical Lithium-Ion Battery	Parthasarathy, Remin	Engineering	Manufacturing and Materials	2023	2582-5046	earch/details?id=124943
26	Injection Methods for Reducing	Jagadeesh, Abin Joy,	Engineering	Engineering &	2023	2231-1793	earch/details?id=42790
27	Various Ergonomic Assessment	Mathew	Engineering	Research &	2023	2249-4766	s/abstractingjournals
28	Mechanism	Antony, Jayashankar	Engineering	Engineering &	2023	2231-1793	earch/details?id=42790
29		Anandu Sajeev, Alen	Engineering	Design(STM)	2023	2231-1793	s/abstractingjournals
30	of PVC Pipes	Ajith K G N	Engineering	Design(STM)	2023	2231-1793	s/abstractingjournals
31	Controllor in Automatic Vehicle	Dr.Rabi. J	Engineering	(JES)	2024	1873-6289	results?issn=0361-



SL NO:	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of the Journal
32	OpenFOAM Modelling of Single-Phase and Two-Phase Heat Transfer in Square Ducts Partially Filled with Porous Medium https://doi.org/10.1007/s42757-024-0189-y	Bibin, Kattapurathu Scharia, Sarath Raj, Janardanan Sarasamma Jayakumar, and Krishnan Kuty Elsy Bai Reby Roy.	Mechanical Engineering	Experimental and Computational Multiphase Flow	2024	2661-8869 / 2661-8877	https://mjl.clarivate.com/search-results?issn=2661-8869,0301-9322,1994-2060,1899-5276,2096-5451,1054-4887,1687-9724,2244-8659,0007-4888,1196-1961&hide_exact_match_fl=true&utm_source=mjl&utm_medium=share-by-link&utm_campaign=search-results-share-these-results
33	Parabolic Trough Collector: A	Navish Kumar	Engineering	Energy and Thermal	2024		s/abstractingjournals
34	or MoS2-Reinforced Aluminum	Dr Pratheesh K	Engineering	No. 2 , 2024.	2024	1330-3651	https://www.doaj.org/toc/1848-6339
35	Graphene	Manuel George	Engineering	Composites(STM)	2023	2321-2810	results?issn=2321-
36	Total Productive Maintenance	Raveendran	Engineering	Engineering &	2023	2231-1793	earch/details?id=42790
37	Automatic Hand Brake Systems	P	Engineering	Engineering and	2023	2455-3360	index.org/index.php/asi/article/view/78
38	Graphene	P.P. George	Engineering	Composites(STM)	2023	2321-2810	results?issn=2321-
39	of Ag2MoO4 Nanoparticles using	Dr. P.P George	and	Research Journal	2023	2313-7797	.07.237
40	for the Fabrication of Ag2 MoO4	Dr. P.P George	and	Research Journal	2023	2313-7797	p/ABAARJ/article/view/118
41	western management practices fail	Mr.Sam T Mathew	Management	International Journal of	2024	2582-3930	ISSN=International Journal of
42	Attitude Induces Purchase	Dr. Prima Anne George	Management	Educational Administration,	2024	2148-2403	Examining Perceived Attitude
43	Digital Marketing on Consumer	Joychen Manuel	Management	Educational Administration,	2024	2148-2403	An Analysis of the Impact of Digital
44	Attitude Induces Purchase	Ms Neethu Kuncheria	Management	Educational Administration,	2024	2148-2403	Examining Perceived Attitude
45	Shift in the Learning Culture	Shibu C Chithran	Management	History Research Journal	2023	0976-5425	INSTRUMENTATION JOURNAL
46	Attitude Induces Purchase	Mr. Bose Tom	Management	Educational Administration,	2024	2148-2403	Examining Perceived Attitude



Article

Fresh and Hardened Properties of Self-Compacting Concrete Comprising a Copper Slag

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Abstract: Recycling trash and protecting natural resources are two of the many benefits of using copper slag as a fine aggregate in a concrete building. However, stakeholders need proven research output to build trust and initiate or enhance the use of such industrial waste in buildings. This study evaluated self-compacting concrete's fresh and hardened characteristics (SCC) comprising a copper slag aggregate (CSA). For this purpose, six mixes were prepared by substituting river sand with CSA up to 50%, with a 10% increment. The properties of fresh SCC were evaluated using slump flow, V-funnel, and L-box tests. Several parameters of SCC were examined, including water absorption, sorptivity, chloride ion penetration, sulphate attack, and acid attack tests. Energy dispersive spectroscopy (EDS) and scanning electron microscopy (SEM) were used to investigate the concrete microstructure. The results indicated that the fresh characteristics of SCC were enhanced as the amount of CSA increased consistently. The durability properties showed a considerable enhancement in SCC mixes comprising up to 20% of CSA.

Keywords: concrete; copper slag; compressive strength; acid attack; microstructure



Citation: Prithiviraj, C.; Swaminathan, P.; Kumar, D.R.; Murali, G.; Vatin, N.I. Fresh and Hardened Properties of Self-Compacting Concrete Comprising a Copper Slag. *Buildings* **2022**, *12*, 965. <https://doi.org/10.3390/buildings12070965>

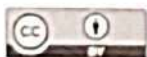
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1. Introduction

Massive volumes of industrial by-products are produced and disposed of worldwide, posing severe issues. Heavy metals, including arsenic, cadmium, and lead, can be found in high amounts in copper slag, causing them to be classified as hazardous wastes [1]. These metals harm human health and lead to air and water pollution. Due to a lack of landfill space and, as a result, rising costs of natural river sand, efforts have been undertaken to recycle or reuse them. One method is to utilize industrial derivatives in concrete, which will be advantageous in ecological and financial terms.

Concrete's durability may be characterized by its resistance to chemical, biological, and physical disintegration [2–5]. Chemical attack can take several forms, including sulphate resistance [6], acid resistance [7], the effect of carbonation [8], chloride ion penetration [9–11], the alkali-silica aggregate effect, and depending on the concrete exposed to the environment. The excessive loading of concrete buildings, the impact of abrasion, frost attack, and natural disasters, such as earthquakes, floods, and fires, can all cause physical disintegration [12]. Bacteria, sponges, lichens, marine borers, mosses, and boring shells are part of the biological onslaught [13,14]. Chemical attack, on the other hand, is predominantly accountable for the disintegration of concrete structures [15,16], and researchers must focus on durability [17–20]. Apart from durability, the manufacturing cost of concrete mainly depends on the constituent materials being used from natural resources. To develop durability and minimize manufacturing costs, industrial by-products can be one of the alternate solutions [21–26]. Various industrial subsidiary products, including steel slag, copper slag,





Article

Experimental and Statistical Investigation to Evaluate Impact Strength Variability and Reliability of Preplaced Aggregate Concrete Containing Crumpled Rubber and Fibres

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Abstract: The proper disposal of used rubber tires has emerged as a primary concern for the environment all over the globe. Millions of tires are thrown away, buried and discarded every year, posing a major environmental concern owing to their slow decomposition. As a result, it is advantageous to use recycled waste rubber aggregates as an additional building resource. Recycling crushed rubber would lead to a long-term solution to the problem of decreasing natural aggregate resources while conserving the environment. This study examines the impact strength variability and reliability of preplaced aggregate concrete containing crumpled rubber and fibres. Ten different mixtures were prepared by replacing natural aggregate with crumpled rubber (5, 10, 15 and 20%). The crumpled rubber was pretreated by the water with sodium hydroxide dilution for 30 min before usage. Hooked-end steel fibres were used at a dosage of 1.5%. The compressive strength, impact strength, impact ductility index and failure pattern were examined and discussed. In addition, a statistical method called Weibull distribution is used to analyze the scattered experimental results. The results showed that when the crumb rubber content was raised, the retained first cracking and failure impact numbers increased. As a result of substituting crumb rubber for 20% of the coarse aggregate in plain and fibrous mixes, the percentage development in first crack and failure was between 33% and 76% and 75% to 129%, respectively.

Keywords: impact strength; reliability; concrete; rubber waste; fibres; Weibull distribution

1. Introduction

Concrete is producing considerable use of recyclable and solid waste resources to address environmental challenges and reduce energy consumption [1]. Further research into the production of green concrete is encouraged by the increase in concrete properties and environmental advantages from the use of waste resources [2]. There are several substitutes and solid waste products, such as building debris and demolition [3], plastic wastes [4], rock waste [5], silica fume [6], flyash [7], lime sludge [8] were added to concrete to enhance their properties and minimize emissions of carbon gases while conserving

RESM



Research Article

Parametric study on the performance of industrial byproducts based geopolymer concrete blended with rice husk ash & nano silica

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Keywords

Abstract

Geopolymer concrete

Industrial byproducts

Workability

Strength properties

Ambient curing

In this study, Geopolymer concrete (GPC) blended with fly ash (FA), ground granulated blast furnace slag (GGBS), rice husk ash (RHA) and nano-silica (NS) developed and investigated in three aspects. In the first aspect of GPC (FA+GGBS), FA varied from 0-100% of GGBS at 10% intervals to determine the optimum proportion of FA+GGBS. In the second aspect of GPC (FA+GGBS+RHA), RHA varied from 0-25% of FA at 5% intervals with a constant of 30% GGBS obtained from the first aspect of the study. In the third aspect of GPC (FA+GGBS+RHA+NS), NS was replaced with 1, 2, and 5% with the optimum proportions of GGBS (30%) and RHA (15%) obtained from the first and second aspects of the study. The fresh and hardened properties of GPC were obtained at 7 and 28 days under ambient curing. The compressive strength improved while FA was replaced by GGBS (0-100%) from 27.75 to 45 MPa. Meanwhile, workability has decreased to 0.81 from 0.97. Hence, the optimized proportion of FA and GGBS was obtained as 70:30 from the workability aspect. RHA replacement provided compressive strength increment up to 15% (39.5 MPa), but workability gradually decreased (0.92 to 0.84) from 0 to 25%. So, the optimum proportion of RHA was achieved by 15% from the second aspect. In the third aspect, the workability increased from 0.89 to 0.92 while NS replacement (0-2%) with FA. Also, compressive strength has improved from 39.52 to 41.65 MPa. Thus, the optimized NS proportion gained at 3% of NS. Overall, this study provides a view of industrial by-product utilization as part of GPC in optimal proportions.

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Full Text

LATEST NEWS

20/04/2024 / Collaboration for HSTD-2024: Editorial Board of our journal and Organizing Committee of the 18th International Conference on High-Speed Transport Development (HSTD) have agreed to collaborate. Extended versions of the selected papers from the conference will be published in our journal. For more see Events.

20/04/2024 / Collaboration for DML2024-55: Editorial Board of our journal and Organizing Committee of the DML2024 Fluid Flow, Energy Transfer & Design (55) have agreed to collaborate. Extended versions of the selected papers from the session will be published in our journal. For more see Events.

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Robust fuzzy logic schemes for cooperative spectrum sharing in 5G networks with uncertain channel conditions

B.B. Shankar ^a  , M. Udhayamoorthi ^b, Y.M. Latha ^c, R.V.S. Lalitha ^d, A. Prakash ^e, V.P. Vijayan ^f

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Highlights

- The FL-eRL technique presents a cutting-edge approach to manage the increased demand in wireless networks.
- A robust fuzzy-game method is employed to navigate the uncertainties inherent in network sharing and routing.
- The process utilizes fuzzy values within logical spaces, enhancing tolerance to variability in network incentives.
- Network controllers' decision-making is bolstered by extensive validation, proving the technique's reliability in changing conditions.
- This study finds the evolution of next-generation networks facing dynamic and unpredictable environments.

Abstract

The rising use of wireless interfaces necessitates effective spectral reuse, addressed here through a novel Fuzzy Logic-inspired Enhanced Reinforced Learning (FL-eRL) technique. This paper explores robust spectrum access within wireless sharing networks, leveraging fuzzy-game strategies against routing uncertainties. Decision-making spaces are modelled as fuzzy-logical areas, using fuzzy values to represent ambiguous data, enhancing resilience to incentive variability, and maintaining network speed amidst uncertainties. This approach enables controllers to make informed, collective decisions through fuzzy analysis. Validated through rigorous testing in variable conditions, this technique promises significant advancements for next-generation communication systems in volatile settings, underscoring its pivotal role in future network management.

Graphical abstract





Enhancing the accuracy of target detection in remote video surveillance analytics through federated learning

S. Selvi¹ · Kapil Aggarwal² · Raji Pandurangan³ · Vinodh P. Vijayan⁴ · Anooja Ali⁵ · K. Anuradha⁶

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Abstract

Video observation is fundamental for guaranteeing public well-being and security in different environments such as air terminals, train stations, retail outlets, and local residential locations. Existing video examination techniques face significant restrictions and difficulties, like low precision, high computational intricacy, and restricted flexibility to evolving environmental conditions. To address these difficulties, this paper proposes an original way to deal with improving video examination for distant observation by consolidating progressed object location, following and following behavioural algorithms into a unified structure. Faster deep learning object detection Algorithms like R-CNN, YOLO, and SSD are used here to precisely recognize and restrict objects of interest in surveillance videos. We investigated a few benchmark datasets and contrasted their presentation and cutting-edge techniques. The outcomes show that the proposed approach beats existing precision, strength, and efficiency strategies.

Keywords Deep learning · R-CNN · YOLO · And SSD

1 Introduction

Video surveillance frameworks have become fundamental for guaranteeing public well-being and security in different environments, including air terminals, public transportation, and foundation offices (Khan and Han 2018; Li et al. 2020). With the appearance of computerized camcorders and high-velocity organizations, far-off observation has become an undeniably famous way to deal with screens and secure huge regions without requiring on-location personnel (Conche and Greten Xiao et al. 2018).

Subsequently, this study means to investigate progressed video examination calculations and AI procedures to upgrade the exactness and efficiency of item discovery, following, and conducting acknowledgment in remote surveillance frameworks (Bewley et al. 2016; Ruban et al. 2020). The review will zero in on creating and assessing new calculations and methods that can address the impediments of current methodologies and work on the general execution of distant observation frameworks. The consequences of this study could

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Original Article

Path Indexed Energy Efficient MANET Routing Protocol (PiEER)

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Abstract - Mobile ad hoc networks are a promising branch of network technology. The modern world is highly dependent on ad hoc networks for their flexibility, extensibility, and adaptability, and thus MANET is used in almost all modern devices. Much research is being carried out worldwide to maximize the performance of MANET in terms of routing, energy utilization, bandwidth utilization, mobility management, and so on. Researchers are trying to remodel the MANET by adjusting the above factors to an ideal nature. One major challenge MANET faces is managing power and saving it through optimization. In this paper, an energy-efficient routing protocol is used for data transfer. This method uses Path Indexed Energy Conserving Routing in MANET (PiEER). During the routing process, PiEER analyses the individual node energy, the outstanding energy of the path, distance, and recovery chances and ranks the different paths based on the statistics. Packets are transmitted over these paths based on the ranking. Since PiEER routing has energy balance data, more data is routed over healthy routes, and less data is routed over weaker paths to balance the overall data transmission

Keywords - Energy management, Energy optimization, MANET, Packet routing, Route recovery.

1. Introduction

The scope of computer networks is expanding day by day. The growth of network technology has enabled and opened up many advanced fields of science. There are a variety of networks, of which MANETs are considered the most flexible and scalable. We cannot imagine any modern device without wireless access. Society today demands enormous networking capabilities, so researchers are trying to add more services.

The growth of MANET is not a flash in the pan. Much research has been done in this area to maximize performance. The various constraining factors of MANET are mobility, routing, joining and retreating on demand, self-powered energy [1], and bandwidth [2]. Therefore, researchers have focused on these areas to improve the current situation. Mobility is such an unpredictable factor in MANET, as it depends solely on the situation of the node.

Mobility can adversely affect node and path energy as well as routing. Therefore, researchers keep trying to develop routing algorithms with predictions to improve the performance of MANET [3, 4]. The additional factors are

more manageable with improved optimizations. We present a new energy-conserving routing protocol (PiEER) that generates a network energy plan by analyzing the node energy, the outstanding energy of the path, and the number of hops. The collected information forms a hierarchy of data transmission paths. Data is transmitted over the ranked paths, and since the ranking is based on several parameters, the overall state of a path is maintained by sending more traffic over the best path and loading the remaining paths with the remaining data.

2. Related Works

This segment will discuss the recent research on optimizations on MANET based on power usage. Firstly, we will discuss Power Efficient Reliable Routing Protocol (PERRA) [5]. This algorithm aims to find the energy required to send, receive, and process a packet. It also identifies the path stability of the network, and the route selection is made accordingly. The second algorithm on the focus is e, which is called link-stability and energy-aware routing protocol (LAER) [6], which determines two factors such as link steadiness and least energy gutter rate. The link steadiness metrics are valued using the historical links and



Securing the Skies: Cybersecurity Strategies for Smart City Cloud using Various Algorithms

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Abstract : As smart cities continue to evolve, their reliance on cloud computing technologies becomes increasingly apparent, enabling the seamless integration of data-driven services and urban functionalities. However, this transformation also raises concerns about the security of the vast and interconnected cloud infrastructures that underpin these cities' operations. This paper explores the critical intersection of cloud computing and cybersecurity within the context of smart cities.

This research is dealing with challenges posed by the rapid expansion of smart city initiatives and their reliance on cloud-based solutions. It investigates the vulnerabilities that emerge from this technological convergence, emphasizing the potential risks to data privacy, urban services, and citizen well-being. The abstract presents a comprehensive overview of the evolving threat landscape that smart cities face in the realm of cloud computing.

To address these challenges, the abstract highlights the importance of proactive cybersecurity strategies tailored specifically to the unique needs of smart cities. It underscores the significance of adopting a multi-layered approach that encompasses robust encryption protocols, intrusion detection systems, threat intelligence sharing, and collaborative efforts among stakeholders. Drawing insights from existing research and real-world case studies, the abstract showcases innovative solutions that leverage advanced technologies like artificial intelligence and blockchain to fortify the security posture of smart city cloud infrastructures. It explores the role of data governance, user authentication, and anomaly detection in creating a resilient cybersecurity framework that safeguards critical urban systems.

Keywords: Smart city, Cyber security, Multi-layered security, Threat detection, Data privacy, Collaborative security

1. INTRODUCTION

In an era characterized by unprecedented urbanization and technological innovation, the concept of smart cities has emerged as a transformative force, promising to revolutionize the way we live, work, and interact within urban environments. Central to this paradigm shift is the pervasive integration of

cloud computing technologies, which serve as the backbone for the seamless flow of data and the delivery of essential services. As smart cities rapidly evolve into complex ecosystems of interconnected devices, systems, and citizens, the convergence of cloud computing and urbanization brings to light both remarkable opportunities and formidable challenges.

Breast Cancer Diagnosis and Prognosis Using Triple Hybrid Deep Learning Approach

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Abstract

Breast cancer is one of the malignancies that affects women. Breast cancer is a condition that is brought on by abnormal breast cells that multiply and form tumours. If left untreated, tumours have the capacity to grow throughout the body and become fatal. Early initiation and thorough completion of treatment is associated with better outcomes and greater patient tolerance for breast cancer patients. These days, early detection of breast cancer is quite helpful and will help the women who battle the illness. The earliest detection of breast cancer can be successfully achieved with the use of machine learning-based approaches. Breast cancer can be diagnosed with great accuracy using a number of machine learning techniques, including CNN, RF, SVM, NB, KNN, AB, and others. Thus, I am introducing a triple hybrid deep learning method for breast cancer diagnosis and prognosis. This is the CNN, GRU, and LSTM combination.

Keywords: Machine Learning, Triple hybrid deep learning, CNN, GRU, LSTM

1. INTRODUCTION

One of the most serious cancers that affect women is breast carcinoma. It ranks among the most frequent causes of death due to cancer in females. A biopsy is a medical procedure that involves taking a sample of breast cells for testing purposes. Other recommended tests to detect breast cancer include breast ultrasounds, breast inspections performed by a doctor, mammograms, and breast magnetic resonance imaging (MRI). Of these testing methods, the biopsy is the one that can conclusively identify breast cancer. Following the testing of all these medical procedures, radiologists look at the results, talk with the doctors about them, and determine if the cells are malignant or not. Studies show that radiologists diagnose cancer incorrectly between 10% and 30% of the time when doing screening studies. Errors resulting from misinterpreting breast cancer symptoms account for 52% of errors, whereas failure to detect abnormal scan symptoms accounts for 43% of errors [4]. Due to this mistake rate, many benign tumours require biopsies, which puts the patient through needless expenditure and discomfort. Mistakes resulting from improper classification of mammography have a significant financial cost. This is because false negative results from screening mammography are a serious problem because early detection can drastically reduce treatment costs, delays, and effectiveness. On the other hand, if the illness is identified early, patients can avoid pointless treatments.



Skin cancer detection: Improved deep belief network with optimal feature selection

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Abstract. During the past few decades, melanoma has grown increasingly prevalent, and timely identification is crucial for lowering the mortality rates linked to this kind of skin cancer. Because of this, having access to an automated, trustworthy system that can identify the existence of melanoma may be very helpful in the field of medical diagnostics. Because of this, we have introduced a revolutionary, five-stage method for detecting skin cancer. The input images are processed utilizing histogram equalization as well as Gaussian filtering techniques during the initial pre-processing stage. An Improved Balanced Iterative Reducing as well as Clustering utilizing Hierarchies (I-BIRCH) is proposed to provide better image segmentation by efficiently allotting the labels to the pixels. From those segmented images, features such as Improved Local Vector Pattern, local ternary pattern, and Grey level co-occurrence matrix as well as the local gradient patterns will be retrieved in the third stage. We proposed an Arithmetic Operated Honey Badger Algorithm (AOHBA) to choose the best features from the retrieved characteristics, which lowered the computational expense as well as training time. In order to demonstrate the effectiveness of our proposed skin cancer detection strategy, the categorization is done using an improved Deep Belief Network (DBN) with respect to those chosen features. The performance assessment findings are then matched with existing methodologies.

Keywords: Gaussian filtering, histogram equalization, I-BIRCH, Improved Local Vector Pattern, Arithmetic Operated Honey Badger Algorithm (AOHBA), improved DBN

1. Introduction

Melanoma, a kind of skin cancer, has gotten more deadly globally in past years. Amongst malignancies, skin cancer is by far the most lethal because it can arise from non-pigmented cells anyplace throughout the body [1–5]. The epidermis, the topmost covering of the skin, encompasses four kinds of cells: squamous, basal, as well as melanocytes. These basal cells make up the bottommost layer of the epidermis, whereas the squamous cells make up the topmost layer. Melanocytes utilize a pigment designated as melanin to safeguard the deepest layers of the skin. The skin's melanocytes might alter or grow markings for a multitude of reasons, including infections, allergies, and sun exposure. Skin cancer might appear as any new, larger, altering, blistering, bleeding lumps, patches, or moles. More often than not, excessive sun exposure leads to skin darkening [6–11]. The triggered effects of DNA mutations have an influence on such skin cells' proliferation over time when they are subjected to intense UV radiation. Because not all

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A hybrid model of random forest ensemble and resample for cardiocography data classification

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Abstract

Fetal health monitoring is essential as it leads to increased mortality rates in fetuses. Cardiotocography is a medical technique used by obstetricians to monitor fetal health during labor, particularly in cases involving complications. Though various works have been carried out in the classification of CTG data there seems to be a need for improvement in achieving significant accuracy levels. In this work, first, we implemented the Smote Tomek sampling technique to create a balanced dataset. Then, the balanced data is employed for classification in the Random Forest ensemble with a bagging classifier. Our technique's performance is assessed using metrics including accuracy, precision, recall, and F1-score. Experimental findings reveal our method achieves an accuracy of 98.5%, outperforming not only other classifiers examined in the study but also surpassing deep learning algorithms. Hence, the findings of our study highlight the effectiveness of our approach in classifying Cardiotocography data, suggesting the potential for enhancing fetal health monitoring during labor and for improved obstetric care.

Keywords: Cardiotocography (CTG), Fetal health, Classification, SmoteTomek, Random Forest Ensemble, Bagging classifier, Resampling



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“Sahaya”- A Multirole IoT Based Bot for Geriatric Care

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Abstract— Due to the global shortage of trained labor and the aging population, the healthcare industry may consider utilizing robots to fill the void. The deployment of Artificial intelligence-equipped senior care robots has been beneficial for the healthcare sector; however, adoption rates of these robots are still lower than those of other service robot market sectors. In the event of a sharp rise in different pandemic situations, like COVID-19 cases, we are adopting a number of measures to prevent the spread of contact. Moreover, healthcare workers are often infected due to the physical contact. This rationale led us to come up with this work. “Sahaya”, a multi-functional robot that offers not only food and drug delivery systems but also health monitoring, thermal screening, and UV disinfection in old age homes. It can be controlled either manually or automatically, and it can be used to carry food to patients as well as to give medicines and other emergency care. It offers real time monitoring, and it analyzes and displays the collected data through ThingSpeak (an IoT analytics platform).

Keywords—IoT, Artificial intelligence, health monitoring, U.V disinfection, thermal screening, ThingSpeak.

I. INTRODUCTION

Demand for caregivers and nursing homes is rising as a result of the world's aging population. Robotics in geriatric care is a vital way of addressing the mismatch between the number of senior citizens in need of medical care and the availability of caregivers. A UN analysis projects that the number of adults over 60 would increase from 962 million in 2017 to 21 billion in 2050 and 31 billion in 2100. Advances in technology have resulted in the development of robot caregivers and caretakers, who hold the potential to assist and monitor senior citizens.

A. Scope of the system

The deployment of robots in senior care is gaining more popularity and attention since it can enhance people's quality of life. Our “Sahaya” is designed to provide vital assistance, such as delivering food and medical items, monitoring medication compliance, and providing emergency alerts to protect senior citizens. These features help elderly people stay independent for a longer period of time and potentially reduce the need for advanced care. These smart devices are primarily intended to care for the elderly, the physically impaired, patients with infectious illnesses like COVID-19, and patients in locations where medical professionals are unable to reach them quickly.

Depending on the situation or environment, we can operate this robot either manually or automatically. The main aim is to avoid direct interactions and ensure a safe and healthy environment in geriatric care. In order to avoid direct contact and human effort, a bot that can serve food, medicines, and U.V disinfectant for disinfection along with temperature

screening is being proposed. An IoT analytics platform that enables us to accumulate, visualize, and analyze real-time data streams in the cloud is used to display the measured health parameters, including temperature and heart rate. Moreover, it is applicable to people who have undergone quarantine or are bedridden. This concept is put forward as a multifunctional bot whose functions will change according to the requirements of each one. While operating in automatic mode, we adopt a line-follower method, whereas in manual mode, we control this robot with the help of a mobile application. Our goal is to implement this bot in order to reduce physical interaction and human effort.

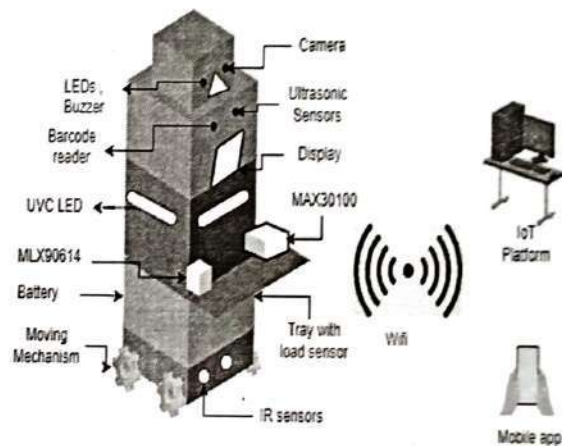


Fig. 1. Schematic diagram of the working model

B. Objective

The primary objective of this paper is to implement an IoT-based multirole robot that can be made effective in places like geriatric care without compromising on treatment quality and standard. This concept is put forward as a multifunctional bot whose function will change according to the requirements of each one. Therefore, we can offer comprehensive health monitoring and prompt food and medication delivery with the help of modern technological innovations.

Compared to other systems now in use, our suggested system offers numerous enhanced functions. A robot in an existing system is built for a specific environment. Here, we integrate many functionalities into a single robot to meet the demands of various contexts. All types of conditions and circumstances, including houses, nursing homes, and

Comparing the Performance of Lead-based and Lead-free Inorganic Perovskite Solar Cell Using SCAPS-1D

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Abstract

In perovskite solar cell (PSC) research fields organic-inorganic lead halide planar architectures are becoming popular as they are useful and workable for tandem structure easier fabrication process and low temperature processability. The commonly examined charge transport materials are organic for planar or inverted planar cells, as it affects from poor conductivity, poor chemical stability, and higher processing cost. In order to get better of the limitation of organic equivalent leads towards advancing regards in applying solution processed inorganic metal oxide transport layers up to definite level. Here in lead-based PSC structure and lead-free based PSC, studied about the achievement of electron transport materials ZnO (zinc oxide) and NiO_x (Nickel oxides) as hole transport material (HTM). The open circuit voltage (V_{OC}), short circuit current (J_{SC}), fill factor (FF) and power conversion efficiency (PCE) are thoroughly analysed. The aim of this paper is to presents a comparison between methyl ammonium lead iodide (CH₃NH₃PbI₃) based PSC structure and inorganic Cs₂TiBr₆ based PSC structure with NiO_x is used as a hole transport layer and ZnO is used as an electron transport layer. To study the performance of both the PSC structure, a simple but comprehensive ID simulation is used.

Keywords

Perovskite solar cell, Hole transport layer, Electron transport layer, Power conversion efficiency

Introduction

In the future photovoltaic technology has become a promising technology by depletion of fossil fuels [1]. Nowadays more advancements are being reported in solar cell technology, the requirement of most economical, efficient, green, and ample obtainable materials remains a challenge [2]. Compared to ordinary energy sources the best extensively available photovoltaic material is silicon solar cells, but it is not economical [3]. The performance of PSC materials is more and also economical. PSCs are processed at room temperature the PCE of PSCs is increasing from a few to more than 25% in a very small-time span [4]. Among the perovskite materials lead based metal halide perovskite have higher PCE and they become more attractive. Moreover, planar configurations of perovskites are smoothing the way for tandem junction cells [5]. There are two planar architectures n-i-p and p-i-n. But the inverted configuration remains admirable due to the processing feasibility at and $T < 150\text{ }^{\circ}\text{C}$ [6], lower hysteresis [7] and better carrier collection capability [4]. The p-type oxide has high bandgap and for incoming light NiO_x contributes better optical transparency, it is selected as HTM and ETM is selected as ZnO, an oxide with higher conductivity [8].

RESEARCH ARTICLE

Optimization of Lead-Free Cs_2TiBr_6 Green Perovskite Solar Cell for Future Renewable Energy Applications

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Abstract: Introduction: A modern genre of solar technology is Perovskite solar cells (PSCs), which are growing rapidly because they work well. The composition of links within the hole transport materials, electron transport materials and the footprint on PSCs is perovskite. Method: The traditional genre of lead halide perovskite can be swapped with a new perovskite compound called Cs_2TiBr_6 . Cs_2TiBr_6 has better properties when it comes to light, electricity, and solar energy. When comparing the performance of various electron transport films (ETFs) for the effective operation of perovskite, TiO_2 is recognized as an ETF as it has higher thermal stability, low-cost, and appropriate energy level. Results: The most productive hole transport film (HTF) for these perovskite solar cells, compared to other HTFs, has been demonstrated as V_2O_5 . Conclusion: The various solar cell characteristics of the proposed device, the " $\text{Au/V}_2\text{O}_5/\text{Cs}_2\text{TiBr}_6/\text{TiO}_2/\text{TCO}$ " perovskite solar cell, are investigated in this examination by tuning the parameters such as temperature, series resistance, defect density, etc.

Keywords: Green perovskite solar cell, numerical modeling, Cs_2TiBr_6 , V_2O_5 , TiO_2 , TCO.

1. INTRODUCTION

Natural processes constantly refill the energy sources known as non-conventional sources. These may be produced continuously and utilized again since they are difficult to exhaust [1]. A non-conventional energy source is solar energy. Solar-based cells are emerging as a serious rival to driving energy sources for producing power for climate-friendly, sustainable and practical energy advancements [2]. The electromagnetic radiation released by the sun is known as solar radiation, often known as the solar resource or simply sunlight. Solar radiation may be absorbed and converted into usable forms of energy, such as heat and electricity, using several methods. A solar cell, also known as a photovoltaic cell, is an electronic device that uses the photovoltaic effect to convert light energy directly into electricity. A photoelectric cell is a device whose current, voltage, or resistance changes in response to light [3-7]. In recent years, numerous techniques have been developed to capture solar energy, including solar architecture [8], solar heating [9], artificial photosynthesis, photovoltaics, photocatalytic water-splitting etc. The one that attracted the most attention was

photovoltaic, which uses photovoltaic effects to harness solar energy and convert sunlight into electricity [10]. Perovskite photovoltaics' light weight, flexibility, and straightforward manufacturing procedures are anticipated to enable new applications such as in-car solar cells and solar cells integrated into building materials [11]. Over the past ten years, there has been an exponential increase in the demand for clean energy, especially in the field of solar photovoltaics (PV). The amount of solar PV installed annually increases, demonstrating this dramatic growth. In 2018, for example, over 100 GW of solar PV was installed globally, and it is anticipated that by 2022, there will be over 200 GW of newly installed capacity [12-15].

First-generation solar cells are built of crystalline silicon and comprise monocrystalline (mono-Si) and polycrystalline (multi-Si) semiconducting materials [16, 17]. They are also known as conventional, classic, wafer-based solar cells. Thin-film technology is the foundation of second-generation solar cells or panels, which have substantial economic significance [18, 19]. These include amorphous silicon, CIGS, and CdTe. A dye-sensitized solar cell (DSSC) is a cost-effective solar cell element of the thin-film solar cell family. It is based on a photo-electrochemical [20-21] system in which a semiconductor exists between a photo-sensitized anode and an electrolyte. However, it's worth noting that while DSSCs have advantages in terms of low-cost manufacturing and

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A regulatory power split strategy for energy management with battery and ultracapacitor

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Ultra-capacitor

ABSTRACT

Electric vehicle batteries face fast degradation due to the high frequency of charging/discharging cycles and great peak power demands. Lifetime, continuity of supply and power density of these batteries affect the performance of electric vehicles (EVs). Hybrid energy storage systems (HESS) offers a feasible solution by incorporating other energy storage elements like ultra-capacitor (UC) along with battery. Their combination provides higher efficiency and better performance in terms energy/power density. UC can behave like a power buffer when the EV is accelerating and regenerating. The HESS needs a controller that can split the available power between different sub systems as per demand. This paper presents a regulatory control strategy useful in HESS with battery and UC for the speed regulation of a brushless DC (BLDC) motor using a 3-port bidirectional DC-DC converter. The regulatory control strategy monitors the state of charge (SOC) of UC and a fuzzy logic controller regulates the power flow between HESS and the motor. Simulation in MATLAB validates the efficacy of the strategy. Simulation results and hardware evaluation confirm that the regulatory control scheme is effective in splitting the available power according to the load demand and achieves better energy efficiency.

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1. INTRODUCTION

The appeal for energy increases day by day and the deteriorating stock of conventional fuel demands contemporary techniques for drive trains. Electric vehicles offer ecofriendly solutions with almost zero emissions. EVs were in use since 1890s. Considering longer periods, EVs are not only cost effective, but also provides better wheel-to-wheel efficiency, quick response, and ease of control. Hence, EVs are trendsetters not only in market but also among the research community across the globe. Significant amount of research and literature are available regarding EVs [1]–[4]. They deal the architecture of EVs, technologies, integration with the grid, range and range prediction problems, challenges and scope. All electric vehicle (AEV) has the battery alone as the source while hybrid electric vehicle (HEV) has another drive parallel or series with the battery. If the batteries are rechargeable from an external source, they are plug-in hybrid electric vehicle (PHEV). Rechargeable batteries provide the source and storage of energy for electric vehicles. Ni-Cd, Lead-acid, Li-ion, and Ni-MH are commonly available rechargeable batteries. In early days, EVs used Lead-acid batteries, but now a days electric drives mostly use Lithium-ion batteries [5], [6]. They offer better power and energy density, longer service life and are ecofriendly.

FRT capability improvement of a wind power system using support vector regression and deep neural network models

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ABSTRACT

The increasing energy demand and environmental conditions have led many countries to favor renewable energy, such as wind and solar, over conventional power plants. As per the Central Electricity Authority (CEA), India's wind power capacity has grown substantially, reaching 45,154 MW in 2023, from 22,465 MW in 2013. However, integrating wind generators to an existing power system network can reduce transient stability during faults. To prevent wind turbine disconnection during faults, Indian grid code authorities mandate Fault Ride Through (FRT) or Low Voltage Ride Through (LVRT) capability for wind turbines. This paper proposes Dynamic Voltage Restorer (DVR) for enhancing the FRT capability of a constant speed wind turbine. Analysis and simulation are done on a fixed speed wind turbine employing Squirrel Cage Induction Generator (SCIG) under balanced and unbalanced voltage sags. Performance of DVR with two Artificial Intelligence-based controllers, Support Vector Machines (SVM) Regression Model Based Supervised Machine Learning algorithm, and Deep Neural Network (DNN) controller, is analysed and compared. The SVM Regression algorithm, achieves 100% voltage sag compensation under unbalanced voltage sags, reduces torque pulsations to 25% and maintains rotor speed at rated values, enabling the turbine to remain connected to the grid. Additionally it reduces Total Harmonic Distortion to 2%.

ARTICLE HISTORY

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KEYWORDS

LVRT; constant speed wind turbine; DVR; DNN controller; SVM regression-based supervised machine learning

1. Introduction

The electricity demand is increasing globally and rapidly which causes increased loading of the existing power networks. They are operated close to stability limits due to economical and environmental limitations. This leads to voltage instability problems (Central Electricity Authority 2013). Global warming and rapidly depleting fossil fuel resources have prompted many countries to shift their focus to renewable energy sources. Fuel constraints encompass restrictions on fuel availability and surging fuel expenses, impacting power accessibility in various discernible ways. Renewable energy sources such as solar and wind play a pivotal role in overcoming these constraints, owing to their abundance, scalability, cost competitiveness, and environmentally beneficial attributes (Agrawal et al. 2023).

The intermittent nature of wind has certain disadvantages like voltage flicker and other power quality issues. Large-scale integration of wind power into the grid raises serious concerns during the occurrence of grid faults. Grid faults may cause voltage dips at the Point of Common Coupling (PCC), causing additional problems like voltage stability issues, loss of synchronism and cascaded tripping of wind generators from the grid. Therefore, electric utilities in many countries have made it mandatory that wind generators should ride through the grid faults of short durations.

New Indian Grid Codes (IWGC) require uninterrupted operation of wind farms, even during faults. Most of the existing wind farms employ constant speed wind turbine using SCIG that do not have LVRT or FRT capabilities. When a fault occurs PCC, a sudden drop in grid voltage results in a decrease of real power supplied to the grid, while the mechanical input to the turbine remains constant, which leads to the sudden increase in the rotor speed. When this speed becomes greater than the maximum tolerable value, the generator is disconnected from the grid.

The various conventional FRT techniques available are classified into control techniques and hardware technologies. Hardware techniques can be incorporated into both existing and new wind turbines. The common hardware techniques include FACTS devices including Static VAR Compensator (SVC), Static Synchronous Compensator (STATCOM), DVR, Unified Power Quality Conditioner (UPQC), and various types of fault current limiters (Gounder, Nanjundappan, and Boominathan 2010; Sufyan et al. 2019).

FACTS devices have a history of successfully preventing disconnection of wind farms during fault and provide reactive power support to maintain voltages within prescribed limits. DVR is a versatile FACTS device that can seamlessly mitigate voltage sags by injecting a series voltage proportional to sag depth



Buckling, bending and dynamic analyses of laminated three-phase polymer/graphene/carbon fiber composite rectangular plates

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Keywords

CFRP plate
Laminated composite
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Finite element analysis
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ABSTRACT

The bending and dynamic buckling analysis of graphene reinforced with carbon fiber reinforced polymer (CFRP) composite plates was investigated in this study. The CFRP composites were fabricated using the hand layup method. The mechanical characteristics of CFRP composites with 0–1 wt% graphene reinforcement were evaluated using ASTM tests. The experimental dynamic analysis is carried out on graphene reinforced CFRP composites. A higher order finite element (FE) formulation is implemented to compute the characteristics of the CFRP plate using MATLAB software. The FE model's validity is compared to numerical data reported in the literature, and the results demonstrate excellent agreement. Furthermore, parametric analysis is performed to explore the influence of wt.% of graphene, aspect ratios, and end conditions on the bending and dynamic buckling properties of graphene reinforced with CFRP composite plates.

1. Introduction

Due to their remarkable stiffness to weight ratio, corrosion resistance, and low density, carbon fiber reinforced polymer composites (CFRP) are commonly employed in the aerospace, naval, and energy sectors [1,2]. The interfacial adhesion of fibers with the matrix plays a crucial role in enhancing the mechanical performance of CFRP composites. Hence, the interfacial bond strength enhanced by modifying the fibers or particle toughening of the matrix is adopted in many studies [3,4]. Graphene is often utilized as a matrix filler due to its superior stiffness and strength [5]. Therefore, incorporating graphene into composite materials has gained significant attention in recent years. The

nanoparticle-reinforced CFRP composites have potential applications in the construction of wind turbine blades, sail boats, and sporting goods such as modern bicycles and tennis rackets [6,7]. Graphene is less costly to synthesize than carbon nanotubes (CNT) since it has a larger surface area [5,8]. Duan et al. [9] modified graphene using benzyl glycidyl ether reinforced with epoxy, which improved the mechanical properties due to the π - π interaction. Han et al. [10] obtained superior thermal and mechanical characteristics of graphene in epoxy than the CNT in epoxy.

Sharma et al. [11] reported that interfacial adhesion between CF/epoxy and graphene is due to the polar functionalities at the edges of the graphene oxide (GO) and epoxy chain interactions. There is an intrinsic weak zone at the fiber–matrix interface, which could be enhanced by

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Enhancement of vibrational characteristics of rotating CFRP composite tapered plates reinforced by graphene nanoparticles

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Abstract

In the present study, the dynamic behavior of rotating carbon fiber reinforced polymer (CFRP) composite tapered plates reinforced with graphene nanoparticles has been investigated using a finite element (FE) formulation. The mechanical properties of CFRP laminates containing 0–0.5 wt% graphene nanoparticles were assessed using ASTM standard tests. The experimental dynamic analysis was conducted on CFRP and graphene reinforced CFRP composites under cantilever end conditions. The first-order shear deformation theory (FSDT)-based FE model was developed using MATLAB software to obtain the natural frequencies of the graphene reinforced CFRP plates. The validity of the FE results is compared with literature, and it shows excellent agreement for composite structures. Furthermore, parametric analysis is performed to explore the influence of wt% of graphene, rotating speed, setting angle, and ply thickness on the dynamic responses of graphene reinforced CFRP tapered plates.

Highlights

- Effects of graphene reinforcement in CFRP composites are investigated.
- The mechanical characteristics were evaluated using ASTM standards.



Characterization of material, mechanical, static bending and vibration properties of glass fiber composite panels reinforced with graphene nanofillers

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Keywords

GFRP panel
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ABSTRACT

The present study investigates the material, mechanical, static bending and vibration characteristics of glass fiber reinforced polymer (GFRP) composites reinforced with graphene nanofillers. The crystallinity, functional groups, morphology, and tensile and flexural strengths of GFRP and graphene reinforced GFRP composites were examined using a variety of material and mechanical characterization techniques, including X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), scanning electron microscope (SEM), and tensile and flexural tests. The first-order shear deformation theory (FSDT) based finite element (FE) model was developed to obtain the static bending and vibration characteristics of the graphene reinforced GFRP composite panels. The validity of the FE model is verified with numerical data published in the literature. Further research is conducted into the effects of the wt% of graphene, end conditions, curvature ratio, and aspect ratio on the static bending and vibration characteristics of graphene reinforced GFRP panels. The findings of this study indicate that graphene reinforced GFRP panels could be utilized in a variety of applications, particularly for parts used in the aerospace and automotive industries.

1. Introduction

Composite structures are frequently used in the military, marine, and aviation industries because of their exceptional stiffness-to-weight ratio, high shear strength, and lower density [1,2]. The fiber-matrix interfacial adhesion of composites with fiber reinforcement greatly enhances their mechanical performance. These composite structures' stiffness is frequently decreased by dynamic loads in various environments. To enhance the mechanical characteristics of such structures, nano particles such as carbon nanotubes (CNT) [3] and graphene [4] have been incorporated into laminated composites. Compared to CNTs, graphene has a greater surface area, which makes it less expensive to synthesize [5]. Graphene is renowned for its higher strength and stiffness, and as a result, it acts as a matrix filler, increasing the interfacial surface area for matrix bonding and thereby increasing the matrix's strength and modulus [6–8]. The flexural and tensile strength of the composites were improved by an effective load transfer achieved with graphene in epoxy

due to the wrinkled structure and increased interfacial bonding [9]. According to Netkueakul et al. [10], increasing graphene in epoxy reduced particle aberration, which was further reduced as the filler particle surface area was reduced. Han et al. [11] showed higher mechanical and thermal performance employing graphene in epoxy over CNT-epoxy due to the high specific surface area offered by the graphene for adhesion and interlocking process between wrinkled graphene and epoxy.

Surface roughness is created by functionalizing graphene, which allows graphene to interlock with epoxy, improving mechanical characteristics and allowing for effective stress transfer [12]. Sharma et al. [13] found that the polar functionalities at the margins of graphene oxide (GO) and epoxy chains interact to cause interfacial adhesion between carbon fiber reinforced polymer (CFRP) and graphene. At the fiber matrix interface, there is an inherent weak zone that can be improved by boosting reaction sites or triggering surface energies with chemicals. As a result, graphene functionalization enhances interfacial

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INVESTIGATION AND OPTIMIZATION OF TRIBO-MECHANICAL BEHAVIOR OF SQUEEZE CASTED Al-Si PISTON ALLOY-BASED METAL MATRIX COMPOSITE USING RESPONSE SURFACE METHODOLOGY AND NEURAL NETWORK

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The piston in the automobile engine must withstand high stress and temperatures and also have low weight. The alloy of Al-Si is the most commonly used in the piston. The reinforcement using ceramics, fibres or nanoparticles will increase the properties of the piston alloy. In this work, the piston alloy is fabricated as a metal matrix composite of Al-Si reinforced by TiC-MoS₂ using the squeeze casting method. The squeeze casting effect on the matrix and the reinforcement is studied using tensile testing and microstructure analysis. The strength hardness obtained from the experimentation gives the highest tensile strength of 330 MPa and the hardness of 110HBN. The fractography and morphology are investigated using SEM (scanning electron microscope), resulting in the lowest porosity of 3.21% obtained in the composite material. The tribological behavior was also investigated at the condition of dry Sliding using pin on disc tribometer gives the lowest coefficient friction of 0.31 and the wear rate of 0.0051 mm³/m. The experiment is numerically designed and optimized using the response surface methodology (RSM). The obtained value is predicted and validated using a hybrid approach of deep belief network-reptile swarm algorithm (DBN-RSA). The regression of the parameters is about 99.97% showing that the model is very accurate to the experimental results. The RMSE of the proposed method implies less error and shows the accuracy level of the parameters. The result shows that the designed model is best fitted for the tribological and mechanical properties investigation of metal matrix composite.

Keywords: Squeeze casting; metal matrix composite; tensile testing; microstructure; tribological behavior.

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Novel Thermal Management of BIPV System-Liquid Earth-Based Cooling

Abhinand Vijay¹, Akshay Raj², Arun V. Madhu³, Cijo Kurian Abraham⁴, Manikandan H.^{5,*}

Abstract

The application of solar PV has tremendously increased in recent years owing to the improved efficiency and economic feasibility. Among the several applications of PV panels Building integrated photovoltaics has become a hot topic in research. However improper thermal management of solar panels is the main cause of a decline in efficiency and longevity. In this regard, water-based cooling systems, integrating cooling ducts, using optical filters, phase change materials, and air-passed cooling systems are some of the major techniques for boosting efficiency. This project focuses on upgrading the water-based back surface cooling system to increase the BIPV system's effectiveness by implementing a cooling channel on the back side of the 36-celled 70 W Photovoltaic panel. The project determines the back surface temperature of the solar panel and also the heat extraction rate by the newly designed cooling channel. The parameter considered for analysis was water velocity in the cooling channel ranging from 0.5 m/s to 3.5 m/s. The simulation results revealed that back surface temperature increases up to 326.186 K and a maximum heat extraction of 95674.75 J/s was possible at 3.5 m/s water velocity, accompanied with a 7763.06 Pa of pressure drop inside the channel.

Keywords: Solar panel, PV modules, Water Cooling, renewable energy, ANSYS FLUENT

INTRODUCTION

Usage of solar panels started by 1950s. From that onwards different innovations were made to increase its efficiency, design, durability, etc. By 1990s a new system of solar panel integration was discovered and known as Building Integrated Photovoltaic (BIPV) system. Its basic idea was to integrate solar panels on the walls of buildings. The interest in BIPV systems came to attraction by the 2000's due to its capability of designing net zero energy buildings by increased solar energy utilization. An entire year's worth of worldwide electricity needs can be met by the hour and a half's worth of moonlight that reaches the earth's surface. In solar energy systems, photovoltaic (PV) panels or optics are used to concentrate solar radiation and converted it to energy for electricity. This power has two possible storage methods; thermally or in batteries.

Solar Panel

Utilizing the sun's light, which is composed of minute energy particles called "photons," solar panels, also known as "PV panels," are gadgets that produce electricity that may be utilized to fuel electrical appliances. Solar panels gather then convert solar radiation into electrical power, which is subsequently used to power appliances and appliances. Solar panels are composed of multiple solar cells, each composed of layers of silicon in

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Stair Climbing Wheelchair

Tony Mathew^{1*}, Jayaraj J.², Joel Jaimon³, Kiran E.P.⁴, Vidhukrishnan U.⁵

Abstract

The wheelchair is an invention that has revolutionized the lives of people with disabilities, enabling them to move around independently and with greater ease. However, certain activities such as climbing stairs and working at heights have remained a challenge for people with disabilities, forcing them to rely on others for assistance. The solution to this problem has been the development of wheelchairs with elaborate sensors and gyroscopes that can perform complex tasks and help users navigate various terrains. While these advanced wheelchairs are effective, they can come with a hefty price tag, making them inaccessible for many people with disabilities who are on a low budget. As a result, there has been a growing demand for more affordable and accessible equipment that can still provide users with the same level of safety, convenience, and functionality. In response to this need, our team has developed a cost-effective, and portable wheelchair that is powered by electric energy. Our design is driven by the goal of providing users with a wheelchair that is not only affordable but also reliable and easy to use. Our wheelchair comes equipped with advanced features that enable users to perform different activities independently, such as ascending and descending stairs, getting to a height without external support, and traversing all kinds of terrain. This design has been created with safety and convenience as our top priorities, making it an ideal solution for people with disabilities who want a wheelchair that is easy to use, cost-effective, and functional. With our innovative design, we hope to empower people with disabilities to live more independently, allowing them to move around freely without any limitations or restrictions. By providing a more affordable and accessible solution for people with disabilities, we aim to enhance their mobility, independence, and overall quality of life.

Keywords:

INTRODUCTION.

Wheelchairs are widely used around the world to provide mobility to the elderly and disabled. An estimated 1% of the world's population, or just over 65 million people, need a wheelchair. However, the difficulty to access areas with curbs and stairs using a standard electric-powered wheelchair limits the scope of activities, thereby declining the quality of life of those who depend on electric-powered wheelchairs. Although slopes and elevators are being introduced to promote barrier-free locomotion, it is difficult to implement them in all public facilities.

Therefore, climbing up and down the stairs is inevitably a critical issue with respect to user safety. With the increasing interest in the aging population and health welfare around the world, various studies on indoor electric wheelchairs for the elderly and disabled are being conducted. The recent developments in the field of electric wheelchairs can be categorized into the wheel-type and caterpillar type methods [1]. The representative example of the wheel type method is ibot. The ibot presents a method of climbing stairs by changing the angle of movement and the center of gravity of the occupant. The other type of method is the caterpillar, which is

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Ergonomic Design and Intervention of a Chapati Making Machine

Adithya Shine¹, Ajith Joy², Aravind Shine³, Ashik Suresh⁴, Harikrishnan A.R.^{5,*}

Abstract

An ergonomic analysis of a chapati maker can provide valuable insights into the design and use of the device, and can help to identify opportunities to improve the safety and efficiency of work practices. Workers use Chapati maker throughout the day, which can cause a variety of musculoskeletal disorders. Musculoskeletal disorders caused by the individual's job are one of the main issues since they have a significant negative influence on quality of life, create a significant financial burden, and reduce productivity. Digital Human Modelling (DHM) software like CATIA V5 is used for both modelling humans and analysing ergonomics. The study employs observational methodology and experimental techniques such as the Nordic questionnaires, OWAS, RULA and REBA to gather data.

Keywords: CATIA V5, MSD, Nordic questionnaire, OWAS, REBA and RULA

INTRODUCTION

An ergonomic analysis of a chapati maker involves evaluating the design and use of the device to determine whether it promotes safe and efficient work practices for the user. This can include assessments of the physical demands placed on the user, such as the amount of force required to operate the device, the frequency and duration of use, and the body postures and movements involved in using the device. Overall, an ergonomic analysis of a chapati maker can provide valuable insights into the design and use of the device, and can help to identify opportunities to improve the safety and efficiency of work practices. Workers use Chapati maker throughout the day, which can cause a variety of musculoskeletal disorders. These conditions result from harm to soft tissue, including muscles, tendons, nerves, arteries, and joints. Unnoticed problems with the working approach are the work-related musculoskeletal disorders (WMSDs) in the upper extremity region, including the shoulder, hand, neck, wrist, and upper back region. The cause of the WMSDs that the workers encounter is determined to be prolonged standing, raised arm posture, and repetitive arm movements. Musculoskeletal disorders caused by the individual's job are one of the main issues since they have a significant negative influence on quality of life, create a significant financial burden, and reduce productivity.

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METHODOLOGY

Nordic Questionnaire

A standard Nordic questionnaire was modified for the study. The questions can be grouped into two sections namely demographical and job-related information. In demographical data section, personal details like age, sex, weight, height and marital status were included. In job-related information section, questions are included to collect data related to job duration, movements involved during the job such as standing hours, teaching hours per day, tools used, WMSC etc.

Design of Flexible Mobile Platforms for Industrial Elevation Tasks

Sreenath A.¹, Manuel George^{2,*}

Abstract

The goal of ergonomic risk assessment is to identify and mitigate the risk of injury or discomfort resulting from forceful, uncomfortable, or repetitive movements by evaluating workplace activities and the surrounding environment. The goal of the ergonomic assessment is to make sure that workers are safe and comfortable at work, which can boost output, lower absenteeism, and enhance general job satisfaction. This will discuss ergonomic assessment and the steps to conduct an ergonomic assessment in the Workplace. To detect and lower the risk of musculoskeletal disorders (MSDs) brought on by clumsy, repetitive, or forceful motions, it assesses workplace practices and environments. The primary goal is to investigate different ergonomic risk factors that the workers at KMML (the part that houses the segment production plant) are experiencing connected to musculoskeletal diseases at work. The work suggests corrective measures for task having high risk of developing musculoskeletal disorders and to undertake posture analysis of elevation activities.

Keywords: Ergonomic, KMML, MSDs, Filters, RULA

INTRODUCTION

An adaptive filter is a programmable filter whose frequency response is adjusted so that, in the output, the intended signal is extracted without deterioration and the distortion is reduced to the greatest extent possible. The design of furniture that is safe and user-friendly interfaces for machinery and equipment are examples of items where human factors engineering is useful. Appropriate ergonomic design is crucial to avoid musculoskeletal disorders and repetitive strain injuries, which can progress over time and cause permanent disability. Human factors and ergonomics center on the "fit"—also referred to as "fitting a job to a person" or "fitting the task to the man"—between the user, the tool, and the surroundings. To make sure that tasks, functions, information, and the environment are appropriate for the user, it takes into consideration the user's abilities and limits. Greek terms ergo, which means work, and nomos, which means health, are the roots of the word ergonomics. It is the study of how people

work and how to design the workplace so that people can easily adapt to it and be more productive. The study of ergonomics focuses on how employees interact with their workplace. This includes the physical space in which a person works, as well as the tools and materials, work practices, and work structure, whether the person works alone or as part of a team Human Health and safety are the main goals of ergonomics research and advice. This includes preventing musculoskeletal diseases and other health and safety goals in the workplace. Also, workplace health and safety laws in many countries have a strong connection to ergonomics [1-5]. In these situations, companies may not see ergonomics

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Paddy Sacking Conveyor

Arjun P.¹, Begin Abraham Ninan², Bibin Varghese³, Ceril M Mathew^{3,4}, Manikandan H.^{5,*}

Abstract

In this project, we are developing a highly efficient and effective screw conveyor packaging machine aimed at revolutionizing the way farmers pack their harvested paddy. The objective is to streamline the packaging process, saving valuable time and effort for farmers while ensuring optimal grain preservation and handling. During the paddy field harvesting period, it is common practice to store the collected grain at a designated spot within the field. Our innovative solution involves placing the screw conveyor packaging machine precisely at this location. This strategic placement eliminates the need for manual transportation of the harvested paddy, enhancing convenience and reducing labor-intensive tasks. When packaging is required, the operator simply activates the machine and positions the inlet towards the collected grain. The machine's intelligent design incorporates a screw conveyor mechanism that automatically pulls the harvested grain from the storage area towards the outlet of the packaging machine. This process significantly reduces manual intervention and expedites the packaging operation. To accommodate varying packaging needs, our machine offers flexibility in choosing the bag size. Farmers can opt for packaging bags weighing either 20 kg or 50 kg, depending on their specific requirements. This adaptability allows for greater versatility and caters to a wide range of market demands. The rotational movement of the screw conveyor is the driving force behind the grain's movement towards the outlet. We have incorporated a powerful motor to provide the necessary rotational power, ensuring smooth and consistent operation of the machine. This motor, combined with the precisely engineered screw conveyor system, guarantees efficient grain transfer without compromising the quality or integrity of the harvested paddy. Our screw conveyor packaging machine is set to revolutionize the way farmers pack their harvested paddy. By eliminating manual grain transportation and optimizing the packaging process, we aim to improve overall efficiency, reduce labor costs, and enhance grain preservation. This innovative solution is poised to significantly benefit farmers, offering them a streamlined and reliable packaging solution for their valuable produce.

Keywords: Packaging, transportation, paddy, harvesting, grain

INTRODUCTION

In today's agricultural landscape, the effective packaging of harvested crops plays a crucial role in ensuring their marketability and long-term preservation. Farmers often face challenges in efficiently packing their produce, particularly in the case of paddy, which requires careful handling and precise packaging techniques. Recognizing the need for a more streamlined and efficient solution, we have undertaken the development of a screw conveyor packaging machine that aims to revolutionize the packaging process for farmers.

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The primary objective of our project is to create a packaging machine specifically designed for paddy that simplifies the packaging process, reduces manual labor, and enhances overall

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Thermal Management of Cylindrical Lithium-Ion Battery Using A Wavy Tube

Albert Mathew^{1,*}, Parvathy Parthasarathy², Remin Rafi³, Priya Varghese⁴, Shoaib N.⁵

Abstract

To maintain a proper temperature range and eliminate local temperature disparities, thermal management is required for lithium-ion batteries in electric vehicles. A wavy tube is presented for a liquid cooling cylindrical lithium-ion battery module in this research. On the suggested battery module, three-dimensional transient simulations were run, and numerical improvements were made by changing the wavy contact angle of the wavy tube. The heat dissipation efficiency and temperature field homogeneity of the battery module improve when the wavy contact angle and mass flow rate rise. However, if the wavy contact angle or mass flow rate is raised, the favourable effects decrease because the wavy tube hits its limit in cooling the battery module. Experiments were conducted under simulated working settings to verify the battery module's heat transfer capability. The simulation results will provide particular reference values for cylindrical lithium-ion battery module thermal management. The circumferential contact area between the wavy tube and the batteries is determined by the wavy contact angle, which has a direct impact on the heat transfer rate from the batteries to the wavy tube and temperature homogeneity inside the battery monomer. A 60-degree contact angle with the battery module has proved to improve working conditions. At temperatures ranging from 25°C to 50°C, lithium-ion batteries may work efficiently and achieve a good mix of service performance and cycle life. Because of its excellent heat transfer efficiency, liquid cooling has gotten a lot of interest in BTM system research, especially for battery packs that operate at a fast discharge rate. Water is a better coolant than ethylene glycol, according to the results of both the steady state and transient analyses. However, in practice, a mixture of water and ethylene glycol is employed since it has superior characteristic

Keywords: Cylindrical, Lithium Ion Battery, wavy tube, Water, Ethylene glycol

INTRODUCTION

Compared to other batteries, lithium-ion batteries have a better energy density, longer cycle life, lower self-discharge rate, and higher efficiency, making them the best choice for electric vehicles. Temperature has a significant impact on lithium-ion battery performance, cycle life, and safety. A high battery temperature lowers battery performance and can potentially lead to rupture, explosion, and fire, whereas a low battery temperature causes localized degradation and reduces battery life. When a significant number of batteries are linked in series or parallel, the repercussions will be more severe. A wide uneven temperature distribution in a battery pack over time will damage battery consistency and result in state-of-charge (SOC) mismatches [1].

As a result, maximum temperature and temperature differential are two crucial characteristics that directly affect the battery

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Comparative Study of Various Injection Methods for Reducing Engine Heat of Internal Combustion Engine

Tony Mathew^{1,*}, Amal Jagadeesh², Abin Joy³, Aswin A.⁴, Aravind P⁵

Abstract

To maintain a proper engine temperature and better combustion of internal combustion engine an experimental study is conducted with mixing additional substance into the combustion chamber mixed with petrol. The additional substance added are water, hydrogen and methanol. Out of the three substances mixed with the fuel, the overall engine temperature and combustion is identified. The injection method is organized using a fuel injection system or by a carburettor. Three different methods were studied, including methanol, water, and hydrogen. The engine was naturally aspirated and operated at stoichiometric condition. In each test, the percentage of injection was varied from 0 to 100% and the full crank rotation is taken into consideration. The effects of the combustion at normal method and different injection methods were investigated and the overall combustion is validated. All injection methods are a promising approach with significant improvement in engine performance and knock suppression. The hydrogen injection method exhibits better a high energy content and burns cleanly, which can improve combustion efficiency and reduce emissions. Adding water to petrol can improve fuel economy and reduce emissions. Methanol has a high octane rating and can improve engine performance when added to petrol and it is also a renewable fuel source and produces lower emissions. Of all the three methods it has come to an end that by using methanol as the additional substance with petrol it can produce more power output with less engine temperature.

Keywords: Additive injection, heat management, engine performance, fuel efficiency, IC engine

INTRODUCTION

In current years, the increased usage of internal combustion engine has resulted in huge scarce of fossil fuel and it causes a threat to the nature by pollution. In order to make a small change in this situation several methods are used to reduce the pollution caused by IC engines and to reduce its consumption of fuel. The techniques used for this are of various types. However in this project idea, a technique called additive injection is used. By the additive injection method there are several advantages

which can be acquired. The main advantage of additive injection is its impact on engine performance. The overall engine efficiency, heat management, emission, combustion efficiency all can be varied.

Additive injection systems can be included as aftermarket upgrades or integrated into the engine's fuel delivery system. They provide adaptability and enable customization based on particular engine needs. However, in order to assure compatibility and prevent any potential detrimental effects on engine performance, it is crucial to adhere to manufacturer recommendations and utilise approved additives. Additionally, the use of

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Ergonomic Risk Analysis Using Various Ergonomic Assessment Tools to Reduce the Risk of Musculoskeletal Disorders (Msds): A Case Study in Construction Industry

Sarath T.R.¹, Tony Mathew^{2,*}

Abstract

As construction workers are often exposed to ergonomic risks, an accurate ergonomic risk analysis for job design is necessary to mitigate risks and consequently improve productivity. Ergonomic risks, which include musculoskeletal disorders (MSDs), cumulative trauma disorders, repetitive strain injuries, and repetitive motion injuries, are a major cause of occupational illness. The purpose of this paper is to identify the actual and potential hazards associated with Plastic mortar preparation, metal cutting, roofing, welding, concrete crushing, drilling, brick stacking, cement stacking, and plumbing. Ergonomic assessment is performed using various tools such as Nordic Body Map questionnaire analysis, NIOSH (National Institute for Occupational Safety and Health) lifting equation (LI), Rapid Upper Limb Assessment (RULA), Rapid Entire Body Assessment (REBA), and 3D Static Strength Prediction Program (3DSSPP). The risk scores are evaluated and prevention measures are recommended to avoid the possibilities of the risks and thereby reducing the Musculoskeletal Disorders (MSDs).

Keywords: Musculoskeletal disorders (MSD), Ergonomics, NIOSH, LI, RULA, REBA, 3DSSPP

INTRODUCTION

The construction industry is a dangerous place to work because its physical processes bring with it various ergonomic problems. The construction industry faces many risks of occupational accidents and fatalities, making it unique and challenging to study. Construction is always risky due to outdoor operations. Construction is a complex industry that employs a large manpower. The construction industry has often been compared to other industries and the chance of being injured or seriously ill is far greater than workers in most other industries. Construction is still one of the riskiest industries in terms of its activities. The industry stands out from other occupations by having the highest worker injury and fatality rates, making it the most at-risk industry for work-related musculoskeletal disorders (MSDs). This industry is characterized by worker mobility; changing workplaces, huge diversity with regard to the importance and type of work performed in extreme sensitivity to economic instability and large cyclical and seasonal fluctuations in the level of activity. Construction represents a strategically important sector in the provision of buildings and infrastructure, on which all sectors of the economy depend. Construction workers face different types of safety and health hazards every day while working on their sites.

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Semi-Automatic Cow Lifting Mechanism

Famy Antony¹, Jayashankar Pillai², Justin K Kurian³, Sayana Niyas⁴, Rabi. Johnson^{5,*}

Abstract

There is a great difficulty faced by the farmers due to lack of machinery needed to move cows manually and are struggling much because of the high costs involved in handling the problem. The primary challenge dairy farms face is lifting the cow that has fallen over owing to excess weight gained during pregnancy, a leg injury, or an infection. These cows must be lifted by at least two people, and it is exceedingly difficult to do so alone. Milma currently owns the necessary equipment to lift this kind of cow. The existing machinery, a cow raising crane, costs a lot of money to hire and costs Rs.5000 every day. Farmers cannot afford it, and a professional operator is required due to the equipment's considerable weight, expensive transportation costs, and lengthy running times. In this project, through our design, we intend to create a single-person-operable semi-automatic cow lifting mechanism. Two winching devices support the cow from the front and the back of the apparatus. Additionally, a hip clamp is available at the back to help lift the cow first. Winching equipment can be run manually or with a hand drill. Each 500 kg can be lifted by the winch. The design has been justified for its robustness by conducting a proper load analysis.

Keywords: Cow lifting mechanism, winching equipment, load analysis, design and fabrication, vehicle

INTRODUCTION

Background and Motivation

The design and fabrication of a cow lifting machine is driven by the need for efficient and safe handling of cows in various agricultural and veterinary settings. Cows, being large and heavy animals, often require lifting or support during various procedures such as medical examinations, treatments, hoof trimming, and artificial insemination. Traditional manual methods of lifting cows can be physically demanding, time-consuming, and pose a risk to both the animals and the handlers.

The motivation behind the design of a cow lifting machine is to address these challenges and provide a practical solution that ensures the well-being of the cows while improving the efficiency and safety of the handling process. By utilizing mechanical, electrical, and hydraulic systems, a well-designed cow lifting machine can alleviate the physical strain on handlers, minimize the stress experienced by the animals, and enhance the overall productivity and effectiveness of cow-related tasks [1].

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Moreover, a properly designed cow lifting machine can also contribute to reducing the incidence of injuries and accidents that may occur during manual handling. It provides a controlled and stable environment for the cows, reducing the risk of slips, falls, or sudden movements that can harm both the animals and the handlers.

The design and fabrication of a cow lifting machine have the potential to revolutionize cow handling practices, making them more efficient, humane, and safe. It offers a practical solution for farmers, veterinarians, and other professionals

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Diaper Dissolving Machine

Amal Es¹, Anandu Sajeev², Alen Jose³, Adarsh Joseph⁴, Navish Kumar^{5,*}

Abstract

In landfills, there are approximately 3.5 million tonnes of disposable diapers, according to the Environmental Protection Agency (EPA). Currently, used diapers are disposed of through burning, burying in the ground, or improper disposal on the ground, including illegal dumping by caregivers. These careless disposal practices pose the risk of spreading infectious diseases and contribute to environmental degradation. To address this significant problem, we propose a suitable nappy waste management system. The system consists of a container mounted on a metal pedestal, a shredder at the bottom, a solenoid valve for water supply, a salt distributor, and a control circuit as its primary components. The '1' key on the keyboard needs to be pressed as soon as a nappy is placed inside the container. The solenoid valve will then use a microcontroller to supply one diaper is worth of water at that moment. Like that, salt water supply is likewise managed. The keyboard's button '2' must be pressed if there are two diapers within the container. It is possible to get rid of five diapers at once because the solenoids' operation time grows in tandem. The shredder motor's working time is also adjusted by the microcontroller in accordance with the solenoid's operating time.

Keywords: Environmental Protection Agency, Landfills, Waste management system, Diapers, Disposable

INTRODUCTION

In the parenting journey, disposable diapers are a crucial product that provides high levels of performance, convenience, and affordability. Used often in households are disposable diapers. Disposable diapers are favored over cloth diapers because they do not need to be washed, dried, or folded after each use. This makes them a need for parents who work, especially because cloth diapers can be reused. Disposable diapers have been available since the early 1960s, and their widespread use has helped to steadily grow the baby diaper industry. Over the years, various iterations of diapers have been developed and altered for wider applicability. However, this has also made it more difficult to dispose of and recycle diapers once they have been used. Over the period of 2016–2050, an increase in global garbage from 2 to more than 3 billion tons is anticipated. The World Bank's show that the distribution of solid waste is Food wastes account up 44% of all garbage, followed by paper, plastic, glass and rubber and wood. 2018b The World Bank In the US, around 20 billion diapers are disposed of each year, generating 3.5 million tons of solid trash. Each child uses between 6000-9600 diapers

throughout their first 2.5 years, according to data from Malaysia, which equates to 1.7 million tons of diaper garbage yearly. Diaper waste is burned in several nations in Europe and Asia Baby diaper waste has drawn a lot of attention in recent years due to its enormous volume and challenging recycling procedure. Baby diapers are composed of cellulose, superabsorbent polymers plastic sheet. With a production rate of 2.119 million tons in 2014, baby diapers accounted for more than 74% of the US\$ 7.1 billion worldwide superabsorbent polymers market. According to Arena et al. (2016), waste baby diapers [1] currently make up 2%–7%

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Cutting Tool for Accurate Cutting of PVC Pipes

Ajith K.G.N.¹, Alex Mathew George², Balakrishna K.P.³,
Febin Santhosh⁴, Amal R.^{5,*}

Abstract

An abstract describing a PVC pipe cutting tool based on Nichrome 80 wire is provided. The cutting tool consists of a frame, a handle, and a high-resistance nichrome 80 cutting wire that generates heat when an electrical current passes through it. The wire is mounted between two fixed posts on the frame and is powered by a battery-operated electrical source. All the user has to do is hold the handle and move the wire along the PVC pipe. The wire heats up rapidly and cuts through the pipe with ease, precision, and cleanliness. The cutting tool is ideal for use in a variety of situations because it is lightweight and portable. The main advantages of conventional cutting tools such as Hacksaws and Miter saws are that they are simple to use and they require minimal training, making them accessible to a wide range of users. They are also very cheap. However, they have a number of drawbacks, such as poor cutting accuracy, increased labor needs, and shorter tool life. Our new design aims to address these shortcomings of the traditional tools. The cost of the new design is only slightly higher than that of the conventional tools. A patent application will be submitted at a later time to protect its intellectual property because of its unique design and functionality.

Keywords: PVC Pipes, battery, wire, cutting tool, Nichrome 80

INTRODUCTION

PVC pipes are utilised for a wide range of piping tasks, primarily the delivery of drinking water tourban areas. They are a fundamental component of modern culture. Many fluids can be transported due to their physical properties. These pipes are low maintenance and robust as well. Recyclable PVC pipes can be done easily eight or ten times. In many structures, these pipes are used to insulate wire. They are also reasonably priced and safe to use. Hacksaw blades are the best tool for the job, but precise cutting of pipes requires back-and-forth motions repeatedly, which takes time and is only practical for pipes that are not too thick. In contrast, pipe cutters use a metallic blade to cut pipes, and they are more dependable and faster than hacksaw blades.

However, they have the drawback that after cutting the PVC pipe, the clamp must be manually returned to its original position, which results in hand pain and fatigue. PVC pipe needs to be precisely cut in order to prevent turbulence from the fluid running through it from being restricted. Because the material can project from the area of the cut, it is crucial to cut PVC pipe accurately. Which results in a loose fit, and in some cases, it may lead to less and a deviation from the ideal profile for the proposed work. PVC is more durable when submerged in the earth and has superior chemical resistance to dangerous substances [1-4].

Hot wire-cutting technology is employed by the apparatus. NiCr wire is heated to a particular temperature in order to cut PVC pipes with various

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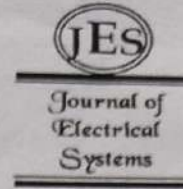
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Development of Fuzzy Logic Controller in Automatic Vehicle Navigation using IoT



Abstract: - The integration of fuzzy logic controllers in automatic vehicle navigation systems represents a significant advancement in intelligent transportation systems, especially when paired with Internet of Things (IoT) functionalities and optimized through genetic algorithms. This innovative fusion harnesses the precision of fuzzy logic, the connectivity of IoT, and the optimization capabilities of genetic algorithms to transform automatic vehicle navigation. Fuzzy logic controllers excel in managing uncertainty and imprecision, providing decision-making capabilities akin to human reasoning. By simultaneously assessing multiple inputs and determining actions based on degrees of truth, fuzzy logic enables safe and efficient navigation in dynamic driving environments with fluctuating variables like obstacle proximity and traffic flow. IoT integration enhances navigation systems by enabling real-time data collection and sharing among vehicles and infrastructure, fostering adaptive route planning and improving the overall navigation experience. Genetic algorithms further optimize system performance by iteratively adjusting fuzzy logic controller parameters, ensuring efficient decision-making tailored to specific performance criteria such as travel time and fuel consumption. This collaborative integration of fuzzy logic controllers, IoT, and genetic algorithms offers a holistic solution to the challenges of automatic vehicle navigation, enhancing safety, efficiency, and adaptability in complex driving scenarios. Beyond enhancing individual vehicle performance, this approach contributes to overall transportation system efficiency and safety by mitigating traffic congestion, reducing emissions, and minimizing accidents. Consequently, these integrated systems address crucial societal challenges and pave the way for widespread adoption of autonomous vehicles in the future.

Keywords: Fuzzy logic controllers, Automatic vehicles, Internet of things, Genetic algorithm.

I. INTRODUCTION

Automatic vehicle navigation, also known as autonomous or self-driving vehicle technology, stands at the forefront of transformative innovation in road transportation. It represents a paradigm shift aimed at enhancing safety, efficiency, and accessibility in transportation systems worldwide. This technology relies on a sophisticated array of sensors, cameras, and radar systems, coupled with advanced algorithms and artificial intelligence (AI), to perceive and interpret the surrounding environment in real-time. By comprehending complex traffic scenarios, including the behavior of other vehicles, pedestrians, and various obstacles, autonomous vehicles navigate roads with precision, aiming to revolutionize the concept of mobility [1]-[3].

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Central to automatic vehicle navigation is the ability to process vast amounts of data from onboard sensors accurately. These sensors collect information about the vehicle's surroundings, which is then analyzed by onboard computers running complex AI models. Through this process, autonomous vehicles continuously update their understanding of the environment, adjusting their speed, steering, and braking to ensure safety and compliance with traffic laws. Integration with global positioning systems (GPS) and digital maps allows these vehicles to plan routes, navigate through cities, and adapt to changing conditions such as traffic congestion [4]–[6].

Connectivity features enable autonomous vehicles to communicate with other vehicles and infrastructure, further enhancing their ability to anticipate and react to potential hazards. This communication, facilitated by technologies like cellular networks (5G), Wi-Fi, and dedicated short-range communications (DSRC), allows for real-time data exchange and fosters a more comprehensive information ecosystem. By sharing data on traffic conditions, weather updates, roadwork information, and vehicle diagnostics, vehicles can make informed decisions, improving overall navigation efficiency and safety [7]–[9].

Autonomous vehicles operate across a spectrum of automation levels, from partially automated systems requiring human oversight to fully autonomous systems capable of operating without any human intervention. As the technology matures, it promises to reduce traffic accidents caused by human error, alleviate congestion through optimized routing, and provide mobility solutions for those unable to drive. [10]–[12].

The FLC (fuzzy logic controllers) are a critical component of an autonomous vehicle's navigation system. This means that, even as the world shifts unpredictably, cars can keep driving straight ahead. The construction of any FLC meant for vehicle navigation involves several important steps. The first prerequisite Regardless of the future direction of high technology, automatic vehicle navigation demands a clear set basic not fuzzy decisions. The input and output variables of a navigation task are distance to obstacles, vehicle speed, and steering angle which are all defined in such a case.

The magical core is the rule base for an FLC which is composed of a variety of If Then rules and describes the way the system should react when different combinations of input conditions occur. They are extracted from expert knowledge or empirical data and designed to imitate human decision processes. The FLC checks up on the rules given the present input and uses inference procedure, like Mamdani method and Sugeno method evaluations on them to decide on actions are suitable. The rules' outputs are aggregated and defuzzified to produce hard control commands for the vehicle, such as particular steering angles or velocity values [13]–[15].

The development of automatic vehicle navigation based on rules means that we create and implement predefined instructions or "rules" which guide the behaviors of self-driving cars. This systematic approach involves a range of specific situations or decisions the vehicle may encounter while driving, such as traffic signals, obstacle avoidance, and speed limits. With rule-based systems, the simplicity and transparency are good. But they still must overcome a number challenges of complexity and unpredictability in human driving environments [16]–[18].

When it comes to the architecture of the smart car network, the Internet of Things has constructed a multi-layered platform that includes various technologies. This architecture is not comprised only of multi-layered perception; you also have network, data process, application, security layers. The networking supports real time, accurate collection and transmission of data that can be analyzed for more timely feedback even as data come in. Data usually arrives at varying intervals, they are often incomplete, and their significance depends on context. Real-time data sources: filter more data points than ever before! IoT technology helps with this by providing a wealth of real-time statistical information from linked sensors and devices - improving situation awareness as well as encouraging adaptive decision-making [19],[20].

Genetic algorithms can significantly enhance the performance of fuzzy logic controllers for automatic vehicle navigation. Drawing from the art of natural selection, genetic algorithms can change and enhance the parameters and rules of fuzzy logic systems over time, adapting to different conditions and making for better control of navigation. Before deploying fuzzy logic controllers, IoT integration, and genetic algorithms must be evaluated carefully. By using simulated environments like virtual ones to mimic real-world conditions, developers can optimize systems and predict how they will behave, making necessary changes to reduce the risks involved in real world tests.

To a greater extent, performance of automatic vehicle navigation systems is examined through real-world testing

OpenFOAM modelling of single-phase and two-phase heat transfer in square ducts partially filled with porous medium

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Abstract

The primary objective of the current computational research is to provide open-source solvers for studying heat transfer through media having pore implants for one-phase and multi-phase flow. The new solvers are created with the OpenFOAM framework. The Darcy–Forchheimer model is used to simulate the flow through the media with pores. The interface for a two-phase flow is tracked using the VOF phase fraction technique. The energy equations of these solvers are used with the local thermal equilibrium model and phase change model to calculate heat transfer in the presence of a porous media. The recently created solutions are tested against benchmark situations for both flows. In further case studies, the compactness and porousness of the porous medium are varied to examine the features of heat transport in square channels. It is discovered that, as compared to a channel without a porous medium, the transfer rate for single-phase flow is increased by a factor of 10.4. According to the results of the two-phase study, as the porousness of the porous medium increases, the percentage of vapour concentration and heat transfer rates also increase for thickness (compactness) ratios (H_p^*) > 0.4. For the channel with $H_p^* = 0.4$, the rate of heat transfer is improved if the porosity of the porous matrix rises.

Keywords

computational fluid dynamics (CFD)
code development
porous medium
phase change
square duct
heat transfer enhancement.

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Research Article

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1 Introduction

The porous medium is extensively used in various applications in engineering, particularly in heat exchangers, heat pipes, oil recovery and petroleum, food processing, hydrology, soil science, and biological tissues. The energy demand is thriving at a much more rapid rate in some regions of electronic device cooling, battery cooling in electric cars, thermal management of data centres, cooling of reactor cores, re-entry vehicles, etc. (Hayes et al., 2008; Lu et al., 2008; Magnini, 2012; Kheirabadi and Groulx, 2016; Liu, 2017). An electronic chip's required heat removal rate can touch even $300 \text{ W}\cdot\text{cm}^{-2}$. The heat generated in these devices can be removed through channels with various sizes and shapes. For heat transfer enhancement, these channels may be provided with twisted strips, conical rings with

pierced holes, baffles, etc. (Nakhchi and Esfahani, 2019a, 2019b). Out of these methods, installing the porous media is conveniently employed in heat exchangers and heat pipes for managing the thermal loads in both conventional and terrestrial applications. Determining the factors that influence the heat transfer and hydraulic features of the channel that possess the porous media is essential for its design. However, investigations of conduit pipes with porous mediums are difficult as the full-scale modelling is computationally very intensive. So, the averaging process is the only viable solution to this problem. The governing equations of the macroscopic variables are derived from the standard equations fluid dynamics by averaging it over areas or volumes comprising many pores (Vafai, 2015; Das et al., 2018). There are many numerical investigations with different models (Khashan and Al-Nimr, 2005; Carciofi

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Factors Influencing the Design of Parabolic Trough Collector: A Review

Navish Kumar*

Abstract

Due to limited resource availability and high conventional energy usage, research into renewable energy has increased during the past few years. Utilizing collecting systems, significant renewable energy can be produced from the available solar radiation. The majority of solar energy harvesting systems use parabolic trough concentrating collectors. The performance of parabolic trough collectors as a whole is examined in this paper. The operating characteristics, such as the type of receiver and collector material, the medium for heat transfer, the type of application, and varied environmental conditions, all affect the performance.

Keywords: Radiation, parabolic trough collector, thermal analysis, efficiency, energy

INTRODUCTION

Energy consumption is based on the use of traditional energy sources. The release of highly poisonous gases influences the greenhouse effect, producing climatic changes and natural disasters, which reduces the need for traditional energy resources. Identifying a provider of renewable energy is crucial to solve these issues. Heat is transferred from the sun to water or any other substance that absorbs heat as it moves through the receiver pipe. Finally, a tank is used to store the hot water for residential usage [1]. Concentrated collectors are used in solar thermal power production to produce high temperatures with great thermal efficiency and a minimal collecting surface [2]. For low temperature applications, non-concentrating collectors were employed. When temperatures are high, a concentrator is employed instead of a nonconcentrating collector [3]. In order to optimize the design of the parabolic trough collector, the aspects to be taken into account are reviewed in this study.

PARABOLIC TROUGH COLLECTOR

A solar collector [reflector] made of a reflecting material, such as glass, aluminium, or stainless steel, makes up a parabolic trough collector (PTC). It is used to catch the sun's intense rays and bounce them back towards the receiver, which is situated in the middle of the collector's focus line. The receiver consists of an absorber tube enclosed in an evacuated glass shell that is often coated with stainless steel or copper to selectively absorb solar light while emitting low levels of infrared radiation. To absorb solar energy and transfer the heat to the steam generator or the heat storage system, a fluid is circulated

through the absorber tubes [4]. A solar thermal collector's primary parts are its collection, receiver, fluid or heat transfer medium, tracking system, and storage tank [5]. The physical model of the trough collector and all of its accessories are shown in Figure 1. Along the focal line of the collector, a solid plug is placed in the absorber tube. The reflected radiation from the tube is prevented in the evacuated space, thereby prevents the heat losses [6].

Figure 2 depicts the stages of the energy transfer process. Figure 3 shows a diagrammatic

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Liquid Metallurgy Synthesis of Gr or MoS₂-Reinforced Aluminum Composites: a Short Review

MONIKANDAN V. V.*, PRATHEESH K.

Abstract: This review briefs the vortex casting and hardness of mono aluminium matrix composites (AMCs) and hybrid AMCs (HAMCs) containing lamellar solids (Gr (graphite) or MoS₂ particles). The vortex addition process and the associated process parameters to fabricate the mono and hybrid AMCs are discussed. The Gr particles are coated with Ni or Cu where they alloyed with the melt to enhance the wettability. Furthermore, the addition of alloying elements and the particle preheating improve the wetting of the uncoated lamellar solids with the melt. The Gr-reinforced or MoS₂ reinforced mono AMCs exhibited a decrease in hardness with the addition of lamellar solids. In HAMCs, the ceramic particles resist the indentation, leading to their better hardness than the lamellar solid reinforced mono AMCs.

Keywords: Gr-reinforced composites; hardness studies; MoS₂ reinforced composites; stir casting

1 INTRODUCTION

Metal matrix composites (MMCs) are methodical combinations of different materials (one of them is a metal) synthesized to attain customized properties [1, 2]. Thus, MMCs possess two or more duly dispersed phases (physically and chemically unique) whose combined properties (mechanical, tribological, or physical) are better than the individual phases [1]. The hybrid MMCs (HMMCs) possess two or more reinforcement phases to exhibit various properties and sustain different operating conditions [3-5]. The hybrid aluminum matrix composites (HAMCs) and mono aluminum matrix composites (AMCs) are proposed as candidate materials to replace aluminum alloys used to fabricate elements of automotive power train, chassis, and body [5, 6]. The intention behind synthesizing HAMCs containing lamellar solids and ceramic particles is to impart better tribological and mechanical properties [7-9]. The mono AMCs are also synthesized with lamellar solids. The composites containing MoS₂ or Gr (graphite) particles have shown the most potential for different commercial applications [3]. Gr particles (lubricity enhances with condensable vapors [10]) and MoS₂ particles (lubricity degrades with moisture in the air [10]) exhibit contrasting lubrication characteristics, based on which the suitable operating environments are selected. Gr possesses a sheet-like crystal structure [10] wherein all of the carbon atoms in its basal planes (atomic layers) are bonded together by strong covalent bonds, while weak van der Waals forces bond the basal planes themselves [11]. A carbon atom in the basal plane of Gr joins three adjacent carbon atoms at a distance of 0.1415 nm and an angle of 120°. At room temperature, the distance between the atomic layers of Gr is 0.335 nm [10]. The hardness of Gr in a direction parallel to the basal plane is 8.5 Mohs or reasonably greater than 1500 Vickers Pyramid Number (VPN) [12]. MoS₂ is one of the transition-metal dichalcogenides and forms a large molecule with a layer lattice [13]. Each layer of MoS₂ is stacked, and strong covalent bonds exist within the layers [14], and a layer is bonded to the layer above and below by weak van der Waals forces [10]. MoS₂ is highly anisotropic, and even though the mean hardness is only about 1 to 1.5 Mohs, its crystallite edges can be 8 Mohs

(roughly equivalent to 1000 VPN) [15]. Unlike Gr, MoS₂ possesses intrinsic lubrication property [16].

The hardness of Gr-reinforced mono AMCs decreases with the increase in the addition of Gr particles, and the same phenomenon is also observed for the MoS₂ reinforced mono AMCs [7, 17]. On the contrary, the increase in the addition of ceramic particles increases the hardness of mono AMCs having ceramic reinforcements [18]. The HAMCs contain both lamellar solids and ceramic particles, providing interesting premises to discuss their hardness. In the past few decades, self-lubricating HAMCs and mono AMCs (containing Gr or MoS₂ particles) fabricated through solid and liquid-state processing methods have frequently been reported [19]. However, particles-reinforced composites produced through liquid metallurgy are observed to be the least expensive [20]. Foundry processing enables the synthesis of intricately shaped components at high production rates and sizeable numbers - the requirement of the manufacturing industries [20]. The vortex-based casting process (stir casting) has been widely used to synthesize AMCs owing to the flexible, simple, and commercially viable execution of the process [20, 21]. The above discussion revealed the scope to discuss the hardness of mono AMCs and HAMCs reinforced with Gr or MoS₂ particles. Furthermore, it is understood that the vortex-addition technique is a convenient method to synthesize the commercially viable, particles-reinforced composites. By taking these factors into account, the synthesis of self-lubricating mono AMCs and HAMCs (containing Gr or MoS₂ particles) through stir casting is discussed in this short review. Furthermore, the hardness of these composites is also reviewed with an emphasis on the combined influence of lamellar solid and ceramic particle addition on hardness.

2 GRAPHITE-REINFORCED MONO AND HYBRID ALUMINUM COMPOSITES

The synthesis of Gr-reinforced mono and hybrid AMCs through vortex casting is discussed; the hardness of these composites is also reviewed in this section.

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Dielectric Properties of Reduced Graphene Oxide with Nickel Cobalt Ferrite and Nickel Zinc Ferrite Epoxy Nanocomposites

Manuel George^{1,*}, P.P. George²

Abstract

In this work, two systems of the composite were prepared using NiCoFe and NiZnFe with reduced graphene oxide (rGO) epoxy and the samples were subjected to electrochemical impedance spectroscopy (EIS). The Quality factor and loss tangent values of the composite was found out as a function of frequency. The modified ferrite-graphene-epoxy blends show dielectric loss and Quality factor values at low frequency. The incorporation of graphene aims to improve electrical conductivity, while the magnetic nanoparticles contribute to enhanced dielectric permittivity. The fabrication process involves the dispersion of these nanofillers within the epoxy matrix, followed by thorough characterization of the resulting nanocomposites using techniques such as impedance spectroscopy and scanning electron microscopy. NiZnFe-rGO obtained higher Quality factor in the intermediate concentration at higher frequencies but the loss tangent obtained least in the higher frequency range. The dielectric loss was least with NiCoFe-rGO which is due to the decrease of grain size at the same time dielectric loss was high for NiZnFe-rGO. Thus, a synergistic effect obtained with multifunctional fillers on the dielectric constant, dielectric loss, and electrical conductivity of the nanocomposites. The study aims to provide insights into the tailored design of advanced dielectric materials for applications in electronic devices, capacitors, and electromagnetic shielding, exploiting the unique properties of graphene and magnetic nanoparticles in epoxy nanocomposites.

Keywords: Quality factor, dielectric constant, loss tangent, frequency range, graphene, epoxy.

INTRODUCTION

Due to its covalent bond and insulating properties, the polymer specifically epoxies won't play any part in ion conduction. Electronics have employed epoxy blends with conducting fillers as coating materials, embedding materials, and dielectric compounds [1, 2]. There happens an interaction between the conducting filler and the epoxy polymer blends [3]. These interactions would depend on the concentration of fillers and the mixing protocol and hence affect the conductivity of the polymer [4].

Ni-Zn ferrite, were developed for the applications where high permeability and low loss were the main requirements. High concentration (50 wt%) of micro filler particles causes the insulation problems such as increased dielectric loss and decreased breakdown strength and improved the resistance with less amount [5, 6, 7].

Under high frequency and high voltage electric fields, epoxy's low dielectric constant reduces electrical coupling, reduces signal distortion, and has low dielectric loss and strong breakdown strength. These properties assure dependable

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Spinning a New Narrative of Total Productive Maintenance Strategies in Textile Manufacturing

Ajith Raveendran¹, Manikandan H.^{2,*}

Abstract

Since there is nothing more than what an intense and globalized era demands, quality has emerged as one of the most important factors in determining an institution's survival and success. Well-run companies understand that their bottom lines could be severely impacted by customer reliability. Consequently, a number of fiercely competitive businesses are continually increasing their standards for quality. They are using a quality system called total productive maintenance (TPM) and are holding themselves to high standards for their manufacturing processes. The purpose of the study is to increase workstation effectiveness by implementing the TPM program inside textile industry processing units. A variety of workstations' overall equipment effectiveness (OEE) has been assessed. Because Total Productive Maintenance (TPM) is more similar in the manufacturing sector, OEE analysis is used as a success metric when applying TPM. A maintenance program called total productive maintenance (TPM) uses a recently developed idea to maintain machinery and plants. The TPM program's objective is to significantly boost output while concurrently raising staff morale and work satisfaction. It can be considered as the medical science of machines. TPM brings maintenance into focus as a necessary and vitally important part of the business. It is no longer regarded as a non-profit activity. Downtime for maintenance is scheduled as a part of the manufacturing day and, in some cases, as an integral part of the manufacturing process. The goal is to hold emergency and unscheduled maintenance to a minimum.

Keywords: Textile processing unit, Total productive maintenance, Overall equipment efficiency (OEE) and quality

INTRODUCTION

Total productive maintenance (TPM) is a maintenance program, which involves a newly defined concept for maintaining plants and equipment. The TPM program's objective is to significantly boost output while concurrently raising staff morale and work satisfaction. It might be referred to as the machine science of medicine. TPM emphasizes maintenance as an essential and crucial component of the company. It isn't thought of as a nonprofit endeavor anymore. Maintenance downtime is planned into the manufacturing day and, in certain situations, is an essential component of the manufacturing process. Minimizing unplanned and emergency maintenance is the aim [1].

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OBJECTIVES

The important ones are listed below.

- Avoid wastage in a quickly changing economic environment.
- Producing goods without reducing product quality.
- Reduce cost
- Produce a low batch quantity at the earliest possible time.
- Goods sent to the customers must be non-defective

Next-Gen Parking Technology: Automatic Hand Brake Systems Unveiled

Bimalrag P.¹, Manikandan H.^{2,*}

Abstract

Hand brakes are one of the most important safety systems in a motor vehicle. When parked, the hand brake mechanism's primary function is to maintain the car's secure motionlessness. The primary purposes of the brake system are to slow down the car, maintain speed when driving downhill, and, in the end, park the car in a stationary position on a level or sloping road. Human intervention is involved in the conventional hand brake actuation process. The hand brake will not function if the lever is not pulled or pushed. Also, humans frequently forget to apply the hand brakes, either out of carelessness or in an emergency. This could cause the car to roll on slopes and collide with other cars in the parking lot. The automatic handbrake is a crucial component of modern cars, as safety is the primary concern. Our project is to develop a model for the automatic handbrake system which engages and disengages handbrake in automobile and to make it affordable to common man. The model is planned to develop as an external attachment that could be fixed with the existing hand brake mechanisms in automobiles. With the aid of mechanical actuators or sensors, the external attachment will correspond with the hand brake's typical operation. In our automated field, modern cars might have electronic park brake systems, which are more user-friendly and practical than manual parking brake systems. However, our model's goal is to automate vehicles with traditional manual park brake systems by repairing an external component without changing the manual park brake's standard design or functionality using electrical component.

Keywords: Modern cars, handbrake, motor vehicle, EPB, DC motor

INTRODUCTION

For our safety, the hand brake is a crucial part of motor vehicles. The hand brake on an automobile is typically a latching brake that is used to stop the vehicle. The hand brake systems found in many Indian cars in the low-end segment are entirely mechanical and are operated by cables and levers alone. These cables transmit the force required to stop or hold your car in place when you pull on the hand brake lever. The hand brake is connected to the steel cables, which tighten when the hand brake is pulled. The majority of cars have drum brakes on their back wheels, which work by pulling a lever that compresses the brake shoes to stop the car when the hand brake is applied.

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A parking brake is a mechanical hand lever or foot-operated backup braking system. It is also referred to as an emergency brake or an e-brake. The hand brake is usually found between the front two seats of most vehicles on Indian roads. The standard hydraulic brakes on your car are totally different from the hand brake, which operates the rear brakes. It is responsible for maintaining a parked car's motionlessness and stopping it from rolling down a



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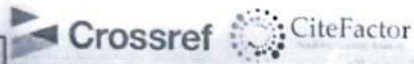
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Examining How Perceived Attitude Induces Purchase Intention When Price Sensitivity And Perceived Risk Act As Moderators In The Purchase.



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Keywords:

Purchase intention, SEM, perceived risk, perceived attitude, perceived value, perceived risk, Price sensitivity

Dr. Prima Anne George

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Mr. Bose Tom

Abstract

The study examined the moderating impact of perceived risk and price sensitivity in the relation between perceived attitude and purchase intention. It also analyzed if there is any significant relation of perceived quality on perceived value and perceived attitude. In the same manner, influence of perceived value on perceived attitude was also studied. The study was done on the purchase intention towards personal care products. The sample size was taken to be 384. The study used confirmatory factor analysis and SEM for the analysis of data. The findings depicted that neither perceived risk nor price sensitivity moderated the relation between perceived attitude and intention to purchase. Perceived quality is seen having a significant influence to perceived attitude. Perceived quality is having significant influence on the perceived value and perceived value and

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Examining How Perceived Attitude Induces Purchase Intention When Price Sensitivity And Perceived Risk Act As Moderators In The Purchase.

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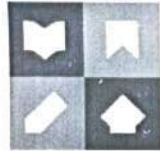
The study examined the moderating impact of perceived risk and price sensitivity in the relation between perceived attitude and purchase intention. It also analyzed if there is any significant relation of perceived quality on perceived value and perceived attitude. In the same manner influence of perceived value on perceived attitude was also studied. The study was done on the purchase intention towards personal care products. The sample size was taken to be 384. The study used confirmatory factor analysis and SEM for the analysis of data. The findings depicted that neither perceived risk nor price sensitivity moderated the relation between perceived attitude and intention to purchase. Perceived quality is seen having a significant influence to perceived attitude. Perceived quality is having significant influence on the perceived value and perceived value and perceived quality is having significant relation to perceived attitude.

Keywords: Purchase Intention, SEM, Personal care products, Perceived attitude, Perceived risk, Price sensitivity

1. INTRODUCTION

Fast Moving Consumer Goods (FMCG) are products that are relatively low priced showing a fast turnover categorised into personal care, household care and food and beverages. Personal Care includes cosmetics, oral care products, personal wash products, hair care products etc. FMCG has intense competition and every effort of the marketer is to surpass that. Consumer's perception and behaviour with regard to purchase has to be understood well in advance. This in turn lead to the strategic planning and managerial decision with regard to a product's sales and marketing (Hawkins et. al., 2004). Various researches were done in connection with the purchase behaviour to explain the forces driving towards behavioural intention to purchase. It has studied that quality, value and customer satisfaction when taken collectively are directly related to behavioural intention in service context (Cronin, Brady & Hult, 2000) quality consciousness, value of money and brand consciousness forms attitude towards purchase of cosmetics (Jawahar & Tamizh Jyothi, 2013), price, availability, quality, taste, attractiveness of packaging, quantity, ingredients, brand and influence by the media (Vibhuti & Pande, 2014) affect FMCG purchase. It has also found that customer of personal care products and cosmetics like best quality product, good service, easy availability of products and better performance (Poranki, 2015). The earlier researchers have identified factors influencing the purchase process of personal care products mostly inclusive under FMCG category. The studies have taken into account the factors like quality (Joseph & Kumar, 2014; Sahoo, Dash & Nataraj, 2010; Mahalingham and Kumar, 2012; Jawahar & Tamizhjyothi, 2013), attitude (Joseph & Kumar, 2014; Sukato & Elsey, 2009; Jawahar & Tamizhjyothi, 2013), price (Joseph & Kumar, 2014; Sahoo & Dash, 2010; Mahalingham & Kumar, 2012; Vibhuti & Pandey, 2014), novelty

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An Analysis Of The Impact Of Digital Marketing On Consumer Purchasing Behaviour

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ABSTRACT

Digital marketing refers to the promotion of products or services using digital technologies and platforms, primarily on the internet. It encompasses various online marketing tactics, strategies, and channels to connect with current and potential customers. The goal of digital marketing is to reach and engage with target audiences in a cost-effective and measurable way. The study used analytical style of research methodology to examine how digital marketing affects customer purchases. The study tries to find out the factors which affect online consumer purchase behaviour. Consumer purchase behaviour refers to the process individuals go through when making decisions about which products or services to buy. It involves several stages and is influenced by various factors, including psychological, social, cultural, and situational elements. Data collected is both primary and secondary. Primary data collection is done through questionnaire distributed among a sample size of 100 college students and working professionals from Kottayam district. The study tries to find out how perceived usefulness impact consumer buying behaviour and also the relationship between age and influence of advertisement media, gender and buying pattern.

Keywords: digital marketing, consumer buying behaviour, perceived usefulness, buying pattern,

INTRODUCTION

The dynamics of customer behaviour have undergone a substantial shift with the use of digital marketing. Businesses looking to properly target and engage their consumers must comprehend this relationship. Global reach is one of the significance of digital marketing. Global audience access is effortless with digital marketing. It permits companies to reach a worldwide clientele without having to make big financial commitments. Online Marketing or internet Marketing is often one of the best cost effective approach when compared with the traditional way of marketing. Since its costs are cheaper and engagement is higher, it offers a superior return on investment (ROI). Businesses can target particular demographics, interests, and geographic areas using digital marketing. Reaching prospective clients who are likely to be interested in the supplied good or service is more likely thanks to this focused strategy. Unlike traditional marketing, digital marketing provides tangible and measurable results. It allows businesses to track their marketing efforts in real time, enabling them to adjust their strategies to improve performance. Interaction and Engagement: Digital marketing allows for two-way communication between businesses and their customers. It lets companies interact with their target market using a variety of digital platforms, including websites, emails, and social media. Through digital marketing, businesses can build and establish their brand more effectively. It allows for consistent and targeted brand messaging, which helps in creating a strong brand presence in the digital sphere. Online consumer buying behaviour refers to the process and patterns by which individuals make purchasing decisions when shopping online. While similar to traditional consumer buying behaviour, online buying behaviour has its own unique characteristics and considerations due to the digital nature of the transaction

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DIGITAL LEARNING: A PARADIGM SHIFT IN THE LEARNING CULTURE AMONG EMPLOYEES OF INDIAN ORGANIZATIONS.

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ABSTRACT

Advancements in technology bring more options for employee training and development. Here we delve into the paradigm shift in learning culture of Indian employees with the advancements happening in digital learning. In the fast-moving highly competitive work environment opportunity to learn online will be a relief for the busy employee. The aim of this paper is to contribute to the discussion on the impact of technology in the changing trends of learning and development activities of the Indian Organizations with special reference to Banking and telecom Sector where employee skill up gradation is of prime importance. It also intends to identify the motive behind attending digital learning and to identify the mode of digital training adopted by various organizations. An attempt was made to identify the impact of digitalization on re skilling of employees in the highly competitive work environment. A literature review about e learning aspects is done .An online survey is proceeded to identify motives of digital learning and modes of digital learning. Primary results show there is extensive usage of digital learning in Indian organizations and most of the organizations use Learning management Software's for Employee training and digital training helps to get domain specific learning environment to the employees round the clock where time and cost will not be a major barrier.

The study aims to through a light on the impact of technology in talent development and nature of knowledge transfer in the digital era

Keywords: Digital learning, up skilling, Re skilling, LMS

INTRODUCTION

With the advancements in technology a paradigm shift is happening in the teaching leaning process and it's not only applicable in the educational sector but also into the learning and development activities among employees and many organizations has started adopting digital learning for providing training programs for their employees which is flexible more cost effective and convenient to the busy workforce who are finding it difficult to devote time for learning. Digital pedagogy starting from sharing material through whats App groups and power point presentations put inputs into the aspect of digital learning. Ability to use digital pedagogy enhance the work quality of the employee. Rao, A. B., & Kishore, M. (2019, April) The paper looks in to the scope of digital learning in learning and development activities of the organizations and how organizations utilize the facility in providing digital training to the employees a survey was conducted among employees in Indian telecom and Banking industries to get an understanding on the mode of digital learning adopted by various companies. By 2025, half of all workers will require retraining due to the introduction of new technology, predicts the World Economic Forum. In five years, more than two thirds of the skills required for today's jobs will change. By 2025, one-third of the skills that employers will need are those related to technology, which aren't now considered essential for today's workforce. In the era of Industry 4.0 and beyond, there is a need for reskilling and enhancing worker readiness for the future. Utilizing the wealth of



Dielectric Properties of Reduced Graphene Oxide with Nickel Cobalt Ferrite and Nickel Zinc Ferrite Epoxy Nanocomposites

Manuel George^{1*}, P.P. George²

Abstract

In this work, two systems of the composite were prepared using NiCoFe and NiZnFe with reduced graphene oxide (rGO) epoxy and the samples were subjected to electrochemical impedance spectroscopy (EIS). The Quality factor and loss tangent values of the composite was found out as a function of frequency. The modified ferrite-graphene-epoxy blends show dielectric loss and Quality factor values at low frequency. The incorporation of graphene aims to improve electrical conductivity, while the magnetic nanoparticles contribute to enhanced dielectric permittivity. The fabrication process involves the dispersion of these nanofillers within the epoxy matrix, followed by thorough characterization of the resulting nanocomposites using techniques such as impedance spectroscopy and scanning electron microscopy. NiZnFe-rGO obtained higher Quality factor in the intermediate concentration at higher frequencies but the loss tangent obtained least in the higher frequency range. The dielectric loss was least with NiCoFe-rGO which is due to the decrease of grain size at the same time dielectric loss was high for NiZnFe-rGO. Thus, a synergistic effect obtained with multifunctional fillers on the dielectric constant, dielectric loss, and electrical conductivity of the nanocomposites. The study aims to provide insights into the tailored design of advanced dielectric materials for applications in electronic devices, capacitors, and electromagnetic shielding, exploiting the unique properties of graphene and magnetic nanoparticles in epoxy nanocomposites.

Keywords: Quality factor, dielectric constant, loss tangent, frequency range, graphene, epoxy.

INTRODUCTION

Due to its covalent bond and insulating properties, the polymer specifically epoxies won't play any part in ion conduction. Electronics have employed epoxy blends with conducting fillers as coating materials, embedding materials, and dielectric compounds [1, 2]. There happens an interaction between the conducting filler and the epoxy polymer blends [3]. These interactions would depend on the concentration of fillers and the mixing protocol and hence affect the conductivity of the polymer

[4]. Ni-Zn ferrite, were developed for the applications where high permeability and low loss were the main requirements. High concentration (50 wt%) of micro filler particles causes the insulation problems such as increased dielectric loss and decreased breakdown strength and improved the resistance with less amount [5, 6, 7].

Under high frequency and high voltage electric fields, epoxy's low dielectric constant reduces electrical coupling, reduces signal distortion, and has low dielectric loss and strong breakdown strength. These properties assure dependable

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Mini Review on Synthetic Route for the Fabrication of Ag_2MoO_4 Nanoparticles Via Ultrasonic Irradiation

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Minireview Article

ABSTRACT

An efficient and ultrasonic technique is adopted for the successful synthesis of silver molybdate (Ag_2MoO_4) nanoparticles using D- Glucose as reducing agent. To investigate the changes on the morphology and particle size of silver molybdate nanostructures the synthesis parameter such as various sonication times was applied in preparation process. The as-prepared silver molybdate nanostructures were systematically characterized by techniques like powder X-ray diffraction (PXRD), scanning electron microscopy (SEM), UV-Visible (UV-Vis) spectrophotometer and photoluminescence (PL) spectrum. The SEM analysis evidenced that the irregular particle, rod-like, and uniform spherical nanostructures of silver molybdate were produced using different sonication times. In addition, the situ coating of Ag_2MoO_4 nanoparticles on silver and copper beads under sonochemical technique is also investigated. Sequentially, the antibacterial properties of different silver molybdate samples were investigated against the pathogens like *S. aureus*, *E. Coli*, and *P. aeruginosa*. The antibacterial results demonstrate that the Ag_2MoO_4 nanoparticles act as promising antibacterial agent against gram-negative and gram positive pathogens.

Keywords: Ag_2MoO_4 NPs; sonochemical synthesis; morphology; PL; optical and anti-bacterial properties.

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Microwave Chemistry: Preparation of Ag_2MoO_4 Nanoparticles using Microwave Radiation

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ABSTRACT

One pot microwave synthesis is carried out for the synthesis of silver molybdate nanoparticles (Ag_2MoO_4 NPs) in the presence D-glucose. The as-synthesized Ag_2MoO_4 NPs were characterized by UV-Visible spectroscopy, transmission electron microscopy (TEM) and infrared spectroscopy. The XRD studies shows approximately 63 nm particle size of Ag_2MoO_4 NPs is generated by microwave heating. The structural investigation of the silver molybdate nanoparticles are studied by Fourier transform infrared spectroscopy (FTIR) and energy dispersive X-ray analysis (EDX). In UV region, broad absorption peaks are shown for Ag_2MoO_4 nanoparticles and the peaks are in blue shift region from 250-550 nm. The Photoluminescence spectra (PL) exhibited one intense emission peak centered at 362 nm for the Ag_2MoO_4 nanoparticles. In addition, the mechanism of the formation of Ag_2MoO_4 nanoparticles via microwave heating in the presence of d-glucose is also mentioned.

Keywords: Ag_2MoO_4 spinel; photoluminescence; mechanism.

1. INTRODUCTION

Important advantages of Microwave-assisted heating are the fast reaction times, high-

throughput capabilities and beneficial crystallization effects. In this article, a novel pathway to synthesize silver molybdate nanoparticles (Ag_2MoO_4) using d-glucose

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