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PRODUCTION OF DIESEL FROM LOW DENSITY POLYETHYLENE

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Abstract

All plastics have to be disposed after their use as waste. They need to manage their waste as plastic become apparent. This leads to pyrolysis which is a way of making to become very useful to us by recycling them to produce fuel oil. In this study, plastic wastes were used for the pyrolysis to get fuel oil that has same properties as the fuel in aviation industry. Thus, the problem faced by the increasing fuel crisis can be eliminated by making a system which can decrease the pollution due to plastic and increasing availability of alternating fuel. This was made by converting the plastic waste into useful alternative oil by means of pyrolysis process.

Keywords: Plastic wastes, Pyrolysis, Fuel oil.

DEVELOPMENT OF A ENVIRONMENT FRIENDLY MINI-COOLING SYSTEM

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Abstract

Every year the demand for cooling system is increasing due to weather conditions. In recent years, living in a hot country like Middle East countries has always led people prefers to use the air conditioner. This is because the air conditioning provides comfort to the user to do a proper daily routine work by controlling the temperature and humidity. A little background about the air conditioner is that it can produce the comfort when the user adjusts the temperature on the air conditioner. This is typically done by using of simple air-conditioning cycle for comfort cooling

in buildings and motor vehicles. It can cause an increase in living cost by increasing the electricity consumption. Also, it causes health hazards. This is due to the harmful gases such as carbon dioxide and greenhouse gases which are not environmentally friendly and causes the global warming of the earth. In this paper, an attempt has been made to develop a mini-cooling system to curtail the global warming. It only uses a desktop cooling fan mounted on top of a plastic box. It has a dual power supply which can be connected either to 9-Volt battery or USB port of a desktop computer. Battery can be used when there is no electric supply. Air at the inlet is cooled by the ice pack which is located inside the plastic box and Styrofoam is used to insulate the box and to reduce the heat transfer. The chilled air is supplied to the space. It is concluded that this mini-cooling system is comfortable, and safe to the environment.

***Keywords*:** Mini-cooling system, thermal insulation, air-conditioner, global warming, heat transfer.

IMPROVED BIOGAS PRODUCTION FROM ALKALI TREATED CELLULOSE WASTE

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Abstract

Biogas has long been a topic of great interest in a wide range of fields. In light of global warming and increased greenhouse gas production, biogas is becoming a reliable, renewable energy source to replace the traditional non-renewable energy sources. However, efficiencies in biogas production methods hindered the rate of adoption of biogas as a fuel. Lignocellulose present in banana leaves has a great potential towards contribution of biogas. Due to ban of

plastic in many parts of India, use of banana leaves has increased incredibly especially in south India. Major portion of banana leaf waste is from hotels, markets, farms, marriage halls and temples. This has led to waste disposal problems. Lignocellulose is the major component of biomass produced by photosynthesis which makes up to half of the matter. It is the most abundant but underutilized resource in the world. It is the best source of carbohydrates, which can be used for the production of biogas and bio-ethanol. Pre-treatment is done to improve the degradability of the cellulose waste and become more accessible to microorganisms for improved biogas production. Through pre-treatment, physical and chemical properties of plant cell wall is modified for an efficient biological conversion of cellulose into fermentable sugars. This paper deals with alkali pre-treated cellulose waste i.e banana leaves for improved biogas generation without and with pre-treatment. The results showed that alkali pre-treated banana leave waste is found to be efficient for biogas generation due to its delignification property. Increase in the biogas generation of about 2.34 times was observed for banana leaves when compared without pre-treatment of banana leaves. Increased biogas generation was due to the removal of lignin from banana leaves which was degraded during alkali pre-treatment.

Keywords: Biogas; Banana Leaves; delignification; Lignocellulose and Pre-treatment

EXPERIMENTAL EXPLORATION ON SURFACE ROUGHNESS IN ABRASIVE WATER JET MACHINING USING RESPONSE SURFACE METHODOLOGY

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Abstract

This paper presents research work involved in AWJ machining of AZ91 mg alloy material. AWJ critical has been confirmed to be an operative technology for processing numerous engineering materials. Surface abnormality of machined quantities is single and the most significant machining characteristics that play an significant role in responsible the quality of engineering components. Procedure parameters namely, traverse speed, water density and stand-off distances

are measured in the current study. The properties of these parameters on surface quality have been studied based on the investigational results. Maximum pressure and minimum stand-off distance cause falling down in the surface quality in AZ91 magnesium alloy.

Keywords: Water jet machining, Magnesium alloy, Surface roughness, AWJM, RSM and ANOVA.

BIODIESEL PRODUCTION FROM WASTE OIL USING A NOVEL CATALYST L-PROLINE AMIDO ETHYL METHYL IMIDAZOLIUM BROMIDE

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Abstract

In this paper, L-proline amido ethyl methyl imidazolium bromide ionic liquid (IL) was used as catalyst and its structures were investigated by nuclear magnetic resonance spectrum (HNMR), elemental analysis (CHNS), thermogravimetric analysis (TGA). Waste oil with high fatty acid was used as raw material for biodiesel production. The optimum reaction condition for various parameters were analyzed and mentioned as follows: molar ratio of methanol to waste oils of 12:1, catalyst loading of 5 wt.%, reaction temperature of 120^{o}C, reaction time of 4 h respectively. The yield of biodiesel achieved 92.7% under the optimum condition. Also, the ionic liquid could be reused for 5 times with negligible loss in catalytic activity. The content of ester in the final sample were analyzed through GC and HNMR methods. The main fuel properties of the final biodiesel were determined and were compatible with the specifications prescribed in the ASTM-D6751 and EN14214. Moreover, the IL showed better catalytic activity for conversion into biodiesel from waste oils with different amount of FFAs (free fatty acids).

Keywords: Biodiesel, Waste oil, HNMR, CHNS, TGA.

EMISSION AND COMBUSTION CHARACTERISATION OF DIRECT IGNITION CI ENGINE FUELLED BY ALGAE BASED BIO-DIESEL

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Abstract

Increasing industrializations of world leads to steep change in oil price and the cause for fast depletion of oil resource. Countries like India imports more than 60% of oil from foreign countries hence the frequent change oil price affect the country economically to a large extent. In this scenario the replacement of fuels for diesel fuel considerably save the national economics. Fossil fuels are the chief contributors to urban air pollution and major source of greenhouse gases and considered to be the prime cause behind the global climate change. Biofuels are renewable, can supplement fossil fuels, reduce greenhouse gases and mitigate their adverse effects on the climate resulting from global warming. In this research, emission and combustion characteristics of Algae oil based biofuel was considered with varying conditions of load, injection pressure and compression ratio and the best biodiesel blends can be identified based on lower NOx, CO, CO_2 and smoke opacity. The direction injection CI engine was used in this work and is operated at different load conditions.

Keywords: CI engine, Emission control, Biodiesel, Algae oil.

DESIGN AND IMPLEMENTATION OF HYBRID ENERGY IN E-BIKE

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Abstract

Battery powered vehicles are nowadays replacing heavily polluting bikes with 4 stroke engines, provide zero emission transportation just because of time required to charge batteries and lack of charging infrastructure it is not accepted by many people till date. The main objective of the

project is to use solar and wind combined energy as additional source to charge an automobile battery which is used to run a two wheeled e-bike. E-bikes and e-scooters, battery-powered and charged by solar energy- wind energy, can plays major role in transportation in India, making it fuel independent, environmentally friendly and affordable. Now is the time for pushing this. The main target of hybridization of different energy technologies is to improve the system efficiency, to find a way to reduce the environmental pollution from carbon emission and reduce operating costs for transportation systems. The main objective of integrating batteries and supercapacitors is to create a hybrid energy storage system (HESS) with high energy density and power density in vehicular or stationary power system architecture. Efficiency will be improved if peak power demand will be provided by the supercapacitor, while the average power demand will be complete by the battery. In transportation, the supercapacitors can provide burst power during vehicle acceleration and recover energy during regenerative braking. During normal operation on the road, DC energy from battery supplies a BLDC motor. The battery is charged in motion by additional solar PV module and wind energy. Other innovative feature is regenerative braking through supercapacitor energy storage. Regenerative braking recovers much of the kinetic energy of the vehicle. It is an option for additional charging, because in fact the reverse current could not be fully used due to charging limits of the battery. Excess current could be absorbed by superCAPs. User-controlled charging of superCAPs while driving improves charging fluctuations and increases the e-bike efficiency.

Keywords: E- Bike, Hybrid energy- Solar & Wind, Supercapacitors, BLDC motor

BIO-SORPTION OF HEXAVALENT CHROMIUM FROM AQUEOUS SOLUTION BY ORGANIC WASTES

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Abstract

World surface is covered 70% with water which is considered as an invaluable resource. Due to rapid industrialization and urbanization, heavy metals are considered as major contaminants

found in water. There were no possibilities to auto-remediate this contamination by the ecosystem. In this study Egg shell, Oyster shell was used as a bio-sorption organic waste, which have the capacity to remove hexavalent chromium. These attributes were analysed. Hexavalent chromium was needed for the experiment; hence the sample solution was prepared synthetically as per ASTM standards. The optimum parameters to determine the bio-sorption capacity of the chosen adsorbents were studied. The comparative study between the adsorbents Egg shell and Oyster shell showed that the removal efficiency is more for egg shells. Using the experimental results isothermal and kinetic studies were carried out. From the observation Langmuir isotherm was found to be the best fit model for adsorbents and the monolayer adsorbent was predominant. Kinetic studies revealed that adsorption process for egg shells follows pseudo-first order and Oyster shells follows pseudo-second order equation. This work focused on usage of bio-sorbents Egg shell and Oyster shell for immobilizing hexavalent chromium under various physical and chemical conditions and the organic bio-sorbents were studied.

***Keywords*:** Bio-sorption, Isothermal, Kinetic studies, Langmuir isotherm, Monolayer adsorbent.

OCCUPATIONAL HAZARD AND CONTROL MEASURES IN UNDERWATER WELDING

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Abstract

Development of modern transportation system there are various types of ships are used to transport goods and peoples from one place to another place. In this process damaged ships are refurnished and welding process is takes place underwater because of the size and weight of the ship. Underwater welding is one of the most dangerous professions in the world. The Centre for Disease Control and Prevention (CDC) released data on commercial dive death rate from 1989 to 1997 there was an average of 5 deaths per year. OSHA also reports that an average of 6 to13 diving-related deaths occurred every year according to their past statistics. The Hazards in

underwater welding are electric shock, explosion, decompression thickness, drowning, hypothermia, hearing impairment. Nitrogen narcosis is one of the major health hazards in underwater welding. Due to reversible alteration in consciousness that occur while diving at depth. It may affect the productivity and human health. Exhale thoroughly and ascend to shallower depth will provides the basis of the vast majority of narcosis control solution in underwater welding.

Keywords: Underwater welding, Hypothermian, Nitrogen Narcosis.

CONTROL OF UPPER LIMB PROSTHESIS USING EMG AND EEG SIGNALS

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Abstract

The human hand is a complex system, with a large number of degrees of freedom (DoFs), sensors embedded in its structure, actuators and tendons, and a complex hierarchical control. Despite this complexity, the efforts required to the user to carry out the different movements is quite small. On the contrary, prosthetic hands are just a pale replication of the natural hand, with significantly reduced grasping capabilities and no sensory information delivered back to the user. Bio-signals driven prosthetic hands have been found to be suitable; wherein control is through conveying human's intention to the prosthesis. There are two possible bio-signal based schemes covering the approaches for conveying human's intention to the prosthesis- Electroencephalogram (EEG) based approaches and Electromyogram (EMG) based approaches. EEG based approaches are implemented through an interface between the brain and the prosthetic hand to be controlled. The activity of the brain is recognized based on the EEG signals. Whereas in EMG based approaches, an indirect interface between the brain and the prosthetic hand to be controlled is established based on the muscles' activity through EMG signals. In this paper, the EEG datasets are generated and features are extracted. Here Gamma signals are considered and then classified using Artificial Neural Network (ANN). Further the

output is used to control the hand motion. The simulation is performed on Matlab environment. Similarly EMG signals are acquired using Myoware sensor and is used for the control of hand motion.

Keywords: Electroencephalogram (EEG), Electromyogram (EMG), Artificial Neural Network (ANN).

REMOVAL OF HEAVY METALS FROM INDUSTRIAL EFFLUENTS USING NANOPARTICLES

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Abstract

The project is based on the samples which were taken from the water discharged from Ranipet Ultramarine chemical Industry. Initially 3 liters of waste water samples were collected from two different sites for further processing. The collected wastewater samples were analyzed for their physiochemical analysis. Consequently, two different nanoparticles were synthesized like iron oxide and graphite Oxide (GO) nanoparticles which were used for the removal of heavy metals like cadmium, chromium and lead. To find the amount of heavy metals in the industrial waste water using Atomic Adsorption Spectroscopy (AAS). The characterization of the above mentioned nanoparticles was done and then the batch adsorption experiments were performed to investigate the adsorption process of different heavy metals by different adsorbents and finally the percentage of removal of heavy metals was calculated using standard empirical formula and achieved 93.7% for chromium, 89.32% for lead and 91.27% for cadmium using synthetic nanoparticles

Keywords: Nanoparticles, Iron oxide, graphite oxide, Chromium, Lead and Cadimum.

SMART INCREMENTAL SNAPSHOT SYSTEM FOR CLOUD PERSISTENT DISKS

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Abstract

Periodical snapshots also called persistent disk snapshots are an essential feature associated with every cloud-hosted virtual instance, which minimizes the risk of unexpected data loss in the server and unavailability issues. The conventional method of creating a snapshot of a production-level server is done by temporarily disabling write access to data during the backup, either by stopping the accessing applications or by using the locking API provided by the operating system to enforce exclusive read access. This is not tolerable for high-availability always-online systems, in which service stoppages are not bearable.

In order to solve this downtime issue in high-availability systems, the backup can be performed in a smarter way as incremental snapshots in which a read-only copy of the dataset frozen at a point in time is stored as snapshot by allowing applications to continue processing and writing their data to the instance. Also, incremental snapshots work in a way that only blocks which are different from the former snapshots are processed and stored in the subsequent one.

This smart backup will reduce the overall space requirement of the snapshot system by storing only the differences in file storage blocks. Also, when implemented this will save energy and infrastructure requirements of the cloud provider as well as the cost and time of the end-user to create a low-latency server. Virtual instances are created on public cloud hosting providers and automated backups are carried out by conventional and incremental snapshot methods. Performance parameters of the incremental snapshot system will be compared with the conventional system to develop a more reliable solution to back up the persistent disks associated with cloud instances.

***Keywords*:** Snapshot Backup, Bigdata, Cloud Server, Virtual Instance.

EXPERIMENTAL INVESTIGATION AND MODELING OF DRILLING PROCESS PARAMETERS FOR SURFACE ROUGHNESS AND MRR OF AL6063/SIC/GR HYBRID COMPOSITE USING RSM

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Abstract

Surface quality and material removal rate (MRR) are two significant factors in the manufacturing which influence precision thus mirrors the productivity of the industry. Objective of this work is motivated to determine the optimum operating parameters for the drilling Aluminum hybrid composite. The metal hybrid composite of Aluminum was fabricated by stir casting process. Silicon carbide and graphite particles were added to improve material properties. The main cutting parameters, namely, spindle swiftness, feed amount and type of coolant are considered in this study. In this work, the experimentations were planned by a Box-Behnken design (BBD) method. The impact of procedure parameters on the reactions are assessed and ideal cutting conditions for limiting surface roughness and boost the MRR were resolved utilizing reaction tables, reaction charts, association tables, 3-D surface plots and attractive quality investigation. To approve, affirmation tests have been completed and anticipated outcomes have been seen as in great concurrence with experimental discoveries.

Keywords: Drilling, Stir casting, RSM, BBD and Surface roughness.

A REVIEW ON MICROGRID BASED ON HYBRID RENEWABLE ENERGY SOURCES

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Abstract

According to Kyoto agreement reached, there is need to reduce the greenhouse gas emission by 50% by 2050. Recently, according to the World Energy Council (WEC), nearly about 1.5 billion people are known to have no access to electricity and about three billion are forced to use fuels

for their day to day activities. Greater percentages of these people are from Sub-Saharan Africa, India and South Asia. Therefore, there is need for more commitment to reduce the number of people without a continuous access to electricity across the globe. WEC estimated that, if all the stake holders are not committed there could still be about 880 Million people without electricity by 2030 and 530 million by 2050. According to the report for the World Bank and IEA, there is need to double the install energy capacity in order to meet the demand from the developing countries in the next 40 years. Regarding these issues, isolated communities/loads are still in search for cost effective means of power generation. Regarding these, Microgrids are proposed as solution to the problem. Microgrid is small electrical distribution systems that connect multiple customers to multiple distributed sources of generation and storage through power electronic inverters that provide necessary interface. However, some the major concerns with these renewable sources are economy and reliability of the power supply to the isolated load or communities compared to the conventional source of energy. Microgrid are usually design in a small scale with either solar or wind or combination of the two sources. Similarly, the proper sizing of hybrid micro grid system is a site specific and depends on the amount of renewable energy generation, weather data, prices of diesel, load demand and other components.

Keywords: Microgrids, Hybrid Renewable Energy Sources.

A COOPERATIVE INTERFERENCE ELIMINATED MECHANISM WITH MMSE PRECODING IN MIMO SYSTEMS

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Abstract

Multiple input multiple output (MIMO) can significantly improve the performance of wireless communication system due to transmission diversity and channel multiplexing. However, because of the use of massive antennas, both enabling technologies suffer from severe interference effects and energy loss problem, especially known as interference between users and

energy dissipation caused by transmitter antenna at base station. Here a practical cooperative eliminated interference mechanism is proposed for MIMO wireless communication system. Water filling power algorithms is used to deal with the energy loss problem at the downlink transmitter. And then combining the linear precoding algorithm with water-filling power algorithm, to solve the interference effects between users. The zero forcing (ZF) precoding algorithm and the maximum message leaking ratio (SLNR) precoding algorithm is taken as an example to study this cooperative mechanism can improve then algorithm. Also, the modification has been made by taking minimum mean square error (MSE) vector precoding and the results were compared.

Keywords: MIMO, Interference, Zero forcing, SLNR, MSE.

TOPOLOGY BASED OPTIMIZATION OF ROBOT GRIPPER

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Abstract

In this work, topology optimization of a robotic gripper finger is performed by modelling the gripper as a continuum compliant mechanism in order to accomplish maximum deformation in bending by means of Method of Moving Asymptotes (MMA) and Sequential Quadratic Programming (SQP) methods for lifting a component of 500 grams for handling materials in a palletizing operation. The robotic gripper modelled and fabricated is a pneumatically actually griper consisting of five fingers where each finger undergoes a free bending action for delivering the grasping force, based on the compliant mechanism. The complex robot gripper is fabricated using 3D rapid-prototyping technique. The maximum deformation of the fabricated robot gripper is determined using finite element analysis-based topology optimization. The robot gripper is made up of polypropylene (PP) material and comparison is made between the experimental and finite element analysis-based deformation.

Keywords: Topology optimization, Robot gripper, 3D printing.

APPLICATION OF PVDF TUBULAR MEMBRANE FOR SOLID-LIQUID SEPARATION

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Abstract

Filtration characteristics for sludge of different concentration using tubular ultrafiltration membranes made of Polyvinylidene fluoride were investigated. The proprietary tubular membrane was developed based on Thermax's know-how. A series of filtration experiments were performed to examine flux behaviour and flux recovery. When initial flux was set to be same as 25 LMH, flux was gradually decreasing with increase in concentration of feed source. At the same time it was noted that quality of permeate was same for various concentration of feed sources. Total solids and turbidity in permeate was less than 5 ppm. Based on different experimental analysis, it was concluded that regardless of total solids feed concentration varying from 500 ppm, 1500 ppm, 3000 ppm, 5000ppm, 7000 ppm and 10000 ppm. Critical flux was observed as 10 LMH. The permeability of PVDF membrane can be reduced by membrane fouling. The membrane fouling can be eased by membrane cleaning to some extent but it will cost much money. In order to improve the permeability and other properties of PVDF membrane, many researches have been carried out. In flux recovery process, during chemical cleaning it was observed that sludge filtration is the example of irreversible fouling phenomenon. Based on the theoretical analysis of membrane cleaning methods to remove irreversible fouling chemical cleaning method is more appropriate. In this experimental study, Acid- alkali method was applied and effective combination of chemical cleansing agents were identified for optimum flux recovery. The effects of cleaning agent concentration have been determined for PVDF Tubular membrane. Cleaning agent temperature and concentration have the greatest effect upon the flux recovery, and both of these parameters display an optimal value which maximises cleaning performance. This PVDF tubular novel membrane withstands with higher solids concentration up to 20000 mg/l also. It gives effective performance for longer time duration. For this membrane 10 LMH is noted as critical flux. After chemical cleaning it gives 90.90% of flux recovery. In Membrane cleaning, 0.1 % Sodium hypochlorite, 2 % Citric acid and 0.1 % of

caustic soda is the effective combination of chemical agents for efficient flux recovery. During filtration experiment it was observed that this filtration experiment gives very impressive permeate quality. From this result we can conclude that this PVDF tubular membrane can be used for many industrial applications for suitable effluents.

Keywords: Membrane filtration, PVDF Membrane, Tubular membrane, flux behaviour, Chemical cleaning, flux recovery.

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DESIGN AND FABRICATION OF AYURVEDIC TABLET MAKER

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Abstract

Ayurvedic tablet maker is an ayurvedic tablet making machine which produces tablets at high rates of production and finishing. The tablet maker working involves both electrical and mechanical process. The machine will be highly usable for ayurvedics centers which are at the verge of extinction. The idea of project is from a detailed study on tablet making processes at Keraleeya Ayurveda Samajam Hospital, Shoranur, Kerala. All the process including both mechanical and electrical were done separately which increased the workload of the employees. Their problems were analysed and introduced the concept of ayurvedic tablet maker in which all the processes of tablet making were assembled in a single machine. Thus helping the employees reduce their workload. With the help of electrical and mechanical actuators the tablet maker has completed. For mechanical part used rollers for making the tablet size and shape, the rollers rotated with the help of AC Motors. Drying unit is separately installed with the table for the final drying process. The design of the machine based on the requirements for the hospital and cost effective one.

Keywords: Ayurvedic tablets, Electrical and Mechanical actuators, Rollers, AC motors, etc.

DEVELOPMENT OF A THERMO-ACOUSTIC REFRIGERATION SYSTEM FOR ELECTRONIC CHIP COOLING APPLICATION

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Abstract

The conventional refrigeration system is being used widely for cooling purposes in the current days. However, this present scenario poses a major threat to the environment as the emission of harmful gases such as CFCs, HCFCs are on the rise, and the requirement for refrigeration is increasing. Hence, there is a necessity to find an alternative to the conventional refrigeration system. Thermoacoustic refrigeration system, which offers a wide range of so further research. Some key advantage includes no emission of harmful ozone-depleting gases and the presence of no moving parts. The main objective of this project is to provide an overview of the arrangement, functioning and analysis of the refrigeration system using high-intensity sound waves. In this project, the refrigerator is been tested under various atmospheric conditions and the results obtained were compared with a conventional refrigeration system and the graphs were plotted.

Keywords: Thermo-Acoustic Refrigeration, Chip-Cooling.

DATA ANONYMIZATION ON MAPREDUCE-CLOUD USING OPTIMIZED TPTDS

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Abstract

Data anonymization is the process of hiding sensitive or identity information whose intent is privacy protection. Cloud resources are needed to support big data storage and big data is a huge business case for moving to cloud. MapReduce can be used as an associated implementation for

processing and generating large data sets. In this paper, we propose optimized two-phase data sets using the MapReduce framework on cloud. Apache Hadoop is used to implement the MapReduce libraries. This work improves the throughput as well as minimizes the delay too compared to the existing TPTDS approach.

Keywords: Cloud, Data Anonymization, Hadoop, MapReduce, TPTDS.

STUDY OF PERFORMANCE EVALUATION OF NOVEL PARA-WINGLET TAPE IN A TURBULENT HEAT EXCHANGER TUBE

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Abstract

Form last decade, passive enhancement techniques in heat exchanger has proved to be one of the promising techniques in heat transfer enhancement. The current study involves para-winglet tape which are examined numerically with three sets of slant angle namely 10^0, 15^0 and 20^0 with a constant pitch of 30mm in the forward and backward arrangement for Reynolds number 6000 to 30000. The inclusion of PWT in the tube has intensified the turbulent kinetic energy and has resulted in recirculation in-between the inserts. Both the arrangement of the PWT has proved their worthiness over the plain tube. The Nusselt number and friction factor increase with the increase in the Reynolds number over the plain tube. Maximum, Nusselt number and friction factor were obtained for 20^0 forward arrangement varying from 3.2 to 2.99 times and 9.95 to 9.61 times. A maximum value of 1.63 Thermal Performance Index was obtained at 15^0 slant

angle for forward arrangement and 1.62 Thermal Performance Index was obtained at 20^0 slant angle for backward arrangement.

Keywords: passive enhancement, Para-winglet tape, Nusselt number, Thermal performance index.

AN EXPERIMENTAL STUDY ON THE STRENGTH AND SELF-HEALING CHARACTERISTICS OF BACTERIAL CONCRETE - BACILLUS SUBTILIS AND E-COLI ISOLATED FROM CONSTRUCTION WASTE SOIL

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Abstract

"Bio-Concrete" refers to the concrete mix prepared by mixing anaerobic bacteria with the concrete mix design to increase the life of the concrete. This type of concrete reduces the cost of maintenance as it heals itself (micro-cracks inside the concrete with reinforcement). Bacteria used in the mix should be able to withstand the pH level of the concrete mix which is around 13(basic in nature) in good concrete mix design. Bacteria that we used in our work are Bacillus subtills and E-coli. Bacteria should undergo through broth process to increase the number of bacteria and overall quantity of bacteria solution. The solution of bacteria is then very carefully mixed with the concrete in two ways: (a) same mix design but different quantity of bacteria solution and (b) different design but constant quantity of bacteria solution. Environment friendly material is used such as M-sand as natural sand reserves are depleting. Different test are conducted and are compared with each other to get the results.

***Keywords*:** Concrete mix, Anaerobic bacteria, pH level, M-sand, E-coli, Bacillus Subtilis, self-healing, micro-cracks.

MULTIPURPOSE AIR COOLING SYSTEM

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Abstract

Air conditioner has become a necessity of all households in 21st Century. In all metropolitan cities, environment degradation due to automobile other factors is on the rise, therefore the requirement of air-conditioner has already been felt. The new technological advancements and the needs of the people have made us think about this project. If a domestic air cooler, water heater and refrigerator can be combined, only one set of their key components like the compressor, the heat exchangers, etc is used, the primary cost will be reduced considerably when compared with using three separate units and thus the new equipments becomes multifunctional. This project aims on achieving this by using a multi evaporator with single compressor for operating air cooler and refrigerator. The waste heat from the condenser is used to heat the water. This ultimately leads to reducing the monthly tariff and also having very less effect to the environment.

Keywords: Domestic Refrigerator, Air conditioner, Affordable, Productivity, Portability, Environment Degradation.

EFFECTIVENESS OF ALGAE BIOFUEL IN CI ENGINE ATTACHED WITH EXHAUST GAS RECIRCULATION SETUP

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Abstract

Modern diesel engines tend to utilize significantly large quantities of exhaust gas recirculation (EGR) and high intake pressures across the engine load range to meet NOx targets. At such high EGR rates, the combustion process and exhaust emissions tend to exhibit a marked sensitivity to

small changes in the EGR quantity, resulting in unintended deviations from the desired engine performance characteristics (energy efficiency, emissions, stability). An accurate estimation of EGR and its effect on the intake dilution are, therefore, necessary to enable its application during transient engine operation or unstable combustion regimes.

In this research, a detailed analysis that includes estimation of the transient (cycle-by-cycle) build-up of EGR and the time (engine cycles) required to reach the steady-state EGR operation has been carried out. One-step global equations to calculate the transient and steady-state gas concentrations in the intake and exhaust are proposed. The effects of engine load and intake pressure on EGR have been examined and explained in terms of intake charge dilution and in-cylinder excess-air ratio. The EGR analysis is validated against a wide range of empirical data that include low temperature combustion cycles, intake pressure and load sweeps. This research intends to not only formulate a clear understanding of EGR application for advanced diesel combustion but also to set forth guidelines for transient analysis of EGR.

Keywords: Biodiesel, Algae oil, EGR, Combustion, CI Engine.

DESIGN AND CONTROL OF WIRELESS CHLORINE LEAKAGE SYSTEM USING CLOUD SERVER

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Abstract

In the paper, the hardware and software design of the chlorine leakage inspection instrument based on ARM-7- LPC 2148 microcontroller is introduced. The design of the constant voltage circuit, signal conditioning circuit (including filtering and amplifying circuit), power supply circuit, display circuit and alarm circuit and through the Wi-Fi module and the cloud server platform to realize data storage and remote viewing of the collected from the chlorine concentration sensor, temperature sensor and humidity sensor. Finally, through the host

computer LABVIEW software is used to query the historical data stored in the cloud server. The lab view software provides the real monitoring of the collected data from the sensor in user interface. The equipment can be widely used in petrochemical, paper making industry, textile, water treatment and other occasions.

Keywords: Leakage testing, LABVIEW, Cloud

PHYCOREMEDIATION OF AGRO-INDUSTRIAL WASTEWATER FOR BIOFUEL AND BIO PRODUCTS RECOVERY

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Abstract

Wastewater is one of the most abundant, cheap and immediate source of macro elements and other nutrients required for cultivation and growth of microalgae. The use of Microalgae for Bioremediation has proven to be an efficient method for treatment of many kinds of wastewater accompanied by biomass generation which can be used in the production of bio products and biofuels. Microalgae are employed in remediation because they are good decontaminating agents that offer several advantages which include easy manipulation, low cost, non-polluting, not a source of secondary waste and have a simple recovery of the metal contaminants. A high lipid producing microalgae strain was isolated from an agro-industrial wastewater plant located at Vellore district, Tamil Nadu, India. Three different oil extraction methods were employed following heterotrophic growth of Chlorella Vulgaris which all produced a significant amount of lipid content of over 70%. Vitamins analysis revealed the presence of Vitamin B1 – B12 and Vitamin C with a significant presence of β-Carotene, Astaxanthin, Cantaxanthin, Chlorophyll-a and b, lutein and other useful pigments that are useful in food industry, cosmetics, nutraceuticals/pharmaceuticals, vitamins, animal feed and fertilizer. Chlorella Vulgaris can be a useful tool for CO_2 sequestration and Phycoremediation of wastewater consequently accumulating lipids, vitamins and pigments for biofuel, food and other related industries.

Keywords*: Wastewater, Microalgae, Chlorella, Bioremediation, phycoremediation.*

BIODEGRADATION OF POLYETHYLENE USING BACILLUS SUBTILIS AND MYCOIDES ISOLATED FROM PLASTIC DUMPED MUNICIPAL SOLID WASTE

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Abstract

Polyethylene is the common plastics being used and dumped in the environment. The present study is used to enhance the rate of biodegradation of polyethylene using physical and biological methods. The bacterial species - Bacillus subtilis and mycoides were tested for its ability in utilizing polyethylene as a carbon source. The microbial species produced surface active compounds (Biosurfactants) which is used to enhance the degradation process. Intially, pretreatment of polymer films using Ultraviolet radiation helps its accessibility as a food for the microorganisms and enables much faster rate of biodegradation. The inoculation of pretreated polyethylene films of thickness 185 with Bacillus subtilis and mycoides with the addition of its biosurfactant (surfactin). The comparative study proved to be most efficient in bacillus mycoides with a weight loss percentage of 11.39% in 30 days.

Keywords: Polyethylene, Biodegradation, Biosurfactant.

FLOATING WASTE COLLECTOR

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Abstract

The floating waste problem in the water bodies are growing day by day and the waste dumped into the water bodies are huge. The wastes are consumed by aquatic lives and they are consumed by human beings. The rate of dumping the waste into the water bodies is much more than collection. This is because of having waste collecting devices which are not very

efficient and quick enough. We have designed an effective device which collects waste from water bodies in the most efficient way. A unique technology has been used to collect waste while the device is still floating in the water surface. Only the surface waste can be collected which accounts to more than 50% of the waste in the water bodies. An Archimedean screw is used to provide suction of waste in to the device. An electric motor powers the Archimedean screw and the collected waste is pushed back to fine meshed nets which can later be collected and segregated. In addition, a control module was attached so that the people who were engaged in collecting wastes earlier, now feel just like playing computer games.

***Keywords**:* Waste Collection, Floating Wastes, Aquatic Lives, Archimedean Screw, Floating Waste Collector.

DESIGN AND FABRICATION OF SEA WATER PURIFICATION SYSTEM

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Abstract

Water is a fundamental need for all living things. The goal of our project is to design and test a portable water desalination unit capable of producing drinkable water in emergency situations. For everyday use, the mechanism uses solar energy as a renewable energy source.

Electric current is run to a heating element located in the contaminated water, transferring heat, causing it to boil. The evaporated water leaves behind 99.9% of contaminants in the boiler producing mostly uncontaminated vapor. The water vapor created then condenses through a concentric copper tube heat exchanger and the result is potable water. This system will efficiently transmit heat to the water and all components of the device will be cost efficient and require minimal maintenance.

Keywords: Sea water, Purification, Solar energy, Renewable energy.

EXPERIMENTAL INVESTIGATION AND OPTIMIZATION OF PROCESS PARAMETERS ON THE CHEMICAL BATH DEPOSITED ZINC SULPHIDE THIN FILMS FOR SOLAR CELL APPLICATIONS

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Abstract

Recent research work is focussed on fabricating low-cost solar cells with higher efficient material towards lowering energy cost through thin film approach. In this work, Zinc Sulphide (ZnS), an n-type II-VI compound is considered, with a varied band gap from 3.5 eV to 3.7 eV, as substrate material and by adopting Chemical Bath Deposition (CBD) method, deposition is carried out with zinc sulphate as precursor solution by varying the process parameters such as solution concentration (0.025 M, 0.030 M and 0.035 M), dipping time (30 min, 60 min and 90 min) and bath temperature (70°C, 80°C and 90°C), in the form of thin film on the glass substrate. A Taguchi's L_9 orthogonal array is formed and the output responses such as band gap, absorption coefficient and thickness are measured. The surface morphology is investigated using images obtained from Scanning Electron Microscope (SEM) and Atomic Force Microscope (AFM) and the optical properties are also determined using Agilent Cary 60-UV-Vis Spectrophotometer. The influence of input parameters over the outputs were identified using response surface plots and by adopting multi-objective optimization approach of Grey Relational Analysis (GRA) outputs were analyzed which shows that, the optimum outputs can be achieved with 0.025 M solution concentration, 90 min dipping time and 80°C is the optimum level for the selected process parameters. The ANOVA results reveal that the molar concentration contributes more to the grey relational grade by 79.31 %, with dipping time by 10.88 % and bath temperature by 7.60 %.

Keywords: Chemical Bath Deposition, Thin film, Solar cell, Taguchi's DoE, Grey Relational Analysis, ANOVA.

SINGLE WINDOW SYSTEM FOR GOVERNMENT SCHEMES BASED ON UNIQUE IDENTITY

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Abstract

This project provides the information about all the Government Schemes which many people are not even aware of due to lack of availability of information and ignorance. A unique ID for every user with their socio-economic details embedded in their profiles helps in filtering and providing information which will be of most useful to them. Data analyzing techniques helps in finding out patterns in the usage of the facility between different categories of people, the response for certain schemes from certain groups, etc., will help in formulating future schemes more efficiently. All the users' information is stored securely with proper security mechanisms in place.

***Keywords**:* Government scheme, Data analyzing, socio-economic, security, unique ID.

FABRICATION AND CHARACTERIZATION OF HYBRID CERAMIC REINFORCED ALUMINIUM METAL MATRIX COMPOSITE ADDED WITH SOLID LUBRICANT

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Abstract

In this work, the influence of variation in volume fractions of silicon carbide (3, 6 and 9% by weight) and boron carbide particles (5% wt.) reinforced in Aluminum matrix mixed with 2 % graphite solid lubricant is studied. Three different proportions of this hybrid metal matrix composite (MMC) is casted using Stir Casting Technique. The effect of percentile variation in reinforce particulate materials are evaluated by compression test, tensile test, micro-hardness and

impact test and corrosion and wear studies. The distribution of reinforced particulates in the matrix is studied with the help of micrographs taken from the optical microscopes. It is concluded that, when compared with mono composite, hybrid composite produces better mechanical properties. Inclusion of solid lubricant enhances the corrosion and wear resistance of the hybrid AMMC.

***Keywords**:* Stir casting technique, HAMMC, solid lubricant, corrosion, wear study.

BIODIESEL PRODUCTION FROM USED COFFEE GROUNDS

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Abstract

The project mainly aims on lowering the depletion of natural resources and promote the use of waste materials for maintaining sustainable development. Biodiesel is an alternative for petroleum products made from natural resources. Usage of biodiesel shows huge reduction in chemical contents such as toxic and hydrocarbon species in the air. Biodiesel can be mixed in any suitable proportion with the conventional diesel. The production of biodiesel from used coffee grounds under transesterification process is experimented. Transesterification process with methanol and KOH as appropriate catalyst is employed for biodiesel synthesis from spent coffee oil. Primarily oil extraction from coffee grounds was done using solvent hexane. The oil will remain leftover while the solvent gets evaporated. Nearly 85% oil-to-biodiesel conversion was obtained through transesterification process. The process was maintained at 60-65ºC and 1:3 oil-to-methanol molar ratio. The procured biodiesels properties were checked and resulted in high energy content biodiesel with similar properties to that of conventional diesel and the engine performance test proved to be efficient.

Keywords: Biodiesel, Coffee oil, Transesterification, Diesel engine.

PERFORMANCE OPTIMIZATION OF DRILLING PALM FIBER REINFORCED EPOXY COMPOSITE USING VIKOR METHOD

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Abstract

In this work, optimization of drilling process is performed on palm fiber reinforced epoxy-based composite for varying rotational speed of drill, feed rate and diameter of drill bit towards material removal rate, delamination and hole quality. Based on Taguchi's approach a L9 orthogonal array was formulated for different combinations of input parameters and a CNC drilling machine was used for experimental purpose. The output parameters were analyzed using a multi-criteria decision making method (MCDM), VIKOR (Vlse Kriterijumska Optimizacija I Kompromisno Resenje) for determining the Multi-Response Performance Index (MRPI) and by adopting entropy method, weightages were considered for the different output responses. Analysis of Variance (ANOVA) was employed for identifying the most influential parameter and with the optimized condition, a good quality hole with lesser delamination and higher MRR was achieved.

Keywords: VIKOR, Entropy Method, Taguchi's DoE, ANOVA.

BIODIESEL PRODUCTION FROM MIXED OILS HEVEA BRASILIENSIS AND PONGAMIA PINNATA USING A NOVEL HETEROGENEOUS CATALYST

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Abstract

Recently, researchers has shown more interest towards biodiesel production from non-edible vegetable oils. The main advantages of biodiesel as a fuel includes: biodegradability, non-toxicity, renewability and low emission profiles. In this study, crude mixed oil was used as

feedstock for biodiesel production using Heterogeneous Catalyst synthesized from waste animal bone. Initially, mechanical extraction process was used to extract the crude mixed oil from the seeds of hevea brasiliensis, and Pongamia pinnata. The crude oil collected from different plant species was characterized using GC-MS spectral data to identify their fatty acid composition. Consequently, the mixed crude oil was converted into biodiesel in the presence of calcinated heterogeneous catalyst obtained from waste animal bone and the catalyst was characterized by XRD, SEM and FTIR spectral data. The effect of variables including methanol/oil molar ratio, catalyst concentration, reaction time, reaction temperature, and rate of mixing on the biodiesel yield was examined and optimized. The properties of obtained biodiesel from mixed oil are close to commercial diesel fuel and used as an alternative to diesel in near future.

Keywords: Biodiesel, Hevea brasiliensis, Pongamia pinnata.

THERMAL HYDRAULIC DESIGN OF AIR HEAT EXCHANGER FOR PROTOTYPE FAST BREEDER REACTORS

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Abstract

Decay heat generated in the reactor core is dissipated to the air by sodium-to-air heat exchangers. These heat exchangers have a tube bundle with circular fins attached to the outer surface of the tubes. Knowledge of heat transfer from the heat transfer is essential for the design of the heat exchangers. Towards this, flow and heat transfer characteristics of the tube bundle with circular fins have to be investigated. For this purpose, three-dimensional Computational Fluid Dynamics (CFD) studies have to be performed using the CFD code STAR CD. The air velocity and tube pitch are varied as parameters. The CFD models adopted for this purpose has been validated against correlations reported in literature. The variation in the velocity, pressure and temperature are need to be studied and the kind of the pattern needed to be plotted.

Keywords: CFD, Star-CD, fast breeder reactor

ANALYSIS OF WATER QUALITY FOR SALINE AND TREATED WATER IN SOLAR DESALINATION SYSTEM

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Abstract

In this study a detailed experiment has been conducted on a single basin solar still which is modified with energy storage medium of blue metal stone. An attempt has been made to utilize the maximum amount of solar energy and to reduce the heat loss from the sides and bottom of the still. The blue metal stone functions as energy storage medium and as insulation layer to reduce the bottom and side loss coefficients. The blue metal stone is used for absorbing excess heat energy from solar radiation during the noon hours. Due to this, the heat accumulated in the space between the water and glass surface is reduced and hence the temperature difference between water and glass surfaces increases. The depth of the blue metal stone in the basin will influence the performance of the still and some of the parameters like basin temperature, water temperature, glass temperature and still productivity. This study deals with the effect of a foresaid parameters on the performance of the still. An attempt has been made to optimize the still performance for above mentioned parameters. To show the effectiveness of the still, its performance with absorbing medium is compared with the conventional still under the same climatic condition.

The experiments have been conducted on a south facing, single slope, solar still of 10° inclination of condensing cover, in summer climatic condition for 24 h on different days for different sizes of blue metal stone from 15- 20mm and this is finally compared with conventional still depth of the water is kept constant in all cases to about 30mm and the quantity is about 15kg.the water quality examination have been tested in the laboratory in TWAD (Chennai) for two different sample .Several physical and chemical test have been tested in the laboratory .The physical parameter which is test in the laboratory are total dissolve solvent, turbid, electrical conductivity and the chemical parameter are tested as follow whereas pH level, alkalinity, hardness, calcium, magnesium, sulphate, iron, ammonia, nitrate, chloride, fluoride test. The parameter result shows the treated water have the better result which is exist under the

permissible limit which is used for domestic purpose and additionally the saline water result goes above the permissible limit so it is not use for domestic purpose.

Keywords: Solar energy, Desalination, Water quality.

TREATMENT OF ANTIBIOTIC WASTEWATER BY ELECTROCOAGULATION PROCESS AND ITS EFFECTIVE SLUDGE MANAGEMENT

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Abstract

This study investigates the treatment of antibiotic wastewater which is a major threat to the environment. Cephalothin sodium is an antibiotic widely used for infections and anesthesia and can cause numerous health problems if not properly disposed. Electro-coagulation is an efficient and environmentally friendly method for the treatment of wide variety of wastewater. The interaction effects of main operating parameters on the removal efficiency and energy consumption were studied through the response surface methodology. The operating parameters chosen were pH (6-10), electrolyte addition (5-20 ml), voltage (5-20 V) and reaction time (10 - 30 min). The optimum results were obtained for maximizing the removal efficiency and minimizing the energy consumption as solution pH of 9.98, electrolyte addition of 7.22 ml, operating voltage 8V and reaction time of 10 minutes with 97.52% removal efficiency and 2.10 W.h energy consumption. The sludge characterization at the optimum conditions were analyzed by SEM and FTIR. In addition to this, an effective method for the safe disposal of sludge is incorporated. The geotechnical properties of the soil has improved considerably and it is confirmed by various tests such as compaction, Unconfined Compressive strength etc. Hence the electro-coagulated sludge can be used as suitable sustainable ingredient.

Keywords*:* Electrocoagulation, Response surface Methodology, Cephalothin Sodium, Energy Consumption, Soil Stabilization

AUTOMATED CRACK DETECTION USING MOBILE ROBOTS

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Abstract

Different engineering structures like bridges, beams, concrete structures, etc. are subjected to different problems due to the improper construction method adopted and carelessness during initial construction. They are also often subjected to fatigue stress, cyclic loading and other environmental changes, which creates breaks on the structures called cracks that results in the reduction of stiffness in the structure as well as creates deformities in the structure. Thus, it is necessary to detect and take preventive measures against cracks inorder to prevent further damage and possible failures of the structures inorder to avoid accidents and for easy maintenance and there requires the need of automated crack detection scheme. The proposed system consists of a robot, a high resolution camera to collect images of surfaces and a global map for locating the position of cracks. The robot will navigate on the surface of the structure like bridges to collect the surface image data at predetermined locations. An image processing technique is also used for processing the image.

Keywords: Mobile robots, Crack detection, Image processing.

SOLAR POWERED VEHICLE CABIN COOLING SYSTEM

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Abstract

Today, an automobile is a necessity for everyone. For a long or short journey people need car regard to the safety, environment and most important comfort. Owing to these reasons, many vehicles are equipped with heating, ventilating and air conditioning system. The major problem

faced by the car users is the hot air trapped inside the cabin after few hours of parking. It increases the temperature inside the cabin to approach around 60-70 degree Celsius. This will make the passengers entering the car to experience uncomfortability. The project is termed as "Solar powered vehicle cabin cooling system". As the name suggests the system used to maintain the thermal comfort inside the vehicle cabin after long hours of parking. A new cooling system is introduced which removes the hot air from the cabin by Thermoelectric cooling (TEC). Thermoelectric cooling operates using the Peltier effect. When the temperature inside the cabin increases than our predetermined limit which is sensed by the temperature sensor and give an input to the control unit and peltier starts working. This cool air from the peltier module is agitated by a fan and cabin starts cooling. All these operations are controlled by a controlling unit which can set the minimum and maximum temperature limit.

Keywords: Thermo electric cooling, Peltier effect, Temperature sensor, Control unit.

CALCULATION OF DISTRIBUTION OF SATURATED AND UNSATURATED FATTY ACIDS IN TRIGLYCERIDES OF WASTE BEEF TALLOW RENDERED FROM FLESHING AND SLAUGHTER HOUSE WASTES

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Abstract

The present study reports the percentage distribution of saturated (S) and unsaturated (U) fatty acids among the different classes of triglycerides in waste beef tallow by using the equations developed by Vander Wal, 1960. Beginning with, waste beef tallow was rendered from fleshing and slaughter house wastes which were collected from leather tanneries and cattle based

slaughter houses respectively. Following this, dominant fatty acids spectra in this waste tallow were characterized through GC spectra and were as found to be: palmitic acid (37.36%), oleic acid (25.17%), stearic acid (14.78%) and myristic acid (13.79%). For calculation purposes, preliminary assumptions were made and they were as follows: (i) the characterized fatty acids (saturated and unsaturated) are randomly distributed in the 1-positions, 2-positions and 3-positions of triglycerides; (ii) the proportions of saturated and unsaturated acyl groups in 1-positions are almost identical with that in 3-positions. Based on calculation, the distribution of saturated and unsaturated acyl groups in different types of triglycerides are as follows: GS_3-21.45%, GS_2U-76.61% (SUS-76.07% + USS -0.54%), GSU_2-1.9254% and GU_3-0.012%. Moreover, the compositions of dominant triglycerides were calculated as: POP-10.54%, POS-8.34% and POO-7.10%; with unsaturated fatty acids, predominantly occupying at 2-poistions.

Keywords: Beef Tallow, Triglycerides Class, Fatty Acids Distribution, Stereospecific Analysis

MACHINABILITY EVALUATION OF CRYOGENIC TREATED CUTTING TOOL DURING TURNING COPPER BASED NANOCOMPOSITE

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Abstract

A cryogenic treatment is the process of treating materials below the cryogenic temperature of around -190°C, in order to remove residual stresses and to improve wear resistance for applications in aerospace industries. Cryogenic treatment has made significant contributions to the improvement of wear resistance, tool life, dimensional integrity and product quality of cutting tool. The mode of application of cryogenic treatment and type of cutting tool both affect tool performance. Use of cryogenic treatment (CT) improves the mechanical property of the materials such as hardness, toughness, stability, corrosion resistance and also reduces friction

between mating parts. Cryogenic treatment has already been applied in treating various materials like as EN8, stainless steel, Inconel, cast iron and etc. In this proposed work, copper-based nano composite material is fabricated using ultrasonic assisted stir casting approach and characterization is carried out to study its microstructural behaviour and mechanical properties. Machinability studies are be carried out with cryogenically treated cutting tool inserts to study its impact in turning and wear studies of the cutting tools shows that cryogenically treated cutting tool performs better than the non-treated cutting tools.

***Keywords**:* Cryogenic treatment, cutting insert, Nanocomposite, Turning process, Tool wear.

FACE RECOGNITION USING ORTHOGONAL PROCRUSTES REGRESSION

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Abstract

Face Recognition has become a major technology that is used in our daily basis such as our phone security, camera detection and much more. Although we have discovered facial recognition at its great extend, we are also facing a great disadvantage on it on the other side. Coming up with each one we have the pose variation which mislead the system to identify or cannot recognize the person even though the system has the database of this person.

To handle face recognition with pose variation and misalignment simultaneously, we direct extend the traditional classifiers and purpose a novel method called Orthogonal Procrustes Regression(OPR). The pose variation are detected by as when the pose variation between the gallery and probe image is small, a linear transformation is estimated via Orthogonal Procrustes problem(OPP) to approximate the variation. When the pose variation between gallery and probe images is large, the two viewpoints does not lie on or close to a locally linear patch of the manifold anymore.

***Keywords**:* Blind navigation, Image Processing, Speech processing, Face detection, Face recognition, Object detection, Object recognition, Text to Speech conversion.

BIOGAS PRODUCTION FROM TANNERY SOLID WASTE

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Abstract

Globally leather industries generate large quantity of organic solid waste. Most of the solid waste is being disposed as such without being treated. India has many leather industries with a potential productivity. Most of the skin of animals is used for leather processing, and there are some portions that cannot be used i.e., ear, tail and feet portion which are called 'Trimmings'. These trimmings are collected in bulk and are being disposed without any treatment which is hazardous to the environment. Generally skin consists of hair which is difficult to remove and degrade. Pretreating the trimmings with suitable method will excel the degradation of hair and substrate.

Biogas generation through anaerobic digestion is a sustainable option that can handle the solid waste without being burden to the earth. This paper focuses on the pretreatment of the hides for enhanced biogas production and compares biogas generation with and without pretreatment. Biological pretreatment is opted for enhanced biogas production i.e., trimmings are pretreated with anaerobic sludge. The pretreated trimmings were subjected to anaerobic digestion in lab scale anaerobic reactors and monitored for biogas generation. Anaerobic reactor studies were carried out with an inoculum to substrate (I/S) ratio of 1 for 35 days period. Chemical Oxygen Demand (COD), Volatile Fatty acids (VFA) pH, Total Solids (TS) and Volatile Solids (VS) were determined during the study period. Results are compared between with pretreatment and without pretreatment. With pretreatment biogas generation is 160.4 mg/g of VS added, and without pretreatment 137.2 mg/g of VS added. Biological pretreatment followed by anaerobic digestion is suitable for managing the trimmings waste.

ORGANIC CHEMICAL SYNTHESIS OF CARBOXYMETHYL CELLULOSE BASED BENTONITE POLYMER BLEND AND ITS INDUSTRIAL APPLICATIONS

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Abstract

Polymer blend of carboxymethyl cellulose (CMC) and bentonite clay were prepared in the presence and absence of the cross-linking agent glutaraldehyde. The synthesized compounds were characterized using FT-IR, XRD, TGA and DSC analysis. The percentage of yield obtained is higher for the polymer blend prepared with glutaraldehyde as cross liking agent. The result of FTIR studies showed the various peaks corresponding to the functional groups present in the two polymers, which clearly indicates the presence of strong cross linking between the polymer and cross-linking agent. Similarly, thermal gravimetric analysis revealed that enhanced thermal stability for the polymer blends along with glutaraldehyde. X-ray diffraction studies prove that the polymer blends have higher crystallinity when blending with glutaraldehyde.

Keywords: carboxymethyl cellulose (CMC), bentonite clay, X-ray, FTIR Spectral studies.

COMBUSTION AND PERFORMANCE CHARACTERISTICS OF RAPESEED BASED BIOFUEL FOR TRANSPORTATION

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Abstract

Rapeseed, Brassica napus subspecies, napus, is a large winter or spring annual oil crop in the Brassica family and is also known as rape and oilseed rape. The main objective of this present research work is to substitute diesel with maximum fraction of rapeseed oil, for which

experimental investigation was carried out with different volume fractions of blended oil with diesel (D10, D20, D30, D40, D50 and D60) and compared with neat diesel. D10 is biodiesel blend with 90% diesel with 10% rapeseed oil. Oil extracted from the rapeseed plant is transesterified and then blended with diesel and is used as a fuel in an unmodified constant speed, single cylinder direct injection diesel engine. The specific fuel consumption, exhaust gas temperature, CO, CO_2, NOx and HC emissions were determined for all the biodiesel blends and a comparison is made. From the results, it is found that, and found that, with inclusion of rapeseed oil emissions tends to reduce due to the higher oxygen content in the biodiesel. With lower calorific value of biodiesel blends, break mean effective pressure and lower engine torque was obtained. With lower carbon content of biofuel, CO and CO_2 emission reduces. NOx increases with higher percentage of rapeseed oil in biodiesel.

Keywords: Biodiesel, Rapeseed oil, Emission, CI engine.

A CRITICAL REVIEW ON RECENT INDUSTRIAL APPLICATIONS ON IN-SITU SUPER CRITICAL CO_2 BASED FLUID EXTRACTION COUPLED TO ADVANCED ANALYTICAL TECHNIQUES FOR COMPOUNDS EXTRACTION AND IDENTIFICATION

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Abstract

The present critical review study summarized the Supercritical Fluid Extraction (SFE) as a new analytical method. As the extracting solvent carbon dioxide (CO_2) is the most used supercritical fluids, sometimes modified by co-solvents such as ethanol (or) methanol. Many industrial sectors including food, cosmetics, pharmaceutics, materials, energy and waste treatment are mainly concerned on this super critical fluid extraction method. *In-situ* super critical CO_2 technique was used in product formulation with specific properties and having significant applications in high-pressure technology. The main applications of super critical fluids (SCFS), extraction is involved in hop constituents, decaffeination of tea and coffee, and the separation of lecithin from oil

performed on a large industrial scale. This SFC technology is green technology and economically feasible at the industrial level, when the products have high value. Consequently, super critical fluids are used as a heat carriers and newly emerged field in SFC. As a final conclusion of this review gives clear idea about the recent applications and future development in the field of supercritical fluids in industrial sector.

***Keywords*:** SCF, Industrial applications, Extraction of SCF.

EXPERIMENTAL INVESTIGATION AND MODELING OF DRILLING PROCESS PARAMETERS FOR MRR OF AL6061/SIC/GR HYBRID COMPOSITE USING RSM

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Abstract

Material removal rate is an important factor in the manufacturing which affect mass production in turn reflects the profitability of the industry. This investigation is engaged to decide the ideal working parameters for the penetrating of Aluminum mixture composite. The crossover metal framework composite was produced by mix throwing process using particulates SiC and graphite each in Al6063 blend. The main cutting parameters, namely, speed of the spindle and rate of feed and types in coolant are considered in this study. In this work, the evaluations are created by a Box Behnken design (BBD) method. The procedural impact parameters on the reactions is assessed and ideal cutting conditions for augment the MRR were resolved utilizing reaction tables, reaction diagrams, collaboration tables, 3-D surface plot sand attractive quality examination. To approve, affirmation tests have been done and anticipated outcomes have been seen as in great concurrence with test discoveries.

Keywords: Drilling, Stir casting, RSM, BBD and MRR.

SMALL BUT MIGHTY: ROLE OF MICROALGAE IN BIOREMEDIATION

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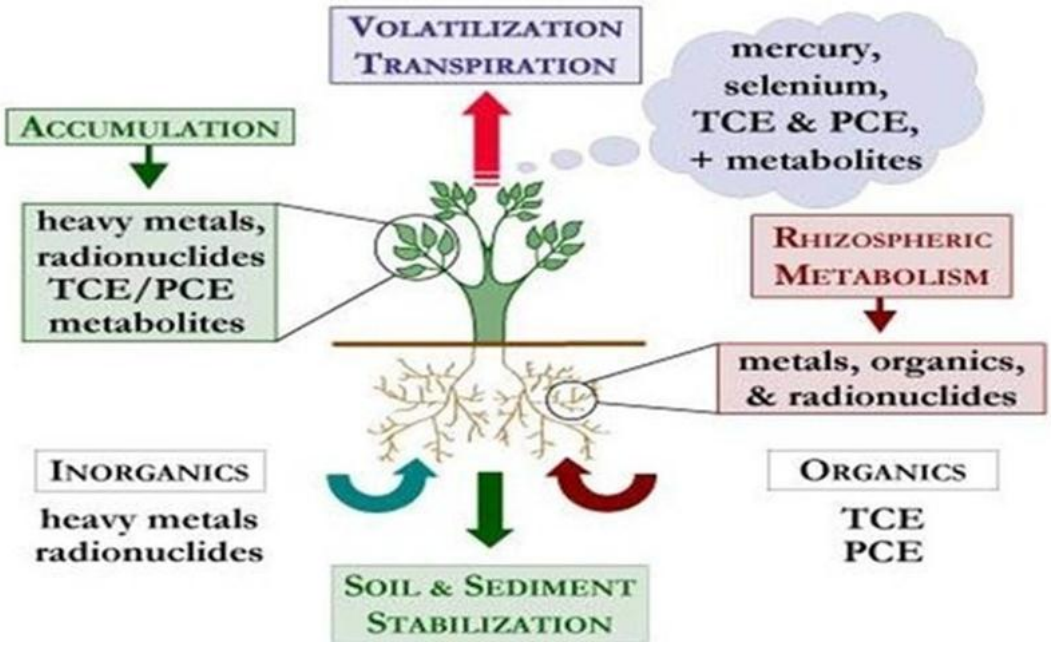
Abstract

Bioremediation refers to use of biological organisms like microorganisms and plants to clean a polluted area. Bioremediation is an environmentally friendly process that is aimed at reducing or transforming the contaminants into nontoxic form which do not pose any harm to the organisms or the environment. Bioremediation is classified into two: *In situ* and *Ex situ*, In-situ involves the degradation of the contaminants at the same site of pollution whereas ex situ is done in a different environment of the pollution. In situ remediation tends to be more environmentally friendly because it does not involve handling and transfer of large volume of contaminated materials. The advantage of Bioremediation over other forms of remediation is that, it uses no chemicals and can allow the waste generated during the remediation process to be recycled.

Keywords: Bioremediation, micro-organism, degradation.



FACILE GREEN AND ECO-FRIENDLY PHYTO-SYNTHESIS OF SILVER NANOPARTICLES USING *ACHYRANTHES ASPERA* LINN SEED-EPICOTYLS LAYER EXTRACT AND ITS ANTICANCER ACTIVITY

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Abstract

This paper deals with the green synthesis of silver nanoparticles using the extract of seed epicotyls layer of *Achyranthes aspera*. This technique was found to be very highly efficient, cost effective and less time-consuming process with reduced threat to environment as well as increased sustainability. The crude extract was refluxed aqueous silver nitrate solution under the following reaction conditions: Reaction temperature: 80OC; Reaction time: 30-35 seconds under continuous stirring at 1000 rpm. Upon characterization, the synthesized nanoparticles were found to be in well accordance with existing values.

***Keywords**:* Phytosynthesis, Silver nanoparticles, Achyranthes aspera linn Seed, Anticancer activity.

CFD ANALYSIS OF PROCESS PARAMETERS OF D-TYPE THERMAL SPRAYING GUN

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Abstract

Detonation gun (D-gun) spraying is one of the most promising thermal spray variants for depositing high quality wear resistant coating and it is the best coating process for coating different materials like metal, non-metal, ceramic and their composite. In the present study the

D-gun process parameters (fuel-oxygen ratio, standoff distance, carrier gas flow rate, detonation frequency and particle size) optimization is analysed using Computational Fluid Dynamics (CFD) techniques. Computational analysis is going to carry out to simulate the effect of process parameters of alumina particles in D-Gun spraying by using CFD. To investigate the particle atomization during spraying, it is necessary to analyse the particle at different stages. The gas velocity, particle velocity, temperature and pressure are going to analyse. Hence a numerical model is going to develop to predict the process parameters of D-Gun spray using CFD.

Keywords: CFD, Coating materials, Optimization, Flow Parameters, Thermal Spraying.

FRICTION STIR WELDING OF DISSIMILAR ALUMINIUM AND MAGNESIUM ALLOY: EXPERIMENTAL AND FEA APPROACH

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Abstract

Friction stir welding (FSW) is considered to be the most significant development in metal joining in a decade and is a ‘‘green’’ technology due to its energy efficiency, environment friendliness, and versatility. The difficulty of making high-strength, fatigue and fracture resistant welds in aerospace industries is eliminated by means of FSW. In this work, two dissimilar metals of aluminium alloy (AA6061) and magnesium alloy (AZ61) were welded using FSW using a M-2 high speed steel tool having cylindrical thread. Thermo-mechanically affected zone (TMAZ) and Heat affected zone (HAZ) were characterized by means of microstructural analysis. Applied load, rotational speed of tool and weld speed were considered as input parameters and thermal and stress analysis were carried out using finite element simulation analysis by calculating the temperature, heat flux and thermal conductivity. Upon welding, the plates were characterized by determining the corrosion resistance by Electrochemical impedance spectroscopy (EIS) method.

Keywords*:* FSW, corrosion study, HAZ, TMAZ, dissimilar metals.

CONVERSION OF CO2 INTO A-AMINO ACIDS USING A NOVEL BIMETALLIC CATALYST

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Abstract

Recently, most of the researchers are concentrating on the incorporation of CO_2 into organic compounds and most of the active research topics in organic chemistry, since, CO_2 is an abundant, inexpensive, nontoxic, and renewable carbon source. Though, CO_2 is thermodynamically stable and kinetically inert gaseous compound, and as such, special strategies are required to incorporate CO_2 into organic compounds. The present research paper deals with the conversion of CO_2 into α-Amino Acids using a novel Bimetallic Catalysts. Distinctly, it is attractive to make unnatural chiral α-amino acids from readily available natural α-amino acids through keeping of the existing chiral α-carbon. However, it is a great challenge to construct them under mild conditions. We had synthesized a series of alpha-amino acids using CO_2 as a key reactant and achieved 85.6 % yield. The synthesized compounds were characterised using ^{1}HNMR, ^{13}CNMR and Mass spectral analysis.

Keywords: CO_2, α-Amino Acids, Bimetallic catalysts, significant % yield.

EFFECT OF FORMABILITY PARAMETERS ON TAILOR WELDED BLANKS- A REVIEW

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Abstract

The innovative growth in the Automotive industry and people's standard of living have led factories and experts to put on some high-tech manufacturing technique or innovation that addresses consumer needs as well as design and development ought to be cost-effective and

prove to be beneficial for both the industry and the consumer. In aerospace and automotive industry different materials with varying cross-section need to be used based on requirement. To coordinate this, researchers are enthusiastically suggesting tailor welded blanks (TWB) strategy, and the technology has been embraced in many automotive industries. The present work is aimed at studying the formability behavior of TWBs of different materials used in aerospace and automotive industry. In this work, an overall review of different parameters affecting the formability of the tailor-welded blanks is presented so that other investigators can rely onto the same for more critical observations in this field.

Keywords: Welded blanks, fusion zone, undercutting.

ENHANCEMENT OF SURFACE QUALITY IN WIRE EDM MACHINING OF MAGNESIUM ALLOY USING ANN MODELING APPROACH

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Abstract

Wire electrical discharge machining is an sophisticated technology that contracts with very high speed cutting performance characteristics and precision machining process. In This paper deals about the surface quality enhancement by demonstrating various device parameters using ANN modeling for wire EDM process and the work piece required for machining was magnesium mix alloy. For exploratory game plan the machining parameters for example pulse off time, pulse on time, wire feed and current (voltage) were considered. The experiment was organized by RSM, CCD was used. Surface quality was foreseen by ANN modeling. Different enlistment limits were utilized to improve the methodology parameters for surface quality. The foreseen characteristics were uncommonly near the test regard and the best assortment was 4.3%. Confirmation test was moreover coordinated to endorse the results and ANN predicted results have been seen as in exceptional concurrence with test revelations.

Keywords: WEDM, RSM, CCD, ANN and Surface quality.

PRODUCTION OF JET TURBINE BASED BIO-KEROSENE USING WASTE BEEF TALLOW AND DRIED COCONUT KERNEL OIL AS BINARY FEEDSTOCK

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Abstract

This present study deals with the production of bio-kerosene for jet turbine applications using waste beef tallow and dried coconut kernel oil as binary feedstock. Waste beef tallow was rendered from leather fleshing wastes using dry rendering technique whereas coconut kernel oil were extracted from dried kernels by means of solvent extraction technique using soxhlet's apparatus. Waste tallow and coconut kernel oil mixture (1:1, volumetric basis) were transesterified using ethanol as solvent and potassium hydroxide as base homogeneous catalyst and their reaction parameters are as follows: molar ratio-1:6, catalyst concentration- 0.5% KOH, reaction temperature- 70^{O}C, reaction time-60 minutes. Post transesterification and refining, the tallow-coconut oil biodiesel were fractionally distillate using Vigreux column, where the distillation temperature was maintained between 45 and 140^{O}C and pressure as 2 torr. Post distillation, overall yield of tallow-coconut oil based bio-kerosene was found to be 67.45%, whereas the tallow-coconut oil bottom was found to be 32.55%.Upon characterization, the biodiesel exhibited wide range of fatty acids having carbon chain from C8 to C18, whereas bio-kerosene displayed fatty acids in range of C8 to C14 with traces of high carbon fatty acids. Fuel properties of tallow-coconut oil based bio-kerosene were determined as per ASTM D1655, along with tallow-coconut oil bottom and ordinary kerosene. Even though, the overall fuel properties of produced bio-kerosene were found to be slightly reduced than the ordinary kerosene, it can also be used as a viable supplement or additive for kerosene/A1 jet fuel.

Keywords: Bio-Kerosene, Waste Beef Tallow, Dried Coconut Kernel Oil, Fatty Acids, Jet Turbine.

BIODIESEL PRODUCTION FROM MIXED OILS MIMUSPOS ELENGI AND PONGAMIA PINNATA USING A NOVEL HETEROGENEOUS CATALYST

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Abstract

Recently, researchers has shown more interest towards biodiesel production from non-edible vegetable oils. The main advantages of biodiesel as a fuel includes: biodegradability, non-toxicity, renewability and low emission profiles. In this study, crude mixed oil was used as feedstock for biodiesel production using Heterogeneous Catalyst synthesized from waste animal bone. Initially, mechanical extraction process was used to extract the crude mixed oil from the seeds of Mimusops elengi, and Pongamia pinnata. The crude oil collected from different plant species was characterized using GC-MS spectral data to identify their fatty acid composition. Consequently, the mixed crude oil was converted into biodiesel in the presence of calcinated heterogeneous catalyst obtained from waste animal bone and the catalyst was characterized by XRD, SEM and FTIR spectral data. The effect of variables including methanol/oil molar ratio, catalyst concentration, reaction time, reaction temperature, and rate of mixing on the biodiesel yield was examined and optimized. The properties of obtained biodiesel from mixed oil are close to commercial diesel fuel and used as an alternative to diesel in near future.

Keywords: Biodiesel, Mimuspos elengi and Pongamia pinnata.

EFFECTS OF SPACE RADIATION ON SOLAR PHOTOVOLTAIC PANELS- A REVIEW

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Abstract

This review article summarises the harmful effects and damages caused due to the space radiations on solar photovoltaic (PV) panels. Beginning with, the most commonly known sources for these radiations are based on these dominant interactions: (i) Inelastic collisions with atomic

electrons; (ii) Elastic collisions with atomic nuclei; and (iii) Inelastic collisions with atomic nuclei. Furthermore, two bigger concerns faced from radiation during the designing of solar panels are (i) ionization; and (ii) atomic displacement. Here, ionization results in reduced transmittance of solar panel glass cover; and darkening in glass materials due to the excitation of orbital electron in them, which jumps to conduction band and get trapped due to impurity thereby forming a stable defect complex in them. Even though, the average energy required from photon to make hole-electron pair is 1.1 eV; in reality, it is absolutely necessary to absorb thrice this energy to make the make this hole-electron pair. Similarly, the defect due to atomic displacement is defined by the displacement of silicon atoms from their lattices by the fast moving particles, which undergoes other reactions leading to formation of stable defects that result in wide variation in concentration of equilibrium carrier and their lifetime. Here, these displacement damage are classified into three types, namely: (i) Electron displacement damage; (ii) proton displacement damage; and (iii) neutron displacement damage. In addition, most concerning radiation effect on PV panel cover materials is that the light transmitted in the visible and near infrared region are changed.

Keywords: Space Radiation, Ionization, Atomic Displacement, Proton Displacement Damage, Neutron Displacement Damage