CRITERION 3 Research, Innovations and Extension	3.4 Research Publication and Awards
3.4.3: Number of research papers per teachers in the journal notified on UGC website during last five years	

RESEARCH PUBLICATIONS 2021

Document details - An Efficient Synthesis of Heterogeneous and Hard Bound Ti^{IV}-MCM-41 Catalyzed Mannich Bases and π-Conjugated Imines

ChemistrySelect

Volume 6, Issue 48, 27 December 2021, Pages 14071-14076

An Efficient Synthesis of Heterogeneous and Hard Bound Ti^{IV}-MCM-41 Catalyzed Mannich Bases and π-Conjugated Imines(Article)

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View additional affiliations

Abstract

A heterogeneous and hard bound Ti^{IV} anchored MCM-41 material has been successfully evaluated for catalytic applications in the one pot synthesis of highly functionalized β-amino ketones and quinoline appended π-conjugated imines via Mannich reaction and condensation reaction, respectively. The synthetic transformation was successfully catalyzed via the dual Bronsted and Lewis acetic nature of the Ti-MCM-41 material that provided excellent yields of the desired products. The heterogeneous catalyst shows good catalytic performance, facile separation from the reaction mixture and can be reused in more than five catalytic cycles without any significant loss in the yield. © 2021 Wiley-VCH GmbH

Funding details

Funding sponsor	Funding number	Acronym
	SB/FT/CS-95/2014	
	SB/EMEQ-297/2014	

Funding text #1

. Author Dr. K. Selvakumar gratefully acknowledges the financial assistance from DST-Fast Track Young Scientist scheme (Ref. No. SB/FT/CS-95/2014) and SERB-EMEQ (Ref. No. SB/EMEQ-297/2014)

Funding text #2

Author Dr. K. Selvakumar gratefully acknowledges the financial assistance from DST-Fast Track Young Scientist scheme (Ref. No. SB/FT/CS-95/2014) and SERB-EMEQ (Ref. No. SB/EMEQ-297/2014).

ISSN: 23656549
Source Type: Journal
Original language: English
DOI: 10.1002/slct.202103547
Document Type: Article
Publisher: John Wiley and Sons Inc

Document details - Design and optimization of unit production cost for AWJ process on machining hybrid natural fibre composite material

International Journal of Lightweight Materials and Manufacture

Volume 4, Issue 4, December 2021, Pages 491-497

Design and optimization of unit production cost for AWJ process on machining hybrid natural fibre composite material(Article)

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View additional affiliations

Abstract

It is very difficult to handle composite material using cutting edge process. The surface defects, fibre – matrix delamination, fibre pullouts and bulk material removal are some of the common effects while machining composite material. To reduce such machining effects, an advanced machining processes are suggested for difficult to cut composite materials. In this research, a hybrid natural fibre composite material is developed inhouse to study the performance of machinability through abrasive water jet cutting process. The natural composite material is developed with two filler materials such as palm and coconut shell powder. During machining the water jet pressure, nozzle traverse speed and standoff distance are varied to predict the optimal process condition. Further the unit production cost for two different combination of material is optimized using a natural evolutionary based genetic algorithm. It was found that the unit production cost for 10 wt% filler reinforce natural fibre composite yields maximum production cost compared to 7.5 wt% filler material reinforcement for nearby machining process parameters. The variation in production cost is due to the influence of mechanical cum metallurgical quality, distribution and densification of filler material reinforced. The level of experiments is also validated using regression analysis. © 2021 The Authors

Author keywords

Composite | Filler | GA | Machining | Optimization | Parameters

Indexed keywords

Engineering controlled terms: Composite materials | Costs | Cutting tools | Genetic algorithms | Jets | Machining | Machining centers | Natural fibers | Regression analysis | Reinforcement | Surface defects

Engineering uncontrolled terms: Composites material | Design and optimization | Fibre composite materials | Filler materials | GA | Natural fiber composites | Optimisations | Parameter | Production cost | Unit production cost

Engineering main heading: Fillers

ISSN: 25888404
Source Type: Journal
Original language: English
DOI: 10.1016/j.ijlmm.2021.07.002
Document Type: Article
Publisher: KeAi Publishing Communications Ltd.

Document details - Equitable fair domination in graphs

Discrete Mathematics, Algorithms and Applications

Volume 13, Issue 6, 1 December 2021, Article number 2150083

Equitable fair domination in graphs(Article)

Swaminathan, V., Sundareswaran, R., Lakshmanaraj, D., Nataraj, P., Muthusubramanian, L.

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View additional affiliations

Abstract

Graphs considered here are simple, finite and undirected. A graph is denoted by G and it has vertex set V (G) and edge set E(G). Inspired by two concepts, this paper comes into existence. One is the degree equitability in graphs conceived by Prof. E. Sampathkumar and the other is fair domination (that is, vertices outside the dominating set are dominated by equal number of vertices) [Y. Caro, A. Hansberg and M. Henning, Fair domination in graphs, Discrete Math. 312 (2012) 2905-2914], Equitable fair domination is studied here. © 2021 World Scientific Publishing Company.

Author keywords

Equitable domination | Equitable fair domination | Fair domination

ISSN: 17938309
Source Type: Journal
Original language: English
DOI: 10.1142/S179383092150083X
Document Type: Article
Publisher: World Scientific

Document details - An efficient GBDTRSO control strategy for PV connected H-Bridge Nine Level MLI System with quasi-Z-source inverter

Applied Soft Computing

Volume 113, December 2021, Article number 108026

An efficient GBDTRSO control strategy for PV connected H-Bridge Nine Level MLI System with quasi-Z-source inverter(Article)

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Abstract

In this manuscript, an extended topology based switched coupled inductor quasi-z-source with nine-level inverter is proposed for three-phase grid-tie photovoltaic power system using hybrid technique. The proposed method is the combined execution of Gradient Boosting Decision Tree (GBDT) and Rat Swarm Optimizer (RSO), hence it is called GBDTRSO method. The major objective of the GBDTRSO method is "compute the performance of photovoltaic system by the maximal power extraction". Here, the designing of the proposed inverter is optimized to supply the maximal power from photovoltaic power generating system. Besides, the higher voltage gain diminished current ripple switched coupled inductor quasi-Z-source inverter i.e extended boost switched coupled inductor quasi-Z-source inverter topology is proposed. The vital aspects of proposed topology is higher voltage gain, ripple free continual source current, typical ground amid the direct current source and inverter circuit, therefore it is optimized for photovoltaic utilizations. The objective function is deemed depending upon its controller parameters with limits like, power, voltages, current, modulation index. These parameters have been employed to the inputs of proposed method. Ensure the maximal power supply to the load using Gradient Boosting Decision Tree technique in terms of maximum power point tracking. Furthermore, the Rat Swarm Optimizer diminished the feed power and controls the direct current link current, voltage and frequency levels. The proposed technique is activated in Matrix Laboratory (MATLAB)/Simulink platform, also the efficiency is likened with different existing methods. The statistical analysis of proposed and existing methods using energy sources is also analyzed. Finally, the experimental outcomes demonstrate that the proposed method is more efficient than the other existing methods. © 2021 Elsevier B.V.

Author keywords

Current | DC link voltage | Frequency circumstances | Gradient Boosting Decision Tree algorithm (GBDT) | Modified Cascaded H-bridge nine level Multi Level Inverter System | PV power generating system | Rat Swarm Optimizer

Indexed keywords

Engineering controlled terms: Bridge circuits | Decision trees | Electric inductors | Electric power system control | Electric power transmission networks | Gain measurement | Maximum power point trackers | Photovoltaic cells

Engineering uncontrolled terms: 'current | Cascaded H-bridge | DC-link voltages | Decision-tree algorithm | Frequency circumstance | Gradient boosting | Gradient boosting decision tree algorithm | Inverter system | Modified cascaded H-bridge nine level multi level inverte system | Multilevels | Power generating systems | PV power generating system | Rat swarm optimizer | Swarm optimizer

Document details - Studies of kerf width and surface roughness using the response surface methodology in AA 4032–TiC composites

Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering

Volume 235, Issue 6, December 2021, Pages 2240-2253

Studies of kerf width and surface roughness using the response surface methodology in AA 4032–TiC composites(Article)

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View additional affiliations

Update notice

ERRATUM to Studies of kerf width and surface roughness using the response surface methodology in AA 4032–TiC composites (Proc IMechE, Part E: J Process Mechanical Engineering, (2021), 10.1177/09544089211041418)

(2021) Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering, 235 (6), p. 2281.

Abstract

A substantially developed machining process, namely wire electrical discharge machining (WEDM), is used to machine complex shapes with high accuracy. This existent work investigates the optimization of the process parameters of wire electrical discharge machining, such as pulse on time (T_{on}), peak current (I), and gap voltage (V), to analyze the output performance, such as kerf width and surface roughness, of AA 4032–TiC metal matrix composite using response surface methodology. The metal matrix composite was developed by handling the stir casting system. Response surface methodology is implemented through the Box–Behnken design to reduce experiments and design a mathematical model for the responses. The Box–Behnken design was conducted at a confident level of 99.5%, and a mathematical model was established for the responses, especially kerf width and surface roughness. Analysis of variance table was demarcated to check the cogency of the established model and determine the significant process. Surface roughness attains a maximum value at a high peak current value because high thermal energy was released, leading to poor surface finish. A validation test was directed between the predicted value and the actual value; however, the deviation is insignificant. Moreover, a confirmation test was handled for predicted and experimental values, and a minimal error was 2.3% and 2.12% for kerf width and surface roughness, respectively. Furthermore, the size of the crater, globules, microvoids, and microcracks were increased by amplifying the pulse on time.

Author keywords

kerf width | metal matrix composites | microcracks | response surface methodology | surface roughness | Wire electrical discharge machining

Indexed keywords

Engineering controlled terms: Electric discharge machining | Electric discharges | Metal casting | Metallic matrix composites | Microcracks | Surface properties | Titanium carbide

Cited by 3 documents

Kalita, K. , Kumar, V. , Chakraborty, S.

A novel MOALO-MODA ensemble approach for multi-objective optimization of machining parameters for metal matrix composites

(2023) Multiscale and Multidisciplinary Modeling, Experiments and Design

Fan, S. , Hu, X. , Ma, X.

Removal Mechanism and Electrochemical Milling of (TiB+TiC)/TC4 Composites

(2022) Materials

Saini, P. , Singh, P.K.

Experimental Investigation On Energy Consumption And Surface Finish In Turning Of Al-4032/6% SiC Composite Fabricated Through Stir Casting

(2022) Surface Review and Letters

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Document details - Investigation of flow dynamic characteristics of inverse fluidized bed biofilm reactor for degrading pharmaceutical based biomedical wastewater

Environmental Engineering Research

Volume 26, Issue 6, December 2021, Article number 200182

Investigation of flow dynamic characteristics of inverse fluidized bed biofilm reactor for degrading pharmaceutical based biomedical wastewater(Article) (Open Access)

Sabarunisha Begum, S., Sikkandar, M.Y., Prakash, N.B., Bakouri, M., Alanazi, A.B., Alkhatlan, N.M.S.

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Abstract

The paper investigates the flow dynamic behaviour of inverse fluidized bed biofilm reactor (IFBBR) for the treatment of pharmaceutical based biomedical wastewater. The residence time distribution (RTD) study has been employed as a tool to investigate the flow dynamic behaviour of wastewater within the reactor. The biofilm reactor is operated using Pseudomonas fluorescens for various ratios of settled bed volume to reactor working volume (V_b/V_r) with different superficial air velocities and examined their impact on flow dynamics. The outcomes of this study demonstrate the presence of dead volume and short circuiting in the reactor were reduced for the optimized (V_b/V_r) ratio of 0.20 and optimum superficial air velocity $(U_g)_m$ of 0.220 m/s. The potential of IFBBR was experimentally validated by analysing the chemical oxygen demand (COD) removal efficiency, total dissolved solids (TDS) and total suspended solids (TSS) emanating from the wastewater. Findings of this study reveals that maximum COD reduction of about 92% was achieved when the reactor was operated with $(V_b/V_r)_m$ of 0.20 with superficial air velocity, U_{gm} of 0.220 m/s showing the optimal operating parameters for IFBBR which has good mixing and less back mixing condition inside the reactor.

Author keywords

Chemical oxygen demand | Flow dynamics | Inverse fluidization | Liquid biomedical wastewater | Residence time distribution | Superficial velocity

Indexed keywords

Engineering controlled terms: Air | Biochemical oxygen demand | Biofilms | Bioreactors | Dissolved oxygen | Fluidization | Mixing | Residence time distribution | Velocity | Wastewater treatment

Engineering uncontrolled terms: Air velocities | Biofilm reactor | Chemical-oxygen demands | Dynamic behaviors | Dynamics characteristic | Flow dynamics | Inverse fluidization | Liquid biomedical wastewater | Pseudomonas fluorescens | Superficial velocity

Engineering main heading: Fluidized beds

Document details - Fabrication and Characterization of Hybrid Natural Fibre-Reinforced Sandwich Composite Radar Wave Absorbing Structure for Stealth Radomes

Transactions on Electrical and Electronic Materials

Volume 22, Issue 6, December 2021, Pages 794-802

Fabrication and Characterization of Hybrid Natural Fibre-Reinforced Sandwich Composite Radar Wave Absorbing Structure for Stealth Radomes(Article)

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View additional affiliations

Abstract

Natural fibre based sandwich composite wave absorbing structures were prepared and characterized for stealth and radome applications. The principal aim of this research was to develop a novel sandwich radar wave absorbing composite structure and evaluating their wave transmission and flexural properties. Fibres such as wool, silk, E-glass, aramid and wave absorbing foams like balsa wood, PVC and PMI were used for making wave absorbing sandwich composites. The composites were prepared using autoclave vacuum bag degassing method followed by post curing at 120 °C. The radar wave transmission characteristics were investigated using stealth radomes by partially replacing the traditional E-glass and aramid fibre structure with a frequency selective surface (FSS) with standard parameters. The free space measurement technique was used to examine the radar wave transmission characteristics in the X-band frequency range (8.2–12.4 GHz). Three point bending test also performed to identify the flexural strength of sandwich composite setup to ensure the bending rigidity. A highest wave transmission of 87.7% at bandwidth 0.83 GHz in −1 dB with flexural strength of 44.2 MPa was observed for sandwich composite type 3c, which contains aramid/epoxy composite + balsa wood + silk/epoxy structure. The SEM micrographs showed highly reacted and toughness improved matrix phase for type 3c composite sandwich.

Author keywords

EM wave transmission | Natural fibre | PMC | Sandwich | Stealth

Indexed keywords

Engineering controlled terms: Aramid fibers | Bending dies | Bending strength | Composite structures | Foams | Frequency selective surfaces | Glass | Radar | Radar measurement | Radomes | Silk | Transmissions | Wave propagation | Wood

Engineering uncontrolled terms: Absorbing structure | Composite sandwiches | Fabrication and characterizations | Free space measurements | Frequency selective surface (FSS) | Three-point bending test | Transmission characteristics | X-band frequency range

Engineering main heading: Wave transmission

Document details - Crystallinity Change and Reduced Warpages on Thin Walled Parts-the Effect of Nano Fumed Silica on Polyacetal

Silicon

Volume 13, Issue 12, December 2021, Pages 4611-4622

Crystallinity Change and Reduced Warpages on Thin Walled Parts-the Effect of Nano Fumed Silica on Polyacetal(Article)

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View additional affiliations

Abstract

Polyacetal is widely used in thin walled injection moulding due to its high mechanical properties. But, its widespread application is limited due to volumetric shrinkage and warpage. The investigations on reducing warpage on Polyacetal is attempted by incorporating nano fumed silica of 1 wt% to 5 wt% as a nucleating agent. The crystallinity study shows that the crystallization rate is increased with the addition of fumed silica up to 4 wt%, beyond which it is reduced. The increased warpage and tensile strength are observed with increase in crystallinity. The tensile strength of PA/5 wt% FS nanocomposite is 1.79% lesser than PA/4 wt% FS nanocomposite, but still 2.5% higher than neat PA. The effect of the filler on surface roughness and optical properties such as haze and gloss are also studied. The micro voids are steadily increased as filler loading increases. Hence, the surface roughness increases uniformly upon increase of filler and it does not depend on crystallinity but depends on growth of micro voids. Furthermore, the microscopic analysis is carried out through FTIR, XRD and SEM and discussed. It is concluded from the above analysis that 5 wt% of FS loading into PA reduces warpage of the thin walled parts with a gain of mechanical strength than neat PA. © 2020, Springer Nature B.V.

Author keywords

Crystallinity | Polyacetal | Silica | Surface roughness | Thin wall | Warpage

Indexed keywords

Engineering controlled terms: Crystallinity | Fillers | Injection molding | Nanocomposites | Optical properties | Silica | Surface roughness | Tensile strength

Engineering uncontrolled terms: Crystallinity changes | Crystallization rates | Filler loading | High mechanical properties | Microscopic analysis | Nucleating agents | Thin-walled parts | Volumetric shrinkage

Engineering main heading: Thin walled structures

ISSN: 1876990X
Source Type: Journal
Original language: English
DOI: 10.1007/s12633-020-00796-5
Document Type: Article
Publisher: Springer Science and Business Media B.V.

Document details - A secured authentication and DSM-KL ascertained performance optimization of a hybrid block chain-enabled framework for a multiple WSN

International Journal of Communication Systems

Volume 34, Issue 17, 25 November 2021, Article number e4972

A secured authentication and DSM-KL ascertained performance optimization of a hybrid block chain-enabled framework for a multiple WSN(Article)

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Abstract

Block chain is extensively seen as a potential alternative in the safety and efficiency problems of the vast internet of things (IoT) data to allow safe and successful data storage/processing/sharing. In this manuscript, a secured authentication and deep slime mould optimized kernel learning (DSM-KL) ascertained performance optimization of a hybrid block chain-enabled framework for a multiple wireless sensor network (WSN) is proposed to recover data security performance and efficiency. To reflect the reality of the multi-WSN network better, local block chain and public block chain are deployed, and a hybrid block chain model is created as per the various capabilities and energy of different nodes. A multi-WSN network model is intended. It has numerous nodes on IoT. Based on dissimilar functions of nodes, the IoT nodes are divided into base stations, cluster heads and ordinary nodes based on its capabilities that facilitate management and cooperation of nodes. A DSM-KL algorithm for dynamically selecting/adjusting block producer, consensus algorithm, block size and block interval to recover efficiency to handle both dynamic and broad dimensional properties of IoT systems is designed. The simulation process is executed in the MATLAB platform. The proposed DSM-KL attains lower drop 27.53%, higher delivery ratio 28.56%, lower drop 28.64%, lower energy depletion rate 38.63%, higher network active time 38.47%, lower overhead 26.47% and higher throughput 27.67%, and the performances are compared with the existing methods such as deep reinforcement learning (DRL) and block chain and reinforcement learning (RLBC), respectively. © 2021 John Wiley & Sons Ltd.

Author keywords

deep slime mould optimized kernel learning (DSM-KL) | hybrid block chain | internet of things (IoT) | multi-WSN | slime mould algorithm (SMA)

Indexed keywords

Engineering controlled terms: Authentication | Blockchain | Deep learning | Digital storage | Drops | MATLAB | Reinforcement learning | Sensor nodes

Engineering uncontrolled terms: Consensus algorithms | Dimensional properties | Functions of nodes | Internet of Things (IOT) | Performance optimizations | Safety and efficiencies | Security performance | Simulation process

Engineering main heading: Internet of things

Document details - Green synthesis of zinc oxide nanoparticles using Ficus carica leaf extract and their bactericidal and photocatalytic performance evaluation

Chemical Physics Letters

Volume 783, 16 November 2021, Article number 139040

Green synthesis of zinc oxide nanoparticles using Ficus carica leaf extract and their bactericidal and photocatalytic performance evaluation(Article)

Arumugam, J., Thambidurai, S., Suresh, S., Selvapandiyan, M., Kandasamy, M., Pugazhenthiran, N., Karthick Kumar, S., Muneeswaran, T., Quero, F.

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[b]Department of Physics, Periyar University PG Extension Centre, Dharmapuri, Tamil Nadu 636 705, India
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View additional affiliations

Abstract

Zinc oxide nanoparticles (ZnO NPs) are obtained through biological method using phytochemicals present in leaf extract of Ficus carica (F. carica) tree. The scanning electron microscope images have indicated formation of small spherical ZnO NPs in the form of clusters whose diameter ranges between 30 and 40 nm having mean diameter of 35 nm. The energy-dispersive X-ray spectrum of the ZnO NPs has disclosed existence of Zn and O alone that revealed their pristine property. The X-ray diffraction pattern has exemplified several sharp crystalline peaks that are indexed to ZnO with hexagonal wurtzite structure and its average crystallite size is 33.39 nm. The Fourier-transform infrared spectrum of the ZnO NPs has unveiled bands with intense absorption at 458 and 494 cm^{-1} that correspond to the ZnO. The ZnO NPs have demonstrated high bactericidal activity against Escherichia coli and Klebsiella pneumoniae strains with inhibition zone value of 17 mm. The photocatalytic performance of the green synthesized ZnO NPs has showed significant decolorization of methylene blue (MB) dye at 60 min of natural sunlight irradiation. A maximum MB degradation efficiency of 95.34% is noticed at an irradiation time of 70 min. The reusability results reveal that the green synthesized ZnO NPs photocatalyst has considerable photostability and reusability during the degradation of MB dye. Hence, the F. carica leaf extract is viewed as an appropriate green resource to prepare ZnO NPs with bactericidal and photocatalytic application prospects. © 2021 Elsevier B.V.

Author keywords

Bactericidal activity | Ficus carica leaf extract | Green synthesis | Photocatalytic performance | Zinc oxide nanoparticles

Indexed keywords

Engineering controlled terms: Absorption spectroscopy | Aromatic compounds | Crystallite size | Escherichia coli | II-VI semiconductors | Irradiation | Photocatalytic activity | Photodegradation | Reusability | Scanning electron microscopy | Synthesis (chemical) | Zinc sulfide

Engineering uncontrolled terms: Bactericidal activity | Fici carica leaf extract | Ficus carica | Green synthesis | Leaf extracts | Methylene blue dye | Performances evaluation | Photocatalytic performance | Synthesised | Zinc oxide nanoparticles

Engineering main heading: ZnO nanoparticles

Document details - fac-Re(CO)₃ core-based complex featuring benzimidazole as pendant motif from hydroxyquinoline and pyridylbenzimidazole

Journal of Organometallic Chemistry

Volume 953, 15 November 2021, Article number 122052

fac-Re(CO)$_3$ core-based complex featuring benzimidazole as pendant motif from hydroxyquinoline and pyridylbenzimidazole(Article)

Priyatharsini, M., Mishra, I., Shankar, B., Srinivasan, N., Krishnakumar, R.V., Sathiyendiran, M.

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[c]Department of Physics, Thiagarajar College, Madurai, 625 009, India

Abstract

Neutral heteroleptic acyclic complex, fac–[Re(CO)$_3$(OQN)(pybimz)] (1), possessing free benzimidazole motif remotely is reported. The complex was obtained from 8-hydroxyquinoline (HOQN), 2-(4′-pyridyl)benzimidazole (pybimz), and $Re_2(CO)_{10}$. The structure of 1 was confirmed using single crystal X-ray diffraction (SCXRD) analysis. The crystal structure of 1 is stabilized by various types of intermolecular non-covalent interactions ($\pi_{(OQN)}\cdots\pi_{(OQN)}$, NH^$CH_{(pybimz)}\cdots O_{(OQN)}$–Re, and C–$H_{(pybimz)}\cdots$O≡C–Re). The extended H-bonding contacts between the molecules (C–$H_{(pybimz)}\cdots$O≡C–Re) in the crystal structure result in the cavity containing polymeric network structure in which toluene molecules reside. The solvent toluene molecules occupy ~35% of the unit cell volume of the crystal. The absorption properties of the complex was studied both experimentally and theoretically. © 2021 Elsevier B.V.

Author keywords

8-Hydroxyquinoline | Hydrogen bond | Non-covalent interactions | Pyridylbenzimidazole | Rhenium

Indexed keywords

Engineering controlled terms: Complex networks | Crystal structure | Molecules | Organic solvents | Rhenium compounds | Single crystals | Toluene

Engineering uncontrolled terms: 8-Hydroxyquinoline | Benzimidazoles | Crystals structures | Heteroleptic | Hydroxyquinolines | Non-covalent interaction | Pyridyl | Pyridylbenzimidazole | Single crystal X-ray diffraction analysis | Toluene molecules

Engineering main heading: Hydrogen bonds

Funding details

Funding sponsor	Funding number	Acronym
Department of Science and Technology, Ministry of Science and Technology, India See opportunities by डीएसटी		डीएसटी

Document details - A novel approach in prediction of crop production using recurrent cuckoo search optimization neural networks

Applied Sciences (Switzerland)

Volume 11, Issue 21, November-1 2021, Article number 9816

A novel approach in prediction of crop production using recurrent cuckoo search optimization neural networks(Article)(Open Access)

Rajagopal, A., Jha, S., Khari, M., Ahmad, S., Alouffi, B., Alharbi, A.

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View additional affiliations

Abstract

Data mining is an information exploration methodology with fascinating and understand-able patterns and informative models for vast volumes of data. Agricultural productivity growth is the key to poverty alleviation. However, due to a lack of proper technical guidance in the agriculture field, crop yield differs over different years. Mining techniques were implemented in different applications, such as soil classification, rainfall prediction, and weather forecast, separately. It is proposed that an Artificial Intelligence system can combine the mined extracts of various factors such as soil, rainfall, and crop production to predict the market value to be developed. Smart analysis and a comprehensive prediction model in agriculture helps the farmer to yield the right crops at the right time. The main benefits of the proposed system are as follows: Yielding the right crop at the right time, balancing crop production, economy growth, and planning to reduce crop scarcity. Initially, the database is collected, and the input dataset is preprocessed. Feature selection is carried out followed by feature extraction techniques. The best features were then optimized using the recurrent cuckoo search optimization algorithm, then the optimized output can be given as an input for the process of classification. The classification process is conducted using the Discrete DBN- VGGNet classifier. The performance estimation is made to prove the effectiveness of the proposed scheme.

Author keywords

Crop production | Data mining | Discrete DBN-VGG Net classifier | Recurrent cuckoo search optimization algorithm

Funding details

Funding sponsor	Funding number	Acronym
Taif University	TURSP-2020/314	TU

Funding text

Acknowledgments: This research was supported by the Taif University Researchers Supporting Project number (TURSP-2020/314), Taif University, Taif, Saudi Arabia.

ISSN: 20763417
Source Type: Journal
Original language: English
DOI: 10.3390/app11219816
Document Type: Article
Publisher: MDPI

Document details - Synthesis and electro-catalytic evaluation of Ti(IV)-anchored heterogeneous mesoporous material for uric acid analysis

Microchemical Journal

Volume 170, November 2021, Article number 106672

Synthesis and electro-catalytic evaluation of Ti(IV)-anchored heterogeneous mesoporous material for uric acid analysis(Article)

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Abstract

A simple and modified synthetic strategy has been developed for the preparation of Ti(IV) anchored mesoporous MCM-41 material from the commercially available starting material of titanocene dichloride and MCM-41. The vacuum diffusion process has been utilized for anchoring Ti(IV) on MCM-41 (Ti-MCM-41) via surface activation instead of the chemical activation process. The modified Ti-MCM-41/glassy carbon electrode (GCE) was developed from Ti-MCM-41 and evaluated for the selective sensing of mammalian metabolic bio-marker of uric acid (UA) by the electrochemical method. The modified electrode (Ti-MCM-41/GCE) shows an excellent selective electrochemical response with UA, good linear competence in wide range concentrations (10–110 nM) and scan rates (50–900 mV s^{-1}) and a low limit of detection up to 2.98 nM in the category of silica based mesoporous material. The selectivity and sensitivity of the electrode were tested with various potential organic interferents that exhibit good anti-interferents activity. The proposed modified electrode is potentially useful for commercial sensing application of UA since the analysis of human urine samples under various age people are good agreements with recovered UA by the standard addition method. The stability and reproducibility of the Ti-MCM-41/GCE were tested and the results are reproducible in a number of electro-catalytic cycles. © 2021 Elsevier B.V.

Author keywords

Electrochemical sensor | Heterogeneous electrocatalyst | Ti(IV) anchored MCM-41 | Titanocene dichloride | Uric acid

Funding details

Funding sponsor	Funding number	Acronym
	SB/FT/CS-95/2014	
	SB/EMEQ-297/2014	

Funding text

Author Dr. K. Selvakumar gratefully acknowledges the financial assistance from DST-Fast Track Young Scientist scheme (Ref. No. SB/FT/CS-95/2014) and SERB-EMEQ (Ref. No. SB/EMEQ-297/2014).

ISSN: 0026265X
CODEN: MICJA
Source Type: Journal
Original language: English

DOI: 10.1016/j.microc.2021.106672
Document Type: Article
Publisher: Elsevier Inc.

Document details - Experimental investigations for the effect of sonication time on nano-phase change material (Sodium carbonate decahydrate with alumina nanoparticles) used in solar energy storage system

Chalcogenide Letters

Volume 18, Issue 10, October 2021, Pages 565-583

Experimental investigations for the effect of sonication time on nano-phase change material (Sodium carbonate decahydrate with alumina nanoparticles) used in solar energy storage system(Article)

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Abstract

In this work, the execution of experimental investigations is to agree on the warm conductivity resting on the entire concept of a solar vigor storage gadget with relatively a numeral Al_2O_3 nanoparticles volume fraction in SCD-PCM and the effects of few physical limits. The usage of ultrasonically helps uses of Al_2O_3 nanoparticles dispersing them into SCD base fluids for making geared up Nano-PCM for a somewhat numeral period from 0 to 180 minutes. This work summarizes the crucial conclusion associated with a relative quantity consequence for constraints similar to the particles extant division, size of the particle, sonication time, the temperature of Nano-PCMs, and surfactants deliver on warm conductivity for Nano-PCM. Its resolute enhancement on warm conductivity is incredibly more suitable than that to the support fluid. The thermal conductivity suggests that growth with the adding up of nanoparticles additionally confirms 22.00 % viable improvement in support fluids. The upshot of sonication is complicated brain waves; to make contributions higher in enrichment on thermal conductivity. In this study, since rising the time of sonication, upgrading of the thermal conductivity of Nano-PCM is distinguished. Investigating facts point out the Nano-PCM's thermal conductivity to amplify with temperature and minimizes (limit) with the size of the particle. Adding up surfactant outcomes is part of the increment in viscosity. Its positions that rising the time of ultrasonication with power effects is greater dispersed additional secure nanofluids in the direction increasing thermal conductivity. It establishes that the use of the ultrasonic horn /probe devices is sizable compact higher super than ultrasonic tub devices; decline time of ultrasonication also electrical strength leads to higher results. Our results present that the ultrasonic wave has the prime effect on the homogeneity and measurement of Al_2O_3 nanoparticles, thermal conductivity, particle shape, and surfactants.

Author keywords

Nano-PCMs (SCD-Al_2O_3 nanoparticles) | Sonication time | Thermal conductivity | Ultrasonication

ISSN: 15848663
Source Type: Journal
Document Type: Article
Publisher: S.C. Virtual Company of Phisics S.R.L

Document details - Facile and low-cost synthesis of diverse copper oxide nanostructures for solar to thermal energy conversion

Optik

Volume 244, October 2021, Article number 167499

Facile and low-cost synthesis of diverse copper oxide nanostructures for solar to thermal energy conversion(Article)

Agalya, P., Suresh, S., Prabu, K.M., Thambidurai, S., Kandasamy, M., Karthick Kumar, S., Pugazhenthiran, N.

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Abstract

Copper oxide (CuO) nanostructures were synthesized through a simple and low-cost wet chemical method using copper nitrate trihydrate as precursor and sodium hydroxide (NaOH) as stabilizing agent. Scanning electron microscopy analysis revealed formation of diverse CuO nanostructures as a consequence of varying the concentration of NaOH in the reaction medium. X-ray diffraction examination disclosed existence of end-centered monoclinic structured CuO as evident from the diffraction peaks observed at 2θ values corresponding to diffraction planes. Existence of cubic phase Cu_2O was confirmed by presence of diffraction peak at 2θ value of 61.5°, corresponding to [0 2 2] diffraction plane. Energy-dispersive X-ray spectroscopy analysis proved pristine nature of the CuO nanostructures. UV-Vis-NIR reflectance value of CuO nanostructures prepared using different concentrations of NaOH exhibited reliable solar absorptance values, which were in accordance with their respective reflectance values. Among them, the CuO nanostructure prepared using NaOH concentration of 1.0 M disclosed high solar absorptance and selectivity values of 0.80 and 18.60, respectively.

Author keywords

CuO nanostructures | Facile preparation | Solar energy conversion, Optical properties | Wet chemical synthesis

Indexed keywords

Engineering controlled terms: Costs | Energy conversion | Energy dispersive spectroscopy | Nanostructures | Optical properties | Reflection | Scanning electron microscopy | Sodium hydroxide | Solar energy

Engineering uncontrolled terms: CuO nanostructures | Diffraction peaks | Diffraction planes | Facile preparation | Low-costs | Oxide nanostructures | Reflectance values | Solar absorptance | Solar energy conversion, optical property | Wet chemical synthesis

Engineering main heading: Copper oxides

Document details - Mechanical properties of AlN and molybdenum disulfide reinforced aluminium alloy matrix composites

Journal of Physics: Conference Series

Volume 2027, Issue 1, 27 September 2021, Article number 012010

International Conference on Recent Advancements in Biomedical Engineering 2021, ICRABE 2021; Chennai; India; 17 March 2021 through 19 March 2021; Code 172130

Mechanical properties of AlN and molybdenum disulfide reinforced aluminium alloy matrix composites(Conference Paper)(Open Access)

Ravichandran, M., Mohanavel, V., Sathish, T., Ganeshan, P., Kumar, S.S., Subbiah, R.

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View additional affiliations

Abstract

Aluminium based composites are extensively used in various applications because of its excellent properties. Aluminium alloy (AA7075) matrix reinforced with Molybdenum disulfide (MoS_2) and Aluminium Nitride (AlN) have been developed via stir casting (SC) method. The mechanical properties such as hardness, tensile strength (TS) and compressive strength (CS) have been studied and reported. The increase in amount of AlN in the matrix improved the properties and decreased the elongation. The porosity % is high for the increase in quantity of the reinforcement particles. © Journal of Physics: Conference Series 2021.

Author keywords

AlN | Aluminium | Composite | Molybdenum disulfide | Properties | Stir casting

Indexed keywords

Engineering controlled terms: Aluminum alloys | Aluminum nitride | Compressive strength | III-V semiconductors | Layered semiconductors | Metallic matrix composites | Molybdenum compounds | Reinforcement | Tensile strength

Engineering uncontrolled terms: Aluminium alloy matrix composites | matrix | Property | Reinforced aluminum | Reinforcement particles | Stir casting | Stir casting method

Engineering main heading: Sulfur compounds

ISSN: 17426588
Source Type: Conference Proceeding
Original language: English

DOI: 10.1088/1742-6596/2027/1/012010
Document Type: Conference Paper
Publisher: IOP Publishing Ltd

Document details - Experimental investigations on mechanical properties of cotton/hemp fiber reinforced epoxy resin hybrid composites

Journal of Physics: Conference Series

Volume 2027, Issue 1, 27 September 2021, Article number 012015

International Conference on Recent Advancements in Biomedical Engineering 2021, ICRABE 2021; Chennai; India; 17 March 2021 through 19 March 2021; Code 172130

Experimental investigations on mechanical properties of cotton/hemp fiber reinforced epoxy resin hybrid composites(Conference Paper)(Open Access)

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Abstract

In this experiment, epoxy resin, fine hemp fibre, and cotton fibres were combined to create bio-composites. The weight percentages of hemp fibre (0, 10, 20, 30 wt. percent), cotton fibres (35, 25, 15, 5 wt. pewrcent), and epoxy resin have been varied to produce four composite mates. As per ASTM standards, composite specimens were prepared using the water jet machining process. Tensile, flexural, and impact tests were performed on the composite specimens in order to determine their mechanical properties and water absorption behaviour. Composites containing 20 wt.% fine hemp fibre in weight percentage showed significant improvements in tensile properties. Composites containing 30 wt% hemp fibre improve both flexural and impact properties, according to the test results. © Journal of Physics: Conference Series 2021.

Author keywords

Cotton fiber | Epoxy resin | Hemp fiber | Hybrid composites | Mechanical properties

Indexed keywords

Engineering controlled terms: ASTM standards | Cotton | Epoxy resins | Hemp | Hemp fibers | Machining | Water absorption

Engineering uncontrolled terms: ASTM Standards | Biocomposite | Composite specimens | Cotton/hemp | Experimental investigations | Fiber reinforced epoxy resins | Hybrid composites | Machining Process | Waterjet machining | Weight percentages

Engineering main heading: Hybrid composites

ISSN: 17426588
Source Type: Conference Proceeding
Original language: English

DOI: 10.1088/1742-6596/2027/1/012015
Document Type: Conference Paper
Publisher: IOP Publishing Ltd

Document details - Assessment on hybrid jute/coir fibers reinforced polyester composite with hybrid fillers under different environmental conditions

Construction and Building Materials

Volume 301, 27 September 2021, Article number 124117

Assessment on hybrid jute/coir fibers reinforced polyester composite with hybrid fillers under different environmental conditions(Article)(Open Access)

Ganesan, K., Kailasanathan, C., Rajini, N., Ismail, S.O., Ayrilmis, N., Mohammad, F., Al-Lohedan, H.A., Tawfeek, A.M., Issa, Z.A., Aldhayan, D.M.

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Abstract

In this work, synergistic impact of hybrid fibers and hybrid fillers on mechanical, moisture absorption and morphological properties of polyester matrix composites at dry and wet conditions was examined. The hybrid composite laminates were fabricated by compression molding technique, using new combinations of jute and coir fibers as primary reinforcements as well as waste eggshell powder (ESP) and montmorillonite nanoclay (MMTK10-NC) as secondary reinforcements in a polyester matrix. The fillers, ESP and NC were added to the jute and coir fiber blended hybrid composite in different amounts. Maximum tensile strengths of the hybrid composites were estimated to be 24.57, 21.77 and 22.63 MPa when fillers were added at equal weight percent (wt.%) of 1.5 for dry, river and sea water (wet) conditions, respectively. Under same dry, river and sea water conditions, flexural strengths of 46.97, 44.85 and 42.36 MPa as well as impact strengths of 2.697, 2.572 and 2.607 J were obtained, respectively. Occurrence of swelling, agglomeration and porosity on the hybrid composites were observed to be crucial factors, which caused their strength reduction. It was evident from the results obtained that addition of hybrid fillers to the hybrid composites in different weight proportions increased their mechanical performances higher than that of non-filler hybrid composites. Mechanical properties diminished with wet condition, due to deterioration between the fibers and matrix interface. Also, scanning electron microscopy (SEM) images indicated that it was due to weak fiber–matrix adhesion. With addition of hybrid filler to the hybrid composites, the moisture absorption rate was reduced. Importantly, the optimal/best hybrid composite sample S4 with equal filler content of 1.5 wt% can be used as an alternative sustainable material for low load bearing structural components in building construction industries, such as trusses and frames, wooden flooring and scaffold. © 2021 Elsevier Ltd

Author keywords

Environmental conditions | Hybrid fillers | Jute/coir hybrid composites | Mechanical properties | Moisture absorption | Optimum behaviors

Indexed keywords

Engineering controlled terms: Basalt | Compression molding | Construction industry | Deterioration | Impact strength | Jute fibers | Laminated composites | Moisture | Nanocomposites | Reinforcement | Scanning electron microscopy | Seawater | Tensile strength | Water absorption

Engineering uncontrolled terms: Coir fibers | Dry waters | Environmental conditions | Hybrid composites | Hybrid fillers | Jute/coir hybrid composite | Mechanical | Moisture absorption | Optimum behavior | Property

Document details - Sobolev LVG Analysis of Aminomethanol and N-Methylhydroxylamine: Potential Spectral Lines for Their Detection in a Cosmic Object

Astrophysics

Volume 64, Issue 3, September 2021, Pages 388-404

Sobolev LVG Analysis of Aminomethanol and N-Methylhydroxylamine: Potential Spectral Lines for Their Detection in a Cosmic Object(Article)

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View additional affiliations

Abstract

Aminomethanol (NH_2CH_2OH) and N-Methylhydroxylamine (CH_3NHOH) are isomers of each other, and have astrochemical importance. To our knowledge, they have not been analyzed so far in any terrestrial laboratory, and probably due to non-availability of accurate frequencies, they have not been searched in a cosmic object. It is well known that physical conditions in cosmic objects are very different as compared to those in our terrestrial laboratories. Therefore, these molecules may exist in the interstellar medium. For having information about the potential spectral lines of these molecules, we have obtained their rotational and centrifugal distortion constants, and electric dipole moment with the help of the GAUSSIAN software using B3LYP method, and aug-cc-pVDZ and aug-cc-pVTZ basis sets, separately. As the electric dipole moment has comparable components along all the three a, b and c axes, we have considered all the three types of radiative transitions together, and have calculated radiative transition probabilities for all the three kinds of radiative transitions. Considering a, b and c type transitions together, we have performed Sobolev LVG analysis of each molecule, where the collisional rate coefficients have been obtained using a scaling law. Considering energy levels up to 300 cm^{-1}, we have found 181 weak MASER lines and 112 anomalous absorption transitions of NH_2CH_2OH, and 21 weak MASER lines and 28 anomalous absorption transitions of CH_3NHOH, which may play important role for the identification of respective molecule in the ISM.

Author keywords

ISM: molecules: aminomethanol: radiative transfer

ISSN: 05717256
Source Type: Journal
Original language: English
DOI: 10.1007/s10511-021-09697-w
Document Type: Article
Publisher: Springer

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Document details - Analysis of Type II and Type III Radio Bursts Associated with SEPs from Non-Interacting/Interacting Radio-Loud CMEs

Astrophysics

Volume 64, Issue 3, September 2021, Pages 327-344

Analysis of Type II and Type III Radio Bursts Associated with SEPs from Non-Interacting/Interacting Radio-Loud CMEs(Article)(Open Access)

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Abstract

We analyze radio bursts observed in events with interacting/non-interacting CMEs that produced major SEPs ($I_p > 10$ MeV) from April 1997 to December 2014. We compare properties of meter (m), decahectometer (DH) type II and DH type III bursts, and time lags for interacting-CME-associated (IC) events and non-interacting-CME-associated (NIC) events. About 70% of radio emissions were observed in events of both types from meters to kilometers. We found high correlations between the drift rates and mid-frequencies of type II radio bursts calculated as the mean geometric between their starting and ending frequencies for both NIC and IC-associated events (correlation coefficient $R^2 = 0.98$, power-law index $\varepsilon = 1.68 \pm 0.16$ and $R^2 = 0.93$, $\varepsilon = 1.64 \pm 0.19$ respectively). We also found a correlation between the frequency drift rates of DH type II bursts and space speeds of CMEs in NIC-associated events. The absence of such correlation for IC-associated events confirms that the shock speeds changed in CME-CME interactions. For the events with western source locations, the mean peak intensity of SEPs in IC-associated events is four times larger than that in NIC-associated SEP events. From the mean time lags between the start times of SEP events and the start of m, DH type II, and DH type III radio bursts, we inferred that particle enhancements in NIC-associated SEP events occurred earlier than in IC-associated SEP events. The difference between NIC events and IC events in the mean values of parameters of type II and type III bursts is statistically insignificant. © 2021, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Solar energetic particle events (SEPs): radio-loud CMEs: Solar flares: m- and DH type II radio bursts: DH type III radio bursts

ISSN: 05717256
Source Type: Journal
Original language: English
DOI: 10.1007/s10511-021-09693-0
Document Type: Article
Publisher: Springer

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Document details - A novel on-time partial shading detection technique for electrical reconfiguration in solar PV system

Solar Energy

Volume 225, 1 September 2021, Pages 1009-1025

A novel on-time partial shading detection technique for electrical reconfiguration in solar PV system(Article)

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Abstract

Mismatch losses due to partial shading condition (PSC) is not permitted to extract maximum power from the solar PV array. Numerous techniques were proposed to reduce the partial shading effect. But the major problem is in finding out the occurrence and its distribution of the partial shading in the solar PV array. Conventional methods disconnect the load temporally from the PV array and measure the short circuit current (I_{sc}) and use the information to detect the partial shading. Frequent disconnection of the solar PV array from the load makes the conventional method unpractical in a large solar power plant and even a stand-alone PV system. A novel on-time partial detection technique is proposed in this paper and useing difference in row voltage (V_d) instead of the short circuit current (I_{sc}) to estimate the partial shading. Greater the V_d infers the severity of occurrence of the partial shading in the solar PV array. By using a static reconfiguration and then a modified couple matching (MCM) technique the voltage difference (V_d) gets reduced. This will ensure the mitigation of the PSC. As in this proposed technique, the load never be disconnected from the solar PV array, to detect the partial shading, it can be used practically even for a stand-alone PV system. Eight extensive partial shading patterns are simulated using MATLAB Simulink to validate the proposed work and the size of 3 × 4 120 W polycrystalline PV panel array is used for the experimental validation.

Author keywords

Electrical reconfiguration | Modified couple matching | Partial shading detection | Solar PV | Static reconfiguration

Indexed keywords

Engineering controlled terms: Photovoltaic cells | Short circuit currents | Solar energy

Engineering uncontrolled terms: Condition | Conventional methods | Electrical reconfiguration | Modified couple matching | Partial shading | Partial shading detection | Short-circuit currents | Solar PV arrays | Solar PVs | Static reconfiguration

Engineering main heading: Solar power plants

GEOBASE Subject Index: array | detection method | electrical power | experimental study | model validation | photovoltaic system | polymer | power plant | solar power

Document details - A Novel Visible Light-Driven p-Type BiFeO₃/n-Type SnS₂ Heterojunction Photocatalyst for Efficient Charge Separation and Enhanced Photocatalytic Activity

Journal of Cluster Science

Volume 32, Issue 5, September 2021, Pages 1431-1439

A Novel Visible Light-Driven p-Type $BiFeO_3$/n-Type SnS_2 Heterojunction Photocatalyst for Efficient Charge Separation and Enhanced Photocatalytic Activity(Article)

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Abstract

This present investigation focused on novel p-type bismuth ferrite ($BiFeO_3$)/n-type tin sulfide (SnS_2) heterostructure photocatalyst has been favorably attained via a facile two-step process followed by co-precipitation approach for enhances the photocatalytic activity through the degradation of Methylene Blue (MB) and Rhodamine B (RhB) organic dyes under visible-light illumination. Structural, optical, and photocatalytic behavior of the prepared $BiFeO_3$ and $BiFeO_3/SnS_2$ photocatalysts are carefully explored. The photocatalytic efficiency of $BiFeO_3/SnS_2$ nanocatalyst was calculated to be 83%, 78% for MB and RhB, respectively, within 120 min illumination whereas the pure $BiFeO_3$ nanoparticle was 58% and 56% for MB and RhB. This prominent enhancement of visible light photocatalytic activity can be ascribed to the separation as well as the transfer of photogenerated charge carriers, successful exploitation of visible light absorption and donates the enlarged number of photocatalytic active sites by the formation of $BiFeO_3/SnS_2$ p-n heterojunction. © 2021, The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Optical | p-type $BiFeO_3$/n-type SnS_2 heterostructure | Structural | Two-step synthesis approach | Visible light photocatalytic activity

ISSN: 10407278
Source Type: Journal
Original language: English
DOI: 10.1007/s10876-021-02114-4
Document Type: Article
Publisher: Springer

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SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Characterization and optimization of influence of MoS₂ hybridization on tribological behaviours of Mg–B₄C composites

Bulletin of Materials Science

Volume 44, Issue 3, September 2021, Article number 192

Characterization and optimization of influence of MoS_2 hybridization on tribological behaviours of Mg–B_4C composites(Article)

Kailasanathan, C., Rajkumar, P.R., Rajini, N., Sivakumar, G.D., Ramesh, T., Ismail, S.O., Mohammad, F., Al-Lohedan, H.A.

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Abstract

Aerospace and automobile industries are facing challenges in developing lightweight materials with high corrosion and wear resistance. The magnesium (Mg) alloys are superior to their monolithics, as they have maximum strength-to-weight ratio. These challenges can be solved with application of Mg-based hybrid composites. Therefore, this study investigated the hybridizing effect of molybdenum disulphide (MoS_2) reinforcement on tribological performance of magnesium–boron carbide (Mg–B_4C) hybrid composites, fabricated by powder metallurgy technique. Wear tests under dry sliding condition were carried out on the prepared composite samples with different proportions/weight percentage (wt%), using a pin-on-disc apparatus. Mg, MoS_2, B_4C and their various composites were characterized, using X-ray diffraction, thermogravimetric analysis, scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy analysis. The experiments were conducted using L_{27} orthogonal array with five factors at three levels that affected the tribological performance. The wear resistance of the hybrid Mg–B_4C–MoS_2 composites significantly increased when compared with Mg–B_4C and Mg–MoS_2 composites, due to the refined effect of both reinforcements. Analysis of variance and grey-relational analysis result showed that increase in MoS_2, sliding distance (D_{SI}) and load (L_{SI}) significantly influenced the tribological performance of the hybrid composites. Mg–10wt%B_4C–5wt%MoS_2 exhibited significant best improvement on the multi-response tribological performance. The optimum quantity of MoS_2 reinforcement was around 7 wt%. Beyond this threshold proportion, wear was significantly increased, due to the agglomeration of MoS_2 particles. Hardness of the composites increased with hybridized reinforcements. SEM micrographs depicted the homogeneous dispersion of reinforcements in the Mg matrix. Also, SEM micrographs of the worn surfaces confirmed that delamination wear mechanism was dominant on the Mg hybrid composites.

Author keywords

friction coefficient | grey-relational analysis | Magnesium matrix composites | powder metallurgy | Taguchi's technique | wear

Indexed keywords

Engineering controlled terms: Aerospace industry | Beryllium compounds | Boron carbide | Corrosion resistance | Energy dispersive spectroscopy | Layered semiconductors | Magnesium alloys | Magnesium metallography | Magnesium metallurgy | Magnesium powder | Molybdenum compounds | Molybdenum metallurgy | Powder metallurgy | Scanning electron microscopy | Sulfur compounds | Thermogravimetric analysis | Tribology | Wear of materials | Wear resistance

Document details - Flexible leather substrate dual-band wearable antenna with impact analysis on testing under wet condition for human rescue system

Textile Research Journal

Volume 91, Issue 17-18, September 2021, Pages 1927-1942

Flexible leather substrate dual-band wearable antenna with impact analysis on testing under wet condition for human rescue system(Article)

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Abstract

Wearable flexible antennas have yielded much attention in recent years because of their interesting features and capabilities for enabling flexible, lightweight, portable and low cost wireless communication. The proposed research work offers the design of the flexible wearable patch antenna with four single Split Ring Resonators (SRRs) using a leather substrate for better performance. The proposed antenna is designed and simulated with leather substrate at the operating frequencies of 0.99 GHz and 3.5 GHz. The antenna is fabricated and validated under free space (normal condition), partially wet, fully wet and dried after wet conditions using Vector Network Analyzer (VNA). Different parameters such as reflection coefficient, Voltage Standing Wave Ratio (VSWR) and gain of the fabricated antenna are measured, and they are compared with the simulation results. The validated results show that the performance of the proposed antenna under free space, partially wet, fully wet and dried after wet conditions is virtually equal. The Specific Absorption Rate (SAR) of this proposed antenna is also investigated for 10g tissues and the SARs are 0.0168763 W/kg and 0.69567 W/kg at the operating frequencies of 0.99 GHz and 3.5 GHz, respectively. As a result, its good performance in wet conditions along with low cost and ready availability of leather material means the proposed antenna can be used for human safety environments, especially in military applications, etc.

Author keywords

Flexible | L and S band | leather substrate | rescue system | wearable antenna

Indexed keywords

Engineering controlled terms: Costs | Electric network analyzers | Leather | Microstrip antennas | Military applications | Ring gages | Slot antennas | Vector spaces | Wearable antennas

Engineering uncontrolled terms: Flexible antennas | Operating frequency | Single split-ring resonators | Specific absorption rate | Validated results | Vector network analyzers | Voltage standing-wave ratio | Wireless communications

Engineering main heading: Microwave antennas

PaperChem Variable: Costs | Frequencies | Impact | Leather | Performance | Reflection | Safety | Testing

Document details - Characterization of mechanical, electrical and thermal properties of Ag nanoparticle-reinforced Al6061 alloy

Journal of Thermal Analysis and Calorimetry

Volume 145, Issue 5, September 2021, Pages 2335-2342

Characterization of mechanical, electrical and thermal properties of Ag nanoparticle-reinforced Al6061 alloy(Article)

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View additional affiliations

Abstract

In this paper, the detailed characterization of mechanical, electrical and thermal properties of Ag nanoparticle-reinforced Al6061 alloy was studied. Four composites with Al6061 alloys and different mass percentages (3%, 6%, 9% and 12%) of Ag nanoparticles were processed by stir casting method. The chemical analysis was used to confirm the elemental composition. The microstructural examination was carried out using optical microscopy. The phase analysis of the samples was studied using X-ray diffraction technique. The density and hardness were measured as per ASTM standards. Four-point probe tester and differential scanning calorimetry were used to measure the electrical conductivity and specific heat. In addition, the thermal conductivity and thermal diffusivity were measured using laser flash method. The results reveal the presence of Ag nanoparticles can significantly enhance the mechanical, electrical and thermal properties. © 2020, Akadémiai Kiadó, Budapest, Hungary.

Author keywords

Ag nanoparticles | Al6061 | Characterization | Electrical | Thermal

Indexed keywords

Engineering controlled terms: ASTM standards | Chemical analysis | Differential scanning calorimetry | Metal nanoparticles | Reinforcement | Silver alloys | Specific heat | Thermal conductivity

Engineering uncontrolled terms: Ag nanoparticle | Electrical conductivity | Elemental compositions | Four point probe | Laser flash methods | Microstructural examination | Stir casting method | X-ray diffraction techniques

Engineering main heading: Silver nanoparticles

Document details - Carbazole-diazafluorene bipolar fluorophores: Synthesis, thermal stability, optical and electrochemical properties

Journal of Luminescence

Volume 236, August 2021, Article number 118145

Carbazole-diazafluorene bipolar fluorophores: Synthesis, thermal stability, optical and electrochemical properties(Article)

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Abstract

Two bipolar fluorophores, namely CEDF and CPDF containing carbazole moiety as electron donor and 4,5-diazafluorene unit as electron acceptor were synthesized and characterized. Carbazole units attached to C-2, C-7 and C-9 positions of 4,5-dizafluorene posing an ideal model of donor-acceptor systems to investigate their photo-physical properties for application in organic light emitting diode (OLED) devices. Both compounds possess high thermal stabilities (T_d > 450 °C) and high glass transition temperature (T_g), 182 °C and 180 °C for CEDF and CPDF respectively. These compounds revealed solvent polarity dependent emission spectra which confirm the excited state undergoes intramolecular charge-transfer (ICT) process in the molecule. Solid state emission is observed in the blue region at 447 nm for both the compounds. CPDF exhibit higher photoluminescence quantum yield (0.76) than CEDF (0.55) featuring its highly emissive ICT excited state. Using the oxidation and reduction potentials determined from cyclic voltammetry analysis, estimates of both the ionization potentials and electron affinity of the compounds are obtained under the same experimental conditions. HOMO and LUMO energy levels, singlet (E_S) and triplet (E_T) energy levels of the compounds were obtained through density functional theory (DFT) and time-dependent DFT calculations. A transient photoluminescence curve with a prompt fluorescent component gives an average lifetime of about 5.7 ns for both the compounds. These studies and the convenient synthetic methodologies starting from the 4,5-diazafluorene, make these molecules attractive opto-electronic materials for their application in OLED devices.

Author keywords

4,5-Diazafluorene | Bipolar | Carbazole | Fluorophore | Spiro-conjugation

Funding details

Funding sponsor	Funding number	Acronym
Fondo Nacional de Desarrollo Científico y Tecnológico	11150590,ANID / FONDAP / 15110019,ID17I-10314	FONDECYT

Funding text

RS would like to thank FONDECYT Initiation program N° 11150590 ; MP for FONDEF IdeA No ID17I-10314 and ANID / FONDAP / 15110019 , Government of Chile for the financial support.

ISSN: 00222313
CODEN: JLUMA
Source Type: Journal
DOI: 10.1016/j.jlumin.2021.118145
Document Type: Article
Publisher: Elsevier B.V.

Document details - Influence of Optimization Techniques on Wire Electrical Discharge Machining of Ti–6Al–2Sn–4Zr–2Mo Alloy using Modeling Approach

Journal of Inorganic and Organometallic Polymers and Materials

Volume 31, Issue 8, August 2021, Pages 3272-3289

Influence of Optimization Techniques on Wire Electrical Discharge Machining of Ti–6Al–2Sn–4Zr–2Mo Alloy using Modeling Approach(Article)

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Abstract

Nowadays, the Wire Electrical Discharge Machining (WEDM) process was also working to cut the hard titanium alloys. During the WEDM, the generation of high temperatures was used to melt and vaporize and also flushed away the hard titanium alloy. The tough Ti–6Al–2Sn–4Zr–2Mo alloy was machined in the current research by the WEDM method and machining features such as surface roughness (SR) and Material Removal Rate (MRR) were statistically evaluated to achieve optimum performance. The investigations were performed using the Taguchi orthogonal array technique. The optimum process factors were defined from the main effect plot 32 µs, 3 m/min, and 12 g for material removal rate and as 10 µs, 32 µs, 7 m/min, and 12 g for surface roughness. The best essential parameters were established from the Analysis of variance (ANOVA) analysis. The pulse on-time current and pulse off time were identified as important parameters for the material removal rate with a contribution of 23.60%, 5.91%, and 65.02%. The best essential parameters for surface roughness were pulse on time, pulse off time, and a combination of pulse on-time and pulse off time with a percentage contribution of 22.71% and 36.88% respectively.Moreover, the machined surface was examined using the Scanning Electron Microscope (SEM).

Author keywords

Aerospace | ANOVA | Machinability | Surface topography | Ti alloy | WEDM

Indexed keywords

Engineering controlled terms: Electric discharge machining | Electric discharges | Scanning electron microscopy | Surface roughness | Titanium alloys

Engineering uncontrolled terms: High temperature | Machining feature | Material removal rate | Optimization techniques | Optimum performance | Taguchi orthogonal arrays | The scanning electron microscopes (SEM) | Wire electrical discharge machining

Engineering main heading: Analysis of variance (ANOVA)

Document details - Brain tumour cell segmentation and detection using deep learning networks

IET Image Processing

Volume 15, Issue 10, August 2021, Pages 2363-2371

Brain tumour cell segmentation and detection using deep learning networks(Article)

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Abstract

Medical science is a challenging area for various problems associated with health care and there always exists scope for continuous medical research. The major challenges in medical imaging are in the region of lesion, segmentation and classification of tumours in the brain. Several technical challenge exists in the classification due to the variation in the tumour size, shape, texture information and location. There is a need for automatic identification of high-grade glioma (HGG) and lower-grade glioma (LGG). The management and grade of brain tumour depend on the depth of the tumour. Due to its irregular features, manual segmentation involves longer time and also increases the misclassification rate. Inspired by these issues, this paper introduces two automatic deep learning networks called U-Net-based deep convolution network and U-Net with dense network. The proposed method is evaluated in our own brain tumour image database consisting of 300 high-grade brain tumour cases and 200 normal cases. To improve the overall efficiency of the network, data augmentation is applied in both training and validation. The proposed U-Net-based Dense Convolutional Network (DenseNet) architecture is compared with the performance of U-Net architecture and concluded that the proposed DenseNet produces a higher dice value. The validation results have revealed that our proposed method can have better segmentation efficiency. Also, the performance of the proposed DenseNet achieved better results compared with the state-of-the-art algorithms. Validation of the test images proves that segmented output classification of tumour risk and the normal region produces a sensitivity of 88.7%, Jaccard index of 0.839, dice score value of 0.911, F1 score of 0.906 and specificity of 100% using U-Net-based DenseNet architecture. © 2021 The Authors. IET Image Processing published by John Wiley & Sons Ltd on behalf of The Institution of Engineering and Technology

Indexed keywords

Engineering controlled terms: Automation, Brain, Classification (of information), Convolution, Convolutional neural networks, Efficiency, Learning systems, Medical imaging, Medical problems, Network architecture, Textures, Tumors

Engineering uncontrolled terms: Convolutional networks, High-grade gliomata, Manual segmentation, Misclassification rates, Overall efficiency, State-of-the-art algorithms, Technical challenges, Texture information

Engineering main heading: Deep learning

Document details - Weighted Greedy Approach for Low Latency Resource Allocation on V2X Network

Wireless Personal Communications

Volume 119, Issue 3, August 2021, Pages 2303-2322

Weighted Greedy Approach for Low Latency Resource Allocation on V2X Network(Article)

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Abstract

In Vehicular ad-hoc networks (VANETs), resource allocation has become one of the primary tasks. Thus, a system should be well-designed so that information could be transmitted reliably and efficiently. As vehicular communication has several characteristics, efficient resource allocation scheme for D2D communications is highly required in VANET. The network topology changes rapidly as the vehicles are moving fast on the road and this makes it harder to communicate among the vehicles by predicting the best available channel. So as to overcome these issues, the proposed technique is offered in which the channel availability is predicted based on the novel mechanism like contention latency prediction using interframe spaces like Short interframe space, Distributed Coordination Function interframe space, Pointed Coordination Function and scattering based greedy weight matrix method. The implementation of this greedy mechanism in turn enhances the prediction probability of best channels that are available. Thus, the best available channel offered using greedy weight matrix scheme thereby estimates the decision probability at which the collision for available channel is computed. Thus, from this the best available channel is provided to the requested user. At last, the performance analysis is made in terms of packet delivery ratio, throughput, delay, reliability, and rate of message loss and is compared with existing techniques to prove the effectiveness of proposed strategy. © 2021, The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Channel prediction | Contention latency prediction | Decision probability | Greedy weight matrix | Interframe space | Vehicular ad-hoc networks

Indexed keywords

Engineering controlled terms: Forecasting | Reliability analysis | Resource allocation

Engineering uncontrolled terms: Coordination functions | Distributed Coordination Function | Efficient resource allocation | Packet delivery ratio | Prediction probabilities | Short interframe spaces | Vehicular Adhoc Networks (VANETs) | Vehicular communications

Engineering main heading: Vehicular ad hoc networks

ISSN: 09296212
CODEN: WPCOF
DOI: 10.1007/s11277-021-08332-3
Document Type: Article

Document details - An efficient trust-based secure energy-aware clustering to mitigate trust distortion attack in mobile ad-hoc network

Concurrency and Computation: Practice and Experience

Volume 33, Issue 13, 10 July 2021, Article number e6223

An efficient trust-based secure energy-aware clustering to mitigate trust distortion attack in mobile ad-hoc network(Article)

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Abstract

Trust-aware clustering plays a vital role in addressing the security issues faced by mobile ad-hoc networks (MANETs). The trust worthiness of each participated node is to be estimated for ensuring the secure communications in MANETs. In this article, we propose a new trust-based secure energy-aware clustering (TSEAC) model to mitigate the malicious nodes from the network and form secure energy aware clusters with a cluster head which is more stable and trustworthy. Moreover, two novel algorithms namely energy-efficient trust-aware secure clustering algorithm and filtering untrustworthy recommendation (FUR) algorithm are proposed in this work. Here, the trust value of a node is measured by both direct trust estimation and indirect trust estimation methods using the Beta distribution technique. The trust value of the node is estimated in terms of the behavior of the node. The role of the FUR algorithm is to enhance the clustering process by mitigating the trust-distortion attack. Thus, from the simulation results it is observed that the proposed work, TSEAC outperforms in improving the lifetime of the network by 38% than the other existing work such as CBTRP, AOTDV, and CBRP. Furthermore, TSEAC shows an improvement of 20% to 24% when compared to CBTRP, 27% to 31% in contrast to AOTDV and 35% to 42% superior to CBRP in terms of packet delivery ratio. Similarly, TSEAC shows 22% to 26%, 28% to 33%, and 34% to 38% better throughput in contrast to CBTRP, AOTDV, and CBRP, respectively.

Author keywords

clustering | direct trust | energy | recommendation trust | trust | trust distortion attack

Indexed keywords

Engineering controlled terms: Clustering algorithms | Energy efficiency | Mobile security | Network security | Power management (telecommunication)

Engineering uncontrolled terms: Beta distributions | Clustering process | Distortion attacks | Energy efficient | Estimation methods | Mobile adhoc network (MANETs) | Packet delivery ratio | Security issues

Engineering main heading: Mobile ad hoc networks

ISSN: 15320626 DOI: 10.1002/cpe.6223

Document details - Fundus image lesion detection algorithm for diabetic retinopathy screening

Journal of Ambient Intelligence and Humanized Computing

Volume 12, Issue 7, July 2021, Pages 7407-7416

Fundus image lesion detection algorithm for diabetic retinopathy screening(Article)

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Abstract

An eye disease that damages the retina of diabetic patients is known as diabetic retinopathy (DR). The severity of the disease is found by different lesions such as hemorrhages, microaneurysms, exudates etc., these are the early stage symptoms of non-proliferative DR for early analysis of DR. A single framework for instinctive Lesion Detection used for diagnosis of the disease easily by screening is proposed. It consists of four steps: luminosity and contrast enhancement, removal of extracted blood vessels and optic disc (OD), lesion detection and classification based on lesions. Gamma correction and CLAHE for luminosity and contrast enhancement. Principle component analysis for vessel extraction and using convex hull transform for OD detection. After background subtraction, lesions are detected using morphological operations and classification based on count of lesions. The proposed algorithm is analyzed using the publically available datasets and evaluated using the metrics of specificity, sensitivity and accuracy. © 2020, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Diabetic retinopathy | Exudates | Hemorrhages | Luminosity and contrast enhancement | Micro-aneurysms

Indexed keywords

Engineering controlled terms: Blood vessels | Eye protection | Luminance | Mathematical morphology | Signal detection

Engineering uncontrolled terms: Background subtraction | Contrast Enhancement | Diabetic retinopathy | Diabetic retinopathy screening | Lesion detection | Morphological operations | Principle component analysis | Vessel extraction

Engineering main heading: Diagnosis

ISSN: 18685137
Source Type: Journal
Original language: English
DOI: 10.1007/s12652-020-02417-w
Document Type: Article
Publisher: Springer Science and Business Media Deutschland GmbH

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Document details - Wiener filter based deep convolutional network approach for classification of satellite images

Journal of Ambient Intelligence and Humanized Computing

Volume 12, Issue 7, July 2021, Pages 7343-7351

Wiener filter based deep convolutional network approach for classification of satellite images(Article)

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Abstract

Semantic segmentation is a fundamental task in computer vision and image scenery detection. Many applications, such as urban planning, change detection, and environmental monitoring require accurate segmentation. Hence, most segmentation tasks are performed by humans. Currently, with the growth of deep convolutional neural network (DCNN), there are many works aimed to find the best network architecture fitting for this task. In this work, the GoogLeNet classifier is used to perform better segmentation as well as a classification for satellite images. The Wiener filter is used here for image denoising. Data Augmentation is performed to extract high information about the input picture. The output of the above steps helps in classification i.e. it identifies the scenery of the input image with four labels. The result shows that the GoogLeNet based image classification has reduced error rate and it also increases the accuracy of output. Additionally, the efficiency of the Wiener filters also described clearly in the result. © 2020, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Deep convolution neural network | GoogleNet | Object based classification | Satellite images | Wiener filter

Indexed keywords

Engineering controlled terms: Convolution | Convolutional neural networks | Deep neural networks | Image denoising | Image segmentation | Network architecture | Semantics

Engineering uncontrolled terms: Change detection | Convolutional networks | Data augmentation | Environmental Monitoring | Input image | Satellite images | Semantic segmentation | WIENER filters

Engineering main heading: Image classification

ISSN: 18685137
DOI: 10.1007/s12652-020-02410-3
Source Type: Journal
Document Type: Article
Original language: English

Document details - Machining parameter optimization using Adam – Gene Algorithm while turning lightweight composite using ceramic cutting tools

International Journal of Lightweight Materials and Manufacture

Volume 4, Issue 2, June 2021, Pages 262-267

Machining parameter optimization using Adam – Gene Algorithm while turning lightweight composite using ceramic cutting tools(Article)(Open Access)

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Abstract

The machining of lightweight composite materials is a challenging process in the field of materials and manufacturing. The composites have materials with distinct phases of hard fibre and soft matrix, inducing the cutting tool edge to face varying cutting pressure. In this paper, alumina based ceramic cutting tools in different combinations [(i) Al_2O_3 + Ti [C,N] and (ii) Al_2O_3 + SiC_w] are used to machine a glass fibre rod at different process conditions. From the experimentation, the performance of the tool is observed to measure the flank wear at individual process conditions. The tool wear found to be rapid and failure occurred with increase in cutting velocity. On other hand, it was found that the tool life decreases with increase cutting velocity and the performance of cutting tools is similar in both cases. Wear morphology was found to be smooth and regular on machining fibre material. A modified Adam – Gene algorithm (AGA) was used with a constraint, to find the optimal machining process condition. It is found that the Al_2O_3 + Ti [C,N] cutting tool has a better tool life with minimal production cost for an optimal process condition of 250 m/min and 0.1 mm/rev. Economically, the Al_2O_3 + Ti [C,N] cutting tool has lower production cost, however, Al_2O_3 + SiC_w cutting tool has better performance. © 2020 The Authors

Author keywords

Adam gene algorithm | Composite | Cost | Machining | Wear

ISSN: 25888404
Source Type: Journal
Original language: English
DOI: 10.1016/j.ijlmm.2020.12.005
Document Type: Article
Publisher: KeAi Publishing Communications Ltd.

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Document details - Prediction of atherosclerosis pathology in retinal fundal images with machine learning approaches

Journal of Ambient Intelligence and Humanized Computing

Volume 12, Issue 6, June 2021, Pages 6701-6711

Prediction of atherosclerosis pathology in retinal fundal images with machine learning approaches(Article)

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Abstract

Atherosclerosis is a common cause of cardiac attack and its early detection prevents further complications. In this paper, a research concept is proposed focusing on a novel method of classification system. This method is carried out with image features derived from fundus photographs. It depends upon the arteries and vein classification process and also by the morphological appearance. Further, the proposed mixed algorithm, by using the retina fundal images, this method achieves an accuracy of detecting Atherosclerosis. In spite of the method being somewhat a hard one, of late, several methods are developed which employ advanced retinal photographic imaging techniques. These techniques involve characterizing, measuring and quantifying any variations and dissimilarities in the retinal structure. The hallmark of these methods, which have both qualitative and quantitative prediction, illustrated the allied symptoms found on cardiovascular diseases. This paper deals with providing the accurate input for the atherosclerosis detection by way of image preprocessing method. The study focuses on the reducing the disease independent variations without damaging any information related to the differences between the images of healthy and atherosclerotic eyes. The propose method enables correction of illumination in the blood vessels, by repainting them. Further, there is a normalization of the focus region for the feature extraction and classification process. Finally, Enhanced Bayesian Arithmetic Classifier (EBAC) is implemented for effective classification of the blood vessels. MATLAB software of 2014b version is employed for deriving the simulation results. © 2020, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Atherosclerosis | Blood vessels | Enhanced Bayesian classifier | Retinal imaging | Retinal vascular imaging

Indexed keywords

Engineering controlled terms: Blood | Diseases | Imaging techniques | Machine learning | MATLAB | Ophthalmology | Predictive analytics

Engineering uncontrolled terms: Cardio-vascular disease | Classification process | Classification system | Feature extraction and classification | Image preprocessing | Machine learning approaches | Photographic imaging | Quantitative prediction

Engineering main heading: Blood vessels

ISSN: 18685137
Source Type: Journal
DOI: 10.1007/s12652-020-02294-3
Document Type: Article

Document details - Extraction and application of keratin from natural resources: a review

3 Biotech

Volume 11, Issue 5, May 2021, Article number 220

Extraction and application of keratin from natural resources: a review(Review) (Open Access)

Chilakamarry, C.R., Mahmood, S., Saffe, S.N.B.M., Arifin, M.A.B., Gupta, A., Sikkandar, M.Y., Begum, S.S., Narasaiah, B.

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Abstract

Over recent years, keratin has gained great popularity due to its exceptional biocompatible and biodegradable nature. It has shown promising results in various industries like poultry, textile, agriculture, cosmetics, and pharmaceutical. Keratin is a multipurpose biopolymer that has been used in the production of fibrous composites, and with necessary modifications, it can be developed into gels, films, nanoparticles, and microparticles. Its stability against enzymatic degradation and unique biocompatibility has found their way into biomedical applications and regenerative medicine. This review discusses the structure of keratin, its classification and its properties. It also covers various methods by which keratin is extracted like chemical hydrolysis, enzymatic and microbial treatment, dissolution in ionic liquids, microwave irradiation, steam explosion technique, and thermal hydrolysis or superheated process. Special emphasis is placed on its utilisation in the form of hydrogels, films, fibres, sponges, and scaffolds in various biotechnological and industrial sectors. The present review can be noteworthy for the researchers working on natural protein and related usage. © 2021, King Abdulaziz City for Science and Technology.

Author keywords

Amino acids | Feathers | Keratin | Proteins | Sheep wool

Indexed keywords

EMTREE drug terms: cosmetic | hydrogel | ionic liquid | keratin

EMTREE medical terms: dissolution | explosion | extraction | human | hydrolysis | microwave irradiation | natural resource | nonhuman | priority journal | protein structure | Review | sponge (Porifera) | water vapor

Funding details

Funding sponsor	Funding number	Acronym
Ministry of Higher Education, Malaysia	FRGS/1/2019/STG05/UMP/02/9	MOHE
Universiti Malaysia Pahang	RDU1903137	

Document details - A quinoline based Schiff base as a turn-on fluorescence chemosensor for selective and robust detection of Cd²⁺ ion in semi-aqueous medium

Microchemical Journal

Volume 164, May 2021, Article number 106030

A quinoline based Schiff base as a turn-on fluorescence chemosensor for selective and robust detection of Cd^{2+} ion in semi-aqueous medium(Article)

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Abstract

A new quinoline based Schiff base receptor L was designed and synthesized by reacting 2-hydroxy-1-naphthaldehyde with 2-hydrazino quinoline. The metal recognition ability of L was investigated with various cations by colorimetry, UV–vis absorption spectroscopic, and fluorescence spectroscopic techniques in ACN:H_2O (8:2, v/v). The probe L exhibits a noticeable color change from colorless to crimson yellow under visible light and turn-on yellow fluorescence under UV light selective to Cd^{2+} over the other metal ions. Further, the L-Cd^{2+} complex shows new UV–Vis absorbance band at 440 nm and emission band at 510 nm upon the excitation at 380 nm. The ligand could form a 2:1 stoichiometry complex with Cd^{2+} and the calculated binding constant of 1.77×10^5 M^{-1} by BH plot method. Besides, the LOD and LOQ of Cd^{2+} by L was found to be 14.8 nM and 49.5 nM respectively. The sensing ability of L with Cd^{2+} was investigated by ^1H NMR and density functional theory (DFT) calculation. Furthermore, the probe was successfully used for the quantification of Cd^{2+} in a different water sample.

Author keywords

Cadmium | Chemosensors | DFT calculations | Fluorescence | Quinoline | Schiff's base

Funding details

Funding text

The authors D.M. sincerely acknowledge Mohamed Sathak Engineering College, Kilakarai for their lab facilities. Author G.G.V. K thanks Sethu Institute of Technology for support the research work.

ISSN: 0026265X
CODEN: MICJA
Source Type: Journal
Original language: English
DOI: 10.1016/j.microc.2021.106030
Document Type: Article
Publisher: Elsevier Inc.

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SciVal Topic Prominence

Topic:

Document details - Effect of ZrB₂ on microstructural, mechanical and corrosion behaviour of aluminium (AA7178) alloy matrix composite prepared by the stir casting route

Ceramics International

Volume 47, Issue 9, 1 May 2021, Pages 12951-12962

Effect of ZrB_2 on microstructural, mechanical and corrosion behaviour of aluminium (AA7178) alloy matrix composite prepared by the stir casting route(Article)

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Abstract

The aim of this work is to develop a new class of aluminium alloy matrix composites (AAMCs) reinforced with different weight percentages of zirconium diboride (ZrB_2) particles through the bottom pouring type stir casting process. The mechanical and corrosion behaviours of aluminium can be improved by the addition of ceramic particles. Mechanical behaviours and microstructure of the composites were studied. Homogeneous distribution of ZrB_2 particles in the matrix was analysed using scanning electron microscope. The corrosion behaviour of the proposed composites was analysed by electrochemical assessments, such as polarization tests and AC impedance spectra. Prepared specimens are submerged inside aqueous sodium chloride (NaCl: 3.5%) solution. Corrosion potential, current, resistance of linear polarization, capacitance of double layer, resistance of charge transfer and resistance of corrosion in material were determined. From corrosion outcomes, we concluded that AA7178–ZrB_2 metal matrix composite revealed higher corrosion resistance than AA7178. The rate of corrosion resistance, hardness, impact strength and tensile strength was augmented gradually by way of increasing weight per cent of ZrB_2 particles in the AA7178 matrix. Hardness was improved by 26% and the ultimate tensile strength was improved by 15% for the inclusion of 10 wt% ZrB_2 particles in the AA7178 matrix.

Author keywords

Aluminium alloy | Composites | Properties | Zirconium diboride

Indexed keywords

Engineering controlled terms: Aluminum alloys | Aluminum corrosion | Charge transfer | Corrosion rate | Corrosion resistance | Corrosive effects | Hardness | Impact strength | Particle reinforced composites | Polarization | Scanning electron microscopy | Sodium chloride | Tensile strength | Zirconium compounds

Engineering uncontrolled terms: Aluminium alloy matrix composites | Corrosion behaviour | Corrosion potentials | Homogeneous distribution | Linear polarization | Mechanical behaviour | Ultimate tensile strength | Weight percentages

Engineering main heading: Metallic matrix composites

Document details - Effective and reliable platform for nonenzymatic nanomolar-range quinol detection in water samples using ceria doped polypyrrole nanocomposite embedded on graphitic carbon nitride nanosheets

Chemosphere

Volume 271, May 2021, Article number 129533

Effective and reliable platform for nonenzymatic nanomolar-range quinol detection in water samples using ceria doped polypyrrole nanocomposite embedded on graphitic carbon nitride nanosheets(Article)

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Abstract

A glassy carbon electrode modification by a novel ternary nanocomposite of advantageously united ceria, polypyrrole, and graphitic carbon nitride (CeO_2/Ppy@g-C_3N_4) is reported here. It can be used to tailor the sensor surface for the electrochemical detection of nanomolar-level quinol (Qnl), a chemical widely used as a developing agent in photography and lithography, as a cosmetic, and as an antioxidant in rubber and food industries. The occupational exposure of Qnl may occur by inhalation or dermal contact, leading to lot of health hazards. The synthesized nanocomposite was characterized by various analytical techniques such as UV–Vis, Fourier transformed infrared (FTIR), X-ray powder diffraction, field emission scanning electron microscopy, high-resolution transmission electron microscopy, Raman, thermogravimetric analysis, energy-dispersive X-ray spectroscopy, selected area electron diffraction, and elemental mapping analyses. The oxidation current of Qnl is linear to its concentration in the range of 0.01–260 μM and the lowest detection and quantification limit are found to be 1.5 nM and 0.004 μM, respectively, with a sensitivity of 283.33 μA mM^{-1} cm^{-2}. The performance of the modified electrode was compared with those of high-performance liquid chromatography, which indicates that the proposed sensor can be used as an effective and reliable platform for nano-molar detection of Qnl in various environmental and biological fluids.

Author keywords

CeO_2/Ppy@g-C_3N_4 | Electrochemical methods | Nanocomposite | Quinol | Sensor

Indexed keywords

Engineering controlled terms: Cerium oxide | Electron diffraction | Energy dispersive spectroscopy | Field emission microscopes | Fourier transform infrared spectroscopy | Glass membrane electrodes | Graphitic Carbon Nitride | Health hazards | High performance liquid chromatography | High resolution transmission electron microscopy | Nanocomposites | Polypyrroles | Rubber industry | Scanning electron microscopy | Thermogravimetric analysis | X ray powder diffraction

Engineering uncontrolled terms: Detection and quantification limit | ELectrochemical detection | Elemental mapping analysis | Energy dispersive X ray spectroscopy | Field emission scanning electron microscopy | Glassy carbon electrodes | Polypyrrole nanocomposites | Selected area electron diffraction

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Optimal routing strategy based on extreme learning machine with beetle antennae search algorithm for Low Earth Orbit satellite communication networks

International Journal of Satellite Communications and Networking

Volume 39, Issue 3, May/June 2021, Pages 305-317

Optimal routing strategy based on extreme learning machine with beetle antennae search algorithm for Low Earth Orbit satellite communication networks(Article)

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Abstract

Due to the significant utilization of terrestrial communication, Low Earth Orbit (LEO) satellite network is a critical part of satellite communication networks owing to its several benefits. But the efficient and trustworthy routing for LEO satellite networks (LSNs) is a difficult process because of dynamic topology, adequate link changes, and imbalanced communication load. This study devises a new hybridization of extreme learning machine (ELM) with multitask beetle antennae search (MBAS) algorithm-based distributed routing called the MBAS-ELM model. The proposed model determines the routes based on traffic forecasting with respect to the level of traffic circulation on the earth. The proposed method is employed for traffic forecasting at the satellite nodes (SNs). To identify the optimal routes, mobile agents (MAs) are applied to concurrently and autonomously determine for LSNs and make a decision on routing data. The experimental outcome has showcased the effective performance of the proposed model over the compared models in terms of different measures, namely, average delay, packet loss ratio (PLR), and queuing delay. The results are validated under varying simulation time and data sensing rates. The obtained outcome pointed out the superior performance of the proposed MBAS-ELM model compared with other methods.

Author keywords

Low Earth Orbit | machine learning | mobile agents | routing | satellite networks

Indexed keywords

Engineering controlled terms: Communication satellites | Knowledge acquisition | Learning algorithms | Machine learning | Mobile agents | Routing algorithms | Satellite antennas | Satellite communication systems | Satellites

Engineering uncontrolled terms: Distributed routing | Effective performance | Extreme learning machine | LEO satellite networks | Low earth orbit satellites | Satellite communication networks | Terrestrial communication | Traffic Forecasting

Engineering main heading: Orbits

Document details - Efficient segmentation of the lung carcinoma by adaptive fuzzy–GLCM (AF-GLCM) with deep learning based classification

Journal of Ambient Intelligence and Humanized Computing

Volume 12, Issue 5, May 2021, Pages 4715-4725

Efficient segmentation of the lung carcinoma by adaptive fuzzy–GLCM (AF-GLCM) with deep learning based classification(Article)

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Abstract

Image processing is an innovative method to convert the real image into a sharp digital image by applying various functions upon it. However, it is a difficult task for physicians in the medical field. The significant difficulty is with the segmentation of images due to the blurred contrast and artifacts at the boundary edges. Hence in this paper, an efficient and adaptive fuzzy-GLCM based segmentation method was proposed. The images derive from the process of bronchoscopy. The ultimate goal of the proposed methodology was the accurate recognition of the lung carcinoma, which undergoes segmentation. The adaptive F-GLCM segmentation method enables the early and easy detection of lung cancer, which helps both the physicians and the patients for proper initial medication. Then the classification was done with the help of the GoogLeNet CNN architecture, which will reveal whether the cancerous growth was in a benign or in a malignant stage. Then the performance analysis of the proposed method was measured by comparing it with the other existing methodology. © 2020, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Adaptive fuzzy-GLCM | Fluorescence bronchoscopy | GoogLeNet CNN architecture | Image processing | Image segmentation

Indexed keywords

Engineering controlled terms: Biological organs | Endoscopy | Image segmentation

Engineering uncontrolled terms: Boundary edges | Cancerous growth | Innovative method | Lung carcinoma | Malignant stage | Performance analysis | Segmentation methods | Various functions

Engineering main heading: Deep learning

ISSN: 18685137
Source Type: Journal
Original language: English
DOI: 10.1007/s12652-020-01874-7
Document Type: Article
Publisher: Springer Science and Business Media Deutschland GmbH

Yamunadevi, M.M.; Sethu Institute of Technology, Virudhunagar, India;

Document details - Occurrence Rate of Radio-Loud and Halo CMEs in Solar Cycle 25: Prediction Using their Correlation with the Sunspot Number

Solar Physics

Volume 296, Issue 4, April 2021, Article number 75

Occurrence Rate of Radio-Loud and Halo CMEs in Solar Cycle 25: Prediction Using their Correlation with the Sunspot Number(Article)(Open Access)

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Abstract

Solar coronal mass ejections (CMEs) are known for their space-weather and geomagnetic consequences. Among all CMEs, the so-called radio-loud (RL) and halo CMEs are considered the most energetic in the sense that they are usually faster and wider than the general population of CMEs. Hence the study of RL and halo CMEs has become important and the prediction of their occurrence rate in a future cycle will help their forecasting. In this article we predict the occurrence rates of RL and halo CMEs in Solar Cycle (SC) 25, obtaining good correlations between the numbers of RL and halo CMEs in each year and the yearly mean sunspot number in the previous two cycles. The values of the sunspot number predicted by NOAA/NASA for SC 25 are considered to be representative and the corresponding numbers of RL and halo CMEs are determined using linear relations. Our results show that the maximum number of RL and halo CMEs will be around 39 ± 3 and 45 ± 4 , respectively. Removing backside events, a set of front-side events is also considered separately and front-side events in SC 25 are also predicted. The peak values of front-side RL and halo events have been estimated to be around 31 ± 3 and 29 ± 3 , respectively. These results are discussed in comparison with the predicted sunspot number values by different authors.

Author keywords

Halo CMEs | Radio-loud CMEs | Solar cycle | Sun | Sunspots

Funding details

Funding sponsor	Funding number	Acronym
National Aeronautics and Space Administration See opportunities by NASA		NASA
National Oceanic and Atmospheric Administration See opportunities by NOAA		NOAA
Catholic University of America		CUA
U.S. Naval Research Laboratory		NRL
Chinese Academy of Sciences		CAS

Document details - Influence of ZnO nanoparticles on thermophysical and tribological properties of polyolester oil

Materials Research Express

Volume 8, Issue 4, April 2021, Article number 045502

Influence of ZnO nanoparticles on thermophysical and tribological properties of polyolester oil(Article)(Open Access)

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Abstract

An experimental assessment of thermo-physical, tribological, and eco-friendly properties of polyolester (POE) oil with zinc oxide (ZnO) nanoparticles for use as nanolubricant in refrigeration compressor. The ZnO nanolubricants were added in the mass fractions in the range from 0.1% to 0.5%, at the temperatures of 0 °C, 20 °C, 30 °C, 40 °C, and 60 °C. The thermophysical properties include thermal conductivity, kinematic viscosity, flash point, fire point, pour point, and cloud point with respect to various proportions. The morphology and size of ZnO nanoparticles are studied using the scanning electron microscope test. The tests findings suggest that ZnO nanoparticles greatly improved the friction characteristics of pure POE oil. The addition of the concentration decreases the pour point by 13.6%; at the same time, the flashpoint is improved by 3.5% when the POE oil is blended with ZnO. Zinc oxide nanoparticles could improve the refrigerants' performance by extending life and avoiding friction problems. The optimum ZnO content of nanolubricants is, therefore, 0.3% for the POE/ZnO nanoparticles addition. The COF values are reduced by 6.95% at the optimum concentration over that with POE oil. The nanoparticles' addition up to 0.3% results in less wear as they provide a defensive film between the surfaces during their motion. The mass loss value increased due to the aggregation of ZnO nanoparticles. The higher thermal conductivity is obtained for the 0.3% volume fraction of nanoparticles, and other 0.1% and 0.5% volume fractions lesser.

Author keywords

biodegradability | Nano lubricant | thermal conductivity | tribological

Indexed keywords

Engineering controlled terms: Friction | II-VI semiconductors | Metal nanoparticles | Oxide minerals | Scanning electron microscopy | Thermal conductivity | Tribology | Volume fraction | Zinc oxide

Engineering uncontrolled terms: Experimental assessment | Friction characteristics | Friction problems | Morphology and size | Optimum concentration | Refrigeration compressors | Tribological properties | Zinc oxide nanoparticles

Engineering main heading: ZnO nanoparticles

Document details - Automated bleeding detection in wireless capsule endoscopy images based on color feature extraction from Gaussian mixture model superpixels

Medical and Biological Engineering and Computing

Volume 59, Issue 4, April 2021, Pages 969-987

Automated bleeding detection in wireless capsule endoscopy images based on color feature extraction from Gaussian mixture model superpixels(Article)

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Abstract

Wireless capsule endoscopy is the commonly employed modality in the treatment of gastrointestinal tract pathologies. However, the time taken for interpretation of these images is very high due to the large volume of images generated. Automated detection of disorders with these images can facilitate faster clinical interventions. In this paper, we propose an automated system based on Gaussian mixture model superpixels for bleeding detection and segmentation of candidate regions. The proposed system is realized with a classic binary support vector machine classifier trained with seven features including color and texture attributes extracted from the Gaussian mixture model superpixels of the WCE images. On detection of bleeding images, bleeding regions are segmented from them, by incrementally grouping the superpixels based on deltaE color differences. Tested with standard datasets, this system exhibits best performance compared to the state-of-the-art approaches with respect to classification accuracy, feature selection, computational time, and segmentation accuracy. The proposed system achieves 99.88% accuracy, 99.83% sensitivity, and 100% specificity signifying the effectiveness of the proposed system in bleeding detection with very few classification errors. Graphical abstract: [Figure not available: see fulltext.]

Author keywords

Bleeding detection | Gaussian mixture model | Superpixel | Support vector machine | Wireless capsule endoscopy

Indexed keywords

Engineering controlled terms: Automation | Biomedical signal processing | Classification (of information) | Color | Endoscopy | Feature extraction | Gaussian distribution | Superpixels | Support vector machines | Textures

Engineering uncontrolled terms: Binary support vector machines | Classification accuracy | Clinical interventions | Color feature extraction | Gastrointestinal tract | State-of-the-art approach | Wireless capsule endoscopy | Wireless capsule endoscopy image

Engineering main heading: Color image processing

Document details - Experimental Investigation and Optimization of Process Parameters in Ti – (6242) Alpha–Beta Alloy Using Electrical Discharge Machining

Journal of Inorganic and Organometallic Polymers and Materials

Volume 31, Issue 4, April 2021, Pages 1787-1800

Experimental Investigation and Optimization of Process Parameters in Ti – (6242) Alpha–Beta Alloy Using Electrical Discharge Machining(Article)

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Abstract

This investigation exposes electrical discharge machine (EDM) technique in expelling the metal with a conducted copper electrode from the Ti–6Al–2Sn–4Zr–2Mo alloy. The alloy Ti–6Al–2Sn–4Zr–2Mo has the highest resistance, high-temperature detection, high tensile strength, and high yield strength. Ti–6Al–2Sn–4Zr–2Mo alloy is commonly used for applications such as aerospace, medical equipment, automotive parts, and nuclear power plants. EDM provides easy machinability and excellent surface finishes. Machine parameters of primary noteworthiness, such as Discharge Current (I), Spark on time (μs), and Tool Diameter (mm), are considered using the Taguchi L27 orthogonal array. Metal removal rate (MRR), tool wear rate (TWR), and overcut (OC) perpendicularity are investigated with the help of mean effective plots. Multi response optimization to maximize the material removal rate (MRR) and minimize the tool wear rate (TWR) and over cut (OC) on the surface of the workpiece has been analyzed by Grey relational analysis (GRA). The result expresses that spark on time (Ton) contributes (6.22%) more on affecting the machining characteristics followed by electrode diameter (76.97%) and discharge current (16.97%). From the F-test, it is assumed that all the machining parameters have a significant influence on responses. Accordingly an optimum combination of machining parameters is also determined. © 2020, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Alloy | Characterization | Machining | Surface | Titanium | Wear

Indexed keywords

Engineering controlled terms: Cutting tools | Electric discharge machining | Electric discharges | Electric power plant equipment | Electrodes | High strength alloys | Machining centers | Nuclear fuels | Tensile strength | Titanium | Wear of materials

Engineering uncontrolled terms: Electrical discharge machines | Electrical discharge machining | Experimental investigations | Grey relational analyses (GRA) | High temperature detection | Machining characteristics | Multiresponse optimization | Optimization of process parameters

Engineering main heading: Nuclear power plants

Document details - Polyoxometalate based ionic crystal: dual applications in selective colorimetric sensor for hydrated ZnCl₂and antimicrobial activity

New Journal of Chemistry

Volume 45, Issue 12, 28 March 2021, Pages 5576-5588

Polyoxometalate based ionic crystal: dual applications in selective colorimetric sensor for hydrated $ZnCl_2$and antimicrobial activity(Article)

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View additional affiliations

Abstract

One-pot synthesis of POM-salt ([Himi]$_4$[$SiMo_{12}O_{40}$] (1)) was achieved by mixing silicomolybdic acid and imidazole in acidic conditions and characterized by FTIR, TGA, SEM, EDX, ICP-OES and XPS. The structure of1was confirmed by single crystal X-ray analysis. The matching of the simulated PXRD pattern with the experimental pattern indicates the phase purity of1. Interestingly,1showed highly selective and sensitive colorimetric detection of hydrated zinc chloride ($ZnCl_2 \cdot 2H_2O$). The addition of $ZnCl_2 \cdot 2H_2O$ into1in the DMSO-H_2O mixture shows the formation of blue colour. Furthermore, metal ions including other anionic zinc salts did not produce any colour change. The limit of detection was calculated to be 0.15 μM. Similarly, solid mixing of $ZnCl_2 \cdot 2H_2O$ with1can also produce a visible blue colour change. On the other hand, anhydrous $ZnCl_2$did not form any color change under the same conditions. The mechanistic studies indicate that the reduction of $Mo^{6+}$to Mo^{5+}might be responsible for the selective colour change. The reversible colour change between colorless and blue colour upon addition of EDTA into 1-$ZnCl_2 \cdot 2H_2O$ demonstrates the reusability of1. Furthermore, microbial activity of1was investigated towards a series of Gram-positive and Gram-negative bacterial and fungal strains. Effective bactericidal activity of1was analyzed againstStaphylococcus aureus. © The Royal Society of Chemistry and the Centre National de la Recherche Scientifique 2021.

Indexed keywords

Engineering controlled terms: Chlorine compounds, Color, Crystal structure, Dimethyl sulfoxide, Energy dispersive X ray analysis, Hydration, Metal ions, Metals, Mixing, Polyoxometalates, Reusability, Salts, Single crystals, X ray diffraction analysis, Zinc chloride

Engineering uncontrolled terms: Anti-microbial activity, Bactericidal activity, Colorimetric detection, Colorimetric sensors, Limit of detection, Mechanistic studies, Microbial activities, Single crystal X-ray analysis

Engineering main heading: Colorimetry

EMTREE drug terms: dimethyl sulfoxide, polyoxometalate, sodium chloride, transition element, unclassified drug, water, zinc chloride, zinc derivative

Document details - Learning From Mistakes: The Role of Phages in Pandemics

Frontiers in Microbiology

Volume 12, 17 March 2021, Article number 653107

Learning From Mistakes: The Role of Phages in Pandemics(Article)(Open Access)

Alsaadi, A., Beamud, B., Easwaran, M., Abdelrahman, F., El-Shibiny, A., Alghoribi, M.F., Domingo-Calap, P.

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Abstract

The misuse of antibiotics is leading to the emergence of multidrug-resistant (MDR) bacteria, and in the absence of available treatments, this has become a major global threat. In the middle of the recent severe acute respiratory coronavirus 2 (SARS-CoV-2) pandemic, which has challenged the whole world, the emergence of MDR bacteria is increasing due to prophylactic administration of antibiotics to intensive care unit patients to prevent secondary bacterial infections. This is just an example underscoring the need to seek alternative treatments against MDR bacteria. To this end, phage therapy has been proposed as a promising tool. However, further research in the field is mandatory to assure safety protocols and to develop appropriate regulations for its use in clinics. This requires investing more in such non-conventional or alternative therapeutic approaches, to develop new treatment regimens capable of reducing the emergence of MDR and preventing future global public health concerns that could lead to incalculable human and economic losses. © Copyright © 2021 Alsaadi, Beamud, Easwaran, Abdelrahman, El-Shibiny, Alghoribi and Domingo-Calap.

Author keywords

antibiotic resistance | emergent pathogen | multidrug-resistant bacteria | phage therapy | public health

Indexed keywords

EMTREE drug terms: carbapenemase | cefepime | monoclonal antibody | virulence factor

EMTREE medical terms: antibiotic resistance | aquaculture | Article | bacterial virulence | bacteriophage | Coronavirinae | drug approval | drug industry | gene therapy | health care cost | health care system | infectious agent | intensive care unit | learning | life expectancy | medical research | multidrug resistance | multidrug resistant bacterium | nonhuman | pandemic | personalized medicine | phage therapy | protein engineering | quality of life | vaccination | virus transmission

Chemicals and CAS Registry Numbers:

cefepime, 88040-23-7

Document details - Indian mallow fiber reinforced polyester composites: Mechanical and thermal properties

Journal of Materials Research and Technology

Volume 11, March 2021, Pages 274-284

Indian mallow fiber reinforced polyester composites: Mechanical and thermal properties(Article)(Open Access)

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Abstract

The natural fiber reinforced polymeric composites have found to be an excellent substitute for synthetic fiber based polymeric composites and are being widely utilized in several advanced engineering applications. The present experimental work deals with randomly oriented Indian mallow fiber/polyester (IMFP) composites which are fabricated by compression moulding method by varying the fiber wt. % from 10 to 50%. The prepared IMFP specimens were evaluated through various mechanical and thermal properties and the results showed that better properties were obtained in specimens with 50 wt. % fiber content. The optimum tensile strength and modulus was about 46 MPa and 3.56 GPa respectively, while the elongation at break was 1.39%. The optimum flexural and impact strength are estimated to be around 111 MPa and 14 kJ/m2 respectively. The heat deflection test (HDT) displayed that temperature withstands up to 84 °C at 50 wt. % of fiber content. The surface morphologies of the fractured composite specimens were characterized by scanning electron microscopy (SEM) analysis. The overall results confirmed the suitability of the present specimens to be employed in various light weight applications.

Author keywords

Hardness HDT Mallow fiber SEM Tensile strength

Indexed keywords

Engineering controlled terms: Fibers Hardness Impact strength Reinforcement Tensile strength Thermodynamic properties

Engineering uncontrolled terms: Fiber-reinforced polymeric composites Fibers content Fibre-reinforced Heat deflection test Mallow fiber Mechanical and thermal properties Natural fiber reinforced Polyester composites Polymeric composites Scanning electrons

Engineering main heading: Scanning electron microscopy

Document details - Facile preparation of highly dispersed copper promoted cobalt catalyst supported on alumina nanospheres

Materials Letters

Volume 286, 1 March 2021, Article number 129221

Facile preparation of highly dispersed copper promoted cobalt catalyst supported on alumina nanospheres(Article)

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Abstract

Co/Cu catalyst supported on alumina nanospheres were prepared by two methods. First, Al_2O_3 nanospheres were successfully prepared by sol – gel method. Next, the prepared alumina nanospheres were impregnated with cobalt and copper metals by wet impregnation method. The physico – chemical properties of the catalyst were studied by X-ray diffraction (XRD), Scanning Electron Microscopy (SEM), Energy Dispersive X-ray analysis (EDX), Thermogravimetry analysis (TGA) and Differential Scanning Calorimetry analysis (DSC). The calculated crystallite size of the catalyst was found to be around 4.3 nm by using XRD analysis. Morphological studies revealed good dispersion and spherical structure and the particles diameter ranges around 62.67 nm. The prepared catalyst was thermally stable up to 750 °C was confirmed by TGA analysis. Further, DSC studies showed that the occurrence of the crystallization process in catalyst with an exothermic peak. © 2020 Elsevier B.V.

Author keywords

Bimetallic catalyst | Nanoparticles | Sol-gel preparation | Wet impregnation method

Indexed keywords

Engineering controlled terms: Alumina | Aluminum oxide | Chemical analysis | Cobalt | Copper | Crystallite size | Differential scanning calorimetry | Energy dispersive X ray analysis | Nanospheres | Particle size analysis | Scanning electron microscopy | Sols | Thermogravimetric analysis | X ray diffraction | X ray diffraction analysis

Engineering uncontrolled terms: Crystallization process | Energy dispersive x-ray analysis (EDX) | Exothermic peaks | Facile preparation | Morphological study | Spherical structures | Thermogravimetry analysis | Wet impregnation method

Engineering main heading: Catalyst supports

Document details - Influence of Primary Regulation on Frequency Control of an Isolated Microgrid Equipped with Crow Search Algorithm Tuned Classical Controllers

Journal of Electrical Engineering and Technology

Volume 16, Issue 2, March 2021, Pages 681-695

Influence of Primary Regulation on Frequency Control of an Isolated Microgrid Equipped with Crow Search Algorithm Tuned Classical Controllers(Article)

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Abstract

Along with the power demand variations, change in wind speed and irradiance leads to large frequency oscillations especially in case of isolated microgrid integrated with PV and wind power generating units. To minimize such frequency changes, proportional plus integral (PI) and proportional, integral, and derivative (PID) controllers are set up for controllable generating units of isolated microgrid. However, this paper introduced primary regulation concept for diesel generator (DG) along with PI/PID controller mechanism which enhances overall system stability and minimize the frequency oscillations during the initial stages of load/power changes. Also, the choice of PI and PID controllers is introduced in this paper when the DG's in microgrid equipped with primary regulation loop along secondary control and only secondary control without primary loop as extension of frequency control. The investigations are carried out in regular load change and generation change patterns along with irregular stochastic models. Crow search optimization algorithm (CSOA) provide fine controller parameters in both cases and results carried out in MATLAB-SIMULINK environment © 2020, The Korean Institute of Electrical Engineers.

Author keywords

Crow search optimization algorithm | Frequency control | Microgrid | PID

Indexed keywords

Engineering controlled terms: Microgrids | Proportional control systems | Solar power generation | Stochastic control systems | Stochastic models | Stochastic systems | System stability | Three term control systems | Wind | Wind power

Engineering uncontrolled terms: Classical controllers | Controller parameter | Frequency oscillations | Proportional , integral , and derivative controllers | Proportional plus integrals | Search optimization | Secondary control | Wind power generating

Engineering main heading: Controllers

ISSN: 19750102 **DOI:** 10.1007/s42835-020-00614-3

Document details - A novel voice activity detection algorithm using modified global thresholding

International Journal of Speech Technology

Volume 24, Issue 1, March 2021, Pages 127-142

A novel voice activity detection algorithm using modified global thresholding(Article)

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Abstract

Voice activity detection is currently a challenging task that is applicable in real time applications such as speech coding and recognition. It is due to the low signal-to-noise ratio that affected the structural properties. Voice activity detection helps in detecting the speech region that is present in various nonstationary noises. The literature associated with Voice activity detection suggests that numerous works use unbalanced classification approach with higher and poor, speech and non-speech detection rates, respectively. This leads to the condition that majority of the noisy segments are categorized as speech. Hence, to overcome this issue, we propose a novel modified global thresholding scheme that has a fuzzy entropy tool. Our proposal can effectively identify both regions by locating the transition from non-speech to speech areas and vice versa. This will improve the detection rates as misclassification error of noisy segments as speech segments are minimized. The performance of the proposed algorithm is tested on various additive non-stationary noises at different SNR levels. In most of the existing research, it is often assumed that the noise is stationary for a particular instant in order to estimate the noise information. But in real scenario this is impossible. Our significant contribution is in developing an algorithm that handles the signals which possess nonstationary noises and various complex events which can be a mixture of different noises. As the characteristics of speech vary over time (nonstationary), when additively mixed with nonstationary noises becomes more challenging especially at low SNR levels (– 5 dB, – 10 dB). Therefore, the problem becomes more complicated like that in the real-time scenario. Our proposed method produces 91.98% and 87.38% of speech and non-speech detection rates in low SNR levels, respectively. It also obtains an accuracy of 93.39% for speech babble noises against the state-of-art algorithms which varied between 50 and 80% only. Similarly, NDS rates of the proposed algorithm is very minimal, i.e. less than 10% compared to the bench mark algorithms which had at least 50% or more of the noise detected as speech segments. The significance of our invention is in precisely locating where a speech begins and ends in a given noisy speech. We believe that we have produced a path breaking approach that can be helpful in real time applications in speech processing.

Author keywords

Additive non-stationary noise | Fuzzy entropy | Modified global thresholding | Speech signals | Voice activity detection

Indexed keywords

Engineering controlled terms: Additives | Signal detection | Signal to noise ratio | Speech analysis | Speech processing

Document details - Immunohistochemical analysis of oral cancer tissue images using support vector machine

Measurement: Journal of the International Measurement Confederation

Volume 173, March 2021, Article number 108476

Immunohistochemical analysis of oral cancer tissue images using support vector machine(Article)

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Abstract

This paper describes an automatic image analysis technique for p53 immunostained tissue sections of oral cancer. The tissue images are segmented using the entropy thresholding and clustered cells are resolved by selectively applying watershed transform. Each cell nuclei of tissue images is classified as positive or negative according to the staining intensity using support vector machine, and then, tissue score is determined as per J-scoring protocol. The performance of the feature and also scoring technique has been evaluated separately by an individual dataset. According to the experimental result, the feature extracted from the blue component has attained the highest classification accuracy of 98.01% with sensitivity and specificity of 98.86% & 94.74% respectively. The outcome of automatic technique based on the blue component has a strong agreement with the manual score. Therefore, automatic tissue scoring has high potential in the field of modern cancer diagnosis and specific therapy design for the patients. © 2020 Elsevier Ltd

Author keywords

Co-occurrence matrix | Entropy thresholding | Feature extraction | J-score | SVM

Indexed keywords

Engineering controlled terms: Diagnosis | Diseases | Image analysis | Patient treatment | Support vector machines

Engineering uncontrolled terms: Automatic image analysis | Automatic technique | Cancer diagnosis | Classification accuracy | Immunohistochemical analysis | Scoring techniques | Sensitivity and specificity | Watershed transform

Engineering main heading: Tissue

Funding details

Funding sponsor	Funding number	Acronym
Universiti Malaya		UM

Funding text

Document details - Synthesis and electrochemical behaviour of TiC- And B₄C-reinforced Al-based metal matrix composite

Emerging Materials Research

Volume 10, Issue 1, February 27, 2021, Pages 24-32

Synthesis and electrochemical behaviour of TiC- And B_4C-reinforced Al-based metal matrix composite(Article)

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Abstract

Aluminium (Al)-based metal matrix composites were developed with titanium carbide (TiC) and boron carbide (B4C) materials as reinforcement. The weight percentages of titanium carbide (1.5%) and boron carbide (0.5%) powder were maintained throughout the process of composite development. Composite process parameters such as powder compaction pressure, sintering temperature and time were varied in different combinations. The prepared composites were mechanically evaluated and metallurgically investigated for their quality. Further, the samples were subjected to electrochemical analysis to study their behaviour in 3.5% sodium chloride (NaCl) solution. From the experimentation, the corrosion potential and current density were measured. Subsequently, the corrosion rate (mm/ year) of the material was calculated through its Tafel plot. The composite processed at a sintering temperature of 630°C for a duration of 135 min had higher corrosion resistance, with a minimum corrosion rate of 1.699 mm/year. The electrical resistance also increased over the exposed surface with a minimum current density of 0.15 mA/cm^2. Scanning electron microscopy and energy-dispersive spectroscopy (EDS) were used to determine the metallurgical quality of the exposed surface. The oxide formation was observed on the exposed surface in the process of corrosion. The element aluminium and oxygen were found on the surface which denotes that the Aluminium oxide formed on the exposed surface. From the results, a discussion is presented confirming the influence of composite powder processing parameters.

Author keywords

Composites | Corrosion | Material characterisation

Indexed keywords

Engineering controlled terms: Alumina | Aluminum oxide | Boron carbide | Corrosion rate | Corrosion resistance | Energy dispersive spectroscopy | Metallic matrix composites | Metals | Powder metals | Quality control | Scanning electron microscopy | Sintering | Sodium chloride | Titanium carbide

Engineering uncontrolled terms: Electrical resistances | Electrochemical analysis | Electrochemical behaviour | Energy dispersive spectroscopies (EDS) | Sintering temperature and time | Sintering temperatures | Sodium chloride solution | Titanium carbides (TiC)

Engineering main heading: Reinforcement

Document details - Cellulosic fiber based hybrid composites: A comparative investigation into their structurally influencing mechanical properties

Construction and Building Materials

Volume 271, 15 February 2021, Article number 121587

Cellulosic fiber based hybrid composites: A comparative investigation into their structurally influencing mechanical properties(Article)(Open Access)

Vignesh, V., Balaji, A.N., Mohamed Rabi, B.R., Rajini, N., Ayrilmis, N., Karthikeyan, M.K.V., Mohammad, F., Ismail, S.O., Al-Lohedan, H.A.

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Abstract

This paper focuses on hybrid and twisted hybrid Indian mallow/roselle cellulosic fiber yarn mat reinforced polyester composites and effects of their wood sawdust filler. The composite materials were fabricated usingcompression moldingtechnique. There were four different combinations of hybrid yarn mat composite samples used, while the twisted hybrids were six. An evaluation of the hybrid and twisted hybrid mechanical properties for the single and double layer cases of the yarn mat was done with and without wood sawdust filler effects. The samples were tested at both warp and weft directions. From the results obtained at warp direction, it was observed that for the hybrid double layer case, longitudinal yarn mat with wood sawdust (filler) composite sampleexhibited better tensile, impact and flexural strength properties in comparison with other related composites of hybrid type reported in literature. Moreover, the modified twisted hybrid double layer composites with longitudinal yarn mat andwood sawdust fillersamplerecorded significantly greater improvement on the mechanical properties at warp direction, when compared with the hybrid double layer longitudinal yarn mat composites with wood sawdust filler and other reported similar hybrid composite materials. Scanning electron microscopy (SEM) technique was utilized to evaluate morphological internal damage (cracks) and fractured surfaces of the various tested composite samples. Based on their mechanical performances and for further practical evidence, these two types of eco-composites were used to effectively fabricate tri-wheeler auto-wheel hubs and ceiling fan blades, as applicable to automobile and electronics industries, respectively.

Author keywords

Hybrid fiber | Mechanical properties | Scanning electron microscopy | Twisted hybrid fiber | Wood sawdust filler

Indexed keywords

Engineering controlled terms: Composite materials | Electronics industry | Fillers | Mechanical properties | Scanning electron microscopy | Wood | Wool | Yarn

Engineering uncontrolled terms: Cellulosic fibers | Composite samples | Fractured surfaces | Hybrid composite materials | Hybrid composites | Mechanical performance | Polyester composites | Strength property

Engineering main heading: Hybrid materials

Document details - Novel synergistic approaches of nano-biomaterials and bacteriophage for combating antimicrobial resistance

Handbook of Research on Nano-Strategies for Combatting Antimicrobial Resistance and Cancer

12 February 2021, Pages 114-132

Novel synergistic approaches of nano-biomaterials and bacteriophage for combating antimicrobial resistance
(Book Chapter)

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Abstract

The antimicrobial resistance has significantly risen in last few decades as a result of too much usage of antibiotics. In the case of failure of drug therapy, the multidrug resistance has become a serious issue in a clinical and food sectors. The rapid emergence of antibiotic resistance has become a great concern for public health worldwide. Therefore, the novel approaches of nano-biomaterials (NBM) and bacteriophage (phage) have received a new attention as an alternative treatment for antibiotic-resistant bacterial infections. Moreover, the advanced molecular biology and genetic engineering have been successfully applied for the rapid detection and control of multidrug resistant pathogenic strains. This chapter specifically summarizes the prevalence of common as well as under-researched antimicrobial resistance of bacterial pathogens and the application of nano-biomaterials and bacteriophage to fight against antimicrobial resistance. Ultimately, the synergistic approach will be a highly promising prospect to threat of antimicrobial resistance. © 2021, IGI Global.

ISBN: 978-179985050-2;978-179985049-6
Source Type: Book
Original language: English
DOI: 10.4018/978-1-7998-5049-6.ch005
Document Type: Book Chapter
Publisher: IGI Global

Easwaran, M.; Sethu Institute of Technology, India

Chapters in this book

Document details - HHFDS: Heterogeneous hybridized fuzzy-based Dijkstra's multitask scheduling in WSN

Concurrency and Computation: Practice and Experience

Volume 33, Issue 3, 10 February 2021, Article number e5354

HHFDS: Heterogeneous hybridized fuzzy-based Dijkstra's multitask scheduling in WSN(Conference Paper)

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Abstract

Wireless Sensor Network (WSN) has to diffuse the independent wireless sensor nodes, which can track the physical or environmental status. In previous works, many issues prevailed with multitask scheduling such as interference, high energy consumption, throughput, etc. Moreover, some issues arise while working with heterogeneous WSN. This work deals with these issues in heterogeneous WSN with aid of the multitask scheduling. For this purpose, a Heterogeneous Hybridized Fuzzy-based (depends on degree of truth) Dijkstra's organizing algorithm (HHFDS) was proposed. This technique integrates light weight characteristics as well as a queuing-based analysis methods, hence identifying the greatest parallel arrangements for which the provided data packet effectively. In this technique, fuzzy Dijkstra's algorithm is hybridized with deep neural network. This also depicts in what way to utilize the identifications outcome with varying data packets and thereby helps with various heterogeneous organizing objectives. The proposed HHFDS algorithm is implemented via the use of the network simulator (NS2). The results of the proposed and existing methods are measured in terms of the metrics like Energy Consumption, Time Consumption, Transmission Delay, and Average Throughput. The simulation results are depicted as follows and the comparison result shown as follows demonstrates the effectiveness of the proposed algorithm. © 2019 John Wiley & Sons, Ltd.

Author keywords

deep neural connections | Fuzzy-based Dijkstra's algorithm | heterogeneous scheduling | interference | multitask scheduling | wireless sensor network

Indexed keywords

Engineering controlled terms: Deep neural networks | Energy utilization | Scheduling | Sensor nodes | Wave interference | Wireless sensor networks

Engineering uncontrolled terms: Average throughput | Dijkstra's algorithms | Heterogeneous Scheduling | High energy consumption | Network simulators | Parallel arrangement | Transmission delays | Wireless sensor node

Engineering main heading: Fuzzy inference

Document details - Quality span prediction (QSP) of solar photovoltaic panels

Proceedings of the 3rd International Conference on Intelligent Communication Technologies and Virtual Mobile Networks, ICICV 2021

4 February 2021, Article number 9388537, Pages 619-628

3rd International Conference on Intelligent Communication Technologies and Virtual Mobile Networks, ICICV 2021; Tirunelveli; India; 4 February 2021 through 6 February 2021; Category numberCFP21ONG-ART; Code 168213

Quality span prediction (QSP) of solar photovoltaic panels(Conference Paper)

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Abstract

One of the most beneficial systems to generate green energy are the solar panels. At present various types of photovoltaic panels are in use depending on the energy requirement of the user. But, all panels are not in good conditions. Sometimes the users are supplied with very old and degraded quality panels. This reduced the power production of PV panels which are lower than their rated value. So the users have to install a new PV system within a very short span of time. Hence the choice of solar power system is decreasing in certain regions. This paper is focused on finding the age and quality of the PV panels. The quality of the PV panel is estimated by Infrared Thermal Imaging (ITI) techniques. The age of the PV panels is found out from the Normal Test Operating Condition (NTOC) values Normal Operating Cell Temperature (NOCT) values. From these NTOC, the Standard Test Condition (STC) values are derived. The deviation between them is used to derive efficiency, percentage defect and age of the panel. The findings necessitate the user to select the right PV panels for their energy production requirements. Hence the cost of reinstallation is eliminated and the selection of PV panels by users is encouraged. The panels are frequently monitored and their full life span is utilized productively. © 2021 IEEE.

Author keywords

Infrared Thermal Imaging (ITI) | Normal Operating Cell Temperature (NOCT) | Normal Test Operating Conditions (NTOC) | Photovoltaic (PV) panels | Standard Test Condition (STC)

Indexed keywords

Engineering controlled terms: Cellular radio systems | Infrared imaging | Mobile telecommunication systems | Photovoltaic cells | Solar power generation | Solar power plants | Wireless networks

Engineering uncontrolled terms: Energy productions | Energy requirements | Infrared thermal imaging | Operating condition | Photovoltaic panels | Power production | Solar photovoltaic panels | Standard test condition (STC)

Engineering main heading: Solar cells

Document details - An efficient dynamic key generation architecture for distributed wireless networks

Proceedings of the 3rd International Conference on Intelligent Communication Technologies and Virtual Mobile Networks, ICICV 2021

4 February 2021, Article number 9388551, Pages 157-160

3rd International Conference on Intelligent Communication Technologies and Virtual Mobile Networks, ICICV 2021; Tirunelveli; India; 4 February 2021 through 6 February 2021; Category numberCFP21ONG-ART; Code 168213

An efficient dynamic key generation architecture for distributed wireless networks(Conference Paper)

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Abstract

Distributed wireless networks are capable of delivering solutions for countless engineering and viable applications. The sensor nodes of these wireless networks tolerate tons of limitations namely low computation capability, secured data transmission, tiny memory, fractional energy resources, etc. Within this environment any sensor node can initiate the communication over a period, hence it is imperative to enhance the reliability of data which is communicated. In a secured communication, diverse numbers of hardware devices are employed for sharing the information wirelessly. Therefore, the dynamic keys guarantee the secureness of data between the diverse numbers of user devices. Here the manuscript deals about a method of generating dynamic keys for secure communication in a distributed environment that cannot be predicted or cloned by the previous values. The dynamic keys are generated by employing a hybrid hardware of PRNG (Pseudo-Random Number Generator) and PUF (Physical Unclonable Function). A hardware platform is preferred to produce the randomly unclonable dynamic keys. © 2021 IEEE.

Author keywords

Crypto device | Distributed wireless networks | Dynamic key | Physical unclonable function | Random number generator | Secure communication

Indexed keywords

Engineering controlled terms: Cellular radio systems | Cloning | Cryptography | Energy resources | Mobile security | Mobile telecommunication systems | Number theory | Sensor nodes

Engineering uncontrolled terms: Distributed environments | Distributed wireless networks | Fractional energy | Hardware devices | Hardware platform | Pseudo random number generators | Secured communication | User devices

Engineering main heading: Random number generation

ISBN: 978-073811183-4
Source Type: Conference Proceeding
DOI: 10.1109/ICICV50876.2021.9388551
Document Type: Conference Paper

Document details - Phage-encoded endolysins

Antibiotics

Volume 10, Issue 2, February 2021, Article number 124, Pages 1-31

Phage-encoded endolysins(Review)(Open Access)

Abdelrahman, F., Easwaran, M., Daramola, O.I., Ragab, S., Lynch, S., Oduselu, T.J., Khan, F.M., Ayobami, A., Adnan, F., Torrents, E., Sanmukh, S., El-Shibiny, A.

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Abstract

Due to the global emergence of antibiotic resistance, there has been an increase in research surrounding endolysins as an alternative therapeutic. Endolysins are phage-encoded enzymes, utilized by mature phage virions to hydrolyze the cell wall from within. There is significant evidence that proves the ability of endolysins to degrade the peptidoglycan externally without the assistance of phage. Thus, their incorporation in therapeutic strategies has opened new options for therapeutic application against bacterial infections in the human and veterinary sectors, as well as within the agricultural and biotechnology sectors. While endolysins show promising results within the laboratory, it is important to document their resistance, safety, and immunogenicity for in-vivo application. This review aims to provide new insights into the synergy between endolysins and antibiotics, as well as the formulation of endolysins. Thus, it provides crucial information for clinical trials involving endolysins.

Author keywords

Antibiotic resistance | Bacteriophages | Endolysin

Indexed keywords

EMTREE drug terms: antiinfective agent | endolysin | glycosidase | hydrolase | peptidoglycan | unclassified drug

EMTREE medical terms: antibiotic resistance | bacterial infection | bacteriophage | biofilm matrix | biotechnology | human | hydrolysis | immunogenicity | nonhuman | Review | veterinary medicine

Chemicals and CAS Registry Numbers:

glycosidase, 9032-92-2; hydrolase, 9027-41-2; peptidoglycan, 9047-10-3

Funding details

Funding sponsor	Funding number	Acronym
	2017SGR-1079	
	712754	
European Commission See opportunities by EC	RTI2018-098573-B-100	EC

Document details - Bactericidal activity of Moringa oleifera leaf extract assisted green synthesis of hierarchical copper oxide microspheres against pathogenic bacterial strains

Journal of Environmental Chemical Engineering

Volume 9, Issue 1, February 2021, Article number 104847

Bactericidal activity of Moringa oleifera leaf extract assisted green synthesis of hierarchical copper oxide microspheres against pathogenic bacterial strains(Article)

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View additional affiliations

Abstract

Hierarchical copper oxide (CuO) microspheres were prepared by Moringa oleifera (M. oleifera) leaf extract assisted green synthesis method. The structural, chemical, and morphological features of the hierarchical CuO microspheres were inspected by XRD, FTIR, SEM, and EDAX techniques. The XRD pattern unveiled the formation of monoclinic crystal structured CuO, which confirmed the conversion of Cu(NO3)2.3H2O to Cu2+ ions by phytochemicals present in the M. oleifera leaf extract. The SEM micrographs demonstrated that small CuO nanostructures have interacted with adjacent CuO nanostructures leading to the formation of cluster-like morphologies that resemble hierarchical CuO microspheres. The asymmetric stretching deformation vibration bands observed in the FTIR spectrum of the hierarchical CuO microspheres correspond to Cu-O bond along the (-2 0 2) direction that conveyed monoclinic unit crystal formation of the CuO. The detected Cu and O elements through the EDAX analysis reveal the pristine nature of the hierarchical CuO microspheres. The rich phytochemicals in the M. oleifera leaf extract played crucial roles towards the formation and stabilization of hierarchical CuO microspheres. The highest bactericidal activity was noticed against the Staphylococcus aureus strain with zone of inhibition (ZOI) of 30 and 32 mm for the hierarchical CuO microspheres dosage of 50 and 100 µL, respectively, followed by Klebsiella pneumoniae, Escherichia coli and Bacillus cereus strains. The better bactericidal activity observed against the selected bacterial strains could be credited to ideal interaction of the hierarchical CuO microspheres/small nanostructures with cell walls of the bacterial strains, favorable deliverance of copper ions inside the cells and subsequent production of reactive oxygen species.

Author keywords

Bacterial strains | Bactericidal activity | Green synthesis | Hierarchical copper oxide microspheres | Moringa oleifera leaf extract | Phytochemicals

Indexed keywords

Engineering controlled terms: Bacillus cereus | Bactericides | Bacteriology | Copper metallography | Crystals | Escherichia coli | Green Synthesis | Metal ions | Microspheres | Nanostructures | Stretching | X ray diffraction

Engineering uncontrolled terms: Asymmetric stretching | Bactericidal activity | Deformation vibrations | Klebsiella pneumoniae | Monoclinic crystals | Morphological features | Pathogenic bacterial strain | Zone of inhibitions

Document details - The first use of tri(1-naphthyl)phosphine oxide as ligand for rhenium(I)- complexes from phosphine via a one-pot approach

Journal of Organometallic Chemistry

Volume 933, 1 February 2021, Article number 121657

The first use of tri(1-naphthyl)phosphine oxide as ligand for rhenium(I)- complexes from phosphine via a one-pot approach(Article)

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Abstract

Tri(1-naphthyl)phosphine oxide ($Np_3P=O$) coordinated complexes fac-[{$Re(CO)_3(Np_3P=O)$}$_2$L] (1-2) were prepared from tri(1-naphthyl)phosphine (Np_3P), H_2-L (2,5-dihydroxy-1,4-benzoquinone for 1/chloranilic acid for 2), and $Re_2(CO)_{10}$ in a multi-component one-pot approach. A hard $Np_3P=O$ was formed in situ from soft Np_3P during the reaction process. The solid state structure of 2 reveals that chloranilato is sandwiched between two naphthyl units, controlled by both aromatic π···π···π- and Cl···π- contacts. This is the first report on metal-complexes of tri(1-naphthyl)phosphine oxide. © 2020

Author keywords

2,5-Dihydroxy-1,4-benzoquinone | Chloranilic acid | Rhenium | Self-assembly | Tri(1-naphthyl)phosphine | Tri(1-naphthyl)phosphine oxide

Indexed keywords

Engineering controlled terms: Coordination reactions | Metal complexes | Phosphorus compounds

Engineering uncontrolled terms: As-ligands | Coordinated complexes | Multicomponents | One pot | Phosphine oxide | Reaction process | Rhenium complexes | Solid-state structures

Engineering main heading: Rhenium compounds

Funding details

Funding sponsor	Funding number	Acronym
University of Hyderabad		UoH
Department of Science and Technology, Government of West Bengal		DST

Funding text

Document details - Applicability of cellulosic-based Polyalthia longigolia seed filler reinforced vinyl ester biocomposites on tribological performance

Polymer Composites

Volume 42, Issue 2, February 2021, Pages 791-804

Applicability of cellulosic-based Polyalthia longigolia seed filler reinforced vinyl ester biocomposites on tribological performance(Article)(Open Access)

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View additional affiliations

Abstract

The focus of this work was to analyze the effect of weight percentage (wt%) of Polyalthia longigolia seed filler (PLSF) on the wear responses (wear loss and coefficient of friction) of the vinyl ester (VE) matrix composites, using signal-to-noise (SN) ratio and analysis of variance (ANOVA) methods. The Polyalthia longigolia seed filler/vinyl ester (PLSF-VE) composites were produced by compression molding (CM) technique. Scanning electron microscopy (SEM) analysis showed that the PLSF content was homogeneously distributed in the matrix. Pin on disc (POD) wear tester was employed to carry out the experiments. Both SN ratio and ANOVA were performed to determine the process parameters that exhibited lower wear responses. The wear of the composite was minimized by optimizing the four diverse process factors: load, P (N), sliding speed, N (rpm) and filler content (wt%), based on Taguchi's L_9 orthogonal array. The process parameters at which minimum wear loss (WL) occurred were identified with 25 wt% sample at 10 N and 300 rpm. Also, the process parameters for minimum coefficient of friction (COF) were observed with 25 wt% sample at 5 N and 700 rpm. From the ANOVA results obtained, it was evident that P mostly influenced the WL and COF of the PLSF-VE composites during POD wear testing. This kind of lightweight composite can be a suitable alternative for small scales loading conditions, such as brake bad and clutch plates in the automobile industry. © 2020 Society of Plastics Engineers

Author keywords

friction | particles | polymer matrix composites | sliding wear

Indexed keywords

Engineering controlled terms: Analysis of variance (ANOVA) | Compression molding | Esters | Fillers | Friction | Scanning electron microscopy | Signal to noise ratio | Tribology | Wear of materials

Engineering uncontrolled terms: Analysis of variance method | Coefficient of frictions | L9 orthogonal arrays | Lightweight composites | Loading condition | Process parameters | Tribological performance | Weight percentages

Engineering main heading: Reinforcement

Document details - Significance of nanosomes for diagnosis of Alzheimer's disease

Handbook on Nanobiomaterials for Therapeutics and Diagnostic Applications

1 January 2021, Pages 499-510

Significance of nanosomes for diagnosis of Alzheimer's disease (Book Chapter)

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Abstract

Alzheimer's disease (AD) is a progressive neurodegenerative disorder that is mainly characterized by the accumulation of toxic β amyloid and tau protein in the brain. It is the fourth most common cause of death in western countries after heart disease, cancer, and stroke. The major problem in AD is often undiagnosed; even though it is diagnosed, people are unaware of their symptoms, and the pathogenesis involved in AD is still completely unclear. This chapter mainly focuses on concepts and clinical diagnosis of AD with nanosome-based approaches. During the last decades, various nanotechnology-based methods hold a highly promising prospect for early detection and therapy of AD. Theranostic nanosomes have wide applicability in definitive diagnosis for screening the AD patients due to their nontoxic and nonimmunogenic, biodegradability, and biocompatibility, which are considered as attractive future diagnostic aid for understanding the pathophysiology of the early stages of AD. This approach has been developed to selectively interact with brain capillary endothelial cells across the blood-brain barrier (BBB) and can prominently bind with the respective biomarkers that are the soluble extracellular protein aggregates in the brain for promptly screening the prognosis of the disease. This chapter will describe the current and future nanosomes-based diagnostic approaches for the detection and noninvasive treatment of neurodegenerative AD. © 2021 Elsevier B.V. All rights reserved.

Author keywords

Alzheimer's disease | Blood-brain barrier | Drug delivery system | Molecular diagnostics | Nanosomes | Nanotechnology

ISBN: 978-012821013-0
Source Type: Book
Original language: English

DOI: 10.1016/B978-0-12-821013-0.00010-6
Document Type: Book Chapter
Publisher: Elsevier

Chapters in this book

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- Nanosomes for drug delivery
- Nanomaterials for bioimaging studies
- Exosome RNAs as biomarkers for cancer therapy
- Tumoral delivery of nanotherapeutics
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- Nanocarriers in novel drug delivery system
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- Emerging mesoporous silica nanoparticle-mediated

Document details - Simulated annealing algorithm for minimising assembly variation in nonlinear assembly

International Journal of Manufacturing Technology and Management

Volume 35, Issue 5, 2021, Pages 422-442

Simulated annealing algorithm for minimising assembly variation in nonlinear assembly(Article)

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Abstract

Precision assemblies need close tolerance components. A close tolerance component requires secondary operations, which increase the manufacturing cost considerably. Selective assembly (SA) methods like uniform grouping, equal probability, uniform tolerance etc., was discussed in the literature focus generally on reducing surplus parts or minimising clearance variation in the linear assembly. Moreover, the existing techniques use component's tolerance for obtaining the best bin combinations rather than using the component's dimension. The present work aims to obtain maximum number of products with closer assembly specification from wider tolerance sub components of a nonlinear assembly by mating their component's dimensions based on the best bin combinations. Overrunning clutch assembly (OCA) has been considered as an example problem, in which the sub components are manufactured with wide tolerance and partitioned into three to ten bins. Combinations of best bins have been obtained for various assembly specifications by implementing simulated annealing algorithm (SAA). The proposed method has proved its effectiveness by showing 24.9% of cost saving in making OCA.

Author keywords

clearance variation | nonlinear assembly | over running clutch assembly | SAA | simulated annealing algorithm | Tolerance

Indexed keywords

Engineering controlled terms: Assembly | Manufacture | Specifications

Engineering uncontrolled terms: Annealing algorithm | Assembly specifications | Clearance variation | Nonlinear assembly | Over running clutch | Over running clutch assembly | Simulated annealing algorithm | Sub-components

Engineering main heading: Simulated annealing

Document details - Generative adversarial network for video analytics

Generative Adversarial Networks for Image-to-Image Translation

1 January 2021, Pages 329-345

Generative adversarial network for video analytics (Book Chapter)

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Abstract

A generative adversarial network (GAN) is a framework composed of a generator and a discriminator. GAN learns the deep attributes without the need for hugely annotated training data. This learning is attained by back-propagation approach through competition between generator and discriminator network. Since 2014, GAN has been used in a wide variety of applications such as game development, security, image editing, data generation, attention prediction, and so on. In this article, we explore the fundamental working principle, architecture of GAN, and the effectiveness of GAN for video analytics. Video analytics has become a crucial research area for the academic world and the industry thanks to the availability of IP CCTV as well as the progressive growth in the video content analysis algorithms. Automation in video analytics has come into practice due to the extensive growth of deep learning algorithm. The prime intention of this chapter is to provide a comprehensive review of the GAN variants available for video analytics, explore different architectures, and further the techniques used in those respective applications. © 2021 Elsevier Inc. All rights reserved.

Author keywords

Action recognition | Video generation | Video prediction | Video retargeting | Video summarization | Video understanding

ISBN: 978-012823519-5
DOI: 10.1016/B978-0-12-823519-5.00008-7
Source Type: Book
Document Type: Book Chapter
Original language: English
Publisher: Elsevier

Chapters in this book

Document details - Topical Sentiment Classification to Unmask the Concerns of General Public during COVID-19 Pandemic using Indian Tweets

Proceedings of the 2021 4th International Conference on Computing and Communications Technologies, ICCCT 2021

2021, Pages 508-514

4th International Conference on Computing and Communications Technologies, ICCCT 2021; Chennai; India; 16 December 2021 through 17 December 2021; Category numberCFP2192Y-ART; Code 177364

Topical Sentiment Classification to Unmask the Concerns of General Public during COVID-19 Pandemic using Indian Tweets(Conference Paper)

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Abstract

One of the vibrant social media platforms is which has more than half a million uses across the globe. It has become a popular means for dissemination of the news, to discuss on world events. It is also medium to converse about health centric information with updates given by the concerned officials and general public health-related information, during an abnormal situation like COVID-19 pandemics. As the dimension of data and the linguistics of data been discussed is diverse in nature, it is a challenging task to identify only the content that is interesting and useful. Few studies have been done exploring the regional languages than other English. In this work, we explored huge number of tweets on post-lock down during Covid-19 pandemic by analyzing the sentiments expressed on the tweets and topic identification. To do the same we have employed English 2,126,421 and 76,265 Tamil tweets for analyzing and discussing the usefulness of sentiment analysis and topic modeling in both of the languages. Seven subjects were that are ranked on the analysis of content discussed from India, in Twitter during the four months from May 2020 and August 2020. Tamil tweets are investigated to understand the sentiments of people during anamount of time and the association to the media information published, and the assessment of the psychological behavior of human in India. It is always significant to understand the human opinions, information communication and building an agreement including social media in different regions of the nation. © 2021 IEEE.

Indexed keywords

Engineering controlled terms: Behavioral research | Classification (of information) | Modeling languages | Sentiment analysis

Engineering uncontrolled terms: Analysis models | General publics | Health related informations | Information communication | Sentiment analysis | Sentiment classification | Social media | Social media platforms | Topic identification | Topic Modeling

Engineering main heading: Social networking (online)

Document details - ANN-BASED DIRECT TORQUE CONTROL SCHEME OF AN IM DRIVE FOR A WIDE RANGE OF SPEED OPERATION

Neural Network World

Volume 31, Issue 6, 2021, Pages 395-404

ANN-BASED DIRECT TORQUE CONTROL SCHEME OF AN IM DRIVE FOR A WIDE RANGE OF SPEED OPERATION(Article)

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Abstract

Induction motor (IM) drives with direct torque control (DTC) enable fast torque response without the need for complex orientation conversions or inner loop current loop. In the speed estimation responses, however, there is a significant level of torque ripple. The voltage source inverter adds acoustic noise and needs a high sampling frequency since it operates at a high and variable switching frequency. This work describes an ANN-based DTC technique for controlling the speed of an IM drive over a large speed range. To achieve good dynamic performance of induction motor drive, the ANN-based speed controller will replace the speed controller, switching tables, and hysteresis comparators. The neural network was trained using the back-propagation algorithm. The goal of a neural speed controller is to improve the system ability to respond quickly to changes in process variables while also mitigating the impacts of external perturbations. The projected ANN based DTC considerably and simply tracks the reference speed thus improves the efficiency of speed-torque of induction motors with quicker responses for rapid varying of speed reference and torque as that of Electric Vehicles in any uneven roads circumstances. MATLAB/Simulink software is used to evaluate the drive performance for both transient and dynamic operations. The proposed control performance is simulated and compared to a DTC-based traditional PI speed controller. In comparison to PI, the results show that ANN has better and faster effects. The torque ripple gets reduced by 1.5 % in ANN (artificial neural network) controller compared to PI controller. The THD (total harmonic distortion) is reduced by 6.38 % from PI controller to ANN controller. © CTU FTS 2021

Author keywords

artificial neural networks | back propagation algorithm | induction motors | pid controller | torque control | total harmonic distortion

Indexed keywords

Engineering controlled terms: Acoustic noise | Controllers | Electric drives | Electric inverters | Electric machine control | Harmonic distortion | Induction motors | MATLAB | Speed | Speed control | Speed regulators | Three term control systems | Torque | Torque control | Wave filters

Engineering uncontrolled terms: Back-propagation algorithm | Direct torque control | Induction motor drive | Inductions motors | Network-based | PID controllers | Speed controller | Speed torque | Torque ripples | Total harmonic distortions

Engineering main heading: Neural networks

Document details - Dynamic mechanical properties and thermal properties of madar fiber reinforced composites

Materials Today: Proceedings

Volume 51, 2021, Pages 1096-1098

International Conference on Computations in Materials and Applied Engineering, CMAE 2021; Uttarakhand; India; 1 May 2021 through 2 May 2021; Code 147168

Dynamic mechanical properties and thermal properties of madar fiber reinforced composites(Conference Paper)

Ramkumar, R., Saranya, K., Saravanan, P., Srinivasa Perumal, K.P., Ramshankar, P., Yamunadevi, V., Ganeshan, P.

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Abstract

The conventional materials are found to fetch for alternate solution such as natural fiber made composites. Various new technologies have been implemented to meet out the above statement. The dynamic mechanical analysis (DMA) is the most preferred technique for the composite materials. It was investigated that the interfacial bonding between the matrix and fibers signifies the dynamic mechanical properties of the materials. And also it was studied that these properties are relied on temperature, fiber length, etc. The naturally available madar fiber is utilized to manufacture the composite. This fiber is reinforced into the matrix. The quality of the so prepared composite is decided from the analysis such as thermogravimetric and dynamic mechanical analysis. The samples are subjected to investigation to find the optimum result. The samples are categorized under varying fiber length. Hence, the present work studies the optimum composite under varying fiber length.

Author keywords

Composites | Dynamic mechanical properties | Natural fibers | TGA

Indexed keywords

Engineering controlled terms: Dynamic mechanical analysis | Dynamics | Fiber bonding | Fiber reinforced plastics | Quality control | Thermogravimetric analysis

Engineering uncontrolled terms: Composites material | Conventional materials | Dynamic mechanical property | Fiber length | Fibre-reinforced composite | Interfacial bonding | matrix | Property | TGA | Thermo-gravimetric

Engineering main heading: Natural fibers

Document details - Physical and mechanical properties of various metal matrix composites: A review

Materials Today: Proceedings

Volume 50, 2021, Pages 1022-1031

2nd International Conference on Functional Materials, Manufacturing and Performances, ICFMMP 2021; Lovely Professional UniversityPhagwara; India; 17 September 2021 through 18 September 2021; Code 147158

Physical and mechanical properties of various metal matrix composites: A review(Conference Paper)

Suresh Kumar, S., Thirumalai Kumaran, S., Velmurugan, G., Perumal, A., Sekar, S., Uthayakumar, M.

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Abstract

Over the last few decades, the research trends have been shifted from conventional materials and alloys to composite materials to develop lightweight and efficient one for the required applications. Among the classifications of composites, Metal Matrix Composites (MMCs) revealed improved properties such as lower density with a higher strength to weight ratio, better wear and abrasion resistance and lower thermal expansion coefficient, etc. This paper is concise about the Al, Cu, Mg, Ti and Zn and their alloy based MMCs and their physical and mechanical properties. The details of various reinforcements included in the above-said matrix materials and the properties obtained are summarized. It is understood that Al alloy based composite is the choice of the various researchers. The micro and nano scaled reinforcements in to the matrix and the influence of the same are discussed in detail. The outlook on the conclusion and future scope is included which is based on the challenges raised with the existing production methods.

Author keywords

Characterization | Mechanical | MMC | Nano particles | Physical | Sustainable

Indexed keywords

Engineering controlled terms: Aluminum alloys | Density (specific gravity) | Metallic matrix composites | Nanoparticles | Particle reinforced composites | Thermal expansion | Zinc alloys

Engineering uncontrolled terms: Characterization | Matrix composite | Mechanical | Metal matrix | Metal matrix composite | Nanoparti-cles | Physical | Physical and mechanical properties | Property | Sustainable

Engineering main heading: Wear resistance

SciVal Topic Prominence

Topic:

Prominence percentile:

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2021.07.354
Document Type: Conference Paper
Publisher: Elsevier Ltd

Document details - FAULT-TOLERANT CROSS LAYER SCHEME USING VIRTUAL CLUSTER HEAD FOR HETEROGENEOUS SENSOR NETWORKS

Comptes Rendus de L'Academie Bulgare des Sciences

Volume 74, Issue 11, 2021, Pages 1657-1666

FAULT-TOLERANT CROSS LAYER SCHEME USING VIRTUAL CLUSTER HEAD FOR HETEROGENEOUS SENSOR NETWORKS(Article)

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Abstract

In real-time applications such as target tracking and Internet of Things (IoT), the Wireless Sensor Network (WSN) is installed for gathering data information of heterogeneous nature. In such a deployment setting, the power level and the data aggregation capabilities of various sensor nodes differ from each other. For competent routing deliberation, cluster-based routing is normally deployed in wireless sensor networks. Cluster heads aggregate and forward sensed data to the destination based upon the clustered routing. In harsh environments, cluster heads may fail due to various reasons. In the case of such multiple cluster head failures, the faulty cluster heads cannot perform data aggregation which results in deficient data sensing. In this paper, a novel virtual cluster head formation mechanism is proposed in the cross-layer scheme to effectively tolerate the failure of normal cluster heads for increasing the network lifetime and throughput of the wireless sensor networks with minimized energy consumption and average delay. Simulation analysis using the proposed approach shows better performance in terms of the above metrics when compared to traditional cross-layer approaches in the wireless sensor networks.

Author keywords

Cluster based routing | Cross layer scheme | Fault tolerance | Virtual cluster head | Wireless sensor network

ISSN: 13101331
DOI: 10.7546/CRABS.2021.11.11
Source Type: Journal
Document Type: Article
Original language: English
Publisher: Academic Publishing House

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SciVal Topic Prominence

Document details - Effect on lotus leaf for dielectric applications

Materials Today: Proceedings

Volume 49, 2021, Pages 2048-2051

2021 Global Conference on Recent Advances in Sustainable Materials, GC-RASM 2021; Mangalore; India; 29 July 2021 through 30 July 2021; Code 176167

Effect on lotus leaf for dielectric applications(Conference Paper)

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Abstract

Lotus leaves have received significant attention for multiplicity of application. This study focuses on dielectric applications on lotus leaves. The Lotus leaves (Nelumbo nucifera) were taken from Tamilnadu, South India. After assortment of lotus leaves, the lotus leaves was dried in the sun. Finally Ball milling method was used to powder Sun- dried lotus leaves having thickness of 5(μm) and 50 (μm). The Microstructure have been analyzed using scanning electron microscope (SEM) and Fourier-transformed infrared (FTIR) spectroscopy methods. Frequency-dependent dielectric constant (ε'), complex dielectric (ε") constant and dielectric loss/loss tangent (tan d) were measured. The results are compared with available literature values and discussed. Selection and Peer-review under responsibility of the scientific committee of the Global Conference on Recent Advances in Sustainable Materials 2021.

Author keywords

Complex dielectric constant | Dielectric constant | Dielectric loss | Dielectrics | Lotus leaf | SEM

Indexed keywords

Engineering controlled terms: Ball milling | Dielectric devices | Dielectric losses | Fourier transform infrared spectroscopy | Scanning electron microscopy | Spectroscopic analysis

Engineering uncontrolled terms: Ball-milling methods | Complex dielectric constant | Dielectric application | Fourier transformed infrared spectroscopy | Infrared spectroscopy method | Lotus leaves | Nelumbo nucifera | Scanning electron microscope | Scanning electrons | South India

Engineering main heading: Dielectric materials

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2021.08.224
Document Type: Conference Paper
Volume Editors: Seenuvasan M.,Swaminathan K.,Sangeetha D.M.
Publisher: Elsevier Ltd

Sivabharathy, M.; Department of Physics, Sethu Institute of Technology, Kariapatti, India;

Document details - Comparative Study of Mechanical Properties and Thermal Stability on Banyan/Ramie Fiber-Reinforced Hybrid Polymer Composite

Advances in Materials Science and Engineering

Volume 2021, 2021, Article number 5835867

Comparative Study of Mechanical Properties and Thermal Stability on Banyan/Ramie Fiber-Reinforced Hybrid Polymer Composite(Article)(Open Access)

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Abstract

The usage of natural fibers has increased recently. They are used to replace synthetic fiber products in aircraft and automobile industries. In this study, natural fibers of bidirectional banyan mat and ramie fabrics are used for reinforcement, and the matrix is an epoxy resin to fabricate composite laminates by traditional hand layup technique at atmospheric temperature mode. Five different sequences of reinforcements are as follows to quantify the effect of thermal stability and mechanical behavior of silane-treated and untreated hybrid composites. The results revealed that silane-treated fabric composite laminates were given enhanced mechanical properties of 7% tensile, 11% flexural, and 9% impact strength compared with untreated fabric composite, and at the same time when the increasing of ramie fabric was given the positive influence of 41% improved tensile strength of 40.7 MPa, 49% improved in flexural strength of 38.9 MPa and negative influence in 57% lower impact strength in sample E and positive value in sample A 21.12 J impact energy absorbed in the hybrid composite. Thermogravimetric analysis (TGA) revealed the thermal stability of the hybrid composite. In sample A, the thermal stability is more than in other samples, and 410°C is required to reduce the mass loss of 25%. The working mass condition of the hybrid composite is up to 3.25 g after it moves to degrade.

Indexed keywords

Engineering controlled terms: Automotive industry, Epoxy resins, Fiber reinforced plastics, Hemp, Impact strength, Laminated composites, Natural fibers, Reinforcement, Tensile strength, Thermodynamic stability, Thermogravimetric analysis

Engineering uncontrolled terms: Comparatives studies, Composite laminate, Fabric composites, Fiber products, Fibre-reinforced, Hybrid composites, Hybrid polymer composite, matrix, Ramie fabrics, Ramie fibers

Engineering main heading: Hybrid composites

ISSN: 16878434 **DOI:** 10.1155/2021/5835867

Document details - A fuzzy content recommendation system using similarity analysis, content ranking and clustering

Journal of Intelligent and Fuzzy Systems

Volume 41, Issue 6, 2021, Pages 6429-6441

A fuzzy content recommendation system using similarity analysis, content ranking and clustering(Article)

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Abstract

Recently, the e-learners are drastically increased from the last two decades. Everything is learnt through internet without help of the tutor as well. For this purpose, the e-learners are required more e-learning applications that are able to supply optimal and satisfied data based on their capability. No content recommendation system is available for recommending suitable contents to the learners. For this purpose, this paper proposes a new semantic and fuzzy aware content recommendation system for retrieving the suitable content for the users. In this content recommendation system, we propose two content pre-processing algorithms namely Target Keyword based Data Pre-processing Algorithm (TKDPA) and Intelligent Anova-T Residual Algorithm (IAATRA) for selecting the more relevant features from the document. Moreover, a new Fuzzy rule based Similarity Matching algorithm (FRSMA) is proposed and used in this system for finding the similarity between the two terms and also rank them by using the newly proposed Similarity and Temporal aware Weighted Document Ranking Algorithm (STWDRA). In addition, a content clustering process is also incorporated for gathering relevant content. Finally, a new Fuzzy, Target Keyword and Similarity Score based Content Recommendation Algorithm (FTKSCRA) is also proposed for recommending the more relevant content to the learners accurately. The experiments have been conducted for evaluating the proposed content recommendation system and proved as better than the existing recommendation systems in terms of precision, recall, f-measure and prediction accuracy.

Author keywords

clustering | content ranking | content recommendation | Fuzzy logic | fuzzy rules and annova-T | semantic analysis

Indexed keywords

Engineering controlled terms: Clustering algorithms | Fuzzy inference | Fuzzy rules | Learning systems | Search engines | Semantics

Engineering uncontrolled terms: Clusterings | Content clustering | Content rankings | Content recommendations | E-learners | Fuzzy rule and annova-T | Fuzzy-Logic | Pre-processing algorithms | Semantic analysis | Similarity analysis

Engineering main heading: Recommender systems

Document details - #Vaccine: Using hashtags from Indian Tweets to Capture and Analyse the Sentiments of People on Vaccination for Covid'19 Pandemic

Advances in Parallel Computing

Volume 39, 2021, Pages 88-92

#Vaccine: Using hashtags from Indian Tweets to Capture and Analyse the Sentiments of People on Vaccination for Covid'19 Pandemic(Article)(Open Access)

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Abstract

To prevent the public from pandemic Covid'19 the government of India has started the vaccination from mid of January 2021. The government has approved the two vaccines, Covishield from the university of Oxford and Covaxin from Bharat Biotech.The vaccination started with frontline workers and is further extended to common public prioritizing the elders of above 60 years and people aged 45 years above with co morbidities. Though many people have got benefitted from it there is still a group of people not convinced with the vaccination. We have carried out this work to analyze those Indian people sentiments on the vaccines through the hash tags of tweets. The results show that though majority of the community has a positive belief on the vaccines but some of them still express negative emotions. © 2021 The authors and IOS Press. This article is published online with Open Access by IOS Press and distributed under the terms of the Creative Commons Attribution Non-Commercial License 4.0 (CC BY-NC 4.0).

Author keywords

Covaxin COVID Covishield India Pandemic Vaccine

ISSN: 09275452
ISBN: 978-164368218-1
Source Type: Book Series
Original language: English

DOI: 10.3233/APC210183
Document Type: Article
Volume Editors: Hemanth D.J.,Elhosney M.,Nguyen T.N.,Lakshmanan S.
Publisher: IOS Press BV

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Document details - Effects of the Interfacial Bonding Behavior on the Mechanical Properties of E-Glass Fiber/Nanographite Reinforced Hybrid Composites

Advances in Polymer Technology

Volume 2021, 2021, Article number 6651896

Effects of the Interfacial Bonding Behavior on the Mechanical Properties of E-Glass Fiber/Nanographite Reinforced Hybrid Composites(Article)(Open Access)

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Abstract

The nanoparticles are incorporated into the composite to mark their unique properties. This work investigates the hybrid epoxy nanocomposite and the impact of nanographite reinforcement. The composite was prepared by using a mechanical stirring technique. The amount of nanographite was added in different volumes, i.e., 1.0, 1.5, and 2.0 wt.%. Results of mechanical and dynamic loading properties were analyzed in accordance to the quantity of nano-G. The fiber and matrix interfacial bonding enrichments were evident in high-resolution SEM images-tensile fracture surface. Finally, the optimum content of nanoparticle which impacts the sample greatly was found to be 1.5 wt.%. © 2021 N. Saravanan et al.

Indexed keywords

Engineering controlled terms: Dynamic loads | Fiber bonding | Hybrid composites | Reinforcement | Tensile strength

Engineering uncontrolled terms: Dynamic loadings | E-glass fibers | Hybrid composites | Hybrid epoxy nanocomposites | Interfacial bonding behavior | matrix | Mechanical loading | Mechanical stirring | Nano-graphite | Property

Engineering main heading: Nanoparticles

ISSN: 07306679
CODEN: APTYD
Source Type: Journal
Original language: English

DOI: 10.1155/2021/6651896
Document Type: Article
Publisher: Hindawi Limited

Document details - Performance optimization of mahua biodiesel using cetane number improver

Materials Today: Proceedings

2021

Performance optimization of mahua biodiesel using cetane number improver

(Article in press)

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Abstract

The harness of conventional fuels is day by day escalating because of the rise in the number of vehicles running by IC engines. Because of this, pollution is also increasing rapidly and it is very dangerous to our environment. If the same thing continues further there will be a problem of extinction of conventional fuel and also the problem of pollution. One of the best alternativesto this problem is biodiesel and mahua is one of the promising biodiesels which is extracted from the mahua non-edible trees which are abundantly accessible in India. Most of the biodiesels are used up to 15–20% blend percentage and it is also having superior properties than those biodiesels. Cetane number improver such as DTBP is supplemented to it to improve the biodiesel performance. Literature survey provided that the toting up of additive may proliferate the blending percentage of mahua biodiesel. The results divulge that M30 with additives indicated an augmented thermal efficiency by 8–10% and declined specific energy consumption by 9–12% compared to diesel and M30 fuel. © 2021

Author keywords

Break Thermal efficiency | DTBP | Emissions | Mahua Biodiesel | Specific Fuel consumption

Indexed keywords

Engineering controlled terms: Additives | Blending | Energy utilization | Pollution | Thermal efficiency

Engineering uncontrolled terms: Break thermal efficiency | Cetane number improver | Conventional fuel | DTBP | Emission | Mahua biodiesel | Number of vehicles | Performance optimizations | Specific fuel consumption | Thermal-efficiency

Engineering main heading: Biodiesel

ISSN: 22147853
Source Type: Journal
Original language: English

DOI: 10.1016/j.matpr.2021.01.201
Document Type: Article
Publisher: Elsevier Ltd

Document details - Power Enhancement in Partial Shaded Photovoltaic System Using Spiral Pattern Array Configuration Scheme

IEEE Access

Volume 9, 2021, Pages 123103-123116

Power Enhancement in Partial Shaded Photovoltaic System Using Spiral Pattern Array Configuration Scheme(Article)(Open Access)

Cherukuri, S.K., Balachandran, P.K., Kaniganti, K.R., Buddi, M.K., Butti, D., Devakirubakaran, S., Babu, T.S., Alhelou, H.H.

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Abstract

Partial shading causes mismatch losses in the solar PV system. In the PV array, the power output from the healthy PV modules is gone in vain due to the mismatch losses. The PV array construction with the high resistivity to the mismatch loss generation is the progressing research work in the research field. In this work, a new kind of array configuration scheme is framed for the PV system for overcoming the effect of partial shading. The proposed array configuration has a high resistivity to the mismatch loss generation over the other conventional array configuration methods. The array configuration is framed in a pattern that is similar to the spiral step pattern. Each row of the PV array is constructed with the PV modules from each row of the conventional Total Cross Tied configuration with the optimized distance. This row construction allows the system to uniformly disperses the partial shading over the PV array. The simulation analysis is carried out by applying various shading patterns in MATLAB/Simulink. The performance of the proposed array configuration is also analyzed in the experimental setup and the results were presented. © 2013 IEEE.

Author keywords

Array configuration | maximum power point (MPP) | mismatch loss | partial shading | PV array reconfiguration | spiral pattern | sudoku pattern | total cross tied (TCT)

Indexed keywords

Engineering controlled terms: MATLAB

Engineering uncontrolled terms: Array configurations | High resistivity | Partial shading | Photovoltaic systems | Power enhancement | Research fields | Simulation analysis | Solar PV systems

Engineering main heading: Photovoltaic cells

ISSN: 21693536
Source Type: Journal
DOI: 10.1109/ACCESS.2021.3109248
Document Type: Article

Document details - A review: Machinability studies on human implant materials

Materials Today: Proceedings

Volume 46, 2021, Pages 7338-7343

3rd International Conference on Materials, Manufacturing and Modelling, ICMMM 2021; Vellore; India; 19 March 2021 through 21 March 2021; Code 171404

A review: Machinability studies on human implant materials(Conference Paper)

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Abstract

In current scenario, the engineering materials are profound their application towards Bio-Medical field. The human implants caught the eye of researchers in the field of materials and metallurgy. After meeting the accidents, aged people's bone crack and other factors for replacing bones is a major problem faced by the medical society. Considering the fact, researchers have found some viable alternative for the bone material which is positive towards biocompatibility. The alternative implant materials are manufacturing without compensate biocompatibility. This paper covers the trends happening in the machining of implant material through the non traditional approaches such as EDM, WEDM and some other advance technologies.

Author keywords

Bio compactibility | EDM | Implants | Machining | WEDM

Indexed keywords

Engineering uncontrolled terms: 'current | Bio compactibility | Bio-medical | Compactibility | EDM | Engineering materials | Implant | Implant materials | Medical fields | WEDM

Engineering main heading: Biocompatibility

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2020.12.1007
Document Type: Conference Paper
Volume Editors: Xavior A.,Yarlagadda P.K.D.V.,Jeyapandiarajan P.,Joel J.,Batako A.D.L.
Publisher: Elsevier Ltd

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Document details - Evaluate the structural and thermal analysis of solid and cross drilled rotor by using finite element analysis

Materials Today: Proceedings

Volume 47, 2021, Pages 4686-4691

2021 International Conference on Futuristic Research in Engineering Smart Materials, FRESM 2021; CMR Institute of TechnologyBengaluru; India; 23 April 2021 through 24 April 2021; Code 172450

Evaluate the structural and thermal analysis of solid and cross drilled rotor by using finite element analysis(Conference Paper)

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Abstract

The finite element analysis (FEA) in the brake rotor is essential to study the thermal behavior of the model. In the brake disc, the frictional contact between the brake disc and brake pad will generate heat. The heat generated will cause adverse effects such as thermal judder, hot spots. Hence the temperature distribution over the disc rotor has been a primary concern in research. The thermal behavior over the disc can cause an adverse effect on the rotor failure. Thus the material, design are mainly focused on many kinds of research. The cross-drilled rotors have been compared with the solid rotor with three different materials, which has shown the best possible combination with the design and material compatibility. The objective is to study the materials' thermal behavior with a solid disc and the cross-drilled rotor to optimum design. The geometry was modelled in PRO-E software, and the analysis was done in ANSYS software. The results obtained by the simulation have been compared. Three materials with different properties have been designed with solid and cross-drilled rotors. By the analysis, cross-drilled disc performance has produced the best optimum results.

Author keywords

Brake disc | Brake pad | Design | Performance analysis | Strength | Thermal stress

Indexed keywords

Engineering controlled terms: Brakes | Infill drilling | Thermoanalysis

Engineering uncontrolled terms: Adverse effect | Brake disks | Brake pads | Brake rotors | Finite element analyse | Frictional contact | Performances analysis | Strength | Thermal | Thermal behaviours

Engineering main heading: Finite element method

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2021.05.544
Document Type: Conference Paper
Volume Editors: Arunkumar T.,Ramachandran S.

Document details - Experimental study of mechanical properties of AA6061 and AA7075 alloy joints using friction stir welding

Materials Today: Proceedings

Volume 47, 2021, Pages 4330-4335

2021 International Conference on Futuristic Research in Engineering Smart Materials, FRESM 2021; CMR Institute of TechnologyBengaluru; India; 23 April 2021 through 24 April 2021; Code 172450

Experimental study of mechanical properties of AA6061 and AA7075 alloy joints using friction stir welding(Conference Paper)

Amuthan, T., Nagaprasad, N., Krishnaraj, R., Narasimharaj, V., Stalin, B., Vignesh, V.

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[c]Department of Mechanical Engineering, Dambi Dollo University, Ethiopia

View additional affiliations

Abstract

The primary aim behind this work is to calibrate the welding parameters effect on the mechanical properties of friction stir welded butt joints made of dissimilar aluminium alloys AA6061 and AA7075. A new solid-state joining process is FSW (Friction stir welding) and this method of joining is energy-efficient, cost-effective, environmentally friendly, and adaptable. Friction stir welding is used in aerospace for joining aluminium alloys and other metallic alloys that are difficult to weld using traditional fusion welding techniques. In this process, two metal pieces namely AA6061 and AA7075 of dimensions 100 × 50 × 6 mm, are welded by considering the effect of parameters like tool rotation speed and transverse feed. The effects of welding parameters were assessed by looking at the resulting mechanical properties of the axial welded field, such as hardness distribution and wear properties.

Author keywords

AA7075 | Aluminum alloy AA6061 | Conventional fusion welding | Friction stir welding

Indexed keywords

Engineering controlled terms: Aluminum alloys | Cost effectiveness | Energy efficiency | Friction | Joining | Research laboratories

Engineering uncontrolled terms: Aa7075 | Alloys joints | Aluminum alloy AA6061 | Conventional fusion welding | Friction stir | Friction-stir-welding | Fusion welding | Parameters effects | Welded butt joint | Welding parameters

Engineering main heading: Friction stir welding

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2021.04.628
Document Type: Conference Paper
Volume Editors: Arunkumar T.,Ramachandran S.

Document details - Effect of fumed silica in rice bran wax-epoxy coating on aluminum substrate: mechanical, thermal, and water absorption properties

Biomass Conversion and Biorefinery

2021

Effect of fumed silica in rice bran wax-epoxy coating on aluminum substrate: mechanical, thermal, and water absorption properties

(Article in press)

Thavasilingam, K., Kumar, A.S., Khan, M.A., Devanand, S., Giridharan, K.

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Abstract

Surface technology is making emerging trends in engineering environment. Wax-epoxy coatings are one of the surface improvers, which are also found in nature and appear on plant leaves, such as lotus leaf and some insect wings. The present study was focused on this stream line where the effect of the fumed silica addition into the rice bran (RB) wax-epoxy coating on aluminum substrate. The main aim of the present study was to find how the addition of RB wax modified the base properties of epoxy resin and what could be the significant of adding fumed silica as strength booster. The coatings were done using spray coating technique at ambient temperature. According to the results, the addition of RB wax into the resin along with fumed silica improved the mechanical, hydrophobic nature, thermal stability, and wear resistance. A highest flexural strength of 102 MPa, lap shear strength of 21.65 MPa, microhardness of 88 shore-D, Sp. wear rate of 0.003mm^3/Nm, and the lowest COF of 0.38 were noted for composites made using rice bran and fumed silica particle. The density remains same due to low density wax material addition with noticeable improvement in surface hardness. The SEM micrographs revealed flat fractograph for pure epoxy and high wavy structure for wax mixed fumed silica dispersed epoxy coating. The surface roughness of coated surfaces explicated less surface roughness than uncoated one. These eco-friendly coatings could be used in automobile, medial, and biological applications.

Author keywords

Contact angle | Fumed silica | Polymer | Thermal | Wax coating | Wear

Indexed keywords

Engineering controlled terms: Epoxy resins | Organic coatings | Plants (botany) | Silica | Surface roughness | Water absorption | Wear of materials | Wear resistance

Engineering uncontrolled terms: Aluminum substrate | Biological applications | Engineering environment | Fumed silica particles | Hydrophobic nature | Spray coating techniques | Surface technology | Water absorption properties

Document details - Design and Fabrication of Flexible Antenna Using Foam Substrate for WiMAX Applications

Lecture Notes in Networks and Systems

Volume 179 LNNS, 2021, Pages 191-202

4th International Conference on Microelectronics and Telecommunication Engineering, ICMETE 2020; Ghaziabad; India; 26 September 2020 through 27 September 2020; Code 260579

Design and Fabrication of Flexible Antenna Using Foam Substrate for WiMAX Applications(Conference Paper)

Pandimadevi, M., Tamilselvi, R.

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Abstract

In present scenario, world interoperability for microwave access (WiMAX) is gaining great momentum among broadband wireless technologies. Employing flexible antenna will enable high-performance of radio frequency transmission as well as cost effective for such wireless applications. In this work, a flexible antenna is designed, simulated, and fabricated using foam substrate material for world interoperability for microwave access (WiMAX) band applications. The operating frequency is chosen as 3.5 GHz. The proposed antenna is bendable, wearable, low cost, and smaller in size, reduced reflection co-efficient, greater directivity, and wider bandwidth. The antenna is simulated using computer simulation technology software and is fabricated using vector network analyzer. The return loss value obtained in measurement is –24.95 dB which is in good agreement with simulated value of –34.6 dB. The gain and directivity obtained are 3.096 and 4.93 dBi, respectively. The radiation pattern obtained is omnidirectional. Thus, the designed antenna is compact enough with the dimensions of 50 × 36 × 2.2 mm^3 to place inside any new technology wireless device. Since the directivity of the antenna under bending condition is 4.672 dBi, it can also be used for wearable applications. © 2021, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author keywords

Bending | Directivity | Flexible antenna | Foam substrate | Returns loss

ISSN: 23673370
ISBN: 978-981334686-4
Source Type: Book Series
Original language: English

DOI: 10.1007/978-981-33-4687-1_19
Document Type: Conference Paper
Volume Editors: Sharma D.K.,Son L.H.,Sharma R.,Cengiz K.
Publisher: Springer Science and Business Media Deutschland GmbH

Pandimadevi, M.; Sethu Institute of Technology, Virudhunagar, Tamil Nadu, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Treatment of ro rejects wastewater by integrated coagulation cum adsorption process

Polish Journal of Environmental Studies

Volume 30, Issue 5, 2021, Pages 4031-4038

Treatment of ro rejects wastewater by integrated coagulation cum adsorption process(Article)(Open Access)

Kumar, M.S., Kalyani, G., Mahendran, S., Rao, H.J., Gokulan, R., Someswaran, R., Latha, C.J., Palpandian, M.

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Abstract

This research proposed to treat the RO rejected wastewater in a household plant by the integrated treatment system. The possibility of wellhead water treatment by the combined treatment system of coagulation and adsorption for salinity reduction via flexible high recovery RO system was evaluated through analysis of treatment options on a laboratory scale. The naturally available gooseberry seed used as a coagulant in phase-1. It reduced 99.3% of TDS and hardness. It also increases the DO level of RO reject water, at the same time it increases turbidity and color. Turbidity and color removed by surface-modified zeolite in the phase-2. The zeolite material was taken in temperature 400°C as adsorbent of 6 cm column achieved 8NTU in 150 mmin. The 12 cm column was achieved 7.5NTU in 150 mins. Thomas and Thomson modelling well fitted with an experimental study. The regression correlation reached up to 0.942, 0.9810 and 0.984. It is apparent from the recorded SEM patterns study. This study concludes that the coagulation by Goosperry seed produced the highest removal of TDS and hardness and in the adsorption process, with 400°C enhances the surface morphology and porous structure indicates that heating with higher-level temperature enhances the adsorption capacity of the adsorbent material. The highest efficiency is observed in hydrothermal hotness.

Author keywords

Adsorption | Coagulation | Column regeneration | RO reject | SEM analysis | Zeolite

Funding details

Funding text

This work was supported by the Sethu Institute of Technology, Kariapatti, Tamil Nadu, India.

ISSN: 12301485
Source Type: Journal
Original language: English
DOI: 10.15244/pjoes/130274
Document Type: Article
Publisher: HARD Publishing Company

Kumar, M.S.; Department of Civil Engineering, Sethu Institute of Technology, Kariapatti, Virudhunagar, Tamil Nadu, India;

Document details - L-Shape Propagated Array Configuration with Dynamic Reconfiguration Algorithm for Enhancing Energy Conversion Rate of Partial Shaded Photovoltaic Systems

IEEE Access

Volume 9, 2021, Article number 9474476, Pages 97661-97674

L-Shape Propagated Array Configuration with Dynamic Reconfiguration Algorithm for Enhancing Energy Conversion Rate of Partial Shaded Photovoltaic Systems(Article)(Open Access)

Srinivasan, A., Devakirubakaran, S., Sundaram, B.M., Balachandran, P.K., Cherukuri, S.K., Winston, D.P., Babu, T.S., Alhelou, H.H.

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Abstract

Partial shading is an unavoidable factor that reduces the performance of solar PV systems. The PV system receives uneven irradiation due to partial shading which causes the mismatch loss. The partial shading distracts the irradiation from the PV modules that makes the healthy modules as idle or low performing modules. The mismatch loss can be mitigated by uniformly distributing the partial shading over the PV array. In this work, L-shaped propagated array configuration method with a new dynamic reconfiguration algorithm have proposed for enhancing the energy conversion under the partial shading conditions. A new kind of array configuration is implemented in a 4times 4 PV array for the better shade dispersion. Further, a dynamic reconfiguration algorithm is employed to disperse the effect of partial shading. The combination of new array configuration and reconfiguration method is simulated in MATLAB/Simulink® and implemented in hardware. The outputs are measured under all possible shading patterns and validated with the outputs of convention methods for observing the enhanced energy conversion rate of the proposed system. © 2013 IEEE.

Author keywords

Array configuration | futoshiki puzzle pattern | mismatch loss | partial shading | PV array reconfiguration | sudoku pattern | total cross tied (TCT)

Indexed keywords

Engineering controlled terms: Dynamic models | Irradiation | Photovoltaic cells

Engineering uncontrolled terms: Array configurations | Dynamic reconfiguration algorithms | Energy conversion rates | Enhanced energy conversions | MATLAB /simulink | Partial shading | Photovoltaic systems | Solar PV systems

Engineering main heading: Energy conversion

Document details - Experimental investigation on tensile and flexural properties of randomly oriented treated palmyra fibre reinforced polyester composites

Materials Today: Proceedings

Volume 46, 2021, Pages 7556-7560

3rd International Conference on Materials, Manufacturing and Modelling, ICMMM 2021; Vellore; India; 19 March 2021 through 21 March 2021; Code 171404

Experimental investigation on tensile and flexural properties of randomly oriented treated palmyra fibre reinforced polyester composites(Conference Paper)

Sivakumar, S., Vignesh, V., Arasu, I.V., Venkatesan, G., Mohamed Rabi, B.R., Adam Khan, M.

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Abstract

The natural fiber is a best replacement for synthetic fiber which is reinforced with polymer composites for advanced engineering application. The main purpose of this paper is to study the tensile and flexural properties of untreated and treated palymra natural fiber reinforced polyester composites. Palmyra fibre is used as a reinforcement and the polyester resin is used as a matrix. Composites plates were fabricated through handlayup moulding techniques. The treated palymra fiber composites yields excellent tensile and flexural properties. Tensile tests revealed that the ultimate strength is about 48MPa, and elongation break at 6%. The flexural strength is estimated to be around 64MPa respectively. The mechanical properties of materials prepared from a chemical treated with potassium permanganate palmyra are found to be much stronger than those of untreated fiber. Surface morphologies of fracture surfaces of composites were reported using electron microscopy scanning (SEM).

Author keywords

Flexural strength | Palmyra fibre | Tensile strength

Indexed keywords

Engineering controlled terms: Bending strength | Glass fibers | Natural fibers | Polyester resins | Potash | Reinforcement | Scanning electron microscopy | Tensile testing

Engineering uncontrolled terms: Advanced engineerings | Engineering applications | Experimental investigations | Fibre-reinforced | matrix | Natural fiber reinforced | Palmyra fiber | Polyester composites | Polymer composite | Tensile and flexural properties

Engineering main heading: Tensile strength

ISSN: 22147853
Source Type: Journal
DOI: 10.1016/j.matpr.2021.01.511
Document Type: Conference Paper

Document details - Design and analysis of serial drilled hole in composite material

Materials Today: Proceedings

Volume 45, 2021, Pages 5759-5763

2nd International Conference on Aspects of Materials Science and Engineering, ICAMSE 2021; Chandigarh; India; 5 March 2021 through 6 March 2021; Code 169287

Design and analysis of serial drilled hole in composite material(Conference Paper)

Jule, L.T., Ramaswamy, K., Nagaprasad, N., Shanmugam, V., Vignesh, V.

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View additional affiliations

Abstract

During last two decades the growth of composite materials was remarkable. The volume and number of applications of composite materials are rapidly growing and continuously conquering new market fields. The demand for these engineered materials varies from consumer goods to advanced niche applications, reflecting substantially development of composite materials. However, the composites losses it properties during secondary processing methods such as drilling, and cutting. The main objective of this paper is to study the loss of strength in composites while cutting serial fastener holes for mechanical joints of structures. The design is to be made such that the loss in strength is reduced considerably by selecting an exact combination of the parameters like (E/d, K/d ratios). Finally, the theoretical values are compared to the Ansys values.

Author keywords

Ansys software | Composite material | Failure analysis | Tensile loading

Indexed keywords

Engineering controlled terms: Composite materials | Cutting

Engineering uncontrolled terms: ANSYS software | Composites material | Consumer Goods | Design and analysis | Drilled holes | Engineered materials | Niche applications | Property | Secondary processing | Tensile loading

Engineering main heading: Infill drilling

ISSN: 22147853
Source Type: Journal
Original language: English

DOI: 10.1016/j.matpr.2021.02.587
Document Type: Conference Paper
Volume Editors: Sehgal S.,Goyal P.
Publisher: Elsevier Ltd

Document details - A review on selection of soft magnetic materials for industrial drives

Materials Today: Proceedings

Volume 45, 2021, Pages 1591-1596

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

A review on selection of soft magnetic materials for industrial drives(Conference Paper)

Subramanian, A.T.S., Meenalochini, P., Sathiya, S.S.B., Prakash, G.R.

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[c]SRM TRP Engineering College, Trichy, Tamilnadu, 621 105, India

Abstract

For the manufacture of electrical equipment, automotive and transport products, electric steel continues to be a crucial commodity. In particular, they form the core engines and are used to efficiently transform magnetic power into electricity. The magnetic characteristics of steel laminations are critical in allowing materials to be chosen for a specific application. The paper explores the characteristics of common magnetic materials used as a basis of electric rotation. The analysis focuses on the effect of magnetic parameters, including flux density and material permeability, on the loss of iron. The work will illustrate the cost of the material and pave the way for the designers to select the material that is ideally suited to the application as industrial drives. © 2021 Elsevier Ltd. All rights reserved. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

Core material | Industrial drives | Magnetic materials | Rotating machine

Indexed keywords

Engineering controlled terms: Electric drives | Magnetism | Silicon steel | Soft magnetic materials

Engineering uncontrolled terms: Automotives | Core engines | Core material | Electric steel | Electrical equipment | Electrical transport | Industrial drives | Magnetic characteristic | Power | Rotating machine

Engineering main heading: Coremaking

ISSN: 22147853
Source Type: Journal
Original language: English

DOI: 10.1016/j.matpr.2020.08.389
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

Document details - The effect of process parameters for synthesized copper metal matrix using stir casting process

Materials Today: Proceedings

Volume 45, 2021, Pages 1970-1974

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

The effect of process parameters for synthesized copper metal matrix using stir casting process(Conference Paper)

Vairamuthu, J., Stalin, B., Sivakumar, G.D., Fazil, B.M., Balaji, R., Natarajan, V.A.

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[b]Department of Mechanical Engineering, Anna University, Regional Campus Madurai, Madurai, 625 019, India

Abstract

In recent days, the role of the stir casting process has been increased in metal manufacturing sectors. It can be produced the components with good quality and less casting defects. The experimental work has been discussed about the effect of stir casting process parameters for synthesized Copper Metal Matrix Composite (Cu-MMC) reinforced with Titanium Carbide (TiC). The hardness, impact, and tensile strength were determined through the variation of input stir casting factors such as particle size, the weight percentage of TiC, and stirring time. The experiment was conducted as per L_9 orthogonal based Taguchi design. The influential factor was measured through variance test. © 2021 Elsevier Ltd. All rights reserved. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

Composite | Copper metal matrix | Hardness | Strength | Taguchi technique | TiC

Indexed keywords

Engineering controlled terms: Metallic matrix composites | Metals | Particle size | Tensile strength | Titanium carbide

Engineering uncontrolled terms: Casting defect | Casting process | Copper metal matrix | Manufacturing sector | Metal manufacturing | Process parameters | Stir casting | Strength | Synthesised | Taguchi technique

Engineering main heading: Hardness

ISSN: 22147853
Source Type: Journal
Original language: English

DOI: 10.1016/j.matpr.2020.09.262
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

Vairamuthu, J.; Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, Pulloor, India;

Document details - Dual loop control for single phase PWM inverter for distributed generation

Materials Today: Proceedings

Volume 45, 2021, Pages 2216-2219

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Dual loop control for single phase PWM inverter for distributed generation(Conference Paper)

Kalavalli, C., Meenalochini, P., Selvaprasanth, P., Haq, S.S.A.

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[b]Sethu Institute of Technology, Kariapatty, Tamilnadu, India

Abstract

In this paper the design of synchronous frame DQ control based double loop control for single phase inverter in distributed generation system is proposed. For synchronous frame control, the orthogonal signal is generated by second order generalized integrator method. In Dual-loop control systems, the inner capacitor current feedback control and outer synchronous frame control is used to achieve better performance with zero steady state error. The better performance of load is achieved by providing load current as an additional feedback instead of using inductor current feedback. The proposed system is simulated using Matlab and results were presented. The designed controller gives the inverter output voltage with good transient response and reduced harmonic distortion. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

Current control | Distributed generation | H bridge inverter | Synchronous frame control | Total harmonic distortion

Indexed keywords

Engineering controlled terms: Bridge circuits | Closed loop control systems | Electric inverters | Feedback | Harmonic distortion | Pulse width modulation | Transient analysis | Wave filters

Engineering uncontrolled terms: Double-loop control | Dual-loop control | H bridge inverte | H-bridges | Performance | PWM inverter | Single phasis | Synchronoi frame control | Synchronous frame | Total harmonic distortions

Engineering main heading: Distributed power generation

ISSN: 22147853
Source Type: Journal
Original language: English

DOI: 10.1016/j.matpr.2020.10.116
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

Document details - Wear study and elaborate the parametric effect on cupronickel metal matrix

Materials Today: Proceedings

Volume 45, 2021, Pages 1987-1991

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Wear study and elaborate the parametric effect on cupronickel metal matrix(Conference Paper)

Vairamuthu, J., Stalin, B., Khan, M.A., Fazil, B.M., Sathiyan, S.

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View additional affiliations

Abstract

The demand for cupronickel in marine applications has been increased due to its better corrosion resistance against seawater. In these experimental investigations, cupronickel Metal Matrix Composite (MMC) was formulated through squeeze casting process. In cupronickel, the role of iron and manganese was used to the strengthening of material. The chemical composition was validated through Energy Dispersive Spectroscopy (EDS). The substance behaviours have been studied through the change of reinforcements such as Tungsten Carbide (WC) and Silicon Carbide (SiC). The wear experiment was conducted through pin-on-disc tribometer. The contribution factor on wear and its effects were investigated through the variance test. The contour plot analysis of different factors was used to investigate the effect of wear. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

Cupronickel | MMC | Silicon carbide | Squeeze casting | Tungsten carbide | Wear

Indexed keywords

Engineering controlled terms: Corrosion resistance | Energy dispersive spectroscopy | Marine applications | Metallic matrix composites | Seawater corrosion | Silicon carbide | Tungsten carbide

Engineering uncontrolled terms: Casting process | Chemical compositions | Contour plot | Cupronickel | Experimental investigations | Matrix composite | Metal matrix | Metal matrix composite | Parametric effects | Pin on disc tribometer

Engineering main heading: Wear of materials

Cited by 4 documents

Perumal, A. , Kailasanathan, C. , Wilson, V.H.

Machinability of Titanium alloy 6242 by AWJM through Taguchi method

(2022) Materials Today: Proceedings

Bachchhav, B.D. , Bagchi, H.

Tribological performance of copper-titanium alloy under dry sliding contact

(2021) Materials Performance and Characterization

Jule, L.T. , Krishnaraj, R. , Nagaprasad, N.

Evaluate the structural and thermal analysis of solid and cross drilled rotor by using finite element analysis

(2021) Materials Today: Proceedings

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ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2020.09.282
Document Type: Conference Paper
Volume Editors: Kumaresan G.

Document details - Energy efficient distance based clustering protocol for heterogeneous wireless sensor networks

Materials Today: Proceedings

Volume 45, 2021, Pages 2599-2602

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Energy efficient distance based clustering protocol for heterogeneous wireless sensor networks(Conference Paper)

Dawood, M.S., Benazer, S.S., Saravanan, S.K.V., Karthik, V.

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[b]Sri Krishna College of Engineering and Technology, Coimbatore, India

Abstract

Wireless Sensor nodes are considered for range of applications such as temperature, humidity monitoring and etc. Sensor nodes are finished up of non-replaceable battery power, limited memory and processing capabilities. So the life span of the sensor node and network depends on the energy utilization. As the deployment area is not reasonable for manual intercession, energy spending is crucial to enhance the existence of the network. Many Authors have proposed many routing protocols to operate the energy very efficiently. Clustering is one of main technique to condense the energy consumption in the network. Selecting Cluster head is the major process for energy efficiency of clustering algorithms. As maximum energy is dissipated during data transfer, communication within the cluster is paramount. Communication distance between the Cluster head and member node is paramount. Node with elevated communication distance within the Cluster will acquire more energy. So the proposed protocol reduces the communication distance between in the cluster to condense the energy burning up in the network and recover the lifetime of the network. Ó 2021 Elsevier Ltd. All rights reserved. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019. © 2021 Elsevier Ltd.

Author keywords

EERP (Energy Efficient Routing Protocol) PEGASIS (Power-Efficient Gathering in Sensor)

Indexed keywords

Engineering controlled terms: Clustering algorithms, Data transfer, Energy efficiency, Energy utilization, Internet protocols, Power management (telecommunication), Routing protocols

Engineering uncontrolled terms: Cluster-heads, Communication distance, Distance-based, Energy, Energy efficient, Energy efficient routing protocol, PEGASIS, PEGASIS (power-efficient gathering in sensor), Power efficient

Engineering main heading: Sensor nodes

ISSN: 22147853
Source Type: Journal
Original language: English

DOI: 10.1016/j.matpr.2020.11.339
Document Type: Conference Paper
Volume Editors: Kumaresan G.

Document details - Investigation on performance of solar photovoltaic fed hybrid semi impedance source converters

Materials Today: Proceedings

Volume 45, 2021, Pages 1597-1602

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Investigation on performance of solar photovoltaic fed hybrid semi impedance source converters(Conference Paper)

Sabarish, P., Karthick, R., Sindhu, A., Sathiyanathan, N.

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[b]Sethu Institute of Technology, Karriyapatti, Tamilnadu, India

Abstract

Normally the output voltage of the solar photovoltaic panel is very low; it varies widely under the influence of environment and climatic conditions. In this paper the combination of each power system and the output of the dc-dc converters are regulated by some kind of increased dc input voltage. The structure of the dc-dc converter is also very important for photo voltaic power systems. Various voltage raising technologies have indeed been thoroughly tested to date, such as rectifier circuit, managed to switch inductance, capacity to change, coupled inductance, impedance matching, and spiralled raising technologies. However, these processes are both dynamic with poor accuracy and greater cost. The effectiveness of the hybrid semi impedance source converter is greater. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

DC-DC converters | Digital Information system | Hybrid systems | Open loop converter control | Semi impedance source converters | Solar PV

Indexed keywords

Engineering controlled terms: Boost converter | Electric rectifiers | Inductance | Rectifying circuits | Solar concentrators | Solar panels | Solar power generation

Engineering uncontrolled terms: Converter controls | Dc/dc converters | Digital information systems | Impedance sources | Open loop converter control | Open-loop | Performance | Semi impedance source converter | Solar photovoltaics | Solar PVs

Engineering main heading: Hybrid systems

ISSN: 22147853
Source Type: Journal
Original language: English

DOI: 10.1016/j.matpr.2020.08.390
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

Document details - Efficient model for IoT based railway crack detection system

Materials Today: Proceedings

Volume 45, 2021, Pages 2789-2792

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Efficient model for IoT based railway crack detection system(Conference Paper)

Benazer, S.S., Dawood, M.S., Ramanathan, S.K., Saranya, G.

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Abstract

In present's world, transport is a key requirement. The fourth biggest railway set of connections in India is the human race. This paper discuss about the detection of crack in a railway track. In previous methods GPS module and the GSM modem were used. It leads to high cost. The effective railway crack detection system utilizing the simple components inclusive of a RF transmitter and receiver, LED -LDR set up. It has low cost compared to the existing techniques. In this paper LED and LDR assembly is utilized to find out the crack in a railway track. RF is an obvious option for message, because it allows more information to be transferred at high speed and over long remoteness. Here the sensor data is transferred to control room or monitoring unit. In this paper we proposed an IoT Based crack detection system using LED-LDR assembly, RF transceiver include autonomous power unit using solar powered battery. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

LED-LDR assembly | Moving robot | Railway crack | RF transmitter and receiver | Sensors | Solar panel

Indexed keywords

Engineering controlled terms: Internet of things | Radio transceivers | Railroad tracks | Railroads | Remote sensing | Satellites | Sensor nodes | Solar panels

Engineering uncontrolled terms: Crack detection system | Human races | LED-LDR assembly | Moving robots | Railway crack | Railway track | RF receivers | RF transmitter | Solar panels | Transmitter and receiver

Engineering main heading: Light emitting diodes

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2020.11.743
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

Document details - Performance analysis of modified on-demand multicast routing protocol for MANET using non forwarding nodes

Materials Today: Proceedings

Volume 45, 2021, Pages 2603-2605

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Performance analysis of modified on-demand multicast routing protocol for MANET using non forwarding nodes(Conference Paper)

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Abstract

ODMRP (On-Demand Multicast Routing Protocol) is an admired multicast protocol in wireless ad-hoc networks. ODMRP flood a route applies for over the total network to go for a set of forwarding nodes for packet delivery. On the other hand, a on its own forwarding path is exposed to node failures, which are common due to the vibrant nature of mobile ad hoc networks. Still, a set of mischievous or malicious nodes can generate network partitions and mount Denial-of- Service (DoS) attacks. We recommend a new ODMRP-based wireless multicast protocol that offer more forwarding paths in face of link failures. A subset of the nodes that are not on forwarding path rescreen received packets to nodes in their neighbourhoods to beat perceived node failure. This rebroadcasting creates superfluous forwarding paths to skirt unsuccessful areas in the network. Each node makes this forwarding conclusion probabilistically. Our simulation results indicate the unbiased packet delivery ratio with smallest control in the clouds. Ó 2021 Elsevier Ltd. All rights reserved. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019. © 2021 Elsevier Ltd.

Author keywords

DOS | Energy efficiency | MANET | Nodes | Non forwarding | ODMRP | QoS

Indexed keywords

Engineering controlled terms: Denial-of-service attack | Mobile ad hoc networks | Multicasting | Power management (telecommunication) | Routing protocols

Engineering uncontrolled terms: Forwarding nodes | MANET's | Multicast protocol | Node | Node failure | Non forwarding | On-demand multicast routing protocols | Packet Delivery | Performances analysis | Wireless ad-hoc networks

Engineering main heading: Energy efficiency

ISSN: 22147853
Source Type: Journal
Original language: English

DOI: 10.1016/j.matpr.2020.11.342
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

Document details - A sinusoidal pulse width modulation (SPWM) technique for capacitor voltage balancing of nested I-type four-level inverter

Materials Today: Proceedings

Volume 45, 2021, Pages 2435-2439

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

A sinusoidal pulse width modulation (SPWM) technique for capacitor voltage balancing of nested I-type four-level inverter(Conference Paper)

Haq, S.S.A., JeyaRohini, R., Meenalochini, P., Jeyakanth, K., Immanuvel, C., HarishBabu, T.

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Abstract

This article proposes a new control method based on a sinusoidal-width modulation (PWM) scheme to control the voltage of the I-type inverter. The four-stage FC type I inverter has fewer switches and components than the classic and advanced four-stage inverter, making this chassis attractive for high-performance high voltage applications. This structure was designed and studied assuming a constant current source rather than a flying capacitor. In this circuit, a medium power single phase rectifier is designed to balance the voltage of the flying capacitor. The efficiency and qualification of the proposed control methods are evaluated experimentally under constant and temporary conditions and at various modulation rates and loads. Experimental results show the effectiveness of the control method developed to control the capacitor voltage. © 2021 Elsevier Ltd.

Author keywords

FC inverter | I type FC inverter | Multilevel inverter | T type NPC inverter | THD

Indexed keywords

Engineering controlled terms: Electric rectifiers | Pulse width modulation | Voltage control

Engineering uncontrolled terms: Capacitor voltage balancing | Control methods | FC inverte | Flying capacitor | Four level inverter | I type FC inverte | Multi Level Inverter (MLI) | Sinusoidal pulse width modulation techniques | T type NPC inverte | THD

Engineering main heading: Electric inverters

ISSN: 22147853
Source Type: Journal
DOI: 10.1016/j.matpr.2020.11.014
Document Type: Conference Paper

Document details - Design of rectenna for wireless sensor networks

Materials Today: Proceedings

Volume 45, 2021, Pages 2912-2915

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Design of rectenna for wireless sensor networks(Conference Paper)

Dawood, M.S., Benazer, S.S., Nanthini, N., Devika, R., Karthick, R.

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Abstract

Nowadays most used technology is Wireless sensor network which provides increasing efficiency of data collection and processing, which controls the flow of data applications. Rectenna is a device that converts Radio waves into Electrical signal by utilize of rectifying bridge circuit which is directly connected to the normal antenna. The common purpose of antenna is used in transmission of microwave energy. The purpose of rectenna is to receive RF energy from the atmosphere and transmit through the circuit. This provide high efficiency while conversion of microwaves into the Electrical energy. © 2021 Elsevier Ltd. All rights reserved. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

Bridge circuit | Data collection | Data processing | Rectenna | Rectifying antenna | Wireless sensor networks

Indexed keywords

Engineering controlled terms: Bridge circuits | Data acquisition | Data handling | Electric rectifiers | Microstrip antennas | Rectennas | Timing circuits

Engineering uncontrolled terms: Data application | Data collection | Electrical energy | Electrical signal | Energy | Flow of data | Higher efficiency | Microwave energies | Rectenna

Engineering main heading: Wireless sensor networks

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2020.11.905
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

Dawood, M.S.; Sethu Institute of Technology, Virudhunagar, Pulloor, India;

Document details - Microstrip patch antenna design for wireless network applications

Materials Today: Proceedings

Volume 45, 2021, Pages 2518-2523

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Microstrip patch antenna design for wireless network applications(Conference Paper)

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Abstract

Advances in communication systems involve the promotion of low cost, low weight, light weight and low profile antennas has been improved over last few years. It has capable of maintaining higher performance over a large range of frequency spectrum. This technological trend has focused a great deal of effort on growing of micro strip patch antennas due to its unalienable characteristics. It meets the requirement of modern communication devices. In this work, the inset feed technique was used to present the design and simulation of a compact rectangular slot patch antenna for double frequency operation at 5.27 GHz. The simulation of the built antenna was performed using the 2019 studio suite of computer simulation technology (CST) and MATLAB which will be used to measure the parameters. The substrate used for the proposed antenna is the four flame-resistant (FR-4) with a dielectric constant of 4.3 and a loss tangent of 0.023. The antenna proposed could find applications in Wireless Local Area (Wi-Fi) and Bluetooth technology. © 2021 Elsevier Ltd.

Author keywords

Directivity | Gain | Microstrip antenna | Return loss | Substrate | VSWR

Indexed keywords

Engineering controlled terms: MATLAB | Microwave antennas | Slot antennas | Wi-Fi | Wireless local area networks (WLAN)

Engineering uncontrolled terms: Communications systems | Directivity | Gain | Low-costs | Micro-strip patch antennas | Microstrip-patch antenna | Network applications | Patch antenna designs | Returns loss | VSWR

Engineering main heading: Microstrip antennas

ISSN: 22147853
Source Type: Journal
DOI: 10.1016/j.matpr.2020.11.125
Document Type: Conference Paper

Document details - Suppression of four wave mixing effect in DWDM system

Materials Today: Proceedings

Volume 45, 2021, Pages 2707-2712

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Suppression of four wave mixing effect in DWDM system(Conference Paper)

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Abstract

This article discusses the nonlinear effect, four-wave mixing (FWM), which lowers the performance of optical communication systems. The concept of orthogonal polarization was introduced to reduce the effects of FWM. Here, orthogonal polarization is used with various modulation techniques such as NRZ, RZ, GAUSSIAN and RAISED COSINE. Orthogonal polarization was found to reduce the effect of FWM more than round polarization. Weaknesses of the four wavelength mixes were analyzed for various levels of input power. The capacity of a four-wave mixing product (FWM) is assessed by an optical spectrum analyzer. System performance is analyzed in terms of quality factors and BER. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

Dense Wavelength Division Multiplexing (DWDM) | Four Wave Mixing (FWM) | Optical Networks | Orthogonal polarization | Quality factor and Bit Error Rate (BER)

Indexed keywords

Engineering controlled terms: Bit error rate | Dense wavelength division multiplexing | Optical communication | Optical signal processing | Polarization | Spectrum analyzers

Engineering uncontrolled terms: Bit-error rate | Dense wavelength division multiplexing | Dense wavelength-division-multiplexing | Dense-wavelength-division-multiplexing | Four wave mixing | Four-wave-mixing | Mixing effects | Orthogonal polarizations | Quality factor and bit error rate | Quality factors

Engineering main heading: Four wave mixing

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2020.11.545
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

Document details - Hardness performance analysis of chromel composite using end and lateral quenching method

Materials Today: Proceedings

Volume 45, 2021, Pages 1839-1842

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Hardness performance analysis of chromel composite using end and lateral quenching method(Conference Paper)

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View additional affiliations

Abstract

The achievement of materials hardness was difficult in heat treatment through quenching methods. At the same time, the quenching medium was not covered the entire surface of the work piece. In present topic was discussed about the development of water quenching method for chromel composite. For these experimental investigations, the different levels of control factors were considered such as water velocity, the rotational speed of the work piece, and Standoff Distance (SOD). The response such as hardness was evaluated according to the variation of control or input factors. The effects of quenching factors were reported through the Taguchi technique and variance analysis. The maximum hardness of 545BHN was achieved through the developed quenching apparatus. The water velocity (74.22%) was the influential factor on hardness. It was validated through variance analysis. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

Chromel composite | Hardness | Quenching | Rotational speed | Variance analysis | Water velocity

Indexed keywords

Engineering controlled terms: Quenching

Engineering uncontrolled terms: Chromel composite | Control factors | Material hardness | Performances analysis | Quenching | Quenching media | Rotational speed | Variance analysis | Water quenching methods | Water velocities

Engineering main heading: Hardness

ISSN: 22147853
Source Type: Journal
Original language: English

DOI: 10.1016/j.matpr.2020.09.037
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

Document details - Enhancing network-on-chip performance by 32-bit RISC processor based on power and area efficiency

Materials Today: Proceedings

Volume 45, 2021, Pages 2713-2720

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Enhancing network-on-chip performance by 32-bit RISC processor based on power and area efficiency(Conference Paper)

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Abstract

This papers deals with base design of the RISC-V 32b processor. It is used to support many additional commands including hardware loops, post-upgrade and save instructions and additional ALU instructions. RISC processors can be used in different ways, depending on speed and power consumption. Organized to design low power RISC processors through design and solution processes. The speed can also be increased by using the correct clock method. Decoding of execution, memory and rewriting. A one-sided clock signal is used for the middle stage. MIPS V adds a new data type, Single Associated (PS), which stores two single-point floating point numbers (32-bit) in a list of 64-bit floating point numbers. Existing floating point statement variants have been added for arithmetic operations, suitability and limitations to work with this type of data using the SIMD method. New instructions for downloading, transferring and transferring PS data have been added. This is the first command to skip the floating point SIMD with the available fonts. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

FPGA | Microprocessor without Interlocked | Pipelined Stages | Reduced instruction set computer processor | VLSI

Indexed keywords

Engineering controlled terms: Clocks | Digital arithmetic | Integrated circuit design | Network-on-chip | Pipeline processing systems | VLSI circuits

Engineering uncontrolled terms: Computer processors | Floating point numbers | Floating points | Microprocessor without interlocked | Networks on chips | Pipelined stage | Reduced instruction set computer processor | Reduced instruction set computers | RISC processors | VLSI

Engineering main heading: Field programmable gate arrays (FPGA)

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2020.11.550
Document Type: Conference Paper
Volume Editors: Kumaresan G.

Document details - Experimental investigation and the performance evaluation of a mixed mode solar dryer for coconut

Materials Today: Proceedings

Volume 45, 2021, Pages 3662-3665

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Experimental investigation and the performance evaluation of a mixed mode solar dryer for coconut(Conference Paper)

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Abstract

The agricultural and food products may be enhanced by reducing their moisture contents, by means of a drying process. The aim of the work is to evaluate a mathematical modelling based on the experimental analysis of forced circulation of mixed mode solar dryer. From previous literature four different models (Newton, Page, Henderson & Pabis and Wang & Singh) are chosen for testing the performance of solar dryer. Selected models are evaluated by using E_{MD}, E_{RMS}, R^2 and v^2 and it is concluded that Page model is more suitable for the fabricated mixed mode solar dryer at air flow rate 0.009 Kg/s based on the experimental analysis.

Author keywords

Coconut | Drying capacity | Mathematical model | Solar dryer | Solar energy

Indexed keywords

Engineering controlled terms: Drying | Food products | Solar dryers

Engineering uncontrolled terms: Coconut | Drying capacity | Drying process | Experimental analysis | Experimental investigations | Forced circulations | Mixed-mode solar dryer | Model-based OPC | Performance | Performances evaluation

Engineering main heading: Solar energy

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2021.01.157
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

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Document details - Combinatorial optimization technique for improving performance of PV modules under partial shading conditions

Materials Today: Proceedings

Volume 45, 2021, Pages 1651-1654

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Combinatorial optimization technique for improving performance of PV modules under partial shading conditions(Conference Paper)

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Abstract

In this work, the development of Photo Voltaic (PV) modules operation under partial shading conditions is attained over and done with combinatorial optimization technique. The different power - voltage peak values attained by means of partial shading in the solar panels. The outcomes of progression significantly disturb the overriding algorithms and cause enormous power depletion in energy gathering. The current algorithms are incompetent to apprehending the difference and performance speedy. Combinatorial optimization has proficient of diverse strengthening and divergence mechanisms with each other (power - voltage). Different performance parameters like voltage current variation, precision, and response time are engaged for interpretation. The simulation conceded out for different partial shading patterns and validated the mathematical concept of the proposed method. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

Artificial intelligence | Discrete optimization | Exhaustive search | Integer programming and linear | Programming

Indexed keywords

Engineering controlled terms: Artificial intelligence | Combinatorial optimization | Linear programming | Solar panels

Engineering uncontrolled terms: Combinatorial optimization techniques | Condition | Discrete optimization | Exhaustive search | Integer Program- ming | Integer programming and linear | Partial shading | Photovoltaics | Power voltage | Programming

Engineering main heading: Integer programming

Document details - Rebar properties in sand-substitute mortars after exposure to high temperatures

Gradjevinar

Volume 73, Issue 4, 2021, Pages 381-388

Rebar properties in sand-substitute mortars after exposure to high temperatures(Article)(Open Access)

[Svojstva armature ugrađene u mortove sa zamjenom pijeska nakon izlaganja visokim temperaturama]

[Bewehrungseigenschaften in Sandersatzmörteln nach Einwirkung hoher Temperaturen]

Balasubramanian, J., Gopal, E., Kamaraj, D., Ponnaiah, S.K., Periakaruppan, P.

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[b]University College of Engineering, Department of Civil Engineering, India
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Abstract

This study investigates the effects of fire, cooling methods, and cover thickness, on the behaviour (strength and ductility) of 12-mm diameter rebars embedded in mortars with river sand (RS) substitutes such as granite powder and manufactured sand, with 30 and 50 mm cover thickness. Beyond 500°C, thermal stress induced random spalling of mortar cover, and tension test results showed strength decrement and ductility increment of rebars for air cooling, while the vice versa was observed for water quenching. © 2021 Union of Croatian Civil Engineers and Technicians. All rights reserved.

Author keywords

Air cooling | Cover thickness | Fire | Rebar properties | Sand substitutes | Water quenching

ISSN: 03502465
CODEN: GDVIA
Source Type: Trade Journal
Original language: English

DOI: 10.14256/JCE.2931.2020
Document Type: Article
Publisher: Croatian Association of Civil Engineers

Balasubramanian, J.; Sethu Institute of Technology, Department of Civil Engineering, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Design of a nanocoated heat exchanger working with organic nanofluids using a hybrid technique

Transactions of the Canadian Society for Mechanical Engineering

Volume 45, Issue 2, 2021, Pages 308-319

Design of a nanocoated heat exchanger working with organic nanofluids using a hybrid technique(Article)

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Abstract

In this paper, we developed an adaptive neuro-fuzzy inference system (ANFIS) to predict the thermal and hydrodynamic properties of two types of Newtonian nanomodules in the outer layer of shell and tube heat exchanger (STHE). The input data for the ANFIS model were the apparent density of the nanoparticles, the Reynolds number, the thermal conductivity of the nanoparticles, and the brand number. According to a particle swarm optimization (PSO) algorithm, multi-component optimization was performed to reduce the overall pressure, increase the heat transfer coefficient, and increase the number of nanofluid cores in the STHE. During the optimization, the pressure of the nanofluids decreased and the number of noses (tube side) was calculated using the ANFIS model. The best ANFIS was a combination of spatial neural network and phase organization. Despite the stability of the nanofluids, the heat transfer during cooking was significantly reduced owing to its resistance to minerals. The formation and laceration of the nanoparticles was experimentally studied. The comparison of experimental thermal conductivity coefficients between the results of the relationship with the ANFIS shows high efficiency and accuracy of the synthetic neural network provided in thermal conductivity data.

Author keywords

Adaptive neuro-fuzzy information system | Aluminum | Particle swarm optimization | STHE and thermal conductivity

Indexed keywords

Engineering controlled terms: Fuzzy neural networks | Fuzzy systems | Heat exchangers | Heat resistance | Heat transfer | Nanofluidics | Nanoparticles | Particle swarm optimization (PSO) | Reynolds number | Thermal conductivity

Engineering uncontrolled terms: Adaptive neuro-fuzzy inference system | Apparent density | High-efficiency | Hybrid techniques | Hydrodynamic properties | Shell and tube heat exchangers | Synthetic neural network | Thermal conductivity coefficient

Engineering main heading: Fuzzy inference

Document details - Optimization of mould sand properties by mixing of granite powder using Taguchi method

Materials Today: Proceedings

Volume 45, 2021, Pages 2254-2259

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Optimization of mould sand properties by mixing of granite powder using Taguchi method(Conference Paper)

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Abstract

The casting quality is depended on many properties of moulding sand like dry compressive strength, wet tensile strength, permeability, etc. and these properties are dependent more or less on parameters like setting/curing time, resin amount, hardener amount, content of moisture and so on. This paper focuses on studying the mechanical properties of silica sand when granite powder is added to it and how it affects the properties or composition of the moulding sand. The strength of mould of the silica sand specimen by using the Taguchi technique was studied. Random experiments are conducted using the L9 orthogonal array. Setting Time, Resin and Hardener are some of the main factors taken into consideration using 1000 g of silica sand. Selection of the parameters was chosen based on brainstorming foundry sessions and reviews from various literatures. As we are studying the effects of granite powder in the moulding sand it is also considered as one of the influencing factors. The resin used for this experiment is Phenolic Resin (cashew nut shell oil) and hardener used is hexamine. After the calculations from the experiments were done on the compressive strength, tensile strength, and permeability it is observed that setting time and granite powder are the parameters dominant for quality of mould and strength. Graphical analysis was done and based on that conclusions were made. © 2021 Elsevier Ltd.

Author keywords

Candidate material | Dry compressive strength | L9 orthogonal array | Permeability | Taguchi method | Wet tensile strength

Indexed keywords

Engineering controlled terms: Compressive strength | Granite | Molding | Molds | Resins | Silica | Taguchi methods

Engineering uncontrolled terms: 'Dry' [| Candidate materials | Dry compressive strength | Granite powder | L9 orthogonal arrays | Permeability | Property | Setting time | Taguchi's methods | Wet tensile strength

Engineering main heading: Tensile strength

ISSN: 22147853
Source Type: Journal
Original language: English

DOI: 10.1016/j.matpr.2020.10.231
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

Document details - Evaluation of EDM process parameters on titanium alloy through Taguchi approach

Materials Today: Proceedings

Volume 45, 2021, Pages 2394-2400

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Evaluation of EDM process parameters on titanium alloy through Taguchi approach(Conference Paper)

Perumal, A., Kailasanathan, C., Stalin, B., Rajkumar, P.R., Gangadharan, T., Venkatesan, G.

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Abstract

Titanium alloy due to its high strength and rigidity is extremely difficult for machining and is commonly used in a variety of industries. The reddening of contaminants from the inter-electrode gap is the major concern during EDM operation. EDM spark erosion is the same as creating an electrical problem that sparks a small hole in the center of metal that comes into contact with it. Both the machining process and the electrode material must be electrical conductors in the EDM phase. An experiment is also carried out in this project to examine and optimize the impact of variables for machining, such as spark on time, discharge current, and voltage based on the Taguchi strategy method. The Titanium workpiece is being used to perform this experiment with a copper tool (electrode) with three different diameters, and EDM oil has also been selected as a dielectric medium. The experiment is conducted using Taguchi's L27 orthogonal array. S/N ratio is determined to examine the effect of input factors precisely. For investigation and clarification, the curve is graphed between the mean S/N ratio also for the rate of material removal and tool wear rate with three machining parameters (current, spark on time, voltage) with the aid of the MINITAB 17 program.

Author keywords

Copper | EDM | MRR | Taguchi technique | Titanium | TWR

Indexed keywords

Engineering controlled terms: Cutting tools | Electric discharge machining | Electric discharges | Electrodes | High strength alloys | Machining centers | Titanium alloys

Engineering uncontrolled terms: EDM | High-strength | MRR | Process parameters | S/N ratio | Taguchi approach | Taguchi technique | Titania | Titanium (alloys) | TWR

Engineering main heading: Copper

ISSN: 22147853 **DOI:** 10.1016/j.matpr.2020.10.737

Document details - Intelligent starting current-based fault identification of an induction motor operating under various power quality issues

Energies

Volume 14, Issue 2, January 2021, Article number 304

Intelligent starting current-based fault identification of an induction motor operating under various power quality issues(Article)(Open Access)

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View additional affiliations

Abstract

Since most of our industries use induction motors, it is essential to develop condition monitoring systems. Nowadays, industries have power quality issues such as sag, swell, harmonics, and transients. Thus, a condition monitoring system should have the ability to detect various faults, even in the presence of power quality issues. Most of the fault diagnosis and condition monitoring methods proposed earlier misidentified the faults and caused the condition monitoring system to fail because of misclassification due to power quality. The proposed method uses power quality data along with starting current data to identify the broken rotor bar and bearing fault in induction motors. The discrete wavelet transform (DWT) is used to decompose the current waveform, and then different features such as mean, standard deviation, entropy, and norm are calculated. The neural network (NN) classifier is used for classifying the faults and for analyzing the classification accuracy for various cases. The classification accuracy is 96.7% while considering power quality issues, whereas in a typical case, it is 93.3%. The proposed methodology is suitable for hardware implementation, which merges mean, standard deviation, entropy, and norm with the consideration of power quality issues, and the trained NN proves stable in the detection of the rotor and bearing faults.

Author keywords

Discrete wavelet transform (DWT) | Induction motor | Motor faults | Power quality issues

Indexed keywords

Engineering controlled terms: Condition monitoring | Discrete wavelet transforms | Entropy | Fault detection | Induction motors | Statistics

Engineering uncontrolled terms: Broken rotor bar | Classification accuracy | Condition monitoring systems | Fault identifications | Hardware implementations | Misclassifications | Neural network (nn) | Standard deviation

Engineering main heading: Power quality

Document details - Bio-active mixed ligand Cu(II) and Zn(II) complexes of pyrimidine derivative Schiff base: DFT calculation, antimicrobial, antioxidant, DNA binding, anticancer and molecular docking studies

Journal of Biomolecular Structure and Dynamics

Volume 39, Issue 8, 2021, Pages 3012-3024

Bio-active mixed ligand Cu(II) and Zn(II) complexes of pyrimidine derivative Schiff base: DFT calculation, antimicrobial, antioxidant, DNA binding, anticancer and molecular docking studies(Article)(Open Access)

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Abstract

A new series of bio active Cu(II) and Zn(II) complexes [CuL(phen)](OOCCH$_3$) (1), [ZnL(phen)](OOCCH$_3$) (2), [CuL(bpy)](OOCCH$_3$) (3), [ZnL(bpy)](OOCCH$_3$) (4) have been synthesized using the pyrimidine derivative Schiff base (HL) [HL = 2-(4,6-dimethylpyrimidin-2-ylimino)methyl)-4-nitrophenol], 1,10-phenanthroline (phen), 2,2'-bipyridine (bpy) and acetate salts of Cu(II) and Zn(II). UV-Visible, FT-IR, ^{1}H-NMR, ESR, elemental analysis, molar conductance and EI-MS spectral techniques have been used to endorse the square planar geometry for the complexes 1–4. The optimized molecular structure and the harmonic vibrational frequencies have been scrutinized by DFT methods. The antibacterial and antifungal activity of Schiff base (HL) and complexes 1–4 indicates that complex 1 acts as good antimicrobial agent against microbial strains than HL, complexes 2–4 and standard drugs streptomycin and nystatin. DNA cleavage study of the complexes 1–4 exposes that complexes 1 and 3 spectacle good cleaving agent than complexes 2 and 4. The interaction of complexes 1–4 with CT DNA using absorption, emission and viscometric measurements signifies that complexes 1–4 bind via an intercalation mode. The highest binding constants (K_b) for the complex 1 is confirmed as 7.83×10^3 M^{-1} and 2.98×10^4 M^{-1} by absorption and emission spectrum respectively. These experimental observations were found to be close to the theoretical observations investigated by the molecular docking technique. Antioxidant property of the complexes 1–4 using DPPH assay clinches that complex 1 produces significant scavenging effect than other compounds. The result of in vitro cytotoxicity of the Schiff base (HL) and complexes 1–4 shows that complex 1 shows better ability to inhibit the growth of cancer cells. Communicated by Ramaswamy H. Sarma.

Author keywords

anticancer | antimicrobial | binding | Bioactive | cleavage | DFT | docking

Indexed keywords

EMTREE drug terms: copper derivative | nystatin | pyrimidine derivative | Schiff base | streptomycin | zinc derivative | antiinfective agent | antioxidant | coordination compound | copper | DNA | ligand | pyrimidine derivative | Schiff base | zinc

Document details - Trusted energy aware cluster based routing using fuzzy logic for WSN in IoT

Journal of Intelligent and Fuzzy Systems

Volume 40, Issue 5, 2021, Pages 9197-9211

Trusted energy aware cluster based routing using fuzzy logic for WSN in IoT(Article)

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Abstract

WSN plays a major role in the design of IoT system. In today's internet era IoT integrates the digital devices, sensing equipment and computing devices for data sensing, gathering and communicate the data to the Base station via the optimal path. WSN, owing to the characteristics such as energy constrained and untrustworthy environment makes them to face many challenges which may affect the performance and QoS of the network. Thus, in WSN based IoT both security and energy efficiency are considered as herculean design challenges and requires important concern for the enhancement of network life time. Hence, to address these problems in this paper a novel secure energy aware cluster based routing algorithm named Trusted Energy Efficient Fuzzy logic based clustering Algorithm (TEEFCA) has been proposed. This algorithm consists of two major objectives. Firstly, the trustworthy nodes are identified, which may act as candidate nodes for cluster based routing. Secondly, the fuzzy inference system is employed under the two circumstances namely selection of optimal Cluster Leader (CL) and cluster formation process by considering the following three parameters such as (i) node's Residual Energy level (ii) Cluster Density (iii) Distance Node BS. From, the experiment outcomes implemented using MATLAB it have been proved that TEEFCA shows significant improvement in terms of power conservation, network stability and lifetime when compared to the existing cluster aware routing approaches.

Author keywords

clustering and routing | energy | Internet of Things (IoT) | trust | WSN

Indexed keywords

Engineering controlled terms: Computer circuits | Digital devices | Energy efficiency | Fuzzy inference | Fuzzy logic | Internet of things | MATLAB | Power management (telecommunication)

Engineering uncontrolled terms: Cluster formation process | Cluster-based routing | Computing devices | Energy-constrained | Fuzzy inference systems | Network life time | Power conservation | Sensing equipments

Engineering main heading: Clustering algorithms

ISSN: 10641246
Source Type: Journal
DOI: 10.3233/JIFS-201633
Document Type: Article

Document details - Segmentation of human knee osteoarthritis images using unsupervised local center of mass computation technique

Journal of Ambient Intelligence and Humanized Computing

2021

Segmentation of human knee osteoarthritis images using unsupervised local center of mass computation technique

(Article in press)

Sikkandar, M.Y., Sabarunisha Begum, S., Alkathiry, A.A., Alotaibi, M.S.N., Manzar, M.D., Aboamer, M.A.

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Abstract

In this paper, a recent unsupervised segmentation algorithm based on computation of 2-dimensional (2D) local center of mass (LCM) technique is used to segment X-ray images of Knee Osteoarthritis (KOA) of various stages. Clinically, KOA is classified into four grades ranging from 1 to 4 based on the degradation of ligament in between the two bones fibula and femur and causes suffering with impaired movement. Identifying this space between bones through anterior view of knee X-ray image can indicate the type of KOA and helps in selection of suitable treatment process. Several segmentations methods in scrutinizing the 2D Knee X-ray image for KOA is in practice are supervised segmentation methods. Unsupervised segmentation techniques like watershed, K-means etc., are not sufficient to produce a precise segmentation results on its own and also segmented image takes more memory space. In this research, a new unsupervised segmentation algorithm based on computation of LCM technique is used to segment 2D knee X-ray images to screen the KOA stages. The calculated center of masses (CM) is related to the spatial region of pixels and forms the clusters; hence the segmentation is done based on the information from the whole image rather than only on the neighboring pixels. LCM method of segmentation is tested on 80 clinically categorized X-ray images (20 from each category) of KOA. The results are compared with two popular segmentation methods such as Watershed and Gaussian Mixed Model-Hidden Markov Random Field (GMM-HMRF) segmentation methods, respectively. Evaluated Dice score gives higher value of 0.59 ± 0.02 for the segmented results obtained from LCM computation method. Memory space occupied by LCM based segmented images is around 250 ± 30 kilo bytes (KB) which is less compared to other two watershed and GMM-HMRF methods. Overall, it is observed that LCM method could able to produce a crystal-clear segmented region boundaries and less memory space when compared to other two methods. The CMs calculated also depends on the intensity value of grey scale pixels and this method would be more appropriate for bone mineral density (BMD) analysis.

Author keywords

Intensity value | Local centre of mass | Osteoarthritis | Segmentation | Unsupervised

Document details - Autonomous unmanned aerial vehicle for post-disaster management with cognitive radio communication

International Journal of Ambient Computing and Intelligence

Volume 12, Issue 1, January-March 2021, Pages 29-52

Autonomous unmanned aerial vehicle for post-disaster management with cognitive radio communication(Article)

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Abstract

Unmanned aerial vehicles (UAV) play a significant role in finding victims affected in the post-disaster zone, where a man cannot risk his life under a critical condition of the disaster environment. The proposed design incorporates autonomous vision-based navigation through the disaster environment based on general graph theory with dynamic changes on the length between two or multiple nodes, where a node is a pathway. Camera fixed on it continuously captures the surrounding footage, processing it frame by frame on-site using image processing technique based on a SOC. Identifies victims in the zone and the pathways available for traversal. UAV uses an ultrasonic rangefinder to avoid collision with obstacles. The system alerts the rescue team if any victim detected and transmits the frames using CRN to the off-site console. UAV learns navigation policy that achieves high accuracy in real-time environments; communication using CRN is uninterrupted and useful during such emergencies.

Author keywords

CNN Model | Cognitive Radio Network | General Graph Theory | MobileNet-SSD | Navigation | Raspberry Pi | SOC | UAV

Indexed keywords

Engineering controlled terms: Antennas | Cognitive radio | Disaster prevention | Disasters | Graph theory | Image processing | Ultrasonic applications

Engineering uncontrolled terms: Autonomous unmanned aerial vehicles | Collision with obstacle | Critical condition | Dynamic changes | Image processing technique | Post-disaster management | Real-time environment | Vision based navigation

Engineering main heading: Unmanned aerial vehicles (UAV)

ISSN: 19416237
Source Type: Journal
Original language: English
DOI: 10.4018/IJACI.2021010102
Document Type: Article
Publisher: IGI Global

Document details - Overcome the challenges in bio-medical instruments using IOT - A review

Materials Today: Proceedings

Volume 45, 2021, Pages 1614-1619

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Overcome the challenges in bio-medical instruments using IOT - A review(Conference Paper)

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Abstract

Internet of Things (IoT) is a term associated with the use of IP (Internet Protocol) address sensors. It can connect to the internet and collect sensor data. The information is analyzed and a decision is made automatically. With an IoT medical device, your doctor can monitor the patient's health, health, and well-being. Physiological medical devices and methods can be easily traced. Timely monitoring of the patient's physiological parameters can be helpful to avoid early health problems. Security issues identified in medical IoT communication can be weak due to the reliability or vulnerability of the system. We later suggested filtering for anonymity. It is known for its features such as anonymous sensors, sensor traceability, playback, and ensuring that clone attacks are carried out. The proposed authentication system would be useful for IoT application distribution. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

Anti-attacks | Bio-medical applications | Bio-medical devices | Cyber-security | IoT

Indexed keywords

Engineering controlled terms: Cybersecurity | Health | Internet protocols | Medical applications | Physiological models | Physiology

Engineering uncontrolled terms: Anti-attack | Bio-medical | Biomedical applications | Biomedical devices | Cyber security | Internet protocol address | Medical Devices | Medical instruments | Patient health | Sensors data

Engineering main heading: Internet of things

ISSN: 22147853
Source Type: Journal
Original language: English

DOI: 10.1016/j.matpr.2020.08.420
Document Type: Conference Paper
Volume Editors: Kumaresan G.
Publisher: Elsevier Ltd

Document details - Optimization of powder metallurgy parameters of tic-and b₄c-reinforced aluminium composites by taguchi method

Transactions of the Canadian Society for Mechanical Engineering

Volume 45, Issue 2, 2021, Pages 249-261

Optimization of powder metallurgy parameters of tic-and b_4c-reinforced aluminium composites by taguchi method(Article)

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Abstract

In this work, an aluminium-based metal matrix composite material was developed via powder metallurgy considering various input process parameters. Sintering time, sintering temperature, and compaction pressure were the three main factors used as input process parameters, which were varied at three levels. The research was planned with reference to the experimental design of an L9 orthogonal array using a 3 × 3 matrix. The density, Vickers hardness, and compression strength were tested and analyzed. The influence of individual input parameters were analyzed using the Taguchi-based S/N ratio and analysis of variance (ANOVA). The optimum parameter levels to achieve low density, high hardness, and high compressive strength were identified through main effect plots. Experimental results indicate that the sintering temperature and compaction pressure strongly influence properties such as density and hardness. Similarly, compression strength depends mainly on sintering time and sintering temperature. Through ANOVA analysis, the optimum levels were confirmed for the process parameters sintering time, compaction pressure, and sintering temperature to produce the most favorable metal matrix composite material.

Author keywords

Composite | Compression strength | Density | Hardness | Taguchi method

Indexed keywords

Engineering controlled terms: Aluminum | Aluminum metallurgy | Aluminum refining | Analysis of variance (ANOVA) | Compaction | Compressive strength | Metallic matrix composites | Powder metallurgy | Powder metals | Reinforcement | Taguchi methods | Vickers hardness

Engineering uncontrolled terms: Aluminium composites | Compaction pressure | Compression strength | Input parameter | L9 orthogonal arrays | Optimum parameters | Process parameters | Sintering temperatures

Engineering main heading: Sintering

ISSN: 03158977 DOI: 10.1139/tcsme-2020-0091

Document details - Recent developments of graphene composites for energy storage devices

Materials Today: Proceedings

Volume 45, 2021, Pages 1779-1782

2019 International Conference on Advances in Materials Research, ICAMR 2019; Sathy; India; 6 December 2019 through 7 December 2019; Code 169281

Recent developments of graphene composites for energy storage devices(Conference Paper)

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Abstract

Graphene, one of the limited constituents, has attracted attention of researchers in various industrial applications owing to its exceptional structural, thermal, electrical and biocompatibility properties. Generally, Graphene (allotrope of Carbon) forms a monolayer of atoms to exhibit a plane of sp2 hybridised carbon atoms which are covalently bonded together and organized in the hexagonal lattice. The exclusive material, Graphene is extensively used as conducting material in energy storage devices through the tough p-p bond interactions among graphene layers prime to excessive damage of the surface area of graphene electrodes and the constructed sheets of graphene stands out to be an efficient approach compared to other materials. This review paper presents an outline of recent developments of graphene composites and their applications in various energy storage devices as perceived in recent years. Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research - 2019.

Author keywords

Additive manufacturing | Applications | Batteries | Composites | Energy storage devices | Fuel cells | Graphene | Supercapacitors

Indexed keywords

Engineering controlled terms: 3D printers | Biocompatibility | Energy storage | Fuel cells | Fuel storage | Graphene | Graphene devices | Graphite electrodes

Engineering uncontrolled terms: A-plane | Battery | Carbon atoms | Carbon forms | Covalently bonded | Energy storage device | Graphene composites | Hexagonal lattice | Property | Thermal

Engineering main heading: Supercapacitor

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2020.08.631
Document Type: Conference Paper
Volume Editors: Kumaresan G.

Document details - Diffusion brazing of Inconel 617 and 321 stainless steel by using AMS 4772 Ag interlayer

Journal of Manufacturing Processes

Volume 61, January 2021, Pages 383-395

Diffusion brazing of Inconel 617 and 321 stainless steel by using AMS 4772 Ag interlayer(Article)

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Abstract

The diffusion brazing of Inconel 617 and AISI 321 stainless steel was carried out with a 50 μm thick AMS 4772 Ag interlayer at a constant brazing temperature of 750 °C under a variable holding time (30 & 60 min). The microstructure of the diffusion-brazed joints was studied in detail via the use of a scanning electron microscope and energy dispersive spectroscopy. The shear strength and fracture behavior of the joints were investigated. Void-free diffusion-brazed joints were obtained due to the capillarity effect of Ag and a more uniform reaction layer was obtained in the joint with a higher brazing/holding time. The joint with a prolonged brazing time of 60 min has the maximum shear strength of 322.9 MPa and an improvement of 26 % over the joint processed at 30 min. The predominant brittle (fracture) failure in the sample processed at 30 min brazing/holding time was responsible for its weak shear strength. At effective brazing/holding time, the use of the AMS4772 Ag interlayer has been effective in joining the IN617 and AISI 321 SS alloys. © 2020 The Society of Manufacturing Engineers

Author keywords

Ag interlayer | AISI 321 stainless steel | Diffusion brazing | Fracture | Inconel 617 | Microstructure | Shear strength

Indexed keywords

Engineering controlled terms: Brazing | Diffusion | Energy dispersive spectroscopy | Fracture mechanics | Joints (structural components) | Scanning electron microscopy | Silver

Engineering uncontrolled terms: 321 Stainless Steel | Ag interlayers | Brazing temperature | Brazing time | Diffusion brazing | Fracture behavior | Holding time | Reaction layers

Engineering main heading: Austenitic stainless steel

ISSN: 15266125
Source Type: Journal
Original language: English
DOI: 10.1016/j.jmapro.2020.11.013
Document Type: Article
Publisher: Elsevier Ltd

Document details - Fracture Analysis of C-Stringer and Hat Stringer on the Load Carrying Vehicle

Lecture Notes in Mechanical Engineering

Volume 23, 2021, Pages 47-55

International Conference on Advances in Industrial Automation and Smart Manufacturing, ICAIASM 2019; Nandyal; India; 26 July 2019 through 27 July 2019; Code 250529

Fracture Analysis of C-Stringer and Hat Stringer on the Load Carrying Vehicle(Conference Paper)

Stalin, B., Dhinakaran, V., Ravichandran, M., Sathiya Moorthi, K., Vairamuthu, J.

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Abstract

In this paper, chassis frame stringer's fracture analysis in TATA 2516 TC truck is sited. To save the shock, twist and other loads, the chassis must be a high strengthened one. After that load, the chassis should hold out against fracture behaviour. The work performed on chassis stringer's fracture analysis with the properties of stiffness, strength by use of Ansys workbench software. Reports are showing that hat stringer has more strength than C-shaped stringer during fracture conditions. © 2021, Springer Nature Singapore Pte Ltd.

Author keywords

FEA Fracture Mechanical properties Stringer

ISSN: 21954356
ISBN: 978-981154738-6
Source Type: Book Series
Original language: English
DOI: 10.1007/978-981-15-4739-3_4
Document Type: Conference Paper
Volume Editors: Arockiarajan A.,Duraiselvam M.,Raju R.
Publisher: Springer Science and Business Media Deutschland GmbH

Stalin, B.; Department of Mechanical Engineering, Anna University, Regional Campus Madurai, Madurai, Tamil Nadu, India;

Prominence percentile:

Document details - Analysis of Parameters on Bend Force in Nickel-Coated Mild Steel Sheets Through Contour Plot

Lecture Notes in Mechanical Engineering

Volume 23, 2021, Pages 647-652

International Conference on Advances in Industrial Automation and Smart Manufacturing, ICAIASM 2019; Nandyal; India; 26 July 2019 through 27 July 2019; Code 250529

Analysis of Parameters on Bend Force in Nickel-Coated Mild Steel Sheets Through Contour Plot(Conference Paper)

Pritima, D., Stalin, B., Vairamuthu, J., Mallesham, P., Srinivasa Rao, M., Marichamy, S.

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View additional affiliations

Abstract

The contour plot analysis of parameters on bend force is carried out in nickel-coated mild steel sheets using response surface methodology (RSM). The contour plot analysis includes various parameters, namely as punch travel (mm), strain hardening index, holding time (min), punch velocity (mm/s) and width of the sheet (mm) on the bend force. The experimental analysis is achieved through central composite design (CCD). The linear and quadratic polynomial equations are used to predict the mathematical models. Finally, concluded that the proposed models predict the response satisfactorily within the limits and the punch travel is the main significant parameter on bend force. The holding time and strain hardening index provide less effect on bend force. © 2021, Springer Nature Singapore Pte Ltd.

Author keywords

Bend force | Nickel-coated mild steel | Punch travel and RSM | Sheet bending

ISSN: 21954356
ISBN: 978-981154738-6
Source Type: Book Series
Original language: English

DOI: 10.1007/978-981-15-4739-3_55
Document Type: Conference Paper
Volume Editors: Arockiarajan A.,Duraiselvam M.,Raju R.
Publisher: Springer Science and Business Media Deutschland GmbH

Stalin, B.; Department of Mechanical Engineering, Anna University, Regional Campus Madurai, Madurai, Tamil Nadu, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Tribological Behaviour and Electric Discharge Drilling of Duplex Silicon Metal Matrix

Lecture Notes in Mechanical Engineering

Volume 23, 2021, Pages 553-562

International Conference on Advances in Industrial Automation and Smart Manufacturing, ICAIASM 2019; Nandyal; India; 26 July 2019 through 27 July 2019; Code 250529

Tribological Behaviour and Electric Discharge Drilling of Duplex Silicon Metal Matrix(Conference Paper)

Vishnu Vardhan, T., Marichamy, S., Stalin, B., Vairamuthu, J., Dhinakaran, V.

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View additional affiliations

Abstract

Silicon metal matrix composites are extensively used in many industries such as automobile, aerospace, marine and mineral processing industries due to their enhanced wear properties. This experimental investigation deals with tribological behaviour and electric discharge drilling (EDD) of the silicon metal matrix. The duplex silicon metal matrix is synthesized by stir casting process and characterization was studied through a scanning electron microscope (SEM) and energy dispersive analysis of X-rays (EDAX), respectively. Mechanical properties such as hardness, tensile strength and impact strength were estimated after adding the weight percentage of titanium carbide. Drilling holes were formed on the surface of the metal matrix using electric discharge machining (EDM). Wear characteristics are carried out by pin on disc apparatus. Applied load, sliding velocity and weight percentage of reinforcement were considered as the input parameters. Wear rate is the response parameter for this experiment. After wear test, morphology of the worn out surfaces was analysed by SEM. It was clearly observed that mechanical and wear resistance were improved by increasing the weight percentage of reinforcement material. The influential parameter and its effect have been found out by analysis of variance (ANOVA). © 2021, Springer Nature Singapore Pte Ltd.

Author keywords

Analysis of variance (ANOVA) | Duplex silicon metal matrix | Electric discharge drilling (EDD) | Scanning electron microscope (SEM) | Tribological behaviour | Wear rate

ISSN: 21954356
ISBN: 978-981154738-6
Source Type: Book Series
Original language: English
DOI: 10.1007/978-981-15-4739-3_48
Document Type: Conference Paper
Volume Editors: Arockiarajan A.,Duraiselvam M.,Raju R.
Publisher: Springer Science and Business Media Deutschland GmbH

Marichamy, S.; Department of Mechanical Engineering, Sri Indu College of Engineering and Technology, Hyderabad, Telangana, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Buckling Analysis of C-Stringer and Hat Stringer on the Load Carrying Vehicle

Lecture Notes in Mechanical Engineering

Volume 23, 2021, Pages 177-183

International Conference on Advances in Industrial Automation and Smart Manufacturing, ICAIASM 2019; Nandyal; India; 26 July 2019 through 27 July 2019; Code 250529

Buckling Analysis of C-Stringer and Hat Stringer on the Load Carrying Vehicle(Conference Paper)

Stalin, B., Dhinakaran, V., Ravichandran, M., Sathiya Moorthi, K., Vairamuthu, J.

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View additional affiliations

Abstract

In this paper, the stringer's buckling analysis is analyzed and reported. To block the shock, twist, and other stresses, the chassis should be in very high strength. More than that of strength, the chassis should tolerate the buckling condition of the frame. Here, the work is done toward stringer analysis in chassis with the properties of buckling behavior, strength by use of FEA software (Ansys Workbench). The result shows that hat stringer is stronger than C-stringer during the stringer on buckling conditions. © 2021, Springer Nature Singapore Pte Ltd.

Author keywords

Buckling FEA Strength Stringer bar

ISSN: 21954356
ISBN: 978-981154738-6
Source Type: Book Series
Original language: English
DOI: 10.1007/978-981-15-4739-3_15
Document Type: Conference Paper
Volume Editors: Arockiarajan A.,Duraiselvam M.,Raju R.
Publisher: Springer Science and Business Media Deutschland GmbH

Stalin, B.; Department of Mechanical Engineering, Anna University, Regional Campus Madurai, Madurai, Tamil Nadu, India;

Document details - Parametric Effect and Laser Beam Machining of Rhenium Diboride-Based Molybdenum Metal Matrix

Lecture Notes in Mechanical Engineering

Volume 23, 2021, Pages 725-732

International Conference on Advances in Industrial Automation and Smart Manufacturing, ICAIASM 2019; Nandyal; India; 26 July 2019 through 27 July 2019; Code 250529

Parametric Effect and Laser Beam Machining of Rhenium Diboride-Based Molybdenum Metal Matrix(Conference Paper)

Augustine, A., Vijayakumar, J.D., Paulsingarayar, S., Marichamy, S., Stalin, B., Dhinakaran, V.

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View additional affiliations

Abstract

The applications of super hard material have been increased in aerospace, marine and automobile industries. In the present, the investigation deals with rhenium diboride (ReB_2)-based molybdenum metal matrix which is fabricated through stir casting method. Rhenium diboride is mixed to the molybdenum with various weight percentages such as 3, 5 and 8%. The material properties are evaluated for the sample specimens. Based on the comparison of material properties, molybdenum with 8% of rhenium diboride has been considered for these experimental investigations. Due to high hardness and strength, conventional machining methods are not suitable. Among all the unconventional machining processes, the laser beam machining process is the most suitable for high hardness materials. Various input and output parameters are considered. The responses such as the material removal rate (MRR) and surface roughness (SR) are measured. The effects and contribution of parameters are confirmed through analysis of variance (ANOVA) and Pareto charts. © 2021, Springer Nature Singapore Pte Ltd.

Author keywords

Laser beam machining process and ANOVA | Molybdenum metal matrix | Rhenium diboride | Stir casting method

ISSN: 21954356
ISBN: 978-981154738-6
Source Type: Book Series
Original language: English

DOI: 10.1007/978-981-15-4739-3_64
Document Type: Conference Paper
Volume Editors: Arockiarajan A.,Duraiselvam M.,Raju R.
Publisher: Springer Science and Business Media Deutschland GmbH

Marichamy, S.; Department of Mechanical Engineering, Sri Indu College of Engineering & Technology, Hyderabad, Telangana, India;

SciVal Topic Prominence

Topic:

Document details - Phytogenic synthesis of Co₃O₄ nanorods and its application in biomolecule sensing and antifungal activity

Inorganic Chemistry Communications

Volume 123, January 2021, Article number 108305

Phytogenic synthesis of Co_3O_4 nanorods and its application in biomolecule sensing and antifungal activity(Article)

Muthukumar, T., Arumugam, E., Chandrasekaran, S., Karuppiah, C., Kodirajan, S.

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Abstract

An efficient, ease, and environmentally friendly method has been developed using Ocimum tenuiflorum leaf extract as reducing agent to prepare Co_3O_4 nanorods. The synthesized nanorods have been characterized by using various physicochemical techniques such as XRD, FTIR, TG-DTA, TEM, XPS and evaluated the biological sensing activity of Co_3O_4/GCE as electrocatalyst against glucose and dopamine etc. Electrochemical measurements reveal that Co_3O_4/GCE exhibited excellent electrocatalytic activity towards glucose with two different linear counter part, i.e., 200 nM – 110 μM (R^2 = 0.9996) & 160 μM – 5.91 mM (R^2 = 0.9873). The developed glucose sensor reveals the lowest limit of detection level and sensitivity of glucose is about 50 nM and 1301.39 $\mu AmM^{-1}cm^{-2}$, respectively in short response time. The Co_3O_4/GCE sensor also exhibited electrocatalytic activity towards dopamine with wide response range of 500 nM to 407 μM with the correlation coefficient of R^2 = 0.9939 and the sensitivity of Co_3O_4/GCE calculated to 0.24 $\mu A\mu M^{-1}cm^{-2}$ and the sensor exhibits the detection limit to dopamine around 240 nM. The cobalt oxide nanorods show more potent fungal activity towards the Aspergillus niger and Candida albicans as the standard used.

Author keywords

Antifungal activity | Cobalt oxide | Glucose/dopamine sensing | Nanorods | Ocimum tenuiflorum

Funding details

Funding sponsor	Funding number	Acronym
	DST-SB/EMEQ)-215/2013,UGC-MRP 6451/16	

Funding text #1

Dr. A.E expresses his gratitude's to the Management of Thiagarajar College and financial support by DST, Govt of India, (DST-SB/EMEQ)-215/2013 and UGC, Govt of India (UGC-MRP 6451/16(SERO/UGC)).

Funding text #2

Dr. A.E expresses his gratitude's to the Management of Thiagarajar College and financial support by DST, Govt of India, (DST-SB/EMEQ)-215/2013 and UGC, Govt of India (UGC-MRP 6451/16(SERO/UGC)).

ISSN: 13877003
CODEN: ICCOF
DOI: 10.1016/j.inoche.2020.108305
Document Type: Article

Document details - Internet of Medical Things (IoMT) Enabled Skin Lesion Detection and Classification Using Optimal Segmentation and Restricted Boltzmann Machines

Studies in Systems, Decision and Control

Volume 311, 2021, Pages 195-209

Internet of Medical Things (IoMT) Enabled Skin Lesion Detection and Classification Using Optimal Segmentation and Restricted Boltzmann Machines(Book Chapter)

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Abstract

In recent times, Internet of Medical Things (IoMT) and cloud enabled healthcare applications and services finds helpful for effective decision-making. Melanoma is the serious kind of skin cancer, results to high death rate. Earlier identification of skin cancer can leads to maximum survival rate. But the diagnosis process becomes difficult and expensive because of the need of medical experts and complex medical equipments. To overcome this issue, the latest developments in IoMT based decision making system with maximum performance can be used. This study introduces a new IoMT based skin lesion detection and classification model using Optimal Segmentation and Restricted Boltzmann Machines (RBM), named OS-RBM model. The proposed OS-RBM model involves a series of steps namely image acquisition, gaussian filtering (GF) based preprocessing, segmentation, feature extraction, and classification. Then, optimal segmentation using artificial bee colony (ABC) with kapur's thresholding takes place. Besides, histogram and texture feature extraction will be carried out. Finally, RBM is applied as a classifier to detect and classify the existence of skin lesion in the dermoscopic images. A detailed simulation analysis takes place for ensuring the better outcome of the OS-RBM model and the results are assessed under diverse performance measures. The experimental outcome ensured the effective classification performance of the OS-RBM model with the maximum sensitivity of 96.43%, specificity of 97.95% and accuracy of 95.68%. © 2021, The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Switzerland AG.

Author keywords

Classification | Deep learning | Restricted Boltzmann machine | Segmentation | Skin lesion

ISSN: 21984182
Source Type: Book Series
Original language: English
DOI: 10.1007/978-3-030-55833-8_12
Document Type: Book Chapter
Publisher: Springer Science and Business Media Deutschland GmbH

Sheeba Rani, S.; Department of EEE, Sri Krishna College of Engineering and Technology, Coimbatore, India;

Document details - Invasive Weed Optimized Area Centralized 2 Degree of Freedom Combined PID Controller Scheme for Automatic Generation Control

Journal of Electrical Engineering and Technology

Volume 16, Issue 1, January 2021, Pages 31-42

Invasive Weed Optimized Area Centralized 2 Degree of Freedom Combined PID Controller Scheme for Automatic Generation Control(Article)

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Abstract

Frequency disturbances caused by load perturbations of multi area interconnected power system are reduced by using proper control schemes provided via secondary control loop along with primary control of generation plants. These secondary controllers provide simultaneous control signal to individual machines of a particular area when the control scheme is area centralized. This area centralized mechanism provides quick control action with less computational burden since control problem dimensions gets reduced even the area consists multiple plants/machines. Such centralized new cascade control scheme is proposed in this paper to supervise the secondary control mechanism and it is implemented with parallel connection of 2-Degree of Freedom Proportional-Integral-Derivative (2-DOF PID) controller combined with regular PID controller. The performance of this new controller is studied on multi area multi machine interconnected power system with participation factor concept and later its relative performance in terms of dynamic and steady state specifications are compared with conventional PID and 2-DOF PID controllers. These control parameters are tuned by Invasive Weed Optimization (IWO) algorithm to achieve better system outputs. Case studies presented in this paper show the advantages of proposed control scheme.

Author keywords

2-DOF-PID controller | Automatic generation control (AGC) | Invasive weed optimization algorithm

Indexed keywords

Engineering controlled terms: Cascade control systems | Centralized signal control | Degrees of freedom (mechanics) | Electric connectors | Electric control equipment | Electric power system control | Electric power system interconnection | Proportional control systems | Three term control systems | Two term control systems | Weed control

Engineering uncontrolled terms: 2 degree of freedoms | Automatic generation control | Frequency disturbances | Invasive weed optimization | Participation factors | Proportional integral derivatives | Secondary control mechanism | Simultaneous control

Engineering main heading: Controllers

Document details - Development and Implementation of the Smart Energy Monitoring System Based on IoT

Lecture Notes in Electrical Engineering

Volume 688, 2021, Pages 513-525

2nd International Conference on Power Engineering, Computing and Control, PECCON 2019; Chennai; India; 12 December 2019 through 14 December 2019; Code 249049

Development and Implementation of the Smart Energy Monitoring System Based on IoT(Conference Paper)

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Abstract

This paper is designed to measure energy consumption in home and buildings and to generate its bill automatically. It is accomplished by utilizing a smart energy meter with the Internet of things (IoT) technology, which will permit the user to successfully observe the energy meter calibrations and verify the electricity bill via the online. Our projected scheme utilizes Arduino to track utilized energy and to send out the units along the cost charged over the Internet. The Liquid Crystal Display (LCD) module is interfaced with Arduino, and the measured voltage, current, power, and the corresponding bill are displayed to the consumers. Arduino also sends data to the Adafruit cloud using the Wi-Fi module NodeMCU ESP-12. This smart meter will permit both the consumer and electricity supplier to ensure the energy usage quickly among the cost charged online. Power cost analysis of a month for a smart home is done in a separate section. Finally, the hardware is implemented with various loads, and results are displayed via LCD. © 2021, Springer Nature Singapore Pte Ltd.

Author keywords

Ada fruit cloud | Arduino | Energy meter | Internet of things | LCD | TNEB

Indexed keywords

Engineering controlled terms: Automation | Cost benefit analysis | Electric measuring instruments | Electric power measurement | Electric utilities | Energy utilization | Liquid crystal displays | Liquid crystals

Engineering uncontrolled terms: Electricity bill | Energy meters | Energy usage | Internet of thing (IOT) | Liquid crystal display(LCD) | Measured voltages | Smart energies | Smart energy meters

Engineering main heading: Internet of things

Document details - A novel dimensionality reduction approach for ECG signal via convolutional denoising autoencoder with LSTM

Biomedical Signal Processing and Control

Volume 63, January 2021, Article number 102225

A novel dimensionality reduction approach for ECG signal via convolutional denoising autoencoder with LSTM(Article)

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Abstract

Typical IoT based e-health scenarios use resource constrained wearable device to facilitate ubiquitous long-term monitoring for chronic conditions like cardiovascular disease (CVD). Electrocardiogram (ECG) is an efficient indicator to diagnose patients with CVD. In wearable technology, the signal transmission cost is high and the observed ECG signal is likely to be contaminated with noise. To amend this, an efficient lightweight signal compression scheme is designed to reduce the signal size before transmitting it and thereby reducing the transmission cost and allow long-term monitoring. In this paper, an edge based novel approach is proposed by combining convolutional denoising autoencoder (CDAE) and long short-term memory (LSTM) for ECG signal compression. A single layered LSTM network is added to the end of encoder section of the CDAE, instead of adding several convolutional filters and pooling layers. In which, the number of trainable parameters of the model are reduced and in turn lessen the computation time. Also, the LSTM network learns the order dependencies between the data that helps to reconstruct the data from its compressed form. In the meantime, the proposed algorithm denoises the signal as it employs Denoising Autoencoder architecture. The experiments are conducted on ECG signal taken from MIT-BIH Arrhythmias Database. The experimental result shows that the proposed method is efficient by achieving compression ratio of 64 with better reconstruction quality score of 15.61 which is higher than state-of-the-art methods. As well the proposed method is lightweight when compared with baseline methods CDAE and stacked autoencoder in terms of computation cost.

Author keywords

Convolutional denoising autoencoder | Electrocardiogram | Energy efficiency | Long short-term memory | Signal compression | Wearable device

Indexed keywords

Engineering controlled terms: Convolution | Dimensionality reduction | Electrocardiography | Learning systems | Light transmission | Long short-term memory | Network layers | Signal denoising | Wearable technology

Engineering uncontrolled terms: Cardiovascular disease | Long term monitoring | Mit-bih arrhythmias database | Reconstruction quality | Signal compression | Signal transmission | State-of-the-art methods | Transmission costs

Engineering main heading: Biomedical signal processing

Document details - FPGA Design of SAR Type ADC Based Analog Input Module for Industrial Applications

Lecture Notes in Electrical Engineering

Volume 676, 2021, Pages 97-113

International Conference on Advances in VLSI and Embedded Systems, AVES 2019; Surat; India; 20 December 2019 through 21 December 2019; Code 244619

FPGA Design of SAR Type ADC Based Analog Input Module for Industrial Applications(Conference Paper)

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Abstract

Programmable logic controller (PLC) is connected with analog and digital input and output modules to process physical variables which are to be maintained at the desired values. Each module has a processor to process analog or digital signals. This paper has designed analog input module (AIM) using field programmable gate array (FPGA). It has used a digital to analog converter (DAC), comparator and FPGA for a single channel analog to digital converter (ADC). It becomes an analog input module (AIM) when a DAC and comparator are added to FPGA for every addition of a channel. Conversion time of a processor based AIM is $n*t_c$ where 'n', 't_c' are the number of channels and conversion time of ADC respectively. Conversion time of 'n' channel FPGA based AIM is 't_c' as all the analog signals are processed concurrently. The design was experimented using Multisim software and the conversion time of eight channels ADC was identified 0.13 ms. © 2021, Springer Nature Singapore Pte Ltd.

Author keywords

ADC FPGA Microprocessor Programmable logic controller

Indexed keywords

Engineering controlled terms: Analog to digital conversion, Birds, Comparator circuits, Comparators (optical), Digital to analog conversion, Embedded systems, Integrated circuit design, VLSI circuits

Engineering uncontrolled terms: Analog signals, Analog to digital converters, Conversion time, Digital inputs, Digital signals, Physical variables, Programmable logic controllers (PLC), Single channels

Engineering main heading: Field programmable gate arrays (FPGA)

ISSN: 18761100
ISBN: 978-981156228-0
Source Type: Book Series
Original language: English

DOI: 10.1007/978-981-15-6229-7_8
Document Type: Conference Paper
Volume Editors: Patel Z.,Gupta S.,Kumar Y.B. N.

Medicinal Research Reviews • *Open Access* • Volume 41, Issue 1, Pages 72 - 135 • January 2021

Document type
Review • *Hybrid Gold Open Access* • *Green Open Access*

Source type
Journal

ISSN
01986325

DOI
10.1002/med.21724

View more

The recent outbreaks of human coronaviruses: A medicinal chemistry perspective

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Abstract

Coronaviruses (CoVs) infect both humans and animals. In humans, CoVs can cause respiratory, kidney, heart, brain, and intestinal infections that can range from mild to lethal. Since the start of the 21st century, three β-coronaviruses have crossed the species barrier to infect humans: severe-acute respiratory syndrome (SARS)-CoV-1, Middle East respiratory syndrome (MERS)-CoV, and SARS-CoV-2 (2019-nCoV). These viruses are dangerous and can easily be transmitted from human to human. Therefore, the development of anticoronaviral therapies is urgently needed. However, to date, no approved vaccines or drugs against CoV infections are available. In this review, we focus on the medicinal chemistry efforts

Document details - Efficient Target Detection and Classification of SAR Images Using Z-Buffer Convolutional Neural Networks

Smart Innovation, Systems and Technologies

Volume 182, 2021, Pages 449-458

4th International Conference on Smart Trends for Computing and Communications, SmartCom 2020; Bangkok; Thailand; 24 January 2020 through 25 January 2020; Code 242589

Efficient Target Detection and Classification of SAR Images Using Z-Buffer Convolutional Neural Networks(Conference Paper)

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Abstract

Target detection and classification for military, geographical, and other scientific research areas are the demanding requirement. This paper aims to detect the targets effectively as well as enhances the quality of detected image before classification by deep learning techniques. A Z-buffer convolutional neural network (Z-BCNN) model consisting of two phases is more suitable for target detection, and classification of SAR image is proposed in this paper. In the first phase, the region of interest (ROI) is extracted from the background of the SAR image by means of cavity detection algorithm and elliptical Fourier descriptors are computed to describe the characteristics of target outline, whereas in the second phase, the noise present in the detected SAR image is reduced by using wavelet transform-based brute force thresholding algorithm with directional smoothing. Afterward the detection of hidden targets, classification of military vehicles from SAR images is done by using Z-buffer convolutional neural network. The proposed methodology gives significant results in terms of classification accuracy compared with the other existing algorithms. © 2021, The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author keywords

Cavity detection algorithm | Elliptical Fourier descriptors | Synthetic aperture radar (SAR) image | Wavelet-based brute force thresholding | Z-buffer convolutional neural network

Indexed keywords

Engineering controlled terms: Convolution | Convolutional neural networks | Deep learning | Image classification | Image enhancement | Image segmentation | Military photography | Military vehicles | Radar target recognition | Synthetic aperture radar | Wavelet transforms

Engineering uncontrolled terms: Cavity detection | Classification accuracy | Fourier descriptors | Learning techniques | Scientific researches | Target detection and classifications | The region of interest (ROI) | Thresholding algorithms

Engineering main heading: Radar imaging

Document details - Design and simulation of flexible jute antenna with performance validation on bending and soaking conditions

Textile Research Journal

Volume 91, Issue 1-2, January 2021, Pages 219-231

Design and simulation of flexible jute antenna with performance validation on bending and soaking conditions(Article)

Pandimadevi, M., Tamilselvi, R., Parisa Beham, M.

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Abstract

Recently, there has been an abrupt increase in the integration of community antenna to flexible, textile and wearable applications. The proposed work introduces the design of a flexible wearable patch antenna using a jute fiber substrate for better performance. The antenna has been designed and simulated with jute substrate at the operating frequency of 3.23 GHz. The antenna has been fabricated and tested under normal, wet, on-hand and bending conditions using a vector network analyzer. The various parameters such as reflection coefficient parameter and voltage standing wave ratio of the fabricated antenna are measured and compared with the simulation results. The tested results show that the performance of the antenna under normal, wet, on-hand and bending conditions is almost approximately equal. Due to better performance in soaking and bending conditions as well as low cost and adequate availability of jute material, the proposed antenna can be used in various applications such as biomedical, military, radio location, ground radar, search and rescue applications, and more. © The Author(s) 2020.

Author keywords

antenna | flexible | jute | soaking | wearable | wet condition

Indexed keywords

Engineering controlled terms: Electric network analyzers | Jute fibers | Microstrip antennas | Microwave antennas | Military applications | Radar antennas | Slot antennas

Engineering uncontrolled terms: Design and simulation | Operating frequency | Performance validation | Search-and-rescue applications | Soaking conditions | Vector network analyzers | Voltage standing-wave ratio | Wearable applications

Engineering main heading: Wearable antennas

PaperChem Variable: Bending | Fibers | Integration | Jute | Performance | Radio | Simulation | Soaking

ISSN: 00405175
CODEN: TRJOA
Source Type: Journal
Original language: English

DOI: 10.1177/0040517520935978
Document Type: Article
Publisher: SAGE Publications Ltd

Document details - A novel synthetic aperture radar image change detection system using radial basis function-based deep convolutional neural network

Journal of Ambient Intelligence and Humanized Computing

Volume 12, Issue 1, January 2021, Pages 897-910

A novel synthetic aperture radar image change detection system using radial basis function-based deep convolutional neural network(Article)

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Abstract

Today, the automatic change detection and also classification as of the Synthetic Aperture Radar (SAR) images remain a hard process. In the existing research, the availability of Speckle Noise (SN), high time-consumption, and low accuracy are the chief issues. To resolve such issues, this paper proposed a novel SAR image change detection system utilizing a Radial Basis Function-based Deep Convolutional Neural Network (RBF-DCNN). The proposed methodology comprises six phases, namely, pre-processing, obtaining difference image, pixel-level image fusion, Feature Extraction (FE), Feature Selection (FS), and also change detection (CD) utilizing the classifier. Initially, the noise is eliminated as of the input, SAR image 1 and SAR image 2, utilizing the NLMSTAF approach. Subsequently, the difference image is attained by utilizing a Log-ratio operator (LRO) and Gauss-LRO, and the attained difference image is then fused. Next, the LTrP, WST, edge, and MSER features are extracted from the fused image. As of those features that were extracted, the necessary features are selected utilizing the Hybrid GWO-GA algorithm. The features (selected) are finally inputted to the RBF-DCNN classifier for detecting the changes in an image. Experimental outcomes established that the proposed work renders better performance on considering the existing system.

Author keywords

Gauss-log-ratio operator | Hybrid Gray Wolf optimization-genetic algorithm (Hybrid GWO-GA) | Local tetra pattern (LTrP) | Log-ratio | Maximally stable external region (MSER) | Non local mean spatio temporal adaptive filtering (NLMSTAF) | Radial basis function-deep convolutional neural network (RBF-DCNN) | Wavelet statistical transform (WST)

Indexed keywords

Engineering controlled terms: Convolution | Convolutional neural networks | Deep neural networks | Feature extraction | Functions | Image fusion | Image processing | Radial basis function networks | Synthetic aperture radar | Tracking radar

Engineering uncontrolled terms: Automatic change detection | Change detection | Difference images | Existing systems | Pixel-level image fusion | Radial basis functions | Synthetic aperture radar (SAR) images | Time consumption

Engineering main heading: Radar imaging

Document details - A New Nanocomposite Electrode of Carbon Quantum Dots Doped Functionalized Multi-walled Carbon Nanotubes for Lethal Mercury Sensing

Journal of Cluster Science

Volume 32, Issue 1, January 2021, Pages 135-144

A New Nanocomposite Electrode of Carbon Quantum Dots Doped Functionalized Multi-walled Carbon Nanotubes for Lethal Mercury Sensing(Article)

RasulKhan, B.B., Periakaruppan, P., Ponnaiah, S.K., Venkatachalam, G., Jeyaprabha, B.

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Abstract

In this work, a new nanocomposite, carbon quantum dots (CQD) functionalized multi-walled carbon nano tubes (f-MWCNTs), was prepared by facile sonochemical treatment of CQD and f-MWCNTs. The synthesized CQD@f-MWCNTs was then used as a novel electrode material to construct a non-enzymatic electrochemical sensor for selective and sensitive detection of toxic mercury (Hg^{2+}) ions. Due to the high catalytic activity of carbon based CQD and the excellent charge transfer property between acid groups of the ligands in f-MWCNTs, the obtained sensor exhibited high sensitivity for Hg^{2+} detection under optimum experimental conditions. A linear relationship between the current and toxic Hg^{2+} concentration was shown in the range of 1.0 nM to 12.0 nM with the corresponding sensitivity of 59.16 μAmM^{-1}. In addition, the limit of detection was calculated to be 0.5 nM (S/N = 3). Furthermore, with the advantages of good repeatability, stability and selectivity, the fabricated sensor could be applied to detect Hg^{2+} successfully in real samples such as river, industrial and tap waters. The results obtained from this study will certainly accelerate the applications of CQD@f-MWCNTs in the electrochemical field and provide insights into design of multifunctional non-enzymatic sensing materials for various applications in bio-catalysis, bio-analysis and water testing. © 2020, Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

DPV analysis | Electrochemical sensor | Mercury detection | Modified glassy carbon electrode

ISSN: 10407278
Source Type: Journal
Original language: English
DOI: 10.1007/s10876-020-01770-2
Document Type: Article
Publisher: Springer

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SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Physico-chemical and Mechanical Properties of Alkali-Treated Red Banana Peduncle Fiber

Journal of Natural Fibers

Volume 18, Issue 12, 2021, Pages 2102-2111

Physico-chemical and Mechanical Properties of Alkali-Treated Red Banana Peduncle Fiber(Article)

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Abstract

The aim of this present investigation is to improve the properties of natural fiber from red banana peduncle plant by alkali treatment for the first time. The main objective of this paper was to study the physico-chemical, thermal, and mechanical properties which are chemically modified by alkaline treatment of red banana peduncle fiber (ARBPF), which is used as a reinforcement in the polymer matrix and finally to make an end product for various industrial applications. The result indicates that cellulose content was improved in ARBPF when compared to untreated red banana peduncle fiber which is proved through X-ray diffraction (XRD) studies recording high crystalline index in fibers. The thermal property of ARBPF also exhibiting good thermal stability was observed by thermo-gravimetric analysis (TGA), atomic force microscopy (AFM) analysis confirmed that the surface of the fiber is rough. © 2020 Taylor & Francis.

Author keywords

AFM ARBPF FT-IR physico-chemical properties TGA Analysis XRD

Indexed keywords

Engineering controlled terms: Alkalinity Atomic force microscopy Fruits Gravimetric analysis Mechanical properties Thermogravimetric analysis X ray diffraction

Engineering uncontrolled terms: Alkaline treatment ARBPF Cellulose content Chemically modified Crystalline index Physico-chemical and mechanical properties Physico-chemicals TGA Analysis

Engineering main heading: Fibers

PaperChem Variable: Alkalinity Fruits Gravimetry Mechanical Properties Thermal Analysis X Ray Diffraction

ISSN: 15440478
Source Type: Journal
Original language: English
DOI: 10.1080/15440478.2020.1723777
Document Type: Article
Publisher: Taylor and Francis Ltd.

Document details - Characterization Studies of Natural Cellulosic Fibers Extracted from Shwetark Stem

Journal of Natural Fibers

Volume 18, Issue 11, 2021, Pages 1934-1945

Characterization Studies of Natural Cellulosic Fibers Extracted from Shwetark Stem(Article)

Raja, K., Prabu, B., Ganeshan, P., Chandra Sekar, V.S., NagarajaGanesh, B.

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Abstract

The present investigation is mainly aimed to characterize the cellulosic fibers extracted from the stem of Shwetark plant to test its possibility to be used as polymeric reinforcement. Chemical analysis conducted on the Shwetark fibers shows the presence of cellulose (69.65 wt. %), lignin (16.82 wt. %), wax (0.53 wt. %), ash (3.4 wt. %) and wetness content (8.8 wt. %). The density of the fibers is found as 1.364 g/cm^3. Crystallinity index and the crystallite size of the fibers are calculated as 72.06% and 3nm, respectively, from X-ray diffraction analysis while the presence of functional groups is ascertained from Fourier transform infrared analysis. Thermogravimetric analysis shows that the fibers are thermally stable till 225°C, and the fiber morphology seen through scanning electron microscopic shows that the fibers are composed of densely and uniformly packed cellulose microfibrils. Atomic force microscopic studies exemplify that Shwetark fibers can be used for tribological applications. The mean tensile strength and percentage elongation of the Shwetark fibers are found as 309.68 MPa and 1.092%, respectively. Thus, the studies show the possibility of Shwetark fibers as prospective candidates to replace harmful synthetic man-made fibers.

Author keywords

atomic force microscopy | chemical analysis | FT-IR analysis | Shwetark fibers | thermogravimetric analysis (TGA) | X-ray diffraction

Indexed keywords

Engineering controlled terms: Atomic force microscopy | Cellulose | Chemical analysis | Crystallinity | Crystallite size | Fibers | Tensile strength | X ray diffraction | X ray powder diffraction

Engineering uncontrolled terms: Cellulose microfibrils | Characterization studies | Crystallinity index | Fourier transform infra reds | FTIR analysis | Percentage elongation | Scanning electron microscopic | Tribological applications

Engineering main heading: Thermogravimetric analysis

PaperChem Variable: Cellulose | Chemical Analysis | Crystallinity | Fibers | Gravimetry | Tensile Strength | Thermal Analysis | X Ray Diffraction

Document details - Structural and Thermal Properties of Chemically Modified Luffa Cylindrica Fibers

Journal of Natural Fibers

Volume 18, Issue 7, 2021, Pages 1038-1044

Structural and Thermal Properties of Chemically Modified Luffa Cylindrica Fibers(Article)

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View additional affiliations

Abstract

This present investigation is aimed at understanding the impact of various chemical treatments on the physicochemical properties of Luffa cylindrica fibers (LCFs). One of the major disadvantages of natural fiber as reinforcement materials in polymer composites is the incompatibility of hydrophilic nature of natural fiber and hydrophobic nature of polymers. So in this investigation, LCFs were pre-treated using optimal alkali solution followed by individual treatments with potassium permanganate, benzoyl peroxide and stearic acid to reduce the hydrophobic nature of LCF to use as reinforcement materials in composites which can be used for semi-structural applications such as household products, construction and building materials, car-interior components, etc. Further, the physicochemical properties of chemically modified LCFs were studied using thermogravimetric analysis (TGA) and X-ray diffraction (XRD). It was noticed that all modified LCFs improved crystallinity and thermal stability. Moreover, the stearic acid treatment promoted the superior thermal stability of LCFs. © 2019 Taylor & Francis.

Author keywords

Chemical treatment | crystallinity index | Luffa cylindrica fibers | thermogravimetric analysis

Indexed keywords

Engineering controlled terms: Benzoyl peroxide | Chemical analysis | Crystallinity | Hydrophobicity | Natural fibers | Natural polymers | Physicochemical properties | Potash | Reinforcement | Stearic acid | Thermodynamic stability

Engineering uncontrolled terms: Chemical treatments | Chemically modified | Crystallinity index | Household products | Luffa cylindrica | Potassium permanganate | Reinforcement materials | Structural applications

Engineering main heading: Thermogravimetric analysis

PaperChem Variable: Chemical Analysis | Crystallinity | Gravimetry | Natural Fibers | Natural Polymers | Potassium Carbonate | Thermal Analysis | Water Repellence

Document details - Influence of Natural Filler on Mechanical Properties of Hemp/Kevlar Hybrid Green Composite and Analysis of Change in Material Behavior Using Acoustic Emission

Journal of Natural Fibers

Volume 18, Issue 11, 2021, Pages 1580-1591

Influence of Natural Filler on Mechanical Properties of Hemp/Kevlar Hybrid Green Composite and Analysis of Change in Material Behavior Using Acoustic Emission(Article)

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Abstract

This work is focused on development of hybrid composites with better toughness and hardness by including natural filler reinforcements. The changes in the behavior of the composite due to filler inclusion were evaluated through acoustic emission technique to reveal the mechanism behind the improvement in properties. The hybrid composite was developed with Hemp/Kevlar fibers in (60:40) ratio by weight as reinforcement. To improve the shock resistance, bio-fillers palm and coconut shell mixture in (1:1) ratio was added to the matrix at different wt.% of resin. Characterization of the material was carried out after the flexural, impact and hardness tests. © 2019 Taylor & Francis.

Author keywords

acoustic emission | hemp | hybrid composite | impact | Kevlar

Indexed keywords

Engineering controlled terms: Acoustic emissions | Fillers | Hardness | Hemp | Reinforcement

Engineering uncontrolled terms: Acoustic emission techniques | Green composites | Hybrid composites | impact | Kevlar | Material behavior | Natural fillers | Shock resistance

Engineering main heading: Hemp fibers

PaperChem Variable: Aramide Fibers | Fillers | Hardness | Hemp | Impact | Reinforcement

ISSN: 15440478
Source Type: Journal
Original language: English
DOI: 10.1080/15440478.2019.1692321
Document Type: Article
Publisher: Taylor and Francis Ltd.

Document details - Physico-Chemical Properties of Fiber Extracted from the Flower of Celosia Argentea Plant

Journal of Natural Fibers

Volume 18, Issue 3, 2021, Pages 464-473

Physico-Chemical Properties of Fiber Extracted from the Flower of Celosia Argentea Plant(Article)

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Abstract

This study was aimed at understanding the characteristics of Celosia argentea fiber (CAF) and its physicochemical properties. The physicochemical properties of CAF were analyzed by FT-IR, XRD, TGA, SEM, and AFM analysis. Cellulose content (64.34wt.%), density (843 kg/m^3) and crystallinity index (52.54%) properties were identified in the CAF while the thermal studies performed by TG and DTG technique revealed that the maximum degradation temperature is 324°C with a kinetic activation energy of 61.393 kJ/mol. From the results, it is evident that the CAF could be one of the future reinforcement materials for green composites applications. © 2019 Taylor & Francis.

Author keywords

AFM | Celosia argentea flower fiber | FTIR | SEM | TGA | XRD

Indexed keywords

Engineering controlled terms: Activation energy | Crystallinity | Room and pillar mining | Scanning electron microscopy | X ray diffraction

Engineering uncontrolled terms: AFM analysis | Cellulose content | Crystallinity index | Degradation temperatures | FTIR | Green composites | Reinforcement materials | Thermal study

Engineering main heading: Physicochemical properties

PaperChem Variable: Activation Energy | Cellulose Content | Crystallinity | Fibers | Reinforcement | Scanning Electron Microscopy | X Ray Diffraction

Funding details

Funding sponsor	Funding number	Acronym
King Mongkut's University of Technology North Bangkok	KMUTNB-63-KNOW-001	KMUTNB