Abstract Book

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Potential of Fuzzy Methodology for Investigation in Nanofluid Heat Transfer

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Abstract. In this paper, the Fuzzy Nanofluid Model (FNFM) used to develop a fuzzy analysis investigation on heat transfer optimal performance at different nanofluids flow rate .The fuzzy nanofluid model is applied to examine the effects of heat transfer parameters on heat transfer performance. Silicon Oxide SiO_2 nanofluid is used to explain their effects on heat transfer by two methods traditional and fuzzy (with two shapes of member ship function triangular and trapezoidal). This study evaluates the effects of nanoparticles SiO_2 with different value of particle concentration *PC* (0.0-4.0%) using the water as a base fluid. This investigation covers a Reynolds number (*Re*) in the range of (100-500) as a flow rate (*FR*) for laminar flow. The main objective of present research, first one, compared a developed FNFM model with traditional model (*TM*) and determines how fuzzy model plays a significant role in prediction of Heat Transfer performance. Second one, to provide developed methodology for performance evaluation of heat transfer by connecting more than one parameter to a single output which is invaluable supplements relative to classical models. Third one, a developed FNFM can be used as a help tool for decision making to get the best judge (optimum) the performance of any system.

The results of fuzzy model showed the heat transfer of SiO_2/H_2O nanofluids significantly increased the *PC* compared with the increase in *FR*. However, however, using this method, there will be no need to resort to solving complex equations to arrive at a representation of the performance of any system. Finally, the study shows that fuzzy model plays significant role in prediction of heat transfer investigation without the complexity of mathematical tradition models. The correlations coefficients R^2 between *TM* and FNFM models for heat transfer coefficient (0.97) and the average relative error ($\boldsymbol{\varepsilon}$) is ((4.4%).FNFM models can predict heat transfer characteristics with higher accuracy than that of the traditional model.

Keyword; Nanofluid Heat Transfer Flow Rate Fuzzy theory Decision Making.

Acceptance Number: 003

Assessment Doses and Cancer Risk of Background Radiation for Soil Samples in Najaf Districts, Iraq Using GIS Technique

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Abstract. The main source of radioactivity and nuclear radiation are called radionuclides, which represent daily part of our lives. Background radiation represents the most important types of ionizing radiation, the soil is the important source of natural radioactivity, such as terrestrial radiation may be the affect human health. In the present study, background radiation was measured using portable radiation dosimeter type Inspector Exp. that made in the USA. Also, annual average effective dose (AAED) and excess lifetime cancer risk (ELCR) were determined. As well as all results were drawn by GIS (ArcGIS 10.7.1.) technique. The results show that the average values with stander error for dose rate (μSv/h), AAED (mSv/y), and ELCR$\times 10^{-3}$ were 0.121±0.004, 1.06±0.03, and 3.73±0.12, respectively. The background radiation from soil samples was determined for each district to indicate that Najaf city can be regarded as having normal levels of background radiation which indicates that does not pose any kind of health hazards or radiological effects for the inhabitant of the study area.

Keyword: background radiation, AAED, ELCR, soil samples, GIS Technique and Najaf city.

Acceptance Number: 004

Principles of Using Project Management Tools and Techniques to Mitigate Components Causing Delays and disruption in Public and private Construction Projects in Iraq

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Abstract. Delays and disruption are a common issue in both community and personal building programs The problem exists all throughout the world, but it is particularly prevalent in Iraq, where millions of dollars are squandered each time as a outcome. Delays and interruptions may have serious consequences not just for Iraq's construction plans, but also for the country's economic and social status.. While numerous studies have been conducted to investigate the factors driving delays and disruption in Iraqi construction projects, slight consideration has been given to by what means project management implements and approaches have affected the occurrence of project delays and disruption. After analyzing the crucial reasons for delays and instability in public and private construction projects in Iraq, this paper aims to improve the recording and recommendations using Project Supervision concepts. A thorough investigation was conducted to identify the critical factors that are causing delays and disruptions in construction projects in Iraq's public and private sectors and present project management application procedures in order to establish recommendations to successfully reduce work disruptions and instability in Iraq This paper identifies the top crucial factors contributing to construction project delays and disruptions in Iraq. It further identifies project management Tools and techniques that, when used appropriately, have the potential to address the major causes of delays and interruptions. Following that, a new set of guidelines for applying Project Management methodologies and strategies to address the identified delay and disruption issues is provided, with the objective of aiding practitioners in minimizing the possibility for construction delays and interruption in Iraqi projects.

Acceptance Number: 005

Evaluation of conventional water-based mud characteristics by applying ZnO and SiO2 Nano-Sized materials at Different Temperature Conditions for a selected well in The Kurdistan/ Iraq Oil Field

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Abstract. Nanomaterial is being used for formulating a new generation of drilling mud which is known as Nano- mud. Where it has the ability to improve mud properties and eliminate bore hole problems. Using nanoparticles as an additive agent in conventional drilling mud can lead to a more efficient drilling process in troublesome formations. In this experimental study, several conventional water-based muds from a selected well drilled in the Kurdistan / Iraq oil field have been prepared. Then nano-drilling muds were formulated by dispersing SiO2 and ZnO nanoparticles in concentrations ranging from (0.25 to 1 wt.%) to water-based mud (WBM) at various temperatures. The objective of this experimental study is to evaluate and compare the performance of conventional water-based muds after adding SiO2 and ZnO nanoparticles. This evaluation was performed by carrying out a series of laboratory experiments to determine the rheological and mud filtrate properties. The results demonstrated that adding SiO2 and ZnO NPs to conventional water-based mud improved the rheological behavior and provided better filtration control compared to conventional drilling muds. The effectiveness of NPs is more at higher temperatures. However, there was little or no impact of nanomaterials on the mud density for all mud systems.

Keywords: Nanoparticles, Nano-Muds, WBM, Rheological characteristics, Filtration loss

Acceptance Number: 006

Prediction of the Position and Construction Procedures Response of Static and Dynamic Conditions in the Twin Tunnel Construction

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Abstract. Several factors influence the design and construction of twin tunnels, including the distance between the twin tunnels, their location, and the method of construction, among others. Surface and sub-surface structure are affected by tunnel failures. Geotechnical and geological conditions, design, and appropriate construction procedures are the main causes of failures. Understanding the distributions of various stresses on tunnels is important for tunnel stability. After construction, the findings of static and dynamic analysis were concentrated at (stress and displacement). To analyze the behavior of position and construction process of twin tunnels, a series of three-dimensional numerical analysis were performed. New geotechnical software called MIDAS GTS NX (v. 2015) was utilized to model the twin tunnel. Collecting data from a variety of studies on this issue that have been done by prior authors. Linear elastic behavior is one of a well-known method of tunnel analysis and modeling that assumes the material is linear, isotropic, and homogenous. Usually, the first tunnel (for example, the upper tunnel) is construct first, followed by the second. The present study is a particular case, both twin tunnels were excavated at the same time. The purpose of this research is to compare the impacts of tunnel position and construction procedure on the tunnel structure and surrounding ground.

Acceptance Number: 007

Comparative Study of Polymeric Laminated Composites Reinforced by Different Fibers of Prosthetic Socket by DSC and FTIR

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Keywords: Prosthetic Socket, Composite, Fibers, FTIR and DSC.

Abstract. Prosthetic socket is the device that links an artificial limb with the amputee part. This work was done on seven laminated composites using polyester resin and (Jute, Carbon, Glass, Perlon) fiber reinforcement. The interaction between fibers and matrix material was studied using Fourier transform infrared (FTIR) spectroscopy. The DSC test has also been studied for different laminated composites. The results of infrared spectra FTIR demonstrate no new peak was identified for the polyester composite specimens after adding natural and synthetic fibers. While DSC results showed an increase in the glass transition temperature (Tg) as the number of Jute layers was increased (reached to 97 °C for three layers of jute fiber). The glass transition temperature decreased to 89 °C for the hybrid (3 Jute+ 2 Glass) and reached 91 °C for the hybrid (3 Jute+ 4 Glass). The highest value of Tg 107 °C was obtained for a hybrid composite (3 Jute+ 4 Carbon).

Acceptance Number: 008

An overview of optical fiber sensing techniques for various applications

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Abstract. In this research he sheds light on sensor technologies, especially those that used optical fibers of all kinds as a sensor. The most important applications used in the field of optical pulp sensitization are reviewed, in addition to the development in recent years of PCF sensors. In this way, the use of optical fibers as a sensor is reviewed in several areas, including measuring and monitoring environmental pollution, gas leakage sensor, refractive index sensor, and sensors in several other areas. Their presented results, in order to reach previously published best results in the use of PCF for optical, biological, and chemical sensors.

Keywords: PCFs, fiber sensor, image processing.

Acceptance Number: 009

Biogenic gold Nanoparticles as Antibrain cancer Agents

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Abstract. This study aimed to look for economical and available plant sources whose pure extractors which are used in the biosynthesis of nanoparticles have inhibitory or toxic effectiveness and potency on brain cancer cells and to know the ability of Grape Vitis Vinifera L Seed to influence the cellar line (A172) for brain cancer and cellular line WRL68 for normal cells. It was prepared Gold Nanoparticles by adding Gallic Acid extracted from grape seeds to (HAuCL4.3H2O) which confirmed that it has inhibitory effectiveness leading the cell towards the primed death by testing the cellular toxicity, the results stated that (GA-GNPS) has inhibitory effectiveness on the cancer cellular line cells (A172) where the highest inhibition value to grow the cell was (%61,27) upon the concentrations (400 µg/ml) and less value of inhabitation was (%4.36) upon the concentrations (25µg/ml) this is comparing with the natural cells, for cancer cells reached (IC50 46.99) while for natural cells reached (IC50 432.1) and testing the impacts which could happen in some of the cellular indications (HCS) including nuclear, cell count, intensity cell permeability, mitochondrial membrane potential and cytochrome. It was found during the study that (GA-GNPS) has obvious impact on the cellular properties upon the higher concentrations while its impact be little and decrease upon the minimum concentrations. The findings explained that there is an impact upon the concentrations (100&200µg/ml) on all cellular indications with moral differential ($p<0.01$) while its impact was less at the minimum concentrations. Our results revealed a novel biological activity of gold nanoparticles in an inhibition of cancer cells that may be a useful strategy for improving the efficacy of biosynthesized nanoparticles in anticancer therapy.

The key words : Gold Nanoparticles -Brain Cancer - Grape Seed .

Acceptance Number: 010

Functionalization and Characterization of Iron Oxide with Multi-Walled Carbon Nanotubes Using Ovicides Oxidation Method in *Aedes Aegypti* Eggs.

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Keywords: Multi-Walled Carbon Nanotubes, *Aedes*, Mosquito control, Eggs, ovicides

Abstract. Background of the study, we studied the possibility of nano-crystalline Fe_3O_4/MWCNTs) modify bandgap by doping with the iron oxide with carbon nanotube aqueous, colloidal, production using photo catalyze as ovicides biosynthesis for the first time against hatching eggs of *Aedes agypti*. Various concentrations of iron oxide Fe_3O_4/CNTs) Multi-Walled Carbon Nanotubes (MWCNTs) crystal (100, 200, 300, 400 µg mL−1) and aqueous solutions (50, 100, 150, 200 µg mL−1) rate (2:1), were evaluated, and in all the concentrations, Fe_3O_4/CNTs) crystal showed significant ovicides properties against *Aedes aegypti* eggs by mortality rate 95-99%.

Functionalization NP (CNT decorated with iron oxide/CNTs) Multi-Walled Carbon Nanotubes (MWCNTs) dispersion enhancement in processing or bioactivities changes and anti-microbial. The employment of ultrasonic methods with strong oxidizing acid combinations to modify MWNTs has been employed repeatedly to functionalize CNTs. An ultrasonic bath at 250°C for 30 minutes is used to process the functionalized MWCNTs. FTIR, XRD, and SEM were used to determine the results (SEM). As well as Raman spectra and FTIR spectrum.

Acceptance Number: 011

Effect of Polypropylene (PP) and Polyacrylonitrile (PAN) Fibers reinforced Acrylic Resin on Compression, Hardness, and Surface-Roughness for Denture Applications

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Keywords: PMMA denture base, Compression strength, Surface roughness, hardness, polypropylene fibers, Poly acrylonitrile fibers.

Abstract. Poly methyl methacrylate PMMA polymer is used continuously and popular in dental applications during the previous years because it has a set of good properties, including ease of manufacture, light weight, low cost and others. Yet, it has weak mechanical properties under pressure for a long time. The aim of this research was to manufacture composite material with advance mechanical properties by adding two types of fibers, (polypropylene PP and Poly acrylonitrile PAN) to the matrix polymer PMMA. In this research, groups of composite samples were prepared with selected weight ratios of both fibers (1.5, 3.5, 5.5 and 7.5 wt. %). Compression strength, hardness value and surface roughness in addition to the Morphology examination were the properties that been evaluated in the normal circumstances. The results showed an increase in compressive strength, hardness and surface roughness, during the increase of reinforcing ratio of the fibers. There was a clear increase in the compressive strength during the increase in the weight ratio of both types of fibers, the largest value was (300MPa) for PMMA/PAN samples that obtained at the highest reinforcing ratio compared to (240 MPa and 119 MPa) PMMA/PP and the neat PMMA, respectively. The hardness increases noticeable with the increase of both type of fibers the reinforcement ratio, and reaches its highest value at the ratio of (7.5wt.%) for both type (87), compared to the neat sample (81). On the other hand, surface roughness increased during the increase of fibers ratio used which negatively affected the samples comparing to the neat polymer. Through SEM test, it was found that the fracture surface of the neat PMMA was homogeneous, while it is almost continuous for both PMMA/PP and PMMA/PAN.

Acceptance Number: 012

Design and Optimization of Vertical Axis Wind Turbines Using QBlade

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Abstract. Wind energy is considered one of the most important sources of renewable energy in the present time, because it contributes to reduce blade works in different sites in Iraq. It was used the Qblade (Version 8) software to achieve the calculations and the optimization the negative effects on the environment on the one hand and on the other hand obtaining a source of energy that is needed for world. The two most important types of wind turbines are horizontal and vertical. This research paper presents the full details to design the vertical axis wind turbine (VAWT) and find the optimal values of necessary factors. Also, the results shed light on the efficiency and performance of the (VAWT) under different working conditions. It was taken into consideration the variation of the surrounding environment conditions (such as density and viscosity of fluid, No. of elements of blade, etc.) to simulate how the (VAWT) working. It was investigated the effect of many design factors such as the blades number and size on the behavior of the wind turbine. It was assumed that the vertical wind processes to obtain the optimal design of the wind turbine (vertical type) that suitable for the promising site. The results proved that can obtain accurate results using Qblade software.

Keywords: Vertical axis wind turbine, power generation, aerodynamic analysis.

Acceptance Number: 013

Spectrophotometric Determination of Salbutamol and Meptazinol in Drug Formulations Using the Berthelot Reaction

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Abstract. For the assurance of a few phenolic compounds (salbutamol or meptazinol), a rapid and delicate spectrophotometric strategy was developed and linked to drug assurance in pharmaceutical definitions. The method is based on oxidative coupling reaction of these compounds with sulfapyridine and benzocaine in the presence of potassium metaperiodate as oxidizing agent. The formed blue indophenol dyes have maximum absorptions at 670, 690, 630 and 650 nm for salbutamol with benzocaine (D1), salbutamol with sulfapyridine (D2), meptazinol with benzocaine (D3) and, meptazinol with sulfa pyridine (D4) respectively. The spectrophotometric determination of this phenolic compounds using the molar absorptivity are 2.969×10^3, 5.848×10^3, 2.724×10^3 and 2.172×10^3 L mol^{-1}. cm^{-1} for concentrations obeyed Beer's law in the ranges 2-20, 1-16, 2-14 and 1-12 µg ml^{-1} for the above compounds respectively. The average recovery % was ranged between (99.45% - 100.51%) with relative standard deviation ≤ 0.111 for all the studied compounds. The method is applied successfully to the assay of salbutamol and meptazinol.

Keywords: Indophenol; Phenolic compounds; Job method; Beer's law; Berthelot reaction.

Acceptance Number: 014

Bidirectional Data Transfer Via LiFi Technology

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Abstract. Optical wireless communication through led is the most recent area of research into next-generation networking, with light being one of the most sustainable things in our lives. The ease of using a low-cost, high-efficiency system for other purposes, such as wireless communication, is a very appropriate method in the Light Fidelity technology (LiFi). The most critical part of LiFi technology is the Light Emitting Diodes (LED) (white light) This paper is focused on the use of LiFi in data(text) transmission, and LEDs are proposed for use in an indoor communication system. The proposed bidirctional LiFi transceiver circuit is made up of simple and readily available components, with an interface program that is a desktop application. To boost the performance of the proposed system a Convex lens is combined with an LED, which improves the LED's light output. The proposed system satisfies a transmission distance of 280cm with a maximum bit rate of 1115600 bps and the acceptance angle is 60°.

Acceptance Number: 015

Investigate the Effect of Alternative Dry frictional clutch Disc Material on the Transient Thermal Performance of Sliding System Experimentally under Different Boundary Conditions

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Abstract. The thermal characteristics of different types of friction materials are investigated experimentally using new friction clutch material in the present work under different working conditions; such as rotational speed, torque, and sliding time. The magnitude and distributions of the temperature over a cross section of friction clutch element (pressure plate and flywheel) are investigated and compared. The effect of alternative materials for friction lining of clutch disc on the thermal behavior of sliding system with different operating conditions (different rotational speeds, torques and sliding periods) is investigated experimentally . Four friction materials were used **(G95, LUk, HCC and Tiger)** in order to study the temperature distribution over a cross section of friction clutch element during the sliding period (heating phase), and during the full engagement period (cooling phase), each one of which had different thermal and mechanical properties .The temperature was measured and compared at various points in r-direction and θ – direction at the interface of the contact surfaces between pressure plate and clutch disc and between flywheel and clutch disc It can be observed from the obtained results that the maximum effect on the temperature values occurs when applying maximum torque (4.5 kg.m), maximum initial rotational speed (1200 rpm), and slipping period (30 s) and the temperature values at interface contact decreases when decreasing all the above input conditions values to (2.5 kg.m, 690 rpm and slipping period to 8 s). The results showed that the temperature reduced from (180.4 °C) for applied torque 4.5 kg.m, initial rotational speed (1200 rpm) and slip period (30 s) to (83.3 °C) for applied torque 2.5 kg.m, initial rotational speed (680 rpm) and slip period (8 s) for clutch disc (LUK), the difference between them is (53%). It can be observed the same behavior for other three discs (G95, HCC and Tiger) but with different values of temperature. The results show that the temperature is proportional to thickness, and that the temperatures of pressure plate interface are higher than those at flywheel interface; these results are obtained because of the low thermal capacity of the pressure plate compared to the flywheel under the same boundary conditions. The results showed that the maximum value of temperature at outer disc radius from flywheel interface is equal to (Tmax=152.7 °C) and at pressure plate interface the maximum temperature is equal to (Tmax=159.1 °C) for the same operating condition using frictional clutch disc G95. .The experimental optimization results showed that the highest temperatures value are obtained when using friction clutch disc (LUk), and minimum temperature is obtained when using (HCC) disc, it was obtained the highest reduction in temperature which were (20 %) compared to (LUK) for the same input condition when used applied torque (4.5 kg.m) initial rotation speed (1200 rpm) and slip period (30 s).

Acceptance Number: 016

Effect of adding green syntheses copper nanoparticles and experiment conditions on live blood cells

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Abstract. One of the most important problems of the age is pollution with chemicals, due to their frequent use in various fields of applied and industrial life. It is unpredictable from scientific knowledge in the field of commonly used chemical compounds to estimate potential risks arising from the use of chemical Nano composites. The main principle of understanding the toxicity of nanomaterial's is their small size, which enables them to penetrate the cell walls of living cellular organisms, allowing them to penetrate these basic biological structures and disrupt their normal functions. In this study, green synthesis of Nano copper has been investigated and the potential of adding zero-valent Nano copper on DNA for the live blood cells was studied. The nanomaterials were experimentally reduced using ascorbic acid ($C_6H_8O_6$) as an environmentally friendly reducing agent. It was found that ascorbic acid can reduce the copper ion into copper particles within 10 minutes. The as-prepared copper nanoparticles were characterized by infrared (FTIR) and XRD (X-ray) spectroscopy. The comet test was used to determine the effect of the NZCV of different units of weight (mg/L) on the shape of the DNA strain by measuring the difference in the shape of the DNA tail and the increase in the percentage of dead cells. To study the toxicity, three different concentrations of copper nanoparticles were used which are 30 mg/L, 50 mg/L, and 100 mg/L, where it was observed that the percentage of dead cells increased when the concentration of NZVC nanoparticles was used to become 2.89, 3.92%, and 4.78%. It was found that the toxicity of nanomaterial's increases with the increase in concentration, as it was found that the highest effect of copper nanoparticles was in the higher concentration of it, which is 100 mg/L, as the toxicity increased to reach 5.34%, which is the highest in the experimental conditions. The number of dead cells was counted and the variation in DNA morphology was studied using fluorescence microscopy. As a result, the effect of copper nanoparticles at a constant temperature showed an obvious change in DNA morphology indicating the danger of nanomaterial to the genetic materials of the life blood cell.

Keywords: Zero valent copper, Nano technology application, living cell, DNA.

Acceptance Number: 017

Design and Planning for Applying Horizontal Well Program in Taq Taq Oil Field in Kurdistan region of Iraq

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Abstract. This paper presents the application of horizontal drilling in an oilfield of Kurdistan region of Iraq. The most important developments in Petroleum industry were through drilling technology by producing more horizontal wells in the worlds since eighties. Horizontal drilling is considered as a cost-effective method for developing reserves because of continues breakthrough of hardware equipment in oil fields. The technology of Horizontal wells remains to be a remarkable enthusiasm of oil industry since they can give an attractive way to enhancing both production rate and oil recovery factor. The practice of drilling a horizontal oil well in Kurdistan region of Iraq will be highlighted in this paper. In the previous few years horizontal drilling in this region has given an exciting experience for petroleum engineers. A horizontal well will be drilled in the oil fields of Taq Taq and one of the important applications of this well is to recover production rate in thin/tight reservoir and saving in total growth cost. The aim of this paper is to show the structure and parts of horizontal well. Well plan viewpoints incorporate choice of bit and casing sizes, casing setting depths and penetrating mud density, casing, and hydraulics, technique for boring and well profile. An Iraqi oil field (Taq Taq field) is selected for designing horizontal well to increase the productivity and long rich position. Short to Medium radius horizontal well profile is suggested for the developing the field. This paper employs instructions learned and results obtained while applying a rotary drilling of an offset nearby well with liner system on conventional horizontal rig, during the designing and drilling operation arrangement. The main goal of this work is to show the impact of horizontal drilling application on the performance improvement of that oil field.

Acceptance Number: 018

Investigation of Sensible and Latent Heat Storage System Using Iraqi Paraffin Wax as Storage Media

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Abstract. Iraqi paraffin wax grade (A) was used in this work used as a latent heat storage (LHS) was placed in a vertical cylindrical heat storage container (HSC) and a vertical single pipe for heat exchange purpose was also inserted in the container. In this setup**,** the phase change characteristics of wax during solidification are measured by monitoring the temperature profiles within the container. Energy was supplied to the sample from a resistance heater placed around the outside surface of the container. In an attempt to gain extra heat storage, a sensible heat material consisted of fourteen-cupper fins pipe inside wax sample, while in other system an open-ended wire mesh cylinder made out of steel is embedded in the sample. It was found that the flow rates were largely influenced by the type of system used. This work revealed the advantage of using finned pipe for heat exchange, with finned pipe system, higher rates of heat flow were obtained. Whereas small advantage was gained by adding steel mesh.

***Keywords*:** Solar energy application; Phase change materials; Iraqi paraffin wax; Latent and sensible heat; Heat transfer.

Acceptance Number: 020

Study the Impact of Cobalt on Hardness and Adhesive Wear of NiAl-Y_2O_3 Composite Material

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Key words: Powder Metallurgy, Intermetallics, NiAl, Cobalt, Adhesive Wear, Hardness.

Abstract. The sintering at (1.35x10^2) °C for 90 minutes under argon gas atmosphere formed a nickel aluminide NiAl-based composite strengthened with yttrium oxide Y_2O_3 with the addition of cobalt in the current sample. (ASTM E140 – 12b) was used to perform the Brinell hardness test. The addition of cobalt increases the hardness of the (NiAl-Y_2O_3) composite. The hardness of NiAl-30Y_2O_3 composite improved from 341HB to 359HB after 1.5 wt.% Co was added, although the hardness improved to (381-383)HB after 2-2.5 percent Co was added. According to the findings of the wear examination, the inclusion of cobalt decreases the wear intensity of NiAl-30Y_2O_3, according to the findings of the wear examination. The adhesion wear rate reduces from 7.61 * 10^-6 gr / cm to 6.72 * 10^-6 gr / cm when

1.5 wt. percent Co is added, thus inserting 2- 2.5 wt. percent Co reduces the rate to (5.87–5.22)* 10^-6 gr /cm.

Acceptance Number: 021

Using Energy Plus Simulation Tools for Improvement Cooling load in Office Buildings at Semi-Arid Climates: A Case Study North Iraq

ABSTRACT. This paper deal with the improvement of cooling load in office buildings in Semi-Arid Climates. Generally, the building in North Iraq consumes a lot of energy to satisfy cooling need due to the climate in northern Iraq is a hot atmosphere, as well as lack of sufficient construction techniques, materials, and operations without providing satisfactory comfort and health levels for the occupants, that lead to using a mechanical device (split unit) to achieve thermal comfort. Therefore, this paper aims to test some applying passive cooling strategies to reduce energy consumption and improve thermal performance in office buildings. Design builder and Energyplus are used to present the dynamic role of the simulation tool in architecture. This study proposed a conventional office to be baseline module for simulation and selected one room from each orientation to simulate the current situation and then with various passive cooing variables to improve the office space cooling load. The study concluded that Window shading by the overhang, low solar transmittance, and decreasing window-to-wall ratio scored the best results for minimizing cooling loads by 17% -40% compared to the base case. The primary objective, which has been achieved through this article, emphasizes the importance of using Building Performance Simulation.

Keywords: Passive Cooling Strategies, Office building, Cooling Load, North Iraq, Semi-Arid Climates

Acceptance Number: 022

Studying the Effect of Hydroxyapatite Coating on the Properties of Alumina

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Keywords : Degradation, Al_2O_3, Biomaterials, Hydroxyapatite, Coating.

Abstract. The expansion in the application of bio- materials leads to a wide variety of forms. The current study includes the preparation of a biological material in the form of a bio-coating that is represented by the, combination of a substrate with biological properties and at the same time high mechanical properties represented by alumina and the use of a coating from a material that provides high biological properties and low mechanical properties if it compared with the substrate, which is the hydroxyapeptite .The XRD and EDS technique showed an increase in the proportion of hydroxyapatite coatings formed and appears in calcium and phosphorous ions increasing with immersion time. A degradation test has been done after soaked the samples in Buffer solution for 7 days which proved an increment in degradation as the soaking time increase .

Acceptance Number: 023

The Numerical Simulation and Thermal Analysis of Nanoparticles Blends within a Stirred Batch Reactor for Biodiesel Production from Waste Cooking Oil

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Keywords: Biodiesel, blend, Alumina gamma NPs, CFD, Batch reactor, nanoparticles, stirred tank.

Abstract. The production of biodiesel has been grown effectively during the last decades. Biodiesel is considered a clean energy source and one promising alternative fuel for petroleum diesel engines that can protect the ecosystem by reducing greenhouse gas emissions. The thermal analysis of biodiesel- nanoparticles blends inside batch stirred reactor has been investigated numerically using COMSOL Multiphysics. The present investigation focuses on the using Alumina gamma nanoparticles of 40 nm as a heat transfer improver and biodiesel blend. The hydrodynamic, heat transfer characteristics, and conversion percentage have been studied for various agitation speeds (r), shift heat fluxes (Q) and nanoparticles concentrations (fi). The results of the velocity, streamlines, temperature contours, heat transfer coefficient, and conversion % plots for various operating conditions are obtained during this study. . The optimization analysis by using design of experiment function is also applied for parametric analysis, where ANOVA table, Perto chart, advanced non- linear regression and optimization plots are obtained. The optimum operating conditions are r=350 rpm, Q=600 W/m^2, fi= 1.25 %, and conversion = 96 % of biodiesel- nanoparticles blend.

Acceptance Number: 024

Mechanical Properties of High Strength SCC Made with Hybrid Steel Fibers from Discarded Bead Wires

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Keywords: discarded bead wires, steel fibers, high strength, self-compacting concrete, flexural toughness

Abstract. The tire manufacturing sector occupies a significant portion of the global economy. The production of vehicle tires requires the utilization of different raw and processed materials. Steel beads are one of these main ingredients, used to reinforce the treads and sidewalls of car tires. In this study, the effect of incorporating steel fibers cut from discarded bead wire (DBW) during the tire manufacturing process on the rheological, mechanical, and flexural toughness of high-strength self-compacting concrete (SCC) was investigated. Four SCC mixes were prepared with four discarded bead wires, at volume fractions of 0%, 0.3%, 0.6%, and 1%. Four lengths of the discarded bead wires were used in the term of hybridization: 10, 20, 30, and 35 mm. These were mixed together, with each length comprising 25% of the total. Investigations of fresh and hardened concrete properties were carried out. The results showed that DBW affected the rheological properties of high-strength SCC adversely, where a slight reduction in slump flow was found with 3.94%, the required time to pass the V-funnel was increased by 31%, the blocking ratio of L-box test also was found to be increased with 15%, as well as the segregation index decreased by 28% by the addition of 1% of DBW. On the other hand, compressive and splitting tensile strength were found to be enhanced due to effect of DBW. Moreover, investigations of flexural toughness were conducted. Overall, the presence of different lengths of the DBW helped to transfer the load from the cementitious matrix to the short fibers, and then to the long ones, leading to the enhanced energy absorption capacity of high-strength SCC.

Acceptance Number: 025

PHYSICAL PROPERTIES OF TEST SIGNALS TO ENHANCE TELECOMMUNICATION PATHS

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Abstract. The properties and characteristics of test signals used in constructing the high definition TV (HDTV) and ultra-high definition TV (UHDTV) become an essential task. The proposal was made for the properties and different parameters of tool signals. These properties were considered very important to estimate. the spatial two-dimensional transfer function of frequency modulation through the light path of test signals. Some work was also performed to measure the resolution of the signal transmission and the end device.

KEY WORDS*:* dimensional, Fresnel zones, modulation transfer function, HDTV, MTF, high-frequency

Acceptance Number: 026

Metal organic frameworks as gas storage for Liquefied petroleum gas vehicle in Iraq

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Abstract. This research introduces new idea of using HKUST-1 as gas storage for Liquefied petroleum gas (LPG) vehicle in Iraq. There was a need to develop adsorbent with high storage capacity at low pressure and normal temperature, allowing for successful desorption in typical operating conditions in order to overcomes the drawbacks of isothermal adsorption-desorption process. HKUST-1 was synthesized using hydrothermal method and characterized using Xray diffraction (XRD), Fourier Transforms infrared spectroscopy (FTIR) and surface area and pore volume analysis. The prepared HKUST-1 was used to study propane adsorption at different temperatures of (25, 30, 35, and 40 ^{0}C) and pressures from 1 to 7 bar to determine propane adsorption capacities. The propane adsorption capacity was found to be 10.499 mmol/g at a pressure of 7 bar and a temperature of 298K. In addition, an isotherm adsorption study was carried out to better understand the system equilibrium (i. e., the best fitting Langmuir, Freundlich and temkin), and it was found that the experimental data were best fitting by Freundlich isotherm model. The HKUST-1 has a reversible nature as an adsorbent, according to the reusability performance results. The adsorption capacity of HKUST-1 decreased and stabilizes after twenty cycles of isothermal adsorption-desorption process by 5% from the initial adsorption capacity.

Keywords: propane adsorption, HKUST-1 and adsorbent

Acceptance Number: 027

Tar Production from Microwave Pyrolysis of Water hyacinth Using Taguchi Method

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Abstract. Tar is produced from Water hyacinth (WH) under fast microwave pyrolysis process. This study includes the effect of four factors on tar yield, these factors are: Microwave power, Temperature of reaction, Microwave absorber ratio, and Particle size of WH. In this study reaction time kept constant about 2 min. The experiments were designed according to the Taguchi method by using MINITAB 17 software. Moreover, Taguchi method used for analysis the results and to optimize process parameters. The maximum tar yield was obtained using the optimized conditions of microwave power- 94.88%, temperature- 680°C, microwave absorber ratio- 72.7%, and particle size – 1.5mm. Analysis of variance (ANOVA) and the Signal to Noise ratio (S/N) were used to study the effect and the significance of the process factors on tar yield. The results indicate that all process parameters have significant on product. The rank of significance of process factors are: particle size > microwave power > microwave absorber > temperature. Mathematical model for tar product was obtained with its correction factor (R^2) by multiple regression method, R^2 for the tar yield was 98.99. Effect of Parameters on Tar yield behavior shows that at low reaction temperature tar yield increases with increasing power level, but at high temperature (i.e. 680°C), a higher yield was obtained and it tends to decrease as the microwave power level increases, this increase stopped at high power of microwave and the yield of tar became decrease when microwave absorber increase on the other hand, the yield of tar decrease with the increase of particle size at constant temperature. The produced tar was analyzed by Fourier-transform infrared spectroscopy (FTIR), this analysis supplies perfect information on the concentrations of many functionalities.

Key words: Water hyacinth, fast microwave pyrolysis process, taguchi method, tar yield.

Acceptance Number: 028

The Use Of Borehole Logs To Study The Reservoir Properties Of Shiranish Formation In Qayarah Field In Northern Iraq

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Abstract. The present study consists of evaluating the reservoir properties of Shiranish formation of two wells: (Qayarah-54 well QY-54 and Qayarah-84 well QY-84) in the Qayarah oil field, Northern Iraq. It relies on the information of borehole logs of these wells to clarify the reservoir properties of the Shiranish formation in order to assess the petro physical properties. The most important borehole logs that are used: density log, sonic log, neutron log, gamma ray log, and resistivity logs. They are converted into digital values by using Didger program while the petro physical parameters are calculated by using Microsoft excel program. The petro physical properties of this formation are drawn by using the log plot program. In the Qayarah field, Shiranish formation is divided into three reservoir units depending on the petro physical properties: the reservoir unit (RU-1), the second reservoir unit (RU-2), and the third reservoir unit (RU-3). The petro physical properties of Shiranish formation shows that the best reservoir unit according to the hydrocarbon saturation is the unit (RU-3), regardless of the thickness variation in both wells. The lithology study of Shiranish formation shows that it consists of limestone, marley limestone, dolomite limestone, dolomite, and layers of marl.

Keywords: Petrophysical ; Shiranish Formation ; Reservoir properties ; Qayarah Field.

Acceptance Number: 029

COVID-19 Outbreak: The Kurdistan Region Perspective

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Abstract. Covid-19 first appeared in Wuhan, China then spread across the globe including Kurdistan region-Iraq. Seven types of coronaviruses can infect human (SARS, MERS, 229E, OC43, NL63, HKU1, and most recent SARS-CoV-2), four of these (HKU1, OC43, NL63, 229E cause mild infection in the upper respiratory, while SARS, MERS, and SARS-CoV-2 are responsible for high mortality rate, particularly SARS-CoV-2 is highly pathogenic and has caused acute respiratory disease which endangers human health and public safety.

Compared with SARS and MERS, the Covid-19 mortality rate is low since the majority of the cases have recovered. Despite its low mortality, the COVID-19 death toll is high, because COVID--19 has caused pandemics and spread across the world, while SARS and MERS only caused endemics.

So far large portions of the world population have been affected by the Covid-19, the disease led to an emergency of public health and concern of the international community, thus putting health institutions across the globe on alert.

Since the Spanish flu at the beginning of last century, the Covid-19 pandemic is only the second outbreak to extremely influence the world countries' health system, economy, and psychology of the world population, in this respect Kurdistan region of Iraq has not been an exception. This review study focuses on virology, pathogenesis, global and regional epidemiology, clinical presentations, diagnosis, treatment and control, and vaccinations concerning the Kurdistan region of Iraq.

Acceptance Number: 030

Evaluating the Theoretical Models of Bearing Capacity of Foundations on Geogrid Reinforced Soil

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Abstract. In spite of several theoretical models developed during four decades ago to predict the bearing capacity of foundation on geogrid reinforced soil, no unique theoretical model can best simulate the behavior for all cases of foundations on different reinforced soil where more verifications are required to confirm that. This paper includes the evaluation of several theoretical models that predict the bearing capacity of foundation on geogrid reinforced soil by comparing the results with the experimental results. Three types of foundation was used: strip, rectangular and square foundation. The research considered two types of soils: silty clay and sandy soil. Although the theoretical models used in this study gave a promised validation with an experimental results, it need more study to improve these models. Relatively, the best model is the model that was previously developed based on assuming punching in upper reinforced layers and then general shear failure on the other layers. A method of computing the tensile force induced in the reinforced layer based on the value of elastic settlement in silty clay was proposed instead of method based on a range of strain values which proposed in the literatures. The contribution of this study was that the evaluation of the available theoretical models with the experimental results may adopt a best theoretical models which may be used in design of a foundations on a reinforced local soils.

Acceptance Number: 031

Design Methodology of Diagonally Reinforced Concrete Coupling Beams

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Abstract. The main lateral force resisting system of buildings is shear walls. Reinforced concrete coupling beams usually connect these shear walls. This research summarizes the design procedures of reinforced concrete coupling beams. Although there are many aspects to the analysis of a coupled wall system, this paper focuses on the ACI 318 design of the reinforced concrete coupling beam as an individual member and uses several simplifying assumptions to illustrate an efficient process for the design. The assumption relates the shear force with the plastic moment capacity of the coupling beam. A typical building dimension is considered, and a coupling beam with an aspect ratio of 1.6 is designed as a diagonally reinforced coupling beam (DRCB) in accordance with ACI 318. The results show that the DRCB can be simply designed based on the moment capacity of the coupling beam instead of the current iterative procedure of the ASCE 7, in which horizontal forces are elastically distributed that is related to the stiffness of the structural members.

Acceptance Number: 032

Development of an accurate and rapid spectrophotometric method for the determination of loratadine drug using Prussian blue in Pure and Pharmaceutical formulation

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Abstract. A new Simple, sensitive and accurate spectrophotometric methods have been developed for the determination of loratadine (LOR) drug. This method based on the reaction of (LOR) with Prussian blue, it is prepared by reaction of ferrous sulfate and potassium ferrocyanide with $KI+KIO_4$ solution. The product shows absorption maximum at 460 nm. The linearity ranges of LOR are (2-18 µg.mL-1) with molar absorptivity (19373.728 liter. $mol^{-1}.cm^{-1}$ and the Sandell's sensitivity index 0.01976µg/cm^2) detection of limit and Quantification limit (0.123, 0.375 µg / mL) respectively. The results showed that there are no interferences of excipients on the determination of the drug. The proposed method has been successfully applied for the determination of Loratadine in pure and pharmaceutical formulations.

Key words :spectrophotometric ,Loratadine, Potassium Ferricyanide, ferrous sulfate , Prussian blue

Acceptance Number: 033

Synthesis, Characterization, Study of Biological Activity and Liquid Crystal Behavior for Some New Derivatives of Tetrazole and 2,3-Dihydroquinazolin

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Abstract. In this study, new tetrazole [SF_1-SF_6] compounds were prepared by the reaction of schiff base compounds with sodium azide in tetrahydrofuran (THF) and new 2,3-dihydroquinazolin [SF_7-SF_{12}] compounds were prepared by the reaction of schiff base compounds with anthranilic acid in 1,4-dioxan. The prepared compounds were characterized by physical properties, UV-Vis, FT-IR and ^{1}H-NMR spectral. TLC checked the purity for these compounds. Antibacterial behaviors were investigated against a variety of bacteria, including ***Pseudomonas aeruginosa*** Gram (-) ve, ***Staphylococcus aureus***, Gram (+) ve for compounds [FS_2, FS_4, FS_6, FS_7, FS_9]. The optical microscope polarization has been studied in the liquid crystal phases. The values of the thermal transfer degrees of the liquid and isotropic crystal phases were assigned to most of some prepared compounds [SF_6, SF_8, SF_{12}], and the nature of these transitions was studied. The liquid crystal shapes were diagnosed using a heated polarized light microscope.

Key words: *Tetrazole, 2,3-Dihydroquinazolin,* Biological *Activity, Liquid crystals.*

Acceptance Number: 034

Synthesis, Characterization, Biological Evaluation, and Assessment Laser Efficacy for New Derivatives of Tetrazole

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Keywords: Tetrazole, Biological Activity, Laser Effectiveness.

Abstract. In this study, new tetrazole [A_1-A_5] were prepared by the reaction of Schiff base with sodium azide in tetrahydrofuran (THF) by the traditional method (reflux) and microwave technology. The prepared compounds were characterized by physical properties, UV-Vis, FT-IR, ^{1}H-NMR, ^{13}C-NMR spectral, and C.H.N analysis. TLC checked the purity of these compounds. Antibacterial behaviors were investigated against a variety of bacteria, including ***Escherichia coli,*** and ***Klebsiella pneumonia*** Gram (-) ve, ***Staphylococcus aureus***, and ***Staphylococcus epidermidis*** Gram (+) ve. The laser efficacy of the [A_1-A_5] was evaluated after they were radiated by laser for (10, 20, 30) seconds. As the melting point, and color of the substances were determined, it was discovered that they were unaffected, and did not disintegrate or polymerize. Using the Chem3D 19.0 program, the heat of the formulation of the [A_1-A_5] was investigated.

Acceptance Number: 035

Mechanical Property Evaluation of PLA /soybean oil Epoxidized Acrylate Three-Dimensional Scaffold in Bone Tissue Engineering

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Keywords: bone tissue engineering, soybean oil, biodegradable polymers, biomaterials, three-dimensional printing.

Abstract. Recently investigated photocurable, biocompatible plant resin on tissue engineering to provide the scaffold with structural support and mechanical properties. A novel method had been used here to build our scaffold by combined the traditional three-dimensional fused deposition modeling (FDM) printing and injected the structural scaffold after fabrication with plant-based resin. The materials used are polymers a synthesized one polylactic acid and soybean oil epoxidized acrylate. The addition of soybean plant-based resin improves the adhesion and proliferation of the PLA scaffold while also providing structural support to the fabricated scaffold. The purpose of the study made optimization of printing parameters and compared different printing scaffolds to select the perfect one with preferred mechanical properties. Two designs are built (cubic design and cylinder design) to make a comparison of mechanical properties between the two designs. The novel method was used through injected soybean oil resin into the PLA scaffold by avoiding any heat and temperature rise of the resin. In the traditional method, the resin is printed using an SLA printer which exposed the resin to heating before printing, this will affect the properties of the final model in our technique temperature will eliminate by direct inject the plant-based resin into the PLA scaffold and then photocuring with ultraviolet curing device for 30 min at 405nm. Finally, the results demonstrate that after injecting PLA scaffold with soybean oil resin, the mechanical properties of the scaffold improve; additionally, the results show that the cylindrical design has more promising mechanical properties than the cubic design.

Acceptance Number: 036

Experimental and Finite Element Modeling in Dry Drilling of Stainless Steel AISI 304

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Abstract. Drilling operation is very significant in manufacturing. Drilling is usually implemented at eventual steps in industry to make accurate holes in the machined specimen. The objective of this paper is to study the heat factor that influences the material of the specimen experimentally and by means of commercial software of Deform-3D Ver11. The experimental setup consists of a radial drilling machine with twist drill bit of 16mm diameter and specimen of AISI 304. The tool material is high speed steel DIN338. Due to the impossibility of measuring the highest temperature that generated on the workpiece during drilling when using single measurement thermal camera, it was decided to apply the laser of the camera on a specified point on the specimen which is close to the drill bit. The model of the thermal camera is Fluke"VTO4" visual infrared thermal imager. Five levels of drilling speeds are used in this study (48-72-112-160-200) rpm, and one feed speed as 0.1 mm/rev. During the experimental work, the thermal camera is fixed on a fixture to prevent any expectable vibration that may cause inaccuracy of measurement. A video camera is fixed behind the thermal camera owing to the impossibility of picking up the temperatures because of the short time until achieve the penetration of the tool into the workpiece as 3mm. For numerical work, FE simulations are implemented based on deform-3D software to validate the readings of temperatures that are recorded by the thermal camera in the experiments. A 3D cutting tool of STL format is used in FE simulations. This tool is imported from a specific website freely and has the same geometrical parameters of the one that is used in the experimental. The outcomes of both experimental and numerical works referred to a considerable increase of temperature with increase of drilling speed. The resultant chip was continuous due to the considerable ductility of workpiece material. There was also an acceptable closeness between experimental and its FE works.

Keywords – Machining, Drilling, FEM, DEFORM-3D, Simulation, Infrared Camera, High Speed Steel, AISI 304

Acceptance Number: 037

Electrostatic Deposition of Bio-Composite polymer/Hydroxyapatite Coatings on 316L Stainless steel

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Keywords: Electrostatic spray, composite coatings, implants.

Abstract. The present work aims to prepare polymer-based biocomposite coated layers by electrostatic spray method onto a 316L stainless steel substrate. Different percentages of (2,4, and 8) wt.% of Hydroxyapatite (HA) with (98,96, and92) wt.% of PMMA were used to prepare the composite coating. Wettability, phase composition, and surface morphology were studied using contact angle measurement, X-ray diffraction, and scanning electron microscopy techniques respectively. The results revealed that a homogenous, uniform, and crack-free coating layers were obtained. The wettability testing indicated increased hydrophobicity of the coatings with the addition of hydroxyapatite particles where the 8wt.%HA applied the highest contact angle of (104.08°).The average thickness was about (400µm) for the coating layer deposited on the substrates using the electrostatic technique, whereas the average diameter coating was about (33.95µm).

Acceptance Number: 038

Experimental Study and Simulation of Ideal Continuous Reactors for the Glyceryl Oleates Production via a Homogeneous Esterification Reaction

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Abstract. The esterification of glycerol with oleic acid for the production of glycerol oleates in the presence of methyl ester sulfonate acid as a homogeneous catalyst was studied. The study was carried out experimentally in a batch reactor with reaction time up to 360 minutes and temperature between 100 and 175 °C. The results showed that the yield of the glycerol oleates increased with increasing reaction time and temperature, reaching the highest yield of 82.61%. The kinetic of the glycerol oleates yield was examined, and the calculations showed that the reaction follows a third-order kinetic model, and the activation energy and frequency factor were determined. The obtained reaction kinetics data were invested in modeling and simulating the esterification reaction of glycerol with oleic acid in ideal mixed and plug flow reactors. The simulation results demonstrated that the effect of the temperature on the yield of glycerol oleates in the mixed flow reactor is less than that of the plug flow reactor. The results also indicated that the mixed flow reactor is suitable when the required glycerol oleates yield is less than 63%, while the plug flow reactor is suitable for higher yield values.

Acceptance Number: 039

Malachite Green Removal from Wastewater by Electro Coagulation Treatment Technique

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Abstract. Electro-coagulation describing strategy has been utilized to evacuate malachite green - a dye utilized in aquaculture as antimicrobial agents. There was an effect of six operating parameters like initial concentration of dye, pH, current density, electrode spacing, and amount of electrolyte on the effectiveness of color removal that has been inspected by using aluminum electrodes. It was found that the optimum measurement dosage for the malachite green aqueous solution at initial concentration 50 mg/l of dye concentration, the best current density is 87.5 A/m^2, the optimum pH is 8.0, the optimum NaCl concentration as an electrolyte is 0.7 g/l, the optimum spacing between Aluminum electrodes is 1cm where can be observed that decreasing in dye removal when increasing in spacing at 70 min. Thus, through the results gotten, treating the Malachite Green dye in this strategy is considered efficient and great treatment.

Keywords: Electrocoagulation; Malachite green; Dye removal; Electrode

Acceptance Number: 040

Reinforcing the bio-based (polyvinyl alcohol/carboxymethyl cellulose) hydrogel for efficient methylene blue removal: a modeling approach

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Keywords: Methylene blue removal; bio-based hydrogel; polyvinyl alcohol/carboxymethyl cellulose; intelligent modeling

Abstract: The textile manufacturing industries often produce a large quantity of dye-contaminated wastewater. Industrial wastewater containing methylene blue (MB) is a menace for human beings, the environment, and the ecosystem. Thus, the MB molecules are needed to be removed before wastewater discharge to the environment. Adsorption is a well-known process for dye removal from water and wastewater. This study relies on the artificial intelligence technique for simulating the process of MB removal by different bio-based hydrogels. Indeed, the cascade correlation neural network (CCNN) employs for simulating the MB adsorption by the bio-based (polyvinyl alcohol/carboxymethyl cellulose) hydrogel reinforced by graphene oxide (GO) nanoparticles and bentonite. The trained CCNN by the Levenberg-Marquardt algorithm estimates the MB adsorption capacity of hydrogels as a function of adsorbent type, temperature, contact time, pH, and initial dye concentration. Trial-and-error analyses justified that the CCNN with one hidden layer containing six neurons is the most reliable model for the considered problem. This model predicts the reported experimental data in the literature with excellent accuracy (i.e., RMSE=2.00, AARD=2.4%, and R^2=.0.9980). Experimental measurements and modeling findings approved that MB uptake at 30-40 ºC intensifies by increasing temperature, contact time, pH, and initial dye concentration. Increasing the mobility of the large dye ions at 50 ºC reduces the adsorption capacity of all bio-adsorbents. Furthermore, the reinforced bio-based hydrogel with bentonite/GO nanoparticles is the best adsorbent for the methylene blue uptake.

Acceptance Number: 041

Self-Healing of Mortar Cracks by using Human Pathological Bacteria

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ABSTRACT. This work presented the self-healing characteristics of N-type cement mortars by using two types of biological agents namely *Proteus mirabilis* and *E. Coli* bacteria. Mortars are prepared from Portland cement and ordinary sand were treated by these two biological agents at different concentration. The mechanical properties of the treated mortars are measured and the mortars were characterized by means of Fourier-transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), and electron energy dispersive spectroscopy (EDX). Results show that *Proteus mirabilis* and *E. Coli* assist the formation of calcium carbonate inside the mortar micro-pores leading to enhancement of the compressive strength and hardness of the mortar specimen. This emphasizes on the possibility of activating the self-healing characteristic of the cement mortar and its utilization for cracks treatment and repair.

Keywords: Bio-mortar, compressive strength, Pathological Bacteria, Urine

Acceptance Number: 042

Using Novel Controller Based on Current Source Converter (CSC) For Transient Stability Evaluation

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Abstract. Electronics forces working to address the problems of electric power, one of the things of importance in the current era represents. some of these problems in the electrical system disturbances, harmonics current and voltages inflation and contraction voltage. To achieve transient stability and control the generation or absorption of a good amount of power, the devices should be used which improves temporary system stability. Therefore, we will use current source converter (CSC) as a kind of shunt device. The results show that enhanced stability and suppression of unwanted fluctuations in the network were obtained when the system is exposed to disruption. The system was supported by MATLAB software. In this paper, work was done on the 2 areas and 7bus network.

Acceptance Number: 043

Investigation of Optical Properties of Unsaturated Polyester Matrix and its Glass Fiber Composite Under Extreme Temperatures

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Abstract. Glass fiber reinforced polymers are widely used in structural systems as load-bearing elements at both high and low temperatures. This investigation presents the evaluation of glass fiber reinforced unsaturated polyester under harsh conditions of changing temperature and moisture content. This study Explore how these parameters affect the optical properties of the polymer matrix and the composite. Using the hand layup method, the polyester resin was modified by E-glass fibers (15 vol. %) to manufacture fiber-reinforced composite. This work includes the preparation of glass-like polyester resin sheets and estimates all light transmittance properties at high and very low temperatures and wet conditions. All-optical properties were retested to evaluate the level of improvement or failure. The results found that when comprising reinforced composite fiber to the unreinforced specimens, the reinforced composite shows an outstanding fair optical property at high temperatures and good performance at low temperatures.

Acceptance Number: 044

Design of Air Cathode Bacterial Fuel Cell for Sustainable Power Production and Azo Congo Red Dye Removal

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Abstract. This work has attempted to elaborate on the importance of bacterial fuel cells (BFCs) to remove azo dyes (Congo red) and electricity generation by depending on using mixed culture, agar salt bridge pipe membrane, and graphite plate electrode. It was noticed the effect of some parameters on biodegradation and energy i.e., agar salt bridge type, molarity concentration of salt, and temperature. Lab-scale air cathode-BFCs were working under the anaerobic condition on batch mode for 20 days, it was obtained high voltage output and removal efficiency at (type salt KCl, 1.5 M, and 30°C) was 1989mv and 95%, respectively, whereas the lowest percentage was at (NaCl .0.5M, and 40°C) and the research show variation in pH and EC for every parameter. Using mixed cultures is preferred for inoculation in BFCs due to cost-effectiveness and practical reasons in treatment. Artificial neural network (ANN) had been applied to predict the voltage generation and removal efficiency from AC-BFCs and comparing it with the experimental working. It is observed that molarity plays a major role in voltage production (100%) followed by temperature 17.6%.

Keywords: AC-BFCs, Azo dye, Decolorization, Voltage.

Acceptance Number: 045

Annealing Time Effect on Intermetallic Compounds of Hot Dip Galvanizing Coating

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Keywords: Galvanization, coating, zinc, steel, annealing

Abstract. The use of zinc coatings deposited onto steel is one of the most important commercial processing techniques employed to protect steel components exposed to severe corrosive environments. Our objective is to improve the coated galvanizing steel used as irrigation tube in the agriculture field. After the best mechanical and chemical preparation, the substrates of this steel were galvanized by immersion in a molten zinc bath heated at 450°C during 15 min. the coated steel substrates underwent an annealing treatment in classical furnace heated at 350 °C for various holding times. This research work is to investigate the time effect of annealing treatment on intermetallic compounds of coatings obtained by hot dip galvanizing steel. For this purpose, several characterization means are used to evaluate the change effected by the annealing time on the phases of galvanizing coating. The kinetic growth of each layer relates the thickness to the annealing time by a simple power law. The treatment of annealing at temperature of 350 °C and holding time of 150 min can changed the structural and mechanical properties of coating phases. The gamma and delta layers presented the hard inner layers became relatively soft phases which would not lead to cracking and detachment of the coating.

Acceptance Number: 046

Manufacturing of Lightweight Aggregates in Iraq Using Selected Local Materials

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Abstract. Lightweight aggregate has been, internationally, in use since the beginning of the last century when volcanic rocks were used in the production of light concrete and light concrete products. In countries without volcanic debris, light expanded clay aggregates, known as LECA, are produced and used as an alternative of lightweight aggregates. In the 1980s, the Iraqi Ministry of Industry made several attempts to produce LECA for the urgent need for this material in many uses. The country still lacks large quantities of this product to support reconstruction and sustainable development. In this paper, the manufacturing of this material was studied, produced, and tested in the University of Anbar's laboratories using local raw materials available in the western desert region of Iraq. Nine samples of clay extracted from several locations, which were selected and found to be the best in containing less harmful magnesium compounds. The results showed that the best-selected clay samples were extracted from Husayniyyah and Amij quarries, producing a total density ranging from 0.778 to 0.823 tons per cubic meter, which is less than the water density and close to the LECA International Standards. The use of sawdust, as an organic additive to create pores, has shown better results than the use of waste oils. The increase in the content of the glass sand in the clay samples increased the density of the aggregates, but at the same time, it helped to increase the hardness of the ceramic veneer in the aggregates resulting in a higher compressive strength of the concrete products.

Keywords: *Iraqi western desert, Lightweight Expanded Clay Aggregates, LECA, Lab Scale Manufacturing.*

Acceptance Number: 047

Synthesis and Characterization of Nano Silica from Iraqi Sand by Chemical Precipitation with Different Acid Types

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Keywords: Nanosilica, Chemical precipitation, silica-sand, acids.

Abstract. The present work is concerned with the preparation of Nano silica from Iraqi sand and studies the influence of different organic and inorganic acids on characteristics using the chemical precipitation method. The materials included silica - sand, sodium hydroxide, sulfuric acid, hydrochloric acid, acetic acid, and distilled water. Three samples of silica nanoparticles were collected and characterized by X-Ray Diffraction (XRD). Structure analysis revealed that all the samples of Nano silica powder had an amorphous structure in nature. They also have a wide peak at 2Θ= (22 - 23º) for each sample. The particle size distribution was measured using an Atomic Force Microscope (AFM), and the results revealed that the best average diameter was 61 nm, with a dimension range of 35-80 nm. While Brunner Emmett Teller (BET) for three samples analysis confirms a high surface area of approximately 560.86 m^2/g. The inclusion of hydrogen-bonded silanol groups (Si–O–H) and siloxane groups (Si–O–Si) in the Fourier Transform Infrared spectra (FTIR) experimental results demonstrated the high purity of silica nanoparticles. Thermogravimetric Analysis (TGA) study findings demonstrated the thermal stability of the Nanosilica by a lower overall weight loss of 11.74%.

Acceptance Number: 048

Study of Chemical Synthesis through Micro-reactor in Terms of Kinetic Analysis & Process Intensification

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Abstract. Now days essential & very significant concept under process technology & chemical engineering has been 'process Intensification' that is being used to deliberately integrate different phenomenon or operations. The chemicals has been utilized under system are assumes such that each molecule is provided with the same processing experience thus yielding increased productivity due to high selectivity. Micro-reactor technology (MRT) has been part regards process intensification for minimizing equipment size, energy reduction & waste production. MRT under association with cavitations opens up a whole range of possibilities. The current investigation also deals with the study of the preparation of per acetic acid (PAA) & Performed acid (PFA). The formation of PAA & PFA was studied in a batch reactor undercurrent of ultrasonic irradiations using Amberlite IR-120H catalyst. Reaction mechanism of synthesis & hydrolysis of both compounds was also studied. The rate of intrinsic reaction constants & equilibrium constant were estimated through validated data.

Keywords: Chemical synthesis, Micro-reactor, Kinetic analysis

Acceptance Number: 049

Biokinetics and Treatability of Dairy Wastewater Using Sequencing Batch Reactor

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Abstract. This study consists of two parts; first part was conducted for the assessment of the treatability of dairy wastewater by using SBR technique. 2nd part was carried out for determining the biokinetic parameters. Whole experiments of 1st part were done using a 12 L reactor. It was divided into two stages; 1st stage investigated the effect of the cycle-time on the treatment efficacy, whereas 2nd stage investigated the effect of changing fill time to the total time of fill plus react time of the selected cycle time which was determined from 1st stage. SBR displayed a good removal of contaminates as well as producing sludge with good settling characteristics. Where the removal efficiency of total COD ranged from 81.1% ~ 89.1% and the removal efficiency of SS ranged from 76.5% ~ 98.4% for the stage one, the values of sludge volume index (SVI) were under 100 mL/g for all tracks of this part. 2nd part aimed to determine the biokinetic parameters of aerobic-suspended solids growth system. This objective was accomplished using a series of four batch reactors which were operated at different mixed-liquor suspended solids. Four biokinetic constants were obtained from this part, where the (Y=0.52 mg(MLVSS) /mg(FCOD)), k_d=0.21 d-1, μ_{max}=1.11 d^{-1} and K_S=893 mg/L.

Keywords: Biokinetic parameters; Dairy wastewater; Sequencing batch reactor; Suspended solids; Total chemical oxygen demand.

Acceptance Number: 050

Risk Assessments of Higher Consumption of Fuel on Environment due to Rapid Escalation of Automobile Numbers in Kurdistan Region - Iraq

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Abstract. There are serious environmental problems due to the higher rate of fuel consumption during the period 2006–2019. The higher escalation of automobile numbers in Iraq generally and the Kurdistan Region (KRI) in specific has led to a rapid increase in air pollution. During the ISIS war, the area faced problems due to the decline in the economic level and the increase in the number of refugees from different war regions in Iraq and even from Syria which led to an increase in the old, environmentally unfriendly vehicles. The number of automobiles has increased by 21 times, therefore the consumed fuel and the released pollutant increased by the same rate. Large traffic data were obtained from the Traffic General Directorate in KRI. Tenths of gasoline and diesel oil samples were laboratory tested for Sulphur content. The practical aspects of the research took nearly two years, as samples of fuel were taken during different seasons and examined in the laboratories of Koya University. These checks were accompanied by a statistical investigation of the daily fuel consumption for each type of vehicle based on the traveled distances. The estimated emissions of harmful gases are concentrated on (CO, CO2, SO2, NOx, and HC) in addition to MP (mass particulates). These data were analyzed and graphically represented in a suitable way. The research aims to determine the risk assessment of the increase of different pollutants on the environment due to transportation during the period from 2006–2019 in KRI.

Acceptance Number: 051

Effect of Adding Nano Starch Biopolymer on some Properties of Silica Fume Concrete

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Keywords: Biopolymer concrete, Biopolymer admixtures, Nano starch, strength, silica fume concrete

Abstract. The article describes a new method to use biopolymers (Nano starch) as an alternative to mineral admixtures in improving concrete properties, producing sustainable concrete, and reducing CO_2 emissions in the atmosphere by partial replacement of cement with silica fume. The impact of nano starch as a biopolymer on certain properties of silica fume concrete In the fresh state (slump and fresh density) and In the hardened state (compressive strength, splitting tensile strength) at 7 and 28 days was researched. It has been added to silica fume concrete in various percentages of (0.5%, 1%, and 1.5%) by the weight of cement. The mix proportions were (1:2.3:2.3) (cement: sand: gravel) respectively, for all blends w/c equal 0.47, and constant percentage of (silica fume of 15%, and superplasticizer of 0.75 percent) by the weight of cement. According to the findings, the optimal starch addition was 0.5%, which resulted in a 34% increase in compressive strength and a 31% and 21% increase in splitting tensile and flexural strength of concrete, respectively. Slump increased by 19%, and fresh density increased by 4% when the starch powder was added at a concentration of 1.5%.

Acceptance Number: 052

Green Method for Removal of Cationic dyes From Aqueous Solution Using Bis [Hg (2-Apt)]-Modified Magnetic Nanoparticles

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Abstract. Bis [Hg (2-Apt)]-Fe3O4 nanoparticles was successfully prepared as adsorption by Fe_3O_4-loaded with Bis [Hg (2-Apt)], and characterized. The resulting composites were verified by FTIR, FESEM, EDX, XRD, TEM and H-NMR. Batch adsorption experiments were present to evaluate adsorption kinetic, isotherm, Gibbs free energy, and reusability. Pseudo-second-order model was best described by adsorption kinetic, whereas adsorption equilibrium data were superior description by Langmuir model and the negative value of ΔG show a spontaneous process in natural. In addition the factor effects of key adsorption like pH value, initial dye concentration, contact time, adsorbent dose and Temperature were studied in details. The adsorption equilibrium reached within 70min and 120 min with removal percent 100% and 97.55% of BG and MB for 20 ppm at natural adsorbent pH 5 at wide range of Temperature (5-45C^{o}). The recycling study established that the adsorption ability of new adsorbent to each dyes maintained well after six consecutive cycles. Eventually, the new modified Fe3O4 nanoparticles can be utilized as green and high efficiency adsorbent for removal MB and BG molecules from aqueous solution. Rapid and great reusability results in better efficiency.

Keywords: nanocomposites; bis-(2-amino phenyl thio) mercury; cationic dye; adsorption; isotherm; kinetics.

Acceptance Number: 053

Synthesis and Description of New Biosorbent from Shrimp Shell to Take Off Chromium Ion from Solution

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Abstract: A new chitosan –Benzaldehyde Schiff base adsorbent was prepared from extracted chitosan take away exoskeletons of crustaceans shrimp shells to be high ability for remove Cr(III) from aqueous solution. The resulting composites were verified by FTIR, FESEM, EDX, XRD, TEM and H-NMR. A batch adsorption experiment was used to conduct kinetic, isotherm, Gibbs free energy, selectivity, and reusability evaluation. Applying adsorption kinetic model, the pseudo 2nd order model was best characterized, using adsorption equilibrium data, the Langmuir model provided a superior description. and the negative value of ΔG show a spontaneous process in natural. In addition the factor effects of key adsorption like pH value, initial chromium ion concentration, contact time, adsorbent dose and Temperature were studied in detail. The adsorption equilibrium was reached within 30min with removal percent 100% of Cr(III) for 50 ppm at natural adsorbent pH at wide range of Temperature(5-45C^{o}).the selectivity coefficient for Cr(III) interference ions are larger than one. The recycling research showed that imine retained its adsorption capacity for Cr(III) ions after five consecutive cycles.. Finally, A recently modified chitosan is a very effective and efficient adsorbent for the removal of Cr(III) ions from solution, with rapid reaction time and reusability.

Keywords: Extracted chitosan, Schiff base, removal of Cr (III), isotherm sorption, uptake kinetics, desorption & reuse.

Acceptance Number: 054

Experimental investigation of the thermal performance of scrap tire rubber-concrete blocks

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Keywords: concrete blocks, rubber crumb, thermal insulation, thermal conductivity, construction materials.

Abstract. In this paper, the thermal behavior of concrete blocks with different rubber ratios was examined experimentally. The rubber of 0%, 5%, 10%, 15%, and 20% used instead of fine aggregate in a concrete block raw materials. The size of the rubber granules used in this study is between 0-1 mm. The concrete approved mixing ratios are 1:2:1. The indoor solar simulator with 700 w/m^2 light intensity was applied on the external surface of each block and thermocouples were used to measure the temperature on the external and internal surfaces. The other block surfaces are insulated. The results indicated that the use of rubber aggregate with the concrete block reduced the inner surface temperature by increasing the thermal resistance of the heat flux. For 20% rubber added, produce 8.5% low-weighted construction materials and with high thermal resistance that works to save energy consumed in the building sector.

Acceptance Number: 055

Novel Development and Analysis of Multiplex Microsatellite Markers Sets in Pomegranate.

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Abstract. In one reaction, multiplexing includes simultaneous amplification of many loci and subsequent analysis of various molecular markers in a single gel lane. This work emphasizes on the use of multiplex-PCR (Simple Sequence Repetition) SSR, and how it may both be extremely informative and easy utilizing polyacrylamide. We also address the importance of this method to the multiplex ratio of SSR markers and show that it is also efficient to provide optimal findings, as an economic procedure for the germplasm assessment and evolutionary research. Different conditions and methods of multiplex PCR is recommended to develop multiple SSR marker sets in pomegranate (*Punica granatum* L.), as a result 10 multiplex sets were developed based on 15 SSR markers selected from the previously studied sequences. The method was tested by using five populations from local pomegranate landraces. The optimization of the primer concentration was 0.1, 0.3, and 0.4 µM, in the meantime the PCR program conditions also optimized regarding annealing and extension temperature as well as the number of cycles, the technical aspects of the application and a description of the allelic constitution at various loci of all genotypes analyzed were described. Population genetic results achieved from these samples showed moderate genetic variation. For the investigation of genetic diversity in grenade collections consisting of a large number of accessions, the optimization techniques in this work might be relevant. In addition, the technique may be transferred to comparable analyzes by any plant species.

Key words: SSR markers, multiplex PCR, pomegranate.

Acceptance Number: 056

Three Different Spectrophotometric Methods for Simultaneous Determination of Liothyronine and Thyroxine in Human Serum Samples

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Abstract. Three simple and accurate spectrophotometric techniques for simultaneous quantification were investigated in this work of liothyronine (T3) and thyroxine (T4) in human serum samples. For fourth derivative spectrophotometry, the original method used the zero-crossing technique measurement. The second technique was based on the second derivative of ratio spectra. The third technique, on the other hand, was based on mean centring of ratio spectra. The procedure lack of any previous separation steps. The calibration graph of fourth derivative is linear in the concentration range 1.0 –17.0 µg ml^{-1} and 1-18.0 µg ml^{-1} , ratio derivative spectrophotometric technique linear from 2.0 –17.0 µg ml^{-1} and 2-18.0 µg ml^{-1} and for mean centring of ratio spectra 3.0 -17.0 µg ml^{-1} and 3.0 – 18.0 µg ml^{-1} for liothyronine (T3) and thyroxine (T4) respectively. The recoveries range from 94.90 – 103.12 % for liothyronine and 95.20 – 102.77 % for T4 thyroxine with relative standard deviation less than 4.90% and 3.75% in all in stance for liothyronine and thyroxine respectively. Using one-way ANOVA, the outputs of the proposed ways were compared, and the result showed no significant differences between ratio spectra and zero-crossing mean centering methods.The proposed techniques are successfully applied for simultaneous quantification of liothyronine and thyroxine in human serum samples.

Keywords: Liothyronine (T3), Thyroxine (T4) ,Derivative spectrophotometry, Derivative ratio ,Mean centering

Acceptance Number: 057

The Use of Rehabilitative Exercises in the Treatment of Torn Shoulder Joint Muscle Injuries In Adults of Age for the Category of Men From 40-50 Years

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ABSTRACT. The use of rehabilitative exercises in the treatment of torn shoulder joint muscle injuries in adults of age for the category of men from 40-50 years

The introduction and the importance of the research lie about the rehabilitative and therapeutic exercises, which are considered one of the natural and basic means from a therapeutic point of view for the patient. And represented in the injuries that the elderly are exposed to as a result of advancing age and weak bones that affect the strength of the daily loads of the old person, as the researcher touched on the research problem, where the research problem lies in the lack of exercises on the subject of injury, as well as the presence of means and devices for athletes and the lack of attention to people with Non-athletes for the injured in general and those with a rupture of the shoulder joint for the elderly, for the category of men in particular, as well as the spread of pharmacological treatment without scientific bases and not consulting a specialist doctor. The researcher used the experimental method for its suitability to the nature of the research problem and its objectives, and the research vocabulary was applied to the research sample, which numbered (8) men for ages 40 to 50 years. Therapeutic treatment In the rehabilitation of shoulder joint injury in the elderly for the category of men. Among the most important recommendations reached by the researcher in the use of these rehabilitation exercises in the treatment of shoulder joint injuries, as well as in enhancing the experience of using the method of rehabilitation exercises among therapists in rehabilitation centers within a contract and referring to the development courses that help in the accurate and optimal selection in rehabilitation programs and benefit from them In a way that serves the patient, and the extent of its reflection on his performance in carrying out his daily work while avoiding injury.

Keywords: Shoulder Joint, rehabilitative, therapeutic, tendons , ligament and injury.

Acceptance Number: 058

New 4,4'-methylenedianiline monobactame compounds: synthesis, antioxidant and antimicrobial activities evaluation.

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Abstract. Reactive oxygen species (ROS) in the form of free radicals (superoxide, singlet oxygen, hydroxyl radical) and neutral molecules (hydrogen peroxide) play an significant role in the development of many serious diseases. If they produced in high level they can produce damage to lipids, proteins, and DNA. Antioxidants are defined as scaffolds that suspend, prevent or eliminate oxidative damage to target vital molecules when introduced in low concentrations. Infectious diseases are among the chief causes of death worldwide, and antimicrobial resistance has been regularly reported globally .These complications necessitate the emerge of a new antioxidant and antimicrobial agents that are effective, safe, and selective. This study examines the antioxidant and the antimicrobial activity for new synthesized compounds with two monobactame moiety derived from 4,4'-methylenedianiline. The chemical structures for the new synthesized compounds were distinguished the physical and spectral data. The antioxidant activity of these compounds was evaluated by testing their free radical scavenging activity of DPPH (1,1-diphenyl-2-picryl-hydrazyl) and H_2O_2, also the antimicrobial activity of the synthesized compounds was evaluated via measuring the inhibition zones in the disk diffusion method. The tested synthesized compounds show varied antioxidant and antimicrobial activities. The hydroxyl and the amide moiety in any organic compound could possess potent antioxidant activities. The aliphatic and aromatic chlorine atoms possess potent antibacterial activities, and these activities increases as the number of the chlorine substitutions increased too. The ether group in any organic compound could represent a potent antifungal activity.

Keywords: Antioxidants, antimicrobial, monobactame, 4,4'-methylenedianiline, DPPH, amide.

Acceptance Number: 059

Effect of Aging on Corrosion Behavior of Martensite Phase in Cu-Al-Ni Shape Memory Alloy

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Key words: Cu-Al-Ni shape memory alloy; Martensite phase; Corrosion behavior, Aging remediation

Abstract. Due to the promising mechanical and corrosion properties of Cu-based shape memory alloys (SMAs), their applications have become essential in many applications. In the present study, the effects of aging on the microstructure, structural properties, phase components, transformation characteristics, shape memory effect, and corrosion behavior of the Cu-13Al-4Ni (wt. %) SMA has been investigated by means of SEM, EDS, XRD measurements and the potentiostatic tests. Polarisation tests, and Open circuit potential measurements have been utilized to evaluate the impact of heat remediation on the corrosion characteristics of Cu-13Al-4Ni (wt. %) shape memory alloy in 3.5 percent NaCl solutions. All prepared specimens were investigated in their as-sintered condition and following a thermal remediation processing that included annealing at 900 ℃ for 60 min associated with water quenching, and 200 ℃ for 30 hrs. and rapid cooling in iced water. The enhancement in polarisation resistance and reduction in corrosion rate of heat-treated CuAlNi alloy further suggests that heat remediation has a positive effect on CuAlNi alloy corrosion resistance.

Acceptance Number: 060

Resilient modulus and permanent deformation responses of tire rubber-cement stabilize soft clay

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Keywords: Resilient modulus, Permanent deformation, Clay, Tire rubber, Cement

Abstract. This study investigates the effect of cement and tire rubber on the dynamic behavior of clay (bentonite) by performing a series of repeated loading triaxial tests. The effect of cement in two percentages (1, and 2% by dry weight) on reinforced clay with different tire rubber (5, 10, and 15% by dry weight) was examined. Based on the results of the compaction test, the addition of rubber and cement reduced the optimum moisture content and the maximum dry density of pure clay. The analysis of the repeated loading triaxial tests results showed that increasing rubber content from 5% to 10% reduced the permanent deformation values of the clay/rubber/cement mixtures with the same cement proportion, while the samples containing 15% rubber content demonstrated the highest rate of permanent deformation. With some exemptions, the clay/rubber/cement mixtures containing 2% cement illustrated less deformation than the mixtures of 1% cement. The resilient modulus results revealed that the combination of cement and rubber is ineffective in improving the resilient modulus of clay samples.

Acceptance Number: 062

Prediction of strength and A/C ratio of concrete based to workability by using the UPV method

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Abstract. The aim of this study was to find relationships and equations that could estimate concrete compressive strength and A/C content based on ultrasonic pulse velocity (UPV) and design parameters of concrete mix using locally available materials in Nineveh. In this research, two groups of concrete mixes with different workability were prepared. The selected slump of group1 mixes is (10-30mm) and for group2 mixes is (60-180mm). Each group containing five mixes ranges from 15-55 MPa with different A/C ratios for each mix. For each mix, six of 150mm side length cubes were prepared for test age at 7and 28 days. At age of 28days the UPV direct method, test and compressive strength test have been used. The results showed that the concrete mixes in group1 with low workability showed higher UPV than those mixes in group2 with higher workability in the same level of strength. Linear regression equations were obtained between crushing compressive strength and A/C ratio against UPV.

Acceptance Number: 063

Improvement of Design Synthetic Nano-Catalysts for Performance Enhancement of Oxidative Desulfurization Using Batch Reactor

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Abstract. The performance of the batch oxidative desulfurization (ODS) process for the removal of dibenzothiophen (DBT) chemical from fuel (light gas oil) is being investigated using newly developed nano-supports (nano-catalyst). Mercury oxide (HgO) nanoparticles based on tin oxide (SnO), barium peroxide (BaO_2), and arsenic trioxide (As_2O_3) nanoparticles were used to make the nano-catalysts, which have outstanding catalytic properties. Several reaction temperatures (65-85) ºC, concentrations of oxidant (hydrogen peroxide (H_2O_2)) from (2-6) ml, and agitation speeds (450-850) rpm were used at a constant reaction time (30 min) and various catalysts to acquire a better knowledge of the process. With a reaction temperature of 75 ºC, a volume of oxidant of 6 ml, and an agitation speed of 850 rpm, greater than 83.06 percent of the process conversion from DBT was obtained at the catalyst (HgO/SnO). The findings demonstrate that increasing the reaction temperature, H_2O_2 concentration, and agitation speed increases the effectiveness of sulfur compound removal.

Keywords: Mercury oxide (HgO), Nano catalyst, Oxidative desulfurization, Hydrogen peroxide

Acceptance Number: 064

Efficiency of Waste Eggshell as Powder on Some Mortar's Fresh and Hardened Properties

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Abstract. This research checked the efficiency of using eggshells as powder replaced partially the cement in the mortar's matrix. The effect of the waste eggshells has been studied on some fresh and hardened properties of cement mortars. Level of replacement with either eggshell powder or eggshell fine aggregate are; 0%, 2%, 4%, 5.0 %, 7 % 8.0% and 10% (by weight of cement). The results were compared for setting time (initial and final), slump, density, and hardened properties like; dry density, compressive and flexural tensile strength, water absorption, and porosity. Results showed that eggshell powder works like accelerators, and it reduced both initial and final setting time. The difference in the initial setting time is about 9.3 to 37.0% for 0% to 10% of ESP ratio, respectively. The difference in the final setting time is about 3.3% to 25.6% for 0% to 10% of ESP ratio. At an early age, (7 days) ESP led to higher compressive strength than control one. While at a late age (28 and 56 days), the rate of strength is increasing decrease. Flexural strength increased with increasing ESP% up to 4%, then began to decrease for higher content. Also, ESP led to a decrease both of %absorption and %porosity, especially for low content up to 4%. It can be concluded from results that the best percentages of ESP is 4%.

Keywords: Eggshell powder, setting time, compressive strength, porosity, absorption.

Acceptance Number: 065

Identification of Buried Structures Using Numerical and Field 2D Electrical Resistivity Imaging Techniques

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Abstract. Buried structures in engineering construction sites bring significant geotechnical challenges and problems for environmental and geotechnical engineers. Detection of these structures is crucial to characterize the underground condition and to facilitate the engineering works with regard to the suggested system of engineering foundations. In the current work, a synthetic model and field studies using 2D Electrical Resistivity Imaging ERI techniques are adopted to detect the buried pipes in the construction site of University of Diyala, Baqubah city- northeast of Iraq. Wenner, Dipole-Dipole and Wenner-Schlumberger arrays are implemented. The results showed that the electrical arrays used are able to detect the buried pipes. Dipole-Dipole and Wenner- Schlumberger arrays perform better in resolving the geometry and position of the buried structure due to their characteristic features. Interpretation of field 2D sections is confirmed through a synthetic resistivity model simulated the field situation. 3D ERI section produced by combining three parallel 2D sections using Wenner- Schlumberger array revealed shape and position of the hidden pipe more effectively. The results demonstrated that ERI technique can be used as a non invasive and cost effective complementary tool to detect covered structures during the preliminary stages of the geotechnical site investigations.

Keywords: Buried Structures, Numerical, Engineering, Electrical Resistivity Imaging ERI

Acceptance Number: 066

An enhancement concentrate on bulk liquid membrane and its opposition in copper ion expulsion and recovery from wastewater

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Abstract. Bulk Liquid Membrane (BLM) is one of the most simplest kinds of liquid membrane with higher membrane stability but lower solution fluxes. The transportation of Cu(II) ion from an aqueous source containing copper ion metal actions to the receiving aqueous phase is introduced as a kerosene membrane system with tri-butyl-phosphate TBP [$C_{12}H_{27}O_4P$] as carrier. Extension of phases of reception, transport time, rates of agitation and stirring, pH of the source phase, the presence as phase altered of fatty acid in the membrane, the type and concentration of the surfactant and mineral acid in the receiving phase, carrier concentration and the temperature were determined to provide optimum transport conditions. The ion-transportation behavior of Cu(II) was also described by a kinetic model, assuming that it follows the film laws of two consecutive, irreversible processes. The initial concentration of Cu(II) ion from an aqueous source phase into the receiving phase was extracted by the bulk liquid membrane under optimal conditions. Therefore, this paper aims to describe BLM's membrane strength in heavy metal removal and wastewater recovery.

Key word : copper ion, transport through membrane, expulsion, reclamation, resistance of membrane

Acceptance Number: 067

Liquefaction Study for Soils under Earthquakes

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Abstract. In this research, studying the generation pore water pressure in saturated soils as a result of dynamic loading from SPT test for a site investigation in two different sites and two types of soils, especially for the foundation machinery, and studying the possibility of liquefaction as a result of the dynamic loads with different acceleration (0.05, 0.1 and 0.25)g by using computer program LiquifyPro.

The analysis results showed that for cohesionless soil at acceleration 0.05g the factor of safety was less than 1, the settlement less than 9 cm, and the Cyclic Stress Ratio (CSR) about 0.1. At acceleration 0.1g the factor of safety was about 0.4, settlement less than 20 cm, and CSR about 0.25. At acceleration 0.25g the factor of safety was less than 0.2, the settlement was more than 30 cm, and CSR about 0.55. And for cohesive soil at acceleration (0.05 and 0.1)g the factor of safety was more than 2, the CSR about 0.1 and there was no settlement and at acceleration 0.25g the factor of safety was less than 0.8, the settlement less than 6 cm and CSR about 0.35.

Acceptance Number: 068

Study of adsorption for Eosin dye by using barley chaff

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Abstract . In this study remove the eosin dye from aqueous solution by using barley chaff. Spectroscopy using ultraviolet - visible rays was used to select the equilibrium time of adsorption process and found it equal to 120min. the results showed that best weight for adsorption surface is (0.2g). Therefore that study was at range of acidic state (pH = 1-10). Isotherm that used was (Langmuir, Freundlich, Dubinin, Temkin) and found that the best Isotherm was Isotherm Dubinin. Also determine the amount of adsorption at temperature range (20-40) C° where found that amount of adsorption increase directly with temperature. The reaction was endothermic and determines the value of thermodynamics functions and studies the kinetic of adsorption and found that adsorption was pseudo second order.

Keyword: Eosin dye, Barely chaff, Adsorption, activated carbon.

Acceptance Number: 069

A review on the enhancement of asphalt cement using different additives

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Abstract. Asphalt cement, commonly known as asphalt or bituminous, is one of the basic materials used to produce hot mix asphalt (HMA) for road pavements. In the past, asphalt was mixed directly with other materials to produce a conventional HMA without any modification. However, the asphalt binder has failed in many places worldwide due to climate change and various issues such as cracking, bleeding, shoving, etc. Therefore, they modify asphalt cement by using many types of additives to overcome these problems. This work aims to review these studies that have been concerned with improving asphalt cement as a pre-action before mixing it with other materials to make modified hot mix asphalt (HMA) for road pavements. The present paper reviews published studies (1978–2019). It is evident from literature survey studies that modification of asphalt cement gives more efficient, economic, and eco-friendly results.

Keywords: Asphalt Cement; Conventional HMA; Additives; Modification; Modified HMA.

Acceptance Number: 070

Studying the Tensile, Flexural And Impact Properties of Hybrid Nano-composite Reinforced By Luffah Fiber, Used for Prosthetic Socket

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Abstract. The mechanical properties found by studied experimental tests for socket applications composite prosthetic materials by using tensile, Impact and flexural tests. By collected (6) layers from perlon fibers (P) and (4) layers of luffah fibers (LU) and fabricated using vacuum molding technique. This work using acrylic resin (PMMA) as a polymer with three types of natural reinforcement (0.3 nanoparticles Walnut shells Nano-powder (WSP), (0.9%) Hemp Fibers (HF), and (luffah fibers) instead of the traditional fibers to get the improvement the mechanical properties of the prosthetic limb, extend its lifespan, and lower the cost to the patient. The results demonstrate that the materials exhibit a significant enhancement in properties including (tensile strength, elasticity modulus, and flexural) for hybrid Nanocomposite materials [(PMMA+(0.3%)WSP)+(0.9%)HF)] when adding (2(2 P +1 LU +1P +1 LU)) (that equal to (60 MPa, 3.6 GPa, and 130 MPa) respectively, and the highest value of (impact strength and flexural toughness) were (19 KJ/m² and 10.7 MPa√m) respectively, for [(PMMA: 0.3% WSP):0.9%HF] reinforcement with (3P+4Lu+3P) layers.

Acceptance Number: 071

Desalination Of Groundwater For Several Districts In Baghdad-Iraq Using Reverse Osmosis Membrane

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Abstract. This paper has been achieved to desalinate the brackish groundwater for several districts located in Baghdad the capital of Iraq which are Amiriya, Shurta 5 ,and New Baghdad by using reverse osmosis (RO) Unit. ULP 1812- 50 RO type has been used for desalination in this paper. The system has accomplished the percentage of water recovery that ranged between (18.18 - 33.33)% and the percentage of salt rejection that ranged between (97.07 - 99.29)%. As well as the high efficiencies of removal for the physio-chemical parameters of the raw groundwater which are Electrical conductivity, EC (95-99)%, Turbidity(100)%, Total Hardness (100)%, Ca (95-100)%, Mg (84-93)%, Cl (70-96)%, SO_4 (85-100)% and NO_3 (73-93)%. These results have showed us that the RO technique is suitable to produce freshwater from brackish water.

[Key Words: Desalination, Groundwater, Baghdad, Reverse Osmosis].

Acceptance Number: 072

Numerical Investigation of Fatigue Crack in Asphalt Concrete Pavements Using Cohesive Zone Model

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Abstract. One of the major and important distresses that functionally affect the performance of the flexible pavements which occurs in most of Iraqi roads is the fatigue crack. This paper presents the investigation of fracture behavior that happen in asphalt concrete pavements by the cohesive zone model (CZM). Finite element method is applied the CZM in ABAQUS 6.14 software that made simulation for a laboratory beam test data. Some result of the experimental program were used for developing an FE model of fatigue test by employing the finite element techniques for modeling an asphalt beam by using three dimensional model by a proper material characterizations. The inhomogeneity in the materials of asphalt could lead to the variation between examinations the simulation. Then the model used for investigating crack propagation in the flexural fatigue test and predicting simulations for experimental results. It was concluded that coupled model XFEM-CZM successfully simulated the flexural fatigue test process and propagation of the crack. This model was effective in predicting the 25 mm notch in depth of the testing for a specific limit. Analysis of Crack propagation shows that beam failure mechanism is principally to the tensile stress.

Acceptance Number: 073

Study the Effect of Welding Parameters on the angular deformation Induced by three Arc Welding process

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3.

Abstract. The quality of a joint can be measured in terms of but weld, mechanical qualities, and distortion. In general, all welding procedures are utilized to provide welded joint parameters that have superior mechanical qualities and little deformation. Nowadays, the Taguchi approach by the Design of Experiment (DoE) is commonly employed to build a mathematical link between the variables. In these three processes, three input parameters (voltage, current, and travel speed) were utilized for welding a low carbon steel (ASTM A283 Grade C with 8 mm thickness). Three levels (-1, 1, +1) for each input welding parameter and for each welding process were used. In order to determine the welding input parameters that lead to effect in the application industry, the welding process input parameters and the output variable of the angular deformation were compared for each welding used are shield metal arc welding ,submerged arc welding and gas tungsten arc welding. The welding speed greatly decreased the angular deformation induced after conducting the three types of welding processes, whereas the arc voltage has an adverse influence.

Keywords: Taguchi, ANOVA, S/N, SMAW, SAW, GTAW.

Acceptance Number: 074

Experimental and CFD study of micro heat sinks: different shapes and arrangements

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Abstract. Heat dissipation from electronic devices is a crucial demand to keep their rated performance. Finned heat sinks are one of the efficient routes to dissipate the generated heat. This paper studies the performance of forced convective heat transfer from different shapes and arrangements of micro heat sinks. Ten designs of the micro heat sinks, included novel designs of micro fins, have been experimentally and numerically investigated in a rectangular air flow channel with Reynolds number ranging from 2000 to 11000. Laser etching technique has had been used in manufacturing the micro heat sinks while the CFD analysis have been conducted finite element method implemented in COMSOL Multiphysics. Results show that the proposed designs can significantly improve the fluid dynamic through the micro heat sink surface and thus the heat transfer performance. The enhancement in thermal transmittance because fluid-wall interaction has been proven to be effective in many designs in this study without relying on the contribution of the increase in the surface area. Therefore, this study provides significant rules to the design of micro-structured heat sinks for enhancing the heat transfer performance.

Keywords: Micro-heat sink; Forced convective heat transfer; Direct metal laser melting; CFD; Infrared thermography.

Acceptance Number: 075

The Hydroxychloroquine drug reduction the cytokines storm and cortisol levels in mice

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Abstract. Since HCQ has anti-inflammatory, immunosuppressive, and antiviral effects; it has been proposed as an effective treatment for Covid-19. So this research aimed to demonstrate the effect of HCQ treatment on concentrations of plasma TNF-α and IL-6 in mice and its relationship with corticocorticoids level. In this research, 30 adult male Balb/C mice were used. The mice aged 2-3months were divided into 3groups. Tow groups were treated with HCQ; one with highe-dosage which is 8.1mg/kg body-weight, twice for 10days; and other with low-dosage which 6.4mg/kg body-weight, twice on one day and once on other 4days. The last group was left without treatment to be serve as a control group. At different points time, the mice were sacrificed by cervical distraction. A blood sample is taken from the eye and the serum is separated to determine cortisol level by cobas e411 analyzers. Brain, spleen, and kidney were taken and homogenized. Eliquit and serum were be used to determine TNF-α and IL-6 level by sandwich ELISA using murine IL-6 and TNF-α kits (Melsin/China). The results showed a significantly lower cortisol, IL-6, and TNF-α levels in serum and tissues of both treated groups compared to control. The reduction of cytokines are believed to inhibit the HPA axis resulting in decrease glucocorticoids level which could be good prove of the interplay between immune and endocrine systems. So it is very important to check cortisol level during HCQ treatment and it is preferred to use a combined treatment between HCQ and glucocorticoid.

Keywords: Hydroxychloroquine, IL-6, TNF-α, Cortisol.

Acceptance Number: 076

Effect of Puberty and Gender on Metabolic Hormones Level and Lipid Profile in Patients with Growth Hormone Deficiency

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Abstract. The current study aims to evaluate the effect of puberty and gender on metabolic hormones level and lipid profile in a sample with growth hormone deficiency (GHD). Seventy-five Iraqi patients with GHD (45 boys and 30 girls) within the age range (3-15) years were involved in this study. The study was achieved in the National Diabetic Center for Treatment and Research /Al-Mustansiriya University in a period of October, 2018 to April, 2019.

Blood samples were obtained from the patients to determine the level of basal GH before stimulation with clonidine, GH_2 and GH_3 after 1 h. and 1.30 h. stimulation with clonidine, respectively; insulin-like growth factor-1 (IGF-1); level of metabolic hormones [thyroid hormones: triiodothyronine (T3), tetraiodothyronine (thyroxin) (T4), thyroid stimulating hormone (TSH), and cortisol]; and lipid profile [cholesterol, triglycerides (TGs), high density lipoprotein (HDL), low density lipoprotein (LDL) and very low density lipoprotein (VLDL)].

Effects of the puberty on the studied parameters revealed that the levels of GH_2, IGF-1, TGs and VLDL were significantly ($P<0.05$) higher in the pubertal group than the pre-pubertal group, while levels of T3 and T4 were significantly ($P<0.01$) lower in the pubertal group compared to the per-pubertal group. Non-significant ($P>0.05$) differences were found in level of other parameters (GH, GH_3, TSH, cortisol, cholesterol, HDL and LDL) between the two groups. Effect of gender on the studied parameters showed non-significant ($P>0.05$) differences between boys and girls.

It can be concluded from this study that puberty effects on some parameters such as GH2, IGF-1, T3, T4, TGs and VLDL in patients with GHD; while gender shows no significant effect on the all studied parameters.

Key wards: Growth hormone deficiency, metabolic hormones, puberty, gender.

Acceptance Number: 077

Liquid-Liquid Extraction of Cadmium Ions Using New Macrocyclic Compound

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Abstract: The article describes the synthesis and characterization of a novel macrobicyclic ligand. Liquid-liquid extraction Studies were conducted to assess the extraction performance of the new macrobicyclic ligand towards cadmium ion. According to the toxicity and commercial significance of the heavy metals lead to the suggested study. The results of the experimental studies to determine the best extraction conditions demonstrates pH=9 in the presence of 8ppm of Cd^{2+} in 10mL with shaking time equal to 30min at 25° C using a concentration of reagent 0.05% and chloroform as an organic solvent. This article studies. the influence of various parameters on the extraction percentage like; effect of pH, shaking time, type of solvent, temperature, the effect of concentration of metal ion and reagent, ionic strength. IR and HNMR have been for the characterization of the new macrocyclic compound. Thermodynamic parameters have been calculated based on the experimental results at different temperatures with ΔH 39.91 kJ /mol, ΔS (0.155KJ/mol.K), and ΔG (-6.28 KJ/mol), which, indicates that the reaction is endothermic, randomness and spontaneous. This process has been used for extracting cadmium ions using an atomic absorption spectrometer (AAS).

Keywords: Solvent extraction, Cadmium ion, Synthetic sample, Macrocyclic compound.

Acceptance Number: 078

Numerical Study on the Behaviour of Underground Railway Subjected to a Truck Explosion by Using ALE Approach

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Abstract. Underground subways have widely used in several countries as a principal solution to treat transportation problems. Nowadays, terrorist activities become the main threat to the safety of these structures particularly vehicle explosions. The current study aims to estimate the blast-resistant of subway lining under a surface explosion of a truck that carried 4,536 kg TNT charge weight by utilizing actual dynamic properties of concrete determined by using the Split Hopkinson Pressure Bar impact test (SHPB). The damage assessment proved that the tunnel roof centre is the most critical part and showed a high damage level at a burial depth of 4 m, whereas it was safe at burial depths of 6 and 8 m. The mechanism of shock waves appeared the important role of burial depth to reduce the velocity and reflected the pressure of tunnel roof centre and increase the tunnel resistance against blast loads.

Acceptance Number: 079

Influence of Post Annealing on CBD Deposited ZnS Thin Films

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Abstract. Zinc sulfide (ZnS) nanostructure thin films was deposited on bare soda-lime glass substrates utilizing the technique of chemical bath deposition (CBD) at 65±2˚C then annealed at various temperatures in the air. The effect of post-annealing on growth, structure, morphology and optical properties was investigated by using X-ray diffraction, Field Emission Scanning Electron Microscope (FESEM), and UV-Visible spectrophotometer respectively. XRD analyses confirm the wurtzite hexagonal structure of the ZnS films. Raising the annealing temperature results in a clear change in the morphology of the prepared ZnS thin films. The flower-Like structure for the as-deposited thin film at 65˚C changed to the sheet-like structure at 200˚C then to a cluster and compact aggregation of particles at 400˚C. The transmission of the films reduced from 43% to about only 10% in the range of 300-1200 nm when the annealing temperature increased. Accordingly, the energy bandgap (Eg) reduced from 3.96eV to 3.68eV for the as-deposited and annealed films at 400oC respectively. Controlling the quality of the prepared ZnS thin films will have a wide potential optoelectronic application.

KEYWORDS: ZnS, Annealing, nanostructure thin films, CBD, energy gap.

Acceptance Number: 080

Synthesis, Structural and Optical Properties of CdO Nanocrystalline Prepared by Sol–Gel Method

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Keywords: CdO, Thin Film, powder, Sol-gel method, annealing, structural and Optical properties.

Abstract. CdO Thin Film and powder nanoparticles have been produced using the sol-gel method. The X-ray diffraction technique is used to evaluate structural properties of powder CdO at different annealing temperatures 623, 673, 723 $[K]$. It indicates that CdO nanoparticles in nature have a polycrystalline cubic structure. The size of the crystallite (D) is in the middle of the range 23.14-46.65 $[nm]$. As the annealing temperature increases, the crystallite size increases. Also, dislocation density (δ), strain (ε), and texture coefficient $TC(h\ k\ l)$ were calculated. The energy band-gap and refractive index were estimated. Band gap energy decreases with increasing annealing temperature and refractive index increases with increasing annealing temperature.

Acceptance Number: 081

Fire Simulation of RC Slab Inclusion with Nano-silica and High Volume Fly Ash

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Abstract. This paper presents the thermal behavior simulation of high-strength high-volume fly ash nano-silica (HSHVFANS) reinforced concrete (RC) slab exposed to various fire curves using finite element (FE). The experiment includes a medium-scale furnace test (ISO 834 fire curve load, 120 min) of the HSHVFANS RC slab. Results show locations and depths of concrete spalling and temperature distribution at depths 30, 60, 90, and 200 mm. As limited numbers of thermocouples are utilized, and at that point, it may or may not spall, the temperature distributions at locations of spalling are simulated. For spalling of 5 mm (NS), the simulation curve maintains within the experimental results, but at a maximum of 23 mm (MS), the temperature rises significantly. The behavior of HSHVFANS RC slab exposed to HC, RABT-ZTV, and RWS fire curves is predicted using this model. The simulated temperature of reinforcement remains below critical (300 °C) for all fire curves loads except for RWS. For ISO 834, the fire-resistant periods of HSHVFANS RC by NS and MS models are 120 and 72 minutes respectively. For the HC and RWS, they are 120 and 46 to 55 minutes. The fire-resistant period of the HSHVFANS RC slab is significantly affected at maximum spalling depth.

Acceptance Number: 082

Effect of Support System Type on Boundary Displacement of Tunnel in Soft Soil

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Abstract. For many years, the rockbolt and shotcrete lining have been an integral part of the supporting structure system to reducing tunnel boundary displacement. Theirs various characteristics, such as length, diameter, distribution technique for rockbolt and the thickness of the shotcrete lining are critical in describing their role in this field. A parametric study conducted by a numerical finite element technique called Plaxis 2D, to investigated the effects of different bolt and lining parameters on the maximum boundary displacement of tunnel in soft soil type. Bolt's parameters were available in five sizes 16, 22, 25, 28, and 32 mm and selected four lengths 3, 4, 5, 6 m. The lining changeable parameter was only its thickness by taking four different thicknesses of 30, 35, 40, and 50 cm. It was noticed that sidewall displacement is greater than the crown displacement. The maximum displacement in the sidewall was about 166 cm when no bolt was used and its reduced by 31% when using a 3 m bolt with a diameter of 32 mm. Bolt diameter performs better at longer lengths, while the boundary displacement at 3 m bolt length is often smaller than other lengths. The performance of the lining was much better than bolt effect. It's reduced the displacement at sidewall (for lining of 50 cm thickness) from 165.6 cm to only 5 cm which is mean 97% reduction and also shows a 98.4% reduction for crown displacement.

Keywords: Tunnel; Support system; Rockbolt; Shotcrete lining

Acceptance Number: 083

An Analytical Study on the Effect of Curing Temperatures and Additives on the Mechanical Properties of Ultra High-Performance Fiber Reinforced Concrete (UHPFRC)

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Abstract. Ultra-High-Performance Fiber Reinforced Concrete (UHPFRC) is a cement-based composite with exceptional mechanical and durability properties. This analytical study examines the impact of the mix design proportions, the curing temperatures, and the curing ages on the mechanical properties of the composite. In this study, more than 100 previously conducted studies on the development of the mechanical properties of UHPFRC were analyzed. Regression analyses from the collected data were carried out to develop various equations for predicting different mechanical properties of the composite from its mix compositions, curing conditions, and ages. The mechanical properties of the composite was found to be highly dependent on the curing temperature at its early ages and its compositions at later ages. The findings of this study demonstrates that UHPFRC is an exceptionally suitable material for structures subjected to aggressive environments and it is a good choice for cast-in-situ applications.

KEYWORDS: UHPFRC; CURING TEMPERATURE; AGE; ADDITIVES; MECHANICAL PROPERTIES

Acceptance Number: 084

Influence of Welding Parameters on Optimization of the Tensile Strength and Peak Temperature in AISA 1020 Alloy Joints Welded by SAW

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Abstract. Submerged Arc Welding (SAW) is a safe and efficient process for joining thick plates AISI 1020. A high-quality weld joint is a critical objective in a series of optimization studies. The current study focuses on maximizing the ultimate tensile strength and minimizing the peak temperature using Taguchi, Genetic Algorithm (GA), and Simulated Annealing (SA) algorithms. The input parameters in the three techniques were voltage (V), welding speed (S), and wire feed rate (F). At a 95% confidence level, the regression models were combined using the ANOVA to predict tensile strength and peak temperature. The maximum ultimate tensile strength was 599MPa achieved at a welding speed of 30 mm/s, an arc voltage of 30 V, and a wire feed rate of 120 mm/s, while the minimal peak temperature was 417C under the same conditions. With the increase of the welding parameters (welding speed, arc voltage, and feed rate), the ultimate tensile strength was increased. Furthermore, the average hardness achieved was 250 at welding metal and 292 at HAZ, while it was 275 at the base metal. The results were supported with an examination of microstructure. In the heat-affected zone (HAZ), the grain was finer while its grain size was larger in specimens with high tensile strength. It was noticed that the HAZ contains pearlite and some colonies of ferrite.

keywords. SAW, tensile strength, peak temperature, optimization, Taguchi, simulated annealing, genetic algorithm.

Acceptance Number: 085

Investigations the structure and corrosion behavior of bioceramic HA/TiO_2 and ZrO_2/TiO_2 coatings on Ti-6Al-7Nb alloy by micro-arc oxidation

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Abstract . The aim of this work improve implant biocompatibility and corrosion resistance by micro-arc oxidation (MAO) process. The most common structural titanium alloy (Ti-6Al-7Nb) was used as the substrate material by applied voltage 300V and 15min . It is shown that a relatively thick and hard TiO_2 coating can be produced by anodic micro-arc oxidation of titanium, and an HA coating and ZrO_2 incorporated on top of the TiO_2 layer can simultaneously be formed using micro-arc oxidation at high values of PH. X-ray diffraction (XRD), scanning electron microscopy (SEM) have been used to investigate the microstructure and morphology of the coatings. The corrosion resistance of the specimens was examined using potentiodynamic tests in a Ringers solution. The results indicate that bioceramic layered HA/TiO_2 and ZrO_2/HA which should show good biochemical stability in the corrosive environment of the human body.

Keywards : *Biocompatibility ; Hydroxyapatite; Micro-arc oxidation; Titanium oxide; Ti-6Al-7Nb .*

Acceptance Number: 086

Finite Element Analysis of Conventional and Composite Materials of Automobile Drive Shaft

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Abstract. Propeller shaft also called drive shaft is one of the foremost imperative components used to transmit power from the engine to the wheels and is usually made of steel. Reducing the weight of the automotive components, including the drive shaft, while preserving their functional characteristics has become an even more urgent task in the automobile industry. Therefore, many efforts have been made by the researchers to minimize the weight of the components. Despite all these endeavors, however, the matter still needs more investigation. The aim of this research is to reduce the weight of a drive shaft using different materials. Six different materials were used including a conventional material (steel) and five different composite materials such as carbon/epoxy, E-glass/epoxy, S-glass epoxy, Kevlar epoxy and thermoplastic polyimide with 30% carbon. A three-dimensional (3D) drive shaft was designed, modeled and simulated using ANSYS software. The results show that the unidirectional carbon/epoxy is the favorable fabric instead of structural steel, and the greatest stress is produced with the same dimensions and configuration load. Moreover, the amount of weight is decreasing compared with structural steel.

Keywords: Carbon/Epoxy, Composite material, Drive shaft, FEM, Weight reduction.

Acceptance Number: 087

Fenton- Advanced Oxidation

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Abstract. In the present study, investigation the performance of the photo Fenton process for treatment of wastewater pollutant with antibiotic tetracycline was conducted. The operational parameters that effluence the procedure (pH value of polluted water (3-10), the concentration of hydrogen peroxide (25-100 ppm), the concentration of ferrous Sulphate (5-20 ppm), the initial concentration of the antibiotic tetracycline (10-50 ppm), irradiation time (30-90 min), and the temperature (25-70 **C°**) on the removal of the tetracycline were studied. Minitab software by response surface method (RSM) Box-Bingham method was used to design the experiments and to discover the optimum conditions for determining a high efficiency of elimination the contaminated from the wastewater pollutant. The results showed that the degradation rate was 91.5% of the tetracycline antibiotic, and Optimum condition of (irradiation Time, pH value, initial Concentration of tetracycline, [H_2O_2], [Fe^{+2}], and the Temperature were (90 min, 3, 15 ppm, 86.3 ppm, 20 ppm, 25C°) respectively. followed by analysis the results by Portable Statgraphics Centurion statistical software.

Keywords: Wastewater treatment, advanced oxidation, Photo-Fenton process, design of experiment, analysis of variance (ANOVA).

Acceptance Number: 088

The Distribution of Soil Mapping Units in Erbil Province at Kurdistan Region, Iraq Using Geo-informatics Technique

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Abstract. Soil reaction in studied pedons was slight to moderately alkaline and non-saline. Pedons have a high organic matter content in surface horizons exception for pedons (3) and (5) that fluctuated between increase and decrease. There is no stable pattern of carbonate distribution in study pedons, therefore in pedons (1, 2, and 5), the distribution path indicated a decrease in carbonate content with depth whilst, in pedons (3, 6, and 7) carbonate distribution fluctuated between increase and decrease, concerning the pedon (4) total carbonate was increased with depth in subsurface horizon. CEC ranged between (18.68- 42.27 Cmolc.kg-1), and there was an increase in CEC values in pedons (1, 2, 3, and 4) in locations that have high rainfall. Clay distribution along soil pedons showed different distribution paths and explained an increase in clay content with depth in pedons (2, 4, and 5) and clay content fluctuation among soil horizons in pedons (3, 6, and 7), whereas in pedon (1) was decreased with depth. Silt fraction has a different distribution pattern with depth and ranged between (190- 444 g.Kg-1). Sand particles increase with depth in pedons as in (1, 2, and 7), and decrease with depth as in pedons (4, and 6) whereas fluctuated with depth in pedons (3, and 5). Soil texture was ranged from clayey to sandy loam that means soil texture in studied pedons has a wide range and different from fine to coarse soil texture. The slopping increased from southwest to northeast direction, and slopping across the study area range from 2% and lower to 35% and reaches 50% in a mountainous area. Determining soil losses based on the pixel-by-pixel technique is not accurate for huge areas with many differences in slope, vegetation cover, and agriculture practice. The soil loss increasing from southwest to north and northeast. The lowest soil loss was found in pedon (7) (17.18 Tons Ha-1 Year-1), whereas the highest soil loss value found in pedon (1) (93.46 Tons Ha-1 Year-1). The generated soil mapping units (SMUs) comprised of seven different SMUs based on studied pedons locations include ChD6, SoC5, CmE5, ShB5, GzA4, KoB4, and MaB3 respectively. The SMUs show variable soil erosion classes range from (3-6). Moreover, slope classes varied from class A (0- 2%) to class E (18- 30%). Generating Fuzzy Logic Overlay map has many options; the best representative map will be produced when using MS Small (Mean = 1, Standard Deviation = 2) for Fuzzy Logic membership type, Fuzzy Gamma (using 0.62) as a Fuzzy Logic Overlay type, and using of Geometrical interval as a map classification type.

Keywords: Mapping units, Clay, Soil erosion, Slope, Organic matter, Total carbonate, Fuzzy Logic Overlay

Acceptance Number: 089

Surface Characteristics of Zircadyne (Zr) alloys after Anodization Process for Biomedical Applications

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Abstract. Due to its excellent characteristics such as biocompatibility, wear behavior, and corrosion resistance, zirconium (Zr) is frequently used in biomedical implants. However, due to their lack of surface characteristics, these implants may have certain negative outcomes. As a result, developing the necessary surface characteristics for Zr implants is critical. (ZrO2), in particular, has shown promise in terms of regulating biological responses to Zr. The anodizing procedure was carried out on the surface of a zirconium 705 substrate in an electrolyte comprising 0.4g NaF in 1ML H3PO4 for 30 minutes at a voltage of (10,20,30)V. The layer was seen by Optical microscope examination and XRD , the zirconia layer after the process appeared clearly at 30V, while the corrosion resistance of Zr samples treated with zirconium oxide was higher than that of the samples before treatment and the highest corrosion resistance at its voltage 30 V.

Keywords: Anodization, biomedical applications, oxidation, surface properties, Zirconium.

Acceptance Number: 090

Correlation between Composition and Magnetic Properties of $SrFe_{12}O_{19}$/Co Nanocomposite Synthesized by the High Energy Ball-Milling Process

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Keywords: Ball-milling, nanocomposites, exchange-spring, morphology, elemental analysis

Abstract. Nanocomposites (NCs) (100-x) $SrFe_{12}O_{19}$/x Co (x = 10, 20, and 30 wt. %) were produced using the high energy ball-milling (HEBM) process. The effects of hard/semi-hard ratio and annealing temperature (800, 900, and 1000 °C) on the exchange-spring in magnetic NCs were discussed. X-ray diffraction examination showed the coexistence of M-type hexaferrite $SrFe_{12}O_{19}$ (SFO) as the hard phase and $CoFe_2O_4$ spinel ferrite (CFO) as the semi-hard phase. Using a scanning electron microscope (SEM), the morphology and elemental analysis of the NCs were analyzed. The magnetic performances were investigated via a vibrating sample magnetometer at room temperature. With increasing the CFO content and annealing temperature, the hysteresis loop became narrower and possessed semi-hard magnetic properties. The 10 wt. % Co NCs annealed at 800 °C had the highest coercivity of H_c = 4.2 kOe. These results are correlated with switching field distribution plots that have indicated the efficient exchange-spring between SFO and CFO phases NCs annealed at 800 °C. The hard/semi-hard SFO/CFO NC materials can be a promising candidate in permanent magnets and magnetic recording media applications.

Acceptance Number: 091

Determination Of KetoprofenIn Tablet Dosage Forms By Derivative IR Spectroscopy

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Abstract. Ketoprofen is a 2-(3-benzolphenyl) propionic acid with anti-inflammatory, analgesic and antipyretic properties. It is used in a wide variety of acute and chronic inflammatory diseases and in the treatment of rheumatoid arthritis, osteoarthritis, ankylosing spondylitis and abdominal cramps associated with menstruation. The study as a simple and rapid method has been described for determination of ketoprofen depending upon normal and first derivative IR Spectroscopy. The aim of this study is to develop a specific, precise and accurate spectroscopic methods that could be applied in quality control for the determination of ketoprofen in pharmaceutical formulations. Ketoprofen has been determined quantitatively in the range of (1000 to 5000)ug/ml depending on the measurement of the peak area against the concentration in the normal spectra and derivative of the peak area/derivative of the wave number against the concentration in the 1st derivative spectra with %E +2.93 and +3.5 and RSD 2.15 % and 4.53 %, respectively. The values of $r^2$of the both methods were 0.995 and0.996, respectively. The methods have been applied for determination of ketoprofen in some pharmaceutical samples with recovery 98.32%.

Acceptance Number: 092

Numerical Simulation of Piano Key Weir Type-B

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Abstract. In this research, five geometric parameters had been tested in order to investigating chief geometric parameters influence the weir of hydraulic efficient and for define their optimum values in numerical way by software program (Flow-3D). The study consists of 16 models which by the program lithographic (Standard Triangle Language (stl)), the geometric shapes are provided, or has been drawing in AutoCAD and exported in the (stl) format. The (stl) file is then right inserted to Flow-3D and every model had been tested by at least 15 rans. All the tests were 400 ran. The geometric parameters are :(Influence of the upstream head above the weir crest, Influence of relative length, Influence of Key width, Influence of Height and Influence of difference height of upstream and downstream). This research is based on theoretical experiments which aim to determine the Piano Key Weir discharge coefficient for different geometrical configurations under free flow conditions for type B. An empirical equation was developed using theoretical data, based on the technique dimensional analysis and the statistical program SPSS. The developed formula finds the discharge coefficient and related with seven parameters; the coefficient of determination is (R^2=0.964). By comparing the developed formula with previous formula on PKW, the results showed a good agreement.

Key words: piano key weir, flow 3D, Discharge coefficient, PKW type B, stl.

Acceptance Number: 093

Quantitative Assay of Hydrazine in Various Water Samples with Visible Spectrophotometry Using Phenathiazine and Bromopyrogalol Red

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Abstract. Hydrazine is one of the important compounds in our daily life because the fields of use of hydrazine in industry are very diverse. It is also used as a fuel for satellite-carrying rockets and the importance of this chemical compound. Two spectroscopic methods have been proposed for the determination of hydrazine. Both methods are based on the principle of oxidation and reduction. Both methods are indirect spectroscopic methods characterized by being Easy, fast, inexpensive and with very good stability, the first method was based on the oxidation reduction reaction using cerium(IV) ions in an acidic medium, then reacting the remaining amount of cerium(IV) ions with bromopyrogalol red reagent to form a red complex measured at 498 nm. This method followed Beer's law in a concentration range of 0.4-36 $\mu g.mL^{-1}$, the molar absorbance was 2.31×10^4 $L.mol^{-1}.cm^{-1}$, and the sensitivity of Sandall's was 0.0056 $\mu g^{-2}.cm^{-1}$. The second method also based on oxidation reduction reaction between hydrazine and chromate ions in acidic medium in the first step, followed by the second step which including the reaction of remaining amount of chromate ions with promethazine to form a reddish-pink complex measured at 515 nm. The second method obeys Beer's law from 0.8-40 $\mu g.mL^{-1}$, with the molar absorptivity equaled to 2.31×10^4 $L.mol^{-1}.\ cm^{-1}$, and Sandall's was 0.0048 $\mu g^{-2}.cm^{-1}$. These methods have been successfully applied for determination of hydrazine in various water samples.

Keywords: Hydrazine, Promethazine, Cerium(IV), Bromopyrogalol Red, Oxidation.

Acceptance Number: 094

Fiber Bragg Grating FBG as Temperature Sensor for the Human Body in Review

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Abstract . in this paper , the update was provided the result for employing the FBG sensor in various application , Below we have picked a current selection of articles in the subject of optical fiber sensor to capture and measure the physiological information about the human body such as temperature and pressure that have previously been published in scholarly publications. As a consequence, we compared their provided results in order to arrive at the best previously reported outcomes in the usage of FBG.

Acceptance Number: 095

Investigating the Effect of Different Type of Bearing Pad on the Behavior of Reinforced Concrete Half-Joint structure under Repeated Loads

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Abstract. Four samples of half joints were tested with four types of pads: elastomeric rubber, steel, polytetrafluoroethylene (PTFE), and steel roller. A device is prepared with a horizontally applied load to make these tests. The repeated load pattern is used to investigate the half joint because this type is an essential factor in affecting the behavior of such elements. The PCI code's equations (5.44) and (5.45) are used to estimate the ultimate load of half joint, which gives 313 kN and 181.4 kN for equations (5.44) and (5.45), respectively. The values obtained by using of equation (5.44) were 313 and showed a good agreement with experimental tests result for pad types under tests which were 303, 326, 328.3, and 306.9. While the equation (5.45) can be considered, underestimate. The results show that stress concentration under both steel plate pads and PTFE pads. Meanwhile, the other types (elastomeric rubber and steel roller pads) failed with lesser stress concentration. The first cracks for steel and PTFE pads are more than the elastomeric pads 40% and 140%, respectively, while the steel pad gives the first crack value the same as an elastomeric pad. The ultimate loads gained from using different types of pads show that the sample with PTFE gives the highest maximum load than the steel pads and the steel roller compared with elastomeric pads. Ultimate loads percentage differences of 7.59%, 8.35%, and 1.29% are obtained for Steel plate, PTFE, and Steel Roller, respectively comparing with elastomeric. The ultimate defection for both Elastomeric and Steel Roller pads is almost the same, in the other hand, the steel pad giving more deflection than elastomeric by about 49%, which is due to the local failure happen in this type of pad. The PTFE pad records a deflection about 20% more than elastomeric. The strain at the top and middle bars are investigated using linear variable differential transformers (LVDT). It is obviously can be shown that the strain at the bottom bar changed from compression to tension in a load value between 270-290 kN, which are approaches ultimate load. It may explain the failure of top reinforcement, giving a high value of strain. The bottom strain for the steel pad shows a maximum in comparison to the other pad types. Again this is due to the local failure. Elastomeric pads record the maximum top strain due to the horizontal forces resulting from shape arcing occur in the pad. The Steel roller pad shows a strange behavior curve for top strain, which decreases at a load value of 170 kN. The uniform distribution of stress at the bearing area can explain the above behavior.

Acceptance Number: 096

Comparison Study between Brick and Ribbed Dome by Using F.E. Analysis

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Abstract. Engineers are particularly interested in brick due to the fact that they contain a maximum amount of space with a minimum amount of surface area, they have shown to be very inexpensive in terms of constructional materials consumption The first braced dome was the ribbed dome. As the name implies, it is made up of a sequence of similar meridional solid girders or trusses, which are linked at the crown by an elastic band or a compression band.
In this paper a comparison between the strains and deformations of a brick dome and that of a ribbed dome. With the help of STAAD Pro V8i, finite element models of these domes were built and analyzed. For the bricks, shell elements were used, while steel sections were used for the ribs and rings. There was a pressure on the entire surface of the dome from the loads. Brick failure criteria were determined by analyzing stresses and deflections of the dome. Various distributions of ribs and rings were tested in order to determine the optimal angle of rib distribution and ring spacing.
The stresses and deformations of a brick dome and a ribbed dome were compared in this paper. STAAD Pro V8i software was used to create and analyze finite element models of these domes. Shell elements were used to simulate bricks, while steel sections were used to simulate ribs and rings. Loads were applied as a pressure on the entire dome's surface. The stresses and deflections of the dome were investigated in order to determine the failure criteria in bricks. In order to identify the optimal angle of the steel rib distribution and the space between rings, ribbed domes with various steel rib and ring distributions were tested.
In order to compare the brick dome with ribbed dome, new analysis of the same dimensions of brick dome were done. Standards steel section was used for ribs and rings, 240 mm thickness of brick fill the area between ribs and rings. The behavior of this dome under the same load was study. The analysis showed, that dome with steel ribs of angle in plan theta (15 degree) was successful to resist the loads and the tensile stresses of brick were less than 0.20 N/mm^2 (maximum tensile strength of used brick), when the angle in plane theta increase to 22.5 and 30 degrees, the hoop tensile stresses in brick exceeds the tensile strength limit. So that the meridional cracks may be appear at the springing zone of dome. While crushing failure did not occur, where the compressive stresses in all models were lower as compared with brick allowable compressive strength (0.80 N/mm^2).

Acceptance Number: 097

Structural Behavior of Short RC Circular Columns Strengthened by External CFRP

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Abstract. This study is to investigate the response of normal strength RC columns confined with carbon fiber reinforced polymers (CFRPs). A total of 12 small-scale circular RC column specimens, with a diameter of 150 mm and total length of 600 mm, were cast in three groups of 4 columns depending on the spacing of lateral ties reinforcement. The spacing used was (90, 125 and 160) mm. CFRP strips and sheets were used for external confinement with different arrangements. In each group, the first column had been left without any external CFRP confinement to be used as control unit. The second, third and fourth columns were wrapped with CFRP to cover 25%, 50% and 100%, respectively, of the total circumferential surface area of each column. Detailed experimental investigation on the confinement effectiveness of both the external CFRP wraps and the internal lateral ties are presented and discussed. The experimental results show that the CFRP has higher effect on the ultimate load-carrying capacity and ductility of the column compared to the effect of reducing the spacing between the lateral ties reinforcement. Also, strengthening the columns with CFRP strips contributed in delaying the appearance of first crack on the unbounded areas of the column surface.

Acceptance Number: 098

The Impact Of Using Stone Column On Soft Soil Creep Behavior

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Abstract. The stone column technique is effective method to increase the strength of soft cohesive soil, which results in a reduction in foundation settlement and an increase in bearing capacity.The topic of restraining creep settlement through the use of stone columns techniques has gained increasing attention and consideration; because stone columns are widely used to treat soft soil deposits, caution should be exercised in estimating creep settlement. Brown clayey soil from a location near Al-Rashid Camp, south of Baghdad was chosen for study.The following laboratory tests physical properties, consolidation test, compaction test, vane shear test, and triaxial test were conducted and use the Plaxis- 3D 2020 software for analysis of finding.We discovered that increasing the L/D of floating stone column had a negligible effect on creep settlement. Increasing the L/D of end bearings does not affect creep settlement, and the creep settlement began at the primary settlement. L/D affected the improvement factor (n) of creep settlement in floating cases, but this effect was not observed in end-bearing stone columns. The standard creep coefficient's n values in floating and end bearing conditions were more significant than the low creep coefficient's n values in forwarded conditions. The stress in the floating stone column was uniformly distributed along its length. In contrast, the stress effect on the end-bearing stone column was limited to the stiffness layer and was unaffected by the column's length. The embankment's maximum horizontal displacement occurred on edge.

Acceptance Number: 0100

Physical and Mechanical Characterization study of Thin Nitriding Layers Produced by Plasma on Low Alloy Steel

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Keywords: Nitriding; steel; nitrogen; layers, plasma nitriding, activation rate

Abstract. The present study has been conducted in order to obtain iron nitrides layer on AISI4140 steel by using plasma nitriding treatment. As one of several parameters of this process, the nitrogen rate ranging from 10 to 70% with a step of 20% was chosen. The structure, the morphology, the thickness and the hardness of iron nitrides layer were investigated. As a result, the improvement of surface hardness of nitrided steel was identified related with the increase of compound layer thickness due to the increase of activation rate. The steel substrate treated at high activation rate presents hardness 3 times higher than that of untreated steel.

Acceptance Number: 0101

Improving Performance of Rigid Pavement Using SBR Polymer

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Abstract. Many attempts have been recently made to improve concrete using a polymer. However, despite the great importance of this subject, minimal studies are available about using polymer in rigid pavement highways. The dosages of a Styrene-Butadiene Rubber (SBR) emulsion are 5,10,15 and 20% by weight of cement. Compressive, splitting tensile, and flexural strengths, and dynamic modulus of elasticity were tested after 7 and 28 days for control and SBR concretes, respectively. Using various concrete mixtures, a total of 30 cubes, 30 cylinders, and 30 prisms were created. Various SBR polymer concrete mixture types were utilized to calculate slab thickness of rigid pavement roads using the AASHTO-1993 technique. The results showed that using 10% SBR produces high-performance concrete, particularly in terms of mechanical and structural characteristics, compared to control concrete.

Keywords: Compressive test, rigid pavement highway, elasticity test, flexural test, splitting tensile test, SBR.

Acceptance Number: 0102

Production of electroplated nano composites Ni-SiC and Co-SiC by PRP and anionic surfactant

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Abstract. Pulse reverse plating technique with an anionic surfactant that have been used recently [1,2,3] was used to produce nickel matrix nanocomposites for the first time. Also, Co-nano SiC with 50 nm mean diameter of SiC was reproduced again in this work using three different cathodic pulse time (tc), to compare them with the Ni matrix nanocomposites. Sulphamate bath suggested for the studying of the microstructural behaviour of the nano composites Ni-SiC. To increase the particle inclusion with well dispersion in the produced Ni-nanoSiC, cathodic time (tc) was selected in accordance to the results of the Co-nanoSiC. Results showed sound coatings with particles inclusion through the Ni matrix, which can be considered promising for the production of the Ni system nanocomposites using this technique.

Acceptance Number: 0103

A Theoretical and Practical Inclusive Study of The Effect of Some Factors on The Ionization Constants of Some Aromatic Imines by Potentiometric Titration

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Abstract. Three aromatic imines derived from ortho-amino and para-amino benzaldehyde with suitable primary amine were synthesized by standard methods. These resulted to the formation of one oxime compound and two Schiff bases which were named Syn-ortho-aminobenzaldoxime, ortho-aminobenzylidinaniline and para-aminobenzylidin-para-chloroaniline respectively. The structures of these imines were certain by physical methods as outlined in another paper under publication. The main aim of project was the determination of ionization constants pKa for acid conjugate bases of imines under stud by potentiometric titration method using 0.1 M HCl as a titrant. These allowed the determination of ionization constant at range of temperatures (288-328) K, Hence the thermodynamic parameters of ionization, processes namely ΔG, ΔH and ΔS were evaluated and discussed. All the experimental results were complemented with theoretical calculations using density functional theory (DFT), various types of descriptors as parameters were based on quantum mechanical handlings. The parameters tested which have the capability to represent the changes observed in the experimental pKa(s) are atomic and structural properties included Molecular properties like energies of HOMO and LUMO, hardness(η), chemical potential(μ), ΔHf, , dipole of molecule(DM), and electrophilicity index(ω). The pKa investigated had a relation with the values of each parameter of the studied compounds. Depending on these relations, three sets of parameters were originated for comparison between the AM1, PM3, and HF6-311G methods. They were derived by employing semi-empirical calculation exemplified with AM1 and the PM3 model, and an Abinitio method expressed by Hartree-Fock (HF) model performed at the 6-311 G(d, p) level of theory..

Acceptance Number: 0104

The experiment and selection 3D printer material for fingers Prosthesis

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Abstract. The 3D printer technology is widely used to build different complex shape models. It becomes popular spatially last ten years. There are many types of 3D printers appears in market like SLA, DLP, FDM and more, the most used one is FDM because it's the cheaper 3D printer in the market. The most model print as a prototype but every day there are new material appear in the market. The research aims are to compare the new generation of PLA call (ST-PLA) with other types of PLA and ABS and compare the same material properties before and after printing to ensure the compatibility for build functional prosthetic finger at home. The test focus on tensile of material, wear test and water effect on the mechanical properties. The results show that the PLA with different generations loss around 20% from its elasticity when immersed in water, but the ABS shows unstable effect by water, and the rate of wear for ST-PLA becomes stable after 50000 cycle and has an adaptable friction coefficient.

Acceptance Number:105

Effect of ZnO, SiO_2 and Al_2O_3 doped on Morphological, Optical, Structural and Mechanical Properties of Polylactic acid

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Key words: Polylactic Acid (PLA), Oxides particles, Crystallinity, Optical Properties and mechanical behavior.

Abstract:

In this study, the influence of incorporation of Al_2O_3, SiO_2, and ZnO particles into PLA-based composites was investigated. There was particular attention on the crystallinity, to improve the crystallinity controls the barrier properties (gas permeability) of polymers and improve mechanical properties such as hardness and young's modulus. All particles were incorporated into PLA via a solvent casting method. Optical microscopy showed the morphology of the composite films produced, the crystallinity of composite films were characterized through (ATR-FTIR) spectroscopy and XRD diffraction. Mechanical tensile tests are used to characterize the mechanical behavior of PLA composite films. The obtained result shows the micrograph of PLA samples with different composition are evenly distributed on the films surfaces. The intensity of the absorption band located at 754 cm^{-1} which correspond to the crystalline phase of PLA is verified by the ATR-FTIR characterization. The XRD diffraction shows that the ceramic particles influence on the peaks intensity of PLA films localized at 19.5 ° C and 22.5 ° C, which indicate an augmentation in the crystallinity of the composite films. Mechanical tests show Tensile strength and Elasticity modulus are improved after the addition of Oxide Particles to Polylactic acid films.

Acceptance Number:107

Evaluation of the Bearing Capacity of Piles Constructed in Thi-Qar, Iraq, Using Direct Methods of SPT

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Abstract. The determination of the bearing capacity of pile value has been of concern to geotechnical engineers. Increasing the geotechnical structures established in Nasiriyah, located in southern Iraq, places great responsibility on geotechnical engineers in assessing the values of the viability of bearing the piles for different projects and proposing the most appropriate methods for this area. In this study, different methods for estimating the value of the bearing capacity from direct Standard Penetration test (SPT): Meyerhof (1976), Aoki Velosso(1975), Bazaraa & Kukur (1986), Shariatmadari(2008), Decourt (1995) for Al-Eskan Interchange in Nasiriyah, southern Iraq. Three criteria were used to rank the best method. The first method was by plotting the predicted value versus measured value and the second method was by estimating the means and standard deviations. The last one was by using the probability distribution method. The results of this study indicated that the predicted value of bearing capacity of pile calculated with Meyerhof's equation is the closest to the measured value from the interpretation of static test load. This conclusion contributes to using the appropriate method for the preliminary pile foundation design for soil in Nasiriyah.

Acceptance Number:108

Formation of Dextrin/PVA Microspheres and Encapsulation of Drug

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Keywords: Microspheres, Dextrin, Drug, aqueous two phase

Abstract. The aim of this study was to produce microspheres from dextrin maize starch and capsulation insulin using aqueous two-phase system, also study the stability of microspheres at pH (3-9) to mimic the human body condition. The microspheres characterized by using (FTIR), (OM), (DLS) and (SEM). The result was the absence of drug-polymer interaction, besides the success of insulin loading. According to the morphology tested by optical microscope, it was noticed that the core of microsphere increased as well as to diameter, and the effective diameter increased after loading from (906.36 nM) to (1089.90 nM). The stability of microspheres size was obtained from (PDI) in which before loading was (0.415) and after loading was (0.418). Finally, SEM test at (5, 10 and 100) µm was obtained, in which it was found that the microsphere was really exist at (100 µm), and at (5 and 10) µm which it was found an indicator of degradation in microsphere walls.

Acceptance Number:109

Medical Diagnostic Using RFID Implanted Tag

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Keywords: Passive sensing, Chipless RFID, Frequency selective surfaces, Implanted antenna, UltraHigh-frequency (UHF), Implantable Biomedical device.

Abstract: RFID wearable and implantable technology have recently attracted much interest in medical healthcare applications. On the other hand, Using the RFID tags with the proximity of a human body, create challenge whence Design, fabrication, testing, etc. with these factors in mind, this article presents a novel completely design of a chipless RFID tag for medical use with scientific characteristics that include comfortable shapes and dimensions which can be implanted inside any area of the human body, as well as the use of non-toxic materials that do not have adverse effects on body tissues in the Design of the proposed tag within ultra-high frequency (UHF) that is based on international safety guidelines. Moreover, The chipless tag able to diagnose and change its encoding reader depending on the iron level in the blood for patients who suffer from an increase or decrease the iron level, like (thalassemia, anemia, etc) to monitor and track their health situations. The simulation results obtained through(CST Microwave Studio), have shown New concept validity and proposed design efficiency can be directly printed outside.

Acceptance Number:110

Investigation Mechanical Properties of Hybrid Composite Laminates Reinforced with Glass Fiber and Nano Zirconium Oxide

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Keywords: Composite Materials, Unsaturated Polyester, UPE, Nanoparticles, ZrO^2

Abstract. In this century, composites have been discovered to be the most promising and discriminating material, and it was found that the most frequent approach to modify the final characteristics of these materials is to incorporate various types of fibers or modifier fillers or both of them into the polymeric matrix. In this study, standard chopped fiberglass mat (CSM) and nanoparticles have been added to the unsaturated polyester resin (UPE) in two stages, at first, the fibers have been added with a weight fraction of 26% and calculated the tensile strength, impact resistance, and hardness magnitudes. After that, different weight fractions of nanoparticles zirconium oxide (ZrO2) were added to the mixture and recalculated the previous tests again. The experimental test's results illustrated that the mechanical properties (tensile strength, impact resistance, and hardness) of polyester were enhanced by adding 26 wt.% of standard chopped fiberglass mat by about (113.58%, 574.5%, 4.7%) respectively. The same tests were repeated after adding different weight fractions (1%, 2%, 2.5%, 3%, 3.5%, 4%) of (ZrO2) and observed that adding the nanoparticles were Significant effects on the mechanical properties since at first it improved the tensile strength, impact resistance, and hardness until nanoparticles ratio reached to 2.5 wt.%, but any higher addition than this ratio caused a decrease in the enhancement of the mechanical properties. Thus, it was found that adding 2.5 wt.% nanoparticles gave us the best improvement in the tensile strength, impact resistance, and hardness by about (38.98%, 95.2%, 3.5%) respectively.

Acceptance Number:111

Comparative study of hot and cold injection molds for the effect of secondary pressure change on the shape of the final product

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***Keywords*:** Polypropylene (PP), injection molding, cold mold, hot mold.

Abstract

This is a practical study that was carried out in the medical syringe factory, Babil, Iraq. This study was carried out in order to achieve proper mechanical properties at high byproducts rate to reduce the use of raw materials with acceptable mechanical properties. The effect of changing the secondary pressure on polypropylene PP samples were studied. The samples made from PP raw materials and the manufacturing process byproducts. Two types of machines were used for this purpose, which are cold-mold and hot-mold injection machines. The secondary pressure was changed to ten readings at constant temperature for both machines, ten samples were manufactured for each machine. Several properties of the resulting samples were examined to test which samples were more suitable to use at higher rate of the byproducts of the manufacturing process. These tests included, melt index flow MIF, density, hardness, tensile strength, FTIR (Fourier Transmission Infrared) spectra, SEM (Scanning Electronic Microscopy), for all these tests, the PP product exhibits good mechanical properties (hardness, tensile strength, density) for the samples produced at pressure (95-78) bar for hot-mold and pressure (60 – 47) bar for cold-mold.

Acceptance Number:112

Flexural properties of a light-weight concrete panel made with ferro-cement

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Keywords: Foamed concrete, Foaming agent, steel square mesh, Ferro-cement.

Abstract: A novel form of ultra-light foamed concrete (FC) has been developed that may be utilized as a modern energy-saving and environmental-safety material for building that is specifically well suited to the heat insulation of structure exterior wall. Ferro cement is a very adaptable composite material composed of cement mortar and coatings of wire mesh that is manufactured. Light Weight concrete is made by combining foam and cement in a ratio of 40 percent foam to cement volume and cement to weight The sand ratio is 1:1.5, and in order to improve the concrete's tensile properties, steel square mesh is inserted in-between the concrete The effects of using a single layer screen and a double layer mesh were recorded, and it was compared to regular Ferro cement

Acceptance Number:113

Effect of AISI 4140 Carbon Steel Heat Treatments on Specified Mechanical Properties

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Keywowrds: AISI 4140, Heat treatments, Mechanical properties.

Abstract

Heat treatments can be considered as an effective method to improve the properties of Carbon steel AISI 4140 as it has a good ability to change its mechanical properties. In the current study, the mechanical properties of AISI 4140 and their resistance to mechanical loads were investigated through heating the sample using an electric oven at temperatures of 800, 850, and 900 ^{o}C. The samples were cooled after that with a compressed air flows at different speeds of 11, 13, 15, and 17 m^3/s using an air blower for 10 minutes. The tested samples properties have been examined before and after the heat treatment process includes; hardness by the Rockwell method and tensile test. The results were analysed and compared to show the effect of heat treatment on the properties of the metal. An increase in the tensile strength and hardness is observed after heat treatment, especially at a temperature of 800°C and cooling airflow of 17m^3/s in which the hardness found to be 53 HRC at an ultimate tensile force of 569 N.

Acceptance Number:114

Effect of Halabjah Seismic Loading on Uplift Bearing Capacity of Pile Model Embedded in Saturation Sandy Soil

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Keywords: seismic, uplift pile, sandy soil.

Abstract. Experimental model was done for pile model of L / D = 25 installed into a laminar shear box contains different saturation soil densities (loose and dense sand) to check the capabilities of bearing capacity of tension pile embedded in sandy soi before and after seismic loading. The event chosen for the study was Halabjah earthquake which was the highest earthquake happened during the last ten years in Iraq (Date 22/11/2017 , magnitude,7.3 MW).The study showed the effect of Halabjah seismic loading in decreasing the tension bearing capacity of pile in loose sand from (80.73 N) to (62.84 N) and from (116.86N) to (105.29N) in saturation dense sand when applying only seismic loading, while the capacity of pile model in two cases of tests was decreasing from (80.73N) to (39.36N) and from (116.86N) to (67.12N) for pile installed in saturation loose and dense sand respectively and consequently failed when apply combined of seismic and tension loading in the same time.

Acceptance Number:115

Investigating the Behavior of Post-Installed Reinforcing Bars Fixed by Chemical Adhesives with Different Concrete Base Compressive Strength

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Keywords. Post-installed Reinforcing Bars, Adhesive Anchors in Concrete, fastening systems, bond behavior, pull-out test.

Abstract. This research studies the effect of the concrete base's compressive strength on the post-installed reinforcement (PIR) behavior and compares the results. The study was conducted on concrete blocks with four compressive strengths (23, 27, 40, and 46) N/mm^2 with dimensions of (Length=2000mm, Width=2000mm, and Height=400mm). Four different reinforcement bar diameters are used and post installed in the concrete base (12mm, 16mm, 20mm, and 25mm). For different embedment lengths are adopted in the experimental work. The present works focused on the behavior of the post-installed bars using a pull-out test and the influence of compressive strength of the concrete base on the failure load and the failure mode.

Acceptance Number:116

Detection of Objects Geometries and Colors using MATLAB

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Keywords: Image Processing, MATLAB, Bounding Box, RGB Image, Geometry Detection.

Abstract: Object detection is very interesting in most industrial applications and robots, also the color detection of these objects is important. The real challenge is how to develop the algorithms used in image processing to recognize objects and their colors. This work presents a new algorithm of digital image processing (DIP) for the recognition of the dimensional shape of the objects such as circles, squares, rectangles, and triangles. MATLAB Graphical User Interface (GUI) program was used to detect the color and geometry of the objects. The bounding box method was used to recognize the geometry shape of the objects. This work presents the test of three colors of objects (red, green, and blue) and detects the object color using the image processing algorithm. The results indicated the accuracy and effectiveness of the image processing algorithm used to determine the color and geometry shape of the objects, where it was found that the effectiveness of the proposed image processing algorithm is 98.33%.

Acceptance Number:117

The Effect of Solvent (NMP, DMSO) on the electronic transition of Nano blend POT: (PEDOT: PSS/MWCNT)

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Key Words: Electrical conductivity, NMP, DMSO, conducting Polymer blend.

Abstract. Conducting polymer Poly (o-toluidine) in N-methyl-2-pyrrolidinone (POT(ES): NMP), and Dimethyl sulfoxide (POT(ES): DMSO) when blended with PEDOT: PSS which contains the amount of (5wt%) from MWCNT. Material blends with optimum mechanical properties are created by combining different weights of two conducting polymers. Field-emission scanning microscopy (FE-SEM) was being used to analyze nano blend morphology; The absorbance spectrum was measured by a UV-**vi**sible spectrometer. The electrical conductivity was measured using two probe methods (Lab View 2018) and use ITO glass as a substrate. The activation energy is calculated from the Arrhenius equation.

Acceptance Number:118

Challenges of applying BIM technology for Quality Management in construction projects

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Abstract:

In this article , I'd like to discuss the challenges that BIM technology implementation faces**.** Jerry Laiserin coined the term "Building Information Modeling" (BIM) to describe the ability to model buildings. use, reuse, and exchange data, of which electronic papers are only a small part. BIM is much more than 3D renderings or the electronic transfer of paper documentation. "Risk is decreased, design intent is retained, quality control is streamlined, communication is clearer, and higher analytic tools are more accessible" as a result of BIM implementation (AIA 2005). Several BIM definitions can be found in the literature. They all appear to agree, however, that BIM is a digital depiction of the structure. The following are two options that represent the perspectives of two of the most influential organizations in the subject."A building information model (BIM) is a digital representation of a facility's physical and functional attributes. As a result, it acts as a shared knowledge repository for information about a facility, providing a solid foundation for decisions throughout its life cycle."(Building SMART website). The development and use of a computer software model to mimic the design and operation of a facility is known as building information modeling. A Building Information Model, as a result, is a data-rich, object-oriented, intelligent, and parametric digital representation of the facility. This can be used to collect and evaluate perspectives and data according to the needs of individual people. Create data for decision-making and to optimize the delivery process convenience Using BIM models to improve the planning, design, and building process.Virtual Design and Construction (VDC) is a term that's becoming more popular.

Acceptance Number:119

Optical and Structural Characterization of Polyaniline/Titanium Dioxide Nano Composites

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Keywords: Conducting Polymer, Polyaniline (PANI), Titanium di-oxide(TiO_2), Structure characterization, Optical properties, PANI composite.

Abstract

Polyaniline/ titanium dioxide composite (PANI/TiO_2) was synthesized by in-situ chemical polymerization in ice bath medium for polyaniline with different percentage of TiO_2 nanoparticles (3, 6, and 9) wt. %. The structural and morphological characterizations were identified by X-Ray diffraction and Scanning Electron Microscopy (SEM). The optical characterizations were identified using UV-Vis spectroscopy. The XRD patterns showed polycrystalline structure for PURE PANI and PANI/TiO_2 composite of different TiO_2 ratios. The analysis of UV-Vis spectra revealed that the energy gaps for PANI/TiO_2 decreased with increasing of the ratios of TiO_2 nanoparticles.

Acceptance Number:120

Toward intelligent and responsive architecture design: Lessons learned from COVID-19.

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Keywords: Coronavirus, COVID-19, Intelligent Architecture, Post pandemic architecture, Architecture design.

Abstract: An intelligent building is much more than a set of walls; it's a dynamic organism that employs integrated technologies to share data about the building among various systems to enhance efficiency and provide a better experience for its users. There are a number of challenges with intelligent buildings. They must respond to people's requirements and needs, including their health and well-being; they must be resource-efficient, and they must include the most useful aspects of new technologies. The current COVID-19 outbreak has pushed architects to consider the future of architectural design technologies. Is it possible that the epidemic may influence the design of our buildings, causing them to become smarter or more intelligent? What role did architecture play throughout the epidemic and in the post-pandemic stage, as well? This paper aims to discuss the future of intelligent design technologies in light of the current Coronavirus epidemic and how it might reshape our architecture design. Finally, the effect of COVID-19 on people's everyday routines in building design will be discussed.

Acceptance Number:121

Assessment Physic-Chemical Quality of Drinking Water of Bardarash District/ Duhok City in Kurdistan Region of Iraq

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KEYWORDS: Drinking water, Wells, Heavy metals, Physico-chemical parameters, Duhok–Bardarash.

Abstract. Safe quality of drinking water is a critical concern for human health. Bardarash is one of the districts of Duhok city located in the Kurdistan Region in the north part of Iraq and considered a rich area of oil resources. Groundwater wells are the main sources of drinking water in this area. To date, no study has focused on examining the quality of drinking water in Bardarash district. The aim of this study is to assess the physic-chemical quality of drinking water in this area. Water samples were collected from local wells (103) from four subjoined districts and analyzed for 10 heavy metals and physico-chemical parameters using atomic spectroscopy and standard methods. The results showed that most of the heavy metals and physico-chemical analysis values were below the permissible limits set by WHO, while few values were higher for Al, Fe, Cr, NO_3^{1-} and TAL. The data also show significant variation ($P < 0.05$) of the physico-chemical parameters and some heavy metals among four subjoined districts. It can be concluded that the water samples were not highly contaminated although water treatment with regular monitoring and periodic cleaning of domestic tanks is required to obtain sustainable clean drinking water in this area.

Acceptance Number:122

The Effect of Green Diode Laser on White Ant (*Psammotermes hypostoma*)

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Keywords: green diode laser**,** white ants**,** biophysics**,** thermal effect

Abstract. This work focused on studying the effect of the green diode laser on the external appearance of white ants (termites) *(Psammotermes hypostoma)* and then finding the percentage of mortality resulting from this beam of wavelength (532 nm), energy (100 mW), and exposure times (60, 70, 80, 90 & 100)sec at (5, 10)cm for each exposure time. The results recorded in this research showed a clear increase in termite death rates, In addition to an increase in deformations as laser exposure times increased and the percentages were higher at the lower distance, where the laser was used to capture the results of this therapeutic effect over periods (12, 24, 48 & 72)hours. These results in general, show green laser thermal effects resulting from its interaction with tissues, the thermal propagation leads to ravage to the structures and thus to an increase in death rates.

Acceptance Number:123

NEW MODELS FOR NONLINEAR ANALYSIS OF ULTRA HIGH STRENGTH FIBER REINFORCED CONCRETE DEEP BEAMS

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Keywords: Cracked Shear Modulus, Deep Beams, Finite Element, Nonlinear Analysis, Steel Fiber, Tension Stiffening, Ultra High Strength.

ABSTRACT: Deep beams are structural members, which have small shear span to depth ratios. In the current research, the process of regression analysis has been used on many experimental results by using SPSS-Statistical program to propose new material constitutive relationships for Ultra High Strength Steel Fiber Reinforced Concrete (UHSSFRC). In the nonlinear finite element analysis, the concrete is represented by eight node isoperimetric plane stress elements (u,v) and the reinforcing bars are treated as embedded bars. The model of compressive strength is divided in two approaches (elastic perfect plastic and strain hardening). In order to track the cracks propagation, two tension stiffening (TS) models are used based on fracture energy. The interaction between the reinforcement bars and surrounding concrete is represented as a perfect bond. The computer program for the nonlinear finite element analysis was originally introduced by Abdul-Razzak [22]. The program, which was coded in (FORTRAN 90), has been modified to analyze the high strength steel fiber reinforced concrete deep beams. Based on the obtained results, an excellent agreement is shown between the numerical and experimental results in terms of the ultimate loads. The shear span-to-depth ratio (a/d) has a significant impact on the ultimate load capacity of UHSSFRC deep beam. The numerical results indicate that the ultimate load value is decreased by increasing the ratio of (a/d); where the ultimate load equal to (510 kN) when (a/d) equal to (0.96), while the ultimate load equal to (600 kN) when (a/d) equal to (0.71). The ratio between (PNum/PExp) equal to 1.0.

Acceptance Number:124

Sperm Count and other Clinical Features of Males with Infertility in Baghdad –Iraq

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Keyword: Male infertility , Semen quality , genetic and non- genetic factors

Abstract: Infertility is a worldwide health problem affecting significant number of individuals with an impact of different aspects of their lives .The present study was set to investigate the incidence of factors might associate with male's infertility. The study included 43 males, age's mean was 32.42 years and ranged from 19 to 50 years, attended a private clinic in Baghdad-Iraq during the period of October 2018 to March 2019 for sperm count examining. The voluntary agreed participants' males were asked to give information about their age, occupational, medical record, and family history of infertility. The results showed that large number of the cases (70.6%, 29/41) had lower sperm count with more one third of them showed to have a zero sperm count. In addition to that, the history of mumps infection showed to be one of the risk factors associated with male's infertility. This is due to the significant number (26.83%, 11/41) of cases that reposted to have mumps infection early in their life. Other health problems such as chronic asthma, testes pain, undescended testes and typhus were also reported in a higher frequency among the studied males with infertility issues. Overall, the obtained findings of the present study agreed with the observations of previous studies in terms of the reported risk factor associated with male infertility.

Acceptance Number:125

The Effect of Sulfurous Water on the Corrosion Behavior of Carbon Steel with Different Carbon ratios

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Keywords: carbon steel, corrosion rates, sulfurous water, carbon ratios.

Abstract: The aim of this research is to study the effect of carbon percentage on corrosion rates. Four types of carbon steel with different carbon percentage (0.112% C, 0.196% C, 0.314% C, 0.394% C) were used in this study. The samples were submerged in a erosion medium composed of sulfur water for periods of (30,45, 60) days. The corrosion rate was calculated using a weight loss method. The results showed corrosion rates depend on carbon percentage in carbon steel, the highest corrosion rate was found in carbon steel which contains(0.394% C), while the lowest corrosion rate was found in carbon steel contain (0.112% C). Sulfur water has a major role in increasing the corrosion rates of carbon steel, because it contains a large percentage of chlorides, salts and sulfates in addition to the presence of hydrogen sulfide. The presence of the calcareous layer on the surface of samples resulting from calcium ions may contribute to reducing corrosion rates, as it works to prevent oxygen from reaching the metal surface.

Acceptance Number:126

Conventional and Non-Conventional Gas-Liquid Contacting Methods: A Critical Review and a Quantitative Evaluation

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Keywords: Gas-liquid contactors; Mass transfer principles; Contacting effectiveness; Quantitative evaluation; Rotating devices; Microfluidic devices.

Abstract. Gas-liquid contacting is the basis for many chemical separation operations, including gas absorption (e.g., removing contaminates like ammonia and hydrogen sulfide from a biogas), humidification and distillation. Many different types of contactors have been developed, recently, in the field of chemical engineering to achieve this type of contacting, depending on different contacting principles. The present work is focused, squarely, to achieve two main goals regarding these contacting methods. The first is reviewing, not exhaustive but critically, the most common conventional and non-conventional contactors. This includes packed bed, bubble, spray and plate columns as conventional contactors and the novel and innovative methods such as rotating spiral channel, falling-film microcontactors and others as non-conventional methods. The second goal is evaluating, quantitatively, the performance of non-conventional contactors and putting them into context with other conventional contacting methods. Two essential parameters are developed in this paper to assess mass-transfer performance of a contractor: *mean processing time* and *purification factor*, considering both physical absorption and desorption operations. Interestingly, the comparison results based on mass-transfer data reported in the relevant literature showed that some of the non-conventional contactors can allow a step improvement in mass transfer relative to the conventional contactors and offer solutions for some of inherent limitations of contacting fluid phases.

Acceptance Number:127

Continuous Flow Electrocoagulation Process in Combination with other Treatment Processes: a Review of Current Applications and Approaches

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Abstract. The combination of electrocoagulation (EC) with other treatment techniques is a recent approach to achieve better removal of pollutants. Numerous reported experiments revealed the feasibility of combining EC with various physical, chemical, and biological treatment processes. However, most of the experiments reported the behavior of EC units in batch process, other experiments were more realistic as they were conducted in a continuous flow process. There have been numerous review papers highlighted different points regarding EC, these review papers covered the removal of a specific pollutant, treatment of specific wastewater, operational factors, type of the treatment process that is integrated with EC, or applications of advanced EC. Nevertheless, the type of EC process, batch or continuous, was overlooked in these reviews. This manuscript reviewed the combination of continuous flow EC process with other treatment techniques. The outcomes of this study showed the efficient performance of these combinations to remove various pollutants, however, a potential deterioration of removal efficiency for a certain pollutant might occur especially those pollutants which are removed by post biological nutrients removal. Moreover, real wastewater was used in most of the reviewed studies confirming the applicability of the results and conclusions, on the other hand, the majority of the studies were conducted using bench scale units which may lessen the authenticity of the results. Furthermore, a lack of comprehensive costing studies and kinetic studies of these combinations is noticeable. Finally, the majority of the reviewed papers investigated EC as a pretreatment process, accordingly an obvious gap of EC as a post treatment process should be considered.

Acceptance Number:128

Evaluation of Traffic Conditions for Selected Urban streets in North Part of Al-Najaf City

Keywords: Average travel time, average travel speed, Al-Najaf road network, LOS; and urban streets,

Abstract: Urban streets may represent a heartbeat for the movements of any urban city. Limited studies classifying and indicating the main characteristics of urban streets for Al-Najaf city and most other Iraqi cities were the primary motivation for this study. Hence, this study has focused on classifying 14 urban streets with 40 segments. Therefore, the evaluation of these roads has been achieved after classifying the roads according to Highway Capacity Manual (HCM) 2000 and 2010 based on the observed Free-Flow Speed (FFS). Then, the Level of Service (LOS)for each road or even each segment, according to the calculated average travel speed and (v/c) ratio, was determined. The results revealed that most segments fall into urban streets Class II. Besides that LOS according to the average travel speed is slightly different from that determined according to (v/c) ratios.

Acceptance Number:130

Comparative study of multi-walled carbon nanotube properties before and after purification prepared at low temperature

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Keywords: Multi-walled carbon nanotube, hydrothermal method, Treatment, Purification.

Abstract. This study includes the preparation of multi-walled carbon nanotubes (MWCNTs) by hydrothermal method at temperature about 200 °C. The starting materials are ferrocene and sulfur with sodium hydroxide as a reducing agent. The purification process of prepared MWCNT is carried out by using nitric and sulfuric acids as long as hydrogen peroxide and acetone. The structural and optical properties of MWCNTs are investigated by the FT-IR, TEM, XRD and UV-VIS characterization techniques. The d-spacing is 3.42 Å from XRD, the bandgap about 4eV to 3.7eV from optical calculation, the average ID and OD are respectively, 34nm and 52nm from TEM measurements with the length of (0.7-1)µm.

Acceptance Number:131

Model Analysis and Parametric Evaluation of Titania Nanoparticles modified epoxy composites

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Abstract. The influence on the specific wear rate of epoxy modified titanium nanoparticles from several factors such as sliding velocity, filler quantity, normal load and sliding distance is examined. Radial Basis neural network function was used to simulate the non-linear connection between the four parameters and the specified share of a modified epoxy composite, using four input nodes, five hidden layer and one output layer configurations. The parametric analysis utilizing the three-dimensional plots indicated that the four factors were not linearly related to the reported wear rate. In order to model the influence of the parameters on the modified epoxy composite, a radial neural function network with the softmax activation function was effectively used. A model prediction with R^2 of 0.998 means that the forecasted wear rate of the improved epoxy composite is in line with the values observed. The degree of relevance analysis of the parameters shows that all factors have an important impact on model output with with the sliding velocity having most significant influence.

Acceptance Number:132

Corrosion Protection of Mild Steel by Using Recycling Materials as Inhibitors in Salt Solution

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Abstract: The purpose of this work, the evaluation of inhibition of corrosion behavior for mild steel in the 3.5%NaCl solution by using recycling materials as inhibitor. Silicate sodium (glass water) were used for protection the mild steel from corrosion. The electrochemical measurements and surface analysis were studied. Polarization measurements prove that decreased the corrosion rate for all concentration additives of inhibitors. These alloys responsible for the inhibitory action due to physiochemical effect and formation protective films. The analyzing done by SEM shows improvement in the passive layer to the corrosive ions on the surface of mild steel surface in 3.5%NaCl solution a present inhibitor.

Acceptance Number:133

Electrodeposition of a Ni/TaC Composite Coating on 316L SS and Its Corrosion Behavior in 3.5% Sodium Chloride Solution

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Keywords: composite coating, electroplated, corrosion, microhardness and micro scale

Abstract. This work tries to use a composite coating (co-deposition coating) and assesses, develops the Nickel coatings properties by combining particles of tantalum carbide into the electrodeposited solution. The electroplating coating used to coat the stainless-steel samples consisted of Nickel and tantalum carbide micro scale particles having an average sizes 125 µm with various contents equal to 10, 20 and 30 (g/L). The samples were tested by SEM and XRD after electroplating and potentiostatic polarization test in a solution contain 3.5% NaCl for investigating the corrosion behaviour. Subsequently, microhardness of these samples were evaluated. A great decrease in the currents of corrosion due to the inert micro particles' addition was obtained. The corrosion resistances were improved when adding the composite coating.

Acceptance Number:134

Investigating The Effect Nano powder (AI_2O_3) of Wire Electrical Discharge Machining of Ti-6242

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Keyword: Nano powder(AL2O3), Recast layer, RSM, ANOVA.

Abstract. Wire Electrical Discharge Machining (WEDM) is a non-traditional thermal machining process used to manufacture irregularly profiled parts. Machining of titanium (TI-6242) under several machining factors, which affect the WEDM process, is presented. The considered machining factors are pulse on time (Ton), pulse off (Toff), peak current (Ip), voltage (V), wire tension (Wt), and wire feed (Wf). Their setting is performed via an experimental design using the Box–Behnken method to optimize the machining factors. The optimization objective is to achieve maximum Material Removal Rate (MRR) and minimum Surface Roughness (RL). Additionally, the analysis of variance (ANOVA) is used to identify the most significant factor. Also, a regression analysis is carried out to forecast the MRR and RL dependent on defined machining factors. Depending on consequences, the best regulation factors for reaching the maximum MRR are Ton = 120 µs, Toff = 50 µs, Ip = 11 A, Wt = 1kg. and V = 50 volt. Whereas, the optimal control factors that achieve the minimum RL is Ton = 130 µs, Toff = 60 µs, Ip = 12 A, Wt = 3 kg, and V= 30 volt. It is hypothesized that the perfect combination of control factors that achieves minimum RL and maximum MRR is Ton = 120 µs, Toff = 50 µs, Ip=10 A, Wt=1kg. The microstructure of the machined surface in the optimal machining conditions shows a very narrow recast layer at the top of the machined surface.

Acceptance Number:135

Mechanical Analysis of Four Different Stainless-Steel Alloys Used for Knee Replacement Surgical Tool

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Keywords: knee replacement, mechanical behavior, stainless steel alloy, surgical stainless steel.

Abstract: Surgical stainless steel is a grade of stainless steel used in biomedical applications. It has been widely used for orthopedic implants and surgical tools. Surgical steels are those with the best amount of corrosion and rust resistance. In addition to the stainless-steel corrosion resistance, some of it's alloys (316, 316L, 304 and 17-4 PH stainless steels) have additional properties that encouraged using them in surgical applications such as good biocompatibility, low risk for allergic reaction, ability to withstand intense sterilization processes used in the medical industry, oxidation resistant as well excellent tensile strength and fracture toughness. In this comparative study, these four stainless steel alloys have been mechanically tested to prove their effectiveness in a surgical tool used in aligning tibial component in knee replacement surgery. A load of 100N has been applied to the tool in maximum mechanical condition. The mechanical testing performed using ANSYS 19.0 as static structural system. Total deformation resulted was in the range (0.062- 0.065 mm). Strain was in the range (0.79×10-3 to 0.82×10-3). Equivalent stresses were between 143.87 MPa to maximally 144 MPa for 304 alloy. Safety factor of 17-4PH stainless steel produced after analyzing it was 5.3169 while the other three alloys had a minimum safety factor of approximately 1.4. Yield strength and resulted safety factor proved that 17-4 PH stainless steel was the superior among the tested alloys. High safety factor means high durability of the metallic tool. Yet all alloys produced convergent deformation, strain and stress results. The differences between the four tested alloys were moderate and the numerical values were acceptable compared to the mechanical properties of the alloys. It can be concluded that these four alloys can be used safely to manufacture such surgical tools.

Acceptance Number:136

Evaluation of the Actual Solar Irradiance received by a V-Shaped solar still

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Abstract: The demand for freshwater is in increasing with time because of global warming. The method of producing freshwater is vast. However, the use of the thermal energy of the sun is one of the promising techniques nowadays. This work proposes a new design of the solar still that is used to produce a distilled water out of saline water. The current paper consists of a design of the solar still in V-shape and measurement some of the main performance parameters such as the temperature of the glass cover and water, the subjected solar irradiance, and the water production under Iraqi environment conditions. The results reporting interesting points, such as a continuous increase in the temperature difference between the cover glass and the water (ΔT) with a little reduction from the peak time (14:00 hr) with ΔT =11 ºC and lowest time for solar irradiance at (18:00 hr) with ΔT =9.0 ºC. moreover, the results showed that the actual solar irradiance that the system captures is much less than the actual amount the earth receives. The current data of this particular design suggests the need for a new method of efficiency calculation taking into consideration the thermal capacity of the system.

Acceptance Number:137

Removal of Vat-Orange Dye from the Textile Factories Wastewater by Zeolite X Produced From Alum Sludge

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Abstract: The aim of this work is to synthesis highly crystallized Zeolite from waste material (Alum Sludge), study its formation mechanism according to several variables, and Assess its properties. Subsequently, using the result Zeolite as adsorbent material to remove dye (Vat Orange11) from the wastewater of textile factories and studying the impact of several factors on the process of removing this dye with finding the best conditions that achieve the highest removal rate. So, Zeolite was synthesized using Alum Sludge (AS) as a raw material. To detect the composition and structure of this material, alum sludge was dried and milled. Consequently, the chemical and microstructural analysis techniques (EDX, XRD, and SEM) were assessed. Zeolites were synthesized by two basic steps: 1) alkaline fusion of NaOH:AS with different mass ratios (1.4, 1.6, and 1.8) and 2) hydrothermal treatment for different times (3,6,12, and 24 hours). Crystalline Zeolites were produced based on X-ray and SEM analysis. The optimum Zeolite produced was Zeolite X, which showed the best crystallinity and cation exchange capacity (CEC) of (1.388) meq/100gm. The ability of Zeolite-X to remove Vat Orange 11 dye was studied under the influence of several factors (i.e. Zeolite dosage, time, and pH) by using Box-Behnken Design (BBD) according to the response surface method (RSM). As a result, a second-order polynomial equation for dye removal % was obtained. The results showed that the synthesized Zeolite X can be utilized as adsorbent material (i.e. low cost and satisfied efficiency of more than 86%) for removing the industrial Vat Orange 11 dye in acidic media (pH 3).

Acceptance Number:138

Synthesized of New Alkaloid Compounds and Study Their Anticancer Activity

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Keywords: Amide, Schiff base, Cytotoxic, MCF-7, Alkaloid.

Abstract: This study aimed to synthesis of new compounds that containing nitrogen atom and test their anticancer activity. New alkaloids have been synthesized and ^{1}H, ^{13}C NMR, IR and LC-MS have been thoroughly characterized. Cytotoxicity was measured against the MCF-7 human breast cell lines. The results showed better significant cytotoxic activity of RU8 followed by RU6 and finally RU7 against the human breast cancer cell lines MCF-7.

Acceptance Number:139

Adaptability in Architectural Objects Through Fractal Approaches

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Keywords: *fractal geometry, fractal characteristics*, *fractal forms, adaptability*

Abstract: Study focuses on fractal geometry, that derives its structures, elements and characteristics from nature, which includes static and dynamic characteristics. Fractals as forms and characteristics are able to continuously grow and adapt. In architecture, "adaptation" is defined as their ability to accommodate new variables and renewable spatial and functional requirements over time. This considers one of the characteristics of sustainable architecture, which is similar to the characteristics of sustainable nature itself. Fractional geometry helps designers and architects to achieve sufficient flexibility in buildings to accommodate new variables, spatial and functional requirements, which is called adaptive. The study focuses on three main axes, first is the concept of adaptation in fractal geometry. The second axis is to introduce the vocabulary of adaptation, its characteristics and requirements in architecture. Third axis aims to find common relationship between architecture and fractal geometry as a tool to achieve the required adaptation. Study also focuses on fractal application as a tool of adaptability in architecture level (plans, forms) and urban morphologies level.

Acceptance Number:140

Manufacture of Solar Distillation Device for the Study of Desalination of Wells

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Keywords: Manufacture, Solar Distillation, Study of Desalination, Desalination of Wells.

Abstract: Using groundwater optimally is a science in itself if this process is used or applied correctly. Distillation is a series of industrial processes carried out to remove all or part of excess salts and minerals dissolved in water so that such water can be used in practical life such as agriculture, drinking and industry. A large number of countries suffering from water shortage are concerned in this applied science. Over the next ten years, the application of this science is expected to grow significantly due to the expected water crises in many countries of the world. In this respect, some statistics indicate that hundreds of thousands of people die annually because of the lack of clean water for human use. Desalination requires expensive and highly energy-consuming techniques that have adverse effects on the environment. The amount of energy consumed in the desalination is an important problem that needs to be overcome. In this study, the researchers study samples of well water to determine the concentration of some of the most important physical and chemical properties and salts in these wells. The study also aims to test the process of distillation through the use of a solar distillation device that was manufactured locally for the purpose of knowing the extent to which this device can be used for the distillation of well water. This testing will be conducting by examining the previously examined properties of raw water and studying the extent of the possibility of using this water for different purposes and normal human daily use, by comparing the results of distilled water with the Iraqi public standards set for human use. Two samples were taken monthly from five wells in Al-Alam district for a period of three months, and 6 of the physical and chemical tests were carried out. Thus, we have 180 samples of raw water and 180 samples of distilled water, i.e. 360 samples in total. Using laboratory tests, water obtained from this solar distillation device was proved to be suitable for domestic human use, such as cleaning and washing, but not suitable for drinking due to its high hardness. The water obtained unsurprisingly contains a percentage of bacteria due to microscopic living organisms in air, the glass of the device, the water used, and even the bacteria existing in the people who deal with the device while inserting and emptying the samples. Therefore, the water was found to be not suitable for human use unless one of the known sterilizers, including chlorine (that is locally available), for sterilization. It was concluded through this research that solar distillation is a simplified system; most of its needed labor and materials are locally available and inexpensive. It does not require large capital upon installation and operation. Furthermore, most maintenance and repairs can be done by unskilled workers. It was also concluded that the water obtained from it is suitable for domestic uses but not for drinking.

Acceptance Number:141

Improvement of Electro-Fenton process on degradation of paracholorophenol by UV Irradiation process

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Keywords: Photoelectro-Fenton (PEF), Response Surface Methodology (RSM), Chemical Oxygen Demand (COD).

Abstract: This paper conveys the improvment of Electro-Phenton process on the elimination of pollutants in synthetic wastewater by the photoelectron-Fenton process. A Response Surface Methodology (RSM) has been used to design the experiment and to build a full quadratic second order model using the Minitab 18 software. We analyzed the effects of ferrous concentration (Fe), pH, time (t), and current intensity (I) on Chemical Oxygen Demand (COD) elimination efficiency. The results reveal that the photoelectron-fenton process under optimum conditions, like Fe (II) C=0.59 mM, pH=2.5, t=96.67 min, I=184.84 mA, has a percentage of 96.3% of COD efficiency when the process was irradiated with 6 Watt UV light and employed carbon felt as a cathode and mixed metal oxide as an anode.

Acceptance Number:142

Accelerating K-Means Clustering With Parallel Implementations for Hand Written Digits Using Multicore CPU

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Abstract. Data clustering was implemented in many applications, such as pattern classification, image segmentation, document retrieval, and data mining. The increasing volumes of data set of the advance technology, makes clustering of a large-scale of data set a hard task. In order to solve the problem, many attempts to design parallel clustering algorithms. In this research, we propose a parallel k-means clustering algorithm on hand written digit by multicore CPU, which is a simple parallel programming technique. The experimental results clarify that the proposed algorithm can scale well and efficiently process large datasets on commodity

Acceptance Number:143

Guessing The Coordinates of Targets in Indoor Environments Using Hyperbolic Technique

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Keyword: ToA, RSS, WI, RXs, TXs, Hyperbolic.

Abstract: The difficulty of implementing a localization system in an indoor environment has been exacerbated by multipath and interference issues. In this area, the most essential techniques for establishing such parameters are Time of Arrival (ToA) and Receive Signal Strength (RSS). Both of which should be enhanced, especially for extra interference caused by large multipath problems. The suggested techniques of this analysis are implemented in this article via the use of a case study of a chosen structure. The Hyperbolic method is used in this proposal to estimate the location of chosen targets. The Wireless InSite (WI) software was used to simulate the case study area, with thirty Receivers (RXs) and two Transmitters (TXs) placed in strategic locations. After recording the RSS and ToA values, it will be stored as a database. Such database is indicated as a relation carves using MATLAB package. The results indicate that the estimated locations are reasonably close to the actual locations, with an average error of (0.498349) *m* for the X-coordinate and (1.151832) *m* for the Y-coordinate based on RSS. Such a result came from distance error of (0.453345667) *m* and (0.484111) *m* for TX_1 and TX_2, respectively. On the other hand, based on ToA, the average error is (0.551781) *m* for the X-coordinate and (0.968433) *m* for the Y-coordinate with the distance error are (0.36676) *m*, and (0.4011592) *m* for TX_1 and TX_2, respectively. As a consequence, we confirm that the ToA approach is more effective in assessing indoor localization than the RSS method in the Hyperbolic method.

Acceptance Number:144

Response Surface mythology for Electrocoagulation Treatment for Methyl Red Dye from Wastewater through an Fe and Al Polar

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Keywords: Red methyl Dyes, Electrocoagulation, EC products, Identical Electrodes (IE)

Abstract: Electrocoagulation (EC) has displayed great potential as an effective and environmentally friendly method to remove dyes from wastewaters. This review summarizes the recent development of dyes removal in the EC process that including the effects of primary operating parameters, optimization of the EC performance based on central composite design (CCD) in Response Surface Mythology (RSM) for two elements that are used as Fe, Al, as well as the evaluation of EC reactor configurations and Removing dyes from wastewater spinning textile factories through this process using iron and aluminum and testing the efficiency of the two components in the removal process. Production and characterization of EC products with respect to different electrodes are systematically discussed. Moreover, the performance of EC and the performance of Fe, Al are compared under five factors (I.c, pH, Time, Current, Distance), Optimal conditions were achieved for Fe and Al as initial concentration 10 ppm, pH 7, time 20 min, current 0.5 A, distance 1.5. and initial concentration 75 ppm, pH 5, time 40 min, current 0.75 A, distance 1 respectively Removal yields were achieved as 99.0583% and 99.9885% respectively.

Acceptance Number:145

Feasibility of Using Carbon Fiber, Graphite and their Modified Versions by PbO_2 as Electrodes in Electrochemical Oxidation of Phenolic Wastewater

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Abstract: Human development and the great growth in the industry led to the deterioration of water quality as a result of the introduction of many pollutants into the environment and the arrival of a large number of pollutants into the water. There are many techniques used to treat these pollutants, but in this research electrochemical oxidation processes have been proposed to remove phenol of different initial concentrations (30 and 150 ppm) from wastewater. The oxidation processes were carried out at 35 °C and by using different electrodes of carbon fiber and graphite and their modified versions by depositing PbO_2 on their surface. The results indicated that the phenol removal enhanced when the modified electrodes were used in all oxidation processes, and the performance of the electro-Fenton oxidation process is better than the direct and indirect oxidation processes. It was observed that both current density and ferrous ion concentration had a positive effect on the amount of phenol removed using the electro-Fenton oxidation process for both modified electrodes, as the highest values of phenol removal were recorded using 8 mA/cm^2 current density and 0.4 mM of ferrous ion concentration. The obtained energetic parameters also showed that the values of the specific power consumption increased, while the current efficiency decreased with the increasing of the applied current, which was accompanied by a clear increase in the voltage of the cells due to the formation of intermediate compounds that led to an increase in the resistance values of the electrolytes.

Acceptance Number:146

Mechanical properties of polymer jute rods reinforced with carbon/glass fiber.

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Keywords: JCFRP (Jute/Carbon Fiber-Reinforced Polymer); JFRP ((Jute Fiber-Reinforced Polymer);

JGFRP (Jute/Glass Fiber-Reinforced Polymer); Jute fiber; Mechanical Properties; Natural fiber

Abstract: The increasing demand for jute and carbon fibers in structural works is an area of interest for many researchers to find suitable rebar alternatives. The use of polymer jute is important for solving problems of rust and the effect of alkali and acids solutions and on rebar durability. Natural fibers are cheap and available in large quantities and. They have good tensile strength if they are treated to preserve them from moisture and the impact of the aggressive surrounding conditions. Therefore, this paper focused on studying the mechanical properties of jute fiber rods treated with polymer at heat and low viscosity. Rods of polymer jute fiber were reinforced with 50% carbon fibers and glass fibers. This study aimed to produce cheap bars with the equivalent tensile strength to the conventional rebar. The tensile strength of the Jute/Carbon Fiber-Reinforced Polymer, Jute/Glass Fiber-Reinforced Polymer, and Jute Fiber-Reinforced Polymer were 596,459, and 265 MPa, respectively. The stress-strain curve showed elastic behavior of Jute/Glass Fiber-Reinforced Polymer bars and brittle behavior for Jute/Carbon Fiber-Reinforced Polymer and Jute Fiber-Reinforced Polymer bars, where the failure occurred suddenly at the ultimate stress. Modulus of elasticity of Jute/Carbon Fiber-Reinforced Polymer, Jute/Glass Fiber-Reinforced Polymer bars, and Jute Fiber-Reinforced Polymer bars were 36, 22, and 10 GPa, respectively. The fibers reinforced polymer bars used in this study showed significant bonding with concrete when spreading sand on the surface of the bars. In addition, they showed very high resistance to the moisture and alkaline solutions with PH 12-13 during six months Similarly they showed high resistance to sulfuric acid by 5% and 10% for six months of exposure, Jute/Carbon Fiber-Reinforced and Polymer Jute/Glass Fiber-Reinforced Polymer survived the durability assessment. Therefore, they were a good alternative to the conventional rebar 40-50% reduction in the cost. However, swelling and cracks were observed when submerging Jute Fiber-Reinforced Polymer rods with 10% sulfuric acid after 50 days of immersion. Accordingly, swelling increment and cracks propagation resulted in fibers decomposition after six months.

Acceptance Number:147

Enhancement the Hydrogen Production by Using Nano (MgO) Catalyst

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Keywords Terms— Nano (MgO) Catalyst ; Electrolysis Cell; Morphology; Oxidation process; Electrochemical.

***Abstract*:** With the introduction of nanotechnology, renewable energy generation is an enhancement to play an important role. For cell optimization and hydrogen fuel cell, with high efficiency of hydrogen production in addition to low cost, a (Magnesium Oxide) catalyst was prepared by chemical method. The study of the structural analysis of Magnesium Oxide showed that the cubic crystal structure, as well as SEM, had various structural defects, Looks porous, study the characterization of the electrochemical parameters. For this hydrogen cell.

Acceptance Number:148

Biochar Filler for the Production of Conductive bio-epoxy Composites

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Keywords: Biochar Preparation; Biochar-epoxy Composite; Electrical and thermal behavior; Mechanical Characteristics; Conductive epoxy; Biocomposite

Abstract: The current research is about exploring the effect of biochar on electrical, thermal and mechanical characteristics of thermoset epoxy, aiming to produce a conductive biocomposite. Biochar is a natural material produced from pyrolysis of biomasses and here date seeds are used for this purpose. The pyrolysis has been achieved by exposing the seeds to 350 ºC for 2 hrs in approximately a free-oxygen environment. The produced biochar, then, is characterized and used as a reinforcement for a thermoset epoxy (quick mast 105 from DCP company). The biochar is added in different volume fractions to the epoxy during the polymerization reaction (from 0 to 60%). Interestingly, the results show that there is an improvement in both thermal and electrical behavior of the prepared samples up to 20-25% of filler content. In terms of the mechanical properties, both the tensile and impact strength increase with the content of biochar. The compressive strength, on the other hand, slightly decreases as the filler content increases.

Acceptance Number:150

Synthesis and Characterization of ($TBAPW_{11}O_{39}$) Hybrid Keggin Type Catalyst

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Abstract: Polyoxometalate (POM) possesses unique characteristics that accommodate current society's material, health, environmental, energy, and technology demands. A hybrid organic-inorganic polyoxotungstate [$TBAPW_{11}O_{39}$] synthesized by the method which quaternary ammonium is introduced to a Keggin structure of polyoxometalate by metathetical organic cation exchange by adding tetrabutylammonium bromide (TBAB) to the solution of sodium salts in a heteropolyanion. The synthesized hybrid is characterized by Fourier transform infrared (FT-IR), X-ray diffraction (XRD), Field emission scanning electron microscopy (FESEM) with an Energy-dispersive X-ray spectroscope (EDS), thermogravimetric analysis (TGA), and Atomic force microscopy (AFM). The FTIR of [$TBAPW_{11}O_{39}$] matched the vibration patterns of FTIR of keggin structure type with a slight difference in absorption peaks between the IR spectra of sample and theoretical may relate to cationic structures. The principal characteristic peaks of XRD found in the region of 7–10°, 16–22°and 25–34°, with the highest peak in the first range: 7–10° that is a characteristic of the Keggin type. In addition, the nanostructure may confirm by XRD and FESEM analysis. The TGA shows the mass loss of [$TBAPW_{11}O_{39}$] in three steps and mainly at 400°C. The AFM of [$TBAPW_{11}O_{39}$] refers to small nanoparticles with an average size of 64.41 nm.

Acceptance Number:151

Surface Modification of Cutting Tool by Multilayer Coatings A -Review Paper

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Abstract: One method is to cover sliding components with materials that have low friction and wear characteristics. Surface functionalization is a fast-growing field emerging subject, owing to the need for surface modification being less expensive than designing and manufacturing a whole new material, and allowing the retention of some characteristics of the initial material, such as mechanical properties . Coatings are used as an alternative in the machining process to extend tool life, improve product surface quality, and speed up production. Multilayer coatings are particularly appealing among coating design concepts because they provide for more flexibility in tailoring surface qualities. For tribological performance improvement, the ability to regulate residual stress, hardness to elasticity modulus ratio, and substrate adherence, for example, by stacking coating layers, is advantageous. In this context, multilayer coatings have sparked a surge of interest as a feasible option for minimizing friction and wear. This paper looked at the properties of multilayer coating systems for tribological applications. The purpose of this work is to investigate the performance of coated tools in the machining process.

Acceptance Number:152

Temperature and pressure monitoring of the human body based fiber Bragg grating and optical crystal fiber

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Keywords: Fiber Sensors , Fiber Bragg Grating , Photonic crystal fiber , temperature FBG , pressure FBG

Abstract: Fiber optics has been embraced in the field of sensors. in this paper, uniform fiber Bragg grating have been used to measurement the pressure and temperature range of human body, where these sensors are rapidly utilized in the field of sensing technologies due to of its inherent benefits like Compact size, rapid response, distributed sensing, and electromagnetic immunity.in addition the photonic crystal fiber (PCF) also used in field of sensing applications such as monitor the temperature and pressure. The result indicated that the FBG and PCF are extremely sensitive to the variations of pressure and temperature. where the sensitivity of increasing the temperature range for each transmission and reflection FBG reached to (22pm/C$^{\circ}$ and 10pm/C$^{\circ}$) respectively and the sensitivity of decreasing the temperature range for each transmission and reflection FBG reached to(-21pm/C$^{\circ}$ and -8pm/C$^{\circ}$). The sensitivity of PCF when increasing and decreasing temperature range was (70pm/C$^{\circ}$ and -80pm/C$^{\circ}$). The sensitivity of FBG pressure for high ,pre high ,ideal ,low, very low reached to (2pm/mmHg, 3pm/mmHg, 4pm/mmHg, 7pm/mmHg, 6pm/mmHg) respectively.

Acceptance Number:153

Evaluation of Some Physical and Mechanical Properties of Soil at the Campus Site of College of Science, University of Diyala, Iraq

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Keywords: Geotechnical, Physical, Mechanical, University of Diyala

Abstract: Geotechnical assessment of soil at proposed construction sites is essential to explore its suitability for particular engineering structures. In this study, some physical and mechanical properties of soil samples collected from the campus site of College of Science, University of Diyala have been evaluated. All laboratory tests were performed according to ASTM standards. The test results showed that the range of soil water content *w* was (13.89%-16.34%) with an average of 15.44%. The specific gravity range was (2.58-2.77) with an average of 2.66. The range of Liquid Limit LL was (26.20-35.20%) with an average of 32.22%.The range of Plastic Limit PL was (18.63-23.24%) with average of 21.06%. The range of Plasticity Index was (7.57-12.42) with an average of 11.61. Based on USCS classifications, the soil can be considered as fine-grained soil type CL (CL is inorganic clay soil of low to medium plasticity). Liquidity Index LI values were ranged from 0.002 to 0.560 while Consistency Index CI ranged from 0.271 to 0.998 indicating a plastic state. The average optimum water OWC content and maximum dry density MDD calculated from Standard Proctor Compaction test were 10.36% and 1.79g/cm^3, respectively. Shear test results revealed that the cohesion strength range was (5-10 Kg/m^2) with an average of 7.8 Kg/m^2, and the angle of internal friction range was (25-30°) with an average of 29.4^o. The measured values of angle of internal friction are within the range of CL soil. However, the cohesion strength is relatively low as cohesion of clay soil is affected by different factors such water content and clay content. The compression index derived from consolidation test was ranged from 0.03 to 0.25, and the calculated values of void ratio (0.94-1.04) and porosity (0.48-0.51) are within the range of clay soils. Physical and mechanical properties presented in the current study are useful for future engineering works scheduled at the campus site of College of Science, University of Diyala.

Acceptance Number:154

The Role of Building Materials' Properties in Sustainable Reconstruction of Residential Buildings in Old Mosul

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Abstract. Old Mosul is characterized by the presence of many buildings and heritage monuments of high architectural value which represents the identity and culture of the Mosul community. As a result of the improvisation of reconstruction work after 2017, and the lack of experience in dealing with traditional building materials and their technical, sensory, and intangible characteristics, the main research problem emerged, which is losing of sustainability of urban identity, and losing the spirituality of the place as a result of using modern building materials that do not express their sensual and intangible characteristics with the traditional heritage of the old city. The research aims to explore the reconstruction of heritage residential buildings in old Mosul according to levels of international standers conservation, regarding the role of building materials and their properties order to reach indicators that contribute to the reconstruction of heritage residential buildings to ensure the sustainability of urban identity. In addition, to identify the most important characteristics of the building materials associated with the traditional heritage of the old city in Mosul. The research is based on the field survey method, which depends on collecting data of the heritage residential buildings after their reconstruction or rehabilitation. The characteristics of the building materials and their role in the sustainability of the urban heritage are then described and analyzed, finally, they are compared with the levels and standards of international conservation. The results of the study showed the effect of the characteristics of sensory and intangible building materials on the construction of residential buildings and the sustainability of their architectural identity.

Acceptance Number:155

The Influence of Spray Distance on the Assessment of Porosity in YSZ Thermal Barrier Coating

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Keywords porosity, thermal barrier coatings (TBCs), image analysis (IA), mercury intrusion porosimetry (MIP), pore size distribution.

Abstract: Three types of plasma-sprayed ZrO_2 stabilized by 8 wt. % Y_2O_3 (YSZ) thermal barrier coatings (TBCs) were prepared by changing spray distance (70,100,130) mm. Porosity measurement is a key factor to identify the performance of thermal barrier coatings (TBCs).Combination of image analysis (IA) and Mercury intrusion porosimetry (MIP) techniques were used to analyze the porosity and pore size distribution. The porosity was categorized based on pore size (diameter). To optimize the thermal properties and maintained them during service, it will be important to design TBCs with optimal porosity. Hence, the characterization of the microstructure and the determination of porosity consider as important part in the assessment of YSZ coatings. Microstructure evaluation Post processing images of FESEM was performed using Image J software. XRD inspection used to characterize phases which present in plasma spray coating. In general, the porosity is inhomogeneously distributed and the coatings showed a large difference of pore sizes. Both IA and MIP showed that the porosity changed as a result of the spray distance changing for all investigated coatings. XRD results showed that all three type of coatings were mainly composed of t'-ZrO_2 phase and a small amount of m-ZrO_2 phase.

Acceptance Number:156

Taguchi Approach for Electrocoagulation for Treatment Methyl Red Dye from Textile Wastewater by using Different Connection Electrodes

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Keywords: Methyl Red Dyes, Electrocoagulation, Taguchi experimental design (TED), Identical Electrodes (IE).

Abstract: Electrocoagulation (EC) has displayed great potential as an effective and environmentally friendly method to remove dyes from wastewaters. This review summarizes the recent development of dyes removal in the EC process including the effects of primary operating parameters, optimization of the EC performance based on Taguchi experimental design (TED). In this study, Taguchi experimental design method was applied to determine the optimum operating conditions for the treatment of textile wastewater by electrocoagulation (EC) with iron- aluminum and aluminum-iron Electrode single. The experimental parameters investigated were electrode connection type; initial concentration :(10-100 ppm); initial pH :(3-11); electrolysis time: (5-60 min); current :(0.2-1 A); and distance between electrode :(0.5-2.5 cm).These parameters were varied at five levels to see their effects on the removal Efficiency. The results show that the electrocoagulation using Fe-Al electrode single with different connection Modes was able to treat the dye wastewater. The maximum color removal percentage (99.5828%) with optimum parameter initial concentration 10ppm; initial pH: 11; electrolysis time: 60min; current: 1A; and distance between Electrodes: 2.5cm. this review will contribute to a deeper understanding of the Iraqi government to adopt efficient and adequate methods to removing dyes.

Acceptance Number:157

Visible Spectrophotometric Method for Quantitative estimation of Atenolol Drug using cerium (III and IV)

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Keywords. Atenolol, bromopyrogalol red, pharmaceutical preparations, Cerium.

Abstract. Due to the medical importance of atenolol, indirect visible spectrophotometric methods have been proposed for the determination of atenolol in its pure form and in its pharmaceutical preparations. The proposed methods are based on an oxidation-reduction reaction, between atenolol and cerium as an oxidant agent, in the first method an excess amount of cerium (IV) ions was reacting with Atenolol in acidic medium, then, the remaining cerium (IV) ions was reacted with the reagent bromopyrogallol red to form a red, water-soluble and stable complex, measured at the selected wavelength of 496 nm. In the second method, atenolol reacts in an acidic medium with the cerium tetra ion releasing the cerium ternary ion, which in turn reacts with the xylenol orange reagent to form a stable wine-red complex soluble in water, and its highest absorption is measured at the wavelength 583 nm. The linearity of the method followed Beer's law within the concentration range 2-40 and 2-28 $\mu g.ml^{-1}$ for method A and B respectively, while the molar absorptivity were 1.19×10^4 and 4.66×10^4 $L.mol^{-1}.cm^{-1}$, Sandall's sensitivity 0.02238 and 0.0057 $\mu g.cm^{-2}$ for methods A and B respectively. The present methods have been successfully applied for the determination of atenolol in its pure form and in pharmaceutical preparations.

Acceptance Number:158

Acceptance Number:159

Characterization of Nano-TiO_2 and Nano-Al_2O_3 Particles Prepared by DC Sputtering

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Keywords: sputtering, hydrogen permeation, titanium dioxide, Nanostructured

Abstract: The coated surfaces first layer Ti and second layer composite $TiO_2$with Al_2O_3 as coating Nanostructured thin films of using DC sputtering on structural steel (AISI l018) and study characterization of composite coating SEM/EDS inspection indicated a clearly perfect incorporation of layer composite $TiO_2$with Al_2O_3. X-XRD test done for specimen indicates a complex compound was found phase (Al_2TiO_5), the resulted coating layer of the target compound of (Ti and Al) powders gives different morphology from the Ti layer alone as well as. When using titanium target alone titanium layer with thickness about 100nm deposited and it must be anodized to get TiO_2 phase which also decrease the Hydrogen permeation phenomena of steel (AISI l018) . Coating layer of (Ti and Al) target shown from surface as granular structure of the layer with a variable hemisphere's shapes varied from 25 to 50 nm in size, while cross section of coating layer indicates the hemispheres represents the tips of columnar structure. The Specimens roughness average of coated Ti and composite $TiO_2$with Al_2O_3 respectively was 4.831nm, 8.974 nm. Found that layer ceramic coatings $TiO_2$with Al_2O_3 as coating nanostructured thin films can be improve the hydrogen permeation resistance.

Acceptance Number:160

Regulated Role of Iron Storage Proteins by *csrA* in *E.coli* Under Iron Limiting Conditions

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Key words: *E.coli,* Iron haemostasis, *csrA*, Real time PCR.

Abstract. Iron is a required nutrient for all living organisms though it becomes toxic if accumulated. Accordingly, living organisms maintain this essential component by homeostasis by tightly regulating the genes involved in this process. RNA binding protein, CsrA, regulates iron homeostasis in *Escherichia coli*, affecting the iron levels within the cells. Here in our study, we planned to study the impact of *CsrA* on iron storage protein expression under iron-limited conditions. We investigated the expression profile of 7 genes with relation to *csrA* by real-time and multiplex PCR. We found *CsrA* to inhibit the storage proteins, thereby regulating the expression of iron uptake and enhancing the formation of biofilms. *CsrA* negatively downregulated the *dps, bfr* members and positively regulated the *CsrB, ftnA, ftnB, sufA* and *fecA.* This could propose that the bacteria do need iron for their virulence and multiplication and activate or repress the genes involved in iron metabolism to adapt themselves in a living host.

Acceptance Number:161

Tensile, impact and fatigue Properties of fiber glass Reinforced polyester Composites

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Abstract: E-fiber woven glass (EFWG) reinforced composites have made great progress in the last few decades due to their useful properties, and have been used in many areas as an airspace, in aircraft, marine, sporting goods and automobile industry due to high strength compared to weight and lower cost. The properties mentioned in this article for composite materials such as high tensile strength in relation to weight, high fatigue resistance, which give excellent advantages to leaf springs when used instead of leaf springs made of steel, and therefore this type of composites can be applied in leaf springs used in cars instead of steel springs without any reduction on the load carrying capacity and stiffness in automobile suspension system. This article deals with the study of two types of glass fibers, the first type is regular (0-90) and another type is random, immersed in polyester. Both types are tested under stable load (tensile test, impact test) to obtain mechanical specifications and test under opposing dynamic load (tensile-compression) which is the fatigue test to obtain the fatigue life curve. The results showed that the tensile strength in the regular type is higher than the tensile strength in the random type, the impact test showed an increase in the energy required for fracture in the random type relative to the regular type and the number of cycles required to resist filar fatigue is higher in the regular type than in the random type.

Acceptance Number:162

A Novel Method for Evaluating Inhibition Percentage of Endogenous Digitalis in Patients with Pre-eclampsia

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Keywords: Pre-eclampsia, Hypertension, Endogenous Digitalis.

Abstract: Background: Pre-eclampsia is an idiopathic disorder of pregnancy emergence by proteinuria and hypertension. It is a multisystem illness, but its etiology is poorly understood. Pre-eclampsia has linked to a variety of system abnormalities, including ion transport disorders in neonatal, maternal, and placental cell lines. **Objective:** In this study, a novel method is described to evaluate the inhibition percentage of endogenous digitalis in plasma of pre-eclampsia compared with normal pregnancies, with estimation of sensitivity and specificity of the proposed test. **Design and Methods:** This was a case-control study consisting of 130 cases, and these cases were divided into three groups, 55 normal pregnancy (positive control), 30 non-pregnant women (negative control), and 45 Pre-eclampsia (patients). A novel method included estimation of the percentage inhibition of endogenous digitalis by measuring enzyme activity for the patient and positive control. The results were analysed using the statistical package for social sciences (SPSS®) software version 26.0. A p-value of ≤ 0.05 was consider significant. **Results:** In the pre-eclampsia patient, the specific activity of Na-K ATPase was significantly lower Mean = 0.239 mg / g; ± 0.043 compared to the control group which was 0.397 mg / g; ± 0.021, $P < 0.001$.While the result of inhibition percentage of endogenous digitalis showed significantly higher in the pre-eclampsia patient mean = 35.852 % ± 2.692% compared to the control group mean 17.964% ± 1.784, with a P value < 0.000. C**onclusion:** Pre-eclampsia is linked with significantly lower erythrocyte sodium pump activity than normal pregnancy. Also, the results shown the inhibition percentage of endogenous digitalis elevated in patients with preeclampsia compared with normal pregnancy.

Acceptance Number:163

IMPROVEMENT THE IMPACT STRENGTH PROPERTIES FOR NANO COMPOSITES BASED ON POLYMERS

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KEYWORDS: PolyUrethane, Epoxy, nano (Al_2O_3), Impact Strength, Fracture toughness

ABSTRACT: This study aims to prepare composite materials and improve some of their mechanical properties by using epoxy resin and polyurethane as the matrix material, and nanoparticles(Al_2O_3) as a reinforcing in different ratio with weight fractions (5%, 10%, 15%), to improve some mechanical properties. The results shown in the tables that increasing the weight fraction of nano particle leads to an increase the elasticity coefficient a durability of the impact and absorbed energy, with an increase in the temperature of the composite material reinforced with nano aluminum oxide particles. While the mechanical properties gradually decrease with the increase of the period of immersion in the water.

Acceptance Number:164

Stability Analysis of Laminated Composite Plates via a Two-Step Perturbation Approach

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Keywords: Laminated composite plates, First-order shear deformation theory, Two-step perturbation technique, Buckling, Post-buckling.

Abstract: A two-step perturbation technique is utilized to determine critical buckling loads and post-buckling equilibrium paths of laminated composite plates. The equilibrium, stability, and compatibility equations of laminated plates are derived by using the first-order shear deformation plate theory (FSDT) also Von-Karman-type nonlinearity formulations are the consideration, and through the minimum total potential energy principle. The structure is assumed to be under uniaxial and biaxial compression loads. Effects of different parameters such as biaxial loads, modulus ratio (E_1/E_2), and aspect ratio (a/h) on critical buckling loads and post-buckling equilibrium paths of graphite/epoxy laminated plates are investigated. Then, the critical buckling loads and post-buckling equilibrium paths of the symmetrically laminated composites are calculated by Mat lab software code. Results are shown in the form of plots presenting the variation in dimensionless buckling load parameters with dimensionless maximum deflection. The results offer that the critical buckling loads and post-buckling equilibrium paths under uniaxial compression load are higher than those under biaxial compression load.

Acceptance Number:165

Assessment of Main Related Characteristics For Modified Highway Concrete Pavement By Fibers

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Abstract. Previous researchers remarked that fibers have the ability to enhance concrete performance efficiently, such as enhancement of concrete absorption energy and flexural strength. However, corrosive may have adverse effect on steel fibers concrete of highway pavement, which leads to eliminate fibers effect ultimately. Therefore, fibers types such as macro synthetic and polypropylene are effective alternatives to steel fibers, since they have ability to resist environmental and chemical corrosion. On the other hand, polypropylene fiber requires further properties improvements although of its beneficial utilization in many applications. This study aims to characterize the performance of concrete incorporated fibers compared with traditional concrete mixes. Fresh and hardened properties were covered in this study for concrete with fibers content 0%, 1%, 2%, 3% and 4% are determined by laboratory tests. Slump flow test was adopted for the control (CC – C30) and polymeric fiber reinforced concrete (PFRC) mixes to satisfy the requires specification (25-75)mm. Cylindrical specimen (10cm diameter × 20cm height) were casted for the purpose of thermal expansion and cubical specimen (15 × 15)cm were casted for checking compressive strength. Abrasion test was performed to determine pavement concrete resistance to abrasion for the cylindrical specimens (150DX75H, in mm). Results of the performed test have shown that reinforced concrete fibers are affected by external adverse exposure during pavement surface life. Moreover, incorporating 3% of polymer fibers within concrete mixtures resulted in a significant improvement on various concrete properties (compressive strength, abrasion resistance and thermal expansion).

Acceptance Number:166

The effect of chlorophyll on the mechanical properties of natural rubber (NR) and the penetration resistance to X-ray

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Keywords: Tensile Set. , Hardness , (NR) , Absorbency

Abstract: After extracting chlorophyll from the Alfalfa plant and tree leaves as a plasticizer and antioxidant with different ratios (20 - 100 pphr) and its effect on the mechanical properties of the prepared rubber Composite was studied, the results was showing a decrease in the tensile , elasticity and the hardness while increasing the elongation . As for the X-ray penetration results , was very weak even at high chlorophyll levels (100 pphr) and at (10 KV) voltage. The sample was not relibling for radiation protection.

Acceptance Number:167

Polymer Modelling for Chemical and Biomedical Purposes

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Keywords: polymerization reactions, polyurethane, modeling, biomedical, implant.

Abstract. Thermoset polymers were widely utilized in different chemical and biomedical applications. The mechanism of monomer reactions and heat of reaction plays an essential role in using these polymers in bones and implants. Modelling of homogeneous and catalytic reactions of thermoset polymer reactions have been studied by many researchers to identify the type of reactions. Chain-growth polymerization reactions tend to increase polymer viscosity faster compared to step-growth reactions. Simulation is an effective method for predicting the mechanism of the polymerization reaction. For non-catalytic processes, the catalyst introduces a chain-growth reaction mechanism as opposed to a step-growth mechanism polymerization. The viscosity increases lead to faster attaining to the gel point. In this study, a modelling program was written to distinguish and identify the types of homogenous and catalytic reactions of polyurethane gel reactions. Experimental results of polyurethane reactions prove the results from a modelling program. This simulation provides a powerful tool for better selecting and improving polymers in bones and implants.

Acceptance Number:168

Mechanical Properties of Polymer Blend Reinforced with Nano Silica

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Abstract: Unsaturated polyester resin widely separated because of its low cost and its good physical properties. To get higher impact resistance, it has been blended with natural rubber (NR), for the weight ratio (UP 80 / NR 20) % and reinforced with different loading of nano silica with particle size (20nm) ranging from 0 to 5wt% were prepared by hand – layup method, and were characterized for their SEM. The nanocomposites' mechanical properties like: impact strength, tensile strength, and hardness were studied as a function of filler loading. All of these mechanical properties values were increased with increasing the filler concentration.The results showed averages of (18%, 90% and 39%) increase in tensile strength, impact strength and hardness respectively compared to pure blend. SEM image of 5wt% amine-silica/UP/NR showed that there is a free space between the small clusters of the nano silica agglomerations. And in the case of unfilled UP/NR blend there was a very limited plastic deformation because of Presence of UP matrix around the rubber particles. Keywords: Natural rubber, Unsaturated polyester, nano silica, mechanical properties, Nanocomposites.

Acceptance Number:169

The Impact of the local Materials on the Abbasid palaces sustainability

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Keywords: Abbasid Palaces ; Building materials; Palace ; Environmental sustainability; Brick; Characters of materials

Abstract: The present research aims to study building materials in Abbasid palaces such as clay, bricks to know the environmental sustainability in them and how they have survived to the present time, and analyzed the properties of the Abbasid palace (Al-Jaafari Palace remains) in the city of Samarra. the research methodology was analytical. by taking samples from Al-Jaafari Palace remains and studying the properties of materials of the palace and to obtain the results.

Acceptance Number:170

Validating Sustainable Water Resources And Fluid Flow By Studying Phosphorus Concentration Of Tigris River Water In Baghdad

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Key words: Tigris River Water, Phophorous, Water pollution, Baghdad, Sustainablitiy, Water Resources, Fluid Flow.

Abstract. Water pollution poses one of the major global threats for any political and scientific communities impairing life and health, damaging industrial activities as well as sustainable growth and development of a civilization. In Iraq, population and industrial expansion in the city of Baghdad and major cities has led to the establishment of many industrial projects in various areas. The presence of harmful substances in small quantities from these plants to the river directly does not cause water pollution, but there accumulation for a long time pose a threat to the quality of water as well its environment and organisms such as fish, aquatic animals that harbor that habitat. Water pollution in general is demonstrated by the decrease or increase of dissolved oxygen, the increase in dissolved nutrients, the increase of water polarity and its effect on light penetration. Therefore, the current study aimed to evaluate the qualitative changes (phosphorus concentrations) in the Tigris River water by assessing the river water quality. The study has used the ongoing water treatment projects such as Al- wahda, Al- rashed, Al- karama, Al- wthba, Al- doura, Al- qadisiya, Um al- khanazeer, Shark dijjila and Al-khademya. in the Baghdad city as raw water sources. Furthermore, the study also emphasized the effect of water quality in Tigris River produced from water purification projects of Baghdad city that sites the river path. Chemical tests were conducted on the collected samples which was collected in summer and winter to distinguish the polluted areas in the river and to and identifying the best methods to eliminate the pollution to keep our water resources sustainable.

Acceptance Number:171

Forecasting of Traffic Accidents in Iraq for the Planning Time series *from 2020 to 2025* Years by statistical methods

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Keywords: Traffic Accidents, road, signal traffic, Forecasting, *ARMA(p ,q)* models, Time Series Analysis Future Projection

Abstract: Research aimed to forecast of predicating statistics concerning time series *(2020 – 2025)* period regarding on a traffic accidents numbers in Iraq, in addition projection of long term trend for the dead and non dead traffic accidents, numbers of deaths, and numbers of injuries in Iraq using low ordered of *ARMA(p ,q)* models along the studied period *(2002 – 2019)* yrs. in order to identify the behavior of these indicators in the coming years. Collected of data by using Annuls of the Statistical Reports of Traffic Accidents registered and published by the Ministry of Planning for time period *(2002 – 2019)*. Four criterions had been applicable, such that (*MAE, MAPE, ME,* and *MPE*), the first two criterions measured the importance of the errors. A best model will give a smaller value. The last two criterions measured the bias. A best model will give a value close up to zero. Forecasting models are suggested of low ordered *ARMA(p ,q)*, and among that (Auto-Regression of order (1) model, i.e. *AR(1)*, and moving average model of order (1), i.e. *MA(1)*) were selected, since they are recorded highly significant parameter's estimates at $P<0.01$, as well as significant results concerning goodness of fit tests at $P<0.01$. Among the results of concussions due to forecast studied time series in the coming years, markedly decreased during the projection periods, for the years *(2020 - 2025)*.

Acceptance Number:172

DEVELOPMENT OF CRITERIA AND PROCEDURES FOR THE PROPOSED

ASPHALT BINDER ADHESION TEST METHOD

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Keywords: Asphalt Adhesion, Adhesive bond strength, Moisture damage, Tensile Bond energy.

Abstract: Adhesion on asphalt mixtures can be defined as energy required to fracture the adhesive bond energy between asphalt binder and aggregates causing isolation from each other (adhesion failure). The quality, performance and serviceability of flexible pavement are based on the adhesion properties between aggregate and asphalt binder. Adhesion between aggregate and asphalt plays an important role in the mechanical performance of any asphalt concrete mixture; at the same time adhesion is the weakest link in the material. This study is focused on the development of a laboratory adhesion test method that can be used to directly measure the adhesive bond strength between asphalt binder and aggregates, The main objective of this study was to develop and establish a simple, practical and reliable loaded laboratory adhesion test method and direct measurement of the adhesive bond strength of asphalt binder and aggregates and thus to quantify the adhesive bond strength and failure characteristics of a wide ranges of asphalt binder thicknesses, asphalt binder types, testing conditions (deformation rates and test temperatures) and conditioning procedures (dry and wet conditionings). INSTRON servo hydraulic frame 4204 has been used for measuring the adhesive bond strength. Laboratory work was divided into two parts, which focused on specimen preparation and testing. However, design and fabrication of suitable moulds and testing rig (i.e. test setup and apparatus) were required in the first place, in order to suit the INSTRON servo hydraulic frame 4204, at the end of this part; data analysis was conducted in order to evaluate the uniformity and repeatability of the test results. Results of the study were subjected to comparative analysis in order to determine the effect of various variables and parameters on the test results (a total of 720 specimens of various binder thicknesses in the range of 10 µm (0.01 mm) and 100 µm (0.1 mm) were subjected to dry conditioning at 10 and 20 °C and wet conditioning at 20 ºC for 24 hrs before being tested at different deformation rates (3,6,30,60, 120 and 240 mm/min) and test temperatures (10 and 20 ºC). Four types of asphalt binder and two types of aggregate were used, to propose suitable testing conditions and to validate the reliability and efficiency of the laboratory adhesion test method.

Acceptance Number:173

Luminescence method to characterize the growth of $AgInS_2$ quantum dots

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Keywords: *$AgInS_2$, quantum dot, Luminescence.*

Abstract. Methods of synthesis of nanoparticles are well understood, however, obtaining nanoparticles with specific properties which enable them to be used as biosensors is a completely different story. Many issues occur as a result of putting the technique for producing repeatable and time-stable nanostructures into practice. We synthesized $AgInS_2$, nanoparticles by different methods as colloidal quantum dots (CQD) to examine the efficacy of the synthesis process on the nanoparticles condition in addition to their optical characteristics, as well as the size of, composition, absorption, and luminescence spectra. The findings state that Ag accumulation in the InS lattice creates deformation that leads to structural defects.

Acceptance Number:174

Recognition and Classification of Facial expressions using Artificial Neural Networks

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Keywords: Information Security, Facial Expression, Biometric System , GANS, SFEW

ABSTRACT: This paper addresses the problems of recognition and the classification of the facial expressions from videos. Currently there are excellent results focusing on the control environments, where artificial facial expressions are found. It is by far the largest database of facial expression, valence, and arousal in the wild enabling research in automated facial expression recognition in two different emotion models. On the other hand, much remains to be improved when it comes to the uncontrolled environments, in which variations in lighting, camera angle, face framing, make the small amount of labelled data available in impediment when the training models of automated learning. In order to attack this difficulty, the Reproductive Confrontational Networks technique was used in an innovative way, which allows a large number of unlabelled images to be used with a semi-supervised training style. In this paper; nearly half of the retrieved images were manually annotated for the presence of seven discrete facial expressions and the intensity of valence and arousal. From facial expressions, as well as the primary theoretical frameworks that have been offered to explain these patterns, we propose that this is an area of inquiry that would benefit from an ecological approach in which contextual elements are more explicitly considered and reflected in experimental methods and may suggest heretofore unexplored underlying mechanisms.

Acceptance Number:175

Band Gap Alteration of Fe_2O_3 Nanoparticles by Changing the Polymer Matrix

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Keywords: Nanocomposites; Magnetic nanoparticles; Iron oxide; Polymer matrix; Band Gap Alteration

Abstract. Nanocomposites materials of fe_2o_3 with poly ethylene oxide and poly vinyl pyrrolidone were synthesized by chemical method using ammonia as a reduction agent. Fe_2o_3 based nanocomposites deposited as film by drop casting technique on glass substrates. The effect of polymer matrix type on the optical properties (absorption and direct and indirect band gap) were investigated. It was observed from the absorption spectra of the various synthesized materials that the type of polymer used in the preparation process has a very important influence on the location of the absorption peak as well as the amount of the energy gap.

Acceptance Number:176

Durability Indication of Concrete Exposed to Contact with Some Petroleum Products

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Keywords: Petroleum Products, Oil, Strength, normal concrete;

Abstract. The expose of concrete in direct and indirect contact with petroleum products is evaluated. This study has presented the effect of some petroleum products on some mechanical properties for concrete with different ages. The Petroleum Products that used in this study were gasoline, gas oil and kerosene. First, all the concrete specimens cured by water to age 28 days, Then the concrete samples were divided in to four groups to each specimen's cubes and prisms: the first group cured in water as reference specimen and the others groups cured in tanks filled with gasoline, gas oil , and kerosene. All specimens were kept in cured places of ages 60, 120 and 150 days in ambient temperature. The compressive and flexural strengths for the specimens in above ages were tested. The results showed a decrease in compressive and flexural strength of specimens that were cured by gasoline, gas oil, and kerosene compared with refined specimens.

Acceptance Number:177

Finite Element Parametric Study of Overhang Horizontally Curved Deep Beams

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Keywords: Overhang, Horizontally Curved, Deep Beam, Finite Element, Parametric Study

Abstract. The current work presents a parametric study for twenty-five reinforced concrete overhang curved deep beams using finite element analysis. The parameters that were taken into consideration are radius, height, width, compressive strength of concrete and number of supports. It is found that the max positive moments increase by about 2.8-4.4% when decreasing the radius of beam by about 16-33%. The max negative bending moment, max torsional moments and max deflection decrease by about 1.9-12.4%, 0.4-8.9% and 30-87%, respectively, when beam radius decreases by 16-66%, whereas load capacity increases by about 23-195%. The max positive bending moment, max negative bending moment, torsional moment and load capacity increase by about 32-128%, 30-124%, 31-125% and 31-127% respectively, when the beam height increases by 12.5-100%, while deflection decrease by about 9-18%. The max positive bending moment, max negative bending moment, torsional moment, load capacity and max deflection increase by about 32-147%, 29-134%, 30-138%, 32-146% and 1.2-4.9%, respectively when beam width increases by 12.5-50%. The max positive bending moment, max negative bending moment, torsional moment, load capacity and max deflection increase by about 17-70%, 15-61%, 15-63%, 17-69% and 0.1-0.4%, respectively, when concrete compressive strength increase by 33-166%. Finally, it is found that the max positive bending moment increases by about 32% when increasing number of supports by 33%. Max negative bending moment and capacity of load increase by about 17-60% and 106-763%, respectively, when number of supports increases by 33-133%. Torsional moment and max deflection decrease by about 0.8-16% and 29-78%, respectively when number of supports increases by 33-133%.

Acceptance Number:178

Studying the oxide layer status of Ti6Al4V and CoCrMo alloys in simulated body fluid

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Keywords: Ti6Al4V, CoCrMo, Corrosion, Oxide layer and Mott-Schottky analysis

Abstract: Ti6Al4V and CoCrMo are the most important biometallic alloys. The oxide layer that forms on the surface of these alloys plays a decisive role in determining the passivity and the biocompatibility of these materials. Thus, the current work used advanced electrochemical methods to investigate this layer in detail. The pitting and repassivation were examined using cyclic potentiodynamic. Furthermore, the oxide layer's thickness, resistivity, and electronic structure were determined via electrochemical impedance spectroscopy EIS and Mott- Schottky analysis. The results showed that the two materials have the same corrosion resistance. A much thicker oxide layer was found to form on Ti6Al4V compared to CoCrMo alloy, yet the resistivity of the former is about half of the latter. Further electrochemical examination showed that the oxide layer of Ti6Al4V exhibits n-type semiconductor behaviour, whereas CoCrMo alloy's oxide layer exhibited n- and p-type semiconductor behaviour.

Acceptance Number:179

FLEXURAL STRENGTH OF ALIGNED STEEL FIBER REINFORCED SELF-COMPACTING CONCRETE

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Keywords: fiber orientation, fiber alignment, reinforced self-compacting concrete composites, aligned fibers, electromagnetic flux.

Abstract. The dispersal of steel fibers in the concrete composites is likely to be more or less of a random orientation. The ultimate peak load and post-cracking behavior are controlled by the fiber orientation. This article is dedicated to theoretically investigate the relationship between the fiber direction angle and the percentage of pull-out force carried out. The investigation covers the analysis of an inclined fiber in two-dimensional and three-dimensional composites. The analysis is backed experimentally up by results of tests performed on self-compacting concrete prisms with random and aligned micro steel fibers. An electromagnetic field complemented with vibration is utilized to align the steel fibers in the fresh mixture. In this study, the effect of alignment was compared with the results of three concrete prisms produced with random fibers. The efficiency of alignment was monitored through the visual inspection. The electromagnetic process managed to make the fiber orientation factor ranges between 0.80 and 0.95 in comparison to 0.3 - 0.5 for the prisms of random steel fibers. The failure peak load for the aligned samples was enhanced by 20% compared to the prisms of randomly distributed fibers of 0.35% steel fiber.

Acceptance Number:180

The Influence Of Infill Pattern And Infill Density On The (Tensile, Flexural And Impact) Strength Of 3D Printed Polymers

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Keywords: 3D printing, Polylactic acid (PLA), Tensile strength, Fused deposition modelling (FDM), Infill pattern, Infill ratio.

Abstract. This manuscript describes the effect of the infill pattern and its density (infill percentage) on the tensile behavior of three dimensional printed polymer (polylactic acid-PLA). The polymer filaments were manufactured into 3D prints using locally-made 3D printer, and the specimens were designed by a software that transfers design patterns into the moving printer head with a nozzle that pushes the melted polymer into the final shape. Tensile test specimens were prepared according to the standard specification ASTM D-638, and different infill patterns were made (gyroid, linear and trihexagonal) with different infill densities (30, 50, and 70%). The tests were carried out on 3 specimens for each test to get the optimum results, and the results showed that the specimens with infill ratio 70% and linear infill pattern had the highest tensile strength in the case of Tensile Test compared with other specimens. And the values of Young's modulus obtained by tensile test show that 70% infill density has the highest value, and the linear infill pattern has the highest value, followed by trihexagon and gyroid patterns respectively. But in the case of Flexural Test and Impact Test the Tri-hexagon infill pattern proved to have the highest values of Flexural strength and Impact strength.

Acceptance Number:181

Oxidation of ferrous to ferric ion by additives in bubbel column

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Keyword:- ferrous oxidation , ferric ion, oxidation by additives,Bubble column

Abstract: This study discusses the convert of ferrous sulfate to ferric sulfate by oxidation whit using the bubble column and concentrates by using air and then studies the effect of additives to complete the oxidation. Air is used as an oxidation agent to study the oxidation reaction in bubble column with (5 cm inside diameter, 120 cm tall), in this part of process, studying the operation condition on the oxidation and determining the rate of conversion . Temperature (50,60 and 70)°C ,air flow rate (100,150,200 and 250)liter /hour and initial concentration of ferrous (0.5 , 0.25 , 0.1 and 0.05) moles with fixing the pressure slightly up to 1 atmosphere are used to study the performance of the parameters (initial concentration ,temperature and air flow rate on oxidation ferrous sulfate .The effect of these conditions is studied throughout the experimental work to increase the conversion rate of ferrous .The results are shown that the maximum conversion rate is 53.5% at the temperature 70 °C ,air flow rate 150 liter /hour and initial concentration of ferrous is 0.1 moles. The results of the optimum conditions are depended on the second part of this work by using an additive material, ($CuSO_4$, $KMnO_4$, H_2O_2 and HNO_3) at the different concentration (100 , 200 , 300 , 400 , 500) ppm, the effect of each material is studied to show the conversion rate of ferrous to ferric sulfate. The test of these material gave verifying results for each material and gave verifying result for each concentration of additive on the conversion rate of ferrous .The best result is that the conversion rate is 81.1 % by using $CuSO_4$ at additive concentration 400ppm, the conversion rate is 78.9% by using HNO_3 at concentration of additive 200 ppm , the conversion rate is 73.1% by using $KMnO_4$ at concentration of additive 400 ppm and the conversion rate is 70% by using H_2O_2 at concentration of additive 200 ppm. Mathematical correlation for each additive and the main operating variables on oxidation of ferrous to ferric sulfate are solved by using (Excel) program are illustrated:

$$-\frac{d[Fe^{+2}]}{dt} = 0.412031t + 0.182914T - 0.00967Q - 5.37142Co + 0.019077Cadd - 3.82844$$

Acceptance Number:182

Improving Physicochemical Properties of Municipal Solid Waste Landfill Leachate by Aeration and Filtration in Kwashe Industrial Area in Iraqi Kurdistan Region

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KEYWORDS: Leachate treatment, nutrients, total dissolved solid, and biological oxygen demand.

ABSTRACT: Raw samples of Kwashe open dump sites in the Iraqi Kurdistan region were taken and treated by aeration and filtration methods and 16 physicochemical properties of leachate were determined after and before treatments. The result indicates the efficiency of aeration and filtration in improving this physicochemical characteristics to extend limits. Sodium adsorption ratio and electrical conductivity are reduced by -%19.5 and -53.5%, respectively, but the leachate remained salty as organic waste of Duhok city contain huge amounts of edible salts. Result also revealed that the content of treated leachate of macronutrients like phosphorous, potassium, calcium and magnesium is sufficient for better crops production if it diluted with normal irrigation water and its EC is further reduced.The efficiency of aeration and filtration in reducing nutrients in leachate were in this rank Cl -18%>Ca-15%>Na-11% >Li-10.5% >Ba-9.8%> Mg-8.3% >K-7%> P-5.6% >S-5.2%.TDS and TSS respond to the aeration and filtration better than nutrients and reduced -47% and -45% resistively, but remained slightly over permissible limits of treated leachate. BOD and COD the most critical leachate properties were reduced by treatments -19.7% and -32% respectively, and further advance treatments is required to bring them to allowable ranges of treated leachate.

Acceptance Number:183

Removal of Heavy Metal Ions from Wastewater Using Bulk Liquid Membrane Technique Enhanced by Electrical Potential

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Abstract. Fe is a toxic metal which is found as pollutant in water, it is mainly originating from chemical manufacturing, In this study the Fe ions has been removed from water by using bulk liquid membrane assisted with DC current. Experimental results have shown that high removal of Fe ions occurred when the variants are in an optimum state, the clearance reaches 97%.

Acceptance Number:184

Effect of Horizontal Curvature on Reinforced Concrete Deep Beams

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Keywords: Horizontal Curvature, Reinforced Concrete, Deep Beams, Finite Element.

Abstract. This paper displays the horizontal curvature (circular curvature) effect on deep beams using finite element analysis. Thirty-five reinforced concrete horizontally arched deep beams were analyzed. The parameters that were taken into consideration in the current work are the curvature angle (α) and beam height (H) while keeping one constant value for the beam length (L), i.e., different length to depth ratios (L/H). It is found that for L/H=2; the load capacity decreases by about 38-73% and 16-67%, respectively, when changing α from ∞ (straight beam) to 180 degrees, while torsional moments increase by about 74-174%. Negative bending moments decrease by about 13-56% when changing α from 30 to 180 degrees. The deflection decreases by about 0.1-1.8% when changing α from ∞ to 90 degrees. For L/H=2.5; The load capacity decreases by about 36-73% and 15-67%, respectively, when changing α from ∞ to 180 degrees, while torsional moments increase by about 73-168%. Negative bending moments decrease by about 14-57% when increasing α from 30 to 180 degrees. Decreasing deflection by about 4.1-5.9% when increasing α from 60 to 90 degrees. For L/H=3; load capacity decreases by about 34-73% and 14-68%, respectively, when changing α from 0 to 180 degrees, while torsional moments increase by about 71-161%. Negative bending moments decrease by about 15-58% when increasing α from 30 to 180 degrees. The deflection decreases by about 6-9.7% when increasing curvature angle from 60 to 90 degrees. For L/H=3.5; the load capacity decreases by about 34-73% and 14-69%, respectively, when changing α from 0 to 180 degrees, while torsional moments increase by about 70-156%. Negative bending moments decrease by about 15-59% when changing α from 30 to 180 degrees. Midspan deflection decreases by about 4.6-14.7% when changing α from 60 to 120 degrees. Finally, it is found that for L/H=4; The load capacity decreases by about 33-74% and 14-69%, respectively, when changing α from 0 to 180 degrees, while torsional moments increase by about 69-150%. Negative bending moments decrease by about 16-60% when changing α from 30 to 180 degrees. Changing α from 60 to 120 degrees leads to decrease deflection by about 9.1-19.4%.

Acceptance Number:185

Steel Bar Replacement with Iraqi Bamboo (Qamish) in Concrete Beams.

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Keywords: *Iraqi bamboo (Qamish), Green rebars, Beams, Ductility, Load Carrying Capacity*

ABSTRACT: To minimize the environmental effects of steel reinforced concrete, bamboo is considered as a green rebar in concrete which has been studied for several decades. However, Iraqi bamboo (Qamish) has not been used in concrete by many researchers. Therefore, this paper investigates the usage of Qamish in reinforcing concrete beams. For this purpose, eight concrete beam specimens are cast and tested with dimensions of 100 mm x 200 mm x 1200 mm which are width, depth and length respectively. They tested using three-point loading. It is found that the load carrying capacity of the beams increases with an increase in the number of the Qamish bars if compared with the control specimen which is plain concrete without any reinforcement. That increase is 60% if four Qamish bars are used and it is 82% if six Qamish bars are used. The deflection capacity of the beams increases significantly, where the deflection can increase by 500% if the beam reinforced with four Qamish bars and it will be 550% if the beam reinforced with six Qamish bars. If compared with steel reinforced beams, the load carrying capacity is reduced to nearly a half if six Qamish bars are used and the ductility is nearly a seventh.

Acceptance Number:186

Synthesis, characterization, of Natural Hybrid composite matrix for antibacterial and antifungal application

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Abstract. Due to the fact that natural biomaterials are becoming more and more interesting, they are environmentally friendly, have higher biocompatibility, and cost less. Extraction of natural Calcium carbonate from eggshells was studied using calcination process at 250c, as a reinforcement added to aloe Vera gel with alginate to prepare Natural Hybrid composite matrix (aloe Vera + alginate+ Calcium carbonate). The results showed extracted Calcium carbonate is of high purity and no impurities were resulting from the calcination process, as no secondary compounds appeared and that the ratios of Natural Hybrid composite matrix formation were appropriate and the sustainable mixing method was correct, as it did not affect the main peaks. And the parameter used in the calcination process is very successful and high crystallinity of Calcium carbonate was obtained. In addition, the polymeric additives did not affect the crystallinity and purity of Calcium carbonate, but on the contrary, increased the purity of the material and a uniform structure was obtained. Also the extracted Calcium carbonate has a regular crystal structure, which indicates the success of the calcination process well, in addition to the fact that a Nano-granular size was obtained. The distribution of hydroxyapatite particles within the polymer was uniform and homogeneous. The Natural Hybrid composite matrix proved that it can inhibit some types of bacteria and fungi, but failed against others.

Acceptance Number:189

Utilization waste granulated blast furnace slag to improve the properties of polluted soil by Crude Oil

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Abstract. Utilization of industrial waste materials in the treatment of problematic polluted soils is a cost-effective and environmentally responsible strategy, as it helps to reduce disposal issues created by diverse industrial wastes. The aim of this research is to use waste material Ground Granulated Blast Furnace Slag (GGBFS) to improve various engineering characteristics of polluted soil by crude oil. The engineering characteristics of clean and polluted soils with crude oil were investigated and compared to controls.Three percentages of crude oil 3%, 6%, and 9% were artificially mixed with clayey soils by weight. The effects of Ground Granulated Blast Furnace Slag on the compaction properties (OMC and MDD) and strength characteristics (cohesion and angle of friction) of soil were studied. Different percentages of GGBFS (12%, and 18%) by dry weight were utilized in mixtures of soil samples for different experiments. Ultimately, bases on the experimental results, it is summarized that the use of industrial wastes, i.e. GGBFS are affected in shear strength and compaction properties. Although, they have environment-friendly behavior for the construction project purpose.

Acceptance Number:190

Advances in groundwater pollution by heavy metal

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KEYWORDS: Heavy metal, groundwater pollution, Bibliometric Analysis, Pollution, Environment, Adsorption

Abstract Indiscriminate discharge of heavy metals into the environment is of great concern globally, especially in developing countries. The health risk caused by heavy metals pollution due to its toxicity, non-biodegradation, bioaccumulation, and complex operation with different sources and routes has accelerated as some industries expand with little investment plan around treatment. Over the years, research has been carried out on different aspects of heavy metals pollution, including-, emissions, impact on human health and environment, and mitigation processes. In this study, bibliometric and visualization analysis were used to analyze and evaluate the term heavy metal pollution, health risk, and its treatment approach was analyzed to acquire the overview of the heavy metal pollution on groundwater sources, health risk and treatment, and or removal approaches in different countries of the world from the web of science 1995-2020 publication. The outcome showed that China had a major interest in heavy metal pollution and its impact on lives and ecosystems in the past years as the highest publishers relating to heavy metal treatment technology.VOS viewer software and MS Excel were used as bibliometric tools for the examination of the researcher's certification in their research trends, progress, and publication performance. This, in turn, reveals the publication trends, subject categories and influential journals, country performance, most cited keyword and co-occurrence, author, and co-authorship collaboration network in heavy metals research, which would be of value to new researchers in the field. This paper highlights the trend in heavy metal removal from wastewater.

Acceptance Number:192

Synthesis and Characterizations of Modified Y2O3 Nanoparticles Aluminide Coating on Nickel Alloy IN625

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Keyword: Y2O3 nanoparticles- aluminide coating- cementation process.

Abstract: In this study, the effect of doping Y_2O_3 Nano particles on aluminide coating on the nickel base alloy substrate (IN625alloy) by pack cementation process with single step . The pack powder consists of Al- Y_2O_3-NH_4Cl (as activator) -Al_2O_3 (filler material). The Y_2O_3 doped- aluminide coating specimens were characterized by many tests and inspections, microstructure test, thickness measurement, microhardness test and X-ray diffraction analysis. As temperature above 900ºC layer became unstable. When the temperature arises to 1100ºC, aluminide coating became stable and suitable thickness. After coating layers were synthesized, the nickel diffusion was outward from substrate and the aluminum diffusion was inward from mixture to substrate by parabolic law. It was observed that the coating is composed of top layer, transition layer and interdiffusion layer. The highest value of hardness was (986HV) at doped 2%Y_2O_3 on aluminide coating in comparison to alloy substrate (266 HV). The coating thickness decreases with increasing the Nano Y_2O_3 content in aluminide coating.

Acceptance Number:193

In-Silico screening of selected marketed drugs as potential inhibitors for COVID-19 proteins

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Abstract: Corona virus inflammatory disease -2019 (COVID-19) is a member of corona virus family that include viruses responsible for SARS and MARS outbreaks. Recently, COVID-19 (SARS COV2) causes pandemic worldwide starting from Wuhan city of China. The lack of selective treatment for COVID-19 drags health care practitioner to repurpose approved medicinal compounds for managing the infection and its complications. In this study, 27 FDA approved compounds were screened against SARS COV2 main and papain-like proteases as well as spike protein. Docking results showed that ofloxacin, ciprofloxacin, famotidine and nitrazoxanides showed better interaction with the proteins. The stabilities within binding pocket were further evaluated using molecular dynamic simulations which showed stable binding for ofloxacin and nitrazooxanide during simulation period.

Acceptance Number:194

Environmental impact of using geothermal clean energy (heating and cooling systems) in Economic Sustainable modern buildings architecture design in Iraq: A review

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Keywords: Geothermal Energy, Renewable Energy, sustainability, Environmental design, Architecture design.

Abstract. Nowadays, with all the climate change problems that we face worldwide, engineers from different specialists work together towards Sustainability and finding solutions, and investigating its environmental impact thoroughly. Architectural, Chemical, environmental, civil engineers have always been closely linked in designing and constructing buildings. Geothermal energy is a local, resilient, reliable, ecologically benign, and sustainable form of the renewable energy system. This type of natural energy could be generated from the earth's heat and takes a variety of purposes, including building heating and cooling, electricity generation, supplying warm/cold water for agricultural products in greenhouses, as well as balneological usage. Furthermore, geothermal energy isn't affected by weather and could provide electricity and heat nearly constantly through the year. This study intends to investigate the opportunity of using geothermal energy in Iraq under the ground represents one of the sustainable energy resources we can use it will be a significant environmental benefit in our housing in air conditioning applications. This review gives a summary of geothermal energy systems in general. Topics addressed include: an introduction to the environments and the energy, also their relationship, a geothermal energy history brief, an overview of geothermal

energy systems throughout the world and also through Iraq, and an overview of geothermal systems environmental impacts as well as the environmental impact of Sustainable buildings architecture design, are just a few of the topics covered. Hence, the achieved conclusions of this review can make changes towards sustainable environmental design.

Acceptance Number:195

Characterizing of Chromium oxide Nanoparticles Formation from Solution Plasma synthesis by plasma jet

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Keywords: Chromium oxide nanoparticles, Nanoparticles synthesis, Cold plasma jet, Fructose.

Abstract. In this study, chromium oxide (Cr_2O_3) nanoparticles was synthesized by cold plasma method using the plasma-jet technique. colloidal chromium oxide nanoparticles prepared using chromium nitrate $CrNO_3$ as the precursor in 1 mM molar concentration by de-ionized water as the solvent agent. Additionally, using fructose as natural capping agent in order to prevent the agglomeration and sedimentation of the produced nanoparticles and its role in the size of nanoparticles. The plasma is generated with argon gas by dielectric barrier discharge jet. Cr_2O_3 NPs are produced instantly once the plasma is ignited. The samples are characterized by UV-visible absorbance. UV-vis spectra indicated the presence of two well-defined peaks in their spectrums, at wavelengths are 425 nm and 587 nm respectively, which is a common feature of Cr2O3 NPs .The elemental composition of prepared nanoparticles and their concentration has been determined by Inductively Coupled Plasma mass Spectrometry (ICP-mass), and the results showed that Chromium nanoparticles concentration increased with an increase in plasma exposure times. Determination of particle size and surface charge of NPS are have been for proper characterization of NPs by DLS (dynamic light scattering) and ZP (zeta potential) measurements. The structure of the prepared sample was examined by X-ray diffraction (XRD). For calculating crystalline size the Shearer formula is used. The surface morphology was studied using a Field emission scanning electron microscopy (FESEM) . The obtained results infer that synthesized Cr2O3NPs are in Rhombohedral shape, not crystallized very well with an average crystallite size of 32 nm nm. Synthesized Cr2O3 NPs were subjected to cold plasma to more period with adding fructose led to an increase in the crystallization of the substance and a decrease in the particle size to about 18nm.

Acceptance Number:196

Properties of Sustainable Green Concrete Containing Waste Glass as Eco-Friendly Aggregate: A Review

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Keywords: Waste Glass, Recycling, Construction materials, Sustainable concrete, Mechanical properties

Abstract. The safe disposal of a large amount of waste glass (WG) in several countries has become a severe environmental issue. In contrast, concrete production consumes a large amount of natural resources and contributes to environmental greenhouse gas emissions. It was widely known that a lot of kinds of waste may be utilized rather than raw materials in the field of construction materials. However, for the wide use of waste in building construction, it is necessary to ensure that the characteristics of the resulting building materials are appropriate. Recycled glass waste is one of the most attractive waste materials that can be used to create sustainable concrete compounds. Therefore, researchers focus on the production of concrete and cement mortar in utilizing waste glass as an aggregate or as supplementary materials. In this article, the literature discussing the use of recycled glass waste in concrete as a partial or complete replacement for aggregates has been reviewed by focusing on the effect of recycled glass waste on the fresh and mechanical properties of concrete.

Acceptance Number:197

Three-Component Weather-Sensitive Load Forecast Using Smart Methods

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Keywords: Weather Sensitive Load Forecast, Artificial Neural Network, Mean Squared Error, IRAQI Loads.

Abstract. The electrical load is affected by the weather conditions in many countries as well as in Iraq. The weather-sensitive electrical load is, usually, divided into two components, a weather-sensitive component and a weather-insensitive component (baseload). The impact of the weather-sensitive component includes the summer and winter periods, without distinguishing between them. The characteristics and specifications of this component (weather-sensitive component) differ in summer and winter due to the different loads in the seasons, so it is best to separate these two components into two independent components. The research provides a method for separating the weather-sensitive electrical load into three components, the summer component, the winter component, and the base component. The artificial neural network was used to predict the weather-sensitive electrical load using the MATLAB R17a software. Weather data and loads were used for one year for Mosul City. The performance of the artificial neural network was evaluated using the mean squared error and the mean absolute percentage error. The results indicate the accuracy of the prediction model used in the research.

Acceptance Number:198

Convolutional Neural Networks and Cellular Automata Integration for Predicting Agricultural Lands Using Landsat Images: A Case Study of Baghdad

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KEYWORDS: Land Cover, Convolutional Neural Network (CNN), Image Classification, change Detection

Abstract. This study examined the assessment and forecast of agricultural lands in Baghdad, Iraq through an integrated Convolutional Neural Network (CNN) and Cellular Automata (CA). From 1990 to 2020 images from Landsat were acquired for this purpose. The study area land cover maps were prepared using the CNN method. Each land cover map had five categories, i.e., water, urban/built-up, barren/sparsely vegetated, irrigated crop and pasture, and mixed shrub/grassland. A range of accuracy measures such as confusion matrix, F1 score, Kappa Index, and Overall Accuracy have been used for the validation of the classification maps. The changes focused on irrigated crop and pasture, also projected to 2030, were evaluated after preparing land cover maps for the area under study. The findings indicate that the proposed CNN model has been effective and has produced more accurate results than other classification methods. The results showed that irrigated crops and pasture decreased in 2000 and 2010 from 1990. The decrease was mainly due to a period of drought in Iraq because of the lack of rain. The rainfall amounts were however exceptional in 2018 and 2019, leading to an increase in irrigated crops reflected in 2020 classification maps. The projections for 2030 revealed an increase in irrigated crop and pasture in the Mansour District from 4.29% to 7.52%, 8.94% to 22.23%in in Eastern Karrada District, and the New Baghdad District from 1.35% to 3.9%.

Acceptance Number:199

Bearing Capacity of Shallow Foundation on Geogrid Reinforced Soil

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Abstract. An extensive laboratory test program was planned to satisfy the targets of this research which consists of studying the effect of depth of the first layer, number of reinforced layers, varies types of soils, and different shapes of foundations on performance of shallow foundations on geogrid soil reinforcement. This research included manufacturing a new test machine for measuring the bearing capacity (BC) of different types of foundations rested on different types of reinforcement soils. Three types of foundation was used: strip, rectangular and square foundation. The type of geogrid material was the biaxial geogrid. The research considered three types of soils: clayey soil, sandy and sandy underlain by clayey soil. The results obtained through this study revealed an increase in the bearing capacity for specific values of design parameter. It is concluded that the depth of the first layer affects the results. When the depth of the first layer increases, the bearing capacity of foundation decreases. Optimum value of the ratio of first layer depth to the width of foundation (u/B) was about 0.33 for clayey soil and 0.25 for sandy soil. The influence depth of reinforcement layer (d/B) was 1.25 at silty clay and sandy soil. Optimum number of reinforcement layers about 3 for silty clay and sandy soil. For sandy soil, the bearing capacity ratio (BCR) increased with increasing the number of reinforcement layers in different proportions. For the shape of footing, the square footing showed a maximum value of bearing capacity of foundation on silty clay and sandy soil compared to other types of foundations.

Acceptance Number:200

Lithium Niobate –Based Sensors: A review

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Keywords: lithium niobate; thin film; Sensor; $LiNbO_3$; photonic devices.

Abstract. This paper shows lithium niobate-based sensors as an overview for different sensing applications that based on pure and doped lithium niobate film. The earlier published works are summarized as well as the lithium niobate film as sensor has found broad field as a result of increasing demand for sensing applications in different fields as healthcare, defense, security, automotive, aerospace, environment, food quality control, chemistry, medicine, biotechnologies and aeronautic. Lithium niobate film based sensor are consider to be promising to open a new generation fields to their virtues such as large dynamic range, low cost, high sensitivity, and compact size. Where, the high sensitivity was obtained among electric field sensors. While the high precision sensation value was obtained among gas sensor.

Acceptance Number:201

Electrochemical Study of Redox Stream Antioxidant Effect of Nanocellulose Membranes Prepared from Wheat Straw in Blood Medium

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Keywords: Nanocellulose; Cyclic voltammetry; Oxidative and anti-oxidative; Superoxide; Wheat straw; Membrane. Reactive oxygen species.

Abstract. An inexpensive chemical-mechanical method was used for defibrillation of cellulose, hydrolysis, sonication, and filtration in which nano cellulose membranes were obtained by casting and evaporation. Nanocellulose membranes were fabricated using nano cellulose from wheat straw by sonication and hydrolysis with 30% sulfuric acid as “sample NC1” and 50% sulfuric acid as “sample NC2”. The techniques used in nano cellulose characterization included (FE-SEM), (TEM) and in vivo lab experiment techniques. Increasing the sulfuric acid concentration led to the transition from the formation of web-like nanofibers as NC1 that have a fiber diameter of 5.63 nm and an average area of 34.24 nm to the formation of nanoparticles-based nano cellulose with an average diameter of 36.12 nm and average area of 2582.42 nm as NC2. Nanocellulose membranes prepared are non-toxic in the blood medium and considered as an antioxidant. NC also has its ability to fight organisms armed with an antimicrobial activity which may suggest the decreasing of anodic peak current.

Acceptance Number:202

Synthesis Porous Silicon Substrates Using Electrochemical Etching Method Assisted by Laser

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Keywords: Nanocrystalline; Porous silicon; Electrochemical Etching; Laser.

Abstract. Nano-crystalline size of porous silicon substrates get attractive attention in fabrication of optoelectronic devices as photodiode, photodetectors and solar cells. Electrochemical etching method assisted by laser have been used to synthesize six samples of porous silicon from n-type silicon wafer of (1000) orientation. FESEM, AFM, XRD, Photoluminescence respectively were utilized to characterize and analyze topographical, morphological, structural, spectroscopic properties of the synthesized substrates. Moreover the electrical properties of the synthesized substrates were performed as I-V and $1/C^2$ characteristic. The impact of altering etching current density on structural and spectroscopic surface characteristic of synthesized samples were performed. It observe that excellent quality of synthesized substrates was achieved at 10 mA/cm^2 current density because it has high photoluminescence peak , provide high nanoporous structure, excellent surface roughness and suitable electrical properties

Acceptance Number:203

Treatment of Facial Telangiectasia Using Long-Pulsed Nd: YAG Laser

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Keywords: facial telangiectasia; blood vessels; long-pulsed- Nd: YAG laser.

Abstract. This paper presents an introduction to Facial telangiectasias, which are a frequent cosmetic concern for both females and males with various skin types and ages. This study examines the clinical effects and safety of applications with a long-pulsed 1064 nm Nd: YAG laser system to treat facial vessels. The factors influencing the procedure will be demonstrated. Instant improvement of facial telangiectasia is reported with a low level of discomfort and irritation.

Acceptance Number:204

Reviewing the Effects of Noise Pollution on Students (College and University)

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Abstract. This paper reviews research, studies and questionnaires on issues relating to the effects of noise on students at colleges and universities. Issues covered include factors affecting; colleges and universities campuses noise sources, outdoor and indoor classroom, and educational labs noise sources; health effects of noise on students; and acoustic environment of the classrooms.

Acceptance Number:205

Preparation of Gold nanoparticles doped Zinc Oxide using reactive pulsed laser ablation in liquid

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Keywords: Gold nano-particles; Optical fiber; Gass Sensors; Refractive Index Sensors; Sensors.

Abstract. The effect of using an Nd: YAG laser tattoo removal (nanosecond pulses) to ablate pure gold targets to obtain gold nanorods and pure zinc targets to obtain zinc oxide nanoparticles was investigated separately in ethanol using an Nd: YAG laser tattoo removal (nanosecond pulses) and then mixing the resulting mixtures to obtain gold dopant with zinc oxide in this manuscript. Pure gold Nanorods, ZnO nanoparticles, and Au doped ZnO nanoparticles were characterized using transmission electron microscopy (TEM), X-Ray Diffraction (XRD), and optical properties. The qualities of the manufactured gold Nano highways were disclosed using XRD and TEM. According to the findings, gold Nanorods created by the 532 nm laser have outstanding optical, structural, and morphological features and can be used in a variety of sensors.

Acceptance Number:206

Fiber Optics for Sensing Applications in a review

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Keywords: Optical fibers; thin film; Sensor; gold nanorods; Photonic devices.

Abstract. This paper introduces a review of the use of gold nanoparticles (AuNPs) in the fabrication of optical fiber biosensors based on localized surface Plasmon resonance (LSPR) and Evanescent field absorption. The AuNPs have special properties, such as high surface/volume ratio, and intense light scattering/absorption, and stable structure. The main advantage of AuNPs in the application of the biosensor in the detection signal increasing, for especially low concentration analyses. Moreover, we illustrate some of the previous works in this field in the period from 2001-2021, which used optical fiber and AuNPs as a base in the development of various biosensors and all exhibited differently limits of detection, sensitivity, and good performances to its target detection.

Acceptance Number:207

Robust-Positive Controller for Glycemia Regulation in Type One Diabetes

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Keywords: Type 1 Diabetes (T1DM), Artificial Pancreas, Sliding Mode Perturbation Observer (SMPO), Hybrid Control, Parameters Uncertainty, Non-negatively Invariant Set.

Abstract. The fundamental problem of an Artificial Pancreas (AP) study is to keep Type One Diabetes Mellitus (T1DM) glycemia within normal limits. Avoiding hypoglycemia and reducing the risk of hyperglycemia. In this study, a previous non-negative controller aimed to manage glycemia and avoid hypoglycemia during the fasting phase is constructed. The originality is in developing this controller with undetermined parameters to work in the postprandial phase while avoiding hypoglycemia and preventing hyperglycemia. Furthermore, keeping the system within the non-negatively invariant set (PIS). Meal disturbance is estimated to be included in the control law via a sliding mode perturbation observer. Although the meal effect is removed early enough to avoid glycemia from increasing to hyperglycemia, the new controller's positive performance is not guaranteed. As a result, anytime the new controller performs a negative action, a hybrid controller is programmed to revert to the prior non-negative controller. Because the control input (insulin) can only be injected and cannot be withdrawn from the bloodstream in the event of an overdose, this scenario necessitates the employment of a non-negative control. On five virtual T1DM patients, the hybrid non-negative controller is tested in silico. The in silico results indicated that this controller kept the glycemia stable between hyperglycemia and normal glycemia while preventing hypoglycemia episodes. As can be observed, the controller's positivity in an uncertain circumstance is increased, and the BGC threshold is somewhat exceeded.

Acceptance Number:208

Development of a new system (program) for detections of EMG signals for biomedical purposes

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Keywords Electromyogram (EMG), COVID 19, Corona Virus, Neuromuscular, Myoware Sensor, Biomedical Engineering, Arduino, Pandemic.

ABSTRACT: Electromyography (EMG) is known as an analyzing, recording, and measuring technique for electrical activity generated by skeletal muscles. EMG signals detection with powerful and advanced practices have become a crucial prerequisite in Biomedical engineering with its implications largely in clinical diagnosis as well as in the management of rehabilitation of motor disability. The importance to use newly developed measurements to investigate neuromuscular problems increased dramatically, especially after COVID 19 as patients suffer from muscle weakness. It is crucial to develop the medical technology and its software to get the best reading of the signals so that the clinical doctors can diagnose each special case accurately. In this work, a skeletal system has been proposed to measure muscle activity, which represents the measured voltage and the amount of force exercised by the muscles in real-time. These signals appeared in the form of control orders from the Arduino UNO controller. Special programming has been developed to help us to measure the changes that occur in the muscles when they move, meanwhile the muscles are tightened by a certain amount which leads to the illumination of the first light and then at a stronger tension that illuminates the second light and the process is completed. The indicated systems used different loads and ranges of motions of the elbow joint to calculate the muscles contraction in different cases, the normal cases, athletic muscles, and also the voluntary muscles in the case of Neuro-muscular diseases. The indicated systems used different loads and ranges of motions of the elbow joint to calculate the muscles contraction in normal cases, in atheletic muscles, as well as the voluntary muscles in the case of Neuromuscular diseases.

Acceptance Number:209

A Comparison Study of PV/Thermal Collector Performance Using Air and Water Cooling

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Keywords: PV/Thermal collector, Comparison Study, Air and Water Cooling

Abstract: The high temperature of solar cells, especially in hot weather, causes a significant decrease in the efficiency of these cells. To raise the photovoltaic efficiency of the hybrid solar system, two thermal collectors were established, the first uses air as a coolant and the second uses water to cool the solar panels, which raises the temperature of the liquid and takes advantage of the electrical power on one hand, and increases the electrical and thermal efficiencies on the other hand. The study showed that when the air used to cool the panel (PVT/air) at a speed of 2.5 m / s, electrical power, electrical efficiency and thermal efficiency found to be 92.8 W, 13% and 78.08% respectively. On the other hand, when using water as a liquid to cool the panel(PVT/water) at a flow rate (0.175 L/min), the electrical power, electrical efficiency and thermal efficiency 77.72 W, 11.59%, and 36.61% respectively. The study also showed that enhancing the air cooling process results in better performance of the hybrid solar collector, which would maintain higher power and total efficiency of the collector.

Acceptance Number:210

Review of Surface Plasmon Resonance Phenomenon applied in Different Applications

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Keywords: sensor, surface plasmon, image processing, simulations programs, interference

Abstract: Surface plasmon resonance (SPR) sensing method has expanded widely in using sophisticated methodologies to study biological and chemical processes. These methods vary between practical and simulation techniques to enhance and optimize different designs. This paper focuses on the surface plasmon in different fields, applications and uses it for different purposes. Clarifying the similitudes and contrasts between the works was done sincerely, examining various perspectives held by other authors. Investigation of the optical system methods. Assessment of how each optical method adds to the surface plasmon sensor technique. In the end, it sums up this review paper discusses the fundamentals of plasmonic-based sensors, coupling methods, and studies the latest additive tools for couplings such as a prism, optical fiber, waveguide, and grating. The most crucial goal of this paper is highlighting the application used surface plasmon and tools to reach the primary research objective.

Acceptance Number:211

Opto-Electronic Behavior of LN as a Dielectric Films: Improved Using Low Temperatures Treatment

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Keywords: Lithium Niobate; thin film; MOS device; electrical properties; Optical properties

Abstract. Lithium niobite emerged as a promising material in different optoelectronic devices fabrications. Their extinct structure becomes widely studied and analyzed. In this paper, micro and nano lithium niobite has been prepared using the sol-gel technique. On quartz and silicon substrates, lithium niobite was deposited at 3000 RPM for 30 seconds using a spin coater. Optical and electrical properties were investigated to studying the effect of heat treatment at different temperatures. MOS device was fabricated and its electrical properties revers good ratification.

Acceptance Number:212

Impacts of Tin and Germanium on Corrosion and Erosion-Corrosion Behavior of 60Cu–40Zn alloys

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Key words: α-Brass Alloy, Germanium, Erosion- corrosion Test, Polarization Test, dezincification

Abstract. The phenomenon of dezincification is responsible for brass's low corrosion resistance in certain situations. A trace amount addition of arsenic to α--brasses prevent dezincification, whereas heat treatment to convert more susceptible (α +ß) brasses to single-phase α -brasses is occasionally used to solve the problem. The disadvantages of these procedures include the fact that arsenic is only effective on α -phase brasses and the ineffective cost of the heat treatment. Tin and Germanium were tested as corrosion inhibitors for less expensive hot-stampable (α +ß) brasses in this study. The goal of the research was to figure out what the ideal amounts of these elements are, as well as to figure out how the inhibition works. While tin alone was shown to be an effective corrosion inhibitor, it was discovered that when germanium was added, the inhibition was even better. This is due to an increase in toughness and ductility, as well as improved adhesion and oxide plasticity

Acceptance Number:213

Treatment of Facial Telangiectasia Using Long-Pulsed Nd: YAG Laser

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Abstract. This paper presents an introduction to Facial telangiectasias, which are a frequent cosmetic concern for both females and males with various skin types and ages. This study examines the clinical effects and safety of applications with a long-pulsed 1064 nm Nd: YAG laser system to treat facial vessels. The factors influencing the procedure will be demonstrated. Instant improvement of facial telangiectasia is reported with a low level of discomfort and irritation.

Keywords: facial telangiectasia; blood vessels; long-pulsed- Nd: YAG laser

Acceptance Number:214

Street sweeping usage in the production of compressed earth block (CEB) as a solid waste management reduction

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Keywords: Street sweeping, Solid waste management, compressed earth block (CEB), Compressive strength.

Abstract. The majority of developing countries have an urgent necessity to solve housing problem through low cost and more durable criterion. Earth construction material are usually locally available and ecologically friendly materials. Traditional earth construction techniques adopted such as compressed earth block are experiencing a new popularity. the principal objective of this research is to investigate the possibility of using street sweeping solid waste material stabilized with ordinary Portland cement (OPC). Sets of blocks are prepared with 5%, 7.5%, 10% and 12.5% cement contents and three water contents are 10 %, 11% and 12%, respectively. Compressive strength was tested after 28 days ranging from 2.25-7.2 MPa. The research findings showed the possibility of using street sweeping in the production of compressed earth block (CEB) resulting in the diverting a large amount of solid waste from sanitary landfill and improve environment and enhance appearance