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 2022

Document details - Copper substitution effect on the structural, electrical, and magnetic properties of manganese and lanthanum (Mn_{1–x}Cu_xLa_{0.1}Fe_{1.9}/... nanoferrites

Journal of Alloys and Compounds

Volume 925, 5 December 2022, Article number 166717

Copper substitution effect on the structural, electrical, and magnetic properties of manganese and lanthanum ($Mn_{1-x}Cu_xLa_{0.1}Fe_{1.9}O_4$) nanoferrites(Article)

Palaniappan, P., Lenin, N., Uvarani, R.

[a]Department of Physics, Thiruvalluvar Government Arts College, Namakkal, Rasipuram, Tamil Nadu 637401, India
[b]Department of Physics, Sethu Institute of Technology, Tamil Nadu, Kariapatti, 626115, India

Abstract

In this study, a sonochemical reactor was used to synthesize $Mn_{1-x}Cu_xLa_{0.1}Fe_{1.9}O_4$ nanoferrites with different compositions of x (0.09, 0.18, 0.27, and 0.36). $Mn_{1-x}Cu_xLa_{0.1}Fe_{1.9}O_4$ nanoferrites were subjected to X-ray diffraction (XRD), field-emission scanning electron microscopy (FESEM), vibrating sample magnetometer, and electrochemical impedance spectroscopy to investigate their magnetic, electrical, and structural properties. Formation of a cubic crystalline structure was observed by the XRD patterns. The decreases in crystalline size could have been caused by an increase in Cu^{2+} ions in $Mn_{1-x}Cu_xLa_{0.1}Fe_{1.9}O_4$ nanoferrites. The impedance analysis revealed the presence of pseudocapacitance and resistive behavior in $Mn_{1-x}Cu_xLa_{0.1}Fe_{1.9}O_4$ nanoferrites. The hysteresis loops promoted the soft ferromagnetic behavior present in $Mn_{1-x}Cu_xLa_{0.1}Fe_{1.9}O_4$ nanoferrites. A decrease in saturation magnetization and an increase in coercivity were observed with an increase in the Cu^{2+} content of $Mn_{1-x}Cu_xLa_{0.1}Fe_{1.9}O_4$ nanoferrites.

Author keywords

Crystal structure | Impedance spectroscopy | Magnetic materials | Magnetic properties | X-ray diffraction

Indexed keywords

Engineering controlled terms: Copper | Crystal structure | Electrochemical impedance spectroscopy | Field emission microscopes | Lanthanum | Magnetic materials | Magnetic properties | Manganese | Nickel | Saturation magnetization | Scanning electron microscopy | Structural properties

Engineering uncontrolled terms: Copper substitution | Crystals structures | Diffraction fields | Electrical and magnetic property | Field emission scanning electron microscopy | Impedance spectroscopy | Nanoferrites | Sonochemical reactors | Substitution effect | X- ray diffractions

Engineering main heading: X ray diffraction

Funding details

Funding text

Document details - Partial correlation of optical, electrical and magnetic properties of nanosized Zn–Cr–La ferrite particles synthesized by sonochemical method

Materials Today Communications

Volume 33, December 2022, Article number 104500

Partial correlation of optical, electrical and magnetic properties of nanosized Zn–Cr–La ferrite particles synthesized by sonochemical method(Article)

Sivabharathy, M., Shree, S.A., Lenin, N., Praveen, B.M., Aithal, P.S., Kannan, R.R., Kumar, A.S., Ramachandran, K.

[a]College of Engineering and Technology, Srinivas University, Mangalore, 574 146, India
[b]Department of Physics, Sethu Institute of Technology, Tamil Nadu, Kariapatti, 626 115, India
[c]Department of Nano Science and Technology, K.S. Rangasamy College of Technology, Tamil Nadu, Tiruchengode, 637 215, India

View additional affiliations

Abstract

$Zn_{0.5}Cr_{0.5}La_xFe_{2-x}O_4$ nanoferrites with varied compositions of x = 0.03, 0.06, 0.09, and 0.12 were synthesized using an effective sonochemical reactor. The powders resulting from this synthesis were characterized by X-ray diffraction (XRD) and scanning electron microscopy, energy dispersive X-ray spectroscopy, and their electrical and magnetic properties examined by electrochemical impedance spectroscopy and vibrating sample magnetometer, respectively. The XRD analysis confirms the creation of cubic crystalline structure with the crystallite size from 38 (x = 0.12) to 57 (x = 0.03) nm. The lattice constant of the ferrite nanoparticles is found to decrease with La content. Using XRD patterns, the development of a cubic crystalline structure was revealed. An increase in the amount of La^{3+} ions in $Zn_{0.5}Cr_{0.5}La_xFe_{2-x}O_4$ nanoferrites could explain the decrease in crystalline size. In $Zn_{0.5}Cr_{0.5}La_xFe_{2-x}O_4$ nanoferrites, impedance investigation revealed the presence of pseudo-capacitance and resistive behavior. The conductivity of $Zn_{0.5}Cr_{0.5}La_xFe_{2-x}O_4$ nanoferrites was also slightly reduced when La^{3+} ions were added. The soft ferromagnetic behavior of $Zn_{0.5}Cr_{0.5}La_xFe_{2-x}O_4$ nanoferrites was aided by the hysteresis loops. An increase in the La content of $Zn_{0.5}Cr_{0.5}La_xFe_{2-x}O_4$ nanoferrites resulted in a decrease in saturation magnetization and an increase in coercivity.

Author keywords

Crystal structure | Impedance spectroscopy | Magnetic materials | Pseudo-capacitance | X-ray diffraction

Indexed keywords

Engineering controlled terms: Capacitance | Chromium compounds | Crystal structure | Crystallite size | Electrochemical impedance spectroscopy | Energy dispersive spectroscopy | Iron compounds | Lanthanum compounds | Magnetic materials | Nickel compounds | Particle size analysis | Saturation magnetization | Scanning electron microscopy | Zinc compounds

Engineering uncontrolled terms: Crystalline structure | Crystals structures | Cubic crystalline | Electrical and magnetic property | Impedance spectroscopy | La 3+ | Nanoferrites | Pseudo capacitances | Synthesised | X- ray diffractions

Engineering main heading: X ray diffraction

Document details - Influence of Severe Double-Shot Peening and Plasma Spray Arc TiAlCr /AlCrSi Coating on Tribological Behaviour of Pure Aluminium Alloy

Journal of Inorganic and Organometallic Polymers and Materials

Volume 32, Issue 12, December 2022, Pages 4729-4742

Influence of Severe Double-Shot Peening and Plasma Spray Arc TiAlCr /AlCrSi Coating on Tribological Behaviour of Pure Aluminium Alloy(Article)

Devanand, S., Senthil Kumar, A., Selvabharathi, R.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, India
[b]Department of Mechanical Engineering, P.S.R Engineering College, Tamil Nadu, Sivakasi, India

Update notice

Author Correction: Influence of Severe Double-Shot Peening and Plasma Spray Arc TiAlCr/AlCrSi Coating on Tribological Behaviour of Pure Aluminium Alloy (Journal of Inorganic and Organometallic Polymers and Materials, (2022), 32, 12, (4729-4742), 10.1007/s10904-022-02429-3)
(2022) Journal of Inorganic and Organometallic Polymers and Materials, 32 (12), p. 4743.

Abstract

In this research work, the severe double-shot peening (SDSP) and TiAlCr /AlCrSi plasma spray coating were performed on the commercial structural fabrication materials (Aluminium alloy) to improve the microstructure and surface properties. The materials were adapted to the shot peening process; compressive residual stress and microstrain were formed in the outer surface region as a grain size measurement of 25 µm. The oxygen reduction for Plasma spray TiAlCr/AlCrSi coating was implemented at the base materials; Al–Ti eutectic solid phase was directly converted into twin boundaries and Al lattice structure. Oxidation of micrographs revealed the fine grains boundaries, α′delta phase, porous titania ($TiO_{2)}$ surface, and lower surface roughness. Further, a higher hardness value for the oxidation sample was seen compared to base materials which were 36% augmented. Tensile results of SDSP and TiAlCr/AlCrSi coating were observed as the ultimate strength of 389 MPa and 420 MPa, 437 MPa. AlO_2 surface and multiple bonding structures mainly contributed to the tensile strength of samples. Potential dynamic polarization studies were conducted on the three samples using 3.5% NaCl solution under natural environmental conditions to increase the corrosion resistance of the base materials. CrN and Cr_2N did not observe on the outer surface. Further, dimples, voids, and cracks were not formed in the inner and outer surface layers. The plasma spray TiAlCr/AlCrSi coating method showed better results compared to shot peening process samples and increased the high tensile strength and elongation ratio of the fracture faces.

Author keywords

Aluminium alloy | Mechanical properties | Plasma spray coating | Server double-shot peening | Surface Roughness

Document details - Author Correction: Influence of Severe Double-Shot Peening and Plasma Spray Arc TiAlCr/AlCrSi Coating on Tribological Behaviour of Pure Aluminium Alloy (Journal of Inorganic and Organometallic Polymers and Materials, (2022), 32, 12, (4729-4742), 10.1007/s10904-022-02429-3)

Journal of Inorganic and Organometallic Polymers and Materials

Volume 32, Issue 12, December 2022, Page 4743

Author Correction: Influence of Severe Double-Shot Peening and Plasma Spray Arc TiAlCr/AlCrSi Coating on Tribological Behaviour of Pure Aluminium Alloy (Journal of Inorganic and Organometallic Polymers and Materials, (2022), 32, 12, (4729-4742), 10.1007/s10904-022-02429-3)(Erratum)(Open Access)

Devanand, S., Kumar, A.S., Selvabharathi, R.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, India
[b]Department of Mechanical Engineering, P.S.R Engineering College, Tamil Nadu, Sivakasi, India

Original document

Influence of Severe Double-Shot Peening and Plasma Spray Arc TiAlCr /AlCrSi Coating on Tribological Behaviour of Pure Aluminium Alloy

(2022) Journal of Inorganic and Organometallic Polymers and Materials

Abstract

[No abstract available]

ISSN: 15741443
DOI: 10.1007/s10904-022-02504-9
Source Type: Journal
Document Type: Erratum
Original language: English
Publisher: Springer

Devanand, S.; Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Extraction and characterization of natural lignocellulosic fibres from Typha angustata grass

International Journal of Biological Macromolecules

Volume 222, 1 December 2022, Pages 1840-1851

Extraction and characterization of natural lignocellulosic fibres from Typha angustata grass(Article)

Manimaran, P., Vignesh, V., Khan, A., Pillai, G.P., Nagarajan, K.J., Prithiviraj, M., Al-Romaizan, A.N., Hussein, M.A., Puttegowda, M., Asiri, A.M.

[a]Department of Mechanical Engineering, Karpagam Institute of Technology, Tamil Nadu, Coimbatore, 641105, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Tamilnadu, Kariapatti, 626115, India
[c]Center of Excellence for Advanced Materials Research, King Abdulaziz University, Jeddah, 21589, Saudi Arabia

View additional affiliations

Abstract

In recent years, efforts have been made to reduce deforestation to conserve the ecosystem. In the current scenario, agro-cultivated products are used instead of wood for engineering applications. Thus, natural lignocellulosic fibres are used as a reinforcing material and have been extremely attractive to industries and the scientific community during the past few decades. This study aimed to examine the use of natural fibres extracted from Typha angustata grass as reinforcement in polymer matrix composites. The density of the fibres was 1.015 g/cc. Chemical analysis confirmed that T. angustata fibres (TAFs) have a cellulose content of 73.54 wt%, a hemicellulose content of 10.11 wt%, a lignin content of 6.23 wt% and a wax content of 0.23 wt%. The crystallinity index (65.16 %) and crystalline size (6.40 nm) were identified by X-ray diffraction (XRD) analysis. The presence of functional groups in the TAFs was examined by employing Fourier-transform infrared spectroscopy (FTIR). The presence of cellulose at peak intensities of C2, C3 and C5 in the TAFs was confirmed using ^{13}C nuclear magnetic resonance (NMR) spectroscopy. The single fibre tensile test revealed that the tensile strength was 665 ± 7 MPa and Young's modulus was 27.45 ± 3.46 GPa. The thermal stability of the TAFs was examined by thermogravimetric analysis (TGA), and the prominent peak was observed at 298.48 °C, with a kinetic activation energy of 67.99 kJ/mol. The surface roughness of the fibres was analysed by atomic force microscopy (AFM) with an accuracy of 1 nm. The above-mentioned outcomes indicated that the TAFs have desirable properties that are comparable to existing natural fibres and suggested to be utilised as the possible reinforcement to fabricate the fibre-reinforced polymer matrix composites. © 2022 Elsevier B.V.

Author keywords

AFM FTIR NMR Single fibre tensile test TGA Typha angustata fibres XRD

Indexed keywords

EMTREE drug terms: lignin lignocellulose cellulose lignocellulose polymer

EMTREE medical terms: Article atomic force microscopy carbohydrate analysis carbon nuclear magnetic resonance chemical analysis controlled study crystal structure Fourier transform infrared spectroscopy nonhuman physical chemistry tensile strength thermogravimetry Typha Typha angustata X ray diffraction chemistry ecosystem Poaceae Typhaceae

MeSH: Cellulose Ecosystem Poaceae Polymers Typhaceae

Document details - Potential Utilization and Characterization of Epoxy Based Biomaterials under Alkaline Environment

AIP Conference Proceedings

Volume 2516, 30 November 2022, Article number 050001

2nd International Conference on Mathematical Techniques and Applications, ICMTA 2021; Kattankulathur; India; 24 March 2021 through 26 March 2021; Code 184760

Potential Utilization and Characterization of Epoxy Based Biomaterials under Alkaline Environment(Conference Paper)

Velmurugan, G., Dinesh Kumar, N., Perumal, A., Rajkumar, P.R., Gangadharan, T., Sekar, S., Suresh Kumar, S., Siva Shankar, V., Bhagavathi, M.S.

[a]Institute of Agricultural Engineering, Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Tamil Nadu, Chennai, 600105, India
[b]Department of Mechanical Engineering, Velammal College of Engineering and Technology, Tamil Nadu, Madurai, 635009, India
[c]Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, Viruthunagar, 626115, India

View additional affiliations

Abstract

The impact of locking activity on the mechanical and morphological properties of hemp and flax-based blended natural composites has been investigated. NaOH treatments were used to expand interfacial exchanges among the matrix and filament. The filaments were pre-treated with a 5% NaOH solution for 2 hours, 4 hours, and 24 hours to reduce hydrophilic hydroxyl fraction and contamination from the cellulose fiber, as well as to increase the linkage and compatibility of natural fiber to the polymer matrix. Exterior fiber alterations have been discovered to be very effective at civilizing the fiber-matrix linkage. Mechanical and microstructural studies were carried out, and the results were compared to the properties of raw and pretreated fibers. As a result, pretreated fibers exhibit improved mechanical and morphological properties. The 4-hour alkaline treatment resulted in the greatest improvement in mechanical properties. SEM was used to investigate the morphological properties of hybrid composites.

ISSN: 0094243X
ISBN: 978-073544234-4
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0108535
Document Type: Conference Paper
Volume Editors: Vennila B.,Siva E.P.,Pullepu B.,Katiyar S.K.
Publisher: American Institute of Physics Inc.

Velmurugan, G.; Institute of Agricultural Engineering, Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Tamil Nadu, Chennai, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Enhancing selectivity of o[illegible]bsorber using reduced graphene oxide modified nickel oxi[illegible]e nanocomposite thin films

Solar Energy

Volume 247, 15 November 2022, Pages 185-195

Enhancing selectivity of solar absorber using reduced graphene oxide modified nickel oxide nanocomposite thin films(Article)

Murugesan, N., Suresh, S., Kandasamy, M., Murugesan, S., Pugazhenthiran, N., Karthick Kumar, S.

[a]Department of Physics, Sethu Institute of Technology, Kariapatti 626 115, Tamil Nadu, Virudhunagar, India
[b]PG & Research Department of Physics, Sri Vidya Mandir Arts & Science College (Autonomous), Katteri – 636 902, Tamil Nadu, Uthangarai, India
[c]Department of Chemistry, K. Ramakrishnan College of Technology, Tamil Nadu, Trichy, 621 112, India

View additional affiliations

Abstract

Commercial solar selective absorbers prepared through several techniques have encountered drawbacks of necessitating complicated and expensive equipment, substantial materials requirement, and polluting environment. In this context, carbon incorporated metal oxide thin films have shown promise of low-cost, non-toxic, and efficient solar selective absorbers. In particular, association of reduced graphene oxide (rGO) and nickel oxide (NiO) could facilitate highly ascertained optical properties, environment friendliness, and low-cost. Present study focuses on preparing a novel, high performance, and low-cost rGO-NiO solar selective absorber thin films. Thin films comprised of reduced graphene oxide modified nickel oxide nanocomposites (rGO-NiO NCs) were prepared through solvothermal route and coated on aluminum (Al) substrates by dip-coating technique. The rGO-NiO NCs examined using X-ray diffractometer revealed formation of face centered cubic crystallite structure. The scanning electron microscope images disclosed spherical morphology of NiO decorated on the rGO sheets. The spectra derived from energy-dispersive X-ray spectroscopy ascertained absence of peaks corresponding to impurities. The Raman investigation exhibited high intensity ratio (0.97) of the rGO-NiO NCs that described higher disorder and binding sites. The optical property analysis of the rGO-NiO NC (0.2 wt% rGO) thin film performed in UV–vis-NIR reflectance spectroscopy showed high absorptance (α = 88.03 %) and low thermal emittance (ε = 4.5 %), which eventually delivered high solar selectivity (ξ) of 19.56. These findings suggest that the prepared 0.2 % rGO-NiO NC thin film can be utilized as an appropriate selective absorber for solar to thermal energy conversion.

Author keywords

Energy conversion | Nanocomposite thin films | Optical properties | rGO-NiO | Solar selective absorber

Indexed keywords

Engineering controlled terms: Aluminum coatings | Carbon films | Costs | Energy conversion | Energy dispersive spectroscopy | Film preparation | Graphene | Metal substrates | Metals | Morphology | Nanocomposite films | Nanocomposites | Nickel oxide | Oxide films | Scanning electron microscopy | Thin films

Document details - Online assessment system using natural language processing techniques

Convergence of Deep Learning in Cyber-IoT Systems and Security

4 November 2022, Pages 101-122

Online assessment system using natural language processing techniques (Book Chapter)

Suriya, S., Nagalakshmi, K., Nivetha, S.

[a]Department of Computer Science and Engineering, PSG College of Technology, Coimbatore, India
[b]Department of Computer Science and Engineering, Sethu Institute of Technology, Tamil Nadu, India

Abstract

Recently, online mode-based education is having more demand. Major reason behind this that the learners can easily gain insight of the concepts sitting at any geographically location. Also this has paved way for conducting exams in online mode. The knowledge gained by the students through online study has to be assessed. Hence, online assessment system helps to assess knowledge level gained by a learner and highlight the weaker portions of those concepts in the course of study. Need of the hour during any crisis is that education system of a coun¬try has to improved, which can be enriched through online assessment kind of system. Conducting examination and answer evaluation are hectic. Testing tools for assessing academic performance, integration of ideas are highly required but might have challenges from the perspective of resource availability and time con¬straints in order to generate question and evaluate responses automatically. Also, security concerns is one of the other important challenges to conquer. Hence, this chapter proposes an automated assessment system using supervised machine learning algorithm. The proposed system automatically generate questions with its respective answers and assess user responses. It then corrects the responses given by the learner based on the answers generated and records the results.

Author keywords

Automation system | Machine learning | Online assessment system | Supervised machine learning algorithm

ISBN: 978-111985768-6;978-111985721-1
Source Type: Book
Original language: English
DOI: 10.1002/9781119857686.ch5
Document Type: Book Chapter
Publisher: wiley

Suriya, S.; Department of Computer Science and Engineering, PSG College of Technology, Coimbatore, India;

Chapters in this book

Document details - Performance Analysis of Thermal Image Processing-Based Photovoltaic Fault Detection and PV Array Reconfiguration—A Detailed Experimentation

Energies

Volume 15, Issue 22, November 2022, Article number 8450

Performance Analysis of Thermal Image Processing-Based Photovoltaic Fault Detection and PV Array Reconfiguration—A Detailed Experimentation(Article) (Open Access)

Alwar, S., Samithas, D., Boominathan, M.S., Balachandran, P.K., Mihet-Popa, L.

[a]Department of Electrical and Electronics Engineering, Sethu Institute of Technology, Virudhunagar, 626115, India
[b]Department of Electrical and Electronics Engineering, QIS College of Engineering and Technology, Ongole, 523272, India
[c]Department of Electrical and Electronics Engineering, Vardhaman College of Engineering, Hyderabad, 501218, India

View additional affiliations

Abstract

Due to the flexibility, sustainability, affordability, and ease of installation of solar photovoltaic systems, their use has significantly increased over the past two decades. The performance of a solar PV system can be constrained by a variety of external conditions, including hotspots, partial shade, and other minor faults. This causes the PV system to permanently fail and power losses. The power output in a partially shaded solar system is improved in this work by the introduction of a fault classifier based on thermal image analysis with a reconfiguration algorithm. For that purpose, the entire PV array is divided into two parts, with one of these being the male part and the other being the female part. MOSFET switches are used to build the switching matrix circuit that connects these parts. The Flir T420bx thermal camera captures thermal pictures, and MATLAB/Simulink® is used to extract the image properties. The pairing reconfiguration pattern is found using an algorithm based on image processing and the image attributes. The switching signals to the switching circuit are triggered by an Arduino controller. The image attributes of the thermal images may also be used to categorize PV system defects. This reconfiguration technique is easy, simple to use, and it can also be used to check the health of each PV module. The performance of the proposed work was validated using a 5 kW PV system with a 4 × 5 TCT array configuration at Sethu Institute of Technology's renewable energy lab in India. The proposed method was simulated using the MATLAB-Simulink software program, and the outcomes were verified on different hardware setups. © 2022 by the authors.

Author keywords

image processing | mean | MOSFET | photovoltaics | reconfiguration | standard deviation

Indexed keywords

Engineering controlled terms: Image analysis | Image enhancement | MATLAB | MOSFET devices | Solar panels | Solar power generation

Engineering uncontrolled terms: Images processing | Mean | MOS-FET | MOSFETs | Performance | Photovoltaics | PV arrays | PV system | Reconfiguration | Standard deviation

Engineering main heading: Fault detection

Document details - ANFIS based double integral sliding mode control for a grid-integrated hybrid power system

Optik

Volume 270, November 2022, Article number 170013

ANFIS based double integral sliding mode control for a grid-integrated hybrid power system(Article)

Barsana Banu, J., Jeyashanthi, Muthuramalingam, M., Nammalvar, P.

[a]Dept. Electrical and Electronics Engineering, SBM College of Engineering and Technology, Trichy Road –5, SBM Nagar, ThamaraiPadi, Tamil Nadu, Dindigul, 624005, India
[b]Dept. Electrical and Electronics Engineering, Sethu Institute of Technology, Pulloor, Kariapatti, Tamil Nadu, Virudhunagar, 626115, India
[c]Dept. Electrical and Electronics Engineering, PTR College of Engineering and Technology, Thanapandiyan Nagar, Tamil Nadu, Austinpatti, 625008, India

View additional affiliations

Abstract

Hybrid Power System (HPS), an promising power generation strategy, has gained much popularity in recent years, thanks to its fundamental mechanism that taps the abundantly-available renewable energy sources. HPS comprises of a photovoltaic (PV) panel, a Battery Storage System (BSS) and a Solid Oxide Fuel Cell (SOFC). Here, PV is the chief power source whereas SOFC and BSS are used as backup generators to supply the required power in case when PV energy is deficient. All these sources, with distinct DC-DC converters, are integrated parallel to a same DC bus. A 3-phase Voltage Source Inverter (VSI) is used in this setup to convert DC voltage into AC. Different modes of operations have been demonstrated with conventional Sliding Mode Controller (SMC). The proposed Double Integral Sliding Mode Controller (DI-SMC)-trained Adaptive Neural Fuzzy Inference System (ANFIS) is utilized to enhance the performance and anti-interference ability of the hybrid system. Further, the HPS is also verified and validated in terms of achieving the preferred power supervision between DG sources, grid, and the load. Both modeling and control strategies of the hybrid scheme were simulated in MATLAB/Simulink. The aim of the proposed management scheme is to supply maximum-quality power to the grid under varying loading conditions and solar irradiance with FC state under consideration. Further, the management algorithm was also implemented to stabilize DC bus voltage under load variations. © 2022 Elsevier GmbH

Author keywords

ANFIS | Double integral sliding mode control | Microgrid | Power grid | Sliding mode control

Indexed keywords

Engineering controlled terms: Adaptive control systems | Controllers | DC-DC converters | Electric power system control | Electric power transmission networks | Fuel storage | Fuzzy inference | Fuzzy neural networks | Hybrid systems | Renewable energy resources | Sliding mode control | Solar panels | Solid oxide fuel cells (SOFC)

Document details - Effect of green hybrid fillers loading on mechanical and thermal properties of vinyl ester composite

Polymer Composites

Volume 43, Issue 11, November 2022, Pages 7928-7939

Effect of green hybrid fillers loading on mechanical and thermal properties of vinyl ester composites(Article)(Open Access)

Nagaprasad, N., Vignesh, V., Karthik Babu, N.B., Manimaran, P., Stalin, B., Ramaswamy, K.

[a]Department of Mechanical Engineering, ULTRA College of Engineering and Technology, Tamil Nadu, Madurai, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, India
[c]Department of Mechanical Engineering, A Centre of Rajiv Gandhi Institute of Petroleum Technology, Assam, Sivasagar, India

View additional affiliations

Abstract

The need for eco-friendly materials has been attracted due to renewability, abundance availability, low cost, and so on. Therefore, the search for bio fillers for the fabrication of bio-based composite materials is gaining more and more attention in both academic and industry circles because it promotes sustainability. The present study represents the utilization of biomass solid waste in the hybrid form of Tamarind Seed and Date Seed Filler (TSF/DSF) into polymer reinforced composite which has been explored for the first time by a compression molding technique. These fillers are bio-waste that can be obtained at a minimal cost from renewable sources. An attempt has been made to use these hybrid fillers to reinforce the matrix ranging from 0 to 50 wt%, and their physical, mechanical, and thermal properties were investigated. In general, the inclusion of hybrid fillers increases mechanical properties, although the addition of hybrid fillers had only a minor impact on thermal properties. When compared to the pure vinyl ester resin, the hybrid fillers reinforced composites revealed a significant enhancement in tensile, flexural, impact, and hardness properties, with improvements of 1.51 times, 1.44 times, 1.87 times, and 1.46 times respectively, at 10 wt% filler loading. Filler matrix interaction of fractured mechanical testing samples was evaluated by scanning electron microscope. Based on the findings, hybrid filler reinforced composites may be suitable for applications where cost is a consideration and where minor compromises in thermal qualities are acceptable. © 2022 Society of Plastics Engineers.

Author keywords

compression molding | date seed filler | mechanical properties | scanning electron microscope | tamarind seed filler | vinyl ester

Indexed keywords

Engineering controlled terms: Compression molding | Esters | Filled polymers | Hybrid composites | Mechanical testing | Reinforcement | Scanning electron microscopy | Sustainable development | Thermodynamic properties

Engineering uncontrolled terms: Date seed filler | Date seeds | Filler loading | Hybrid fillers | Mechanical and thermal properties | Reinforced composites | Scanning electron microscope | Scanning electrons | Tamarind seed filler | Vinyl esters

Engineering main heading: Fillers

Document details - Pyrolysis and kinetic behavior of neem seed biomass using thermogravimetric analysis for the production of renewable fuel

International Journal of Materials Research

Volume 113, Issue 10, October 2022, Pages 862-870

Pyrolysis and kinetic behavior of neem seed biomass using thermogravimetric analysis for the production of renewable fuel(Article)

Krishnaswamy, H., Chelliah, R., Ramakrishnan, R.I., Muthukrishnan, S., Jesuretnam, B.R., Ramar, K.

[a]Department of Mechanical Engineering, SCAD College of Engineering and Technology, Cheranmahadevi, Tamilnadu, Tirunelveli, 627414, India
[b]Department of Mechanical Engineering, Amrita College of Engineering and Technology, Tamilnadu, Erachakulam, 629901, India
[c]Department of Mechanical Engineering, Vivekananda Polytechnic College, Tamilnadu, Agasteeswaram, 629701, India

View additional affiliations

Abstract

Renewable fuel is gaining more attention in the current energy crisis, and biomass is one of the potential sources of producing renewable fuel. The objective of the present research is to analyze the pyrolysis and kinetic behavior of neem seed biomass. Pyrolysis and kinetic behavior of neem seed were analyzed using thermogravimetric analysis (TGA) at different heating rates, viz. 5, 10, 15, and 20 K min^{-1}. The kinetic study was conducted on the neem seed using various kinetic models such as Friedman, Kissinger, Flynn-Wall-Ozawa (FWO), and Kissinger-Akahira-Sunose (KAS). Thermodynamic analysis was carried out using the data extracted from the TGA curves. The results showed that the neem seed degraded in three stages, stage I: <100 °C, stage II: 100-550 °C, and stage III: >550 °C. A maximum mass loss of 73.14 % occurred at stage II owing to the loss of cellulose and hemicellulose. The activation energy determined by Friedman, KAS, and FWO models was 5.11-18.64, 10.62-57.41, and 13.77-61.51 kJ mol^{-1}, respectively. Thermodynamic analysis revealed that the pyrolysis of neem seed was an endothermic and spontaneous process. Moreover, the previously reported average activation energy required for the pyrolysis of various seeds and shells was compared with the present study and concluded that the variation in activation energy of neem seed adheres to the outcomes reported earlier.

Author keywords

Kinetic models | Kinetic parameters | Neem seed | Thermal degradation | Thermodynamic parameters | Thermogravimetric analysis

Indexed keywords

Engineering controlled terms: Activation energy | Biomass | Cellulose | Energy policy | Fuels | Kinetic theory | Pyrolysis | Thermodynamic properties | Thermogravimetric analysis

Engineering uncontrolled terms: Flynn-Wall-Ozawa | Kinetic behavior | Kinetic models | Kinetics parameter | Kissinger | Neem seeds | Renewable fuels | Thermal degradation' | Thermo dynamic analysis | Thermodynamic parameter

Document details - DTC-IM drive using adaptive neuro fuzzy inference strategy with multilevel inverter

Journal of Ambient Intelligence and Humanized Computing

Volume 13, Issue 10, October 2022, Pages 4799-4821

DTC-IM drive using adaptive neuro fuzzy inference strategy with multilevel inverter(Article)

Banu, J.B., Jeyashanthi, J., Ansari, A.T.

[a]Department of Electrical and Electronics Engineering, Mahath Amma Institute of Engineering and Technology, Pudukkottai, India
[b]Department of Electrical and Electronics Engineering, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, India
[c]Petroleum Research Center, Kuwait Institute of Scientific Research, Safat, Kuwait

Abstract

This paper presents the speed control of direct torque controlled 3ϕ induction motor using adaptive neuro-fuzzy inference strategy (ANFIS). ANFIS controller has been utilized to produce a reference signal for the SVPWM. The gate pulses for the 3ϕ voltage source inverter (VSI) have been obtained from SVPWM. The VSI has finally controlled the induction motor. The Simulink model for this work has been created in MATLAB. The performance exploration of the DTC-IM drive system using ANFIS has been considered, trained, and accomplished in this paper. Simulations have been done for different speeds such as 800, 1000, 1200, and 1400 rpm for both conventional and five-level inverter. The simulation results have revealed that dynamic along with a transient performance of the drive has been improved using ANFIS control strategy. During the sudden variation in load torque, the machine gives good stabilization with admirable learning capability of neural networks by the use of the ANFIS controller. Moreover, the proposed five-level inverter minimizes the total harmonic distortion (THD) in the current and voltage of the inverter compared to the conventional two-level inverter. The same model has been implemented in an experimental prototype to check the feasibility of the proposed configuration. © 2021, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Adaptive neuro-fuzzy inference strategy | Direct torque control | Space vector pulse width modulation | Total harmonic distortion | Voltage source inverter

Indexed keywords

Engineering controlled terms: Controllers | Electric inverters | Electric machine control | Fuzzy neural networks | Induction motors | MATLAB | Pulse width modulation

Engineering uncontrolled terms: Adaptive neuro-fuzzy inference | Experimental prototype | Learning capabilities | Multilevel inverter | Total harmonic distortion (THD) | Transient performance | Two-level inverters | Voltage source inverter

Engineering main heading: Fuzzy inference

ISSN: 18685137 **DOI:** 10.1007/s12652-021-03244-3

Document details - Single-image super-resolution enhancement mechanism

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 070003

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Single-image super-resolution enhancement mechanism(Conference Paper)

Pramila, P.V., Suresh, P., Siva, T., Priya, M.S., Pandian, B.M.

[a]Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai, India
[b]Sethu Institute of Technology, Pulloor, India

Abstract

A novel example-based single-image super resolution procedure that upscales to high-resolution (HR) of a given low-resolution (LR) input image without relying on an external dictionary of image examples. By generating the low resolution image to high resolution image using modified wavelet zero padding.low resolution of input image is converted into the high resolution image. Iterative back projection is also employed to ensure constancy at each pass of the procedure. An initial approximation to the unknown HR image is generated using WZP It is one of the simplest methods for image resolution enhancement. The input low resolution images were initially decomposed using wavelet transformation. The combination of the DWT and SWT is employed for the decomposition of the image into 4 co-efficients. wide experiments and comparisons with other modern methods, based both on external and internaldictionary. Moreover, when considering objective metrics, such as Peak signal-to-noise ratio (PSNR) and Structural similarity (SSIM), our method turns out to give the best performance. © 2022 Author(s).

Author keywords

Enhancement Image Interpolation Mechanism Prediction

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0109211
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Pramila, P.V.; Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Design of spider web spaced antenna for medical applications

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 060005

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Design of spider web spaced antenna for medical applications(Conference Paper)

Suresh, H.R., Sujatha, C., Sikkandhar, R.A., Rajee, S.A.M., Selvaprasanth, P., Swathika, G.

[a]Vel Tech RangarajanDr. Sagunthala R&D Institute of Science and Technology, Chennai, India
[b]SSM Institute of Engineering and Technology, Dindigul, India
[c]Sethu Institute of Technology, Pulloor, India

Abstract

In field of wearable technology one challenging improvement is wearable textile antenna. Primary requirement for wearable textile antennas are flexible construction materials which includes fabric with planar structure. Properties of the textile antenna such as bandwidth, efficiency, input impedance etc. depend upon type of substrate materials used. These properties are mostly determined by the substrate dielectric constant. Fabric material dielectric constant accurate value is to be calculated from resonant frequency of patch antenna.In this project, we presented a simulation-based study on a wearable textile (jeans) antenna for wireless technologies with parametric analysis. Optimum lengths of dimensions for the antenna is present for best return loss,gain and VSWR, radiation efficiency and freespace path loss. The radiating element for patch and ground plane is made from thin-film copper foil. © 2022 Author(s).

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0103778
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Suresh, H.R.; Vel Tech RangarajanDr. Sagunthala R&D Institute of Science and Technology, Chennai, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Microstructure evaluation and thermal properties of fourth generation reactor materials - Modified 9Cr-1Mo steel

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 050004

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Microstructure evaluation and thermal properties of fourth generation reactor materials - Modified 9Cr-1Mo steel(Conference Paper)

Sivabharathy, M., Praveen, B.M., Aithal, P.S., Dawood, M.S., Senthilkumar, A., Ramachandran, K.

[a]College of Engineering and Technology, Srinivas University, Mangalore, India
[b]Sethu Institute of Technology, Pulloor, India
[c]School of Physics, MKU, Madurai, 625 021, India

Abstract

Microstructure Evaluation and thermal properties of fourth generation reactor materials and also very useful reactor material namely modified 9Cr-1Mo Steel for various thicknesses. The results are compared with literature values and discussed. © 2022 Author(s).

Author keywords

EDAX | Modified 9Cr-1Mo steel | SEM | Thermal conductivity | Thermal diffusivity | Thermal Expansion

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0103636
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Sivabharathy, M.; College of Engineering and Technology, Srinivas University, Mangalore, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Space cloud in cubesat - Consigning expert system to space

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 100001

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Space cloud in cubesat - Consigning expert system to space(Conference Paper)

Aravindaguru, I., Arulselvam, D., Kanagavalli, N., Ramkumar, V., Karthick, R.

[a]M. Kumarasamy College of Engineering, Tamil Nadu, India
[b]Sri Sai Ram Engineering College, India
[c]Rajalakshmi Institute of Technology, Chennai, India

View additional affiliations

Abstract

The world gets incalculably benefitted from Space Technology in terms of Communication, Positioning, Observation, Detection. The advancement of technology and the commencement of very small satellites starting from Microsatellites, Nanosatellites, Picosatellites, Femtosatellites have meant that startle large Multinational companies and emerging countries that could reach space in an accessible way with a short span of time in a position to compete the targeted destination. The most innovative and interesting sector in space is "CubeSat"that are being used in several applications such as Remote Sensing, Earth Observation, Asset Tracking, Security, defence, IoT & Communications, Humanitarian aid, etc., Exploration of the Universe has been one of the fundamental human instincts. Though Space Explorations began with man's quest for knowledge, the technologies that were developed in the process have found applications that are of direct relevance to the development of society. Today Space-based telecommunications, TV Broadcasting, Metrology, Resource Monitoring have become much more pivotal and seminal in everyday life. This demographical statistic proves and shows the reason and their consideration for the rapid accretion towards Minisatellites especially CubeSats. The Collection, Procession, and the distribution of the meaningful data and information, wherein bringing up the Cloud Computing Service allied with Artificial Intelligence in CubeSats. © 2022 Author(s).

Author keywords

Artificial intelligence CubeSat space cloud Star link Constellation

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English

DOI: 10.1063/5.0104401
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Aravindaguru, I.; M. Kumarasamy College of Engineering, Tamil Nadu, India;

SciVal Topic Prominence

Topic:

Document details - Energy conservation using multiple mobile sink routing with dynamic cluster head selection for WSN

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 060004

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Energy conservation using multiple mobile sink routing with dynamic cluster head selection for WSN(Conference Paper)

Swaminathan, G.A., Ahila, A., Vijayarani, G., Rubavathi, C.Y., Shafana, J.

[a]Francis Xavier Engineering College, Tamil Nadu, Tirunelveli, India
[b]Sethu Institute of Technology, Pulloor, India
[c]SCAD College of Engineering and Technology, India

View additional affiliations

Abstract

Energy Consumption is considered as the main factor consider for reducing the network lifetime and it is considered as major problem in WSN. In the Existing system, for data collection Single Mobile Sink was considered. In the proposed system, Multiple Mobile Sinks are considered for collecting the data from the CH. The entire Cluster contains only one Cluster Head. For Cluster formation, K-Means algorithm is used. The CH is selected as dynamic in nature i.e. the selected current CH frequently changes for each round. Initially CH is identified in the network in random manner and in further rounds the nodes with highest residual energy is selected as the current CH. The CH selection is done by using Energy-LEACH algorithm. Cluster Member and Cluster Head communicate in a Single-Hop fashion. Finding the unique shortest path is considered as major problem in WSN. To overcome the above problem, Weighted Rendezvous Planning (WRP) is proposed. WRP increase the network lifetime and reduce energy consumption when compared with the present existing system. The Mobile Sink speed is maintained in constant manner to reduce the packet loss. © 2022 Author(s).

Author keywords

Cluster Head (CH) | Energy-LEACH (E-LEACH) | K-Means algorithm | Mobile Sink Node | Weighted Rendezvous Planning (WRP) | Wireless Sensor Network (WSN).

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0110026
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Swaminathan, G.A.; Francis Xavier Engineering College, Tamil Nadu, Tirunelveli, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - An advanced low profile microstrip antenna using hybrid structure for bandwidth enhancement

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 060003

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

An advanced low profile microstrip antenna using hybrid structure for bandwidth enhancement(Conference Paper)

Banu, M.A., Indira, N.R., Akila, P.G., Devika, P., Priyadharshini, V.

[a]NPR College of Engineering, Tamil Nadu, India
[b]Sethu Institute of Technology, Tamilnadu, Kariapatti, 626115, India
[c]PSNA College of Engineering and Technology, Dindigul, India

Abstract

Microstrip antennas offer many benefits to high-frequency systems, including ease of integration with other RF/microwave components. Unfortunately, microstrip antennas have also been plagued by inherently narrow bandwidths, limiting their use in some applications. A number of approaches have been proposed to increase the operating bandwidths of these antennas, including increasing the substrate thickness, using different impedance-matching and feeding techniques, and using multiple resonators and slot antenna geometries. However, these methods tend to add to an antenna's weight and volume, and can increase the fabrication cost. A low-profile microstrip antenna with strip-slot hybrid structure is proposed to enhance the bandwidth up to 41% within a height of 0.06λ0 (λ0 is the center operating wavelength in free space).The proposed antenna consists of four strips, which are separated by three narrow slots. By controlling the dimensions of the strips and the slots, dual modes, i.e., TM10 mode and antiphase TM20 mode, are excited and coupled to increase the operating bandwidth. The strip-slot hybrid structure can be excited with optimized impedance matching using an aperture-coupled Y-shaped feeding microstrip line. A prototype of the proposed antenna is constructed and tested. Experimental results show an impedance bandwidth of 41% for the reflection coefficient less than -10 dB, achieving an obvious improvement of operating bandwidth 0.067λ0. © 2022 Author(s).

Author keywords

Bandwidth | Impedance matching | Meta material | Microstrip Antenna | Substrate thickness

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English

DOI: 10.1063/5.0103965
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Banu, M.A.;

Document details - Exploration of energy management techniques in smart grid systems

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 060006

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Exploration of energy management techniques in smart grid systems(Conference Paper)

Devika, R., Nagalakshmi, S., Sheik Dawood, M.

[a]Sethu Institute of Technology, Tamil Nadu, Kariapatti, India
[b]Sir Issac Newton College of Engineering and Technology, Tamil Nadu, Nagapattinam, India

Abstract

In this contemporary world, Smart Energy Management is necessary to meet out the future energy crisis. To intensify the Smart Energy Management, Smart Grids (SGs) is a promising technology which integrated with effective communication technology to achieve wider coverage and flawless connection capacity. Therefore, a low-power wide-area network (LPWAN) is identified as a hopeful technique for Smart energy management in SGs. In LPWAN technique, LoRa is an unexceptional and unavoidable technology that can be used in SG applications for smart energy management. This technique contributes to low energy consumption, efficient connection capacity, and long-range communication. This paper first gathers the information about various communication networking technologies then presents about the various LPWAN techniques used for SG applications and discuss in detail about the LoRa technology for an efficient smart energy management system. © 2022 Author(s).

Author keywords

LoRa Technology | Low power Wide area network | Network Communication Technology | Smart Grids

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0104392
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Devika, R.; Sethu Institute of Technology, Tamil Nadu, Kariapatti, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Nanobots: Uploading the human brain

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 050002

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Nanobots: Uploading the human brain(Conference Paper)

Sony, J.D., Ganesh, C.S.S., Bhavani, R., Sikkandar, R.A., Sathiyanathan, N.

[a]Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, University in Morai, Tamil Nadu, India
[b]Karpagam College of Engineering, Coimbatore, India
[c]K. Ramakrishnan College of Technology, Trichy, India

View additional affiliations

Abstract

Every human brain is different the brain makes each human unique and defines the individuals the marvelous and mysterious world inside the human body is the human brain with a hundred billion nerve cells, two million axons, a million trillion synapses, and a trillion interconnections making it the most complex structure. The complicity of uploading this complex structure or its stimulation to computerized form is increasingly challenging that takes over nanotechnology, Robotics with its programming methods Cobots, comprised with artificial Intelligence, mind-machine mortise, micro-robotics, Nanorobotics, nanobots. The approach of uploading the human brain is to obtain the person's conscience even after the death of the body, (i.e) to function exactly like a normal human brain in the form of a machine such a longstanding operation is executed by the nanobots whole design, architecture, framework, manufacturing technology, and the system implementation and its simulation are discussed below. © 2022 Author(s).

Author keywords

Architecture Human Braun Nanobots Neural Network Operation

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0103487
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Sony, J.D.;

Document details - Energy efficient cluster head selection and routing protocol for WSN

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 060001

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Energy efficient cluster head selection and routing protocol for WSN(Conference Paper)

Sakthi, P., Bhavani, R., Arulselvam, D., Karthick, R., Selvakumar, S., Sudhakar, M.

[a]M. Kumarasamy College of Engineering, Tamil Nadu, India
[b]K. Ramakrishnan College of Technology, Trichy, India
[c]Sri Sai Ram Engineering College, Tamil Nadu, India

View additional affiliations

Abstract

The wireless sensor network is formed by an infinite number of sensor nodes with communication and computation abilities. The varied roles in what's more, expanding the existence pattern of the organization and improving the network stability. A cluster head based wireless sensor network routing algorithm is proposed aiming at the premature death of the cluster head thanks to in no time energy consumption and also the unbalanced energy consumption of nodes. Firstly, the master cluster heads and also the member nodes of the cluster are determined supported the improved routing algorithm. Secondly, the cluster head is chosen from cluster member nodes in line with energy consumed by all the member nodes to complete a process of knowledge transmission, collection and fusion supported the principle of minimum energy consumption. Any member node within the cluster transmits the data to the cluster head with relevance it. Supported the simulation results, compared with the improved routing algorithm, delays the death time of the primary node within the wireless sensor network, growing the life cycle of the network. © 2022 Author(s).

Author keywords

dynamic bunch head political decision instrument | energy utilization | group head hub | remaining energy | Throughput. | WSNs

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0105010
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Sakthi, P.; M. Kumarasamy College of Engineering, Tamil Nadu, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Analysis on computational and ocular criteria of (NH2CH2COOH)3.H2SO4 crystals

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 020002

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Analysis on computational and ocular criteria of (NH2CH2COOH)3.H2SO4 crystals(Conference Paper)

Begam, S.N., Sivabharathy, M., Ayeshamariam, A., Dawood, M.S., Ameen, S.H.M.

[a]Sadakathullah Appa College, Dept of Physics, Tirunelveli, 627011, India
[b]Sethu Institute of Technology, Pulloor, 626115, India
[c]Khadir Mohideen College, Adirampattinam (Affiliated to Bharathidasan University), Thiruchirappalli, India

Abstract

A third order nonlinear optical single crystals of Triglycine Sulpho Succinate (TGSSu) has been grown by slow cooling method. The grown crystals were characterized using X-ray diffraction analysis technique and its found the grown crystals in monoclinic structures.Thermal analysis of TGSSu crystal were carriedout and its compared to TGS crystal. The second harmonic generation efficiency was studied Kurtz-Perry powder technique. The third-order nonlinearities of grown crystals have been investigated by Z-scan method. Nonlinear refractive index (n2), the nonlinear absorption coefficient (β) and third-order nonlinear susceptibility (χ(3)) were estimated for the sample. The results were discussed in detailed. © 2022 Author(s).

Author keywords

NLO SHG single crystal TGS Third order nonlinear susceptibility

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0103637
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Sivabharathy, M.; Sadakathullah Appa College, Dept of Physics, Tirunelveli, India;

Document details - Thermal expansion studies on D9 alloy

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 050001

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Thermal expansion studies on D9 alloy(Conference Paper)

Sivabharathy, M., Praveen, B.M., Aithal, P.S., Dawood, M.S., Senthilkumar, A., Ramachandran, K.

[a]College of Engineering and Technology, Srinivas University, Mangalore, India
[b]Sethu Institute of Technology, Pulloor, India
[c]School of Physics, MKU, Madurai, 625 021, India

Abstract

We report warm development estimations on cutting edge reactor pressure tubes, D9 compound. The beginning material is in the size of 11 mm width pole of D9 combination. The bar is arrangement tempered at 1343 K for thirty minutes. The normal grain size in the wake of strengthening in the scope of 25-35m.from metallographic method. The bar is then twisted in strain to bestow 20% virus work and its isothermally strengthened at 1073K in the reach between 0.5 to 1000h.The thermal extension was completed and the outcomes are related with ultrasonic estimations, metallographic and photograph acoustic examinations. © 2022 Author(s).

Author keywords

D9 alloy | Photo acoustic | Thermal conductivity | Thermal diffusivity | Thermal expansion

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0103634
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Document details - Virtues of an automaton - The robot

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 120001

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Virtues of an automaton - The robot(Conference Paper)

Vijayarajan, S., Banu N. M, M., Meenalochini, P., Ramanathan, S.K., Ahmed A, F.

[a]Sethu Institute of Technology, Pulloor, India
[b]Veltech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, India
[c]University of Technology and Applied Sciences, Al Mussanah, Oman

Abstract

The humans have been on this planet for almost 200,000 years and now a new civilization is going to join the human civilization, the robot civilization or in simple words machines who can understand human being's feeling and thoughts. There are laws written for robots to act accordingly, in 1942Isaac Asimov a science fiction story writer who stated the three laws of robotics in Runaround (story). Well at present we have many laws around the world for the robots, the European countries have their own laws for the robots and similarly there are other organizations and countries. Today the robots that are designed and active are bound by the laws therefore next stage for the robots is to demand for their rights. The robots will demand for their rights after they achieve self-awareness. The question is can robots be self-aware and what are the rights they are will demand? © 2022 Author(s).

Author keywords

Artificial Intelligence (AI) Conscious Robot Rights Self-aware Unconscious

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0104119
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Vijayarajan, S.; Sethu Institute of Technology, Pulloor, India;

Document details - Sequencing and identification TOF-SIMS analysis on D9 alloy

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 020001

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Sequencing and identification TOF-SIMS analysis on D9 alloy(Conference Paper)

Sivabharathy, M., Praveen, B.M., Aithal, P.S., Dawood, M.S., Senthilkumar, A., Ramachandran, K.

[a]College of Engineering and Technology, Srinivas University, Mangalore, India
[b]Sethu Institute of Technology, Pulloor, India
[c]School of Physics, MKU, Madurai, India

Abstract

We present a method for the clear identification of materials using a TOF-SIMS. TOF-SIMS method whereby the accurate and reproducible chemical depth distributions of atomic and molecular surface analysis identification on the nanometer scale. TOF-SIMS depth profiles was demonstrated with the PHI TRIFT V nano TOF using a Ga+ cluster LMIG to observe the structure of a spontaneously identified elements of D9 alloy. The high sensitivity of nano TOF's TRIFT analyzer, combined with new ion beam Technologies for nondestructive molecular depth profiling, enables 2D visualization of molecular structures compared with depth profile for PA techniques. © 2022 Author(s).

Author keywords

Alloy Aluminium Metallography Nanotechnology Spot

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English

DOI: 10.1063/5.0103629
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Sivabharathy, M.; College of Engineering and Technology, Srinivas University, Mangalore, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Interstitial lung disease - Case study

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 080001

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

Interstitial lung disease - Case study(Conference Paper)

Sridevi, S., Ilavendhan, A., Devi, M.S., Rahila, J., Kumari, D.A., Pandeeswari, B.

[a]Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, India
[b]Electrical & Electronics Engineering, Dhaanish Ahmed College of Engineering, Chennai, India
[c]Sethu Institute of Technology, Pulloor, Virudhunagar, India

Abstract

In this research, we will look at interstitial lung disease (ILD), which is an inflammation and fibrotic respiratory illness that mostly damages the cells and area around the lungs' air sacs known as the interstitium. There are around group of 200 diseases belonging to this category. This disease affects the other compartments of lungs, the airways known as alveoli, the blood vessels and the outside lining of lung known as pleura. This disease is characterized by respiratory symptoms, chest radiographic abnormalities, pulmonary fibrosis and fibrosis results from chronic inflammation. The lung biopsies with predominance of fibrosis results in poor prognosis comparatively than inflammation. Many studies reported that 80.9 per 1, 00,000 men and 62.7 per1, 00,000 women was diagnosed with this disease every year. There is no established treatment that prolongs life for patients with these diseases. It is critical to do accurate diagnosis in order tohave significantly dissimilar treatment choices and a improved prognosis. © 2022 Author(s).

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0104508
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Sridevi, S.; Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - An adaptive scheduling based communication in 5G network

AIP Conference Proceedings

Volume 2518, 28 September 2022, Article number 060002

2021 International Conference on Systematization, Science and Supervision, ICSSS 2021; Fortune Pandiyan HotelMadurai; India; 26 June 2021 through 27 June 2021; Code 183095

An adaptive scheduling based communication in 5G network(Conference Paper)

Deepa, B., Sujatha, C., Baskar, T.G., Prabaharan, A.M., Rinoj, B.M.V., Fathima, B.S.A.

[a]Sethu Institute of Technology, Pulloor, India
[b]SSM Institute of Engineering and Technology, Dindigul, India

Abstract

In recent days, communication networks are rapidly evolving, to meet the growing demands of the mobile user with advanced wireless technologies like 5G, SDN and HetNets. In the wireless era, the mobile end users expect seamless services and interference-free communication over broadband wireless networks. In 2020, 5G wireless technology is meant to be commercialized for the outside world. Currently, Wireless interoperability for Microwave Access (WiMAX), Long Term Evolution (LTE), Long Term Evolution-Advanced (LTE-A) are the prominent technologies in networks, which are moving towards 5G HetNets. The network vendors are adding more features towards building the smart cities where Quality of Service (QoS) has to be maintained. In the dense network, more users are simultaneously approaching services with the lack of QoS. To meet the user requirements, more mobile station deployment is required. When users transmit the data simultaneously with a continuous flow of information, network interference occurs. For reducing this network interference, a modification in network deployment strategy is required. © 2022 Author(s).

Author keywords

adaptive algorithm. LTE Massive MIMO QoS Scheduling

ISSN: 0094243X
ISBN: 978-073544381-5
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0104071
Document Type: Conference Paper
Volume Editors: Dawood S.M.,Sulthana A.T.
Publisher: American Institute of Physics Inc.

Deepa, B.; Sethu Institute of Technology, Pulloor, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Fused deep learning based Facial Expression Recognition of students in online learning mode

Concurrency and Computation: Practice and Experience

Volume 34, Issue 21, 25 September 2022, Article number e7137

Fused deep learning based Facial Expression Recognition of students in online learning mode(Article)

Sumalakshmi, C.H., Vasuki, P.

[a]Computer Science and Engineering, Koneru Lakshmaiah Education Foundation, Telangana, Hyderabad, India
[b]Department of Electronics and Communication Engineering, Sethu Institute of Technology, Tamilnadu, Kariapatti, India

Abstract

In this research work, Facial Expression Recognition (FER) is used in the analysis of facial expressions during the online learning sessions in the prevailing pandemic situation. An integrated geometric and appearance feature extraction is presented for the FER of the students participating in the online classes. The integrated features provided a low-dimensional significant feature area for better facial data representation. Feasible Weighted Squirrel Search Optimization (FW-SSO) algorithm is applied for selecting the optimal features due to its efficient exploration of the search space and enhancement of the dynamic search. The output of the FW-SSO algorithm is used for tuning the autoencoder. Autoencoder is used for combining the G&A features, for feature optimization process. Classification is done by using Long Short-Term Memory (LSTM) network with Attention Mechanism (ALSTM), as it is highly efficient in capturing the long-term dependency of the facial landmarks in the image/video sequences. The proposed fused deep learning method focuses on the fusion of the G&A features for high discrimination. Experimental analysis using FER-2013 and LIRIS datasets demonstrated that the proposed method achieved maximum accuracy of 85.96% than the existing architectures and maximum accuracy of 88.24% than the VGGNet-CNN architecture. © 2022 John Wiley & Sons, Ltd.

Author keywords

autoencoder | Facial Expression Recognition (FER) | Feasible Weighted Squirrel Search Optimization (FW-SSO) | Long Short-Term Memory (LSTM) network with Attention Mechanism (ALSTM)

Indexed keywords

Engineering controlled terms: Brain | E-learning | Face recognition | Learning systems | Memory architecture | Network architecture

Engineering uncontrolled terms: Attention mechanisms | Auto encoders | Facial expression recognition | Feasible weighted squirrel search optimization | Long short-term memory network with attention mechanism (ALSTM) | Maximum accuracies | Memory network | Optimization algorithms | Search optimization

Engineering main heading: Long short-term memory

Document details - Structural characteristics and electrical properties of lanthanum-doped nanoferrites synthesized by sonochemical method

Applied Physics A: Materials Science and Processing

Volume 128, Issue 9, September 2022, Article number 814

Structural characteristics and electrical properties of lanthanum-doped nanoferrites synthesized by sonochemical method(Article)

Palaniappan, P., Lenin, N., Uvarani, R.

[a]Department of Physics, Thiruvalluvar Government Arts College, Tamil Nadu, Rasipuram, Namakkal, 637401, India
[b]Department of Physics, Sethu Institute of Technology, Tamil Nadu, Kariapatti, 626115, India

Abstract

In this study, an effective sonochemical reactor was used to synthesize $Mn_{0.5}Cu_{0.5}La_xFe_{2-x}O_4$ nanoferrites with different compositions of x = 0.03, 0.06, 0.09, and 0.12. $Mn_{0.5}Cu_{0.5}La_xFe_{2-x}O_4$ nanoferrites were subjected to X-ray diffraction (XRD), ultraviolet-diffuse reflectance spectroscopy, scanning electron microscopy, energy-dispersive X-ray spectroscopy, vibrating sample magnetometer, and electrochemical impedance spectroscopy to investigate their optical, magnetic, electrical, and structural properties. An image of the formation of a cubic crystalline structure was obtained by XRD patterns. An increase in the amount of La^{3+} ions in $Mn_{0.5}Cu_{0.5}La_xFe_{2-x}O_4$ nanoferrites could explain the decrease in crystallite size. The impedance analysis revealed the presence of pseudocapacitance and resistive behavior in $Mn_{0.5}Cu_{0.5}La_xFe_{2-x}O_4$ nanoferrites. Further, the addition of La^{3+} ions led to a little decrease in the conductivity of $Mn_{0.5}Cu_{0.5}La_xFe_{2-x}O_4$ nanoferrites. The hysteresis loops enhanced the soft ferromagnetic behavior of $Mn_{0.5}Cu_{0.5}La_xFe_{2-x}O_4$ nanoferrites. A decrease in saturation magnetization and an increase in coercivity were observed with an increase in the La content of $Mn_{0.5}Cu_{0.5}La_xFe_{2-x}O_4$ nanoferrites. © 2022, The Author(s), under exclusive licence to Springer-Verlag GmbH, DE part of Springer Nature.

Author keywords

Coercivity | Crystal structure | Impedance spectroscopy | Magnetic materials | Pseudo-capacitance | X-ray diffraction

Funding details

Funding text

PP acknowledges the support of his college (Thiruvalluvar Government Arts College, Rasipuram 637 401, Namakkal, Tamil Nadu, India) in carrying out this research project.

ISSN: 09478396
CODEN: APAMF
Source Type: Journal
Original language: English
DOI: 10.1007/s00339-022-05972-5
Document Type: Article
Publisher: Springer Science and Business Media Deutschland GmbH

Uvarani, R.; Department of Physics, Thiruvalluvar Government Arts College, Tamil Nadu, Rasipuram, Namakkal, India;

Document details - Design and Analysis of Linear Phase Finite Impulse Response Filter Using Water Strider Optimization Algorithm in FPGA

Circuits, Systems, and Signal Processing

Volume 41, Issue 9, September 2022, Pages 5254-5282

Design and Analysis of Linear Phase Finite Impulse Response Filter Using Water Strider Optimization Algorithm in FPGA(Article)

Karthick, R., Senthilselvi, A., Meenalochini, P., Senthil Pandi, S.

[a]Department of Electronics and Communication Engineering, Sethu Institute of Technology, Tamil Nadu, Pulloor, India
[b]Department of Computer Science and Engineering, SRM Institute of Science and Technology, Ramapuram campus, Tamil Nadu, Chennai, India
[c]Department of Electrical and Electronics Engineering, Sethu Institute of Technology, Tamil Nadu, Pulloor, India

View additional affiliations

Abstract

In this manuscript, an optimal linear phase finite impulse response (FIR) filter is designed using water strider optimization algorithm and implemented in the field programmable gate array (FPGA). The initiative behind the linear phase FIR filter design is “to estimate the coefficients of optimum filter.” Here, the water strider optimization algorithm is proposed to evaluate the optimal filter coefficients (LPFIR-WSOA filter). The proposed LPFIR-WSOA filter attains 32.57, 19.09, 28.07, 27.42, 24.91 and 12.72% lower maximum pass ripple compared with the existing linear phase FIR filter. Finally, the proposed LPFIR-WSOA filter is implemented in FPGA for real-time application with the target families of Virtex 6 and Virtex 7. For target FPGA families Virtex 6, the FPGA-LPFIR-WSOA filter provides 16.7910, 15.074 and 18.065% lower maximum clock frequency (MHz); 62.3837, 41.9554 and 56.078% lower delay; and 23.7172, 20.324 and 26.417% lower memory usage compared with the existing LPFIR filters like global best steered quantum-inspired cuckoo search algorithm in FPGA (FPGA-FIR-GQICSA), modified artificial bee colony optimization-based FIR filter design in FPGA (FPGA-FIR-MABCO) and hybrid artificial bee colony algorithm-based FIR filter design in FPGA (FPGA-FIR-HABCA), respectively.

Author keywords

Attenuation | Field programmable gate array | Filter coefficients | Linear phase finite impulse response filter | Ripples | Water strider optimization

Indexed keywords

Engineering controlled terms: FIR filters | Impulse response | Integrated circuit design | Logic gates | Optimization | Signal receivers

Engineering uncontrolled terms: Attenuation | Design and analysis | Filter coefficients | In-field | Linear phase finite impulse response filters | Optimisations | Optimization algorithms | Ripple | Water strider optimization | Water striders

Engineering main heading: Field programmable gate arrays (FPGA)

Document details - Strength characterization of caryota urens fibre and aluminium 2024-T3 foil multi-stacking sequenced SiC-toughened epoxy structural composite

Biomass Conversion and Biorefinery

Volume 12, Issue 9, September 2022, Pages 4009-4019

Strength characterization of caryota urens fibre and aluminium 2024-T3 foil multi-stacking sequenced SiC-toughened epoxy structural composite(Article)

Vincent, V.A., Kailasanathan, C., Shanmuganathan, V.K., Kumar, J.V.S.P., Arun Prakash, V.R.

[a]Department of Aeronautical Engineering, Noorul Islam Centre for Higher Education, Tamilnadu, Kumarakovil, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Tamilnadu, Virudhunagar, India
[c]Department of Mechanical Engineering, J. N. N Institute of Engineering, Tamilnadu, Tiruvallur, India

View additional affiliations

Abstract

High toughness and high-impact damage resistance fibre-metal hybrid laminate epoxy composites were prepared and characterized. In this present research, a hybrid fibre-metal laminate was reinforced into SiC-toughened epoxy resin for making high performance structural material for automobile and aircraft applications. Novel natural fibre caryota urens and silicon carbide (SiC) particles were surface-treated using 3-aminopropyltriethoxysilane (APTES) whereas the aluminium foil was sandblasted. The hybrid fibre-metal laminate with different stacking sequenced epoxy composites were prepared using vacuum bag moulding followed by post curing. A highest strength factor of 97 is observed for composite designation CAC_1, which contains 0.5 vol.% of SiC. The drop load impact toughness of ACA_1 composite gives the highest energy absorption of 20.6 J. Similarly, the CAC_1 composite designation gives fracture toughness of 32.1 MPa.m and energy release rate of 1.557 mJ/m^2. The scanning electron microscope images revealed highly reacted phase of surface-treated reinforcements with epoxy resin matrix.

Author keywords

Fibre | Impact toughness | Mechanical properties | Metal foil | PMC | SiC

Indexed keywords

Engineering controlled terms: Aluminum | Epoxy resins | Fibers | Laminated composites | Reinforcement | Sandwich structures | Scanning electron microscopy | Silicon carbide

Engineering uncontrolled terms: 3-aminopropyltriethoxysilane | Aircraft applications | Epoxy resin matrix | Scanning electrons | Silicon carbides (SiC) | Strength characterization | Structural composites | Toughened epoxies

Engineering main heading: Fracture toughness

ISSN: 21906815
Source Type: Journal
Original language: English

DOI: 10.1007/s13399-020-00831-w
Document Type: Article
Publisher: Springer Science and Business Media Deutschland GmbH

Document details - Reconfigurable Intelligent Surface aided Indoor and Outdoor User Distribution in Heterogeneous Network

International Journal of Modern Education and Computer Science

Volume 14, Issue 4, Aug. 2022, Pages 89-97

Reconfigurable Intelligent Surface aided Indoor and Outdoor User Distribution in Heterogeneous Network(Article)

Yamuna Devi, M.M., Amalorpava Mary Rajee, S., Ahila, A., Indira, N.R.

[a]KL Deemed to be University/Department of Computer Science and Engineering, Andhra Pradesh, 522 502, India
[b]Sethu Institute of Technology/Department of Electronics and Communication, Virudhunagar District, 626 115, India

Abstract

Millimeter wave communication suffers from static blockages such as trees, buildings and so on. Reconfigurable Intelligent Surfaces (RISs) has been adapted to solve this blockage problem and enable the urban environment user to choose mmW enabled small cells as their source transmitter or to choose macro cells in case of non-line of sight exists. RIS is a promising network technology to improve the quality of service parameters such as spectral efficiency and energy efficiency by artificially reconfiguring the propagation environment of electromagnetic waves. An indoor user can be connected with mmW band if the line of sight (LOS) link exists. Otherwise, the system utilizes RIS transmission model to have reliable and low-latency communication. It reflects the capability of RISs to enable enhanced communications in challenging environments. An optimization problem is formulated to maximize the sum data rate of an indoor user by phase shift optimization at the RIS. The outage probability of the proposed scheme is analyzed under Rician fading channel. The proposed RIS enabled method targets to enhance the overall performance in terms of average spectral efficiency and achievable data rate in the presence of blockages and system imperfections. The data rate is increased by three fold times than that of the transmission without RIS. The utility of this framework is discussed for both indoor and outdoor environments. © 2022 MECS.

Author keywords

Blockage | Heterogeneous network | Millimeter wave | Reconfigurable Intelligent Surfaces

ISSN: 20750161
Source Type: Journal
Original language: English
DOI: 10.5815/ijcnis.2022.04.07
Document Type: Article
Publisher: Modern Education and Computer Science Press

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Structural, thermal and electrochemical characterization of cellulose acetate–based solid biopolymer electrolyte for zinc ion batteries

Ionics

Volume 28, Issue 8, August 2022, Pages 3865-3875

Structural, thermal and electrochemical characterization of cellulose acetate–based solid biopolymer electrolyte for zinc ion batteries(Article)

Bhuvaneswari, B., Sivabharathy, M., Prasad, L.G., Selvasekarapandian, S.

[a]K. Ramakrishnan College of Technology, Tamil Nadu, Samayapuram, Trichy, 621112, India
[b]Materials Research Center, Tamil Nadu, Coimbatore, 641045, India
[c]Sethu Institute of Technology, Tamil Nadu, Viruthunagar, 626115, India

View additional affiliations

Abstract

Zinc ion conducting biopolymer electrolyte has been prepared from cellulose acetate (CA) with different concentrations of zinc nitrate ($Zn(NO_3)_2$) by solution casting technique. The X-ray diffraction (XRD) analysis has been adopted to investigate the amorphous nature of the samples. The complex creation of the biopolymer with the inorganic salt has been evidenced by Fourier transform infrared spectroscopy (FTIR) studies. The differential scanning calorimetry (DSC) study shows shifting of glass transition temperature to the lower temperature in the salt-doped system. The polymer electrolytes have been subjected to electrochemical impedance spectroscopy (EIS), and the optimum conductivity attained was 2.7×10^{-3} S cm^{-1} for the sample with the composition 45 M.wt% CA:55 M.wt% $Zn(NO_3)_2$. The linear sweep voltammetry (LSV) study reveals the electrochemical stability of the electrolyte as 3.03 V. The transference number for Zn^{2+} has been found to be 0.45 by Evans polarisation technique. The primary zinc battery has been constructed using optimum conducting membrane as an electrolyte. The OCV has been measured for this constructed battery and the value was found to be 1.72 V.

Author keywords

Biopolymer | Cellulose acetate | Primary zinc battery | Transference number

Indexed keywords

Engineering controlled terms: Biomolecules | Biopolymers | Cellulose | Differential scanning calorimetry | Electric batteries | Electrochemical impedance spectroscopy | Energy storage | Fourier transform infrared spectroscopy | Glass transition | Iron compounds | Polyelectrolytes | Solid electrolytes | X ray diffraction analysis

Engineering uncontrolled terms: Biopolymer | Biopolymer electrolyte | Cellulose acetates | Electrochemical characterizations | Ion batteries | Primary zinc battery | Structural characterization | Thermal characterization | Transference number | Zinc ions

Engineering main heading: Zinc compounds

PaperChem Variable: Batteries | Cellulose | Glass Transition Temperature | Infrared Spectroscopy | Iron Compounds | Polyelectrolytes | Stability | Zinc Compounds

Document details - A novel hybrid machine learning framework for the prediction of diabetes with context-customized regularization and prediction procedures

Mathematics and Computers in Simulation

Volume 198, August 2022, Pages 388-406

A novel hybrid machine learning framework for the prediction of diabetes with context-customized regularization and prediction procedures(Article)

Rajagopal, A., Jha, S., Alagarsamy, R., Quek, S.G., Selvachandran, G.

[a]Department of CSBS, Sethu Institute of Technology, Tamilnadu, Virudhunagar, India
[b]Department of Computer Science and Engineering, Chandigarh University, Punjab, India
[c]Department of CSE, University College of Engineering, Tamilnadu, Panruti, India

View additional affiliations

Abstract

This paper proposes a customized hybrid model of artificial neural network (ANN) and genetic algorithms for an efficient diabetes disease prediction framework. Our customized hybrid model uses an improvised technique of detecting the more visible patterns of relations between the variables. Initially, the input medical dataset is preprocessed using a novel normalization technique that works consistently for all degrees of skewness of data. Then, our proposed decision-making algorithm will correctly identify the degree of importance of each variable in influencing the output, and thus priority will be given to the variables that are deemed most important. This is then followed by the implementation of a regularization method that is custom-made for the prediction of diabetes. Such a customized regularization method is considered asymmetrical because the positive numbers are more favored compared to negative numbers, and this was decided based on the characteristics of the dataset. The proposed technique deals with missing numbers as a separate kind of entity compared to numerical entries and can adapt itself to a given dataset. The proposed customized hybrid model and its accompanying decision-making algorithm were applied to the Pima Indian Diabetes dataset sourced from the UCI Machine Learning Repository with an 80% prediction accuracy. © 2022 International Association for Mathematics and Computers in Simulation (IMACS)

Author keywords

Artificial neural network | Asymmetrical regularization | Diabetes prediction | Disease prediction | Genetic algorithm

Indexed keywords

Engineering controlled terms: Decision making | Genetic algorithms | Learning algorithms | Machine learning | Neural networks

Engineering uncontrolled terms: Artificial neural network algorithm | Asymmetrical regularization | Decision-making algorithms | Diabetes prediction | Disease prediction | Hybrid machine learning | Hybrid model | Learning frameworks | Regularisation | Regularization methods

Engineering main heading: Forecasting

Document details - Correction to: Tribological and Mechanical Properties of Hybrid nHAp/ SiO₂/Chitosan Composites Fabricated from Snail Shell Using Grey Rational Grade (GRG) Analysis (Silicon, (2022), 14, 13, (7483-7500), 10.1007/s12633-021-01436-2)

Silicon

Volume 14, Issue 13, August 2022, Page 7501

Correction to: Tribological and Mechanical Properties of Hybrid nHAp/ SiO_2/Chitosan Composites Fabricated from Snail Shell Using Grey Rational Grade (GRG) Analysis (Silicon, (2022), 14, 13, (7483-7500), 10.1007/s12633-021-01436-2)(Erratum)(Open Access)

Gangadharan, T., Kailasanathan, C., Rajkumar, P.R., Perumal, A., Darshini, K.R.C.P.

[a]Centre for Material Research, Department of Mechanical Engineering, Sethu Institute of Technology, Pulloor, Virudhunagar District, Tamilnadu, Kariapatti, 626 115, India
[b]UG Scholar, Department of Bio-Medical Engineering, Sethu Institute of Technology, Pulloor, Virudhunagar District, Tamilnadu, Kariapatti, 626 115, India

Original document

Tribological and Mechanical Properties of Hybrid nHAp/ SiO_2/chitosan Composites Fabricated from Snail Shell Using Grey Rational Grade (GRG) Analysis
(2022) Silicon, 14 (13), pp. 7483-7500.

Abstract

The original version of the article unfortunately contained an error. The affiliation was inadvertently same for all the author's. The correct author name and affiliation footnotes are shown above. The original article has been corrected. © 2021, Springer Nature B.V.

ISSN: 1876990X
Source Type: Journal
Original language: English
DOI: 10.1007/s12633-021-01560-z
Document Type: Erratum
Publisher: Springer Science and Business Media B.V.

Gangadharan, T.; Centre for Material Research, Department of Mechanical Engineering, Sethu Institute of Technology, Pulloor, Virudhunagar District, Tamilnadu, Kariapatti, India;

SciVal Topic Prominence

Document details - Tribological and Mechanical Properties of Hybrid nHAp/ SiO₂/chitosan Composites Fabricated from Snail Shell Using Grey Rational Grade (GRG) Analysis

Silicon

Volume 14, Issue 13, August 2022, Pages 7483-7500

Tribological and Mechanical Properties of Hybrid nHAp/ SiO_2/chitosan Composites Fabricated from Snail Shell Using Grey Rational Grade (GRG) Analysis(Article)

T, G., C, K., P. R, R., A, P., K.R, C.P.D.

UG Scholar, Department of Bio-Medical Engineering, Sethu Institute of Technology, Pulloor, Kariapatti, Tamilnadu, Virudhunagar District, 626 115, India

Update notice

Correction to: Tribological and Mechanical Properties of Hybrid nHAp/ SiO_2/Chitosan Composites Fabricated from Snail Shell Using Grey Rational Grade (GRG) Analysis (Silicon, (2022), 14, 13, (7483-7500), 10.1007/s12633-021-01436-2)

(2022) Silicon, 14 (13), p. 7501.

Abstract

The inorganic nanomaterial plays a crucial role in bone defect repair. Nano hydroxyapatite (nHAp) is the most important inorganic substance that closely resembles the mineral component of natural bone. This study focuses on the synthesis of nHAp $Ca_{10}(PO_4)_6(OH)_2$ from snail shells using dicalcium phosphate dehydrate ($CaHPO_4.2H_2O$, DCPD) at a mole ratio of 4:3 ball milled for 4 h at 150 rpm. The powder is then heat treated at 800°, 900°, and 1000 °C at a rate of 10 °C/min. The crystallite sizes and lattice strain on the peak broadening of the nHAp are studied using the Scherer and Williamson Hall method. The crystallite sizes of nHAp ranges from 16.05 to 21.40 nm using the Scherer method, and from 13.45 to 18.34 nm using the Williamson Hall method, with lattice strain ranging from $\varepsilon = 1.24$ to 0.76 are analyzed. The porosity of nHAp obtained from snail shell is ranged between 81.5 and 84.5 %. It has been enhanced with bio inert ceramics of SiO_2 to boost the mechanical properties of nHAp, which has low fracture toughness and a lack of flexibility. The co-precipitation method has been used to develop the composites of nHAp/SiO_2/chitosan with varying weight percentages. XRD, SEM with EDAX are used to determine the morphology of nHAp particles. The porosity of nHAp/SiO_2/chitosan varies between 78.65 and 85.25 %. The compressive strength of SiO_2-enhanced nHAp/chitosan has reached 43.26 MPa. The tribological behaviour of SiO_2 reinforced nHAp/chitosan at various wt ratios of 10 %, 20 %, and 30 % has been studied using three factors at three levels in a L_9 orthogonal array. The results of the analysis of variance (ANOVA) and grey relational analysis (GRA) have revealed that increasing the amount of adding SiO_2 with nHAp/chitosan composite and the sliding load as well as speed have a significant impact on the tribological performance of the hybrid composites. The multi-response tribological performance is improved significantly when 30 % wt SiO_2 is added. The SEM analysis of the worn surfaces has confirmed that the both the delamination wear mechanism and the abrasive wear are reduced, as the amount of SiO_2 in the composites is increased. The nHAp/SiO_2/chitosan results are comparable to human cancellous bone.

Document details - Carbon Ratio Controlled in-situ Synthesis of Ordered Mesoporous Hybrid Silica/Carbon Materials via Soft Template Method

Silicon

Volume 14, Issue 12, August 2022, Pages 7219-7234

Carbon Ratio Controlled in-situ Synthesis of Ordered Mesoporous Hybrid Silica/Carbon Materials via Soft Template Method(Article)(Open Access)

Shenbagapushpam, M., Muthukumar, T., Muthu Mareeswaran, P., Madasamy, S., Mayappan, S., Abdul Azeez, P.M., Sakthivel, P., Kodirajan, S.

[a]Research Department of Chemistry, Thiagarajar College, Tamil Nadu, Madurai, 625 009, India
[b]Department of Physics, Sethu Institute of Technology, Kariapatti, Tamil Nadu, Virudhunagar, 626 115, India
[c]Department of Industrial Chemistry, Alagappa University, Tamil Nadu, Karaikudi, 630003, India

View additional affiliations

Abstract

A strategy for the synthesis of hybrid ordered mesoporous silica-carbon (Si/C) materials with moderate pore volume and surface area has been developed from the pre-calcinated MCM and the carbon precursor of Tectonagrandis (TG) dry leaves powder by the direct carbon loading method. The carbon precursor of pre-activated carbon (PAC) from the dry leaves powder of TG was prepared with the assistance of sulphuric acid by the partial chemical activation method. The controlled studies of the carbon loading method indicate that the PAC is a better precursor for the preparation of hybrid Si/C material than activated carbon from TG leaves. By this direct carbon loading strategy, the carbon content in the silica matrix is fixed up to 50 weight percentages with respect to silica and renders a novel and highly ordered mesoporous Si/C (OMSC) material. The synthesized hybrid Si/C materials are completely characterized by physico-chemical analyses. The observed 2θ values (2θ = 1.15°, 1.5°, 1.8°) of SAX's analysis, XRD patterns and thermogravimetric analysis of hybrid Si/C materials indicate that the synthesized materials are considerably different from carbon coated Si/C materials. The OMSC hybrid material containing high surface area has been chosen for dye adsorption that exhibits excellent dye adsorption behavior with Methylene Blue (MB) dye up to 97% in a short span of time. The effects of material dosage, contact time and initial concentration of MB dye adsorption were discussed. Adsorption kinetics of the pseudo first order (PFO) and pseudo second order (PSO) model along with adsorption isotherms of Langmuir and Freundlich were verified for the adsorption of MB on $OMSC_2$. The experimental result was best fitted to the pseudo second order kinetic models and Freundlich adsorption isotherm. The calculated maximum adsorption capacity (q_m) (279 mg g^{-1}) is in good agreement with the experimentally observed value, which is higher than other silica-carbon materials.

Author keywords

Adsorption | Hybrid Si/C material | Methylene blue | Ordered mesoporous material | Partial activated carbon | Tectonagrandis

Indexed keywords

Engineering controlled terms: Activated carbon | Adsorption | Adsorption isotherms | Chemical activation | Dyes | Hybrid materials | Mesoporous materials | Silica | Thermogravimetric analysis

Engineering uncontrolled terms: Carbon loadings | Carbon material | Dyes adsorptions | Hybrid silica | Hybrid silicum-carbon material | Methylene Blue | Ordered mesoporous | Ordered mesoporous materials | Partial activated carbon | Tectonagrandi

Document details - RETRACTED ARTICLE: Novel deep learning framework for broadcasting abnormal events obtained from surveillance applications (Journal of Ambient Intelligence and Humanized Computing, (2022), 13, 3, (1-15))

Journal of Ambient Intelligence and Humanized Computing

Volume 13, Issue 8, August 2022, Page 4123

RETRACTED ARTICLE: Novel deep learning framework for broadcasting abnormal events obtained from surveillance applications (Journal of Ambient Intelligence and Humanized Computing, (2022), 13, 3, (1-15))(Erratum)

Krishnaveni, P., Sutha, J.

[a]Department of Computer Science and Engineering, Sethu Institute of Technology, Pulloor, Kariapatti, 626115, India
[b]Department of Computer Science and Engineering, AAA College of Engineering and Technology, Kamarajar Educational Road, Amathur (V), Virudhunagar Main Road, Sivakasi, India

Abstract

The Editor-in-Chief and the publisher have retracted this article. This article was submitted to be part of a guest-edited issue. An investigation concluded that the editorial process of this guest-edited issue was compromised by a third party and that the peer review process has been manipulated. Based on the investigation's findings the Editor-in-Chief therefore no longer has confidence in the results and conclusions of this article. The authors have not responded to correspondence regarding this retraction.

Indexed keywords

Engineering controlled terms: Computer aided instruction, Computer system recovery, Convolution, Deep neural networks, MATLAB, Monitoring, Network routing, Neural networks, Object detection, Object recognition, Wireless sensor networks

Engineering uncontrolled terms: Convolution neural network, Forest environments, Learning frameworks, Multi path routing, Precision and recall, Public Safety Applications, Surveillance applications, Surveillance monitoring

Engineering main heading: Deep learning

ISSN: 18685137
Source Type: Journal
Original language: English
DOI: 10.1007/s12652-019-01668-6
Document Type: Erratum

Document details - Tribological Analysis of Jute/Coir Polyester Composites Filled with Eggshell Powder (ESP) or Nanoclay (NC) Using Grey Rational Method

Fibers

Volume 10, Issue 7, July 2022, Article number 60

Tribological Analysis of Jute/Coir Polyester Composites Filled with Eggshell Powder (ESP) or Nanoclay (NC) Using Grey Rational Method(Article)(Open Access)

Karuppiah, G., Kuttalam, K.C., Ayrilmis, N., Nagarajan, R., Devi, M.P.I., Palanisamy, S., Santulli, C.

[a]Sethu Institute of Technology, Madurai, 626115, India
[b]Centre for Materials Research Lab, Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, 626115, India
[c]Department of Wood Mechanics and Technology, Forestry Faculty, Istanbul University-Cerrahpasa, Bahcekoy, Sariyer, Istanbul, 34473, Turkey

View additional affiliations

Abstract

The wear performance of jute/coir unsaturated polyester composites, filled with eggshell powder (ESP) and nanoclay (NC), were examined, concentrating on two measured parameters, coefficient of friction (COF) and wear rate (WR). To assess the possibilities of this material, a Taguchi study, based on grey relational analysis (GRA), was carried out, based on three testing parameters of the wear performance, load (10, 20, and 30 N), speed (100, 150, and 200 rpm), and sliding distance (30, 40, and 50 m). The material showed promising characteristics especially at high load, low speed, and high sliding distance. When comparing the respective influence of the three different parameters, the speed proved to be the most critical, this suggested the possible application of the biocomposite only for very low values of it. On the other hand, it was also elucidated that the presence and interfacial adhesion of the two fillers considerably hindered the formation of ploughing during wear test, despite the fact that degradation might be continuous and critical as far as loading progresses. © 2022 by the authors.

Author keywords

coefficient of friction | coir | eggshell powder | grey relational analysis | jute | nanoclay | Taguchi | wear rate

ISSN: 20796439
Source Type: Journal
Original language: English
DOI: 10.3390/fib10070060
Document Type: Article
Publisher: MDPI

Santulli, C.; School of Science and Technology, Università degli Studi di Camerino, MC, Camerino, Italy;

Document details - DFO and PI Based Dual Control for Single Stage SEPIC and LLC Based PFC Converter

Journal of Electrical Engineering and Technology

Volume 17, Issue 4, July 2022, Pages 2285-2298

DFO and PI Based Dual Control for Single Stage SEPIC and LLC Based PFC Converter(Article)

Renethaa Desline, D.R., Vijayarajan, S.

Department of Electrical and Electronics Engineering, Sethu Institute of Technology, Pulloor, Kariapatti, 626115, India

Abstract

Power factor correction (PFC) converters are used in many applications and are quickly replacing conventional light source due to its high efficiency and longevity. A standard PFC (LED drives) converter has to adapt with the input voltage variations and provide required load voltage and load current. Simultaneously maintaining unity power factor and delivering high efficiency is considered to be the key requirement. In this paper, a single stage DC/DC PFC converter is studied. A dispersive flies optimization (DFO) and PI based dual control is proposed to improve the power factor and efficiency of the converter. The topology of the selected PFC converter is the integration of SEPIC and LLC circuit. Dual control is proposed to maintain the power factor at unity irrespective of input voltage variations and load changes of the PFC converter. In dual loop, PI is used in outer loop for voltage DC regulation and efficiency improvement. DFO is used in inner loop to control the input current to maintain unity power factor and reduce harmonics. This dual control achieved constant power factor, efficiency and reduced harmonics even with the input voltage variations, load changes with wider control range. The single stage AC–DC converter with dual control is simulated in MATLAB and compared with conventional controller and topologies to prove its superiority. The Dual DFO + PI controller achieved constant average power factor of 0.97 p.u. and 98% efficiency. A small scale prototype of the proposed PFC converter with dual control is designed with input of 220 Vac, 50 Hz and measurements of improved parameters are verified with the theoretical analysis.

Author keywords

Dispersive flies optimization | Dual control | LED drives | Power factor correction

Indexed keywords

Engineering controlled terms: Controllers | DC-DC converters | Efficiency | Light emitting diodes | Power control | Topology

Engineering uncontrolled terms: Dispersive fly optimization | Dual control | Input voltages | LED drives | Optimisations | Power factor corrections | Power factors | Power-factor-correction converters | Single stage | Voltage variation

Engineering main heading: Electric power factor correction

Document details - Novel Carbon Quantum Dotted Reduced Graphene Oxide Nanosheets for Nano-molar Range Cadmium Quantification

Electrocatalysis

Volume 13, Issue 4, July 2022, Pages 435-446

Novel Carbon Quantum Dotted Reduced Graphene Oxide Nanosheets for Nano-molar Range Cadmium Quantification(Article)

RasulKhan, B.B., Ponnaiah, S.K., Balasubramanian, J., Periakaruppan, P.

[a]Department of Chemistry, Thiagarajar College, Tamil Nadu, Madurai, 625 009, India
[b]Department of Civil Engineering, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, 626 115, India

Abstract

A carbon quantum dot (CQD)/reduced graphene oxide (rGO) nanocomposite modified glassy carbon electrode (GCE) was developed as a novel system for electrochemical detection of cadmium ion (Cd). The characterization of the synthesized CQD/rGO nanocomposite was done by Fourier transform infrared, high-resolution transmission electron microscopy, Raman, ultraviolet–visible, and X-ray diffraction analyses. The blending of CQD and rGO provides the sensor with a large surface area, high selectivity, sensitivity, stability, and excellent electrochemical compatibility. The modified CQD/rGO/GCE gives a linear response for Cd ion from 0.5 to 9 nM with a recognition limit of 0.3 nM. Over the studied scan rate, the composite exhibited a diffusion-controlled behavior. The modified electrode showed a good selectivity against interfering species (e.g., Zn^{2+}, Ba^{2+}, Bi^{2+}, Hg^{2+}, Cr^{3+}, Pb^{2+}, Ca^{2+}, Ni^{2+}, Mg^{2+}, and Cu^{2+}) with good reproducibility. This proposed detection system was proved to be cost-effective, precise, and easy to apply for environment monitoring such as groundwater, river water, and industrial effluents. Graphical abstract: [Figure not available: see fulltext.] © 2022, The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.

Author keywords

Cd ion | CQD/rGO | Electrochemical sensor | Modified electrode | Voltammetry

ISSN: 18682529
Source Type: Journal
Original language: English
DOI: 10.1007/s12678-022-00732-8
Document Type: Article
Publisher: Springer

Periakaruppan, P.; Department of Chemistry, Thiagarajar College, Tamil Nadu, Madurai, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Automatic localization of inferior alveolar nerve canal in panoramic dental images

Signal, Image and Video Processing

Volume 16, Issue 5, July 2022, Pages 1389-1397

Automatic localization of inferior alveolar nerve canal in panoramic dental images(Article)

Pandyan, U.M., Arumugam, B., Gurunathan, U., Kopuli Ashkar Ali, S.H.

[a]Department of ECE, Thiagarajar College of Engineering, Tamil Nadu, Madurai, India
[b]Department of Oral and Maxillofacial Surgery, CSI College of Dental Science and Research, Tamil Nadu, Madurai, India
[c]Department of ECE, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, India

Abstract

Dental implants and maxillofacial procedures need forecast planning to circumvent inferior alveolar nerve canal (IAC) damage. Advancement in image processing techniques aids in the automation of IAC localization in maxillofacial regions of cone beam computed tomography-reconstructed panoramic X-ray images and reduces the complexities during the procedure. The proposed technique has been implemented on dental panoramic images and it involves intensity mapping and contrast limited adaptive histogram equalization technique to enhance the image and further the enhanced image is segregated as upper and lower jaws using B-spline technique. Then, the lower jaw is divided into two portions by vertical integral projection technique. Subsequently, the edge region of tooth and canal regions has been obtained by local phase congruency system. The predominant edge points extracted in the previous step are considered as Binary Robust Invariant Scalable Key points, which in turn are considered the feature descriptors for IAC segmentation. The feature points falling within the range of coordinates are connected using curve fitting approach to distinguish the IAC. Next, the performance of the work has been evaluated and finally it is compared with the recent techniques. The proposed method provides a higher accuracy of 92% and improved dice coefficient of 0.829 ± 0.13 compared to the deep learning method. This method provides the enhanced results and it has an ability to guide the dentist for the preoperative diagnostic process to locate the IAC successfully as well as to minimize the complexities associated with oral surgery and implantology.

Author keywords

Inferior alveolar nerve canal detection | Oral surgery and implantology | Phase congruency | Pre-diagnostic measurement of IAC

Indexed keywords

Engineering controlled terms: Computerized tomography | Curve fitting | Deep learning | Dental prostheses | Hydraulic structures | Image enhancement | Image reconstruction

Engineering uncontrolled terms: Automatic localization | Diagnostic measurements | Implantology | Inferior alveolar nerve canal detection | Inferior alveolar nerves | Measurements of | Oral surgery and implantology | Phase congruency | Pre-diagnostic measurement of inferior alveolar nerve canal

Engineering main heading: Surgery

Document details - Charge Density Based Small Signal Modeling for InSb/AlInSb Asymmetric Double Gate Silicon Substrate HEMT for High Frequency Applications

Silicon

Volume 14, Issue 11, July 2022, Pages 6009-6018

Charge Density Based Small Signal Modeling for InSb/AlInSb Asymmetric Double Gate Silicon Substrate HEMT for High Frequency Applications(Article) (Open Access)

Kumar, T.V., Venkatesh, M., Muthupandian, B., Priya, G.L.

[a]Department of Electronics and Communication Engineering, Nadar Saraswathi College of Engineering and Technology, Vadapudupatti, Tamil Nadu, Theni Allinagaram, 625531, India
[b]School of Electronics and Communication Engineering, REVA University, Karnataka, Bengaluru, 560064, India
[c]Department of Electronics and Communication Engineering, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, 626115, India

View additional affiliations

Abstract

This paper proposes the Asymmetric Double Gate Silicon Substrate HEMT (ADG-Si-HEMT) to study the carrier concentration and intrinsic small signal parameters of the InSb/AlInSb silicon wafer DG-HEMT device. The HEMTs work as a three-port system and the device is named Asymmetric Double Gate HEMT when the top and bottom gates are biased with different gate voltages. The position of quasi-Fermi energy levels (E_f) is used to investigate the modulation of back-channel charge density caused by the front gate voltage. Also, the small signal model is obtained for a various parameters such as cut off frequency, gate to source capacitance and transconductance. To enhance device operation, the effects of the following factors are being investigated delta doping, drain current for various top and bottom gate voltages. The transconductance 2390 Sm/mm for V_{fg} = 0.2 V and cut off frequency around 197 GHz for V_{bg} = 0.3 are obtained. The analytical results are compared to the results of the Sentaurus 3-D TCAD simulation. Because of the variation in threshold voltage and modifying carrier density in dual channels, the asymmetric biassing approach has a wide range of mixed applications. © 2021, Springer Nature B.V.

Author keywords

Capacitance | Double gate HEMT | Indium Antimonide | Semiconductor | TCAD

Indexed keywords

Engineering controlled terms: Capacitance | Carrier concentration | Drain current | III-V semiconductors | Indium antimonides | Semiconducting antimony compounds | Silicon wafers | Substrates | Threshold voltage | Transconductance

Engineering uncontrolled terms: Analytical results | Device operations | Double gate silicon | Gate to source capacitances | High-frequency applications | Small signal model | Small signal parameters | TCAD simulation

Engineering main heading: High electron mobility transistors

Silicon

Volume 14, Issue 10, July 2022, Pages 5393-5400

Metallographic Characterization of SiC-Ni-Ti Layer Reinforced on Austenitic Stainless Steel (AISI 316L) by Two-step Laser Fabrication(Article)(Open Access)

Kannan, C.R., Manivannan, S., Stalin, B., Kailasanathan, C.

View additional authors

Save all to author list

[a]Department of Mechanical Engineering, Dr. Navalar Nedunchezhiyan College of Engineering, Tholudur, Tamil Nadu, Cuddalore, 606 303, India
[b]Department of Mechanical Engineering, Karpagam Academy of Higher Education, Tamil Nadu, Coimbatore, 641 021, India
[c]Department of Mechanical Engineering, Anna University, Regional Campus Madurai, Tamil Nadu, Madurai, 625 019, India
[d]Centre for Materials Research, Department of Mechanical Engineering, Sethu Institute of Technology, Pulloor, Tamil Nadu, Kariapatti, 626 115, India

View additional affiliations

Abstract

Industry X.0 is the new paradigm that is the driving phenomenon in the process of making things and the new method in which they are produced. In this work, we attempt to fabricate ceramic layer reinforced metal matrix composite (MMC) of AISI 316 L by a two-step laser process. The SiC-Ni-Ti layer on AISI316L serves to improve wear properties. The reinforcement of SiC-Ni-Ti on AISI316L modified the phase structure and microstructure. Coatings of metal-ceramic powders of 40 % SiC-40 %Ti-20 % Ni and 60 % SiC-30 %Ti-10 % Ni was preplaced on 316 L specimens. High power laser was used to irradiate the preplaced coatings to form MMCs of metal-ceramic particles. The composition of the MMC layer was studied by using optical emission spectroscopy (OES) and its microstructure of the MMC layers, phase analysis and its elemental analysis were characterized by optical and scanning electron microscopy (SEM), X-ray diffractometry, and image analyzing techniques, respectively. The formation of non-uniformity of coating thickness, microporous and crack formation at layer of MMC, revealed that a higher percentage of ceramic particles present in the MMC layer entails a particular disadvantage. The results confirmed the high hardness of the surface due to particle refinement with dispersion of hard SiC particle and precipitation of Cr_2C_3/Fe_2Si in the matrix that results the improved wear resistance of laser clad material. © 2021, Springer Nature B.V.

Author keywords

AISI316 | Ceramic | Laser cladding | Metallographic characterization | MMC | SiC-Ni-Ti

Indexed keywords

Engineering controlled terms: Chromium compounds | Coatings | Fabrication | High power lasers | Iron compounds | Metal analysis | Metal cladding | Metallic matrix composites | Metals | Microstructure | Optical emission spectroscopy | Powders | Precipitation (chemical) | Scanning electron microscopy | Silicon | Silicon carbide | Thickness measurement | Wear of materials | Wear resistance | X ray diffraction analysis

Engineering uncontrolled terms: Ceramic particle | Coating thickness | Image analyzing | Laser fabrication | Non-uniformities | Optical emission spectroscopies (OES) | Reinforced metal matrix composites | Structure and microstructures

Document details - Meta-Heuristic Algorithm-Tuned Neural Network for Breast Cancer Diagnosis Using Ultrasound Images

Frontiers in Oncology

Volume 12, 13 June 2022, Article number 834028

Meta-Heuristic Algorithm-Tuned Neural Network for Breast Cancer Diagnosis Using Ultrasound Images(Article)(Open Access)

Ahila, A., Poongodi, P., Bourouis, S., Band, S.S., Mosavi, A., Agrawal, S., Hamdi, M.

[a]Department of Electronics and Communication Engineering, Sethu Institute of Technology, Kariapatti, India
[b]College of Science and Engineering, Hamad Bin Khalifa University, Qatar Foundation, Doha, Qatar
[c]Department of Information Technology, College of Computers and Information Technology, Taif University, Taif, Saudi Arabia

View additional affiliations

Abstract

Breast cancer is the most menacing cancer among all types of cancer in women around the globe. Early diagnosis is the only way to increase the treatment options which then decreases the death rate and increases the chance of survival in patients. However, it is a challenging task to differentiate abnormal breast tissues from normal tissues because of their structure and unclear boundaries. Therefore, early and accurate diagnosis and classification of breast lesions into malignant or benign lesions is an active domain of research. Over the decade, numerous artificial neural network (ANN)-based techniques were adopted in order to diagnose and classify breast cancer due to the unique characteristics of learning key features from complex data via a training process. However, these schemes have limitations like slow convergence and longer training time. To address the above mentioned issues, this paper employs a meta-heuristic algorithm for tuning the parameters of the neural network. The main novelty of this work is the computer-aided diagnosis scheme for detecting abnormalities in breast ultrasound images by integrating a wavelet neural network (WNN) and the grey wolf optimization (GWO) algorithm. Here, breast ultrasound (US) images are preprocessed with a sigmoid filter followed by interference-based despeckling and then by anisotropic diffusion. The automatic segmentation algorithm is adopted to extract the region of interest, and subsequently morphological and texture features are computed. Finally, the GWO-tuned WNN is exploited to accomplish the classification task. The classification performance of the proposed scheme is validated on 346 ultrasound images. Efficiency of the proposed methodology is evaluated by computing the confusion matrix and receiver operating characteristic (ROC) curve. Numerical analysis revealed that the proposed work can yield higher classification accuracy when compared to the prevailing methods and thereby proves its potential in effective breast tumor detection and classification. The proposed GWO-WNN method (98%) gives better accuracy than other methods like SOM-SVM (87.5), LOFA-SVM (93.62%), MBA-RF (96.85%), and BAS-BPNN (96.3%) Copyright © 2022 A, M, Bourouis, Band, Mosavi, Agrawal and Hamdi.

Author keywords

breast cancer detection | computer-aided diagnosis | supervised learning | texture features | ultrasound imaging | wavelet neural network

Indexed keywords

EMTREE medical terms: Article | artificial neural network | breast cancer | cancer diagnosis | computer aided design | controlled study | diagnostic test accuracy study | female | genetic algorithm | human | image processing | image segmentation | metaheuristics | program efficacy | receiver operating characteristic | sensitivity analysis | sensitivity and specificity | ultrasound

Document details - Epileptic EEG signal classifi ations based on DT-CWT and SVM classifier

Journal of Engineering Research (Kuwait)

Volume 10, Issue 2 A, June 2022, Pages 95-104

Epileptic EEG signal classifications based on DT-CWT and SVM classifier(Article) (Open Access)

Deivasigamani, S., Narmadha, G., Senthilpari, C., Yong, W.H., Rajesh, P.K.

[a]Faculty of Engineering and Computer Technology, AIMST University, Malaysia
[b]Department of Electrical and Electronics Engineering, Sethu Institute of Technology, Tamilnadu, India
[c]Faculty of Engineering, Multimedia University, Malaysia

View additional affiliations

Abstract

Contamination in human cerebrum causes the mind issue, which is epilepsy. The contaminated territory in the cerebrum area creates the unpredictable example signals as focal signs, and the other sound locales in the mind produce the standard example signals as nonfocal sign. Henceforth, the discovery of focal signs from the nonfocal signs is significant for epileptic medical procedure in epilepsy patients. This paper proposes a straightforward and proficient technique for Electroencephalogram (EEG) signals orders utilizing Support Vector Machine (SVM) classifier. The exhibition of the proposed EEG signals characterization framework is assessed for Sensitivity, Specificity, and Accuracy. © 2022 University of Kuwait. All rights reserved.

Author keywords

Epilepsy | Epileptogenic area | Focal | Neural networks | SVM

ISSN: 23071885
Source Type: Journal
Original language: English
DOI: 10.36909/jer.10523
Document Type: Article
Publisher: University of Kuwait

Deivasigamani, S.; Faculty of Engineering and Computer Technology, AIMST University, Malaysia;

Document details - Performance of implantable antenna at ISM band characteristics for biomedical base

ICT Express

Volume 8, Issue 2, June 2022, Pages 198-201

Performance of implantable antenna at ISM band characteristics for biomedical base(Article)(Open Access)

Narmadha, G., Malathi, M., Kumar, S.A., Shanmuganantham, T., Deivasigamani, S.

[a]Sethu Institute of Technology, Madurai, India
[b]Adhiparasakthi Engineering College, India
[c]Jyothishmathi Institute of Technology & Science, Karimnagar, India

View additional affiliations

Abstract

A novel and small sized implantable antenna has been proposed for scientific industrial & medical (ISM) band applications. The proposed antenna is — shaped antenna and it is a circular patch antenna which has been designed based on the previous research articles and the lower size is achieved by implementing different miniaturization techniques. The radiating structure has a circular shaped patch and it has fillet edges with square shape. The back reflections have been avoided by extending the ground plane over the complete plane. The proposed antenna has been structured by using ROGER 3010 substrate which has the thickness of 1.6 mm and dielectric permittivity of 10.2 in order to achieve the geometries of an antenna with rigidity, the proposed structure has been designed. This antenna structure is operated at 2.45 GHz with the most recommended omni-directional pattern that has been used for transmitting with other in body devices. © 2021 The Korean Institute of Communications and Information Sciences (KICS)

Author keywords

2.45 GHz | Bio-medical application | Implantable antenna

ISSN: 24059595
Source Type: Journal
Original language: English
DOI: 10.1016/j.icte.2021.05.009
Document Type: Article
Publisher: Korean Institute of Communication Sciences

Narmadha, G.; Sethu Institute of Technology, Madurai, India;

Document details - Mechanical properties of hybrid vetiver/banana fiber mat reinforced vinyl ester composites

Journal of Industrial Textiles

Volume 51, Issue 4, June 2022, Pages 5869S-5886S

Mechanical properties of hybrid vetiver/banana fiber mat reinforced vinyl ester composites(Article)

Stalin, A., Mothilal, S., Vignesh, V., Sanjay, M.R., Siengchin, S.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, India
[b]Natural Composites Research Group Lab, King Mongkut's University of Technology North Bangkok, Bangkok, Thailand

Abstract

Green sustainable life and biofibers play a vital role in achieving eco-friendly environment and great opportunities for fabricating the products. This work focused on the effect of the hybrid mat as reinforcement in vetiver/banana fiber mat reinforced vinyl ester composites. Composites plates were fabricated at 45° and 90° directions in ten different combinations by the compression molding machine. The mechanical properties of composites plates were tested as per ASTM standard. The morphological behaviour of tested specimens were evaluated by SEM. The hybrid double-layer fiber mat composites in longitudinal direction exhibit optimum results in tensile and flexural properties. However, it is found that vetiver double-layer fiber mat composites at 90° direction, indicating better impact strength than a banana and hybrid fiber mat composites. SEM images provided that composite properties are dependent on interface bonding between the fibers and matrix. © The Author(s) 2020.

Author keywords

banana fiber | scanning electron microscope | tensile strength | vetiver fiber

Indexed keywords

Engineering controlled terms: ASTM standards | Compression molding | Esters | Fibers | Green manufacturing | Impact strength | Mechanical properties | Reinforcement

Engineering uncontrolled terms: Composite properties | Double layers | Eco-friendly | Interface bonding | Longitudinal direction | Properties of composites | Tensile and flexural properties | Vinylester composites

Engineering main heading: Fiber bonding

PaperChem Variable: Compression Molding | Esters | Fibers | Impact Strength | Mechanical Properties | Reinforcement

ISSN: 15280837
CODEN: JINTF
Source Type: Journal
Original language: English

DOI: 10.1177/1528083720938161
Document Type: Article
Publisher: SAGE Publications Ltd

Document details - Twitter Sentiment Analysis Using Social-Spider Lex Feature-Based Syntactic-Senti Rule Recurrent Neural Network Classification

International Journal of Uncertainty, Fuzziness and Knowlege-Based Systems

Volume 30, 1 May 2022, Pages 45-66

Twitter Sentiment Analysis Using Social-Spider Lex Feature-Based Syntactic-Senti Rule Recurrent Neural Network Classification(Article)

Anuratha, K., Parvathy, M.

[a]Department of Information Technology, Sri Sai Ram Institute of Technology, Tamil Nadu, Chennai, India
[b]Anna University, Tamil Nadu, Chennai, India
[c]Department of Computer Science and Engineering, Sethu Institute of Technology, Tamil Nadu, Pulloor, India

Abstract

Social platforms have become one of the major sources of unstructured text. Investigating the unstructured text and interpreting the meaning is a complex job. Sentiment Analysis is an emerging approach as the social platforms have lot of opinionated data.1 It uses language processing, classification of texts and linguistics to retrieve the opinions from the text. Twitter is a micro blogging site which is popular amongst the social users as it is a vast open data-platform and it witnesses lot of sentiments. Twitter Sentiment Analysis is a process of automatic mining of user tweets for opinions, emotions, attitude to derive useful insights into community opinions and classify the opinions as well. Due to the enormous increase in the number of collaborative tweets, it has become complex to identify the terms that carries sentiments. Also, the unstructured tweets may have non-relevant terms and reduce the classification accuracy. To address these issues, we propose a Social-Spider Lex Feature Ensemble Model-Based Syntactic-Senti Rule prediction Recurrent Neural Network Classifier (S2LFEM-S2RRNN) to obtain better classification accuracy. Twitter is used as source of data and we have extracted the tweets using Twitter API. Initially, data pre-processing is done to remove unwanted data, symbols and content terms are extracted to improvise the dataset. Then, the significant lexical content terms are extracted employing the proposed Social Spider Lex Feature Ensemble Model (S2LFEM) based on Syntactic-Senti Rule Prediction. The semantics4 of the terms are analysed on the verbs, subjectivity of the tweet patterns to count the overall weightage of tweets. Based on tweet weightage Recurrent Neural Network is trained to classify the tweets int to positive, negative and neutral. The experiment results show that the proposed classifier outperforms the existing models for sentiment classification in terms of accuracy with a performance score 94.1%.

Author keywords

Lexical | pre-processing | semantic analysis | sentiment analysis | Social-Spider Lex Feature Ensemble Model (S2LFEM) | Syntactic-Senti Rule prediction Recurrent Neural Network (S2RRNN) | twitter

Indexed keywords

Engineering controlled terms: Complex networks | Data handling | Forecasting | Open Data | Semantics | Sentiment analysis | Social networking (online) | Syntactics

Document details - Kinematic Study of Radio-Loud CMEs Associated with Solar Flares and DH Type-II Radio Emissions During Solar Cycles 23 and 24

Solar Physics

Volume 297, Issue 5, May 2022, Article number 57

Kinematic Study of Radio-Loud CMEs Associated with Solar Flares and DH Type-II Radio Emissions During Solar Cycles 23 and 24(Article)(Open Access)

Pappa Kalaivani, P., Prakash, O., Shanmugaraju, A., Michalek, G., Selvarani, G.

[a]Department of Physics, Ultra College of Engineering and Technology for Women, Ultra Nagar, Madurai, 625 104, India
[b]Department of Physics, Sethu Institute of Technology, Pulloor, Kariapatti, Tamil Nadu, Viruthunagar, 626 115, India
[c]Department of Physics, Arul Anandar College, Karumathur, Tamil Nadu, Madurai, 625 514, India

View additional affiliations

Abstract

We have statistically analyzed 379 radio-loud (RL) CMEs and their associated flares during the period 1996 – 2019 covering both Solar Cycles (SC) 23 and 24. We classified them into two populations based on the observation period: i) 235 events that belong to SC 23 (August 1996 – December 2008) and ii) 144 events that belong to SC 24 (January 2009 – December 2019). For both cycles, the mean sky-plane speed, projection corrected speed (space speed), and initial acceleration of RL CMEs are found to be similar. Moreover, the average residual acceleration of RL CMEs in SC 24 (–17.39 ±43.51 m s^{-2}) is twice lower than that of the RL CMEs in SC 23 (–8.29 ±36.23 m s^{-2}), which means that the deceleration of RL CMEs in SC 24 is twice as fast as in SC 23. RL CMEs reach their peak speed at higher altitudes in SC 23 (1443 ±504 km s^{-1}; 13.82 ±7.40 $R_{\odot}$) than SC 24 (1920 ±649 km s^{-1}; 12.51 ±7.41 $R_{\odot}$). We also observed that the mean apparent widths of RL CMEs in SC 23 are less than in SC 24, which is statistically significant. SC 23 has a lower average CME nose height (3.85 $R_{\odot}$) at the start time of DH type-II bursts than that of SC 24 (3.46 $R_{\odot}$). The starting frequencies of DH type-II bursts associated with RL CMEs for SC 24 are significantly larger (formed at lower heights) than those of SC 23. We found that there is a good correlation between the drift rates and the midfrequencies of DH type-II radio bursts for both of these solar cycles (R=2 0.80, ε = 1.53). Most of the RL CMEs kinematics and their associated solar-flare properties are found to be similar for SC 23 and SC 24. The annual variations for the general population of CMEs are well consistent with the mean sunspot number but small variations in halo and RL CMEs are observed. We concluded that the reduced total pressure in the heliosphere for SC 24 enables RL CMEs to expand wider and decelerate faster, resulting in DH type-II radio emissions at lower heights than for SC 23.

Author keywords

DH type-II radio bursts | Radio-loud CMEs | Solar cycle | Solar flares | Sun | Sunspots

Funding details

Funding sponsor	Funding number	Acronym
National Aeronautics and Space Administration See opportunities by NASA		NASA

Document details - Electrochemical behavior of MnO₂/MWCNT nanocomposites for electrode material in supercapacitor

Materials Letters

Volume 314, 1 May 2022, Article number 131887

Electrochemical behavior of MnO_2/MWCNT nanocomposites for electrode material in supercapacitor(Article)

Ramesh Kannan, R., Lenin, N., Aseema Banu, A., Sivabharathy, M.

[a]Research and Development Centre, Bharathiar University, Coimbatore, 641 046, India
[b]Department of Physics, Sethu Institute of Technology, Tamil Nadu, Kariapatti, 626 115, India

Abstract

This study presents the findings of MnO_2 tailoring in MWCNT for supercapacitor applications. Using a solvothermal method, we developed the MnO_2/MWCNT nanocomposites with high energy storage capacity. The XRD peaks revealed the hexagonal structure of graphite and the tetragonal structure of birnessite type MnO_2. TEM revealed that the MWCNT sidewalls were decorated with a huge number of high purity manganese nanoparticles. According to CV studies, the composite electrode's specific capacitance exceeds 314F/g. As per the researchers, the tailored MnO_2/MWCNT nanocomposites should promote the best electrode material for supercapacitor applications. © 2022 Elsevier B.V.

Author keywords

Carbon nanotubes | High specific capacitance | Nanocomposites | Supercapacitor

Indexed keywords

Engineering controlled terms: Capacitance | Electrochemical electrodes | Manganese oxide | Multiwalled carbon nanotubes (MWCN) | Nanocomposites

Engineering uncontrolled terms: Electrochemical behaviors | Electrode material | Energy storage capacity | Hexagonal structures | High specific capacitances | MWCNT's | Solvothermal method | Supercapacitor application | Tetragonal structure | XRD peaks

Engineering main heading: Supercapacitor

ISSN: 0167577X
CODEN: MLETD
Source Type: Journal
Original language: English

DOI: 10.1016/j.matlet.2022.131887
Document Type: Article
Publisher: Elsevier B.V.

Ramesh Kannan, R.; Research and Development Centre, Bharathiar University, Coimbatore, India;

Cited by 4 documents

Palaniappan, P. , Uvarani, R.
Effects of copper substitution on the structural, electrical, and magnetic properties of zinc and lanthanum (Zn1–xCu<... nanoferrites
(2023) Physica B: Condensed Matter

Mohsen Momeni, M. , Mohammadzadeh Aydisheh, H. , Lee, B.-K.
Effectiveness of MnO2 and V2O5 deposition on light fostered supercapacitor performance of WTiO2 nanotube: Novel electrodes for photo-assisted supercapacitors
(2022) Chemical Engineering Journal

Redkin, A.N. , Mitina, A.A. , Yakimov, E.E.
Binder-Free MnO2/MWCNT/Al Electrodes for Supercapacitors
(2022) Nanomaterials

View details of all **4** citations

Inform me when this document is cited in Scopus:
Set citation alert > Set citation feed >

Related documents

Find more related documents in Scopus based on:
Authors > Keywords >

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - A simple triphenylamine based turn-off fluorescent sensor for copper (II) ion detection in semi-aqueous solutions

Journal of Photochemistry and Photobiology A: Chemistry

Volume 427, 1 May 2022, Article number 113850

A simple triphenylamine based turn-off fluorescent sensor for copper (II) ion detection in semi-aqueous solutions(Article)

Mohanasundaram, D., Bhaskar, R., Lenin, N., Nehru, K., Rajagopal, G., Kumar, G.G.V., Rajesh, J.

[a]Chemistry Research Centre, Mohamed Sathak Engineering College, Tamil Nadu, Kilakarai 623 806, India
[b]Department of Chemistry, School of Advanced Sciences, Vellore Institute of Technology, Tamilnadu, Vellore, 632014, India
[c]Department of Physics, Sethu Institute of Technology, Kariapatti 626115, Tamilnadu, Virudhunagar, India

View additional affiliations

Abstract

An efficient donor triphenylamine aldehyde Schiff-base with p-toluene sulfonyl hydrazine fluorescent probe (TPA-PTH) was synthesized and characterized by various spectroscopic techniques. The probe TPA-PTH displayed drastic color changes with Cu^{2+} ions over metal ions in aqueous environment with a fluorescence-off mechanism.The detection limit of Cu^{2+} was found to be 1.25×10^{-8} M by using the equation LOD = K × SD/S. The 2:1 binding stoichiometric mode of TPA-PTH with Cu^{2+} ion was further tested by HR mass and Job's plot analyses. Furthermore, the proposed probe has been effectively applied to determine the trace amount of Cu^{2+} ions in different water samples with 96%~98% recoveries. The sensing mechanism of TPA-PTH was further investigated by Density Functional Theory (DFT) calculations using a Gaussian 16 program. DFT calculations were theoretically supported the experimental findings. © 2022

Author keywords

Cu^{2+}sensors DFT Fluorescence Schiff base Triphenylamine

Funding details

Funding text

The author D.M. sincerely acknowledges Mohamed Sathak Engineering College, Kilakarai for their lab facilities. Authors G.G.V.K and J.R thanks to Saveetha School of Engineering, Saveetha University for supporting research activities.

ISSN: 10106030
CODEN: JPPCE
Source Type: Journal
Original language: English
DOI: 10.1016/j.jphotochem.2022.113850
Document Type: Article
Publisher: Elsevier B.V.

Kumar, G.G.V.; Department of Chemistry, Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Tamilnadu, Chennai 602 105, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Cited by 9 documents

Kucukbasmaci, H. , Aydin, D.
Optical and quantitative sensing capability of phenolphthalein derived Schiff base chromo-fluorogenic sensor for Cu^{2+}
(2023) Journal of Photochemistry and Photobiology A: Chemistry

Gangatharan Vinoth Kumar, G. , Bhaskar, R. , Harathi, J.
Selective colorimetric signaling of mercury (II) ions using a quinoline-based probe with INHIBIT logic gate behavior and test strip
(2023) Inorganic Chemistry Communications

Butnaru, I. , Constantin, C.-P. , Damaceanu, M.-D.
Optimization of triphenylamine-based polyimide structure towards molecular sensors for selective detection of heavy/transition metal ions
(2023) Journal of Photochemistry and Photobiology A: Chemistry

View details of all **9** citations

Inform me when this document is cited in Scopus:

Set citation alert Set citation feed

Related documents

Find more related documents in Scopus based on:

Authors Keywords

Document details - Investigation into Mechanical, Thermal and Water Absorption Behaviors of Cocos nucifera Shell Filler Reinforced Vinyl Ester Polymeric Composites

Journal of Polymers and the Environment

Volume 30, Issue 5, May 2022, Pages 2142-2154

Investigation into Mechanical, Thermal and Water Absorption Behaviors of Cocos nucifera Shell Filler Reinforced Vinyl Ester Polymeric Composites(Article)

David Gnanaraj, J., Mothilal, S., Vignesh, V., Karthick, T., Ismail, S.O., Rajini, N., Raja Mohamed Rabi, B., Siengchin, S., Mohammad, F.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Tamilnadu, Kariapatti, 626115, India
[b]School of Mechanical Engineeirng, Vellore Institute of Technology, Vellore, 632014, India
[c]Department of Engineering, School of Physics, Engineering and Computer Science, University of Hertfordshire, Hertfordshire, Hatfield, AL10 9AB, United Kingdom

View additional affiliations

Abstract

Recently, natural filler reinforced polymer composites are important materials for various engineering applications. Hence, this present work focuses on utilization of Cocos nucifera shell powder (CNSP) as a filler in vinyl ester (VE) resin to produce particulate composite specimens. The particulate composite plates with various weights or filler contents from 5 to 30 wt% were fabricated, using compression molding technique. The fabricated composites were subjected to tensile, flexural, impact, hardness, heat deflection and swelling behavior tests to obtain their corresponding material properties. Energy dispersive X-ray analysis was carried out on the C. nucifera shell powder/vinyl ester (CNSP/VE) composite specimens to investigate into the presence of their elements, in addition to the aforementioned tests. From the experimental results obtained, it was observed that the optimum mechanical properties of CNSP/VE composites were obtained at 15 wt% of filler content, having tensile, flexural and impact strengths of 38.70, 105.13 MPa and 33.04 kJ/m^2, respectively. Also, the heat deflection temperature results varied from 158 (0 wt%, neat VE resin) to 171 °C along various percentages of filler contents. Lastly, the morphological study/analysis of the fractured CNSP/VE composite specimens was conducted by using a scanning electron microscope (SEM) to confirm the experimental data/results obtained. It was evident that CNSP/VE composite structures could be potential substitutes for some synthetic composites. Also, they are suitable for various engineering applications in aerospace, electrical/electronics and automobile industries, based on their properties.

Author keywords

Cocos nucifera shell powder (CNSP) | Fracture mode | Mechanical properties | Swelling behavior | Thermal property | Vinyl ester (VE)

Indexed keywords

Engineering controlled terms: Compression molding | Energy dispersive X ray analysis | Esters | Impact strength | Reinforcement | Resins | Scanning electron microscopy | Shells (structures) | Swelling | Tensile strength | Water absorption | X ray diffraction analysis

Engineering uncontrolled terms: Coco nucifera shell powder | Cocos nucifera | Composite specimens | Filler contents | Fracture mode | Shell powder | Swelling behavior | Vinyl ester | Vinyl esters | Vinylester composites

Document details - Synthesis, vibrational Depictions, IRI interpretations and docking research on coordination metal complex Diaqua aspartato zinc (II) monohydrate using DFT approach

Journal of Molecular Liquids

Volume 351, 1 April 2022, Article number 118687

Synthesis, vibrational Depictions, IRI interpretations and docking research on coordination metal complex Diaqua aspartato zinc (II) monohydrate using DFT approach(Article)

Divya Dexlin, X.D., Deephlin Tarika, J.D., Sethuram, M., Joselin Beaula, T.

[a]Reg.No:19213082132004, Research Scholar, Department of Physics and Research Centre, Malankara Catholic College, Tamil Nadu, Kaliyakkavilai, 629153, India
[b]Reg.No:19213082132003, Research Scholar, Department of Physics and Research Centre, Malankara Catholic College, Tamil Nadu, Kaliyakkavilai, 629153, India
[c]Department of Chemical Engineering, Sethu Institute of Technology, Pulloor, Kariapatti-626115 Tamilnadu, Virudhunagar, India

View additional affiliations

Abstract

In this study, the anti-viral metal coordination complex Diaqua aspartato zinc (II) Monohydrate (DAZM) was grown and its functional outcomes were depicted using Infrared and Raman spectra. For the computational calculations, the Gaussian software package with the B3LYP functional method was implemented to find the optimised parameters of DAZM and correlated them with the experimental data. With the aid of the SQM method, scaled wavenumbers for all the modes of vibration have been deliberated from the PED results. The donor–acceptor interactions were studied to inspect the molecular stability and bond strength. HOMO, LUMO and ESP analyses were done using DFT, whereas, the absorption band in the UV–vis spectrum was predicted and compared with the experimental data. The interactions obtained in the coordination compound were investigated through NCI, DORI and IRI analyses. The docking parameters were studied with SARS-CoV-2 spike glycoproteins and the minimum binding energy was calculated. With the aid of Lipinski's rule, drug likeness test was done for the DAZM molecule and using the ADMET contour the molecule is suggested as a part of medications. © 2022 Elsevier B.V.

Author keywords

ADMET | Docking | DORI | IR | IRI | NCI

Indexed keywords

Engineering controlled terms: Absorption spectroscopy | Binding energy | Complexation | Coordination reactions | Design for testability | Diseases | Metal complexes | SARS | Zinc compounds

Engineering uncontrolled terms: ADMET | Computational calculations | Coordination complex | Docking | DORI | Infrared and Raman spectra | IR | IRI | Metal coordination | NCI

Engineering main heading: Molecules

Document details - Outer complete fair domination in graphs

Discrete Mathematics, Algorithms and Applications

Volume 14, Issue 3, 1 April 2022, Article number 2150126

Outer complete fair domination in graphs(Article)

Swaminathan, V., Sundareswaran, R., Lalkshmanaraj, D., Muthusubramanian, L.

[a]Ramanujan Research Center in Mathematics, Saraswathi Narayanan College, Tamilnadu, Madurai, India
[b]Department of Mathematics, Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam, Tamilnadu, Chennai, 603 110, India
[c]Department of Mathematics, Sethu Institute of Technology, Tamilnadu, Madurai, India

View additional affiliations

Abstract

Graphs considered here are simple, finite and undirected. A graph is denoted by G and its vertex set by V (G) and edge set by E(G). Kulli and Janakiram introduced the concept of the strong non-split domination number of a graph [The strong non-split domination number of a graph, Int. J. Manag. Syst. 19 (2003) 2]. The concept of fair domination was introduced by Yaro Caro et al. in [Fair domination in graphs, Discrete Math. 312 (2012) 2905–2914]. This paper is an outcome of the combination of these two concepts. © World Scientific Publishing Company

Author keywords

Fair domination | outer complete | totally disconnected

ISSN: 17938309
Source Type: Journal
Original language: English
DOI: 10.1142/S1793830921501263
Document Type: Article
Publisher: World Scientific

Document details - Studies on Egg Shell and Si[illegible]forced Hybrid Metal Matrix Composite for Tribological Applica[illegible]ions

Silicon

Volume 14, Issue 5, April 2022, Pages 1959-1967

Studies on Egg Shell and SiC Reinforced Hybrid Metal Matrix Composite for Tribological Applications(Article)

Arunkumar, S., Kumar, A.S.

[a]RMK College of Engineering and Technology, Tamilnadu, Chennai, India
[b]Sethu Institute of Technology, Virudhunagar Dist., Tamilnadu, India

Abstract

The hybrid metal matrix composite is developed through stir casting process. In theAl7075 aluminium matrix material, two different combination of reinforcements are used to make hybrid composite and they are as (i) Al7075 + Al_2O_3 + SiC and (ii) Al7075 + Al_2O_3 + egg shell powder. The weight proportion of SiC and egg shell powder varied to study the influence of reinforcement. To validate the hybrid composite developed, electron microscopic imaging, density and hardness measured. Maximum surface hardness of 197 Hv is observed in the composite with 6% egg shell powder. The presence organic egg shell is in the form of calcium oxide which is harder than carbide particle reinforced in the hybrid composite material. It has posse's natural strength compared to synthetic material and with less in density.The density of egg shell is less compared to SiC and alumina particle reinforcement. Electron images and the corresponding spectroscopic results infer that the reinforcements are equal distributed in the volume of composite. While casting the egg shell has been found in the form of calcium oxide along with aluminium and oxide elements. Since, the composite has less density which is light in weight compared to alumina or silicon carbide. With respect to sliding wear behaviour, the hybrid composite with Sample 1 (3% SiC) and Sample 4 (6% egg shell) has good wear resistance. With increase in hard particle the wear mechanism is abrasion and metal loss trend found increasing. The minimum of 0.25 mm^3/min found with less load (10 N) and 0.42 mm^3/min for 20 N load. On prolonged exposure more than 40 µm reached for maximum load. Increase in hard particle reinforcement (6% Al_2O_3 + 6% SiC) has induced severe surface damage due to abrasion on worn surface. Adhesive morphology and minimum wear are noticed with 6% Al_2O_3 + 6% SiC in hybrid composite. Therefore, it is confirmed that the reduced in hard particle or increase in egg shell may produce expected results on sliding wear behaviour. © 2021, Springer Nature B.V.

Author keywords

Aluminium | Egg shell | Hardness | Hybrid composite | Properties | SEM | Wear

Indexed keywords

Engineering controlled terms: Abrasion | Adhesives | Alumina | Aluminum oxide | Calcium oxide | Erosion | Hardness | Lime | Metal casting | Metallic matrix composites | Morphology | Particle reinforced composites | Powder metals | Shells (structures) | Silicon carbide | Tribology | Wear resistance

Engineering uncontrolled terms: Alumina particles | Carbide particles | Hybrid composite materials | Hybrid metal matrix composites | Microscopic imaging | Sliding wear behaviour | Synthetic materials | Tribological applications

Engineering main heading: Reinforcement

Document details - Generic object detection using deep learning

AIP Conference Proceedings

Volume 2444, 31 March 2022, Article number 0078487

2021 AICTE Sponsored National Online Conference on Data Science and Intelligent Information Technology; Department of Computer Science and Engineering, National Engineering CollegeKovilpatti; India; 14 May 2021 through 15 May 2021; Code 178400

Generic object detection using deep learning(Conference Paper)

Malathi, M., Paramasivam, C., Nagalakshmi, K., Christiana, G., Sangeetha, S.

[a]Department of Computer Science and Engineering, Sethu Institute of Technology, Tamilnadu, Virudhu Nagar, India
[b]Department of Mechanical Engineering, Thiagarajar College of Engineering, Tamilnadu, India

Abstract

Object discovery is one of the very important and challenging problems in computer computing, seeks to obtain the properties of objects from a large number of categories previously described in natural images. In particular, image classification that aims to see the semantic categories of objects in a given image. Object discovery is not only identifies item categories but also predicts the location of each item with a mandatory box. Semantic separation process aims to predict intelligent pixel separation to assign a specific category label to each pixel, thus providing a richer and more comprehensive understanding of the image. In depth learning strategies have emerged as a powerful strategy for reading presentations directly from the data and have led to significant success in the field of general acquisition. Given this period of rapid evolution, the aim of this paper is to provide a comprehensive analysis of the latest achievements in this field brought about in-depth learning strategies. Here, the deep learning object detection algorithm is implemented for accuracy and time effectiveness to show the correct label for a character of interest in a movie which will be more useful in surveillance of building, ATM centres etc. Finally, it concludes with a promising indication for future research. © 2022 Author(s).

ISSN: 0094243X
ISBN: 978-073544187-3
Source Type: Conference Proceeding
Original language: English
DOI: 10.1063/5.0078487
Document Type: Conference Paper
Volume Editors: Gomathi V.,Kalaivani V.
Publisher: American Institute of Physics Inc.

Malathi, M.; Department of Computer Science and Engineering, Sethu Institute of Technology, Tamilnadu, Virudhu Nagar, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Polyoxymethylene/talc composite: Investigation of warpage, mechanical and thermal properties for thin walled-injection molding applications

Journal of Applied Polymer Science

Volume 139, Issue 10, 10 March 2022, Article number 51762

Polyoxymethylene/talc composite: Investigation of warpage, mechanical and thermal properties for thin walled-injection molding applications(Article)

Kailasanathan, C.K., Saravanan, S.T., Natarajan, E., Stalin, B.

[a]Centre for Material Research, Department of Mechanical Engineering, Sethu Institute of Technology, Tamilnadu, India
[b]Department of Plastic Technology, V.S.V.N. Polytechnic College, Virudhunagar, Tamilnadu, India
[c]Faculty of Engineering, Technology and Built Environment, UCSI University, Kuala Lumpur, Malaysia

View additional affiliations

Abstract

The warpage in injection-molded thin-walled components is a research challenge for many years. Polyoxymethylene (POM) composite was prepared with various weight fractions of talc to investigate the reduction in warpage and its effect on mechanical properties such as tensile, compressive, impact, and thermal properties like Vicat softening point and heat deflection temperature (HDT). The uniform distribution of talc fillers is confirmed in Fourier transform infrared (FTIR) examinations. The talc is found to act as a nucleation agent and affect the crystallinity of POM. It is found from differential scanning calorimetry (DSC) analysis that the percentage of crystallinity is increased with respect to the weight percent of talc fillers and reached a minimum at POM/1 wt% and maximum at POM/3 wt% Talc. The 12% of reduction in warpage is observed in POM/1 wt% Talc polymer composite but it has a 45% increase in impact strength, though it loses the tensile, compressive, and thermal properties by 2%–3%. Meanwhile, the superior mechanical properties are observed in POM/3 wt% Talc polymer composite, but with more warpage than other samples. The present study revealed that the composite with 1% wt loading is suitable to high impact application with lower warpage in thin-walled molding. The DSC, scanning electron microscopic, X-ray diffraction, FTIR, HDT, and Vicat softening point results are presented to support the investigations. © 2021 Wiley Periodicals LLC.

Author keywords

composites | crystallization | mechanical properties | molding | thermal properties

Indexed keywords

Engineering controlled terms: Acetal resins | Composite materials | Crystallinity | Differential scanning calorimetry | Fillers | Fourier transform infrared spectroscopy | Impact strength | Injection molding | Talc

Engineering uncontrolled terms: % reductions | Cristallinity | Fourier transform infrared | Heat deflection temperature | Mechanical and thermal properties | Polymer composite | Polyoxymethylene | Thin-walled | Vicat softening point | Warpages

Engineering main heading: Thermodynamic properties

Document details - Smart agriculture monitoring system for outdoor and hydroponic environments

Indonesian Journal of Electrical Engineering and Computer Science

Volume 25, Issue 3, March 2022, Pages 1679-1687

Smart agriculture monitoring system for outdoor and hydroponic environments(Article)(Open Access)

Edwin, B., Veemaraj, E., Parthiban, P., Devarajan, J.P., Mariadhas, V., Arumuganainar, A., Reddy, M.

[a]Department of Computer Science and Engineering, Karunya Institute of Technology and Sciences, Coimbatore, India
[b]Department of Information Technology, PSNA College of Engineering and Technology, Dindigul, India
[c]Department of Information Technology, Francis Xavier Engineering College, Tirunelveli, India

View additional affiliations

Abstract

Agriculture plays an important role in economic aspects in most countries like India. Numerous problems associated with farming are continuously affecting the actions that are happening in the country. A potential resolution for such issues to be eradicated, one should combine the technological advancements with current ongoing agricultural practices. Good agricultural practice will increase crop productivity and reduce unwanted water usage. Many authors have done research on temperature, nutrition, and pH-controlled systems. But no one concentrated on alert messages sent to the mobile phone. The main objective of the proposed system measures various natural aspects that use a global system for mobile communication (GSM) module that is connected to an Arduino to transfer the data that is obtained by the sensors to an internet of things (IoT) application programming interface (API) which is a kind of cloud computing of obtained data, this data can be analyzed if needed, and an alert short message service (SMS) is sent to the cell phone/mobile phone. The alert message can be done through conversational artificial intelligence (CAI). It is the collection of technologies behind triggering the message that will be sent automatically to the mobile as an SMS if any of the sensor values that are generating are not under already specified threshold values.

Author keywords

Alert messages | Communication | Conversational artificial | Global system for mobile | Intelligence | Internet of things | Smart agriculture

ISSN: 25024752
Source Type: Journal
Original language: English
DOI: 10.11591/ijeecs.v25.i3.pp1679-1687
Document Type: Article
Publisher: Institute of Advanced Engineering and Science

Veemaraj, E.; Department of Computer Science and Engineering, Karunya Institute of Technology and Sciences, Tamilnadu, Coimbatore, India;

Concurrent Engineering Research and Applications

Volume 30, Issue 1, March 2022, Pages 116-127

Deep learning based fusion model for COVID-19 diagnosis and classification using computed tomography images(Article)(Open Access)

Subhalakshmi, R.T., Balamurugan, S.A.A., Sasikala, S.

[a]Department of Information Technology, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, India
[b]Department of Computer Science, Central University of Tamil Nadu, Tamil Nadu, Thiruvarur, India
[c]Department of Computer Science and Engineering, Velammal College of Engineering and Technology, Tamil Nadu, Madurai, India

Abstract

Recently, the COVID-19 pandemic becomes increased in a drastic way, with the availability of a limited quantity of rapid testing kits. Therefore, automated COVID-19 diagnosis models are essential to identify the existence of disease from radiological images. Earlier studies have focused on the development of Artificial Intelligence (AI) techniques using X-ray images on COVID-19 diagnosis. This paper aims to develop a Deep Learning Based MultiModal Fusion technique called DLMMF for COVID-19 diagnosis and classification from Computed Tomography (CT) images. The proposed DLMMF model operates on three main processes namely Weiner Filtering (WF) based pre-processing, feature extraction and classification. The proposed model incorporates the fusion of deep features using VGG16 and Inception v4 models. Finally, Gaussian Naïve Bayes (GNB) based classifier is applied for identifying and classifying the test CT images into distinct class labels. The experimental validation of the DLMMF model takes place using open-source COVID-CT dataset, which comprises a total of 760 CT images. The experimental outcome defined the superior performance with the maximum sensitivity of 96.53%, specificity of 95.81%, accuracy of 96.81% and F-score of 96.73%. © The Author(s) 2021.

Author keywords

convolutional neural network | COVID-19 | Deep learning multimodal fusion | deeplearning | Gaussian Naïve Bayes | weiner filtering

Indexed keywords

Engineering controlled terms: Computer aided diagnosis | Computerized tomography | Image classification | Image fusion

Engineering uncontrolled terms: Computed tomography images | Diagnosis model | Experimental validations | Feature extraction and classification | Maximum sensitivity | Multi-modal fusion | Radiological images | Weiner filtering

Engineering main heading: Deep learning

ISSN: 1063293X
CODEN: CRAPE
Source Type: Journal
DOI: 10.1177/1063293X211021435
Document Type: Article
Publisher: SAGE Publications Ltd

Document details - Experimental research and CFD analysis on double pipe heat exchanger with CuO nano particle suspended in cold water

Journal of Thermal Analysis and Calorimetry

Volume 147, Issue 5, March 2022, Pages 3831-3838

Experimental research and CFD analysis on double pipe heat exchanger with CuO nano particle suspended in cold water(Article)

Kannadhasan, V., Senthil Kumar, A., Vairamuthu, J., Nagarajan, R.

[a]Department of Mechanical Engineering, Solamalai College of Engineering, Madurai Dist., Tamilnadu, Madurai, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Virudhunagar Dist., Tamilnadu, Kariapatti, India
[c]Department of Electrical and Electronics Engineering, Gnanamani College of Technology, Namakkal Dist., Tamilnadu, Namakkal, India

Abstract

In this paper, the heat transfer rate of CuO nanoparticle suspended cold-water flow in a double pipe heat exchanger is evaluated. The average size of CuO nanoparticles is 35 nm is dissolved in deionized water, flowing in the counter direction of a hot-water pipe. The velocity and the discharge rate were maintained constant and the dispersion rate of CuO nanoparticles was varied (0, 0.1, 0.2, and 0.3 mass%). The system inlet temperature (hot water) was 50 °C and the cold-water inlet temperature was found to vary with respect to the suspended particle proportion. The experimental results showed that the CuO nanoparticle has highly influenced to reduce the cold-water inlet temperature and heat transferred rate found to be drastically increased from 183 to 3488 kW. Subsequently, with appropriate input details and boundary conditions, the experimentation was simulated with valid computation fluid dynamics software. Simulated results confirmed that the lower concentration of CuO nanoparticle had less impact compared to that of higher concentration of suspended particles. It is found that the experimental results and simulated data found to be very similar, and hence it is confirmed that the proposed model can be executed for different heat exchanger designs. © 2021, Akadémiai Kiadó, Budapest, Hungary.

Author keywords

CFD | CuO nano particle | Double pipe heat exchanger | Heat transfer

Indexed keywords

Engineering controlled terms: Computational fluid dynamics | Copper oxides | Deionized water | Flow of water | Heat transfer | Nanoparticles | Particle size analysis | Water | Water pipelines

Engineering uncontrolled terms: Computation fluid dynamics | Double-pipe heat exchangers | Experimental research | Heat exchanger design | Heat transfer rate | Inlet temperature | Simulated results | Suspended particles

Engineering main heading: Heat exchangers

ISSN: 13886150
CODEN: JTACF
Source Type: Journal
Original language: English

DOI: 10.1007/s10973-021-10804-4
Document Type: Article
Publisher: Springer Science and Business Media B.V.

Document details - Evaluation of Neuro Images for the Diagnosis of Alzheimer's Disease Using Deep Learning Neural Network

Frontiers in Public Health

Volume 10, 7 February 2022, Article number 834032

Evaluation of Neuro Images for the Diagnosis of Alzheimer's Disease Using Deep Learning Neural Network(Article)(Open Access)

Ahila, A., Poongodi, M., Hamdi, M., Bourouis, S., Rastislav, K., Mohmed, F.

[a]Department of Electronics and Communication Engineering, Sethu Institute of Technology, Kariapatti, India
[b]College of Science and Engineering, Hamad Bin Khalifa University, Qatar Foundation, Doha, Qatar
[c]Department of Information Technology, College of Computers and Information Technology, Taif University, Taif, Saudi Arabia

View additional affiliations

Abstract

Alzheimer's Disease (AD) is a progressive, neurodegenerative brain disease and is an incurable ailment. No drug exists for AD, but its progression can be delayed if the disorder is identified at its initial stage. Therefore, an early analysis of AD is of fundamental importance for patient care and efficient treatment. Neuroimaging techniques aim to assist the physician in the diagnosis of brain disorders by using images. Positron emission tomography (PET) is a kind of neuroimaging technique employed to create 3D images of the brain. Due to many PET images, researchers attempted to develop computer-aided diagnosis (CAD) to differentiate normal control from AD. Most of the earlier methods used image processing techniques for preprocessing and attributes extraction and then developed a model or classifier to classify the brain images. As a result, the retrieved features had a significant impact on the recognition rate of previous techniques. A novel and enhanced CAD system based on a convolutional neural network (CNN) is formulated to address this issue, capable of discriminating normal control from Alzheimer's disease patients. The proposed approach is evaluated using the 18FDG-PET images of 855 patients, including 635 normal control and 220 Alzheimer's disease patients from the ADNI database. The result showed that the proposed CAD system yields an accuracy of 96%, a sensitivity of 96%, and a specificity of 94%, leading to splendid performance when related to the methods already in use that are specified in the literature. Copyright © 2022 A, M, Hamdi, Bourouis, Rastislav and Mohmed.

Author keywords

accuracy | Alzheimer's disease | convolutional neural network | deep learning | feature extraction | image analysis | image classification and positron emission tomography

Funding details

Funding sponsor	Funding number	Acronym
Taif University	TURSP-2020/26	TU

Funding text

The authors would like to thank Taif University Researchers Supporting Project (number TURSP-2020/26), Taif University, Taif, Saudi Arabia.

Document details - Shape memory effect of Cu_xAl_{1-x}nitinol/MWCNT nanocomposites for actuators in MEMS

Sensors and Actuators A: Physical

Volume 334, 1 February 2022, Article number 113327

Shape memory effect of Cu_xAl_{1-x}nitinol/MWCNT nanocomposites for actuators in MEMS(Article)

Kannan, R.R., Sivabharathy, M., Lenin, N.

[a]Research and Development Centre, Bharathiar University, Coimbatore, 641046, India
[b]Department of Physics, Sethu Institute of Technology, Kariapatti, Tamil Nadu 626115, India

Abstract

CuAlNiTi SMA's are fashionable because of their wide range of useful transformation temperatures, minimal hysteresis, and low price. Carbon nanotubes have a high thermal conductivity and can be used as a heat transfer medium. We want to combine SMA's and CNT's in this study to boost the cycling frequencies of SMA's nano composites by using CNT's superior heat transmission. The nanocomposites (Cu_xAl_{1-x}-NiTi/MWCNT) (x = 0.0, 0.5, and 1.0). FESEM, EDS, XRD, and TEM demonstrate that a nano-sized nitinol material uniformly concealed the exterior of the MWCNT during the doping process, preserving the sole structure of the pristine MWCNT. The phase transformation temperature from Martensite to Austenite and vice versa is measured using differential scanning calorimetry. The materials hysteresis property is investigated using a vibrating sample magnetometer. The greatest yield strength of the Cu-Al-NiTi/MWCNT nanocomposites is 593 MPa, with an elastic modulus of 103 GPa and an ultimate tensile strength of 857 MPa. For the Cu_xAl_{1-x}NiTi/MWCNT nanocomposites, the shape recovery and deformation ratios rose from 6.23 to 6.72 and 56–70%, respectively. The shape memory effect may exist with a wide range of transformation temperatures, according to the results of the Cu-Al-NiTi/MWCNT composite. The materials can be employed as electrical and thermal actuators in MEMS, according to the research. © 2021 Elsevier B.V.

Author keywords

Carbon nanotubes | Nano composites | Shape memory alloys

Indexed keywords

Engineering controlled terms: Actuators | Aluminum alloys | Copper alloys | Differential scanning calorimetry | Heat transfer | Hysteresis | Multiwalled carbon nanotubes (MWCN) | Shape optimization | Shape-memory alloy | Tensile strength | Thermal conductivity | Titanium alloys

Engineering uncontrolled terms: Cycling frequencies | Heat transfer media | Heat transmission | High thermal conductivity | Lowest price | MWCNT's | Nano composite | Shape-memory effect | Transformation temperatures | XRD

Engineering main heading: Nanocomposites

ISSN: 09244247
CODEN: SAAPE
Source Type: Journal
DOI: 10.1016/j.sna.2021.113327
Document Type: Article
Publisher: Elsevier B.V.

Document details - Prototype rhenium metallocavitand with four exocyclic cavities for small molecules

Journal of Organometallic Chemistry

Volume 959, 1 February 2022, Article number 122123

Prototype rhenium metallocavitand with four exocyclic cavities for small molecules(Article)

Kedia, M., Priyatharsini, M., Sathiyashivan, S.D., Shankar, B., Krishnakumar, R.V., Sathiyendiran, M.

[a]School of Chemistry, University of Hyderabad, Hyderabad, 500046, India
[b]Department of Physics, Thiagarajar College, Madurai, 625009, India
[c]Department of Chemistry, Sethu Institute of Technology, Kariapatti, 626 115, India

Abstract

Neutral trinuclear metallocavitand possessing three-types of molecular receptor units (A, B, and C; four exocyclic calixarene-shaped cavities (A and C) and one endocyclic cavity (B)) suitable to accommodate small ion/neutral molecules were obtained from $Re_2(CO)_{10}$, benzimidazole, and 1,3,5-tris(benzimidazol-1-ylmethyl)benzene in a one-pot approach. © 2021

Author keywords

Benzimidazole | Cage | Calixarene | Cavitand | Rhenium | Supramolecules

Indexed keywords

Engineering controlled terms: Molecules | Rhenium

Engineering uncontrolled terms: Benzimidazoles | Cage | Calixarenes | Cavitands | Molecular receptors | Neutral molecules | Small ions | Small molecules | Supramolecules | Trinuclear

Engineering main heading: Phenols

Funding details

Funding sponsor	Funding number	Acronym
University of Hyderabad		UoH

Funding text

We thank University of Hyderabad, and UGC-India (CAS, UPE programs) for financial support. MS thanks Isha Mishra for her help in the preliminary host:guest studies.

ISSN: 0022328X
CODEN: JORCA
Source Type: Journal
Original language: English

DOI: 10.1016/j.jorganchem.2021.122123
Document Type: Article
Publisher: Elsevier B.V.

Document details - Performance Improvement of 16 Bus System using Hybrid Power Flow Controller

International Conference on Automation, Computing and Renewable Systems, ICACRS 2022 - Proceedings

2022, Pages 1441-1447

1st IEEE International Conference on Automation, Computing and Renewable Systems, ICACRS 2022; Mount Zion College of Engineering and Technology (MZCET)Pudukkottai; India; 13 December 2022 through 15 December 2022; Category numberCFP22CB5-ART; Code 186576

Performance Improvement of 16 Bus System using Hybrid Power Flow Controller(Conference Paper)

Hemalatha, S., Gomathi, S., Devikala, S., Naresh, C., Gnanaprakash, M., Senthil Murugan, M.

[a]St. Joseph's Institute of Technology, Chennai, India
[b]Saveetha School of Engineering, SIMATS, Chennai, India
[c]Sethu Institute of Technology, Kariapatti, India

View additional affiliations

Abstract

The Hybrid Power Flow Controller, also known as an HPFC, is an appealing FACTS device that can be placed between the sending end and the receiving end. The appropriate Reboots converter between the solar energy system, the battery system, and the capacitor of the HPFC. The voltage sag compensation and improvement of the dynamic response in a 16-bus system using a hybrid power flow controller are the subjects of this work (HPFC). The Dynamic Voltage Regulator (DVR) and the Active Filter are both components that are included in the High-Performance Flexible Coupler (HPFC) system (AF). The 16-Bus systems with and without HPFC are modeled and simulated using the blocks of MATLAB. It has been observed that the incorporation of HPFC results in an increase in both the real and reactive power that is supplied to the load. The HPFC system has a number of benefits, including the capability to compensate for voltage sag and a reduction in loss. In the current work, the High-Power Frequency Converter (HPFC) is proposed to improve the Power Quality of a 16-bussystem. © 2022 IEEE

Author keywords

16-Bus | hybrid power flow controller | Power Quality | Reactive Power | Real Power | voltage sag

Indexed keywords

Engineering controlled terms: Controllers | Electric load flow | Flexible AC transmission systems | Flow control | Power control | Power quality | Solar energy | Voltage regulators

Engineering uncontrolled terms: 16-bus | Battery systems | Bus systems | Coupler systems | Hybrid power flow controllers | Performance | Real power | Solar energy systems | Voltage sag compensation | Voltage sags

Engineering main heading: Reactive power

Document details - Nitrogen (N2) based antenna design for real-time mechanical applications

Materials Today: Proceedings

2022

Nitrogen (N2) based antenna design for real-time mechanical applications

(Article in press ?)

(Open Access)

Srinivas Rao, M.P., Revathi, S., Rajaprasanna, R., Vijay Muni, T., Asha, A., Manoj Prabaharan, A.

[a]Department of Basic Sciences and Humanities, GMR Institute of Technology, Andhra Pradesh, Rajam, 532127, India
[b]Department of Electrical and Electronics Engineering, Kongunadu College of Engineering and Technology, Thottiyam, India
[c]Department of Mechanical Engineering, Sri Sairam Engineering College, India

View additional affiliations

Abstract

Precious stone's solitary nitrogen (NV) concealing centers are versatile contort based quantum sensors. For sensor applications, continually screen the unrest of the NV place with microwaves in the foreordained repeat extent of 2.5 GHz and 3.5 GHz. In this article, we will introduce an individual assessed level microwave recieving wire that enables strong treatment of Rotary NV. With confined diversion worked in, the ideal recieving wire arrangement was found. The recieving wire is made dependent on humble direct glass. Exactly when diverse NV natural surroundings get rabbi frequencies up to 10 MHz, they produce a lot of like microwave districts in the extent of around 400 × 400 μm. The Nitrogen Vacuum Center for Diamond (NV) has formed into an adaptable atomic like structure that researches a wide collection of uses in cryogenic and including temperature quantum information and metrology. At room temperature, the NV people group is amazingly engaging as a sensor. For example, biocompatible nanothermometry, magnetometer, pressure assessment, electric field assessment. NV can go probably as a quantum resistor with significant standard quantum doorway and similitude period of seconds These applications are significantly dependent upon the re-appearance of a consistent state. This is unquestionably not an outrageous advancement reliant upon what is called intersystem change (ISC). This grants non-reverberating optical start and go situations to be examined electronically. © 2021

Author keywords

Diamond | Microwave antenna | Nitrogen vacancy centres | Spin manipulation

Indexed keywords

Engineering controlled terms: Biocompatibility | Electric fields | Microwave sensors | Nitrogen | Quantum optics | Wire

Engineering uncontrolled terms: Antenna design | Field assessment | Mechanical | Nitrogen-vacancy center | Quantum Information | Quantum metrology | Quantum sensors | Real- time | Sensor applications | Spin manipulation

Engineering main heading: Microwave antennas

Document details - Electroencephalogram Data Analysed Through the Lens of Machine Learning to Detect Signs of Epilepsy

4th International Conference on Inventive Research in Computing Applications, ICIRCA 2022 - Proceedings

2022, Pages 898-902

4th International Conference on Inventive Research in Computing Applications, ICIRCA 2022; Coimbatore; India; 21 September 2022 through 23 September 2022; Category numberCFP22N67-ART; Code 185672

Electroencephalogram Data Analysed Through the Lens of Machine Learning to Detect Signs of Epilepsy(Conference Paper)

Rajalakshmi, J., Ranjani, S.S., Sugitha, G., Prabanand, S.C.

[a]Sethu Institute of Technology, Research Scholar Department of Computer Science and Engineering, Kariyapatti, India
[b]Muthayammal Engineering College, Department of Computer Science and Engineering, Rasipuram, India
[c]Bannari Amman Institute of Technology, Department of Artificial Intelligence and Data Science, Sathyamangalam, India

Abstract

As most epileptic seizures only happen infrequently the EEG is essential for the categorization and diagnosis of epilepsy. Empirical interpretation of a first EEG has a low sensitivity (between 29 and 55% [29-55 percent]) when applied to adult patients. During EEG epochs in which seizures are not present, valuable EEG data is buried among the signals and is thus inaccessible to any clinician who does not have specialized training in EEG analysis. In order to distinguish people with generalized epilepsy from the general population, we create a multi-variate technique employing EEG data to comprehend the functional connectivity of the brain at the sensor level. The temporal, periodic, and time-frequency domains were probed using five different measurements to investigate eight distinct connection properties. The K-Nearest Neighbor method was used to evaluate the solution, and the results were compared to two groups: the first consisted of patients with epilepsy, and the second consisted of patients who had nonepileptic episodes. Both EG and HC groups demonstrated high levels of classification accuracy (89%), although EG showed significant spatial-temporal abnormalities in the front central regions at the beta frequency band compared to HC. Classification accuracy for EG and NEAD was only approximately 79% because of the well-documented comorbidity of NEAD and epileptic episodes. This study suggests that seizure-free EEG data may be used to reliably differentiate between those with HC and those with specialized epilepsy. Although more research is needed to develop a diagnostic tool that might aid in treatment. © 2022 IEEE.

Author keywords

EEG | Epilepsy | Health care | K-Nearest Neighbor | Machine Learning

Indexed keywords

Engineering controlled terms: Electroencephalography | Motion compensation | Nearest neighbor search | Neurophysiology | Population statistics

Engineering uncontrolled terms: Adult patients | Classification accuracy | Epilepsy | Epileptic seizures | K-near neighbor | Low sensitivity | Machine-learning | Nearest-neighbour | Specialized training | Through the lens

Document details - Analysis of Alzheimer Disease with K Means Algorithm and PSO Segmentation

MysuruCon 2022 - 2022 IEEE 2nd Mysore Sub Section International Conference

2022

2nd IEEE Mysore Sub Section International Conference, MysuruCon 2022; Mysuru; India; 16 October 2022 through 17 October 2022; Category numberCFP22AJ0-ART; Code 185083

Analysis of Alzheimer Disease with K Means Algorithm and PSO Segmentation(Conference Paper)

Gantela, P., Ilankumaran, S., Arunachalam, M., Selvaprasanth, P., Senthamilselvan, R.

[a]Mizan Tepi University, Department of Information Technology, Tepi Campus, Ethiopia
[b]Thiagarajar College of Engineering, Madurai, India
[c]Sri Krishna College of Engineering and Technology, TamilNadu, Coimbatore, India

View additional affiliations

Abstract

A senile dementia is severe brain syndrome and damage remembrances as combined brain range minimize which finally get quick failure. In previous analysis of AD is crucial as growth of extra main healing. Support Vector Machine (SVM), a division of artificial intelligence, utilizes a diversity based on development methods are allows computer to achieve from huge and compound set of information. As a consequence, analyst focuses on machine learning regularly analysis of prior phase of AD. This research extant an analysis and serious assessment of the new effort finished prior recognition of AD using SVM methods. More technique attains capable calculation of accuracy though estimate on various restorative unverified set of information from various picture method building hard to construct a light similarity with the entire. Also, several aspects like pre-processing, number of significant quality for feature selection, category inequality typically change measurement of precision. To avoid these issues a form is proposed which include early pre-processing stage pursue by essential quality collection and arrangement is attain by connection tenet excavating. In addition, projected method gives exact route for investigating prior analysis of AD and possible to differentiate AD from strong power. Alzheimer Disease (AD) at prior step is extremely hard chore for physician to recognize. MRI images are more flat to blare and cause extra physical intrusion. So it becomes hard for physician to recognize Alzheimer (AD) Disease. Hence computer to find Alzheimer Disease (AD) from imagery with the help of K-means algorithm and Particle Swarm Organization (PSO) segmentation. For converting normal picture into grayscale picture by using GLCM (Gray Level Co-occurrence Matrix) technique utilized. Also Wiener filter (WF) utilized into picture and eliminate noise. But edges of the image are not sharp in early stage of brain clots. So image segmentation used to recognize boundaries of the imagery in the Alzheimer Disease (AD) by utilizing MAT LAB tool.

Author keywords

Alzheimer Disease (AD) | Gray Level Co-occurrence Matrix (GLCM) | K-means Algorithm | Particle Swarm Organization (PSO) segmentation | Support Vector Machine (SVM) classifier | Wiener Filter (WF)

Indexed keywords

Engineering controlled terms: Image segmentation | K-means clustering | Magnetic resonance imaging | Neurodegenerative diseases | Particle swarm optimization (PSO)

Document details - Effect of Mg₂Sn Alloy on Silicon Substrate and Its Mechanical Properties with Its Resistivity Measurement

Materials Horizons: From Nature to Nanomaterials

2022, Pages 157-166

Effect of Mg_2Sn Alloy on Silicon Substrate and Its Mechanical Properties with Its Resistivity Measurement(Book Chapter)

Ayeshamariam, A., Sivaranajani, S., Beer Mohamed, S., Ismail Fathima, M., Sivabharathy, M., Jayachandran, M., Kaviyarasu, K.

[a]Department of Physics, Khadir Mohideen College (Affiliated to Bharathidasan University, Thiruchirappalli), Tamil Nadu, Adirampattinam, 614701, India
[b]Department of Physics, St. Antony's College of Arts and Sciences for Women, Thamaraipadi, Tamil Nadu, Dindigul, 624005, India
[c]Department of Material Science, Central University of Tamil Nadu, Tamil Nadu, Thiruvarur, 610001, India

View additional affiliations

Abstract

Metal oxide and semiconducting alloys can be synthesized efficiently using sonochemistry. Ultrasonic chemistry is a branch of study in which chemical reactions are triggered by waves with frequencies ranging from 20 kHz to 1 MHz Water is rapidly transformed to hydrogen peroxide in a sonication bath with a power of 0.3 W/cm, as is well known. In humans, tin oxide is a moderate irritant that has a pulmonary effect. Mild irritation of the eyes and skin has occurred because of exposure. Tin oxide should be kept in well-sealed containers in a cool, dry, well-ventilated location. Tin oxide containers should be kept away from acids and alkalies and should be protected against physical damage. To make magnesium tin alloys by using the electron beam evaporation process and coating the same precursor material on a siliconglass substrate to make magnesium tin alloys. © 2022, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

ISSN: 25245384
Source Type: Book Series
Original language: English
DOI: 10.1007/978-981-19-2639-6_7
Document Type: Book Chapter
Publisher: Springer Nature

Ayeshamariam, A.; Department of Physics, Khadir Mohideen College (Affiliated to Bharathidasan University, Thiruchirappalli), Tamil Nadu, Adirampattinam, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Curcumin loaded gold nanoparticles–chitosan/sodium alginate nanocomposite for nanotheranostic applications

Journal of Biomaterials Science, Polymer Edition

2022

Curcumin loaded gold nanoparticles–chitosan/sodium alginate nanocomposite for nanotheranostic applications

(Article in press)

Kolathupalayam Shanmugam, B., Rajendran, N., Arumugam, K., Rangaraj, S., Subramani, K., Srinivasan, S., Nayagam, L., Aicher, W.K., Venkatachalam, R.

[a]Centre for Nano Science and Technology, K. S. Rangasamy College of Technology, Tamil Nadu, Tiruchengode, India
[b]Department of Biotechnology, Sona College of Arts and Science, Tamil Nadu, Salem, India
[c]Laboratory of Cyanobacterial Biotechnology, Department of Biochemistry, Faculty of Science, Chulalongkorn University, Bangkok, Thailand

View additional affiliations

Abstract

A solvent casting technique was used for the preparation of biomimetic nanocomposites scaffolds at three various concentrations of Curcumin loaded gold nanoparticles (Cur-AuNPs-1, 1.5, and 2 ml) as filler materials with chitosan-sodium alginate composite. The physico-chemical properties of prepared Cu-Au NPs and biomimetic nanocomposites were analyzed using various characterization techniques. In vitro biocompatibility of biomimetic nanocomposites are determined using simulated body fluid for biomineralization property, HAp formation and phosphate buffer saline (PBS) for swelling property, protein adsorption. Antibacterial activity of Cur-Au NPs and their nanocomposites carried out against Escherichia coli (E. coli) and Staphylococcus aureus. In vitro cytotoxicity of Cur-AuNPs is identified against UC-6 and MDA-MB 231 cell lines. The use of above studies and activity of Cur-AuNPs with contain biomimetic nanocomposites can adoptable for nanotheranostics.

Author keywords

bioactivity | Curcumin | nano gold | polymeric composite

Indexed keywords

Engineering controlled terms: Biocompatibility | Biomimetics | Body fluids | Cell culture | Escherichia coli | Fiber optic sensors | Gold alloys | Gold nanoparticles | Metal nanoparticles | Nanocomposites | Scaffolds (biology) | Sodium alginate | Swelling

Engineering uncontrolled terms: Biomimetic nanocomposites | Casting techniques | Curcumin | Gold nanoparticle | Gold Nanoparticles | In-vitro | Nano-gold | Nanotheranostics | Polymeric composites | Solvent-casting

Engineering main heading: Chitosan

Document details - Electrodeposition of Cobalt Oxide Nanoparticles on Stainless Steel for Electrocatalytic Water Oxidation

Topics in Catalysis

2022

Electrodeposition of Cobalt Oxide Nanoparticles on Stainless Steel for Electrocatalytic Water Oxidation

(Article in press)

Jebakumar Immanuel Edison, T.N., Atchudan, R., Perumal, S., Bothi Raja, P., Perumal, V., Lee, Y.R.

[a]School of Chemical Engineering, Yeungnam University, Gyeongsan, 38541, South Korea
[b]School of Chemical Sciences, Universiti Sains Malaysia, Gelugor, Pulau Pinang, 11800, Malaysia
[c]Centre of Innovative Nanostructures and Nanodevices (COINN), Universiti Teknologi PETRONAS, 32610 Seri Iskandar, Perak Darul Ridzuan, Ipoh, Malaysia

View additional affiliations

Abstract

This work presented a simple electrodeposition of hierarchical cobalt oxide nanoparticles on stainless steel mesh (Co_3O_4@SS) for electrocatalytic water oxidation. The synthesized Co_3O_4@SS are systematically characterized using Fourier transform infrared (FT-IR) spectroscopy, X-ray diffraction (XRD) and field emission scanning electron microscopy with energy dispersive spectrum (FE-SEM with EDS). Further, the electrocatalytic water oxidation performance of hierarchical Co_3O_4@SS is examined and compared to bare stainless steel mesh (bare SS) through linear sweep voltammetry (LSV), linear Tafel polarization and electrochemical impedance spectroscopy (EIS) methods in 0.1 M aqueous KOH. The presence of clear and sharp FT-IR bands of Co_3O_4@SS at 658 and 554 cm^{-1} indicated the formation of oxides. The XRD pattern of Co_3O_4@SS show additional 2θ peaks than that of bare SS, which are assigned for crystalline Co_3O_4. The FE-SEM with EDS of Co_3O_4@SS reflects the porous hierarchical morphology along with the presence of Co, O, Fe and Cr elements. Moreover, the electrochemical results such as LSV, Tafel and EIS revealed good electrocatalytic activity of Co_3O_4@SS towards water oxidation. All the results suggested that the electrodeposited Co_3O_4@SS can act as a better candidate for electrocatalytic water oxidation.

Author keywords

Cathodic electrodeposition | Co_3O_4@SS | Electrocatalyst | Hierarchical nanostructures | Water oxidation

Funding details

Funding sponsor	Funding number	Acronym
Ministry of Science, ICT and Future Planning	2018R1A2B2004432	MSIP
National Research Foundation of Korea		NRF

Funding text

This research was supported by the National Research Foundation (NRF) of Korea under the Ministry of Science and ICT (MSIT) (2018R1A2B2004432).

Document details - Assessment of physical and chemical water quality parameters using naive bayes control algorithm

Materials Today: Proceedings

2022

Assessment of physical and chemical water quality parameters using naive bayes control algorithm

(Article in press)

Jeyashanthi, J., Barsana banu, J., Pandi Maharajan, M., Ramuvel, M.

[a]Department of Electrical and Electronics Engineering, Sethu Institute of Technology, Virudhunagar, 626115, India
[b]Department of Electrical and Electronics Engineering, SBM College of Engineering and Technology, Dindugal, 624005, India
[c]Department of Electrical and Electronics Engineering, Nadar Saraswathi College of Engineering and Technology, Theni, 625531, India

View additional affiliations

Abstract

In recent decades, one of the challenging issues faced by global nations is the degradation of water resources. Traditionally, water samples are manually collected from different locations to monitor its standards. Such conventional practices incur heavy cost, demand highly-skilled professionals, consume time and produce low precision results. Due to these drawbacks, these techniques are no longer considered to be efficient ones to check the water quality parameters continuously on real-time basis. In this background, the current study designed and developed a low-cost water quality monitoring configuration that can check the quality of water on real-time basis with the help of IoT. The methodology includes the analysis of physical and chemical water quality parameters. Various sensors are used to determine the water quality parameters in the projectedmethod namely, turbidity, conductivity and temperature. The data collection from the system is communicated via microcontroller system following Arduino model. Naïve Bayes theorem is used to analyse the data collected from the sensor to controller. Using this classifier, either one or multiple water quality parameters are checked in a specific location, leaving beside other parameters. The analysis produced highly accurate results and incurred less cost during implemented in comparison with other techniques. © 2022

Author keywords

Arduino | Chemical materials | Internet of things | Naïve Bayes theorem | Water quality

Indexed keywords

Engineering controlled terms: Cost benefit analysis | Degradation | Internet of things | Quality control | Water resources

Engineering uncontrolled terms: Arduino | Baye's theorem | Chemical materials | Chemical water | Naive baye theorem | Naive bayes | Real- time | Water quality parameters | Water samples | Waters resources

Engineering main heading: Water quality

Document details - An Optimal Energy Competent Mission based Collision Avoidance Protocol Scheme for Multi-Rotor UAV's

13th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2022

Volume 8, 1 January 2022, Pages 837-846

13th International Conference on Advances in Computing, Control, and Telecommunication Technologies, ACT 2022; Virtual, Online; ; 27 June 2022 through 28 June 2022; Code 184560

An Optimal Energy Competent Mission based Collision Avoidance Protocol Scheme for Multi-Rotor UAV's(Conference Paper)

GraceShalini, T., Rathnamala, S.

[a]Velammal College of Engineering and Technology, India
[b]Sethu Institute of Technology, India

Abstract

Currently, with the advancement of computer control technology, unmanned aerial vehicles (UAVs) have developed greatly. In contrast to the remote manipulation used in the early stages, most UAVs can now fly autonomously. As the number of potential applications for Unmanned Aerial Vehicles (UAVs) keeps rising steadily, the chances that these devices get close to each other during their flights also increases, causing concerns regarding potential collisions. To solve the problem of intercepting a moving target by a multirotor unmanned aerial vehicle (UAV) swarm, an optimal strategy along with clustering strategy is proposed. This paper proposed the Energy Competent-Mission Based Collision Avoidance Protocol (EC-MBCAP) using Adaptive whale optimization approach. The clustering technique is carried using Gradient clustering metric based passive clustering method (GCM-PC). This optimization process is employed so as to enhance and optimize the energy in collision avoidance protocol. Experimental and simulation results demonstrated the validity and effectiveness of the proposed solution, which typically reduces the energy consumption and in turn optimizes the protocol efficiency thereby reducing the collision for each risky situation successfully handled.

Author keywords

Adaptive whale optimization | Energy Competent-Mission Based Collision Avoidance Protocol | Gradient clustering metric based passive clustering method | multirotor | unmanned aerial vehicles

Indexed keywords

Engineering controlled terms: Antennas | Cluster analysis | Energy efficiency | Energy utilization | Unmanned aerial vehicles (UAV)

Engineering uncontrolled terms: Adaptive whale optimization | Aerial vehicle | Clustering methods | Clusterings | Collisions avoidance | Energy | Energy competent-mission based collision avoidance protocol | Gradient clustering metric based passive clustering method | Multirotors | Optimisations | Passive clustering | Unmanned aerial vehicle

Engineering main heading: Collision avoidance

Document details - Creating an ML-based Mobile App for Maintaining Crop Health

International Conference on Edge Computing and Applications, ICECAA 2022 - Proceedings

2022, Pages 1305-1310

2022 International Conference on Edge Computing and Applications, ICECAA 2022; Tamilnadu; India; 13 October 2022 through 15 October 2022; Category numberCFP22BV8-ART; Code 184201

Creating an ML-based Mobile App for Maintaining Crop Health(Conference Paper)

Viswanathan, A., Umamaheswari, M., Jaganathan, M., Wosowei, J.B., Prasad, R., Indira, P.

[a]Department of Computer Science and Engineering, Malla Reddy Institute of Tech. & Science, Telangana, Secunderabad, 500100, India
[b]Department of Information Technology, Malla Reddy Institute of Tech. & Science, Telangana, Secunderabad, 500100, India
[c]Department of Computer Science and Engineering, Jain University, Karnataka, Bangalore, 560069, India

View additional affiliations

Abstract

Agriculture is the backbone of our nation. Not only in India, but the growth of food and other crops is also an essential occupation all over the world. One of the major requirements of great yieldin agriculture is the analysis of the soil and the atmosphere. This study aims in finding the best Machine Learning (ML) model that can be used to determine the right fertilizer based on all the factors like environmental conditions and crop requirements. For this purpose, three different ML models were developed using three different algorithms. The algorithms used in this study were the Neural Network (NN), Classification and Regression Tree (CART), and Linear Discriminant Analysis (LDA). Before the models were constructed, a dataset consisting of all necessary data about crops and the environment is obtained from Kaggle. This dataset then undergoes a couple of processes named encoding and upsampling to ensure the better performance of the ML models. The models are then trained using this preprocessed dataset. An unused part of the dataset is then used to test the efficiency of the models. This analysis is done using four parameters named the True Positive Rate (TPR), True Negative Rate (TNR), False Positive Rate (FPR), and False Negative Rate (FNR). By the end of this analysis, it is found that the NN algorithm is the best algorithm that can be used to predict the best fertilizer with the perfect score of 100 as a true negative rate. The LDA algorithm has the least right predictions and the maximum number of false predictions making it the worst algorithm among the three. The best algorithm, i.e., the model designed using the NN algorithm is deployed into a software application. Users can enter all the necessary details to find the most suitable fertilizer for crops based on environmental factors and crop requirements. © 2022 IEEE.

Author keywords

Confusion Matrix | Crop | Data collection | Machine Learning | Preprocessing

Indexed keywords

Engineering controlled terms: Application programs | Discriminant analysis | Fertilizers | Forecasting | Machine learning | Statistical tests

Document details - Quantum Chemical Investigations on the Hydrogen-Bonded Interactions of Bioactive Molecule N²-(4-Methoxysalicylidene) Arginine Hemihydrate

Polycyclic Aromatic Compounds

2022

Quantum Chemical Investigations on the Hydrogen-Bonded Interactions of Bioactive Molecule N^2-(4-Methoxysalicylidene) Arginine Hemihydrate

(Article in press)

Vincy, C.D., Tarika, J.D.D., Sethuram, M., Jenepha Mary, S.J., Beaula, T.J.

[a]Department of Physics and Research Centre, Malankara Catholic College, Tamilnadu, Kaliyakkavilai, India
[b]Department of Chemical Engineering, Sethu Institute of Technology, Tamilnadu, Pulloor, India
[c]Department of Physics, Holy Cross College (Autonomous), Tamilnadu, Nagercoil, India

View additional affiliations

Abstract

The geometry optimization, natural bond orbital analysis, and vibrational analysis of a Schiff base compound N^2-(4-Methoxysalicylidene) Arginine Hemihydrate (4MSAH) were carried out using the density functional B3PW91 method with the 6–31 G (d,p) basis set. Natural Bond Orbital (NBO) analysis is carried out to examine the various intra and inter molecular interactions of molecular system. Normal coordinate analysis was carried out to elucidate the vibrational modes and the assignments were made on the potential energy distribution. From the vibrational analysis, it is endorsed that the stretching wave number of hydrogen bond donor COO^- and hydrogen bond acceptor NH_2^+ is shifted due to the interaction. MO (Molecular Orbital) analysis was accomplished to propose the biological activity of the molecule and the impact of the transition of electrons from n→π* was studied using the UV transmittance spectrum. The molecular orbital contributions are studied by using DOS spectral analysis. Topological studies of 4MSAH were conducted utilizing the Electron Localization Function (ELF) and the Local orbital locator (LOL). Hirshfeld surface analysis and reduced density gradient analysis were conducted to investigate distinct covalent and non-covalent interactions. Molecular docking was employed on antifungal proteins to explore protein-ligand interactions and verify the compound's bioactivity. © 2022 Taylor & Francis Group, LLC.

Author keywords

density of states | docking | Hirshfeld | Interaction | reduced density gradient

ISSN: 10406638
DOI: 10.1080/10406638.2022.2138923
Source Type: Journal
Document Type: Article
Original language: English
Publisher: Taylor and Francis Ltd.

Beaula, T.J.; Department of Physics and Research Centre, Malankara Catholic College, Mariagiri, Tamilnadu, India;

SciVal Topic Prominence

Topic:

Document details - Electrochemical performance of H⁺ implantation intercalate with LiCo₃O₄ thin film and its applications

Materials Science for Energy Technologies

Volume 5, January 2022, Pages 424-432

Electrochemical performance of H^+ implantation intercalate with $LiCo_3O_4$ thin film and its applications(Article)(Open Access)

Sudha, A., Alhaji, N.M.I., Ayeshamariam, A., Ismail Fathima, M., Sivabharathy, M., Kaviyarasu, K.

[a]Department of Chemistry, Khadir Mohideen College (Affiliated to Bharathidasan University, Thiruchirappalli), Tamil Nadu, Adirampattinam, 614701, India
[b]Department of Chemistry, Kunthavai Nachiyar Government Arts College for Women (Affiliated to Bharathidasan University, Thiruchirappalli), Tamil Nadu, Thanjavur, 613007, India
[c]Department of Physics, Khadir Mohideen College (Affiliated to Bharathidasan University, Thiruchirappalli), Tamil Nadu, Adirampattinam, 614701, India

View additional affiliations

Abstract

The purpose of this research is to explore into the impacts of H^+ ion implantation on Al/ $LiCo_3O_4$/ITO (MIS) thin films employing the sprayed pyrolysis method. The discharged and recharged specimens were characterized using XRD, EDAX, and SEM techniques. Using $LiCo_3O_4$ CV curves in KOH solution at various scan speeds, the electrochemical behavior was investigated. Li^+ and H^+ ions from a KOH solution underwent a reversible insertion into the diffusion coefficient values of $LiCo_3O_4$ particles. Increased protonic conductivity and a higher diffusion coefficient value of $3.55x10^{-8}$ cm^2/S with a scan rate of 100 mV/S are the results of the intercalation of lithium with the cobalt oxide $LiCo_3O_4$ and this implantation affects the possible causes of the observed changes in the properties of lithium cobalt oxides. The spray pyrolysis method's process parameters have a major impact on the H^+ implantation film's characteristics. As a result, they have been enhanced to produce high-quality $LiCo_3O_4$ films with excellent electrical conductivity and transparency. © 2022

Author keywords

Cyclic voltammetry | H^+ implantation | $LiCo_3O_4$ thin films | Magnetic studies | Normalized ideality factor

Indexed keywords

Engineering controlled terms: Cobalt compounds | Cyclic voltammetry | Diffusion | Lithium compounds | Potassium hydroxide | Spray pyrolysis

Engineering uncontrolled terms: Coefficient values | Electrochemical performance | H+ implantation | Ideality factors | ITS applications | KOH solution | Lico3O4 thin film | Magnetic studies | Normalized ideality factor | Thin-films

Engineering main heading: Thin films

Document details - Identifying Influencing Factors of Road Accidents in Emerging Road Accident Blackspots

Advances in Civil Engineering

Volume 2022, 2022, Article number 9474323

Identifying Influencing Factors of Road Accidents in Emerging Road Accident Blackspots(Review)(Open Access)

Athiappan, K., Karthik, C., Rajalaskshmi, M., Subrata, C., Dastjerdi, H.R., Liu, Y., Fernandez-Campusano, C., Gheisari, M.

[a]Department of Civil Engineering, Thiagarajar College of Engineering, Tamilnadu, India
[b]Department of Robotics and Automation, Jyothi Engineering College, Kerala, India
[c]Department of Biomedical Engineering, Sethu Institute of Technology, Tamilnadu, India

View additional affiliations

Abstract

This study deals with identifying the accident blackspots and the influencing factors causing accidents using factored analysis in a medium-sized city (Tirunelveli) in India. From the literature review, the geospatial technique to identify the blackspots and the factors causing accidents was used for analysis. The most influencing factors driving the accidents were identified and ranked based on the repetitive occurrence of accidents in the blackspot area. The spearman ranking system showed the correlation among the factors causing accidents. The factor analysis technique was utilized to identify the key factors driving the repetitive accidents and group them. This study will help transportation planners understand the factors causing accidents and take appropriate measures to reduce the casualties in the road construction planning stage and existing conditions. © 2022 K. Athiappan et al.

ISSN: 16878086
Source Type: Journal
Original language: English
DOI: 10.1155/2022/9474323
Document Type: Review
Publisher: Hindawi Limited

Gheisari, M.; Young Researchers and Elite Club, Islamic Azad University, Parand, Iran;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Minimum Latency-Secure Key Transmission for Cloud-Based Internet of Vehicles Using Reinforcement Learning

Computational Intelligence and Neuroscience

Volume 2022, 2022, Article number 6296841

Minimum Latency-Secure Key Transmission for Cloud-Based Internet of Vehicles Using Reinforcement Learning(Article)(Open Access)

Akilandeswari, V., Kumar, A., Thilagamani, S., Subedha, V., Kalpana, V., Kaur, K., Asenso, E.

[a]Department of Information Technology, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, India
[b]Department of Computer Engineering and Applications, GLA University, Uttar Pradesh, Mathura, India
[c]Department of Computer Science and Engineering, M. Kumarasamy College of Engineering, Thalavapalayam, Tamilnadu, Karur, India

View additional affiliations

Abstract

The Internet of Vehicles (IoV) communication key management level controls the confidentiality and security of its data, which may withstand user identity-based attacks such as electronic spoofing. The IoV group's key is updated with a defined frequency under the current key management method, which lengthens the time between crucial changes and encryption. The cluster key distribution management is used as the study object in this paper, which is based on the communication security on the Internet of Vehicles cluster. When vehicles enter and exit the cluster, the Internet of Vehicles must update the group key in real-time to ensure its forward and backward security. A low-latency IoV group key distribution management technology based on reinforcement learning is proposed to optimize the group owner vehicle according to factors such as changes in the number of surrounding vehicles and essential update records and the update frequency and the key length of its group key. The technology does not require the group leader vehicle to predict the nearby traffic flow model. The access-driven cache attack model reduces the delay of encryption and decryption and is verified in the simulation of the IoV based on advanced encryption standards. The simulation results show that, compared with the benchmark group key management scheme, this technology reduces the transmission delay of key updates, the calculation delay of encryption and decryption of the IoV, and improves the group key confidentiality.

Indexed keywords

Engineering controlled terms: Cryptography, Data privacy, Engineering education, Vehicle to vehicle communications, Vehicle transmissions

Engineering uncontrolled terms: Cloud-based, Distribution management, Encryption and decryption, Group key, ITS data, Key-management, Management level, Reinforcement learnings, User identity, Vehicle communications

Engineering main heading: Reinforcement learning

EMTREE medical terms: algorithm, cloud computing, computer security, confidentiality, Internet

Document details - Retraction Note to: Prediction of atherosclerosis pathology in retinal fundal images with machine learning approaches(Journal of Ambient Intelligence and Humanized Computing, (2020), 12, (6701–6711), 10.1007/s12652-020-02294-3)

Journal of Ambient Intelligence and Humanized Computing

2022

Retraction Note to: Prediction of atherosclerosis pathology in retinal fundal images with machine learning approaches(Journal of Ambient Intelligence and Humanized Computing, (2020), 12, (6701–6711), 10.1007/s12652-020-02294-3)

(Article in press)

(Open Access)

Parameswari, C., Ranjani, S.S.

Sethu Institute of Technology, Virudhunagar, India

Abstract

The Editor-in-Chief and the publisher have retracted this article. This article was submitted to be part of a guestedited issue. An investigation concluded that the editorial process of this guest-edited issue was compromised by a third party and that the peer review process has been manipulated. Based on the investigation's findings the Editor-in- Chief therefore no longer has confidence in the results and conclusions of this article. Author C. Parameswari has stated that both authors disagree with this retraction. © Springer-Verlag GmbH Germany, part of Springer Nature 2022.

ISSN: 18685137
Source Type: Journal
Original language: English

DOI: 10.1007/s12652-022-04286-x
Document Type: Erratum
Publisher: Springer Science and Business Media Deutschland GmbH

Parameswari, C.; Sethu Institute of Technology, Virudhunagar, India;

Document details - Retraction Note to: Efficient segmentation of the lung carcinoma by adaptive fuzzy–GLCM (AF-GLCM) with deep learning based classification(Journal of Ambient Intelligence and Humanized Computing, (2021), 12, (4715–4725), 10.1007/s12652-020-01874-7)

Journal of Ambient Intelligence and Humanized Computing

2022

Retraction Note to: Efficient segmentation of the lung carcinoma by adaptive fuzzy–GLCM (AF-GLCM) with deep learning based classification(Journal of Ambient Intelligence and Humanized Computing, (2021), 12, (4715–4725), 10.1007/s12652-020-01874-7)

(Article in press ?)

(Open Access)

Yamunadevi, M.M., Ranjani, S.S.

Sethu Institute of Technology, Virudhunagar, India

Abstract

The Editor-in-Chief and the publisher have retracted this article. This article was submitted to be part of a guestedited issue. An investigation concluded that the editorial process of this guest-edited issue was compromised by a third party and that the peer review process has been manipulated. Based on the investigation's findings the Editor-in- Chief therefore no longer has confidence in the results and conclusions of this article. Author M. M. Yamunadevi disagrees with this retraction. Author S. Siva Ranjani has not responded to correspondence regarding this retraction. © Springer-Verlag GmbH Germany, part of Springer Nature 2022.

ISSN: 18685137
Source Type: Journal
Original language: English

DOI: 10.1007/s12652-022-04267-0
Document Type: Erratum
Publisher: Springer Science and Business Media Deutschland GmbH

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

Document details - Retraction Note to: Fundus image lesion detection algorithm for diabetic retinopathy screening(Journal of Ambient Intelligence and Humanized Computing, (2020), 12, (1–10), 10.1007/s12652-020-02417-w)

Journal of Ambient Intelligence and Humanized Computing

2022

Retraction Note to: Fundus image lesion detection algorithm for diabetic retinopathy screening(Journal of Ambient Intelligence and Humanized Computing, (2020), 12, (1–10), 10.1007/s12652-020-02417-w)

(Article in press)

(Open Access)

Kanimozhi, J., Vasuki, P., Roomi, S.M.M.

[a]Department of Electronics and Communication Engineering, K.L.N. College of Information Technology, Pottapalayam, India
[b]Department of Electronics and Communication Engineering, Sethu Institute of Technology, Pulloor, India
[c]Department of Electronics and Communication Engineering, Thiagarajar College of Engineering, Madurai, India

Abstract

The Editor-in-Chief and the publisher have retracted this article. This article was submitted to be part of a guestedited issue. An investigation concluded that the editorial process of this guest-edited issue was compromised by a third party and that the peer review process has been manipulated. Based on the investigation's findings the Editor-in- Chief therefore no longer has confidence in the results and conclusions of this article. J. Kanimozi has stated that all authors disagree with this retraction. © Springer-Verlag GmbH Germany, part of Springer Nature 2022.

ISSN: 18685137
Source Type: Journal
Original language: English

DOI: 10.1007/s12652-022-04256-3
Document Type: Erratum
Publisher: Springer Science and Business Media Deutschland GmbH

Kanimozhi, J.; Department of Electronics and Communication Engineering, K.L.N. College of Information Technology, Pottapalayam, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Fused Feature-Driven ANN Model for Estimating Code-Mixing Level in Audio Samples

Lecture Notes in Networks and Systems

Volume 458, 2022, Pages 301-315

5th International Conference on Intelligent Sustainable Systems, ICISS 2022; Tirunelveli; India; 17 February 2022 through 18 February 2022; Code 282209

Fused Feature-Driven ANN Model for Estimating Code-Mixing Level in Audio Samples(Conference Paper)

Priya, K., Mohamed Mansoor Roomi, S., Alaguraja, R.A., Vasuki, P.

[a]ECE, Thiagarajar College of Engineering, Tamil Nadu, Madurai, India
[b]ECE, Sethu Institute of Technology, Tamil Nadu, Madurai, India

Abstract

Code mixing spoken language identification (CM-SLI) from speech signal plays a vital role in many computer-aided voice analysis applications. To identify the level of code-mixing language from a speech signal, a powerful feature is needed for training the model. In the proposed work, such a feature is extracted from the speech by mel frequency cepstral coefficients (MFCC), Delta Delta MFCC (D^2MFCC), and pitch. These features are fused and trained by multilayer perceptron (MLP) neural network (NN) with a Bayesian regularization (BR) function. This classifies the given audio sample into Tamil or English and achieves an accuracy of 97.6%. Then, the level of a mix of languages is estimated by classifying fragments of audio that find the acquaintance of the speaker on the chosen language.

Author keywords

Code mixing | Language identification | Mel frequency cepstral coefficients | Multilayer perceptron | Neural network | Pitch

Funding details

Funding sponsor	Funding number	Acronym
Thailand Research Fund		TRF

Funding text

Acknowledgements This work was supported by Thiagarajar Research Fellowship (TRF) in Thiagarajar College of Engineering, Madurai.

ISSN: 23673370
ISBN: 978-981192893-2
Source Type: Book Series
Original language: English

DOI: 10.1007/978-981-19-2894-9_23
Document Type: Conference Paper
Volume Editors: Raj J.S.,Shi Y.,Pelusi D.,Balas V.E.
Publisher: Springer Science and Business Media Deutschland GmbH

Document details - Study of the optical and dielectric behavior of Cr-doped manganese nanoferrites synthesized by sonochemical method

Journal of Materials Science: Materials in Electronics

2022

Study of the optical and dielectric behavior of Cr-doped manganese nanoferrites synthesized by sonochemical method

(Article in press)

Palaniappan, P., Lenin, N., Uvarani, R.

[a]Department of Physics, Thiruvalluvar Government Arts College, Rasipuram, Tamil Nadu, Namakkal, 637 401, India
[b]Department of Physics, Sethu Institute of Technology, Kariapatti, Tamil Nadu, Virudhunagar, 626 115, India

Abstract

In this study, sonochemical reactors were used to successfully synthesize Cr-doped manganese–lanthanum nanoferrites $Mn_{1-x}Cr_xLa_{0.1}Fe_{1.9}O_4$ (x = 0.09, 0.18, 0.27, and 0.36). The impact of powder production factors was thoroughly investigated, and powder characterization was carried out. The results of X-ray diffraction analyses revealed the presence of cubic spinel structures in the produced nanoferrites, with typical crystallite sizes starting from 38 (x = 0.36) to 53 (x = 0.09) nm. The dielectric characteristics (ε', tan δ, and ε") were measured with respect to composition ratio and frequency using an inductance capacitance and resistance meter. To differentiate ε′, tan δ, and ε″, the Maxwell–Wagner polarization and hopping process were used. The pseudocapacitance and resistive behavior of nanoferrites were revealed by Nyquist impedance graphs. The ferromagnetic property of nanoferrites was studied using a vibrating sample magnetometer. In the produced nanoferrites, higher Cr^{2+} ions resulted in significantly decreased coercivity and increased saturation magnetization. It was discovered that adding chromium to $Mn_{1-x}Cr_xLa_{0.1}Fe_{1.9}O_4$ nanoferrites improves its properties, such as structural, optical, magnetic, and electrical properties.

Indexed keywords

Engineering controlled terms: Saturation magnetization | Sonochemistry | X ray diffraction analysis

Engineering uncontrolled terms: Cr-doped | Dielectric behavior | Nanoferrites | Optical behaviour | Powder production | Production factors | Sonochemical method | Sonochemical reactors | Synthesised | Tan δ

Engineering main heading: Manganese

Funding details

Funding text

PP acknowledges the support of his college (Thiruvalluvar Government Arts College, Rasipuram 637 401, Namakkal, Tamil Nadu, India) in carrying out this research project.

ISSN: 09574522
Source Type: Journal
DOI: 10.1007/s10854-022-08845-y
Document Type: Article

Document details - A Novel fuzzy based user pairing and cuckoo search optimization approach for small cell deployment in NOMA-HetNet

Journal of Intelligent and Fuzzy Systems

Volume 43, Issue 3, 2022, Pages 3141-3154

A Novel fuzzy based user pairing and cuckoo search optimization approach for small cell deployment in NOMA-HetNet(Article)

Anu Disney, D., Merline, A.

Department Of Electronics And Communication Engineering, Sethu Institute Of Technology, Tamilnadu, Virudhunagar, India

Abstract

Recently, Heterogeneous Networks (HetNet) are concentrated more in order to improve transmission coverage and spectrum efficiency. When compared to HetNet, Non-Orthogonal Multiple Access (NOMA) is used to allow multiple users to share the same frequency band resource. Moreover, cross-tier links are improved in realistic HetNets due to channel delay and random perturbation. In this research, a fuzzy logic-based user association and pairing was proposed to improve the system robustness and energy utilization. Here, fuzzy logic overcomes the limitations of traditional channel-based and gain-based pairing schemes. The proposed fuzzy logic-based system evaluates distance, channel gain, and reference signal power for mode selection and enhances pairing features. Nature-inspired cuckoo search optimization is also used to improve coverage probability, feasible rate, and energy efficiency by optimizing the path loss, transmit power, and distance between user and base station. The proposed model analysis is carried out through intense simulation to demonstrate improved performance when compared to conventional state-of-the-art techniques.

Author keywords

cuckoo search optimization | energy utilization | fuzzy logic | heterogeneous networks | Non-orthogonal multiple access

Indexed keywords

Engineering controlled terms: Biomimetics | Computer circuits | Energy efficiency | Energy utilization | Fuzzy logic | Optimization

Engineering uncontrolled terms: Cell deployment | Cuckoo search optimization | Cuckoo searches | Fuzzy-Logic | Multiple access | Non-orthogonal | Non-orthogonal multiple access | Optimization approach | Search optimization | Small cells

Engineering main heading: Heterogeneous networks

Document details - A novel fault detection and identification system for solar PV systems using truncated arrangement of active cell (TAAC) structure

Journal of Intelligent and Fuzzy Systems

Volume 43, Issue 3, 2022, Pages 2549-2565

A novel fault detection and identification system for solar PV systems using truncated arrangement of active cell (TAAC) structure(Article)

Jeyasingh, D.A., Rajamanickam Manickaraj, S., Govindhan Radhakrishnan, R.K.

[a]Department Of Electrical And Electronics Engineering, Latha Mathavan Engineering College, Tamilnadu, Madurai, India

[b]Department Of Electrical And Electronics Engineering, Sethu Institute Of Technology, Tamilnadu, Madurai, India

Abstract

Fault detection and identification in a solar Photovoltaic (PV) systems are one of the crucial task in recent days for ensuring both reliability and safety measures. The fault occurrence in the PV cell will affect the output power, and can reduce the efficiency of its characteristics. The fault in PV cell can identify by using the thermal scan method manually. Arrangement of the proposed setup regularly is not possible to monitor due to the hardware installation of several equipment, it took more time to test, and validate the affected PV cells prediction less accuracy while doing in manual testing. In order to solve these issues, this paper intends to propose a novel algorithm, named as Truncated Arrangement of Active Cell (TAAC) structure for accurately detecting the PV faults. This technique is used to analyze the PV cell aging condition and to enhance the PV characteristics. Typically, the improvement in a cell arrangement provides an optimal solution for efficient fault detection. Moreover, the TAAC architecture computes the optimal solution for a PV output terminal based on the PV cell parameters and variation of temperature measures. Also, a Kalman filtering technique is employed to extract the features that are used to improve the detection process. The major advantages of this structure are, it enhance the lifetime of PV cell and stores the maximum power for a long time usage. The experimental results evaluate the performance of this technique by using various measures such as false alarm rate, misclassification rate, misdetection rate, and prediction rate. Furthermore, some of the existing techniques are compared with the proposed technique for proving its superiority.

Author keywords

fault detection | Maximum Power Point Tracking (MPPT) | Photovoltaic (PV) | Renewable Energy Source (RES) | Truncated Arrangement of Active Cell (TAAC)

Indexed keywords

Engineering controlled terms: Cytology | Fault detection | Maximum power point trackers | Optimal systems | Renewable energy resources | Solar power generation

Engineering uncontrolled terms: Fault detection and identification | Faults detection | Maximum Power Point Tracking | Photovoltaic | Photovoltaics | Renewable energy source | Solar photovoltaic system | Truncated arrangement of active cell

Document details - Investigation of Mechanical and Thermal Conductivity Properties of Sansevieria Roxburghiana Leaf Fibers Reinforced Composites: Effect of Fiber Loading

Journal of Natural Fibers

Volume 19, Issue 16, 2022, Pages 13401-13414

Investigation of Mechanical and Thermal Conductivity Properties of Sansevieria Roxburghiana Leaf Fibers Reinforced Composites: Effect of Fiber Loading(Article)

Kailasanathan, C., Gopi Krishna, M., NagarajaGanesh, B.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Virudhunagar District, India
[b]Department of Mechanical Engineering, Madurai Institute of Engineering and Technology, Pottapalayam, Sivagangai District, India

Abstract

The aim of the present research was to elicit the influence of fiber loading on the mechanical properties and thermal conductivity of Sansevieria roxburghiana leaf fibers reinforced epoxy composites. The mean micro-fibrillar angle of the extracted leaf fibers was found as 18.84° by X-ray diffraction technique. Composite samples were fabricated using randomly oriented fibers under different weight ratios (10, 20, 30, and 40 weight%) employing compression molding technique. Studies exemplify that the mechanical properties of the composites increase with increasing weight ratio of fibers. Optimum tensile, flexural, and impact strength of the composites were found to be 21.1 MPa, 65.6 MPa, and 18.37 kJ/m^2 respectively for 30 weight% fiber loading. The high tensile strength of the composites is related to the low microfibrillar angle of the fibers. The increase in mechanical strength is due to the high cellulose content and crystallinity index of the fibers, while the decline at 40 weight% is due to the poor wettability of the fibers. The thermal conductivity of the composites decreases with increase in fiber loading. Void content present in the composites was found. Experimental values obtained show that Sansevieria roxburghiana leaf fibers are potential reinforcements that can be used to make polymer composites suitable for domestic and lightweight applications. © 2022 Taylor & Francis.

Author keywords

fractured surfaces | mechanical properties | micro-fibrillar angle | Sansevieria roxburghiana leaf fibers | thermal conductivity | void content

Indexed keywords

Engineering controlled terms: Compression molding | Crystallinity | Impact strength | Reinforced plastics | Tensile strength | Thermal conductivity

Engineering uncontrolled terms: Conductivity properties | Fiber loadings | Fiber reinforced epoxy composites | Fibre-reinforced composite | Fractured surfaces | Mechanical | Micro-fibrillar angle | Sansevierium roxburghiana leaf fiber | Void contents | Weight ratios

Engineering main heading: Fibers

Document details - Retraction Note to: Wiener filter based deep convolutional network approach for classification of satellite images(Journal of Ambient Intelligence and Humanized Computing, (2020), 12, (1–9), 10.1007/s12652-020-02410-3)

Journal of Ambient Intelligence and Humanized Computing

2022

Retraction Note to: Wiener filter based deep convolutional network approach for classification of satellite images(Journal of Ambient Intelligence and Humanized Computing, (2020), 12, (1–9), 10.1007/s12652-020-02410-3)

(Article in press)

(Open Access)

Poomani, M., Sutha, J., Ruba Soundar, K.

[a]Department of Computer Science and Engineering, Sethu Institute of Technology, Puloor, Kariapatti, 626115, India
[b]Department of Computer Science and Engineering, AAA College of Engineering and Technology, Sivakasi, 626005, India
[c]Department of Computer Science and Engineering, PSR Engineering College, Sivakasi, 626140, India

Abstract

The Editor-in-Chief and the publisher have retracted this article. This article was submitted to be part of a guestedited issue. An investigation concluded that the editorial process of this guest-edited issue was compromised by a third party and that the peer review process has been manipulated. Based on the investigation's findings the Editor-in- Chief therefore no longer has confidence in the results and conclusions of this article. Authors M. Poomani and K. Ruba Soundar have not responded to correspondence regarding this retraction. The Publisher has not been able to obtain a current email address for author J. Sutha. © Springer-Verlag GmbH Germany, part of Springer Nature 2022.

ISSN: 18685137
Source Type: Journal
Original language: English

DOI: 10.1007/s12652-022-04266-1
Document Type: Erratum
Publisher: Springer Science and Business Media Deutschland GmbH

Poomani, M.; Department of Computer Science and Engineering, Sethu Institute of Technology, Puloor, Kariapatti, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Removal of Ni (II) Ions from Wastewater by Raw and Modified Plant Wastes as Adsorbents: A Review

Iranian Journal of Chemistry and Chemical Engineering

Volume 41, Issue 1, January 2022, Pages 174-206

Removal of Ni (II) Ions from Wastewater by Raw and Modified Plant Wastes as Adsorbents: A Review(Review)

Vijayaraghavan, J., Zunaithur Rahman, D., Thivya, J.

[a]Department of Civil Engineering, University College of Engineering Ramanathapuram, Tamil Nadu, Ramanathapuram, 623 513, India
[b]Department of Civil Engineering, Sethu Institute of Technology, Tamil Nadu, Kariapatti, 626 115, India
[c]Department of Civil Engineering, University College of Engineering Dindigul, Tamil Nadu, Dindigul, 624 622, India

Abstract

Adsorption may be used to process significant metal particles in contaminated wastewater by various methods. The authors looked at various adsorbents for the expulsion of Ni(II) particles from an aquatic environment by different researchers. This paper aims to gather scattered open knowledge on a large variety of potentially persuasive adsorbents for the removal of Ni(II) particles. The present work on the usage of nickel by various natural/modified adsorbents was studied profoundly, for example, natural/modified agricultural waste, agricultural activated carbon, algae, fungal and, aquatic plant biomasses. This performance was assessed for removal efficiency and the sorbent capacity of used natural/waste materials in the system processes. Isotherm and kinetic study results were obtained from pH solution equilibrium contact time, adsorbent dose, initial metal concentration, and temperature of various adsorbents toward the Ni(II) particles to be examined. A documented analysis of reputed published papers revealed that industrial solid waste products, natural materials, and biosorbents have extraordinary Ni(II) adsorption ability from wastewater.

Author keywords

Adsorption | Nickel | Sustainable Natural/Modified Biosorbents | Wastewater

ISSN: 10219986
Source Type: Journal
Original language: English

DOI: 10.30492/ijcce.2020.125524.4100
Document Type: Review
Publisher: Iranian Institute of Research and Development in Chemical Industries

Document details - Optimal and Energy Effective Power Allocation Using Multi-Scale Resource GOA-DC-EM in DAS

Intelligent Automation and Soft Computing

Volume 34, Issue 2, 2022, Pages 1049-1063

Optimal and Energy Effective Power Allocation Using Multi-Scale Resource GOA-DC-EM in DAS(Article)(Open Access)

Rajalakshmi, J., Ranjani, S.S.

Sethu Institute of Technology, Kariyapatti Tamil Nadu, Madurai, India

Abstract

Recently many algorithms for allocation of power approaches have been suggested to increase the Energy Efficiency (EE) and Spectral Efficiency (EE) in the Distributed Antenna System (DAS). In addition, the method of con-servation developed for the allocation of power is challenging for the enhance-ment because of their high complication during estimation. With the intention of increasing the EE and SE, the optimization of allocation of power is done on the basis of capacity of the antenna. The main goal is for the optimization of the power allocation to improve the spectral and energy efficiency with the increased capacity of the cable with the help of an efficient optimal method with the model of clustering. In order to attain optimized allocation of power and for antenna optimization, the algorithm of Multi-scale Resource Grasshopper Optimization (MSR-GOA) is implemented. Besides, the clustering process is carried out using the algorithm for clustering namely Discriminative cluster-based Expectation Maximization (DC-EM) so as to minimize the rate of interference and computing complication. The analysis of performance is employed for evaluating the projected performance in various scenarios. The existing approach of investiga-tion and comparison is made with the suggested system (DAS with MSR-GOA-DC-EM) with respect to EE and SE. From the analysis, it was apparent that the method projected here is highly efficient to provide high spectral and energy efficiency than the already available techniques.

Author keywords

DAS | discriminative cluster-based expectation maximization | energy efficiency | multi scale resource grasshopper optimization algorithm | power allocation | spectral efficiency

ISSN: 10798587
DOI: 10.32604/iasc.2022.025127
Source Type: Journal
Document Type: Article
Original language: English
Publisher: Tech Science Press

Rajalakshmi, J.; Sethu Institute of Technology, Kariyapatti Tamil Nadu, Madurai, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Achievements of electro spinning chitosan using composite materials

Materials Today: Proceedings

Volume 66, January 2022, Pages 779-782

Achievements of electro spinning chitosan using composite materials(Article)

Surakasi, R., Mohana, J., Louies Praveen, S., Patil, P., Karthick, R., Alam, M.I.

[a]Faculty of Mechanical Engineering, Lendi Institute of Engineering and Technology, Denkada, Andhra Pradesh, Jonnada, 535005, India
[b]Department of Electronics and Communication Engineering, Saveetha School of Engineering, SIMATS, Thandalam, Chennai, 602105, India
[c]Department of Mechanical Engineering, Panimalar Institute Of Technology, Tamil Nadu, Chennai, 600123, India

View additional affiliations

Abstract

The electro spinning system depicts the transformation of an inorganic nano component or polymers into such another polymer or inorganic grid. An option is to electro spin a colloidal scattering. We've involved an assortment of strong Nano powders and polymers in our examination. Every one of the colloids that breezed through the assessment was electros pun. The little nanoparticles of the made nano fiber mats were contained by the polymeric nano fibers; in any case, the huge ones were identified sticking to the nanofiber mats. When contrasted with unadulterated polymeric nanofibers, the recommended technique could be used to make polymeric nanofibers with metal nanoparticles, which could have fascinating elements. As far as bioactivity, PCL/Ti nanofiber mats beat virgin PCL. The proposed approach can be respected in a game-changing strategy for assembling a development of electrospun nanofiber mats that beyond the realm of possibilities to expect to make utilizing current electrospinning techniques. The nano composite materials utilized in electrospinning are polymer-based, artistic, metallic, and other bioactive particles. © 2022

Author keywords

Electro spinning | Nano component | Nano composite materials

Indexed keywords

Engineering controlled terms: Composite materials | Metal nanoparticles | Nanocomposites | Nanofibers | Sols

Engineering uncontrolled terms: Composites material | Electro-spinning | Fibermat | Inorganics | Nano components | Nano fiber | Nano polymers | Nano powders | Nanofiber mats | Polymeric nanofibers

Engineering main heading: Electrospinning

Document details - Experimental investigation on stir casted hybrid composite AA7068 with SiC and coconut shell fly ash

Materials Today: Proceedings

Volume 62, January 2022, Pages 5540-5545

Experimental investigation on stir casted hybrid composite AA7068 with SiC and coconut shell fly ash(Article)

Kolappan, S., Arunkumar, T., Mohanavel, V., Subramani, K., Kailasanathan, C., Kumaran, P., Subbiah, R., Suresh Kumar, S.

[a]Department of Mechanical Engineering, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Tamil Nadu, Chennai, India
[b]Department of Mechanical Engineering, CMR Institute of Technology, Karnataka, Bengaluru, India
[c]Centre for Materials Engineering and Regenerative Medicine, Bharath Institute of Higher Education and Research, Tambaram, Selaiyur, Chennai, Tamil Nadu 600073, India

View additional affiliations

Abstract

Hybrid aluminium matrix composites through stir casting were made and their mechanical properties are evaluated in this research paper. To strengthen Al7068 hybrid aluminium matrix composites with different SiC weight percentages were created using SiC (0, 2, 4, 6, and 8), coconut shell fly ash (4 wt%) and nano magnesium (2%). Hardness, Impact, ductility and Tensile Strength are just a few of the mechanical properties discussed in this work. Researchers found that adding eight percent SiC reinforcement to aluminium 7068 alloy reinforced with four percent coconut shell fly ash increased the composites' hardness through 32 percent. Adding six percent SiC and four percent coconut shell fly ash to an aluminium alloy 7068 increased its tensile strength by 65 percent. A combination of coconut shell fly ash with Silicon carbide reduced the ductility of the composite material. Aluminium alloy with CSFA and SiC increased the impact energy to 3.2 J. The impact strength increased and decreased in fabricated composites when reinforcement was added to base material. © 2022

Author keywords

AA 7068 | Coconut shell fly ash | Hybrid composites | Mechanical behavior | Nano magnesium | Silicon carbide

Indexed keywords

Engineering controlled terms: Aluminum alloys | Ductility | Fly ash | Hardness | Impact strength | Magnesium alloys | Magnesium compounds | Reinforcement | Shells (structures) | Silicon alloys | Silicon carbide | Tensile strength

Engineering uncontrolled terms: AA 7068 | Aluminium matrix composites | Coconut shell fly ash | Coconut shells | Experimental investigations | Hybrid composites | Mechanical behavior | Nano magnesium | Research papers | Stir casting

Engineering main heading: Hybrid composites

ISSN: 22147853
Source Type: Journal
DOI: 10.1016/j.matpr.2022.04.359
Document Type: Article

Document details - Investigation on wear characteristics of Al 2219/Si3N4/Coal bottom ash MMC

Materials Today: Proceedings

Volume 62, January 2022, Pages 5514-5518

Investigation on wear characteristics of Al 2219/Si3N4/Coal bottom ash MMC(Article)

Subramani, K., Arunkumar, T., Mohanavel, V., Kolappan, S., Kailasanathan, C., Boopathi Rathinam, B., Subbiah, R., Suresh kumar, S.

[a]Department of Mechanical Engineering, VelTech Rangarajan Dr, Sagunthala R&D Institute of Science and Technology, Tamil Nadu, Chennai, India
[b]Department of Mechanical Engineering, CMR Institute of Technology, Karnataka, Bengaluru, India
[c]Centre for Materials Engineering and Regenerative Medicine, Bharath Institute of Higher Education and Research, Tambaram, Selaiyur, Tamil Nadu, Chennai, 600073, India

View additional affiliations

Abstract

High-energy ball milling is used to create nanostructured materials from coal bottom ash (CBA) and silicon nitride (Si3N4). 36 h of ball milling coal bottom ash reduced it to 51.3 nm, while silicon nitride was reduced from 61.2 nm to 29 nm. Metal Matrix Composites (MMC) is fabricated through liquid stir method. The composites wear rate went up with nano coal bottom ash and nano silicon nitride reinforcements due to clustering, as well as a lack of interfacial connection between the base material and hybrid reinforcements employed. Increased frictional drive causes magnified debonding and easy exclusion of composite particles, accelerating the amount of wear. The friction coefficient reduces in all composite configurations as the average load increases. © 2022

Author keywords

Al 2219 | Coal bottom ash | Metal Matrix Composite | Nano powder | Reinforcement | Silicon Nitride | Wear load | Wear rate

Indexed keywords

Engineering controlled terms: Aluminum alloys | Ash handling | Ball milling | Coal | Hybrid composites | Metallic matrix composites | Milling (machining) | Reinforcement | Silicon nitride | Wear of materials

Engineering uncontrolled terms: Al 2219 | Bottom ash | Coal bottom ash | Matrix composite | Metal matrix | Metal matrix composite | Nano powders | Wear characteristics | Wear load | Wear-rate

Engineering main heading: Friction

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2022.04.325
Document Type: Article
Publisher: Elsevier Ltd

Document details - The influence of nickel on the mechanical and tribological properties of AA2219-CNT composites made by stir casting

Materials Today: Proceedings

Volume 59, January 2022, Pages 1478-1484

The influence of nickel on the mechanical and tribological properties of AA2219-CNT composites made by stir casting(Article)

Vairamuthu, J., Sivakumar, P., Senthil Kumar, A., Sivakumar, G.D., Siva Sundar, S., Subbiah, R.

[a]Centre for Materials Research Lab, Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, India
[b]Mechanical and Industrial Engineering, University of Technology and Applied Sciences, Muscat, Oman
[c]Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, India

View additional affiliations

Abstract

AA2219 aluminium alloy matrix composite enhanced with CNTs(Carbon nanotubes) was investigated for its mechanical and tribological properties. Stir casting was used to add nickel to the aluminium matrix, and the homogenization procedure was then used to homogenise the mixture. It was found that the interdimeric portions of the interdimeric CNT and aluminium compounds had a block-shaped structure. There was an increase in tiny needle-shaped Aluminum precipitates near interdimeric zones when nickel was added up to 1.5 wt%; additional nickel addition reduced their abundance in this location. It was found that the needle-shaped Carbon Interdimeric nanotube precipitates disappeared following normalisation treatment with nickel up to 4.5 wt%. Ni and CNT intermetallic were converted to CNT by adding nickel and homogenization. Furthermore, the aluminium matrix generated aluminium precipitates instead of al-Ni precipitates when nickel concentration increased from 3 to 4.5 wt%. Composite's coefficient of friction and wear rate were lowered by 13 percent and 12 percent compared to a control sample without nickel, while its strength was increased by roughly 42 percent. © 2021

Author keywords

AA2219 CNTs Hardness Mechanical properties Nickel additives Stir casting Wear

Indexed keywords

Engineering controlled terms: Aluminum alloys Aluminum compounds Binary alloys Carbon nanotubes Friction Metallic matrix composites Needles Tribology Wear of materials

Engineering uncontrolled terms: Aa2219 Aluminium alloy matrix composites Aluminium matrix Carbon nanotubes composites Homogenization procedure Mechanical and tribological properties Nickel addition Nickel additive Shaped structures Stir casting

Engineering main heading: Additives

Document details - Design and fabrication of hand operated re-bar tying machine for productivity improvement in construction field

Materials Today: Proceedings

Volume 64, January 2022, Pages 1075-1080

Design and fabrication of hand operated re-bar tying machine for productivity improvement in construction field(Article)

Kalirasu, S., Jessy Michla, J.R., Rajini, N., Arunprasath, K., Senthilkumar, K.

[a]Department of Agriculture Engineering, Pulloor, Sethu Institute of Technology, Kariapatti - 626115, Virudhunagar – District, Tamil Nadu, India
[b]Department of Mechanical Engineering, Kalasalingam Academy of Research and Education, Tamil Nadu, Krishnan Koil, 626126, India
[c]Department of Mechanical Engineering, PSN College of Engineering and Technology, Tamil Nadu, Tirunelveli, 627152, India

View additional affiliations

Abstract

In construction of a Reinforced Cement Concrete (RCC) structure, as per the design requirements, the reinforcement mesh is made by tying the assembled re-bars at each crossing with the help of a tie wire. There are different types of tools for process the re-bar busting like – conventional hook, hand twister, twisting pliers, tying gun. Generally, in India, there is a deficiency of skilled labours and the usage of conventional hook is at most common in construction areas that indirectly disrupting the work efficiency and thereby increases the production cost as well as the work done time. It is very important to introduce a new method for re-bar busting process in Indian construction industry. This project deals with a new innovative method for tying the re-bar and comparison of this different method with ordinary methods based on time consumption on tying the knot, productivity range and health issues. © 2022

Author keywords

Labour cost | Labour safety | RCC mesh | Re-bar tying | Reinforcement | Rod busting

Indexed keywords

Engineering controlled terms: Construction industry | Costs | Mesh generation | Production efficiency | Reinforced concrete | Wages

Engineering uncontrolled terms: Cement concrete | Construction fields | Labor costs | Labor safeties | Productivity improvements | Re-bar tying | Reinforced cement concrete mesh | Rod busting | Skilled labor | Work efficiency

Engineering main heading: Productivity

Funding details

Funding text

Document details - Assessment of safety culture in the fireworks industry

International Journal of Occupational Safety and Ergonomics

2022

Assessment of safety culture in the fireworks industry

(Article in press)

Rajaram, S., Sivakumar, G.D.

[a]Department of Mechanical Engineering, Sri Vidya College of Engineering Technology, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, India

Abstract

Workers in the fireworks industry are affected mentally because of hazards that occurred in and around the working environment which caused injuries/fire accidents due to carelessness of workers and poor maintenance of rules and regulations by management. Primary data were collected from 451 workers in 25 fireworks industries randomly. A structured questionnaire is developed to measure safety culture in the fireworks industry in terms of dimensions like work environment, worker awareness, process, governance and safety satisfaction. This instrument is tested for purification of items in terms of stability by various statistical tests like reliability and validity in statistical software like SPSS and AMOS. This field-based study examines safety culture among workers in the fireworks industry to find the real scenario in the workplace and give recommendations for management to control accidents and fire or explosions to save the lives of workers. © 2022 Central Institute for Labour Protection–National Research Institute (CIOP-PIB).

Author keywords

AMOS | fire accident | safety culture | SPSS | worker awareness

ISSN: 10803548
CODEN: IJOEF
Source Type: Journal
Original language: English

DOI: 10.1080/10803548.2022.2079830
Document Type: Article
Publisher: Taylor and Francis Ltd.

Rajaram, S.; Department of Mechanical Engineering, Sri Vidya College of Engineering Technology, India;

Document details - The adjuvant role of acupuncture to treat the diabetes mellitus and its analysis using thermogram

International Journal of Biomedical Engineering and Technology

Volume 38, Issue 4, 2022, Pages 379-394

The adjuvant role of acupuncture to treat the diabetes mellitus and its analysis using thermogram(Article)

Rajagomathi, M., Jeyadevi, S., Latha, K.H., Ramalingam, P.K., Raja, S.P.

[a]Department of Electrical and Electronics Engineering, Kamaraj College of Engineering and Technology, Tamil Nadu, Virudhunagar, India
[b]Department of Electronics and Instrumentation Engineering, Kamaraj College of Engineering and Technology, Tamil Nadu, Virudhunagar, India
[c]Department of Biomedical Engineering, Sethu Institute of Technology, Tamil Nadu, Kariapatti, India

View additional affiliations

Abstract

This work describes the effects of acupuncture in glycemic control and validates the results using infrared thermography. Two groups of patients undergoing diabetes mellitus treatment, are considered for experimentation. Group A is treated with both drugs and acupuncture, while group B is treated with drugs alone. The patient's blood sugar and surface temperature of the foot are studied. Infrared thermography is used to take thermogram, before and after acupuncture treatment, and the effect of acupuncture treatment is analysed. The liver and spleen acupoints are stimulated and the temperature changes in these points are analysed. The results show that, the foot temperature (at treating acupoints) increases after acupuncture treatment in group A and the postprandial glucose level reduces up to 20 mg/dl whereas in group B only 6 mg/dl change, is observed with negligible temperature change. The obtained results show acupuncture as an optional treatment for diabetes, with no side effects and pain. Copyright © 2022 Inderscience Enterprises Ltd.

Author keywords

acupoints | acupuncture | diabetes mellitus | DM | fasting glucose | foot diagnosis | glycemic control | infrared thermography | line analysis | PBG | postprandial blood glucose | spot analysis

Indexed keywords

Engineering controlled terms: Acupuncture | Blood | Controlled drug delivery | Drug interactions | Glucose | Thermography (imaging) | Thermography (temperature measurement)

Engineering uncontrolled terms: Acupoints | Blood glucose | Diabetes mellitus | DM | Fasting glucose | Foot diagnose | Glycemic control | Line analysis | PBG | Postprandial blood glucose | Spot analyse

Engineering main heading: Diagnosis

EMTREE drug terms: antidiabetic agent | glucose

Document details - Mechanical properties of casting titanium alloy matrix composites reinforced by WC and TiB2 ceramic particulates

Materials Today: Proceedings

Volume 59, January 2022, Pages 1503-1507

Mechanical properties of casting titanium alloy matrix composites reinforced by WC and TiB2 ceramic particulates(Article)

Vairamuthu, J., Senthil Kumar, A., Sivakumar, G.D., Naveen Navroz, S., Kailasanathan, C.

[a]Centre for Materials Research Lab, Department of Mechanical Engineering, Sethu Institute of Technology, Pulloor, Tamil Nadu, Kariapatti, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, India

Abstract

Casting Titanium alloys with Wc and TiB2 additives have their mechanical characteristics examined in this work. The mechanical properties of aged titanium alloys are very impressive. UTS reach 406 MPa and YS of 253 MPa and an El of 7.4 percent. Pinned primary Wc and TiB2 phases reduced fineness by more than half, while enhancing assorted nucleation on Wc and TiB2 initial phases boosted nucleation and growth resistance. Following the heat treatment, foundational designed with the intent emerged from the substrate. There are no more stages in the shell. Those alloys containing Wc, on the other hand, have cores composed of Wc and TiB2. From 0.1 wt% to 0.2 wt% of Wc and TiB2 content, core radius rises, but shell width does not appear to change, and particle density does not appear to be altered. In time, composite particles became coarser, but their core dimensions stayed nearly same. As predicted, the exponent (n^{-1}) is less than the expected value of 0.33, Perhaps this is because of the low temperature, which prevents a developed a semi state from emerging. The kinetics are consistent with the KV model's predictions. © 2022

Author keywords

Mechanical properties | TiB2 | Titanium | Tungsten

Indexed keywords

Engineering controlled terms: Additives | Metallic matrix composites | Nucleation | Particle reinforced composites | Titanium alloys

Engineering uncontrolled terms: Ceramic particulates | Core radius | Growth resistance | Initial phasis | Mechanical characteristics | Nucleation and growth | Particle densities | Titania | Titanium (alloys) | Titanium alloy matrix composite

Engineering main heading: Temperature

ISSN: 22147853
DOI: 10.1016/j.matpr.2022.01.385
Source Type: Journal
Document Type: Article

Document details - Image Captioning Using Detectors and Swarm Based Learning Approach for Word Embedding Vectors

Computer Systems Science and Engineering

Volume 44, Issue 1, 2022, Pages 173-189

Image Captioning Using Detectors and Swarm Based Learning Approach for Word Embedding Vectors(Article)(Open Access)

Lalitha, B., Gomathi, V.

[a]CSE Department, Sethu Institute of Technology, Kariapatti, Pulloor, 626115, India
[b]CSE Department, National Engineering College, K.R. Nagar, Kovilpatti, 628503, India

Abstract

IC (Image Captioning) is a crucial part of Visual Data Processing and aims at understanding for providing captions that verbalize an image's important elements. However, in existing works, because of the complexity in images, neglecting major relation between the object in an image, poor quality image, labelling it remains a big problem for researchers. Hence, the main objective of this work attempts to overcome these challenges by proposing a novel framework for IC. So in this research work the main contribution deals with the framework consists of three phases that is image understanding, textual understanding and decoding. Initially, the image understanding phase is initiated with image pre-processing to enhance image quality. Thereafter, object has been detected using IYV3MMDs (Improved YoloV3 Multishot Multibox Detectors) in order to relate the interrelation between the image and the object, and then it is followed by MBFOCNNs (Modified Bacterial Foraging Optimization in Convolution Neural Networks), which encodes and provides final feature vectors. Secondly, the textual understanding phase is performed based on an image which is initiated with preprocessing of text where unwanted words, phrases, punctuations are removed in order to provide a healthy text. It is then followed by MGloVEs (Modified Global Vectors for Word Representation), which provides a word embedding of features with the highest priority towards the object present in an image. Finally, the decoding phase has been performed, which decodes the image whether it may be a normal or complex scene image and provides an accurate text by its learning ability using MDAA (Modified Deliberate Adaptive Attention). The experimental outcome of this work shows better accuracy of shows 96.24% when compared to existing and similar methods while generating captions for images.

Author keywords

decoder | Denoising | encoder | improved YoloV3 multishot multibox detector (IYV3MMD) | modified bacterial foraging optimization in convolutional neural network (MBFOCNN) | modified deliberate adaptive attention (MDAA) | modified global vectors for word representation (MGloVE)

Indexed keywords

Engineering controlled terms: Complex networks | Convolution | Convolutional neural networks | Data handling | Decoding | Embeddings | Image enhancement | Object detection | Signal encoding

Document details - Performance Analysis of Breast Cancer Detection Method Using ANFIS Classification Approach

Computer Systems Science and Engineering

Volume 44, Issue 1, 2022, Pages 501-517

Performance Analysis of Breast Cancer Detection Method Using ANFIS Classification Approach(Article)(Open Access)

Nagalakshmi, K., Suriya, S.

[a]Department of Computer Science and Engineering, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, 626115, India
[b]Department of Computer Science and Engineering, PSG College of Technology, Tamil Nadu, Coimbatore, 641004, India

Abstract

Breast cancer is one of the deadly diseases prevailing in women. Earlier detection and diagnosis might prevent the death rate. Effective diagnosis of breast cancer remains a significant challenge, and early diagnosis is essential to avoid the most severe manifestations of the disease. The existing systems have computational complexity and classification accuracy problems over various breast cancer databases. In order to overcome the above-mentioned issues, this work introduces an efficient classification and segmentation process. Hence, there is a requirement for developing a fully automatic methodology for screening the cancer regions. This paper develops a fully automated method for breast cancer detection and segmentation utilizing Adaptive Neuro Fuzzy Inference System (ANFIS) classification technique. This proposed technique comprises preprocessing, feature extraction, classifications, and segmentation stages. Here, the wavelet-based enhancement method has been employed as the preprocessing method. The texture and statistical features have been extracted from the enhanced image. Then, the ANFIS classification algorithm is used to classify the mammogram image into normal, benign, and malignant cases. Then, morphological processing is performed on malignant mammogram images to segment cancer regions. Performance analysis and comparisons are made with conventional methods. The experimental result proves that the proposed ANFIS algorithm provides better classification performance in terms of higher accuracy than the existing algorithms.

Author keywords

Breast cancer | classification | detection | malignant | segmentation

Indexed keywords

Engineering controlled terms: Classification (of information) | Diseases | Fuzzy inference | Fuzzy neural networks | Image enhancement | Image segmentation | Mammography | Textures | X ray screens

Engineering uncontrolled terms: Adaptive neuro-fuzzy inference | Breast Cancer | Breast cancer detection | Detection | Malignant | Mammogram images | Neuro-fuzzy inference systems | Performances analysis | Segmentation | System classification

Engineering main heading: Fuzzy systems

Funding details

Funding text

We show gratitude to anonymous referees for their useful ideas. The authors received no specific funding for this study.

Document details - Extraction and Characterization of Natural Cellulosic Erythrina variegata Fiber for Biocomposites

Journal of Natural Fibers

Volume 19, Issue 16, 2022, Pages 12676-12687

Extraction and Characterization of Natural Cellulosic Erythrina variegata Fiber for Biocomposites(Article)

Balaji, T.P., Senthilkumar, A., Saravanakumaar, A., Muthu Chozha Rajan, B., Nagarajan, R., Ismail, S.O., Mohammad, F., Vairamuthu, S., Devi, M.P.I.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Virudhunagar, India
[b]Department of Mechanical Engineering, Kalasalingam Academy of Research and Education, Srivilliputhur, India
[c]Department of Engineering, School of Physics, Engineering and Computer Science, University of Hertfordshire, Hatfield, United Kingdom

View additional affiliations

Abstract

This paper presents a study on extraction and characterization of the cellulose fiber from the bark of Erythrina variegate (EV) plant. Several tests were carried out on Erythrina variegata fibers (EVFs) to determine their properties. These included thermogravimetric analysis (TGA)/difference thermogravimetric (DTG), X-ray diffraction (XRD) analysis, Fourier transform infrared spectroscopy (FTIR) as well as morphological analysis, using scanning electron microscopy (SEM) and atomic force microscopy (AFM). From the results obtained, chemical composition of EVFs, such as cellulose, lignin, ash, and wax content of 70.60, 12.70, 8.60, and 0.24 wt.%, respectively, were recorded through standard chemical analysis. The maximum and average tensile strength of the EVFs were found as 6.06 ± 0.02MPa and 2.80 MPa, respectively. The thermogravimetric analysis on the fiber showed excellent stability with a char residue of 19.23% and a maximum degradation temperature of 349°C. The crystallinity index (CI) of 37.5% and crystalline size of 36.93 nm of EVFs were calculated through X-ray diffraction analysis. The morphological study established that EVFs possessed rough surface even in raw form. The density of EVF was obtained at 1412 kg/m^3, which was higher than that of Grewia damine of 1378 kg/m^3 and lower than that of jute of 1460 kg/m^3. © 2022 Taylor & Francis.

Author keywords

applications | biocomposites | characterization | chemical composition | Erythrina variegate fibers (EVFs) | extraction

Indexed keywords

Engineering controlled terms: Cellulose | Composite materials | Crystallinity | Degradation | Fibers | Fourier transform infrared spectroscopy | Morphology | Scanning electron microscopy | Tensile strength | Thermogravimetric analysis | X ray powder diffraction

Engineering uncontrolled terms: Atomic-force-microscopy | Biocomposite | Cellulose content | Cellulose fiber | Characterization | Chemical compositions | Erythrina variegate fiber | Morphological analysis | Property | Thermo-gravimetric

Engineering main heading: Extraction

Document details - Poly(methyl methacrylate)-gelatin porous polymeric scaffolds for controlled drug delivery

Journal of Porous Materials

2022

Poly(methyl methacrylate)-gelatin porous polymeric scaffolds for controlled drug delivery

(Article in press ?)

Pauline Sheela, P.A., Kesavan, M.P., Abdul Khader Jailani, N.M., Lenin, N.

[a]Department of Nanoscience and Technology, K.S Rangasamy College of Technology, Tamil Nadu, Tiruchengode, 637215, India
[b]Department of Chemistry, Hajee Karutha Rowther Howdia College, Tamil Nadu, Uthamapalayam, 625 533, India
[c]Department of Physics, Sethu Institute of Technology, Tamil Nadu, Kariapatti, 626115, India

Abstract

Drug delivery has concerned attention, due to its application with the regeneration of healthy tissues for bone repair and wound healing. Since, it is desirable to develop new and highly porous polymeric scaffolds required to the tissue regeneration and local antibiotic drug delivery. A new therapeutic system based on antibiotic drug ceftriaxone (CFX) loaded PMMA-Gelatin Polymeric Scaffolds (CFX-PGPSs) was prepared, which combines the merits of tissue regeneration and antibiotic drug delivery. The prepared CFX-PGPSs well characterized by different physico-chemical techniques. The morphological studies result clearly indicated the microporous (1–20 μm) surface of the CFX-PGPSs. Our results clearly show that, the blending of PMMA can alter the swelling as well as drug release profile of CFX-PGPSs. In vitro drug release study was carried out on the CFX-PGPSs at physiological condition (pH 7.4, PBS), observed initial burst release followed by controlled release of CFX from CFX-PGPSs. In addition, CFX-PGPS-3 showed extended drug release efficiency (83.55%) than other scaffolds proves the effect of PMMA blending on CFX-PGPSs. Further, CFX-PGPSs displayed comparatively better antimicrobial activity against Escherichia coli than Staphylococcus aureus. Hence, these CFX-PGPSs might be utilized as a new tissue implant as well as local antibiotic drug delivery system.

Author keywords

Antibiotic drug | Controlled drug delivery system | Gelatin | Microporous scaffolds | Poly(methyl methacrylate)

Indexed keywords

Engineering controlled terms: Antibiotics | Blending | Escherichia coli | Esters | Functional polymers | Microporosity | Polymeric implants | Scaffolds (biology) | Targeted drug delivery | Tissue | Tissue regeneration

Engineering uncontrolled terms: Antibiotic drugs | Ceftriaxone | Controled drug delivery system | Drug-delivery systems | Gelatin | Microporous | Microporous scaffold | Poly(methyl methacrylate) | Poly-methyl methacrylates

Engineering main heading: Controlled drug delivery

Funding details

Funding text

The authors gratefully acknowledge the management of K.S. Rangasamy College of Technology, Tiruchengode and Hajee Karutha Rowther Howdia College, Uthamapalayam for their lab and instrumental facilities.

Document details - Automated Pneumonia Detection Method using Hybrid Semantic Segmentation Network

ECS Transactions

Volume 107, Issue 1, 2022, Pages 8571-8581

1st International Conference on Technologies for Smart Green Connected Society 2021, ICTSGS 2021; Virtual, Online; United States; 29 November 2021 through 30 November 2021; Code 179026

Automated Pneumonia Detection Method using Hybrid Semantic Segmentation Network(Conference Paper)

Maheshwari, M.U., Tamilselvi, R., Beham, M.P., Hasan, M.A.

[a]Department of Electronics and Communication Engineering, Sethu Institute of Technology, Tamilnadu, Kariapatti, India
[b]Meenakshi Mission Hospital, Madurai, India

Abstract

Pneumonia is a potentially life-threatening condition that causes the air sacs in the lungs to become full of pus or fluid. Pneumonia is one of the lung infection diseases that can sometimes lead to severe or life-threatening illness and even death. Chest X-rays are mainly used for the diagnosis of pneumonia. Early detection of pneumonia is a challenge in the X-ray imaging due to the limited color scheme of x-ray imaging. Another major drawback in the early diagnosis of pneumonia is the human-dependent detection. Thus it is the need of the hour to diagnose pneumonia at an early stage. Inspired by this issue, in this work, a novel hybrid semantic segmentation network is proposed for early detection and classification of pneumonia. Various performance metrics have been used to analyze the performance of the proposed network. Experimental results prove the efficiency of the hybrid semantic segmentation network compared with the other existing approaches in the recent works. © The Electrochemical Society

Indexed keywords

Engineering controlled terms: Air, Semantic Segmentation, Semantic Web, Semantics

Engineering uncontrolled terms: Color schemes, Detection methods, Early diagnosis, Infections disease, Life threatening conditions, Lung infection, Performance, Performance metrices, Semantic segmentation, Xray imaging

Engineering main heading: Diagnosis

ISSN: 19386737
ISBN: 978-160768539-5
Source Type: Conference Proceeding
Original language: English

DOI: 10.1149/10701.8571ecst
Document Type: Conference Paper
Publisher: Institute of Physics

Document details - Mathematical Modelling of Unsteady Flow of Gas in a Semi- Infinite Porous Medium

International Journal of Electrochemical Science

Volume 17, 2022, Article number 220619

Mathematical Modelling of Unsteady Flow of Gas in a Semi- Infinite Porous Medium(Article)(Open Access)

Mary, M.L.C., Saravanakumar, R., Lakshmanaraj, D., Rajendran, L., Lyons, M.E.G.

[a]Department of Mathematics, Fatima College (Autonomous), Madurai, India
[b]Department of Mathematics, Sethu Institute of Technology, Kariapatti, India
[c]Department of Mathematics, AMET (Deemed to be University), Chennai, Kanathur, India

View additional affiliations

Abstract

The research aims to find a way to solve the nonlinear problem in unsteady isothermal gas flow through a semi-infinite medium using a simple and effective method. This nonlinear equation is solved using a novel analytical technique called new approach of homotopy perturbation (NHPM) and Akbari-Ganji methods (AGM) to obtain the analytical expression of unsteady gas flow of the liquid through a porous medium. Comparing our results with other numerical and analytical methods validates our method's efficiency and accuracy. This method is very effective and concise, and this simple and closed-form of theoretical expression contain only one or two terms. © 2022

Author keywords

Akbari-Ganji method | Mathematical modeling | New approach of homotopy perturbation method | Nonlinear equation | Unsteady gas flow

ISSN: 14523981
Source Type: Journal
Original language: English
DOI: 10.20964/2022.06.05
Document Type: Article
Publisher: Electrochemical Science Group

Lakshmanaraj, D.; Department of Mathematics, Sethu Institute of Technology, Kariapatti, India;
Rajendran, L.; Department of Mathematics, AMET (Deemed to be University), Chennai, Kanathur, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Machinability of Titanium alloy 6242 by AWJM through Taguchi method

Materials Today: Proceedings

2022

Machinability of Titanium alloy 6242 by AWJM through Taguchi method

(Article in press)

Perumal, A., Kailasanathan, C., Wilson, V.H., Sampath Kumar, T., Stalin, B., Rajkumar, P.R.

[a]Centre for Materials Research, Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, Pulloor, Kariapatti, Virudhunagar District, 626 115, India
[b]Department of Technology Management, School of Mechanical Engineering (SMEC), VIT University, Tamil Nadu, Vellore, India
[c]Department of Manufacturing Engineering, School of Mechanical Engineering (SMEC), VIT University, Tamil Nadu, Vellore, India

View additional affiliations

Abstract

Titanium alloy is difficult to machining in the conventional machining process. Hybrid production technology for abrasive water jet machining (AWJM) allows the machining of all engineering applications. This paper explores the optimization of the process variables of Titanium alloy AWJM (Ti- 6Al- 2Sn- 4Zr- 2Mo). The AWJM process parameters such as water jet strength, traverse speed, and standoff distance were studied against the material removal rate, surface roughness, kerf angle. The contribution of this parameter to responses has been calculated by variance analysis. For material removal rate, surface roughness, kerf angle, regression models were obtained. © 2021

Author keywords

Abrasive water jet machining | Kerf angle | Material removal rate | Surface roughness | Ti-6242

ISSN: 22147853
Source Type: Journal
Original language: English
DOI: 10.1016/j.matpr.2021.04.067
Document Type: Article
Publisher: Elsevier Ltd

Perumal, A.; Centre for Materials Research, Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, Pulloor, Kariapatti, Virudhunagar District, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Neonatal cry signal prediction and classification via dense convolution neural network

Journal of Intelligent and Fuzzy Systems

Volume 42, Issue 6, 2022, Pages 6103-6116

Neonatal cry signal prediction and classification via dense convolution neural network(Article)

Vaishnavi, V., Suveetha Dhanaselvam, P.

[a]Department of Electrical and Electronics Engineering, Sethu Institute of Technology, Tamil Nadu, Pulloor, India
[b]Department of Electronics and Communication Engineering, Velammal College of Engineering and Technology, Tamil Nadu, Madurai, India

Abstract

The study of neonatal cry signals is always an interesting topic and still researcher works interminably to develop some module to predict the actual reason for the baby cry. It is really hard to predict the reason for their cry. The main focus of this paper is to develop a Dense Convolution Neural network (DCNN) to predict the cry. The target cry signal is categorized into five class based on their sound as 'Eair', 'Eh', 'Neh', 'Heh' and 'Owh'. Prediction of these signals helps in the detection of infant cry reason. The audio and speech features (AS Features) were exacted using Mel-Bark frequency cepstral coefficient from the spectrogram cry signal and fed into DCNN network. The systematic DCNN architecture is modelled with modified activation layer to classify the cry signal. The cry signal is collected in different growth phase of the infants and tested in proposed DCNN architecture. The performance of the system is calculated through parameters accuracy, specificity and sensitivity are calculated. The output of proposed system yielded a balanced accuracy of 92.31%. The highest accuracy level 95.31%, highest specificity level 94.58% and highest sensitivity level 93% attain through proposed technique. From this study, it is concluded that the proposed technique is more efficient in detecting cry signal compared to the existing techniques.

Author keywords

audio and speech features | dense convolution neural network | Infant cry signal | mel-bark frequency cepstral domain | spectrogram images

Indexed keywords

Engineering controlled terms: Convolution | Forecasting | Image classification | Network architecture | Signal detection

Engineering uncontrolled terms: Audio features | Cepstral domain | Convolution neural network | Dense convolution neural network | Infant cry | Infant cry signal | Mel-bark frequency cepstral domain | Spectrogram image | Spectrograms | Speech features

Engineering main heading: Spectrographs

Document details - Effects of Moisture Absorption and Thickness Swelling Behaviors on Mechanical Performances of Carica Papaya Fiber Reinforced Polymeric Composites

Journal of Natural Fibers

Volume 19, Issue 15, 2022, Pages 12080-12099

Effects of Moisture Absorption and Thickness Swelling Behaviors on Mechanical Performances of Carica Papaya Fiber Reinforced Polymeric Composites(Article)

Saravanakumaar, A., Senthilkumar, A., Muthu Chozha Rajan, B., Rajini, N., Ismail, S.O., Mohammad, F., Al-Lohedan, H.A.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Virudhunagar, India
[b]Mechanical Engineering, Kalasalingam Academy of Research and EducationDepartment of, Srivilliputhur, India
[c]Department of Engineering, School of Physics, Engineering and Computer Science, University of Hertfordshire, United Kingdom

View additional affiliations

Abstract

In this study, composite materials were made from Carica papaya fibers (CPFs), as a reinforcing element in polypropylene (PP), polyester (P) and epoxy (E) matrices, using compression molding technique. Experiments were conducted to evaluate the input parameters with their output responses, specifically density and thickness. Various CPF reinforced PP, P, and E composite specimens with varied fiber orientations of 0°, 45°, and 90° as well as percentages of fiber contents of 10, 20, and 30 wt.% were prepared, according to the ASTM D 570 standard. From the results obtained, it was observed that CPF/E composites with fewer fraction of CPF and orientation of 90° exhibited less water absorption throughout the whole duration of immersion. Water saturated CPF/E composite specimen, designated as E8, with orientation of 0° and fiber content of 20 wt.% showed the highest tensile, flexural strengths, and Shore D Hardness of 119, 115 MPa, and 85, respectively. Also, CPF/E composite specimen (E7) with 90° and 10 wt.% recorded the lowest tensile strength of 32 MPa, and CPF/E composite (E3) with 90° and 30 wt.% showed the lowest flexural strength of 41 MPa. Hence, it was evident that optimum CPF reinforced polymeric composite can be used for some outdoor engineering applications.

Author keywords

Carica papaya fibers (CPFs) | mechanical properties | Natural fiber composites | scanning electron microscopy | thickness swelling | water uptake

Indexed keywords

Engineering controlled terms: Bending strength | Compression molding | Fibers | Polypropylenes | Reinforced plastics | Swelling | Tensile strength | Water absorption

Engineering uncontrolled terms: Carica papaya | Carica papaya fiber | Composite specimens | Fiber-reinforced polymeric composites | Fibers content | Moisture absorption | Natural fiber composites | Swelling behavior | Thickness swelling | Water uptake

Engineering main heading: Scanning electron microscopy

PaperChem Variable: Bend Strength | Compression Molding | Fibers | Swelling | Tensile Strength | Water Absorption

Document details - Combined Weighted Whale Optimization and Attention-based Deep Learning Approach for Sentiment Analysis

2022 International Conference on Computer Communication and Informatics, ICCCI 2022

2022

12th International Conference on Computer Communication and Informatics, ICCCI 2022; Coimbatore; India; 25 January 2022 through 27 January 2022; Category numberCFP2208R-ART; Code 178296

Combined Weighted Whale Optimization and Attention-based Deep Learning Approach for Sentiment Analysis(Conference Paper)

Anuratha, K., Parvathy, M.

[a]Sri Sai Ram Institute of Technology, TamilNadu, Chennai, India
[b]Sethu Institute of Technology, TamilNadu, Madurai, India

Abstract

The swift development of the Internet paved a vital contribution in the rocketing growth of the electronic commerce and online shopping portals to purchase products. Sentiment Analysis (SA) is a method of analyzing the user reviews posted on the e-commerce and shopping portals, for improving the user satisfaction. In the recent years, Deep learning models are applied for SA. This paper presents a combined attention-based deep model and weighted whale optimization for polarity detection in SA. Both the past and future contexts are extracted based on the flow of temporal information in the front and back directions. The Attention Mechanism (AM) is used at the output stage of the bi-directional layers in the deep network model for imposing either high or low emphasis on different words. Convolution and pooling mechanisms are used for reducing the feature dimensionality and extraction of the position-invariant features. word segmentation is performed on the input sequence for obtaining the etymological information about the words. The features are extracted after analyzing the data characteristics and the relevant features are ranked. The concept drift score is obtained to analyze the correlation relationship. Weighted whale optimization and deep attention based RNN are utilized to classify the posted reviews into three types: positive (affirmative) reviews, negative (contradictory) reviews and neutral review. From the comparative analysis with the existing classification approaches, the proposed method achieves high classification accuracy, precision, recall, F-score and low memory usage and time required for training. © 2022 IEEE.

Author keywords

Attention-based Deep Learning Model | Concept Drift | Sentimental Analysis (SA) | Weighted Whale Optimization

Indexed keywords

Engineering controlled terms: Deep learning | Sentiment analysis

Engineering uncontrolled terms: Attention-based deep learning model | Concept drifts | Learning approach | Learning models | Online shopping portals | Optimisations | Sentiment analysis | Sentimental analyse | User reviews | Weighted whale optimization

Engineering main heading: Electronic commerce

Document details - Tribological Behaviors Analysis of Synthesized Chromel Composite

Materials Research

Volume 25, 2022, Article number e20220008

Tribological Behaviors Analysis of Synthesized Chromel Composite(Article) (Open Access)

Fazil, B.M., Suresh, P.

[a]Sethu Institute of Technology, Department of Mechanical Engineering, Virudhunagar, 626115, India
[b]Muthayammal Engineering College, Department of Mechanical Engineering, Rasipuram, 637408, India

Abstract

This paper makes an investigation on the synthesis of tantalum carbide (TaCx) based chromel composites and their tribological behaviour using pin on disc under various load conditions. The reinforced chromel alloy with TaCx was prepared at the rate of 0, 3 and 6 wt.% of TaC using stir casting route. The wear resistance of composites was found to improve with the increase in weight percentage of TaC. The wear properties of Chromel-TaCx composite were enhanced due to the presence of 6% TaC. The wear worn out surface of chromel composite was studied through microstructures. The optimal process factors and their effect on responses have been analyzed through Response Surface Methodology (RSM) and Analysis of Variance (ANOVA).

Author keywords

Chromel | EDX | Response surface methodology | Tantalum carbide | Worn surface morphology

Indexed keywords

Engineering controlled terms: Analysis of variance (ANOVA) | Carbides | Morphology | Surface morphology | Surface properties | Tribology | Wear resistance

Engineering uncontrolled terms: Behavior analysis | Chromel | Load condition | Pin on disk | Response-surface methodology | Stir casting | Synthesised | Tribological behaviour | Weight percentages | Worn surface morphology

Engineering main heading: Wear of materials

ISSN: 15161439
DOI: 10.1590/1980-5373-MR-2022-0008
Source Type: Journal
Document Type: Article
Original language: English
Publisher: Universidade Federal de Sao Carlos

Materials Research. 2022; 25:e20220008
DOI: https://doi.org/10.1590/1980-5373-MR-2022-0008

Tribological Behaviors Analysis of Synthesized Chromel Composite

***B. Mohmed Fazil*[a]*, *P. Suresh*[b]**

[a]*Sethu Institute of Technology, Department of Mechanical Engineering, 626115, Virudhunagar, India.*
[b]*Muthayammal Engineering College, Department of Mechanical Engineering, 637408, Rasipuram, India.*

Received: January 09, 2022; Accepted: February 01, 2022

This paper makes an investigation on the synthesis of tantalum carbide (TaC_x) based chromel composites and their tribological behaviour using pin on disc under various load conditions. The reinforced chromel alloy with TaC_x was prepared at the rate of 0, 3 and 6 wt.% of TaC using stir casting route. The wear resistance of composites was found to improve with the increase in weight percentage of TaC. The wear properties of Chromel-TaC_x composite were enhanced due to the presence of 6% TaC. The wear worn out surface of chromel composite was studied through microstructures. The optimal process factors and their effect on responses have been analyzed through Response Surface Methodology (RSM) and Analysis of Variance (ANOVA).

Keywords*: Chromel, Tantalum carbide, EDX, Worn surface morphology, Response surface methodology.*

1. Introduction

In recent days, nickel based chromium alloys are playing an essential role in metal industries. The combination of chromium with other alloys offers better substance properties. Nickel based chromium alloys were used in automotive industry, aero engines and nuclear reactors[1]. Chromel alloy was generally used as thermocouple. Chromel (K-type) thermocouple was applied to determine the outlet temperature[2]. Tungsten-copper and iron based chromel alloy were effectively utilized for temperature applications[3]. In direct contact type heat exchanger, chromel thermocouple was used to find the water temperature at the bottom of heat exchanger to withstand corrosion[4]. Tantalum carbide (TaCx) was used to enrich the carbon content of the material and also to strengthen the interfacial alloying elements through different compositions. The mechanical behaviors were also gradually improved[5]. As a result, different applications were suggested, including thermal heat insulation and vehicle wear-resistant liners. High volume fraction of tantalum carbide was applied for the improvement of fracture toughness and tensile strength[6]. The different compounds of tantalum carbide rich phases were used in alloy such as TaC, Ta_6C_5, Ta_4C_3 and Ta_2C[7]. Due to superior properties like high hardness, melting point, wear resistance and chemical stability, TaCx was observed to have a great effect on the substance properties[8]. The substance properties of MMC play a major role in the selection of material for any applications and processes. The three types of manufacturing process are (i) liquid state (ii) solid state, and (iii) solid-liquid[9]. Among these processes, liquid state process was found to be more economical. Stir casting was an example of liquid state processing technique. The advantages of using this process are better homogeneous material, cheap and uniform distribution of reinforcement particles. By using computer simulation, the effect of the stirrer velocity on the flow of material and possible distribution of reinforcement particles in the molten matrix yield improved material structure[10].

Reinforcements such as oxides, carbides, borides and nitrides with matrix usually minimize the wear of Al alloy[11]. The wear was increased due to the penetration of reinforcement material into the matrix and the forceful removal of debris material[12]. The wear rate was minimized due to the addition of reinforcement particles to the alloy and it was concluded that load was the top most factors to affect the wear rate[13]. AA 6082-T6 composite that was synthesized by reinforcing with an assortment of silicon and boron carbides using a stir casting process, subjected to a sliding wear test. Load, sliding speed, reinforcement percentage and sliding distance were selected as control factors. Variance analysis showed that the wear increases with an increase of sliding distance and load. However, a decrease in wear was observed with an increase in reinforcement or sliding speed[14]. Sliding wear test was performed on electroless Ni-P coating to investigate the wear behaviour and the test revealed that load and time have a major effect on two-way interaction[15]. An attempt to minimize the wear rate of Al/AlB_2 composites by employing L_9 Taguchi orthogonal array was done by considering the control factors of dry sliding wear behavior[16]. In recent times, Design of experiments was the most realistic statistical approach which was used in many fields for process control, design optimization and product performance prediction. The influence of input constraints on dry sliding wear behavior of SiC and graphite particles based reinforced aluminum composites were analyzed by carrying out L_{27} experiments under Taguchi DOE method. Among other factors, sliding distance was found to be the most significant factor[17].The experiments were performed to obtain the wear data in accordance with the experimental design of array. In particular, the impact of process factors

*e-mail: mohmedfazilmech@gmail.com

Document details - Preparation and characterization of AZ63A/Boron Nitride composites using hybrid mechanical and ultrasonic assisted stir casting

Materials Today: Proceedings

Volume 59, January 2022, Pages 1513-1519

Preparation and characterization of AZ63A/Boron Nitride composites using hybrid mechanical and ultrasonic assisted stir casting(Article)

Vairamuthu, J., Senthil Kumar, A., Sivakumar, G.D., Rajeshwaran, S.K., Subbiah, R.

[a]Centre for Materials Research Lab, Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, India
[c]Department of Mechanical Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Telangana, Hyderabad, 500090, India

Abstract

Magnesium (Mg) is become progressively used in the transportation business because of its low weight. The poorer mechanical properties of magnesium (Mg) compared to aluminium and steel limit its widespread use. Improved mechanical properties can be achieved through grain refinement in cast alloys. Particle substrates can be added to the liquid melt to serve as nucleation sites for the formation and development of grains, resulting in a finer grain size. Mechanical stirring (MS) with impeller is most common technique for dispersing inoculants into the molten metal. However, it is difficult to achieve uniform dispersion of inoculants using this method. Ultrasonic treatment (UST) has also been investigated as an alternative to MS treatment. Particle inoculants BN were studied to see how they would disperse inside the alloy AZ63A Mg in this study. To create the cast composites, either MS or UST were used. Thermal tensile tests and theoretical models were used to determine the mechanical properties of these materials. The UST-treated specimens outperformed the base alloy and the MS-produced samples in terms of mechanical properties. Inoculant dispersion in sonicated samples was shown to be improved due to the use of finer grains, a thermal development discrepancy between the refiner and matrix, and other factors. Using sonication and grain refinement, researchers were able to make a exclusive relationship between theoretic strengthening mechanism forecast models and the actual outcomes they attained. The mechanical properties of Mg alloy can be improved by utilising cutting-edge new technologies, such as UST, in the production of cast alloys. © 2022 Elsevier Ltd.

Author keywords

Magnesium | Mechanical stirring (MS) | Sonication | Ultimate Tensile Strength (UTS) | Ultrasonic treatment (UST)

Indexed keywords

Engineering controlled terms: Grain size and shape | Hybrid composites | Liquid metals | Magnesium alloys | Magnesium castings | Tensile strength | Tensile testing | Ultrasonic testing

Engineering uncontrolled terms: Cast alloys | Finer grains | Grains refinement | Mechanical | Mechanical stirring | Ultimate tensile strength | Ultrasonic treatment | Ultrasonic treatments

Engineering main heading: Grain refinement

Document details - A Systematic Review Literature on Computer-Aided Detection Methods for COVID-19 Detection in X-Ray and CT Image Modalities

Lecture Notes in Networks and Systems

Volume 355, 2022, Pages 227-233

9th International Conference on Innovations in Electronics and Communication Engineering, ICIECE 2021; Hyderabad; India; 13 August 2021 through 14 August 2021; Code 274929

A Systematic Review Literature on Computer-Aided Detection Methods for COVID-19 Detection in X-Ray and CT Image Modalities(Conference Paper)

Brindha, R., Kavitha, A., Bhushan, B.

[a]Department of EEE, Sethu Institute of Technology, Kariapatti, India
[b]Department of ECE, M. Kumarasamy College of Engineering, Karur, India
[c]Department of CSE, School of Engineering and Technology, Sharda University, Greater Noida, India

Abstract

The novel coronavirus was spreading all over the world and causes Severe Acute Respiratory Syndrome coronavirus2 (SARS-CoV2). Failing to identify this syndrome in the early stage of infection leads to death. Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) testing procedure is used to detect infection of SARS-CoV2, but the false-negative rate of the RT-PCR is up to 61% in the early stage of testing. To improve the detection accuracy, Lung Computed Tomography (L-CT) and chest radiograph (CXR) image modalities are used along with RT-PCR clinical procedure. This paper presented a comprehensive survey of the recently used methods and its techniques are used in the computer-aided analysis of L-CT images and CXR images for SARS-CoV2 detection. The survey result might help overcome the limitations of the existing computer-aided image analysis methods and identify research opportunities in lung CT and chest X-Ray image analysis for SARS-CoV2 detection. © 2022, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

Author keywords

Covid-19 Deep learning Lung CT images X-Ray images

ISSN: 23673370
ISBN: 978-981168511-8
Source Type: Book Series
Original language: English

DOI: 10.1007/978-981-16-8512-5_25
Document Type: Conference Paper
Volume Editors: Saini H.S.,Singh R.K.,Tariq Beg M.,Mulaveesala R.,Mahmood M.R.
Publisher: Springer Science and Business Media Deutschland GmbH

Brindha, R.; Department of EEE, Sethu Institute of Technology, Kariapatti, India;

SciVal Topic Prominence

Topic:

Document details - Investigation of Friction Stir-Welded B₄C Particles-Reinforced Copper Joint: Mechanical, Fatigue, and Metallurgical Properties

Advances in Materials Science and Engineering

Volume 2022, 2022, Article number 1667041

Investigation of Friction Stir-Welded B_4C Particles-Reinforced Copper Joint: Mechanical, Fatigue, and Metallurgical Properties(Article)(Open Access)

Sezhian, M.V., Chakravarthi, G., Giridharan, K., Stalin, B., Kumar, B.Y., Sureshkumar, P., Vairamuthu, J., Krishnaraj, R.

[a]Department of Mechanical Engineering, Easwari Engineering College, Tamil Nadu, Chennai, 600089, India
[b]Department of Mechanical Engineering, Anna University, Regional Campus Madurai, Tamil Nadu, Madurai, 625 019, India
[c]Department of Mechanical Engineering, Chennai Institute of Technology, Tamil Nadu, Chennai, India

View additional affiliations

Abstract

Solid-state friction stir welding (FSW) is a sophisticated technique that can join materials that are similar and different without significantly affecting the properties of the base materials. The purpose of this study is to enhance the tensile strength, micro-hardness, and fatigue strength of the copper (C1100) butt-joints reinforced with B4C nanoparticles. The effects of B4C nanoparticle inclusion on the mechanical properties of the fabricated joints are studied in correlation with the microstructural features of the welded joints using optical microscopy. The joints are fabricated on a specialized friction stir welding machine (VMC-TC-1200) with a square pin-profiled tool. Defect-free joints of 3 mm copper plates are produced at the constant tool rotational speed of 1100 rpm, welding speed of 30 mm/min, plunge depth of 0.25 mm, and constant axial stress of 5 kN. B4C particles of 1, 2, 3, and 4wt% are added to the joints and their properties are compared with the joints produced without the inclusion of B4C particles to study the effects of the addition of nanoparticles. The joints attained a maximum micro-hardness of 123 HV, fatigue strength of 159 MPa, and tensile strength of 203 MPa with the addition of 3% B4C. Microstructural investigations performed through an optical microscope and scanning electron microscope (SEM) indicated the presence of homogeneously distributed B4C particles engulfed by finely refined grains. The thermal conductivity of the B4C particles facilitated the smooth flow of copper around the particles by forming a thin lubricating layer, thus improving the properties of the joints. Furthermore, this study has established that the addition of B4C particles is an effective and eco-friendly method of producing strong joints which could be used for industrial and defense applications. © 2022 M. Vetrivel Sezhian et al.

Indexed keywords

Engineering controlled terms: Fatigue of materials, Friction, Microhardness, Nanoparticles, Optical correlation, Particle reinforced composites, Reinforcement, Research laboratories, Scanning electron microscopy, Tensile strength, Thermal conductivity

Engineering uncontrolled terms: Base material, Fatigue properties, Fatigue strength, Friction stir, Friction-stir-welding, Mechanical fatigue, Metallurgical properties, Micro-hardness, Particle reinforced, Property

Document details - A low power and high speed approximate adder for image processing applications

Journal of Engineering Research (Kuwait)

Volume 10, Issue 1, 2022, Pages 150-160

A low power and high speed approximate adder for image processing applications(Article)(Open Access)

Narmadha, G., Deivasigamani, S., Balasubadra, K., Selvaraj, M.

[a]Department of EEE, Sethu Institute of Technology, India
[b]Faculty of Engineering and Computer Technology, AIMST University, Malaysia
[c]Department of Computer Science and Engineering, RMD Engineering College, Chennai, India

View additional affiliations

Abstract

Low power is an essential requirement for suitable multimedia devices, image compression techniques utilizing several signal processing architectures and algorithms. In numerous multimedia applications, human beings are able to congregate practical information from somewhat erroneous outputs. Therefore, exact outputs are not necessary to produce. In digital signal processing system, adders play a vital role as an arithmetic module in fixing the power and area utilization of the system. The trade-off parameters such as area, time and power utilization and also the fault tolerance environment of few applications have been employed as a base for the adverse development and use of approximate adders. In this paper, various types of existing adders and approximate adders are analyzed based on the area, delay and power consumption. Also, an approximate, high speed and power efficient adder is proposed, which yields better performance than that of the existing adders. It can be used in various image processing applications and data mining, where the accurate outputs are not needed. The existing and proposed approximate adders are simulated by using Xilinx ISE for time and area utilization. Power simulation has been done by using Microwind Software. © 2022 University of Kuwait. All rights reserved.

Author keywords

Approximate adder | Area consumption | CMOS | High speed | Image processing | Power efficient

ISSN: 23071885
Source Type: Journal
Original language: English
DOI: 10.36909/jer.10037
Document Type: Article
Publisher: University of Kuwait

Narmadha, G.; Department of EEE, Sethu Institute of Technology, India;

Document details - Experimental Investigation on the Mechanical Properties of Veli Karuvelam–Neem Hybrid Composites

Journal of Natural Fibers

Volume 19, Issue 15, 2022, Pages 11777-11789

Experimental Investigation on the Mechanical Properties of Veli Karuvelam–Neem Hybrid Composites(Article)

Selvanayagam Lillypushpam, B.S., Jesuretnam, B.R., Narasiman, S.D.P., Ramar, K.

[a]Department of Mechanical Engineering, Mar Ephraem College of Engineering and Technology, Marthandam, India
[b]Department of Mechanical Engineering, Muthayammal Engineering College, Rasipuram, India
[c]Engineering Department, University of Technology and Applied Sciences, Shinas, Oman

View additional affiliations

Abstract

Natural fibers-reinforced hybrid composites are acquiring more interest in automobile, marine, and aerospace fields due to its light weight characteristics. The purpose of this research is to develop a new material based on natural fibers for the aforementioned applications. The natural fibers such as Veli Karuvelam and Neem were selected for the investigation. As both the fibers are considered as weed in the agricultural fields, it could be a noteworthy to convert weed into useful material. Hybrid composites were fabricated using Veli Karuvelam and Neem fibers by hand layup method. Totally, five different types of composites were fabricated viz. N:V (1:0), N:V (0:1), N:V (1:3), N:V (1:1), and N:V (3:1). The fibers characteristics were analyzed by TGA and FTIR techniques. Further, the mechanical and moisture uptake behaviors of composites were investigated. TGA results showed that the Veli Karuvelam fiber possessed better thermal stability than Neem fiber. Tensile and flexural studies revealed that the N:V (0:1) composite exhibited the maximum tensile strength of 65 MPa and maximum flexural strength of 240 MPa due to the stuffing of more amount of high strength Veli Karuvelam fibers that involved in better stress transfer. Impact study resulted that the N:V (0:1) composite displayed the maximum impact energy of 6.5 kJ/m^2 owing to the better energy absorption behavior of inner structure of composite. Further, the moisture absorption study revealed that the N:V (1:0) composite absorbed more moisture compared to all other composites due to the intrinsic property of Neem fiber to hold more moisture. Furthermore, it was concluded from this research that the I:V (0:1) composite could a potential candidate for the application in automobile, marine, and aviation fields as showed better performance. © 2022 Taylor & Francis.

Author keywords

hybrid composite | mechanical properties | moisture absorption behavior | Neem | Veli Karuvelam | 关键词 | 印楝

Indexed keywords

Engineering controlled terms: Moisture | Natural fibers | Tensile strength

Engineering uncontrolled terms: %moisture | Absorption behaviors | Experimental investigations | Hybrid composites | Moisture absorption | Moisture absorption behavior | Neem | Veli karuvelam | 关键词 | 印楝

Engineering main heading: Hybrid composites

Document details - Multiresponse Optimization of Wire Electrical Discharge Machining Parameters for Ti-6Al-2Sn-4Zr-2Mo (α - β) Alloy Using Taguchi-Grey Relational Approach

Advances in Materials Science and Engineering

Volume 2022, 2022, Article number 6905239

Multiresponse Optimization of Wire Electrical Discharge Machining Parameters for Ti-6Al-2Sn-4Zr-2Mo (α - β) Alloy Using Taguchi-Grey Relational Approach(Article) (Open Access)

Perumal, A., Kailasanathan, C., Stalin, B., Suresh Kumar, S., Rajkumar, P.R., Gangadharan, T., Venkatesan, G., Nagaprasad, N., Dhinakaran, V., Krishnaraj, R.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Pulloor, Tamil Nadu, Kariapatti, 626115, India
[b]Department of Mechanical Engineering, Anna University, Regional Campus Madurai, Tamil Nadu, Madurai, 625 019, India
[c]Department of Mechanical Engineering, Kalasalingam Academy of Research and Education, Tamil Nadu, Krishnankoil, 626128, India

View additional affiliations

Abstract

The Ti-6Al-2Sn-4Zr-2Mo alloy was machined using the wire electrical discharge machining (WEDM) method in this research. The consequences of input values like pulse on duration, wire tension, and wire feed on metal removal rate (MRR) and surface roughness (SR) have indeed been observed. After conducting 27 experiments using Taguchi's L27 type of research technique, empirical designing and analysis of variance (ANOVA) were performed. For process optimization, the Taguchi technique, which is based on the grey relational analysis approach, is used. The results show that a material removal rate of 0.293 mm3/min was obtained with factors of 10 μs pulse on duration, 7 m/min of wire feed, and 12 g of wire tension (the higher the better), and surface roughness of 2.129 μm was obtained with factors of 6 μs pulse on duration, 3 m/min of wire feed, and 8 g of wire tension (the lower the better). The percentage of errors between results obtained and grey relational analysis (GRA) predicted results varies around 6%. Wire electrical discharge machining with Ti-6242 alloy to optimum conditions resulted in better MRR and surface integrity with good surface finish and integrity as evidenced by a substantial reduction in the crack formation, lumps, and accumulated surfaces.

Indexed keywords

Engineering controlled terms: Aluminum alloys; Analysis of variance (ANOVA); Electric discharges; Molybdenum alloys; Optimization; Surface roughness; Tin alloys; Titanium alloys; Wire; Zircaloy

Engineering uncontrolled terms: Grey relational analysis; Input values; Machining methods; Machining parameters; Metal removal rate; Multiresponses optimization; Process optimisation; Surface integrity; Wire electrical discharge machining; Wire tension

Engineering main heading: Electric discharge machining

ISSN: 16878434 **DOI:** 10.1155/2022/6905239

Document details - A Secured Manhole Management System Using IoT and Machine Learning

Intelligent Systems Reference Library

Volume 215, 2022, Pages 19-30

A Secured Manhole Management System Using IoT and Machine Learning(Book Chapter)

Krishnan, R.S., Sangeetha, A., Kumari, D.A., Nandhini, N., Karpagarajesh, G., Narayanan, K.L., Robinson, Y.H.

[a]ECE, SCAD College of Engineering and Technology, Tamilnadu, Tirunelveli, India
[b]PSNA College of Engineering And Technology, Tamilnadu, Dindigul, India
[c]Sethu Institute of Technology, Tamilnadu, Virudhunagar, India

View additional affiliations

Abstract

Improper maintenance of manholes leads to many critical issues. Periodical checking of Manholes is necessary to maintain our society with proper hygiene. Improper closing of manholes in India led to a loss of 102 lives during 2019. In addition to this, lot of people in India is dying while entering into manhole for cleaning the sewers. The death count of people involved in cleaning of sewers keeps on rapidly increasing year to year. In order to control these issues, a secured manhole management system is developed. This system monitors the lid of the manhole and alerts the Municipal Corporation whenever the position of the lid is changed. Similarly the condition of the sewers are monitored periodically and an alert information regarding the issue in the sewer system and its location details are sent to Municipal Corporation to take necessary actions whenever there is an emergency situation. The sensor details were periodically recorded and the machine learning algorithm is used to set the threshold of the sensor values with the help of Recurrent Neural Network using Long Short Term Memory (LSTM) algorithm. © 2022, The Author(s), under exclusive license to Springer Nature Switzerland AG.

Author keywords

Cloud server | Gas Sensor | GPS | GSM | IoT | Manhole | Mechanical float sensor | RNN | Temperature LSTM

ISSN: 18684394
Source Type: Book Series
Original language: English
DOI: 10.1007/978-3-030-90119-6_3
Document Type: Book Chapter
Publisher: Springer Science and Business Media Deutschland GmbH

Krishnan, R.S.; ECE, SCAD College of Engineering and Technology, Tamilnadu, Tirunelveli, India;

Document details - Brain tumor segmentation in multimodal MRI images using novel LSIS operator and deep learning

Journal of Ambient Intelligence and Humanized Computing

2022

Brain tumor segmentation in multimodal MRI images using novel LSIS operator and deep learning

(Article in press)

Ruba, T., Tamilselvi, R., Beham, M.P.

Department of ECE, Sethu Institute of Technology, Tamil Nadu, Viruthunagar, 626115, India

Abstract

Determination of tumor extent is the foremost challenge in the brain tumor treatment planning and valuation. Among various conventional anatomical imaging techniques for brain tumor diagnosis, MRI (Magnetic Resonance Imaging) provides the best spatial resolution and is noninvasive. MRI volume study for brain tumor extent segmentation is a time-consuming task. The performance highly relied on radiologist's experience. Also the difficulty of MRI and greater volume of test per radiologist in tumor screening system leads to a significant error. The sensible alternative to this problem is to use fully automated Computer Aided Diagnosis (CAD) system which attains the better segmentation of tumor extent with probable image processing tasks. In this paper we propose novel method that segment tumor from 3D MRI data contains Higher Grade Glioma (HGG). This approach not only localizes the tumor but also segments the intra tumor regions (necrosis, edema, non-enhancing tumor, and enhancing tumor). The projected cascaded Convolutional Neural Networks (CNN) actually has two subnetworks such as Tumor Localization Network (TLN) and LSIS (Local Symmetry Inter Sign) based Intra tumor Segmentation Network (LITSN). In TLN, 3DUNet was used to localize the tumor. Then intra tumor regions are segmented using deep CNN with the proposed novel operator which is based on LSIS. The proposed method was validated on BRATS 2015 datasets which contains high-grade glioma (HGG). Experimental results shown that our method can obtain superior segmentation results compared with other promising methods. © 2022, The Author(s), under exclusive licence to Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

3DUNet | Brain tumor | Deep CNN | LITSN | Segmentation | TLN

Indexed keywords

Engineering controlled terms: Brain | Cell death | Computer aided diagnosis | Convolutional neural networks | Deep learning | Image segmentation | Magnetic resonance imaging

Engineering uncontrolled terms: 3dunet | Brain tumor segmentation | Brain tumors | High-grade gliomas | LITSN | Local symmetry | Segmentation | Tumor extents | Tumor localization network | Tumour localization

Engineering main heading: Tumors

ISSN: 18685137 **DOI:** 10.1007/s12652-022-03773-5

Source Type: Journal **Document Type:** Article

Document details - Evaluation of Neuro Images for the Diagnosis of Alzheimer's Disease Using Deep Learning Neural Network

Frontiers in public health

Volume 10, 2022, Page 834032

Evaluation of Neuro Images for the Diagnosis of Alzheimer's Disease Using Deep Learning Neural Network(Article)(Open Access)

A, A., M, P., Hamdi, M., Bourouis, S., Rastislav, K., Mohmed, F.

[a]Department of Electronics and Communication Engineering, Sethu Institute of Technology, Kariapatti, India
[b]College of Science and Engineering, Hamad Bin Khalifa University, Qatar Foundation, Doha, Qatar
[c]Department of Information Technology, College of Computers and Information Technology, Taif University, Saudi Arabia

View additional affiliations

Abstract

Alzheimer's Disease (AD) is a progressive, neurodegenerative brain disease and is an incurable ailment. No drug exists for AD, but its progression can be delayed if the disorder is identified at its initial stage. Therefore, an early analysis of AD is of fundamental importance for patient care and efficient treatment. Neuroimaging techniques aim to assist the physician in the diagnosis of brain disorders by using images. Positron emission tomography (PET) is a kind of neuroimaging technique employed to create 3D images of the brain. Due to many PET images, researchers attempted to develop computer-aided diagnosis (CAD) to differentiate normal control from AD. Most of the earlier methods used image processing techniques for preprocessing and attributes extraction and then developed a model or classifier to classify the brain images. As a result, the retrieved features had a significant impact on the recognition rate of previous techniques. A novel and enhanced CAD system based on a convolutional neural network (CNN) is formulated to address this issue, capable of discriminating normal control from Alzheimer's disease patients. The proposed approach is evaluated using the 18FDG-PET images of 855 patients, including 635 normal control and 220 Alzheimer's disease patients from the ADNI database. The result showed that the proposed CAD system yields an accuracy of 96%, a sensitivity of 96%, and a specificity of 94%, leading to splendid performance when related to the methods already in use that are specified in the literature.

Author keywords

accuracy | Alzheimer's disease | convolutional neural network | deep learning | feature extraction | image analysis | image classification and positron emission tomography

Indexed keywords

EMTREE medical terms: Alzheimer disease | diagnostic imaging | human | neuroimaging | nuclear magnetic resonance imaging | procedures

MeSH: Alzheimer Disease | Deep Learning | Humans | Magnetic Resonance Imaging | Neural Networks, Computer | Neuroimaging

ISSN: 22962565
Source Type: Journal
Original language: English

DOI: 10.3389/fpubh.2022.834032
PubMed ID: 35198526
Document Type: Article
Publisher: NLM (Medline)

Document details - Sustainability and Environmental Impact of Ethanol and Oxyhydrogen Addition on Nanocoated Gasoline Engine

Bioinorganic Chemistry and Applications

Volume 2022, 2022, Article number 1936415

Sustainability and Environmental Impact of Ethanol and Oxyhydrogen Addition on Nanocoated Gasoline Engine(Article)(Open Access)

Padmanabhan, S., Giridharan, K., Stalin, B., Elango, V., Vairamuthu, J., Sureshkumar, P., Jule, L.T., Krishnaraj, R.

[a]School of Mechanical and Construction, Vel Tech Rangarajan Dr. Sagunthala RandD Institute of Science and Technology, Tamil Nadu, Chennai, 600062, India
[b]Department of Mechanical Engineering, Easwari Engineering College, Tamil Nadu, Chennai, 600089, India
[c]Department of Mechanical Engineering, Anna University, Regional Campus Madurai, Tamil Nadu, Madurai, 625019, India

View additional affiliations

Abstract

Climate change, clean air, renewable energy, nontoxic surroundings, and the opportunity to live in a healthy community are just few of the issues that environmental sustainability addresses. To improve environmental health and quality of life, several researchers have turned their attention to alternative energy sources like ethanol and oxyhydrogen. In latest years, significant progress has been made in the development of ethanol and hydrogen as clean energy sources. A higher octane rating is achieved by mixing ethanol with gasoline rather than using regular gasoline. A novel mix of oxyhydrogen, ethanol, and gasoline is ecologically friendly while simultaneously increasing the performance of gasoline engines. In this study, a nanoparticle-coated piston on a low heat rejection gasoline engine fuelled by an ethanol-gasoline mix with oxyhydrogen addition was investigated. It has been evaluated that thermal efficiency improved by up to 25% while fuel consumption can be reduced by up to 28% on a volume basis compared to the baseline engine. Furthermore, the decrease in harmful carbon monoxide reached around 10%, and the reduction in unburned hydrocarbon emissions reached 18%. © 2022 Sambandam Padmanabhan et al.

ISSN: 15653633
Source Type: Journal
Original language: English
DOI: 10.1155/2022/1936415
Document Type: Article
Publisher: Hindawi Limited

Krishnaraj, R.; Centre for Excellence-Indigenous Knowledge, Innovative Technology Transfer and Entrepreneurship, Dambi Dollo University, Dambi Dollo, Ethiopia;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - DFT study of NH₃ adsorption on 2D monolayer MXenes (M₂C, M = Cr, Fe) via oxygen functionalization: Suitable materials for gas sensors

FlatChem

Volume 31, January 2022, Article number 100329

DFT study of NH_3 adsorption on 2D monolayer MXenes (M_2C, M = Cr, Fe) via oxygen functionalization: Suitable materials for gas sensors(Article)

Banu, A.A., Sinthika, S., Premkumar, S., Vigneshwaran, J., Karazhanov, S.Z., Jose, S.P.

[a]School of Physics, Madurai Kamaraj University, Madurai, Tamil Nadu 625021, India
[b]Department of Physics, Lady Doak College, Madurai, Tamil Nadu 625002, India
[c]Department of Physics, Sri Kaliswari College, Sivakasi, Tamil Nadu 626123, India

View additional affiliations

Abstract

This work deals with the kind of the interaction of NH_3 molecules adsorbed on the MXene layers. The adsorption energies of NH_3 on the surface of MXenes (M_2C, M = Cr and Fe) and their oxygen-functionalized forms (O-MXenes or M_2CO_2) were calculated by using the density functional theory. DFT-D4 calculations have revealed that the on-top sites are initiated for adsorption of NH_3 on M_2C and M_2CO_2. For the reaction on Cr_2CO_2, the E_{ad} is found to be –0.29 eV lower than Cr_2C and also the same tendency was achieved in Fe_2C and its O-terminated MXene. This suggests that the molecule will strongly adsorb on Cr_2C than its O-terminated surface. Bader charge analysis in terms of the induced net charges on M_2C MXenes suggests that electron density distribution between N of NH_3 (negatively charged) and the Cr/Fe (positively charged) surface would play a key role in the adsorption. Furthermore, DOS calculations reveal that the electrical conducting behaviour and magnetic nature of MXenes make them suitable for gas sensors applications.

Author keywords

2D layered Transition-metal carbide | Cr_2C MXene | DFT calculations | Fe_2C MXene | Gas sensor | NH_3 adsorption

Funding details

Funding sponsor	Funding number	Acronym
	300107,309827,DST/INT/DAAD-13/2019	
	DST/TMD/MES/2K17/94(G)	
Norges Forskningsråd		
Madurai Kamaraj University		MKU

Funding text #1

Financial support for this study from the Department of Science and Technology-Materials for Energy Storage (DST/TMD/MES/2K17/94(G)) and DST-DAAD (DST/INT/DAAD-13/2019) New Delhi, India is highly acknowledged by the authors. The authors wish to thank DST-PURSE for the computational facilities made available in the Central Instrumentation Centre (CIC), Madurai Kamaraj University. The work by SZK has been funded by the project 300107 and 309827 funded by the Research Council of Norway. Computational work related to the interaction of the MXenes with CO2, CO, and N2 has been performed by using the NOTUR Norwegian supercomputing facilities through the project nn4608k.

Document details - Extraction and Characterization of Agricultural Discarded Sesbania Aculeata Stem Waste as Potential Alternate for Synthetic Fibers in Polymer Composites

Journal of Natural Fibers

Volume 19, Issue 15, 2022, Pages 10601-10615

Extraction and Characterization of Agricultural Discarded Sesbania Aculeata Stem Waste as Potential Alternate for Synthetic Fibers in Polymer Composites(Article)

Venkatesan, G., Vignesh, V., Nagarajan, K.J., Krishnaraj, R., Nagaprasad, N., Vinayagar, K.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, India
[b]Department of Mechanical Engineering, K.L.N. College of Engineering, Pottapalayam, India
[c]Department of Mechanical Engineering, Dambi Dollo University, Ethiopia

View additional affiliations

Abstract

Natural fibers have a wide range of potential applications in green composite manufacturing industrial sectors due to their renewable eco-friendly nature and remarkable properties. In the present work, the physico-chemical, thermal, tensile and morphological properties of Sesbania Aculeata Fibers (SAFs) are presented in first time. Chemical analysis results show that SAFs have relatively higher α-cellulose (70.1 wt.%) with lower hemicelluloses (10.2 wt.%), lignin (12.1 wt.%) and wax (0.6 wt.%) content. Structural analysis of SAFs was performed through fourier transform infrared (FTIR), energy dispersive X-ray microanalyzer (EDX) and NMR spectroscopy. X-ray diffraction (XRD) analysis evidenced that SAFs have a crystallinity index (CrI) of 65.5% with a crystalline size of 4.6 nm. The mechanical properties of the SAFs were investigated through a single fiber tensile test and fiber pull out test. The thermal stability of the SAFs was examined by thermogravimetric analysis (TGA). Based on the results, it is predicted that the SAFs can be used as a potential reinforcement in the polymer matrix composite structure. © 2021 Taylor & Francis.

Author keywords

mechanical properties | natural fiber | Physicochemical properties | sesbania aculeata

Indexed keywords

Engineering controlled terms: Crystallinity | Fourier transform infrared spectroscopy | Natural fibers | Nuclear magnetic resonance spectroscopy | Physicochemical properties | Polymer matrix composites | Tensile testing | Thermodynamic stability | Thermogravimetric analysis | X ray diffraction analysis

Engineering uncontrolled terms: Composite manufacturing | Eco-friendly | Green composites | Industrial sector | Morphological properties | Physicochemical property | Polymer composite | Property | Sesbania aculeatum | Thermal

Engineering main heading: Cellulose

PaperChem Variable: Cellulose | Chemical Analysis | Crystallinity | Gravimetry | Natural Fibers | Sesbania | Structural Analysis | Test Methods | Thermal Analysis

Document details - Effect of titanium oxide, alumina oxide and silicon carbide on mechanical properties and thermal properties of reinforced nylon composites for industrial applications

International Journal of Computer Aided Engineering and Technology

Volume 16, Issue 1, 2022, Pages 119-131

Effect of titanium oxide, alumina oxide and silicon carbide on mechanical properties and thermal properties of reinforced nylon composites for industrial applications(Article)

Sathees Kumar, S., Vignesh, V.

[a]Department of Mechanical Engineering, Cmr Institute of Technology, Telangana, Hyderabad, 501-401, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, Kariapatti, 626-115, India

Abstract

This study deals with the determination of mechanical and thermal performances of titanium oxide (TiO2), alumina oxide (AO) and silicon carbide (SC) reinforced nylon 6 (N6) composites. The composites are prepared by injection moulding method by varying the weight percentages. The effects of adding TiO2, AO and SC particles reinforced with N6 composites has investigated and result observed by tensile strength, impact and hardness test. The fracture surface morphologies have observed through scanning electron microscope (SEM) method. Thermal performances of N6 composites are reviewed by the thermogravimetric (TG) analysis. The exploratory comes about to show that upon expanding the addition of TiO2 (5 wt.%), AO (10 wt.%) and SC (5 wt.%) particles improved the tensile properties and thermal stability of the N6 polymer matrix composites. In addition, the impact strength and hardness properties escalate the expansion of SC (10 wt.%), TiO2 (5 wt.%), AO (5 wt.%) content with N6. For substantiate the work, the composite gear has fabricated for industrial and vehicle applications.

Author keywords

Alumina | Silicon carbide | Thermal stability | Titanium oxide

ISSN: 17572657
Source Type: Journal
Original language: English
DOI: 10.1504/IJCAET.2022.119539
Document Type: Article
Publisher: Inderscience Publishers

Sathees Kumar, S.; Department of Mechanical Engineering, Cmr Institute of Technology, Telangana, Hyderabad, India;

Document details - Energy-efficient heat exchanger equipped with multiple short-length taper twisted tapes

International Journal of Ambient Energy

Volume 43, Issue 1, 2022, Pages 6732-6744

Energy-efficient heat exchanger equipped with multiple short-length taper twisted tapes(Article)

Muthusamy, C., Gopi, P.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, India
[b]Department of Mechanical Engineering, Mahendra College of Engineering and Technology, Namakkal, India

Abstract

This article presents an experimental study of the heat transfer characteristics and the pressure drop of the circular tube fitted with multiple short-length taper twisted tape in convergent and divergent mode with the pitch ratios of 3, 4 and 5 and full-length twisted tape of two different pitch length such as 10 and 14 cm. Tapered twisted tapes have a larger effect on the enhancement of heat transfer with the lower pressure drop compared with the short-length uniform width twisted tape. Based on constant pumping power and constant heat duty, short-length taper twisted tapes are performed better than full-length twisted tape. Based on the experimental data, correlations are developed by using the statistical analysis and the arrived results are within the acceptable limit. © 2021 Informa UK Limited, trading as Taylor & Francis Group.

Author keywords

air heater | heat transfer enhancement | insert | pressure drop | Twisted tape

Indexed keywords

Engineering controlled terms: Drops | Energy efficiency | Heat exchangers | Heat transfer performance

Engineering uncontrolled terms: Air heater | Circular tubes | Divergents | Energy efficient | Heat Transfer enhancement | Heat-transfer characteristics | Insert | Pitch length | Pitch ratio | Twisted tapes

Engineering main heading: Pressure drop

ISSN: 01430750
CODEN: IJAED
Source Type: Journal
Original language: English

DOI: 10.1080/01430750.2021.1999322
Document Type: Article
Publisher: Taylor and Francis Ltd.

Muthusamy, C.; Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, India;

Document details - Automatic detection and classification of human knee osteoarthritis using convolutional neural networks

Computers, Materials and Continua

Volume 70, Issue 3, 2022, Pages 4279-4291

Automatic detection and classification of human knee osteoarthritis using convolutional neural networks(Article)(Open Access)

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

[a]Department of Medical Equipment Technology, College of Applied Medical Sciences, Majmaah University, Al Majmaah, 11952, Saudi Arabia
[b]Department of Chemical Engineering, Sethu Institute of Technology, Tamilnadu, Kariapatti, 626115, India
[c]Department of Physical Therapy, College of Applied Medical Sciences, Majmaah University, Al Majmaah, 11952, Saudi Arabia

View additional affiliations

Abstract

Knee Osteoarthritis (KOA) is a degenerative knee joint disease caused by 'wear and tear' of ligaments between the femur and tibial bones. Clinically, KOA is classified into four grades ranging from 1 to 4 based on the degradation of the ligament in between these two bones and causes suffering from impaired movement. Identifying this space between bones through the anterior view of a knee X-ray image is solely subjective and challenging. Automatic classification of this process helps in the selection of suitable treatment processes and customized knee implants. In this research, a new automatic classification of KOA images based on unsupervised local center of mass (LCM) segmentation method and deep Siamese Convolutional Neural Network (CNN) is presented. First-order statistics and the GLCM matrix are used to extract KOA anatomical Features from segmented images. The network is trained on our clinical data with 75 iterations with automatic weight updates to improve its validation accuracy. The assessment performed on the LCM segmented KOA images shows that our network can efficiently detect knee osteoarthritis, achieving about 93.2% accuracy along with multi-class classification accuracy of 72.01% and quadratic weighted Kappa of 0.86.

Author keywords

Intensity value | Neural network | Osteoarthritis | Segmentation | Unsupervised

Indexed keywords

Engineering controlled terms: Bone | Convolution | Image segmentation | Joints (anatomy)

Engineering uncontrolled terms: Automatic classification | Centers-of-mass | Convolutional neural network | Intensity values | Knee osteoarthritis | Local centers | Neural-networks | Osteoarthritis | Segmentation | Unsupervised

Engineering main heading: Convolutional neural networks

Funding details

Funding sponsor	Funding number	Acronym
	IFP-2020-42	

Document details - E2IA-HWSN: Energy Efficient Dual Intelligent Agents based Data Gathering and Emergency Event Delivery in Heterogeneous WSN Enabled IoT

Wireless Personal Communications

Volume 122, Issue 1, January 2022, Pages 379-408

E2IA-HWSN: Energy Efficient Dual Intelligent Agents based Data Gathering and Emergency Event Delivery in Heterogeneous WSN Enabled IoT(Article)

Susan Shiny, G., Muthu Kumar, B.

[a]Department of Information Technology, Sethu Institute of Technology, Kariapatti, India
[b]Department of Computer Science and Engineering, Syed Ammal Engineering College, Ramanathapuram, India

Abstract

Heterogeneous sensors are equipped with a limited battery source that is concerned with network lifetime problems. However, this problem can be tackled with the effective design of WSN-IoT by clustering and sleep scheduling mechanisms. This paper addresses this issue by presenting novel ideas involved in the WSN operations such as grid construction, cluster head selection, sleep scheduling, and data gathering by intelligent Agents (iAgents). An energy-efficient dual iAgents based Heterogeneous WSN (E2IA-HWSN) is proposed. iAgents are used in this paper to automatically collect the sensed data from IoT sensors. In this E2IA-HWSN, a 3 × 3 grid is built and each cell is sub-divided into four in which cluster heads (CH) are selected in each sub-division, followed by ring partitioning for selecting a CH present at the center. Multi-Objective Harris Hawks optimization (MO-HHO) algorithm is used to select CH and supernode, here to minimize the energy consumption of CH, the supernode takes responsibility to assign sleep schedules to devices. The scheduling slots are assigned only after a sensor reaches below the energy threshold. For scheduling, the Bayes rule-based Markov model (BR-MM) is applied with the determination of residual energy and sensed packet counts. Generator de Bits Pseudo Aleatorios (GBPA) eliminates redundant data in CH and then inter-cluster routing is performed in case of emergency events. If not, then the CH waits for the arrival of iagents, the trajectory of iAgents is dynamically predicted with Deep Policy Gradient (DDPG). The implementation is carried out in NS3.26 and the results show betterment to the well-known methods.

Author keywords

Data gathering | Data redundancy | Emergency event | Grid | Sleep scheduling | WSN-IoT

Indexed keywords

Engineering controlled terms: Energy efficiency | Energy utilization | Intelligent agents | Markov processes | Scheduling | Sleep research

Engineering uncontrolled terms: Agent based | Cluster-heads | Data gathering | Data-redundancy | Emergency events | Energy efficient | Grid | Sleep scheduling | Supernode | WSN-IoT

Engineering main heading: Internet of things

Document details - Physical, Chemical, Thermal and Surface Characterization of Cellulose Fibers Derived from Vachellia Nilotica Ssp. Indica Tree Barks

Journal of Natural Fibers

Volume 19, Issue 13, 2022, Pages 6934-6946

Physical, Chemical, Thermal and Surface Characterization of Cellulose Fibers Derived from Vachellia Nilotica Ssp. Indica Tree Barks(Article)

Saravanan, N., Ganeshan, P., Prabu, B., Yamunadevi, V., NagarajaGanesh, B., Raja, K.

[a]Department of Mechanical Engineering, University College of Engineering Nagercoil, Tamil Nadu, Nagercoil, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, India
[c]Department of Mechanical Engineering, Christian College of Engineering and Technology, Tamil Nadu, Oddanchatram, India

View additional affiliations

Abstract

The purpose of this investigation is to characterize the fibers extorted from the bark of Vacheilla nilotica ssp indica tree. Physical studies conducted on the fibers showed that the density of the fibers was 1.375 gm/cm^3 with their chemical composition containing 60.3% cellulose, 5.76% hemicellulose and 25.24% lignin. Wax, moisture and ash content present in the fibers were 0.63%, 6.95% and 1.12% respectively. FTIR spectrum proved the presence of functional groups pertaining to biopolymers. X-ray diffraction studies on the fibers showed crystalline index, degree of crystallinity and crystallite size as 57.66%, 70.26% and 2.27 nm respectively. Apparent activation energy of the fibers was 59.17 kJ/mol as derived from Broido's plot and the fibers subsist 225°C without degradation. Tensile strength, percent elongation and Young's modulus of the fibers were found as 242 ± 19MPa, 2.06 ± 0.07% and 11.76 ± 0.58GPa respectively. SEM images ascertained the rough fiber surface and the roughness parameters such as average roughness, root mean square roughness, skewness and kurtosis of the fibers were observed as 56.9668 nm, 78.5079 nm, 0.45906 and 3.57799 respectively from the atomic force microscope images. The study culminates that the physical, chemical, thermal and surface characteristics are comparable with other cellulose fibers.

Author keywords

FTIR analysis | Surface morphology | tensile strength | Thermo-gravimetric analysis | Vachellia nilotica ssp indica fibers | XRD diffraction

Indexed keywords

Engineering controlled terms: Activation energy | Biopolymers | Cellulose | Crystallinity | Crystallite size | Degradation | Higher order statistics | Morphology | Surface roughness | Tensile strength | Thermogravimetric analysis | X ray diffraction

Engineering uncontrolled terms: Cellulose fiber | Chemical characterization | Chemical surfaces | FTIR analysis | Physical characterization | Thermal characterization | Thermo gravimetric analysis | Vachellia niloticum ssp indica fiber | XRD | XRD diffraction

Engineering main heading: Surface morphology

Document details - Mechanical and Water Transport Characterization of Indian Almond–Banana Fibers Reinforced Hybrid Composites for Structural Applications

Journal of Natural Fibers

Volume 19, Issue 13, 2022, Pages 7049-7059

Mechanical and Water Transport Characterization of Indian Almond–Banana Fibers Reinforced Hybrid Composites for Structural Applications(Article)

Sundararaju Perinbakannan, A., Karuppusamy, M., Ramar, K.

[a]Department of Mechanical Engineering, Mohamed Sathak Engineering College, Kilakarai, India
[b]Department of Mechanical Engineering, PSNA College of Engineering and Technology, Dindigul, India
[c]Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, India

Abstract

In this investigation, hybrid composites were prepared for structural applications using Indian almond and Banana fibers by hand layup method. Five types of composites were fabricated viz. I-I-I-I, I-B-B-I, I-B-I-B, B-I-I-B & B-B-B-B and the mechanical & moisture absorption characteristics were studied. The tensile and flexural studies showed that the I-I-I-I composite displayed the maximum tensile and flexural strength of 61 MPa and 53 MPa, respectively, due to the placing of high strength Indian almond fiber at outer skin. The impact study resulted that the B-B-B-B composite exhibited the maximum impact strength (6.2 kJ/m^2) owing to the presence of more void content (6.83%) that absorbed more impact energy. The moisture absorption study reported that the B-B-B-B composite absorbed the maximum moisture percentage of 21% at 11 days due to more void content whereas the I-I-I-I composite showed least moisture absorption of 15% at 11 days because of low void percentage. Further, the biodegradation study revealed that the B-B-B-B composite exhibited the maximum weight loss of 38% at 60 days due to more moisture absorption that weakened the bonding strength of matrix and fiber and the microorganism accelerated the degradation.

Author keywords

banana fiber | hybrid composite | Indian almond fiber | mechanical characterization | moisture absorption

Indexed keywords

Engineering controlled terms: Biodegradation | Compressive strength | Fiber bonding | Fruits | Hybrid composites | Impact strength | Moisture | Reinforced plastics | Tensile strength | Water absorption

Engineering uncontrolled terms: Banana fibres | Fibre-reinforced | Hybrid composites | Indian almond fiber | Mechanical | Mechanical characterizations | Moisture absorption | Structural applications | Void contents | Water transport

Engineering main heading: Fibers

PaperChem Variable: Biodegradation | Compression Strength | Fiber Bonding | Fruits | Impact Strength | Moisture | Transport | Water Ways

Document details - Thermal Analysis and Kinetic Study of Indian Almond Leaf by Model-Free Methods

Journal of Natural Fibers

Volume 19, Issue 13, 2022, Pages 5793-5803

Thermal Analysis and Kinetic Study of Indian Almond Leaf by Model-Free Methods(Article)

Joseph, D., Raj, J.B., Ramar, K.

[a]Department of Mechanical Engineering, Raja's Engineering College, Alaganeri, India
[b]Department of Mechanical Engineering, Muthayammal Engineering College, Rasipuram, India
[c]Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, India

Abstract

Thermogravimetric analysis of Indian almond leaf was carried out at four different heating rates such as 5°C/min, 10°C/min, 15°C/min and 20°C/min. The kinetic study was performed using model free methods and the kinetic parameters were calculated by Kissinger, Friedman, KAS and FWO models. Thermogravimetric analysis resulted that the Indian almond leaf showed four stages of decomposition. Most of the mass loss occurred at stage II (188–460°C) owing to the simultaneous decomposition of cellulose, hemicellulose, and lignin. The shifting of pyrolysis curve occurred with increase of heating rate due to the limitation of heat transfer. The rate of mass loss decreased while increasing the heating rate due to the presence of more inert content i.e. ash and less volatile matters. The mean activation energy calculated by Kissinger, Friedman, KAS, and FWO showed as 52.67, 45.53, 73.73, and 72.28 kJ/mole. The mean activation energy of different leaves reported by earlier researcher was compared with the activation energy of Indian almond leaf and concluded that it stick to the range of activation energy of reported leaves.

Author keywords

Indian almond leaf | kinetic study | model-free methods | pyrolysis | Thermal analysis | thermogravimetric study

Indexed keywords

Engineering controlled terms: Cellulose | Heating | Heating rate | Kinetic parameters | Kinetic theory | Pyrolysis | Thermogravimetric analysis

Engineering uncontrolled terms: Indian almond leaf | Kinetic study | Kinetics parameter | Kissinger | Mass loss | Model-free method | Rate of mass loss | Thermogravimetric studies | Volatile matters

Engineering main heading: Activation energy

PaperChem Variable: Activation Energy | Averages | Cellulose | Gravimetry | Heating | Leaves | Mass | Pyrolysis | Thermal Analysis

ISSN: 15440478
Source Type: Journal
Original language: English

DOI: 10.1080/15440478.2021.1889442
Document Type: Article
Publisher: Taylor and Francis Ltd.

Document details - Experimental Investigation on Thermal and Transport Properties of Indian Almond–Kenaf Hybrid Composites for Construction Applications

Journal of Natural Fibers

Volume 19, Issue 13, 2022, Pages 5782-5792

Experimental Investigation on Thermal and Transport Properties of Indian Almond–Kenaf Hybrid Composites for Construction Applications(Article)

Muthukrishnan, S., Iyappalam Ramakrishnan, R., Chelliah, R., Krishnaswamy, H., Bensam Raj, J., Ramar, K.

[a]Department of Mechanical Engineering, Stella Mary's College of Engineering, Aruthenganvilai, India
[b]Department of Mechanical Engineering, Vivekananda Polytechnic College, Agasteeswaram, India
[c]Department of Mechanical Engineering, Amrita College of Engineering and Technology, Erachakulam, India

View additional affiliations

Abstract

Construction industries demand a material with high strength to endure severe environmental conditions like high temperature and humid and hence, it is noteworthy to assess the thermal and water transport properties of the material. In this investigation, the natural fibers based composites were fabricated using Indian almond and kenaf fibers by hand layup method. Entirely, two natural fiber composites viz. epoxy/Indian almond & epoxy/kenaf and two hybrid composites viz. kenaf/India almond/kenaf (K/I/K) & Indian almond/kenaf/Indian almond (I/K/I) were prepared. Thermogravimetric analysis (TGA) was carried out to analyze the thermal properties and water absorption study was carried out to analyze the transport properties. TGA study showed that the epoxy/kenaf composite exhibited a maximum onset temperature of 340.49°C owing to good bonding strength and the K/I/K composite displayed a maximum decomposition temperature of 380.21 ° with a minimum mass loss of 1.29 mg/min. Further, the epoxy/Indian almond composite showed a better flame retardancy property due to more char formation. Water absorption study resulted that the epoxy/Indian almond composite absorbed more water (35% at 50°C) compared to other composites due to spongy like structure and the presence of more voids on the surface of the fiber. Further, the epoxy/kenaf composite displayed more resistance to water penetration with maximum activation energy of diffusion of 2.63 kJ/mole. Transport properties such as diffusion coefficient, sorption coefficient and permeability coefficient were varied in line with temperature. The epoxy/kenaf composite showed least diffusion coefficient of 2.48×10^{-5} cm^2/s, sorption coefficient of 1.05, and permeability coefficient of 2.61×10^{-5} cm^2/s at 30°C among all other composites due to good bonding strength. © 2021 Taylor & Francis.

Author keywords

hybrid composites | Indian almond fiber | kenaf fiber | thermal properties | water absorption

Indexed keywords

Engineering controlled terms: Activation energy | Construction industry | Diffusion | Hemp | Hybrid composites | Kenaf fibers | Thermogravimetric analysis | Transport properties | Water absorption

Engineering uncontrolled terms: Bonding strength | Construction applications | Environmental conditions | Epoxy | Experimental investigations | High-strength | Highest temperature | Hybrid composites | Indian almond fiber | Sorption coefficients

Engineering main heading: Thermodynamic properties

Document details - Mechanical Properties of Typha Angustata/ Vetiver/Banana Fiber Mat Reinforced Vinyl Ester Hybrid Composites

Journal of Natural Fibers

Volume 19, Issue 13, 2022, Pages 5227-5238

Mechanical Properties of Typha Angustata/ Vetiver/Banana Fiber Mat Reinforced Vinyl Ester Hybrid Composites(Article)

Stalin, A., Mothilal, S., Vignesh, V., Nagarajan, K.J., Karthick, T.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, India
[b]Department of Mechanical Engineering, K.L.N. College of Engineering, Pottapalayam, India
[c]Department of CAD/CAM, Sethu Institute of Technology, Kariapatti, India

Abstract

The natural fiber mat is a better replacement for synthetic fiber which is reinforced with polymer composites for advanced engineering application. For the first time, the present experiment was carried out to evaluate the mechanical properties of Typha angustata/Vetiver/Banana fiber/mat reinforced vinyl ester hybrid composites. Eight different types of single and bi-layer hybrid fiber mat composites at 45° and 90° direction were fabricated through compression molding techniques. The Typha angustata double-layer fiber mat composites yield excellent tensile and flexural properties. Tensile tests revealed that the ultimate strength is about 60 MPa, the tensile modulus is 3.56 GPa and elongation break at 1.39%. The flexural strength is estimated to be around 79 MPa, respectively. The Typha angustata/Banana mat composites exhibited better impact strength and hardness due to the hybridization of two natural fibers. The impact strength and hardness of composites are observed to be around 238 kJ/m^2 and 82. The surface morphologies of the fractured composites specimen were characterized by scanning electron microscope analysis. © 2021 Taylor & Francis.

Author keywords

flexural strength | hardness | tensile strength | Typha angustata fiber

Indexed keywords

Engineering controlled terms: Bending strength | Compression molding | Esters | Hardness | Hybrid composites | Impact strength | Natural fibers | Reinforced plastics | Scanning electron microscopy | Tensile testing

Engineering uncontrolled terms: Advanced engineerings | Banana fibres | Engineering applications | Fibermat | Hybrid composites | Natural fiber mats | Polymer composite | Single layer | Typha angustatum fiber | Vinyl esters

Engineering main heading: Tensile strength

PaperChem Variable: Bend Strength | Compression Molding | Esters | Hardness | Impact Strength | Natural Fibers

Funding details

Funding text

The authors wish to express their sincere thanks to the Management of Sethu Institute of Technology, Kariapatti, Tamil Nadu, India for supporting this research by providing sabbatical leave to the corresponding author.

Document details - Influence of Stacking Sequence and Fiber Content on the Mechanical Properties of Natural and Synthetic Fibers Reinforced Penta-Layered Hybrid Composites

Journal of Natural Fibers

Volume 19, Issue 13, 2022, Pages 5258-5270

Influence of Stacking Sequence and Fiber Content on the Mechanical Properties of Natural and Synthetic Fibers Reinforced Penta-Layered Hybrid Composites(Article)

Mohanavel, V., Suresh Kumar, S., Vairamuthu, J., Ganeshan, P., NagarajaGanesh, B.

[a]Department of Mechanical Engineering, Bharath Institute of Higher Education and Research, Tamilnadu, Chennai, India
[b]Department of Mechanical Engineering, Panimalar Polytechnic College, Chennai, India
[c]Department of Mechanical Engineering, Sethu Institute of Technology, Pulloor, India

View additional affiliations

Abstract

The objective of this work is to find the influence of fiber content, stacking pattern, and their sequence on the mechanical properties of hybrid composites. Hybrid composites in four varieties with five laminae containing different stacking sequences of jute/madar/glass fibers were fabricated using hand-layup technique with glass fiber woven mats as their skin layers that just enclose bio-fibers oriented horizontally. The stacking sequences were GJMJG, GMJMG, GJGJG and GMGMG where G, J, and M represents glass fiber mats, jute, and madar fibers, respectively. The fibers in the core layer were oriented perpendicular to the enclosing adjacent plies and they may be jute/madar fibers depending on the stacking sequence. Load Vs deflection curves show that stress and strain were linear and all the samples fail abruptly except the sample that contains high proportion of madar fibers. Jute fiber layers imparted more strength and energy-absorbing capacity, whilst madar fiber layers imparted more strain and toughness to the composites. Studies showed that intercalation of glass fiber mats as the core and skin layers exhibited a significant effect on the mechanical properties of the composites than other samples. The morphology of the fractured samples exhibited compatibility between matrix and reinforcements. © 2021 Taylor & Francis.

Author keywords

fractured surfaces | glass fiber mats | Hybrid composites | jute/madar fibers | mechanical properties | stacking sequence

Indexed keywords

Engineering controlled terms: Fracture | Glass fibers | Jute fibers | Reinforced plastics | Stress-strain curves

Engineering uncontrolled terms: Core layers | Fibermat | Fibers content | Fractured surfaces | Glass fiber mat | Glass-fibers | Hybrid composites | Jute/madar fiber | Skin layer | Stacking sequence

Engineering main heading: Hybrid composites

PaperChem Variable: Composites | Fracture | Glass Fibers | Jute | Layers | Mechanical Properties | Samples | Stacking

Document details - Extraction and Characterization Studies of Cellulose Derived from the Roots of Acalypha Indica L

Journal of Natural Fibers

Volume 19, Issue 12, 2022, Pages 4544-4556

Extraction and Characterization Studies of Cellulose Derived from the Roots of Acalypha Indica L(Article)

Jeyabalaji, V., Kannan, G.R., Ganeshan, P., Raja, K., NagarajaGanesh, B., Raju, P.

[a]Department of Mechanical Engineering, Christian College of Engineering and Technology, Tamil Nadu, Oddanchatram, India
[b]Department of Mechanical Engineering, PSNA College of Engineering and Technology, Tamil Nadu, Dindigul, India
[c]Department of Mechanical Engineering, Sethu Institute of Technology, Tamil Nadu, Virudhunagar, India

View additional affiliations

Abstract

The underlying principle of this current research was to characterize the cellulosic fibers that were retted from the roots of Acalypha indica L. plant to find their aptness for making green composites. Physical characterization tests were conducted and reported proving the reinforcing capability of these fibers which has a density of 1.356 g/cm^3. Chemical composition tests conducted on these fibers showed the weight % of cellulose as 67.86. Amorphous constituents such as hemicellulose and lignin were present as 0.24 and 18.75 weight %, respectively. Wax, ash, and moisture were respectively present as 0.86, 2.13, and 10.16 weight % of fibers. X-ray diffraction (XRD) studies purported the presence of both amorphous and crystalline contents of cellulose confirming the peaks of Fourier-transform infrared spectroscopy (FTIR) studies. The fibers possessed a crystallinity index of 46.62% and their crystallite size was computed as 3.68 nm from XRD, with a good temperature bearing capacity of 225°C as ascertained from the thermo-gravimetric analysis. Conglomeration of fibrils and the roughness characteristics were evident from the scanning electron microscopic images and atomic force microscopic observations, respectively. Thus, it can be seen that this newly identified fiber are apposite reinforcements and can be explored further by infusing them in polymer matrices for making sustainable products. © 2021 Taylor & Francis.

Author keywords

Acalypha indica fibers | cellulose | FTIR | physicochemical studies | surface morphology | thermal stability

Indexed keywords

Engineering controlled terms: Crystallinity | Crystallite size | Fibers | Fourier transform infrared spectroscopy | Morphology | Surface morphology | Thermogravimetric analysis | X ray diffraction

Engineering uncontrolled terms: 'current | Acalypha indica | Acalypha indica fiber | Cellulosic fibers | Characterization studies | Characterization tests | Green composites | Physical characterization | Physicochemical studies | Underlying principles

Engineering main heading: Cellulose

PaperChem Variable: Anatomy | Cellulose | Crystallinity | Fibers | Gravimetry | Thermal Analysis | X Ray Diffraction

Document details - Mechanical and Thermal Properties of Chloris barbata flower fiber /Epoxy Composites: Effect of Alkali treatment and Fiber weight fraction

Journal of Natural Fibers

Volume 19, Issue 9, 2022, Pages 3453-3466

Mechanical and Thermal Properties of Chloris barbata flower fiber /Epoxy Composites: Effect of Alkali treatment and Fiber weight fraction(Article)

Muthu chozha rajan, B., Indran, S., Divya, D., Narayanasamy, P., Khan, A., Asiri, A.M., Nagarajan, S.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Pulloor, India
[b]Department of Mechanical Engineering, Rohini College of Engineering and Technology, Nagercoil, India
[c]Research and Development Department, Pinnacle Bio-Sciences, Kanyakumari, India

View additional affiliations

Abstract

Untreated and alkali-treated (5% NaOH) Chloris barbata flower fibers (CBFFs) were used to fabricate the composites by hand lay-up method. Novel composite plates were manufactured by changing fiber weight fraction (5 wt.%, 10 wt.%, 15 wt.%, 20 wt.%, and 25 wt.%), raw and 5% NaOH treated fibers. The impact of NaOH treatment and fiber weight fraction on tensile, flexural, impact, morphological, and thermal properties of CBFF reinforced epoxy composites were examined and reported for the first time in this article. The tensile, flexural, and impact properties of the composites were increased up to 20 wt. % fiber additions and after that dropped. After the tensile testing, broken cross-sections of the composites were analyzed by scanning electron microscopy (SEM), which showed that NaOH treated CBFF reinforced composite has better interfacial bonding and lesser voids. Thermogravimetric analysis (TGA), Fourier transform infrared analysis (FTIR), and Atomic force microscope (AFM) analysis of composites also pointed out that alkali-treated CBFF is a suitable material for reinforcement with the epoxy polymer matrix.

Author keywords

alkali-treatment | Chloris barbata flower (CBF) | FT-IR analysis | interfacial bonding | mechanical properties | surface topography

Indexed keywords

Engineering controlled terms: Atomic force microscopy | Fibers | Fourier transform infrared spectroscopy | Polymer matrix composites | Scanning electron microscopy | Sodium hydroxide | Tensile testing | Thermodynamic properties | Thermogravimetric analysis

Engineering uncontrolled terms: Alkali treatment | Composite plates | Fourier transform infra reds | Interfacial bonding | Mechanical and thermal properties | Reinforced composites | Reinforced epoxy | Weight fractions

Engineering main heading: Reinforcement

PaperChem Variable: Alkali Treatment | Fibers | Gravimetry | Scanning Electron Microscopy | Sodium Hydroxide | Thermal Analysis

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Effect of stacking sequence on dynamic mechanical properties of Indian almond–Kenaf fiber reinforced hybrid composites

Journal of Natural Fibers

Volume 19, Issue 12, 2022, Pages 4381-4392

Effect of stacking sequence on dynamic mechanical properties of Indian almond–Kenaf fiber reinforced hybrid composites(Article)

Jeyaraman, J., Jesuretnam, B.R., Ramar, K.

[a]Department of Mechanical Engineering, SBM College of Engineering and Technology, Dindigul, India
[b]Department of Mechanical Engineering, Muthayammal Engineering College, Rasipuram, India
[c]Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, India

Abstract

In this investigation, the dynamic mechanical properties of Indian almond–Kenaf fiber composite were investigated and the effect of stacking sequence was analyzed. Four types of composites viz. kenaf, Kenaf/Indian almond/Kenaf, Indian almond/Kenaf/Indian almond, and Indian almond were fabricated by hand layup technique. The experimental results revealed that the kenaf fiber composite showed the superior storage modulus and loss modulus values compared to all other composites due to the high stiffness of kenaf fiber and better bonding between the matrix and fiber. Among hybrid composites, Kenaf/Indian almond/Kenaf composite displayed a greater storage modulus and loss modulus than Indian almond/Kenaf/Indian almond composite due to the presence of two layers of high stiffness kenaf fiber. Further, the order of thermal stability of the composites was observed as: Kenaf > Kenaf/Indian almond/Kenaf > Indian almond/Kenaf/Indian almond > Indian almond. In addition, the Indian almond fiber composite and Indian almond/Kenaf/Indian almond composite exhibited good damping properties than other composites owing to the more mobility of polymer chain. Cole–cole plot showed that the structure of all the fabricated composites was heterogeneous in nature and kenaf fiber composite displayed the higher heterogeneity among all other materials. Moreover, the modeling of storage modulus and damping factor was performed and compared with the experimental results. The results showed good agreement with the theoretical and experimental values. © 2020 Taylor & Francis.

Author keywords

Dynamic mechanical analysis | Hybrid composites | Indian almond fiber | Kenaf fiber | Stacking sequence

Indexed keywords

Engineering controlled terms: Damping | Dynamic mechanical analysis | Dynamics | Elastic moduli | Fiber bonding | Hemp | Kenaf fibers | Stiffness | Stiffness matrix | Storage (materials) | Thermodynamic stability

Engineering uncontrolled terms: Dynamic mechanical property | Fibre composites | Fibre-reinforced | Hand lay-up | High stiffness | Hybrid composites | Indian almond fiber | Loss moduli | ON dynamics | Stacking sequence

Engineering main heading: Hybrid composites

PaperChem Variable: Composites | Damping | Dynamics | Fiber Bonding | Hemp | Kenaf | Stiffness | Storage

Document details - Physico-chemical and Morphological Characterization of Cellulose Fibers Extracted from Sansevieria roxburghiana Schult. & Schult. F Leaves

Journal of Natural Fibers

Volume 19, Issue 9, 2022, Pages 3300-3316

Physico-chemical and Morphological Characterization of Cellulose Fibers Extracted from Sansevieria roxburghiana Schult. & Schult. F Leaves(Article)

Gopi Krishna, M., Kailasanathan, C., NagarajaGanesh, B.

[a]Department of Mechanical Engineering, Madurai Institute of Engineering and Technology, Pottapalayam, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Pulloor, India

Abstract

The rationale behind this present research is to extract and characterize the cellulosic fibers from the Sansevieria roxburghiana Schult. & Schult. F. leaves to prove their potential as polymer reinforcements. Characterization tests were conducted on the fibers and reported. Fourier Transform Infrared Spectroscopy and chemical composition tests confirmed the presence of cellulose (78.63wt%), lignin (9.86wt%) and hemicellulose (2.01wt%) along with wax (0.16wt%), ash (1.49wt%) and wetness content (7.85 wt%). The density of the fibers was found as 0.950 g/cm^3 from standard pycnometric tests and the X-ray diffraction studies purported the semi-crystalline nature of cellulose. Crystallinity index, degree of crystallinity, and crystallite size of the fibers were computed from the X-ray diffraction studies as 95.55%, 95.74% and 5.25nm, respectively. The hydrogen bond energy and bond distance were found as 6.385kJ and 2.8195Å, respectively. The tensile strength, percent elongation and Young's modulus of the Sansevieria roxburghiana fiber was found as 213.6 MPa, 1.12% and 16.02GPa, respectively. Morphological studies showed that these fibers are rough and can maintain inextricable bonding with matrix during composite fabrication. Thus, the fibers possess excellent physical, chemical, and surface morphological features that ratify them to be potential polymeric reinforcing agents in making biocomposites. © 2020 Taylor & Francis.

Author keywords

cellulose content | FT-IR studies | hydrogen bond energy | Sansevieria roxburghiana fibers | surface morphology | X-ray diffraction

Indexed keywords

Engineering controlled terms: Cellulose | Crystallinity | Crystallite size | Fibers | Fourier transform infrared spectroscopy | Hydrogen bonds | Morphology | Tensile strength | X ray diffraction

Engineering uncontrolled terms: Cellulose content | Cellulose fiber | Cellulosic fibers | FT-IR study | Hydrogen bond energy | Morphological characterization | Physico-chemical characterization | Sansevierium roxburghiana fiber | X- ray diffractions | X-ray diffraction studies

Engineering main heading: Surface morphology

PaperChem Variable: Anatomy | Cellulose | Crystallinity | Fibers | Hydrogen Bonds | Tensile Strength

Document details - Influence of Chemical Treatment and Moisture Absorption on Tensile Behavior of Neem/banana Fibers Reinforced Hybrid Composites: An Experimental Investigation

Journal of Natural Fibers

Volume 19, Issue 8, 2022, Pages 3051-3062

Influence of Chemical Treatment and Moisture Absorption on Tensile Behavior of Neem/banana Fibers Reinforced Hybrid Composites: An Experimental Investigation(Article)

Binu Kumar, V.J., Bensam Raj, J., Karuppasamy, R., Thanigaivelan, R.

[a]Anna University, Chennai, India
[b]Department of Mechanical Engineering, Muthayammal Engineering College, Rasipuram, India
[c]Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, India

Abstract

Hybrid composites composed of neem fiber (N), banana (B) fiber and epoxy resin were fabricated by hand layup method. Three types of composites with blending ratio of B:N (1:4), B:N (1:1) and B:N (4:1) respectively were fabricated and the effects of fiber loading, chemical treatment and moisture absorption on tensile strength of the composites were investigated. The results showed that the fiber loading influenced the tensile strength and the B:N (4:1) composite displayed the superior tensile strength of 52 MPa compared to other composites due to the presence of more amount of banana fiber with high strength. The B:N (1:4) composite exhibited the lowest tensile strength of 47 MPa owing to the presence of more amount of neem fiber with low strength. Chemical treatment of fiber surface improved the tensile strength significantly due to the removal of impurities, lignin and hemicellulose. Silane-treated composite showed the greater tensile strength compared to alkali treated and untreated composites. Silane treated B:N (4:1) composite exhibited 17.5% and 42.3% improvement in tensile strength compared to the tensile strength of alkali treated and untreated composites respectively. Moisture absorption study revealed that the moisture uptake behavior of composite reduced the tensile strength due to the breakage of H-bond. Moisture absorption reduced the tensile strength of B:N (1:4), B:N (1:1) and B:N (4:1) composites by 14.7%, 10% and 5.8% respectively compared to dry samples.

Author keywords

banana fiber | chemical treatment | moisture absorption | Neem fiber | tensile strength

Indexed keywords

Engineering controlled terms: Blending | Epoxy resins | Fibers | Fruits | Moisture | Reinforced plastics | Removal | Silanes | Tensile strength

Engineering uncontrolled terms: Chemical treatments | Experimental investigations | Fiber loadings | Hybrid composites | Moisture absorption | Moisture uptake | Removal of impurities | Tensile behaviors

Engineering main heading: Reinforcement

PaperChem Variable: Fibers | Fruits | Mixing | Moisture | Polyepoxides | Removal

Document details - Investigation of performance, combustion, and emission characteristics of diesel engine equipped with exhaust gas recirculation using ceria and zirconia nanoparticles-blended rice bran biodiesel

Energy Sources, Part A: Recovery, Utilization and Environmental Effects

Volume 44, Issue 2, 2022, Pages 5508-5526

Investigation of performance, combustion, and emission characteristics of diesel engine equipped with exhaust gas recirculation using ceria and zirconia nanoparticles-blended rice bran biodiesel(Article)

Selvabharathi, R., Selvam, M., Palani, S.K.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, India
[b]Department of Mechanical Engineering, Vel Tech Multitech, Chennai, India

Abstract

Biofuels are attracted by many investigators because of its environment friendly nature and contribution in the reduction of global warming. The advent of nanotechnology improved the performance of the biofuels while including the nanoparticles in it. Hence, the research focussing on the performance improvement and emission reduction of engine using biofules blended with nanoparticles is a noteworthy. In the present work, an investigation was performed on Common Rail Direct Injection (CRDI) engine equipped with Exhaust Gas Recirculation (EGR) setup to analyze the engine performance, combustion and emission characteristics at variable injection pressures by using rice bran biodiesel blended with ceria (CeO_2) and zirconia (ZrO_2) nanoparticles. Experimental work was done using fuel samples of pure diesel (D100), biodiesel (B30), biodiesel with 15% EGR (B30 + 15%EGR), biodiesel blended with 50 ppm ceria nanoparticles with 15% EGR (B30 + 50CeO_2 + 15% EGR), biodiesel blended with 50 ppm zirconia nanoparticles with 15% EGR (B30 + 50ZrO_2 + 15%EGR) and biodiesel blended with 50 ppm of ceria and zirconia nanoparticles with 15% EGR (B30 + 25ZrO_2 + 25CeO_2 + 15%EGR) under various load conditions and injection pressures. Based on the experimental work, the B30 + 25ZrO_2 + 25CeO_2 + 15%EGR fuel sample displayed better performance compared to other samples. The results showed that the brake thermal efficiency (BTE) of B30 + 25ZrO_2 + 25CeO_2 + 15%EGR fuel sample was increased by 8% and the brake specific fuel consumption (BSFC) was reduced by 9% compared to D100. The combustion characteristics showed that the heat release rate and cylinder pressure were increased by 4.3% and 2.8% respectively. Further, the sample B30 + 25ZrO_2 + 25CeO_2 + 15%EGR decreased the exhaust emission of CO, HC, and NOx by 30%, 19%, and 13.3% respectively.

Author keywords

ceria nanoparticles | Diesel engine | performance characteristics | rice bran biodiesel | zirconia nanoparticles

Indexed keywords

Engineering controlled terms: Biodiesel | Brakes | Cerium oxide | Combustion | Diesel engines | Direct injection | Emission control | Gases | Global warming | Nanoparticles | Zirconia

Engineering uncontrolled terms: Brake specific fuel consumption | Brake thermal efficiency | Combustion characteristics | Emission characteristics | Environment friendly | Exhaust gas recirculation (EGR) | Heat Release Rate (HRR) | Zirconia nanoparticles

Document details - Investigation of Optimal Alkali-treated Perotis indica Plant Fibers on Physical, Chemical, and Morphological Properties

Journal of Natural Fibers

Volume 19, Issue 7, 2022, Pages 2730-2743

Investigation of Optimal Alkali-treated Perotis indica Plant Fibers on Physical, Chemical, and Morphological Properties(Article)

Prithiviraj, M., Muralikannan, R.

[a]Department of Mechanical Engineering, Kamaraj College of Engineering andTechnology, Virudhunagar, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Virudhunagar, India

Abstract

The main objective of this investigation is to study the physical, chemical, and morphological analysis of the optimal alkali-treated Perotis indica fiber (PIF). The PIF is treated with 5% (w/v) NaOH in different soaking times (i.e., 15 min, 30 min, 45 min, 60 min, and 75 min). Through thermogravimetric analysis, treatment is optimized at 5% NaOH in a soaking time of 60 min. That optimized alkali–treated PIF is used for further study. Fourier Infrared spectrum (FT-IR) analysis revealed that treatment has leached hemicellulose, lignin, and wax in the fiber. X-Ray Diffraction (XRD) showed improvement in Crystalline size (15.12 nm to 18.51 nm) and Crystalline index (48.3% to 55.43%). Morphological analysis was compared between untreated PIF and treated PIF by atomic force microscopic (AFM) analysis which exposed surface improvements after treatment. © 2020 Taylor & Francis.

Author keywords

atomic force microscopy | optimal alkali treatment | Perotis indica fiber

Indexed keywords

Engineering controlled terms: Linguistics | Sodium hydroxide | Surface treatment | Thermogravimetric analysis

Engineering uncontrolled terms: After-treatment | Crystalline index | Crystalline size | Exposed surfaces | Infrared spectrum | Morphological analysis | Morphological properties | Plant fibers

Engineering main heading: Chemical analysis

PaperChem Variable: Alkalis | Chemical Analysis | Gravimetry | Plant Fibers | Soaking | Sodium Hydroxide | Surface Treatment | Thermal Analysis | Wax

ISSN: 15440478
Source Type: Journal
Original language: English

DOI: 10.1080/15440478.2020.1821291
Document Type: Article
Publisher: Taylor and Francis Ltd.

Document details - A Survey on Osteoporosis Detection Methods with a Focus on X-ray and DEXA Images

IETE Journal of Research

Volume 68, Issue 6, 2022, Pages 4640-4664

A Survey on Osteoporosis Detection Methods with a Focus on X-ray and DEXA Images(Review)

Nazia Fathima, S.M., Tamilselvi, R., Parisa Beham, M.

Department of Electronics and Engineering, Sethu Institute of Technology, Virudhunagar, India

Abstract

Osteoporosis is one of the common bone diseases that reduces bone strength and affects the structure of the bone and thereby increases the chances of fracture risk, more likely in the spine, hip, and wrist. The diagnosis of osteoporosis is done by measuring the bone quality and bone mass, mainly bone mineral density (BMD). There are various methods available to measure the BMD. Of which, Dual Energy X-ray Absorptiometry (DEXA) is considered as the benchmark method. BMD is a parameter to determine the important score known as T-score that determines the osteoporosis condition. BMD measurement is visualized in X-ray images and DEXA images. This survey article focuses on the measurement of BMD using various benchmark image processing algorithms such as image enhancement, segmentation, and texture analysis on X-ray and DEXA images for osteoporosis detection. Superior properties of DEXA uncover the prospective for new medical applications and researches. The article reviews the early methods of BMD measurements in a nutshell. Also, the article mainly explains the features that are on par with the X-ray and DEXA images. The article explains the image processing algorithms used for osteoporosis detection. The methods such as pre-processing, feature extraction, and segmentation methods are explained for both X-ray and DEXA imaging modalities. © 2022 IETE.

Author keywords

BMD | DEXA | Feature extraction | Image processing | Osteoporosis | Segmentation X-ray

Indexed keywords

Engineering controlled terms: Bone | Diagnosis | Diseases | Extraction | Image enhancement | Image segmentation | Image texture | Medical applications | Surveys | Textures

Engineering uncontrolled terms: Bone mineral density | Dual energy X-ray absorptiometry | Dual-energy X-ray | Features extraction | Image processing algorithm | Images processing | Osteoporosis | Segmentation X-ray | X-ray absorptiometry | X-ray energies

Engineering main heading: Feature extraction

ISSN: 03772063
Source Type: Journal
Original language: English
DOI: 10.1080/03772063.2020.1803771
Document Type: Review
Publisher: Taylor and Francis Ltd.

Document details - Mechanical Properties of Alkali-Treated Carica Papaya Fiber-Reinforced Epoxy Composites

Journal of Natural Fibers

Volume 19, Issue 1, 2022, Pages 269-279

Mechanical Properties of Alkali-Treated Carica Papaya Fiber-Reinforced Epoxy Composites(Article)

kumaar, A.S., Senthilkumar, A., Saravanakumar, S.S., Senthamaraikannan, P., Loganathan, L., Muthu Chozha Rajan, B.

[a]Department of Mechanical Engineering, Sethu Institute of Technology, Virudhunagar, India
[b]Department of Mechanical Engineering, Kamaraj College of Engineering and Technology, Virudhunagar, India
[c]Department of Mechanical Engineering, Sethu Institute of Technology, Pulloor, India

Abstract

This investigation aimed at finding the effect of weight fraction (10 wt.%, 20 wt.% and 30 wt.%) and fiber orientation (0°, 45° and 90°) on mechanical properties (Tensile, Flexural and Impact) of Carica papaya fiber/epoxy (CPFE) composite. Totally nine composite samples were fabricated by hand layup followed by compression molding method. Testing results revealed that composites containing 20 wt.% and 0° fiber orientation exhibited better mechanical properties such as tensile strength (122 MPa), flexural strength (118.9 MPa) and impact strength (7.8 J) when compared to composite samples with other weight fraction and orientation. The scanning electron microscope (SEM) analysis was used to analyze the fractured surfaces of the composite specimens. The thermal stability of CPFE composites was evaluated by the Thermo Gravimetric (TG) and Differential Thermo Gravimetric (DTG) curves. All the findings led to the conclusion that the CPFE composites are suitable material to make the light weight industrial applications. © 2020 Taylor & Francis.

Author keywords

Carica papaya fibers/epoxy composites | flexural testing | impact testing | scanning electron microscope | tensile testing | thermogravimetric analysis

Indexed keywords

Engineering controlled terms: Compression molding | Impact strength | Scanning electron microscopy | Tensile strength | Tensile testing | Thermodynamic stability

Engineering uncontrolled terms: Carica papaya | Composite samples | Composite specimens | Fiber reinforced epoxy composites | Fractured surfaces | The scanning electron microscopes (SEM) | Thermo-gravimetric | Weight fractions

Engineering main heading: Fibers

PaperChem Variable: Composites | Compression Molding | Fiber Orientation | Fibers | Impact Strength | Scanning Electron Microscopy | Tensile Strength | Weight

Document details - Wearable Multilayer Patch Antenna with Electromagnetic Band Gap Structure for Public Safety Systems

IETE Journal of Research

Volume 68, Issue 4, 2022, Pages 2979-2988

Wearable Multilayer Patch Antenna with Electromagnetic Band Gap Structure for Public Safety Systems(Article)

Mustafa, A.B., Rajendran, T.

Department of ECE, Sethu Institute of Technology, Virudhunagar District, Pulloor, 626 115, India

Abstract

For providing security to the people, who survive in country borders, mine and chemical industries, wearable devices with sensors can be used to follow their activities through sensors. The main element of that security device is the antenna. Based on the construction, utility, and performance, miniaturized MicroStrip Patch (MSP) antennas are mainly preferred. In this paper, the compact MSP antenna design, using various flexible multilayer substrate materials with Electromagnetic Band Gap (EBG) structures, has been proposed to resonate at 2.45 GHz in ISM band. The simulated and the measured parameters have been analyzed and an improvement in gain up to 6 dB has been achieved compared to the existing technique. © 2022 IETE.

Author keywords

Electromagnetic band gap structure | Felt | Flexible multilayer substrates | Gain | Jeans | Teflon | Wearable antenna

Indexed keywords

Engineering controlled terms: Chemical industry | Energy gap | Microwave antennas | Multilayers | Security systems | Slot antennas | Wearable antennas | Wearable sensors

Engineering uncontrolled terms: Electromagnetic bandgap structures | Measured parameters | Microstrip patch | Multilayer patch antennas | Multilayer substrate | Public safety systems | Security devices | Wearable devices

Engineering main heading: Microstrip antennas

ISSN: 03772063
Source Type: Journal
Original language: English
DOI: 10.1080/03772063.2020.1739572
Document Type: Article
Publisher: Taylor and Francis Ltd.

Mustafa, A.B.; Department of ECE, Sethu Institute of Technology, Virudhunagar District, Pulloor, India;

Topic:

Prominence percentile:

Document details - Experimental Investigation on Mechanical and Biodegradation Properties of Indian Almond–Kenaf Fiber-Reinforced Hybrid Composites for Construction Applications

Journal of Natural Fibers

Volume 19, Issue 1, 2022, Pages 292-302

Experimental Investigation on Mechanical and Biodegradation Properties of Indian Almond–Kenaf Fiber-Reinforced Hybrid Composites for Construction Applications(Article)

Nampoothiri, E.N., Bensam Raj, J., Thanigaivelan, R., Karuppasamy, R.

[a]Research Scholar, Anna University, Chennai, India
[b]Department of Mechanical Engineering, Muthayammal Engineering College, Rasipuram, India
[c]Department of Mechanical Engineering, Sethu Institute of Technology, Kariapatti, India

Abstract

Tri-layer hybrid composites composed of Indian almond and kenaf fibers were fabricated using hand layup method. Two types of hybrid composites namely Kenaf/Indian almond/Kenaf (K/I/K) and Indian almond/Kenaf/Indian almond (I/K/I) were prepared for the investigation. Tensile, flexural, impact, moisture absorption and biodegradation studies were performed on the prepared composites. Tensile and flexural studies revealed that the K/I/K composite showed the maximum average tensile and flexural strength of 85 MPa and 92 MPa, respectively, due to the presence of high strength kenaf fiber as outer layer. The impact study exhibited that the I/K/I composite displayed the maximum average impact strength (5 kJ/m^2) owing to the presence of Indian almond fiber at outer layer that absorbed more impact energy due to more surface cracks. Moisture absorption and biodegradation studies showed that the I/K/I composite absorbed more moisture and degraded greatly compared to that of K/I/K composite. The experimental investigations concluded that the K/I/K composite could be used in structural applications as showed better tensile and flexural properties and I/K/I composite could be used in damping environments as displayed better impact strength. © 2020 Taylor & Francis.

Author keywords

biodegradation | Hybrid composite | Indian almond | kenaf | mechanical properties

Indexed keywords

Engineering controlled terms: Bending strength | Biodegradation | Hemp | Impact strength | Mechanical properties | Moisture | Tensile strength

Engineering uncontrolled terms: Biodegradation studies | Construction applications | Experimental investigations | Hybrid composites | Indian almond | kenaf | Structural applications | Tensile and flexural properties

Engineering main heading: Kenaf fibers

PaperChem Variable: Bend Strength | Biodegradation | Hemp | Impact Strength | Mechanical Properties | Moisture

Document details - Emission reduction technique on existing diesel engines using renewable fuels

International Journal of Ambient Energy

Volume 43, Issue 1, 2022, Pages 1187-1191

Emission reduction technique on existing diesel engines using renewable fuels(Article)

Vijayanand, G., Augustine, A., Ananda Natarajan, V., Srinivasa Raman, V., Mohanavel, V., Christopher, D.

[a]Department of Mechanical Engineering, V.S.B Engineering College, Karur, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Virudhunagar, India
[c]Department of Mechanical Engineering, Kingston Engineering College, Vellore, India

View additional affiliations

Abstract

In this study, the impact of blending alcohol (cyclo-octanol) with palm biodiesel on its emission patterns is carried out in a constant diesel engine. The study is intended to lessen the CO, HC, NO_X and Smoke emissions when fuelled with neat palm biodiesel and the alcohol blends. Palm biodiesel is processed via transesterification from raw palm oil. Alcohol having a purity of 98.2% is employed in this study. Neat palm biodiesel (BD100), alcohol mixed with palm biodiesel on 10% volume basis (A10BD90), and alcohol mixed with palm biodiesel on 20% volume basis (A20BD80). No base and modified fuels require any slight modifications while combusted in the engine. It was noticed that by adding 10 and 20% of alcohol to palm biodiesel resulted in a significant reduction in HC, CO, Smoke and NO_X emissions. Hence, the addition of alcohol helped to improve the emission characteristics of palm biodiesel. © 2022 Informa UK Limited, trading as Taylor & Francis Group.

Author keywords

Alcohol | biodiesel | engine | hydrocarbon | Smoke

Indexed keywords

Engineering controlled terms: Alcohols | Biodiesel | Blending | Diesel engines | Emission control | Engines | Hydrocarbons | Palm oil | Smoke

Engineering uncontrolled terms: Emission characteristics | Emission pattern | Emission reduction | NOx emissions | Palm biodiesels | Renewable fuels | Smoke Emission

Engineering main heading: Alcohol fuels

ISSN: 01430750
CODEN: IJAED
Source Type: Journal
Original language: English

DOI: 10.1080/01430750.2019.1694583
Document Type: Article
Publisher: Taylor and Francis Ltd.

Christopher, D.; Department of Mechanical Engineering, St Josephs College of Engineering, Chennai, India;

SciVal Topic Prominence

Topic:

Prominence percentile:

Document details - Performance analysis of DEE-Biodiesel blends in diesel engine

International Journal of Ambient Energy

Volume 43, Issue 1, 2022, Pages 1016-1020

Performance analysis of DEE-Biodiesel blends in diesel engine(Article)

Raja, K., Srinivasa Raman, V., Parthasarathi, R., Ranjitkumar, K., Mohanavel, V.

[a]Department of Mechanical Engineering, University College of Engineering Dindigul, Anna University Dindigul Campus, Dindigul, India
[b]Department of Mechanical Engineering, Sethu Institute of Technology, Virudhunagar, India
[c]Department of Mechanical Engineering, V.S.B Engineering College, Karur, India

View additional affiliations

Abstract

In this study, Di-ethyl ether (DEE) was employed as ignition improver and blended with jatropha biodiesel (JBD) using a research diesel engine to examine its Performance and performance pattern. 10 and 20% of DIE (DEE10JBD90 and DEE20JBD80) were included in biodiesel fuel (JBD). The performance test was carried out for all blends and every blend was subjected to varying engine load. As per the Performance fronts, SFC improved with enhancement in BTE for DEE10JBD90 and DEE20JBD80. It is concluded that the addition of DIE is an effective technique to enhance the Performances of JBD. © 2019 Informa UK Limited, trading as Taylor & Francis Group.

Author keywords

Di-ethyl ether | efficiency | fuel consumption | jatropha | Performances

Indexed keywords

Engineering controlled terms: Diesel engines | Efficiency | Ethers | Fuel consumption

Engineering uncontrolled terms: Bio-diesel blends | Ethyl ether | Jatropha | Jatropha biodiesels | Performance analysis | Performance patterns | Performance tests | Performances

Engineering main heading: Biodiesel

ISSN: 01430750
CODEN: IJAED
Source Type: Journal
Original language: English

DOI: 10.1080/01430750.2019.1670262
Document Type: Article
Publisher: Taylor and Francis Ltd.

Mohanavel, V.; Department of Mechanical Engineering, Kingston Engineering College, Vellore, India;

Topic: