ICCESEN-2020

7th International Conference on Computational and Experimental Science and ENgineering

ONLINE-TURKEY

21-25 October 2020

ABSTRACT BOOK

EDITORS

Prof.Dr. İskender AKKURT

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FOREWORD

Dear Colleagues,
I am pleased to host you all in **"7th International Conference on Computational and Experimental Science and Engineering (ICCESEN-2020)"**. Due to Covid-19 ICCESEN-2020 has been held in the period of 21-25 October, 2020 as ONLINE using ZOOM platform. In ICCESEN-2020, 254 abstracts have been submitted and 136 of them accepted for presentation. We have 5 invited speakers from different countries. 106 oral and 30 poster presentation have been presented in ICCESEN-2020.
I thank to all participants, invited speakers, organizing and scientific committee members of ICCESEN-2020.
I hope we can meet face to face again in next year (ICCESEN-2021) and so on.

Prof. Dr. İskender AKKURT
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INVITED SPEAKERS

7th INTERNATIONAL CONFERENCE ON COMPUTATIONAL AND EXPERIMENTAL SCIENCE AND ENGINEERING (ICCESEN-2020)
21-25 October 2020, Online-TURKEY

The Arts: Supported by Data Analytics, Deep Learning and OR: Human Creativity and the Art of Painting

Prof.Dr. Gerhard-Wilhelm WEBER[1,✉] Melvin Selim Atay[2] Suryati Sitepu[3]
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ABSTRACT

Some of modelleging methods have been applied to Art of painting etc.

Keywords*: Deep learning, Data analytics.*

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7th INTERNATIONAL CONFERENCE ON COMPUTATIONAL AND EXPERIMENTAL SCIENCE AND ENGINEERING (ICCESEN-2020)
21-25 October 2020, Online-TURKEY

AI and Knowledge graphs for integrating cyber physical resources

Madjid FATHI✉
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ABSTRACT

AI is no more a theoretical Paradigm the increasing industrial competition required the broad masses of new methods and knowledge sources. More and more applications of AI and machine learning are finding their way into practice. The first way to reach best result is using multi-agent systems for personalized and individualized production operations in smart factories, we will also discusses knowledge graphs as a knowledge representation instrument for smart semantic search on error causes in production processes. Knowledge Graphs help to better understand complex tasks in the industry by integrating cyber physical resources, thus facilitating and optimizing the problem-solving process.

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A Way to Sustainable Development: Establishing Both Energy and Exergy Management System Standards

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ABSTRACT

Sustainable development has been defined in many ways for years while it has an international agreement definition, which consists of three key pillars: economic, environmental, and social. When its environmental pillar is considered, the concept of energy efficiency, the twin sister of the environment, comes to mind. There is also a strong link between energy and its quality, which is exergy. Energy is always conserved while exergy is not conserved, destroying due to irreversibilities and only conserving in ideal processes.

In June 2011, the International Organization for Standardization (ISO) released ISO 50001, "Energy Management Systems (EnMSs)-Requirements with Guidance for Use" and revised it in 2018 while exergy management system (ExMS), of which approach was proposed by the author in 2016 for the first time, has not been considered to be a standard yet.

The main objective of this talk is to present how to establish EnMS and ExMS structures at enterprises. In this regard, the EnMS standard was briefly explained first while the importance of the approach to the ExMS standard was highlighted. Its application to Yasar University, the first university in Turkey, which achieved TS EN ISO 50001:2011 Certification on 5 January 2016, was then summarized. Next, the similarities between two standards were given. Finally, some sound concluding remarks were listed.

Keywords: *Energy Management, Energy Management System Standard, ISO 50001, Exergy Management*

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Node Partitioning and Cycles Creation Problem with Application to Area Patroling with a Fleet of Unmanned Aerial Vehicles

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ABSTRACT

We present a new class of network optimization problems, which extend the classical NP-hard traveling salesman problem. It is formulated as follows. Given a graph with a certain time associated with each node and each arc, a feasible partition of the nodes in subsets is such that, for each subset, there exists a Hamiltonian cycle whose traveling time is below the time associated with each node in the tour. It is required to find a feasible partitioning which minimizes the number of such cycles.

Problems of this kind are typical in numerous applications, where services are repeatedly provided for a set of customers. For each customer, there is a critical time within which a service must be repeated. Given the traveling time between the customers, the set of customers is partitioned so that each subset is served by one agent in a cyclic manner without violating any individual critical time requirement. The number of agents is minimized. As an example, we consider a problem, in which a fleet of unmanned aerial vehicles is used for area patrolling.

We introduce an mixed integer programming formulation of the node partitioning and cycles creation problem, and also heuristic algorithms for solving this problem. Results of numerical experiments are presented.

Keywords: *network optimization, traveling salesman problem, unmanned areal vehicles*

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Computational And Statistical Analysis For Joining Of Exotic Engineering Materials – A Case Study

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ABSTRACT

In the modern era of manufacturing, utilization of interesting materials with enhanced properties is being executed into critical applications. The materials that are to be into service needs a critical evaluation before utilization; the actual working environment is assumed in case of numerical or simulated environment. Some of the material merely used for critical applications and have been evaluated with statistical and computational methods are discussed below.

The statistical evaluations conducted over some aero-engine materials like titanium (Ti-6Al-4V) utilized in blisks were optimized for their multiple responses using Response Surface Methodology (RSM), a statistical tool predicted about 95 % to the experimental value. The corrosion rate of aerospace Aluminum 7075 alloys was predicted by design of experiments (DoE) statistical methods. Similarly, the statistical analysis is also performed with AZ31B on diffusion bonding, revealed that bonding temperature was the most influencing process in the joining of AZ31B. Some comparative approaches like RSM and Particle Swarm Optimization (PSO) on aerospace engine materials revealed that the process with the maximum number of iterations developed close to the optimized value predicted much accurate results.

In computational method of evaluation with modelling software on the horn of ultrasonic metal welding machine made of tool steel. The nodal analysis performed for the tool for determining the dynamic characteristics of tool under the influence of natural frequencies. The results attained expressed that the maximum dynamic deformation of 168 mm at 7 kHz. The case studies discussed led to improved results when subjected to tests for the real time applications.

Keywords: *RSM; PSO; computation; tailored materials; statistics; numerical analysis*

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ORAL PRESENTATIONS

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O_8

A New ANN-AR-framework for time series Modeling and Identification enhanced using IWO and CMA-ES metaheuristics approaches: A pilot Study

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ABSTRACT

In this investigation a novel ANN model for time series is presented. Within classic time series approaches, a time series model can be studied under three groups, namely AR (autoregressive model), MA (moving averages model) and ARMA (autoregressive moving averages model). In this paper, a new ANN-AR scheme applied for times series modeling is presented. It is based on neural networks. This approach will deal with local minima problem of the neuronal networks architecture and simultaneously preserve the fitting quality. The proposed model comprises a parallel interconnection of two sub-ANN models. The first is the primary sub-ANN-AR model, which represents an ordinary model with a low resolution for the time series under consideration, the second is a ANN-AR sub-model called the error model, which represents uncertainty in the primary model. Identification is achieved by innovative metaheuristic optimization algorithms such as The invasive weed optimization algorithm (IWO) and covariance matrix adaptation evolution strategy (CMA-ES). The method's effectiveness is evaluated through testing on numerous benchmark functions and real signals. In addition, a detailed comparative study with several benchmark methods will be given. Intensive computer experimentations confirm that the proposed method can significantly improve convergence and resolution.

Keywords: *Ttime series fitting, ANN, AR, Metaheuristics algorithms.*

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O_9

An improved ANN-framework for dynamic systems Modeling and Identification using ICA and TLO metaheuristics approaches: A Pilot Study

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ABSTRACT

Neural Network Modeling and Identification of Dynamical Systems presents a new approach on how to obtain the adaptive neural network models for complex systems that are typically found in real-world applications. Neural networks are used in many applications such as image recognition, classification, control and system identification. In this paper, a new hybrid Artificial Neural Network Autoregressive Moving Average (ANNARMA) and Artificial Neural Network Autoregressive (ANNAR) scheme applied for dynamical systems modeling is presented. This approach will deal with local minima problem of the neuronal networks architecture and simultaneously preserve the fitting quality. The proposed model comprises a parallel interconnection of tow sub-ANN models. The first sub-ANN model is the primary model, which represents an ordinary model with a low resolution for the dynamical system under consideration. To overcome resolution quality problem, and obtain a model with higher resolution, we will introduce a second ANN sub model called Error model which will represent a model for the error modelling between the primary model and the real nonlinear dynamic system. Identification is achieved by innovative metaheuristic algorithms such as Imperialistic Competitive Algorithm (ICA) and Teaching–learning-based optimization (TLO). The method's effectiveness is evaluated through testing on the three nonlinear dynamical systems described by Narendra in the literature. In addition, a detailed comparative study with several benchmark methods will be give. Intensive computer experimentations confirm that the proposed approach can significantly improve convergence and resolution.

Keywords: *Dynamical systems, Artificial neural network, AR, ARMA, Metaheuristics algorithms.*

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O_14

Estımate of the mınımum laser power to generate sodium LGSs for the E-ELT

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ABSTRACT

The Adaptive Optics (AO) systems used by large terrestrial telescopes need guide stars. Indeed, in order to significantly reduce the effects of atmospheric turbulence on the quality of astronomical images, guide stars play the role of atmospheric probe. These stars inform terrestrial telescopes about the atmospheric turbulence that could affect the wave front of the light comming from the astronomical object observed by the telescope. The guide stars could be natural or artificial.

The stars expected to play this role must have some characteristics, in particular in term of magnitude. Starting from this condition, necessary for the proper functioning of AO systems of terrestrial telescopes, we will try to estimate the required laser power to generate artificial stars. The guide stars of The European Extremely Large Telescope (E-ELT) will be generated using the laser beam interaction with the mesospheric sodium atoms. So, our goal will be focused on the sodium Laser Guide Stars (LGSs).

Keywords: *Adaptive Optics, Laser Guide Stars, Astronomy*

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O_16

Synthesis And Characterization Of A Local Anesthetic: Benzocaine

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ABSTRACT

Aim: Benzocaine is a local anesthetic of the amino ester family derived from para-amino-benzoic acid. It is a molecule whose synthesis is realized in a few steps, in a short time and with the simplest laboratory equipment.

Our work focuses on the synthesis of benzocaine in a laboratory scale and then on an identification and characterization of the synthesis product.

Methods: We synthesized the Benzocaine in laboratory of Medicinal chemistry starting from para- amino-benzoic acid "PABA". The synthesis was followed by purification by recrystallization.

The synthesis product was identified through its organoleptic characteristics, its melting point, its diazocopulation reaction, its infrared absorption spectrum using an FT-IR-ATR spectrophotometer and its characteristic spectrum of absorption In the UV-Visible. The determination of its purity was performed by titrimetry using a 0.1 M sodium nitrite solution.

Results: We obtained benzocaine with an average yield of 46%. The identification and characterization tests showed its conformity to the required standards. The benzocaine content is equal to 100.359%, which complies with the standards required by the 8th European Pharmacopoeia

Conclusion: Our synthetized local anesthetic was therefore, of a proven quality.

Keywords:*Local anesthetic, benzocaine, synthesis, characterization.*

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O_18

Forecasting Models for PM10 Concentrations in Bozüyük, Bilecik (Turkey)

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ABSTRACT

Air pollution is the increase in the amount and density of the foreign substances in the air, which negatively affect the health of living things or cause material damage. Among the air pollutants, the pollutant group known as "particulate matter" exceeds the specified limits. PM10 (µg / m³) mostly comes to mind as the representative of this group. In cases where PM10 (µg / m³) measurements are performed, there may be cases where secure data reception cannot be made. Since PM10 (µg / m³) values do not show a constant trend, it is important to ensure control between the specified limits. This situation reveals the importance of estimation in terms of measures to be taken for air pollution caused by particulate matter. In this study, the air pollution situation in Bozüyük of Bilecik (Turkey) major industrial centers was examined. During the estimation process, monthly average PM10 (µg / m³) values of January 2017- December 2019 obtained from Bozüyük Weather Monitoring Station were used. The estimation methods used were determined as "Fourier Analysis with Least Squares Method", "Gray Prediction Method" and "Holt-Winters Method". The prediction successes of the 3 models based on the determined methods were evaluated with the MAPE, MSE, MAE- MAD and RMSE success criteria. As a result of the study, the Holt- Winters method gave the most successful forecast results, while the Gray Estimation Method gave the most unsuccessful forecast results. Finally, PM10 (µg / m³) forecast values of the next 36 months were obtained using the Holt-Winters method.

Keywords: *Air Pollution, PM10, Forecasting Modeling*

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O_20

Thinning of 3D antenna arrays using the firefly optimization algorithm

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ABSTRACT

The design by thinning of 3D antenna arrays in a cubic geometry is presented in this paper. The decision variables considered for this design problem are the excitation ON and OFF states. The arrays are optimized to ensure minimum sidelobe level and an acceptable directivity. The design process is carried out by the technique of a nature-inspired global optimization technique based on the reaction of a firefly to light of other fireflies and it is hence known as Firefly Algorithm (FA).Simulation results show that side lobe level is reduced significantly with a the directivity that is not that worse as compared to the uniform case.

Keywords: *3D antenna arrays, thinning, optimization, the firefly algorithm, sidelobe level, directivity.*

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O_25

Construction and analysis of areal sweep efficiency calculation model of polymer microspheres flooding in low permeability reservoir

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ABSTRACT

Areal sweep efficiency(ASE) is an important parameter for reservoir development performance evaluation, but there is no specific research on theoretical ASE calculation method of polymer microspheres(PMs) flooding. This research aim to establish a calculation model of ASE considering plugging effect of PMs based on stream tube theory. First, we assume that the plugging area of PMs is rectangular in shape and PMs occupies oil pore volume of plugging area. The length and width of plugging area are determined by injection volume and PMs size considering hydration swelling. Then, the swept area on either side of well connecting line is approximated as trapezoid. The positions of driving front at different times are calculated based on flow formula and volume equition of stream tube. Finally, the ASE calculation model at different times is established by integrating driving front in different 4 water sweep regions. The comparison result of ASE with numerical model of an injection well and a production well verifies the model validity as the ASE of numerical model and the established model is 0.69 and 0.61 seperately. The analysis results of parameter influence law show that ASE increasing by the increasing of permeability, injection period and injection volume and decreasing by the increasing of PMs size and injection rate. This model owns good consistency with actual physical process of field application of PMs and shows good prediction accuracy, meanwhile it can be used to predict ASE at different times and to evaluate the performance of PMs flooding.

Keywords: *Polymer microsphere, Oil recovery model, Areal sweep efficiency, Stream tube method*

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O_27

Precipitation Forecasting in Marmara Region of Turkey

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ABSTRACT

Precipitation regimes that change with global warming and climate changes affect the countries in environmental, economic and social dimensions. Precipitation forecasting is the first step for the management of agricultural planning, flood controls and use of drinking water resources.

Time series analysis is an important statistics tool that allows forecasting the amount of future precipitation based on the historical data analysis. Autoregressive moving-average (ARMA), Autoregressive integrated moving-average (ARIMA) and Seasonal Autoregressive Integrated Moving Average (SARIMA) models are the most common statistical methods used to estimate precipitation based on time series. ARMA, ARIMA and SARIMA models is based on the assumption that past conditions will remain the same in the future.

In this study, precipitation for the 9 cities in Turkey's Marmara region is examined based on the 51-years (1969-2019) historical data and ARMA, ARIMA, SARIMA models are used to predict the precipitation in the next 60 months (up to 2024). While determining the model the lowest AICc and AIC are preferred and generally, the AICc value is used to select the prediction model. After, the forecast measure errors of the models are checked with Mean Absolute Error (MAE), Root Mean Squared Error (RMSE) and Mean Absolute Scaled Error (MASE) indicators. Finally, the ARIMA model is chosen as the most suitable model with the lowest estimation error.

Keywords: *Forecasting, Time Series, Precipitation, Marmara region, Turkey*

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O_34

A Heat Loss Calculation Model for Vertical Steam Injection Wellbore and its Application in Heavy Oil Thermal Recovery Reservoirs

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ABSTRACT

Calculating the heat loss along the steam injection wellbore accurately is the key to evaluate the steam injection effect in a heavy oil thermal recovery well. Based on the definition of dryness and the two-phase vertical drift flow model proposed by Hasan et al., the thermophysical parameters and heat loss rate models of vertical steam injection wellbore are established according to wellbore depth and steam injection time. The error of thermophysical parameters calculated by the model is less than 5% compared with field data. The heat loss will decrease with the increase of steam injection time at the same depth of the wellbore, but the thermophysical parameters are almost same.

Keywords: *heavy oil thermal recovery, dryness, heat loss, steam injection effect, thermophysical parameters*

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O_42

Evaluation of excess lifetime cancer risk due to natural radioactivity for some sludge samples from Basra oil field

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ABSTRACT

Since the existence of the world, all living things have been exposed to natural radioactivity. This natural radioactivity results from different amounts of natural radionuclides such as uranium, thorium and potassium, depending on the geological formation and geographical structure of each region. It is important to know the distribution and concentration of these radionuclides in terms of human health and environmental protection. For this reason, in this study, the natural radioactivity levels of the sludge samples collected from Basra oil field in Iraq were determined by using NaI (Tl) detector gamma spectroscopy system. Excess lifetime cancer risk (ELCR) was calculated using activity concentrations of natural radionuclides and required dose conversion coefficients. The results obtained were compared with studies by other researchers and recommended world averages.

Keywords: *natural radioactivity, sludge, excess lifetime cancer risk, Basra oil field*

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O_51

Development of a light-weighted drilling database system

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ABSTRACT

The traditional drilling database design is huge and comprehensive, including all possible data items in drilling engineering as much as possible, so it is very difficult to use and maintain. In this paper, a light weighted drilling database system is designed, which is used as an assistant tool for the front-line technical managers to simplify the complex data items and provide the most concerned data items in the fastest way. The system is designed with open source lightweight technology, including NodeJS, Angular, TypeScript, etc., which has high economy and practicability. Drilling technicians can easily load data into the database with data loading tools, including surface and seismic slice of blocks, survey, events and logging of wells, and use it through an easy-to-use web interface. At the same time, the system provides a comprehensive data security mechanism, including identity authentication based on JWT and data encryption based on JWE, to ensure the data security.

Keywords: *Drilling, tabase, Lightweight, Petroleum engineering, NodeJS*

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O_52

Modeling and management of a hybrid system. application to a manifacturing system

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ABSTRACT

Optimization problems in production systems present several difficulties related to the needs of the user (search for a comprehensive solution, accuracy of the solution ...), characteristics of the problem being addressed and important time calculations. The resolution of such difficulties has been the subject of numerous studies using various optimization methods.To overcome this difficulty, we have chosen to focus the development of stochastic methods and study their applications to design problems encountered in the production system.The effectiveness of these methods depends on the choice of its control parameters. This adjustment is complex, especially when the number of parameters is large and when the variation range of each parameter is extended.

Through this method, we can provide approximate solutions for classical optimization problems larger and for many applications it was impossible to deal with before. They often have several parameters that control the various operators and their influence on stochastic processes.

To solve our optimization problem, some original contributions were made, which is to identify the factors believed to influence performance and comparison by varying these factors, all offering a good compromise between response time and satisfaction the chosen criterion, such as maximizing the number of items and the minimization of completion time (Makespan).We then compared between these approaches, to distinguish the one that offers the best solution within the meaning of the selected criteria, a large number of samples.

We also proposed to integrate the Grasp method in one decision system and to evaluate and choose at every moment one that offers the best results. The same number of samples, we found an improvement of comprehensive income, with the contribution of each factor.

Keywords: *optimization, stochastics methods Grasp*

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O_54

Modeling of the Magnetic Field of Current Carrying Conductor with Finite Elements Method

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ABSTRACT

In this paper, we have modeled and simulated the magnetic field of the conductor by means of software Ansoft Maxwell, which has incorporated the finite element method. Modeling and simulation are done for three separate cases: one conductor, two conductors located at a distance 0.5mm, and two conductors in contact. Our study is based on the method of finite elements and in Biot-Savart law for calculating the magnetic field depending on the distance from the conductor. We have found that the estimated values of the field are in good accordance with Biot-Savart law, especially for distant distances from conductors. We have found that the magnetic field along the axis is not homogeneous, but changes according to a zigzag curve, while the magnetic field normal to the axis of the conductor falls linearly towards its axis. In the case of simultaneous calculation of the field inside and outside the conductor, a small margin has been found in terms of maximum magnetic field intensity values. This difference is the result of the simultaneous calculation of H in two environments with different magnetic permeability. Then it was computed the magnetic field at an equal point between the two conductors in the case the currents have opposite directions and the same direction, whereby a difference of about 20 times between the magnetic fields is found. Finally, we have modeled and simulated the magnetic field for the conductors in contact. We found that when the conductors approach from 0.5mm in contact when the currents have opposite directions, the magnetic field is amplified by about 2 times. We also found that the magnetic field along the contact line is a nonhomogeneous field and that the difference between the minimum value of the field (when the currents have opposite directions) and the minimum value (when the currents are the same) is 81 times.

Keywords: *magnetic field, conductor, modeling, Finite Element Method, Ansoft Maxwell*

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O_57

Enhancement of power conversion efficiency by understanding of light losses in perovskite solar cells

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ABSTRACT

The realization of highly efficient perovskite solar cells requires the understanding of all optical losses due to haze effect. The loss of light in a solar cell is a matter of concern for the scientific community and glass texturing is a sufficient method for changing the surface morphology to enhance a light trapping. In this study, therefore, anti-reflection(AR) layer was applied on the hybrid inorganic-organic solar cell (perovskite solar cell) for enhancement transparency. The perovskite material is sensitive at thermo, but our AR coating method does not affect the perovskite. This AR film not only improves the transparency of the substrate, but it can also act as a self cleaning effect. As a result, we achieved power conversion efficiency above 15% and we hope that this technology will contribute to the commercialization of the perovskite solar cells industry.

We also studied on the nanostructure and dynamics of electron transport and recombination in the perovskite solar cells incorporating oriented hemisphere TiO2 arrays. The structure of the hemisphere TiO2, which was prepared from nano-imprint technique, was characterized by SEM and AFM. By adjusting the size of polystyrene bead in nano-imprinting process, the sizes of hemisphere pattern were selectively controlled to 300, 700, 1100, and 1400 nm, respectively. Hemisphere TiO2 photonic crystals as electron transport layer lead to light scattering effect in the perovskite solar cells. Especially, 1400 nm sized of hemisphere pattern using 1600 nm polystyrene bead provided the highest light-utilization efficiency among those in the visible range. In addition, recombination rate of electron transport layer was also decreased. As a result, the power conversion efficiency of perovskite solar cell was improved from 10.5 to 15.2%.

Keywords: *Perovskite solar cell, Power conversion efficiency, Anti-reflection layer, Hemisphere TiO2 arrays*

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O_58

Photocatalytic performance enhancement with nano-size polystyrene (PS) sphere-patterned titanium dioxide(TiO2) films

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ABSTRACT

For environmental applications, such as water and air purification utilizing photocatalysts, we synthesized patterned titanium dioxide (TiO2) thin films using polystyrene (PS) spheres. This was primarily done, to enhance the surface area and photocatalytic activities. TiO2 thin films were deposited on silicon wafers attached to various sized PS spheres via the spin coating method and were annealed at 600 ℃. The processing step involved patterning and coating of a TiO2 sol-gel. The photocatalytic performance was analyzed using a UV-visible spectrophotometer. Within 20 minutes, a high catalytic efficiency (98% removal) with 20 times faster decomposition rate of malachite green (MG) solution than that of non-patterned TiO2 was obtained from the patterned TiO2 with 400 nm sized PS due to the large surface area. Also, phenol in water removed as much as 50% within 2 hours with the same photocalysts, which was expected to be one of the strong candidates to be applied to the next generation photocatalyst for water purification.

Keywords: *Titanium dioxide, Photocatalyst, Nano-size Polystyrene sphere, Patterned structure, Phenol removal*

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O_59

The depth of the diffusion of nitrogen in 16MnCr5 steel after Gas Nitriding

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ABSTRACT

The aim of this research is, to determinate the depth of diffusion of nitrogen in steel 16MnCr5 after the gas nitriding via some experimental methods. Nitriding is realized in ammonia atmosphere at three temperatures (510, 550 and 590)0C and with four different durations for each temperature. So, we had in total 12 samples for analyses. The research methods were: metallographic and EPMA (Electron probe micro-analyzer). According to the first method, after the metallographic preparation of the surface (grinding and polishing) with the optical microscope Neophot 30 of the firma Carl Zeis Jena, the surfaces of all samples were observed. With the help of the microscope camera, the nitriding layers were photographed, from which the depths of nitrogen diffusion were determined. Then, with an automatic micro- hardness meter PCE from Leco we found hardness curves. The distance between two consecutive points was 50 μm. According to the DIN 50 190 standard part 3, from hardness curves are calculated depth of diffusion of nitrogen. While with EPMA type JXA-8900RL we investigated the concentration of nitrogen in function of the depth. Measuring distance between two consecutive points was 5 μm and other measurement conditions were: 20kV accelerator voltage and 40nA currents in samples.

The results obtained from experimental methods, we compared with each other and we have

drawn conclusions for the depth of nitrogen diffusion in steel. From the results we see that, for a given type of steel, the depth of diffusion of nitrogen depends on the temperature and duration of nitriding. While for a given temperature, the depth depends on the duration.

Keywords: *diffusion, nitriding, hardness curves, concentration of nitrogen, depth of the diffusion.*

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O_63

Analyzing of Spectra with a Pulse Generator in the Computer Environment

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ABSTRACT

A virtual MCA (Multichannel Analyzer) was designed to display a spectrum of a pulse generator. The pulses from the generator were analyzed by the virtual MCA and a real MCA. Channel numbers and the number of counts obtained from the virtual MCA were compared with those of the real one. To compare the channel numbers, the gain value of an amplifier was changed. Shifting in the channel numbers of the spectrum according to the gain value was investigated. For comparing of the number of counts, data were acquired in different acquisition times. It was seen that the results from the virtual MCA were in compatible with those of the real one.

Keywords: *Virtual MCA, Real MCA, Pulse processing*

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O_64

Developing a Virtual Counter

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ABSTRACT

A virtual counter was developed to count the signals from a scintillation detector. The virtual counter was designed via software in the computer environment. To determine the number of counts for a gamma radiation source, the signals from the detector were processed by the virtual counter through a digitizer and a real counter. The counts obtained from both counters were accumulated via different amplifier gains and source-to-detector distances to investigate their effects on the recorded counts. The results from both counters were compared with each other. Finally, it was concluded that the developed virtual counter could be used to count the radiation detector signals like a real counter.

Keywords: *Virtual counter, Real counter, Scintillation detector signal*

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O_65

Simulation of Thin-Film Tandem solar cells based on CGS/CIGS and CZT/CIGS Structures

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ABSTRACT

In this paper, a mechanically stacked tandem solar cell based on CuIn1-xGaxSe2 (CIGS) bottom cell has been simulated. The electrical performance of the single CIGS solar cell was firstly presented. Two top cell structures based on CuGaSe2 (CGS) and CuZnTe (CZT) absorbers have been proposed and simulated. The thickness of each top absorber was adjusted in order to match the short circuit current density in both top and bottom cells. The obtained results were discussed and compared. Our simulation has shown that CGS/CIGS and CZT/CIGS tandem cell structures have achieved 32.4% and 33.4 % efficiency for 400 nm and 600 nm top absorber thickness respectively. The best open circuit voltage of 1.7 V was obtained for CZT/CIGS tandem cell structure.

Keywords: *CIGS, Solar Cell, Thin-film, Tandem Cell*

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O_67

A new network model in the planning of construction projects

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ABSTRACT

The research problem in this article concerns the planning of construction projects using models supporting planning decisions together with the methods of network planning.

The approach presented in the article is based on such reasoning that construction projects due to their specificity (e.g. various implementation conditions) and technological complexity (e.g. in the construction of a building, many different technologies are used, which create alternative implementation possibilities and require various materials, machines, devices and methods of implementation) are most often implemented in an environment with a high level of uncertainty and planning parameters are disturbed due to the influence of various external and internal factors, causing a discrepancy between the planned parameters and the actual parameters of the project. Therefore, one should strive to improve methods and models of making planning decisions using mathematical tools adequate to the problem, and propose a new approach integrating decision making with methods of network planning.

With the above in mind, the author has developed a new alternative network model with a fuzzy decision node that provides the theoretical basis for this article. And in this article, the author develops this method demonstrating the possibilities of its application and describes why it should be used in such complex projects as construction projects.

The mathematical basis of the article are graph theory and fuzzy set theory. The article also contains a numerical example.

Keywords: *Construction project, Network planning, Fuzzy decision node*

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O_70

Assessment of Medical Titanium Alloys for Radiation Interaction Aad Absorbed Dose Parameters for Medical Radiation Applications

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ABSTRACT

Medical titanium alloys have perfect characteristics on mechanical qualities, biocompatibility as well as corrosion resistance. In this study, attenuation calculations such as mass attenuation coefficients, transmission factors, half-value layer, tenth-value layer, mean-free path, effective atomic number, effective electron density, neutron removal cross-sections, mass stopping power and projected range were investigated by selecting nine medical titanium alloys using MCNPX (ver. 2.6.0) code, WinXCOM and SRIM code. Ti-35Nb-7Zr-5Ta was found to be the superior shielding material. The effect on absorbed dose in femur yellow bone marrow of the alloys has been determined and it was found that Ti-6Al-4V ELI has increased the absorbed dose the most. It can be concluded that the outcomes of this novel investigation could be useful for preferencing optimization of the alloys.

Keywords: *Titanium alloy; Monte Carlo Simulation; Radiation shielding; Absorbed dose*

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O_73

Designing Hardware Application of FBMC Transmitter

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ABSTRACT

Filter-bank multi-carrier (FBMC) is a next-generation wireless 5G modulation technique that provides The next generation of wireless networks (5G) is required a high capacity, high data rate while remaining available spectrum the same, so a modulation technique that achieving these 5G requirements is investigated. In literature, orthogonal division multiple accesses (OFDM) provide a good performance in (4G), but it has many limitations that make it not suitable for (5G) specifications. One of the candidates of a multicarrier modulation scheme is the Filter Bank Multi-Carrier with Offset Quadrature Amplitude Modulation (FBMC/OQAM), the use of FBMC with particular prototype filters allows better spectral properties with reducing Inter-symbol Interference (ISI) and Inter-Carrier-Interference (ICI). There is a good relationship between their flexibility, processing power, and power consumption, of FPGAs, and this provides a good improving area. So FPGAs provide as a good area for the development of a hardware implementation of baseband processors for FBMC transmission. In this paper, FBMC-OQAM transmitter structure is explained and this structure realized firstly in System Generator and then hardware application of FBMC-OQAM Transmitter is applicated with FPGA board.

Keywords: *FBMC, OFDM, 5G, FPGA, Hardware Application.*

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O_74

Approximate description of the Characteristics of diffraction of Bessel- Gaussian beams with finite aperture

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ABSTRACT

An approximate method for the analysis of the propagation of weakly diffracted Bessel, Bessel–Gauss, and Gaussian beams with a finite aperture is presented in this work. This treatment is based on the fact that the circ function can be expanded into an approximate sum of complex Gaussian functions, so that these three beams are typically expressed as a combination of a set of infinite-aperture Bessel–Gauss beams. The evaluation of the diffracted field distribution of the beams is reduced to the summation of Bessel–Gauss functions.

A Gaussian beam weakly diffracted by a circular aperture can be approximated in the far field by another Gaussian beam with slightly different characteristics. Approximation shows that the diffracted beam characteristics may appreciably differ from those of the incident beam. From analytical results, the present approach provides a good description of the diffracted beams in the region far from the aperture. A possible extension of this method to other apertured beams is also discussed.

Keywords: *Diffracted field distribution, Bessel-Gaussian beams, Bessel-Gauss functions.*

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O_84

Train Induced Ground Vibrations Measurements and Numerical Analysis on 2D-Frame Structure Models

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ABSTRACT

As urbanization growing, the need for transportation is increasing day by day. Today, one of the most preferred transportation systems both in the urban centers and intercity transfers is railway transport. Furthermore, railway transportation comes forward with being an energy- efficient, sustainable, and reliable transportation method. However, it has a disadvantage that causing discomfort ground vibrations, especially in densely populated areas. In this study, the records of the ground vibrations originating from the train passes were taken at the selected test site next to the train line. Several field studies carried out, and an excavated trench barrier has used to reduce the impact of vibrations. Vibration levels of the freight, passenger and high- speed trains were measured in three-components up to 40 meters from the railway line. The recorded values analyzed both in the time domain and frequency domain. The results were evaluated for the vibration in the free field and in the barrier field. In order to observe the effect of these vibrations on the building structures, 2D-frame structures with different heights of 3, 6 and 9 stories were modeled and the records taken from the field were used as inputs. Linear time-history analysis was performed without taking into consideration of the soil-structure kinematic interaction. The storey based structural parameters peak acceleration, velocity, and displacement values of the models were computed and compared with the international standards.

Keywords: *Train Vibration, Vibration Mitigation, Vibration Motion, Structural Response*

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O_86

Machine Learning Based Radiomics and 1p/19q Prediction for Low Grade Glioma

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ABSTRACT

Glioma is the most common primary brain tumor that occurs in glial cells, the supporting tissue of the brain. Glioma grades are an important factor to be known in the early treatment of brain tumors. In the WHO 2016 glial tumor classification, IDH mutations have taken their place in the new classification with genetic studies.In addition to the tumor rating, the prediction of the 1p / 19q coding status has an important role in understanding the course of the disease in LGG and whether there is a chance of recovery. The 1p / 19q co-deletion is an invaluable biomarker for predicting clinical behaviour and is particularly useful in determining whether adjuvant radiotherapy and specific chemotherapy protocols will be used. We predicted the coding status of 1p / 19q from Grade II and Grade III patients with low-grade glioma (LGG) by machine learning algorithm from multi-sequence MRI images. It is very difficult to detect grade II and Grade III tumors and their 1p/19q co-deletion with simple image processing and feature extraction methods.

T1-W and T2-W MRIs of a total 121 patients with grade-II and grade-III glioma, who had biopsy proven 1p/19q status consisting either no deletion (n = 40) or co-deletion (n = 81) were used in our study. In this study, the radiomic features of gliomas were analyzed and glioma tumors were segmented with the growcut algorithm. The obtained quantitative values were statistically analyzed with Spearman and Kruskal-Wallis tests and 21 features with significant statistical properties were selected. Radiomic features are classified using Linear Discriminant Analysis.

As a result of the extraction and selection of radiomic features, it was classified with Linear Discriminant Algorithm with 1p / 19q coding / uncoded with 84% accuracy.

Machine learning and feature selection techniques can be used in the analysis of gliomas as well as pathological evaluations in 1p/19q codeletion.

Keywords: *machine learning, radiomic features, 1p/19q*

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O_87

An accurate method to compute the irreversibility distribution ratio of the entropy generation with application to natural or mixed convection flows

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ABSTRACT

The resolution of the governing equation for the entropy generation during fluid flows in natural or mixed convection regime requires the calculation of a coefficient called "irreversibility distribution ratio φ ". This coefficient depends, not only on the thermo-physical properties of the fluid but also on the Rayleigh and the Prandtl numbers in natural convection, to which is added the Reynolds number in mixed convection. Until now, it should be noted that the calculation of the value of the irreversibility distribution ratio φ is still not clearly defined. A simplified calculation, followed by concrete examples, is proposed to determine an exact numerical value for this coefficient.

Keywords: *Irreversibility distribution ratio, Entropy generation, Natural convection, Mixed convection.*

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O_90

Surfactant-assisted microwave synthesis of carbon supported MnO2 nanocomposites and their application for electrochemical supercapacitors

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ABSTRACT

MnO2/C nanocomposites have been prepared using a simple one-step microwave heating method by applying different concentrations of cationic surfactant – cetyl trimethylammonium bromide (CTAB). The morphology and composition of the prepared MnO2/C nanocomposites have been investigated using X-ray photoelectron spectroscopy (XPS), field-emission scanning electron microscopy (FE-SEM) and transmission electron microscopy (TEM) and inductively coupled plasma optical emission spectroscopy (ICP-OES). The electrochemical performance of the prepared nanocomposites has been analyzed using cyclic voltammetry. It was found that a high specific capacitance (Cs) of 742 F g−1 at a scan rate of 10 mV s−1 in a 1 M Na2SO4 solution has been obtained for the MnO2/C nanocomposite that has the mass loading of 0.140 mg cm−2 and has been synthesized in the absence of CTAB. Meanwhile, application of CTAB allowed the increase in the mass loading of MnO2 in the nanocomposites. In the presence of CTAB, the highest value of 654 F g−1 at a scan rate of 10 mV s−1 has been obtained for MnO2/C that has the mass loading of 0.570 mg cm−2. This result confirmed a good performance of the prepared MnO2/C nanocomposites as the electrode material for supercapacitors.

Keywords: *MnO2/C nanocomposites, microwave synthesis, CTAB, specific capacitance, supercapacitors.*

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O_92

Ionospheric electron density profiles in correlation with the NEIAL events observed with the EISCAT Svalbard radars

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ABSTRACT

This work presents studies of ionospheric electron density profiles around the time Naturally Enhanced Ion Acoustic Lines (NEIALs) phenomenon occurs. EISCAT Svalbard radar data were subject to analysis with two specialized programs, i.e. Grand Unified Incoherent Scatter Data Analysis Program (GUISDAP) and Real Time Program (RTG). GUISDAP (ver. 8.6) enabled us to deduce and analyze the ionospheric parameters, such as electron density, while RTG (ver. 2.6) enabled us to monitor and to observe visually and analytically the NEIAL events. Our findings show that the ionospheric electron density profiles are correlated with NEIAL events and such events have an impact on the electron density response around the time NEIALs phenomenon occurs.

Keywords: *Space plasma physics, ionospheric physics, radar science, plasma diagnostics, plasma density*

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O_95

Microstructural and mechanical properties of chromium carbide thin layers Elaborated by conversion treatment process with two methods on 16Mn2 steel

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ABSTRACT

The present study has been conducted in order to obtaining chromium carbide layers on 16Mn2 steel using a conversion processing comprising the following steps: carburizing in solid medium in order to increase the amount of carbon atoms in the steel surface, deposition of a thin layer of pure chromium using electrolytic method, and finally an annealing treatment for carbon diffusion and formation of chromium carbide layer until complete transformation of chromium layer. Depending on the method used (chromium deposition followed by carburizing or carburizing followed by chromium deposition) and the holding time, the partial or complete conversion is obtained as a result of the diffusion process. The role of the annealing temperature on transformation rates of chromium into chromium carbide films was investigated. It is shown that for 1 h at 900°C, the chromium layer is totally transformed. The scanning electron microscopy analysis and X-ray diffraction showed the presence of Cr3C2, Cr7C3 and Cr23C6 chromium carbides in addition of (Cr, Fe)7 C3, Fe2O3 and Cr2O3.

Keywords: *Chromium plating, Conversion treatment, Carbon atoms, Steel, Chromium carbide, Diffusion, Precipitation.*

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O_96

Study of densities, viscosities, and derived properties in binary mixtures water+ methanol, water + ethanol, and methanol + ethanol at 293.15 K

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ABSTRACT

Experimental densities and viscosities are reported for the binary mixtures water + methanol, water + ethanol, and methanol + ethanol over the entire composition range at 293.15 K and atmospheric pressure. From these experimental data, the excess molar volumes, VE, and deviations in viscosity, Δη, were derived and fitted to Redlich-Kister polynomial to determine the adjustable fitting parameters and standard deviations. The variation of excess and deviation properties with composition has been interpreted in terms of molecular interactions between the components of the mixtures and structural effects. Additionally, various correlation equations were employed to estimate the viscosities of the mixtures in order to test their validity for the presently studied mixtures.

Keywords: *Redlich-Kister polynomial, excess molar volume, molecular interactions, viscosity correlation*

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O_99

IBFFM low-lying states and their densities in the odd-odd nucleus 196Au associated with SU(6) approximation and it's O(6) dynamical symmetry of IBM

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ABSTRACT

In the interacting Boson-Fermion-Fermion Model(IBFFM) for odd-odd nuclei 196Au the low-lying states and their densities are calculated for $\pi_{d_{\frac{3}{2}}}, \pi_{d_{\frac{5}{2}}}, \pi_{s_{\frac{1}{2}}}, \pi_{h_{\frac{11}{2}}}$ proton quasiparticles $\upsilon_{p_{\frac{1}{2}}}, \upsilon_{f_{\frac{5}{2}}}, \upsilon_{p_{\frac{3}{2}}}, \upsilon_{f_{\frac{7}{2}}}, \upsilon_{i_{\frac{13}{2}}}$ neutron quasiparticles states, coupled to the IBM core in SU(6) approximation and it's O(6) dynamical symetry of Interacting Boson Model (IBM). In this paper the total and spin dependent level density dependence from dynamical, exchange particle-quasiparticle interactions and residual proton-neutron interactions are investigated. We also applied cutting bosons and fermions space and investigated their impacts on total and spin dependent level density. The results are shown graphically and compared to the previous combinatorial, thermodynamic and spectral distribution approaches for 132Pr, 244 Am and 114 Cd. The total level density in the truncated IBFFM space can be rather well fited by Gaussian, exept for distortions near the high-energy tail of the distribution.The IBFFM low-lying states up to 2 MeV are exactely in acordance with experimentala data. The low energy section of the total IBFFM level density distirbution can be well fitted by Bethe formula and by the constant Fermi gas model. The IBFFM spin-dependent level densities can be well accounted by Bethe and modified spin distribution formula.

Keywords: *Boson-Fermion-Fermion Interaction(IBFFM) , SU(6) and O(6) dynamical symmetry, Dınamıcal, exchange and Residual Interactions*

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O_100

A New Unsupervised Machine Learning Method to Monitor and Diagnose the Failures of Electric Submersible Pumps

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ABSTRACT

The Electric Submersible Pump（ESP）is one of the most important forms of artificial lift systems, which account for over 60% of the total oil production in the whole word. However, it is often observed that the ESP performance reaches the point of service interruption, which results in a loss of hundreds of millions of barrels.

In the past few years, the ESP sensors, data collection and communication systems, and supervisory control and data acquisition systems have been invested in real-time surveillance systems to monitor the tripping or failures of ESP performance. There is a need to create a system that can predict the impending failures with the capability to identify the types of different faults accurately.

This paper presents Principal Component Analysis (PCA) as a new unsupervised machine learning method to provide solutions that would detect the failure of ESP wells in advance and diagnose the causes. Regardless of different ESP fault types, should a well fail, it will be defined as the "generalized failure". A diagnostic model is established to detect the "generalized failure", the result shows that the breakage time predicted by the PCA diagnostic model is earlier than the actual failure time. Moreover, different types of ESP failures can be distinguished and an exact failure type can be detected based on the PCA algorithm.

This study demonstrates that PCA has the potential to be the foundation for detection of developing ESP failures and determination of actual types of fault.

Keywords: *Electric Submersible Pump, Principal Component Analysis, Unsupervised machine learning, Generalized failure, Faultdiagnosis*

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O_102

Influence and Performance of Fiber Orientation And Fiber Density on Mechanical Properties of UV-Cured Robotic 3D Printing Fiberglass Reinforced Composites

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ABSTRACT

The further development of composite materials and composite manufacturing methods are characterized by the progress of their mechanical properties which have widely used in many applications as automotive, aerospace, and marine industries. Automated composite production techniques as follow; automatic tape placement (ATL), automatic fiber placement (AFP) and filament winding (FW) methods used in many industries. These automated composite manufacturing methods currently have limited production of geometric shapes due to the need for additional molds and production as flat surfaces. To overcome all these constraints, photopolymerized composites and their additive manufacturing (AM) methods are promising with new advances in technology. In this method for printing continuous fiber- reinforced plastic (CFRP) composite parts by six-axis industrial robotic arm, based on fused deposition method (FDM) technology, has been implemented. Resin is infiltrated as the continuous fiber passes through the nozzle. Fiber and resin combination deposited from nozzle and cured with ultraviolet rays for 3D printing as planned tool path. The objective of this work is to obtain a better understanding of mechanical properties of robotic 3D printed photopolymer resin continuous fiberglass reinforced composites (CFGRC) as a function of different printing speeds (10, 20 and 30 mm/s), fiber densities (45%, 55%, and 65%) and fiber orientations (0°, 0°/90°, ±45°). The samples were produced according to ASTM D3039, ASTM D7264 and ASTM D256 for tensile, flexural and Izod impact tests. This work refers that mechanical properties are significantly affected by fiber density and fiber orientation of CFGRC.

Keywords: *3D Printing, Composite, Fiber Glass, Robotic, Additive Manufacturing, Photopolymer, UV Curing, Mechanical Properties.*

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O_104

Tensile Properties Study of Reinforced Thermoplastic Pipes

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ABSTRACT

Instead of conventional carbon steel pipes, composite pipes made of fiber-reinforced composites have attracted more and more attention in the oil and gas industries. This paper presents a study on the tensile properties of reinforced thermoplastic pipes (RTPs). A mechanical model of RTPs with an arbitrary number of reinforced layers under tensile action is constructed by combining the constitutive relationship of elastoplastic materials with the continuous displacement condition. On this basis, the effects of various parameters such as the winding angle, the fiber content of structurally reinforced layers, and poisson's ratio on the tensile properties of the RTPs were analyzed, and a tensile test was carried out for validation. The results show that the experimental results can match well with the numerical simulation results. Winding angle of the structurally reinforced layers was the main factor affecting an RTP's tensile performance, where decreases in the winding angle significantly improved its tensile ability, especially the longitudinal strength. With ±45° as the demarcation point, the winding angle was less than ±45° will be resulted in higher strength in longitudinal direction, and increasing the fiber content of structurally reinforced layers cannot effectively improve the overall tensile strength of RTPs within the effective strain range. Poisson's ratio has little effect on the overall tensile properties of the RTPs.

Keywords: *Reinforced thermoplastic pipes, Tensile Properties, Winding Angle, Poisson's ratio*

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O_106

Study on Well Pattern Infilling Adjustment and Well Location Optimization of Offshore Oilfield

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ABSTRACT

In the later stage of development, there are numerous problems in offshore oil fields, such as serious pressure drop, unbalanced injection and production, and low injection water drive efficiency. The target reservoir, Suizhong reservoir, is a typical offshore oil field that had undergone primary well infilling adjustment. However, these problems reappered after a period of efficient development. Therefore, it is necessary to implement secondary infilling adjustment based on the existing well pattern to improve oil recovery and economic benefits. Based on the analysis of the distribution characteristics of the remaining oil in the oil field, all the sweet spot locations with the potential of infilling wells and increasing oil production were determined, and different adjustment modes of well pattern infilling adjustment were proposed. The reservoir numerical simulation technology was applied to analyze and compare the effects of different different adjustment mode, and it was determined that the infilling oil well in the water well drainage, is the best secondary well pattern infilling adjustment mode which effectively uses the remaining oil between the oil wells and between the water wells. The particle swarm optimization algorithm was used to optimize the well location of the infill well with the objective function of maximizing the equilibrium displacement degree, and the cumulative oil production and displacement degree after optimization were further significantly improved.

Keywords: *Well infilling adjustment, Well location optimization, Numerical simulation, Equilibrium displacement*

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O_108

Electronic, themoelectric and thermal propereties of CsMoSe Half Heusler .

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ABSTRACT

The first ab initio study was done on the new Half Heusler (HH) CsMoSe compound, in order to characterize and present the electronic, thermoelectric and thermal properties realized by the simulation code Wien2k. The half metallicity of this new compound which was checked in the calculation of the band structure presents an indirect gap with the consideration of spin down around 2.25eV, it strengthens the Seebeck coefficient and it arrives at a high and very important number. The semi-metallic character affects notably the resistivity and the electrical conductivity. And for thermal properties, the CsMoSe compound has a strong character and very particularly on the heat capacity Cv and thermal Cp, and also for the Debye temperature. We present the results of this study over a long temperature range up to 600 ° K.

Keywords: *Seebek , Debye, Wien2k*

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O_109

Pore-scale investigation of oil-cluster morphology in different lithology by micro computed tomography

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ABSTRACT

We used micro computed tomography technology to study to image the high water cut stage of different lithology and separated the oil, water and particle. After systematically analyzing the micro-heterogeneity differences of different lithology, we found that the pore and throat radius distribution of sandstone presents a single peak, while the pore and throat radius distribution of conglomerate presents a multiple peak. Sandstone has uniform particles, and its pore shape is more similar to sphere than that of conglomerate. The coordination number of sandstone is better than that of conglomerate, and the coordination number is positively correlated with permeability. The classification standard of remaining oil is defined by Euler Number and Oil Thickness. The remaining oil is divided into three categories: Clustered Flow (Continuous phase), Membranous Flow (Continuous phase) and Discontinuous phase. In the high water cut stage, the continuous phase is dominated. In water-wet rocks, Clustered Flow (Continuous phase) are dominant, and in oil-wet rocks, Membranous Flow (Continuous phase) are dominant. In conglomerates with strong heterogeneity, the proportion of remaining oil in clusters is higher than sandstone. The remaining oil distribution pattern in the high water cut stage is related to wettability, viscosity, heterogeneity, permeability, and capillary number, thus a microscopic remaining oil distribution continuity identification was established.

Keywords: *High water cut stage; Pore scale; Micro computed tomography; Pore structure.*

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O_110

Extimation Photon Flux Distribution inside Shielding design

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ABSTRACT

FLUKA code uses the well-known Combinatorial Geometry (CG) package to create very complex geometries even a magnetic or an electric field is present. The scattering photon phenomena has some attractive superiorities. First, we can have more freedom in selecting the relative positions of a isotropic source and the detectors. Second, this technique has greater sensitivity in density variations for low density materials and for superficial measurement.

This study used Monte Carlo Code program (FLUKA 2011.2x.7, July, 2019) for estimation the photon flux distribution inside selected geometry. The simulation was supported with an experimental measurement using isotropic real sources and a 3"×3" NaI(Tl) scintillation detector. The result shows scettering of photon is important when selection pratically geometry.

Keywords:*FLUKA, Geometry , flux distribution*

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O_113

Assessment of climate change mitigation potential for heating system in Kosovo

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ABSTRACT

The energy sources for both space and water heating in Kosovo are biomass (mainly firewood), natural gas, biofuel, Lignite, solar energy and electricity. The woody biomass in form of fire- wood currently is dominating as a heating energy source. The woody biomass is used as an alternative because of not fulfillment of the demands for heating with other energy. But the high consumption of firewood results in deforestation, giving rise to adverse climate changes, environmental, economic and health impacts. Electricity generated from lignite is used inefficiently and there are wide seasonal variations in demand. Heating systems in residential sector buildings in Kosovo use wood, natural gas and electricity, while the services sector uses diesel, heavy oil and coal as well as wood natural gas and electricity. We have provided here a prediction model for the improvement of heating system in Kosovo, following the implementation of an energy efficiency program, the consumption of energy commodities in heating system will decrease and the problem of deforestation will be mitigated. The resulting reductions of Air pollutants and greenhouse gas emissions by reducing the loss of heat and water and increasing the energy efficiency will have a direct and positive impact on the environment and climate change.

Keywords: *Climate changes; heating system in Kosovo; energy efficiency; energy savings; renewable energy; GHG reduction.*

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O_114

Fracturing scheme design for tight carbonate reservoir base on geology- engineering integration workflow: method and case

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ABSTRACT

Numerical simulation of fractured wells is required to guide fracturing construction. The common fracturing design method is to use geological sweet spot to determine the location of fracturing well, then use single-well fracturing design software to optimize the construction parameters, and finally use the reservoir numerical simulation software to optimize oil production. However, the construction data of fractured wells and the log data of penetrated wells aren't fully utilized. Furthermore, previous method also can't establish the directly correlation between oil production and fracturing. To overcome above disadvantages, this paper describes a pragmatic approach for fracturing scheme design using tight carbonate reservoir as a case.

In this paper, a novel geology-engineering integration workflow based on PETREL which realized the fracturing optimization at reservoir scale was designed. A comprehensive sweet spot evaluation method, considering not only reservoir properties but also rock mechanical parameters, was established to apply different levels of scheme designs for different areas of wells. And use the rock mechanical test results in laboratory, construction data, numerical simulation results, well testing results of the fractured wells to proofread the sweet spot.

The S reservoir in Iraq, a tight carbonate oil reservoir, was chosen as the field case of this workflow. Through this method, the reservoir is divided into four levels, and three single well fracturing scheme designs are proposed.

This method which combines reservoir properties and dynamic data in fracturing gives a better solution for the tight carbonate oil reservoirs and other unconventional reservoirs.

Keywords: *Unconventional reservoirs, fracturing optimization, geology-engineering integration workflow*

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O_116

Effects of chelation therapy on QT dispersion in lead exposed industry workers in Turkey

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ABSTRACT

Background: Occupational lead poisoning is a common and serious occupational health problem, with workers mainly exposed to lead through inhalation and ingestion. A wide range of studies conducted on lead intoxication and its ECG effects, revealed that QT interval is one of the most important parameters. QT dispersion is a marker of heterogeneity and is frequently encountered in patients with a disparity in ventricular recovery and is implicated as a direct marker of cardiovascular mortality.

Methods: Battery, metal mine and car service workers who had been working in the same workplace for at least two years and admitted to Ankara Occupational Diseases Hospital for annual examination and hospitalized with toxic blood lead levels, were enrolled in the study. Patients were given chelation therapy with Ca-EDTA, and ECGs were taken before hospitalization and one week after the chelation therapy.

Results: A total of 155 male Caucasian workers (mean age = 32 ± 12 years) were evaluated. The mean blood lead level was 55.3 ± 5.1 µg/dL (min = 45.3 µg/dL max = 70.9 µg/dL). None of the participants had an arrhythmic event or death. QT dispersion before chelation and post-therapy was 38.86±13.24 msec and 35.80±12.32 msec, respectively (p=0.000001).

Conclusion: Chelation therapy by Ca-EDTA in lead poisoning could reduce ventricular arrhythmias by homogenizing ventricular repolarization times.

Keywords: *Lead, poisoning, Chelation, therapy, QT, dispersion*

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O_117

Study on Optimization of Water Shutoff Scheme for Horizontal Wells in Heterogeneous Formation

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ABSTRACT

Due to the primary pores of the formation and the erosion of injected water, high permeability strips are developed around the horizontal production wells. However, the geological model of horizontal well established based on logging data is not in line with the actual situation of the formation after water injection development, without considering the time-varying effect of permeability. Therefore, it is arduous to accurately predict the production increase effect after the injection of water-shutoff agent. At the same time, water shutoff measure is usually taken by one single well, but the relative permeability curve used in the oil field is the result after normalization, so it is necessary to perform historical matching on the relative permeability curve and the high permeability strips for specific well group. A single well group model of horizontal well with high permeability bands was established to determine the effects on dynamic production data such as water cut and daily oil production of different characteristic parameters permeability curve and high permeability strips by numerical simulation technology. The dynamic production data was applied to perform historical matching, in order to determine the applicable relative permeability curve and the width and permeability of each high permeability strip to ensure that the model can reflect the actual situation of the formation. Taking the maximization of economic net present value as the objective function, combined with PSO optimization algorithm, the optimal water plugging agent dosage can be obtained. The economic net present value of the optimized water shutoff scheme obtained by this method can be increased by 5-10%.

Keywords: *Water shutoff, Historical matching, High permeability strip, Relative permeability curve, Dynamic production data*

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O_118

Electrocardiographic changes in occupational exposure to arsenic

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ABSTRACT

Introduction: Arsenic and its poisonous effects, toxic nature and carcinogenic effects are well documented. As an environmental toxicant, arsenic widely appears in nature in its organic and inorganic forms. As an occupational toxicant is shown to be linked to increased risks in many cardiovascular diseases; including hypertension, ischemic heart disease, peripheral arterial disease also known as blackfoot disease and carotid atherosclerosis. QT prolongation is a frequently seen effect of arsenic poisoning and dispersion of QT is implicated in the genesis of ventricular arrhythmias and as a direct predictor of cardiovascular mortality.

Material and methods: 207 metal-mine workers, who were admitted to Ankara Occupational Diseases Hospital for routine annual follow up, were enrolled to the study. Control group was composed of 207 healthy individuals who were screened for, Arrhythmias, hypertension and obstructive coronary artery disease. Patients being treated with a medication that could affect QT interval and those patients with aforementioned conditions were excluded from the study. Statistical analysis: Statistical analysis was performed using SPSS software (SPSS statistics 19). Minimum, maximum values as well as mean ± standard deviation of continuous variables were reported. Taking into consideration the sample size, parametric tests (independent samples t-test) were performed on samples so as to find the difference between groups.

Results: our study showed a significant difference in QT max between healthy individuals and the subjects with high occupational As exposure (P=0.039). QT dispersion and As level in hair samples also showed a significant difference between the study groups (p=0.002 and p=0.001 respectively).

Keywords: *Arsenic toxicity, occupational disease, QT dispersion*

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O_119

Determination of Aberration Coefficients with the Help of Evolutionary Algorithm

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ABSTRACT

Charged particle optical devices such as electron or ion guns and energy analyzers are the most important devices used in the control and focus of the charged particle beam in electron spectrometers. Spherical and chromatic aberrations significantly affect the focusing of the charged particle beam in these devices. Therefore, these principal aberrations must be minimized to achieve high resolution in these devices. In the literature, calculations of third degree aberration coefficients obtained by using different methods such as boundary element method and finite difference method are given in detail. In this study, spherical and chromatic aberration coefficients calculated using genetic algorithm are given for electrostatic lenses. Genetic algorithms (GAs) are inspired by natural selection and genetics. GAs targeting the global optimization of mathematical functions are among the most remarkable algorithms of artificial intelligence. The results of this study indicated that GAs provide a large set of calculation data in a short time when compared to the traditional methods.

Keywords: *charged particle beam, aberration, genetic algorithm*

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O_121

A new method of water drive assisted gas huff and puff to enhance oil recovery in small fault-block reservoirs at high water cut stage

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ABSTRACT

Small fault-block reservoirs are widely distributed in the oilfields of eastern China. Nowadays development of the reservoirs has gone into the high water cut stage, while the field practice reflects that small fault-block reservoirs still have potential for development with two kinds of remaining oil. One is located on the top of structures, the other is the highly dispersive residual oil between wells. In order to fully utilize the remaining oil in small fault-block reservoirs, the paper presents a new development mode named water drive assisted gas huff and puff: Gas huff and puff is adopted in the higher position of structure, while at the bottom, water injection is operated. In the higher position of structure, gas huff and puff is designed to utilize the attic oil and improve the sweep efficiency of water drive. At the bottom of structure, water drive accelerates the migration of gas, and the use of remaining oil between wells is enhanced. In this paper, a typical geological model of small fault-block reservoir is built by numerical simulation, and the factors that influence the development effect are discussed by orthogonal experimental design and response surface methodology. We get the optimum working system of water drive assisted gas huff and puff, and based on that, screening conditions of small fault-block reservoirs for this development mode are obtained. Furthermore, we apply the optimized development mode to the suitable actual reservoir, and effect of EOR is better than other regular methods.

Keywords: *Gas huff and puff, Water drive, Small fault-block reservoirs*

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O_122

Development Of A Pva-Zno And Pva-Chitosan-Zno Nanocomposite Dressing With Antibacterial Activity Against Escherichia coli

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ABSTRACT

PVA and chitosan as biomaterials have found various applications in the biomedical field, especially in the management and care of wounds and burns. PVA and chitosan hydrogels have the main benefit of helping to create a cool, moist environment for wound healing and providing high permeability to water vapor while preventing microbes from entering the skin wound. ZnO nanocomposite has aroused great interest from engineering researchers due to the antibacterial properties of ZnO nanoparticles which accelerate the healing process.

In this work, in order to obtain a dressing with better properties, two types of hydrogel dressings were prepared (PVA and PVA-chitosan) by chemical crosslinking using glutaraldehyde followed by in situ precipitation of oxide nanoparticles. zinc in hydrogel networks. The samples were characterized by infrared spectroscopty (FTIR), Raman spectroscopy and scanning electron microscopy (SEM). In addition, other properties, including the rate of swelling and deflation, the thickness of the films and their pH were also studied. The hydrogels prepared have been tested for their antibacterial activities against Escherichia coli Therefore, these hydrogels have been found to be applicable as robust wound dressings.

Keywords: *Dressing hydrogel PVA chitosan zinc oxide.*

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O_124

Evaluation of the Knowledge, Perception and Attitude of Doctors Working in an Education & Research Hospital About Generic Drugs

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ABSTRACT

Generic drug is defined as drugs containing the same active substance, same dose, same or similar pharmaceutical form as the original drug referenced, that can be produced after the original drug's patent protection period has expired. As generic drugs are cheaper than original drugs, efforts are made to expand the use of generic drugs in order to make efficient use of resources, especially in developed countries. Generic drugs provide great benefits to reimbursement institutions economically and plays an important role in reducing drug expenditures without compromising healthcare quality. Studies in many countries show that doctors avoid prescribing generics because of their suspicion about the effectiveness, safety and quality of generic drugs. In this study, the knowledge level, age, gender and professional experience of the physicians working in the Education and Research Hospital; diagnosis, age and economic status of prescribed patients; By using scales such as the class and pharmaceutical form of the drugs to be prescribed, the roles of doctors in the selection of generic drugs were investigated. As a result, it is necessary to provide training for doctors on generic drugs, the fact that their knowledge points about generic drugs are very low and that these trainings should be integrated into the medical education curriculum in order to evaluate the information provided by the pharmaceutical industry positively. Thus, doctors will prefer the drug that is more economically appropriate without compromising on quality with the use of generic drugs and will contribute to the reduction of drug-related health expenditures.

Keywords: *Generic drug, Education and Research Hospital, Drugs*

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O_125

The Relation Between BCG Vaccination and COVID-19 Spread Rate

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ABSTRACT

In order to reduce tuberculosis infections, we aimed to examine the explanation of the differential incidence and mortality differences observed during the COVID-19 pandemic, comparing the countries that required BCG vaccination until the 2000s with non-countries. For this purpose, we compared the cases and mortality rates approved in the first 120 days of the pandemic in countries that do not require vaccination and require vaccination. It is observed that the incidence and mortality due to COVID-19 is lower in countries with national BCG vaccination over its entire population. It is thought that this may be due to the known immunological benefits of BCG vaccination, therefore, BCG vaccination may have prevented the general spread of COVID-19. The effectiveness of BCG vaccine on COVID-19 should be evaluated by large clinical and retrospective studies.

Keywords: *COVID-19, BCG, Vaccination*

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O_126

A Case Report About Takotsubo Syndrome in a Women Who Was Exposure to Lightning Strike

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ABSTRACT

Lightning strikes that can causes cardiopulmonary arrest, is the most common cause of death in the victims. We present a patient who was diagnosed with myocardial infarction due to lightning strike and who developed Takotsubo cardiomyopathy. A 50-year-old female patient admitted to our hospital with the complaints of fainting and burns due to lightning strikes. The baseline electrocardiography (ECG) was in sinus rhythm at a rate of 75 beats/min and QTc was measured normally. Echocardiography (ECHO) revealed moderate to severe global left ventricular systolic dysfunction (akinesia in the apex and the apical segments of septum- inferior-anterior wall and hyperkinesia in the basal segments), and suspicious thrombus view in the left ventricular apical segment. Ejection Fraction (EF) was %35 at bedside ECHO. (Then, because of deep symmetrical T negativity at ECG leads DII-III-aVF, V2-6 and increasing troponin value coronary angiography performed and revealed normal coronary arteries. All these findings were evaluated to be compatible with Takotsubo cardiomyopathy. At the visit 14 days after the lightning strike, all biochemical parameters including cardiac troponin levels were found to be normal, and the ECHO performed at her visit 4 weeks later, showed no segmental wall motion defect. Left ventricular EF was (60%) normal. Lightning strikes can cause coronary artery spasm. Takotsubo cardiomyopathy, that is especially seen in women, gives balloon appearance with the appearance of akinesia in the distal segments of the myocardium (apex) and hyperkinesis in the basal segments due to excessive stress.

Keywords: *Lightning strikes, the heart, Takotsubo cardiomyopathy*

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O_127

A Very Rare Coronary Anomaly in a Young Patient with Behçet's Disease: Woven CX Coronary Artery

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ABSTRACT

Woven coronary artery was first described by Sane in 1988. It is an extremely rare congenital anomaly of unknown ethology. It has been demonstrated that it can be seen in all coronary arteries (LAD, CX, RCA). Behçet's disease (BD) is a multisystemic inflammatory disease that causes significant morbidities. In BD, coronary arteries are rarely affected. The patient, who was diagnosed with Behçet's disease and a history of bilateral deep vein thrombosis, applied to the cardiology outpatient clinic with chest pain. Coronary angiography was planned. LAD, CX and RCA were normal in the coronary angiography. While CXOM major was giving an anomaly image by being divided into channels in the form of a thin tunnel along a segment of 1*1 cm in the mid region and distally resembled into the lumen. Woven coronary anomaly should be differentiated from collaterals due to chronic total occlusion, intracoronary thrombus or spontaneous coronary artery dissection in the coronary artery. Coronary angiography is the gold standard for the diagnosis of woven coronary artery. Despite abnormal coronary artery structures, blood flow and myocardial contractility are normal. Our case, unlike other cases in the literature, is a patient diagnosed with Behçet's disease, and has a CXOM major localized woven coronary anomaly. The Woven coronary artery does not require special treatment, as it is not mostly a stenotic coronary artery.

Keywords: *Behçet's Disease, coronary anomaly, woven coronary.*

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O_128

FLUKA modelling of Cesium (137Cs) spectrum

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ABSTRACT

In this study, the mathematicle response function of a 3"×3" NaI(Tl) scintillation detector was simulated at 0.662 MeV gamma energy using FLUKA MC code. The methodology presented here improves the determination of the mathematical response function of this type of detector because the MC technique is practicularly suitable for complex geometries where analytical methods cannot be applied. In fact, FLUKA can not simulate the scintillation events in detector region, but it can score the absorbed energy in detector material. Hence, the obtained results can be considered satisfactory to estimate the detector response. The simulation was supported with experimental study using a 137Cs real source.

Keywords: *FLUKA, Responce Function, Experimental*

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O_130

Optimization by Taguchi Method of the Effect of FDM Process Parameters on Mechanical Properties of 3D Printed Products for Sustainable Production

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ABSTRACT

In this study, an optimization was performed with Taguchi method in order to determine the effects of three-dimensional (3D) printing process parameters on mechanical properties in Fused Deposition Modeling (FDM) method for sustainable production. As process parameters; three different independent variables; filling structures (Rectilinear, Triangular, and Full Honeycomb), occupancy rates (10, 30, and 50 %), layer thickness (0.15, 0.2, and 0.25 mm) was determined with Polyethylene Terephthalate Glycol (PET-G) filament material. As a result, it has been observed that optimization has been implemented successfully as a result of the validation experiments. According to the regression equations, the optimum estimated tensile strength, elongation at break, and izod impact values were clarified as 39.184 MPa, 0.094, and 5.42 kj/m². Also, layer thickness is the most influential factor for improving mechanical properties instead of other printing process parameters (occupancy rate and filling structures). It was observed that the filling structure of the Full Honeycomb shows more percentage elongation than other filling structures, and the most tensile strength value was found in the filling structures of Rectilinear. These results will be possible to provide support for mechanical designers and engineers to reduce manufacturing time, material usage and production costs.

Keywords: *FDM, PET-G, Mechanical Properties, Taguchi, Optimization, Sustainable Production.*

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O_131

Multi-Criteria Optimization of The Effect of Fused Deposition Modeling Process Parameters on Mechanical Properties of 3D Printed PLA+ Products By Taguchi Method

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ABSTRACT

In this study, an optimization was performed with Taguchi method with the intent of determine effects of FDM (Fused Deposition Modeling) process parameters on mechanical properties (tensile strength, percentage elongation and izod impact values). Analytical methods such as regression analysis, variance analysis (ANOVA), Signal / Noise (S / N) ratio were used to appoint effect of FDM printing parameters on tensile strength with Taguchi (L9) optimization method for experimental study. Three different FDM process parameters used Polylactic Acid (PLA+) filament material; filling structures (Rectilinear, Triangular, and Full Honeycomb), occupancy rates (10, 30, and 50 %) and table orientation (0, 60, and - 45o) was determined as control parameters. Other printing parameters kept constant under the same condition and tensile and izod impact test samples were printed in the ISO 527 – Type IV and ISO 180-Type I standards, as constant parameters; printing speed (3600 mm/min) and nozzle diameter (0.40 mm). Tests of the samples were made and obtained findings were analyzed. As a result, the FDM process parameters have considerable effects on mechanical properties. In addition, it has been observed that optimization has been implemented successfully as a result of the validation experiments. The results also found tensile strength and impact values directly proportionate to occupancy rate. By improving the material properties through the addition of occupancy rates as observed in the results, it will be possible to provide support for researchers, design engineers and manufacturer to optimize production time, raw-material usage and margin.

Keywords: *FDM, PLA, Tensile Strength, Taguchi, Optimization*

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O_132

Experimental Investigation Of The Behavior Of Sandwich Panels under Shock Loading

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ABSTRACT

In the present study, an experimental investigation of the behavior of sandwich plates with different core densities and different surface plates under shock loads was carried out with the help of a shock tube setup. EPP foams of different densities were used as core material. Aluminum and continuous Carbon fiber reinforced thermoplastic composite plates are used as surface plates. The hot melt EVA adhesives were applied for joining foam and surface plates. The shock pressure was measured with high precision piezoelectric pressure gauges. The speed, acceleration of the shock pressure wave, and the impulse and momentum values affecting the sandwich panels were calculated. The results are concluded by comparing the deformations and damage patterns of the sandwich panels depending on the core density and the type of surface plates.

Keywords: *Shock Loading, Sandwich Panels, Composite Plates*

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O_133

Shock Loading Response of Continuous Flament Fiber Reinforced Thermoplastic Composite Panels

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ABSTRACT

This study is about the shock response of Continuous Filament Fiber Reinforced Thermoplastic Composite (CFTC) plates subjected to blast loads. CFTC plates were produced as layered structures with different configurations by using parameters such as the orientation angles, the number of layers, and fiber volume fractions. CFTC plates were subjected to shock pressure wave in the shock tube setup. Glass fibers and Carbon fibers in continuous filament forms were used as reinforcing materials. Polypropylene thermoplastic polymer was chosen as a matrix material. Deformations and damage patterns of composite panels were concluded comparatively by using post mortem pictures.

Keywords: *Shock Loading, Multilayered Plates, Thermoplastic Composites, Continuous Filament Fiber, Carbon fiber, Glass fiber*

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O_134

Impact of 1p/19q Codeletion Status on MRI Brain Tumor Glioma Grading

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ABSTRACT

LGG (Low Grade Gliomas) are tumors that tend to grow slowly and can show malignant transformation over time. When the type and grade of low-grade glial tumors are not diagnosed early and the correct treatment method cannot be determined, it can leave permanent damage to the body. The World Health Organization (WHO) stated that in 2016, the 1p/19q co-deletion of Grade II and Grade III gliomas was an important factor in the classification of brain tumors. Patients with 1p / 19q coded low-grade glioma (LGG) are known to have a longer life and adapt to treatment faster compared to patients with 1p / 19q intact tumors. In this study, data of 121 patients with Low Grade Glioma (WHO Grade II & III) and 1p/19q status consisting either no-deletion (n = 40) or co-deletion (n = 81), were examined.

Segmentation of 3-dimensional tumor images containing the largest tumor diameter was performed using the growcut algorithm. Wavelet transform was applied to the data set and 12 radiomic features belonging to the wavelet HHH group were determined by Mann Whitney-U nonparametric statistical test among 93 features in total. Extra tree feature selection algorithm was applied and classification was done with support vector machines.

In the classification of glioma grades (Grade II and Grade III) according to the coding status of 1p / 19q, the results of accuracy 0.81, precision 0.82, recall 0.96, f1-measure 0.88 were obtained, respectively.

In this study, it has been shown that the grade of LGG can be determined with high accuracy by machine learning algorithms according to 1p/19q co-deletion status.

Keywords: *machine learning, wavelet features, 1p/19q*

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O_135

Determination of Radiation Shielding Properties of cobalt based dental alloy for ceramic using GAMOS

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ABSTRACT

In this study, it is aimed to determine the linear attenuation coefficients of the dental alloy, whose density and chemical formulas are known, and thus to obtain information about the radiation interactions. The photon attenuation coefficient results of dental alloy were calculated for 1332 keV energy by using GAMOS (Geant4-based Architecture for Medicine-Oriented Simulations) Monte Carlo simulasyon. In order to test the validity of this code, the values of the calculated photon attenuation coefficients were compared with the previously published experimental data. The sample used contains different proportions of elements Co, Cr, Mo, Si, Mn and the percentage fraction of a single element in a sample was calculated for Monte Carlo simulations based on the corresponding molecular formula and atomic weights.

As a result of this study, GAMOS simulation is an alternative technique for determining the shielding performance of cobalt based dental alloy for ceramic.

Keywords: *photon attenuation, dental alloy, monte carlo simulation, GAMOS*

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O_138

Determination of Time Resolution Parameter Using Geneftic Algorithm

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ABSTRACT

Time resolution is an important parameter in the design of deflector analyzers. Electrons with the same energy entering the deflector at different angles follow different trajectories. Thus, electrons reach to the exit of deflector at different times. This distribution is characterized by the concept of time resolution. The time resolution depends on many parameters such as deflector entry angles of charged particles and their energies. In this study, the large dataset of time resolution are determined by an innovative method which is genetic algorithm (GA) method. The GA is an artificial intelligence optimization method inspired by fundamentals of biological natural selection. The results of this study indicate that GA gives the time resolution values in a wide data set in a short time according to the desired parameter.

Keywords: *charged particle beam, time resolution, genetic algorithm*

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O_139

Thermodynamics of a quark-gluon plasma at finite temperature and large quark chemical potential

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ABSTRACT

The thermodynamics of hot and dense matter created in heavy-ion collision experiments is usually studied for a system of infinite volume. In the present work, we report on the possible effects of considering a volumetric coexistence of the hadronic gas and quark gluon plasma (QGP) in a finite size system. Properties of the deconfining phase transition from a hadronic gas of pions to a color singlet QGP with two flavors, in the presence of the quark chemical potential μ are studied using the bag model. The quark number susceptibility as function of the system size, temperature and quark chemical potential shows a critical behavior in the transition region. The resulting QGP thermodynamics at large quark chemical potential is in a good agreement with the available lattice QCD data.

Keywords: *Quark gluon plasma, Quark chemical potential, Deconfining phase transition, Color-singletness*

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O_140

Investigation of 1.5 Mach Supersonic Open Cavity Flow Using An Open Source Solver OpenFOAM

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ABSTRACT

In modern fighter aircrafts, weapons are carried inside the fuselage. It reduces the risk of airplanes getting caught by a radar, drag force and aerodynamic heating, while increasing their survivability and working time. For these reasons, it is necessary to examine, understand and control the aerodynamic behavior and aeroacoustic properties of internal weapon bays, which are called the cavity region. In this study, it is aimed to understand and explain the behavior of turbulent, unsteady and complex open cavity flow. While conducting this study, commercial solvers are not preferred, and an open source solver, OpenFOAM, has been used, and the validation study of the solver for a cavity case has been provided. One of the original aspects of this study is that by using OpenFOAM to reduce the dependency on commercial flow solvers, by making use of an open source flow solver program. There are many numerical and experimental studies in the literature to explain cavity flow physics. Within the scope of this study, the aerodynamic and aeroacoustic analyses of the open cavity region in the supersonic regime are performed with OpenFOAM, and the results of the analyses are compared with an experimental study from the literature. Analysis results are presented in terms of pressure coefficients and sound pressure levels. The results are found to be consistent, and the reliability and accuracy of the OpenFOAM are demonstrated for the supersonic cavity problem.

Keywords: *Cavity, OpenFOAM, Supersonic Cavity*

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O_141

Strengthening of Wood Materials Using Composites

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ABSTRACT

Wood material is used in various fields due to its many positive properties. However, this material deforms and fades over time due to environmental conditions. Therefore, there is a decrease in strength properties over time. For this reason, wooden bearing elements, which are especially exposed to Flexural, are being reinforced with fiber reinforced polymer composites with various properties today. Fiber-reinforced polymers (FRP) can be used for reinforcement, because of their properties such as lightness, corrosion and flexibility, as well as they can be applied without disturbing the appearance of wood. While reinforcing with fiber reinforced polymers, it saves time and offers important advantages in terms of visually. Therefore, the use of fiber-reinforced polymers contributes to creating a more sustainable and renewable structure. In this study, it was aimed to strengthen the wood material with low resistance value with FRP. In the study, it was observed that the properties of low resistance wood materials can be improved with FRP composites.

Keywords: *Wood materials, Composite, Reinforced, Mechanical Properties*

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O_143

Quinoline-sulfonamides derivatives: synthesis, characterisation and biological activity evaluation

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ABSTRACT

Quinoline based compounds are small molecules of huge importance from pharmacological point of view, having a wide range of biological activities such as antiplasmodial and antimalarial, antibacterial, antifungal, antitubercular, anti-HIV, antiviral (including against COVID-19), etc. A special class of quinoline derivatives which pay a particularly attention on scientific community, are quinoline- sulfonamide complexes (QSC), studied especially for their fotoluminiscent (mostly fluorescent) properties. Having in view the biological potential of quinoline and sulfonamide scaffolds (especially antimicrobial), as well as those one of quinoline-sulfonamide combined scaffold (especially anti-HIV-1), we decide to combine the pharmacophoric properties of these core scaffolds with the complementary biological properties of counter cation M2+ (M2+: Zn2+, Cu2+, Co2+, Cd2+), with the final goal of obtaining better biological activity and better pharmacokinetic properties for our compounds.

The synthesized compounds were characterized by FTIR, NMR spectroscopy and by X-ray diffraction on single crystal.The QSC compounds were preliminary in vitro screened for their antibacterial and antifungal activity and the obtained results are very promising.

In this respect, the hybrid N-(quinolin-8-yl)-4-chloro-benzenesulfonamide cadmium (II), considered as leading structure for further studies, has an excellent antibacterial activity against Staphylococcus aureus ATCC 25923 (with a diameters of inhibition zones of 21 mm and a minimum inhibitory concentration (MIC) of 19.04 x 10-5 mg/mL), a very good antibacterial activity against Escherichia coli ATCC 25922 (with a diameters of inhibition zones of 19 mm and a MIC of 609 x 10-5 mg/mL), and again an excellent antifungal activity against Candida albicans ATCC 10231 (with a diameters of inhibition zones of 25 mm and a MIC of 19.04 x 10-5 mg/mL).

Keywords: *Quinoline, Sulfonamide, Antimicrobial activity*

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O_145

New benzo[f]quinolines derivatives: synthesis, structure and antimicrobial activity evaluation

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ABSTRACT

Some infectious diseases can be considered real threats to human health, the complications of these being constantly growing around the world. Benzo[f]quinoline is a polynuclear aromatic nitrogen heterocycle, its derivatives being structurally analogues to the steroid skeleton. These are very useful compounds in various fields of chemistry, including biological and pharmacological chemistry, as well as promising candidates for use in organic light emitting diodes.

Considering the above, our main objective was to synthesize and characterize novel benzo[f]quinoline derivatives (B[f]Qd) adopting a general and straightforward strategy, involving two steps only: quaternization and cycloaddition reactions. In the fist step was used as starting materials benzo[f]quinoline and different halogenated derivatives with increased reactivity. The second step, involved the [3+2] cycloaddition reactions between benzo[f]quinolinium ylides and different dipolarophiles. The structures of newly B[f]Qd were proved using NMR experiments (1H, 13C, 2D-correlations).

The antibacterial and antifungal activity of B[f]Qd were preliminary in vitro screened and the obtained results are promising. The in vitro antimicrobial activity was determined by the method Kirby- Bauer disk diffusion, using nutrient agar medium (Mueller Hinton agar for antibacterial tests and Sabouraud agar for antifungal tests). The antibacterial activity was evaluated against two strains bacteria (Gram-positive Staphylococcus aureus ATCC 25923 and Gram-negative Escherichia coli ATCC 25922) and the antifungal activity against fungus Candida albicans ATCC 10231. As positive control (C+) was used Penicillin 10 IU for Staphylococcus aureus, Carbenicillin 100 µg/mL for Escherichia coli and Nystatin 500,000 IU for Candida albicans; the negative control (C-) consist in sterile filter paper disks with no antimicrobial compounds.

Keywords: *Benzo[f]quinoline, Cycloaddition, Antimicrobial activity*

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O_151

Novel cyano substituted pyrroloquinoline and pyrroloisoquinoline compounds as potential anticancer agents

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ABSTRACT

Azaheterocyclic compounds are fundamental constituents in biologically active compounds. Quinoline and isoquinoline derivatives establish the significant families of compounds among these heterocycles, especially due to the interesting biological properties being considered as privileged heterocycles and broadly used in pharmaceutical and material science. Pyrrolo[2,1-a]isoquinoline is part of the backbone of the Lamellarin class of marine alkaloids that exhibit anticancer and/or antiviral activities and. Therefore, these important frameworks have become targets of interest in the organic synthetic community. Over the past decades, various synthetic methods for the construction of pyrrolo[2,1- a]isoquinoline or pyrrolo[1,2-a]quinoline unit have been developed, including the [3+2] cycloaddition of the corresponding cycloimmonium ylides to activated alkynes or alkenes, 1,5-electrocyclization, and several transition metal catalyzed C–N bond formation reactions.

On the other hand the substituent group of a certain core is very important for the final properties of the compounds, including biological activity. Cyano group is recognized as one of the fundamental functional groups and is often found in various bioactive molecules and functionalized materials.

Considering all these above data, we describe here the synthesis and evaluation for their anticancer activity by screening against 60 human tumor cell lines pane,l of new pyrrolo[1,2-a]quinoline and pyrrolo[2.1-a]isoquinoline derivatives, bearing cyano groups.

Keywords: *pyrrolo[1,2-a]quinoline, pyrrolo[2.1-a]isoquinoline, anticancer*

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Design, synthesis, anticancer evaluation and docking of new pyrrolo-fused heterocycles

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ABSTRACT

Recognized as key dynamic structural components in cells, microtubules play an important role in cellular shape organization, intracellular movement, cell division, and mitosis. Thus, they have been considered an attractive target for the development of new antiproliferative agents in the past few years.

Among the huge number of microtubule-targeting agents with diverse scaffolds investigated during last decades, Phenstatin stands out as one of the simplest molecules that significantly inhibit tubulin polymerization by binding to the colchicine site of tubulin. Phenstatin is also known for its outstanding antitumor activities on a wide variety of human cancer cells. In the process of drug discovery, these kind of compounds are lead scaffolds for the development of improved bioactive analogues, and Phenstatin continues to be a source of inspiration for researchers in designing new potential anticancer drugs. At the same time, the quinoline and isoquinoline rings, present in many natural products and even genetic material, has been noted for its role in many biological processes as well as in cancer pathogenesis, which makes it a priviledged scaffold in anticancer agents discovery.

Applying a structural combination strategy we designed and synthesized a new series of pyrroloquinoline and pyrroloisoquinoline based compounds as Phenstatin analogues and evaluated their anticancer activity and the ability to interact with the colchicine binding site of tubulin.

Keywords: *Pyrroloquinoline and pyrroloisoquinoline, Anticancer, Docking*

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O_156

Synthesis, structure and aplications of newly hybrid azaheterocycles

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ABSTRACT

Probably, heterocyclic chemistry is the most important field in chemistry from biological and industrial point of view. For over a century, chemistry of azaheterocycles has official one the most important areas in chemistry and related sciences, azaheterocyclic compounds being of interest in pharmacological medicine, biology, physics, optics, material sciences, etc. The applications of azaheterocyles compounds as drugs, organic conductors, semiconductors, molecular wires, electrical phenomenon cells and organic light- emitting diodes (OLEDs), lightweight harvest home systems, optical information carriers, with chemicals manageable switches and liquid crystalline compounds, are a reality in our day life.

As part of our on- going research in the field of azaheterocyclic derivatives, we present herein some core results obtained by our group within this field, focused on design, synthesis, structure and their applications in medicine and pharmacy, opto- electronics and agriculture.

Keywords: *Azaheterocycles, Synthesis, Structure, Properties.*

Acknowledgements.

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O_157

Synthesis, structure and biological activity of new azine derivatives

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ABSTRACT

Six member ring azaheterocycles, especially azine and diazine derivatives, possess a large variety of biological activities such as antibacterial, antifungal, antitubercular, antimalarial, anticancer, anti-inflammatory, etc. As part of our ongoing research in the field of azaheterocyclic derivatives, we present herein a thoroughly study concerning design, synthesis, structure and biological activity of some azine derivatives. The synthesis was performed both under conventional thermal heating and nonconventional ultrasounds irradiation, an interesting comparative study being presented. The obtained compounds was tested for their biological activity, some compounds exhibiting a significant activity. Interesting structure-activity correlations has been performed.

Keywords: *Azaheterocycles, Synthesis, Structure, Properties.*

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O_162

Finite Element Analysis of NSM-FRP reinforced Masonry Walls subjected to in plane loading

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ABSTRACT

In this study numerical modeling of NSM-CFRP strengthened brick masonry is carried out using detailed micro-modelling (DMM). in this analysis the non-linearities behavior of brick and mortar was simulated using the Concrete Damaged Plasticity (CDP) constitutive laws. These models are used for the analysis of brick masonry walls reinforced with NSM CFRP strips under combined shear-compression loads. Masonry walls have been tested under vertical compression, with bed joint orientations of 45° relative to the loading direction. The experimental results are used to validate the modelling approach presented here. The Results showed that the application of the CFRP strips on URM wall has a great influence on strength, post-peak behavior, as well as changing failure modes and ductility. On the other hand, the adopted detailed micro-modelling approach (DMM) gives a good interface for predict the shear response on strengthened masonry walls.

Keywords: *detailed micro-modelling approach (DMM), NSM-CFRP strengthened brick masonry, Concrete Damaged Plasticity (CDP).*

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O_165

Effect of surfactant in the crude oil flow in capilary tube

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ABSTRACT

Transportation of crude oil by pipeline is the most convenient and economical way. Indeed, in the petroleum industry, the viscosity of crude oil plays an important role in the calculations of the flow of fluid through pipelines, which generates a high pressure loss, several and different methods are used to reduce the viscosity of the crude oil to reduce pressure loss and improve its transport by pipeline. For example, diluting heavy crude with lighter crudes or alcohols, heating and using surfactants to stabilize emulsions. This work aims to study the effect of surfactant solutions on the flow of hydrocarbons in capillary tubes, For this study we used two types of surfactants, nonionic surfactant Tween80 and another anionic sodium dodecylbenzenesulfonate SDBS , The hydrocarbon used is crude oil. The experimental result shows a remarkable decrease in pressure loss as a function of the surfactant concentration, a low pressure drop in the presence of SDBS compared to Tween80

Keywords: *Crude oil, anionique surfactant ,, nonionique surfactant , pressure loss*

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O_174

The investigation of occurrence state of fluid in nanopores

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ABSTRACT

It is well known that tight oil reservoirs have a large number of nanopores. The occurrence state of fluid in the nanopores is much more complicated than that in micropores and macropores. The confinement effect seriously affects the distribution of fluid molecules in the nanopores. In this paper, Through the combination of experiment and theory, consider the various influencing factors to comprehensively study the occurrence state of fluid in nanopores.

In this paper, nanofluidic chips are fabricated with photolithography and reactive-ion etching. Chips made of silicon and silica alone are designed to simulate the effect of different wettability on the state of occurrence. Different channels are designed to simulate the effects of different nanopore sizes. Different temperature and pressure are set to simulate the effects of different formation conditions. Different component composition of fluid (C5, C8, C10) is altered to simulate the effects of fluid properties. on the basis of nanofluidic experiment, establish an SLD (simplified local density) model coupled with various influencing factors for the occurrence state of fluid.

The results show that the density profile of the fluid is greatly influenced compared with the bulk fluid, and the temperature, pressure, fluid composition and pore size greatly affect the adsorption layer. Different wettability plays a decisive factor on fluid occurrence state, which directly determines the fluid density distribution at the pore wall (adsorption phase) and the pore center (bulk phase): under hydrophilic conditions, the adsorption phase density is smaller than the bulk density. However, as the temperature and pressure conditions change, it not only affects fluid occurrence state, but also affects the wettability. Specifically, as the temperature rises, the wettability of the pore wall tends to be hydrophilic, and the temperature of the adsorbed phase decreases. The combination of the combination of the adsorption phase fluid molecules to the bulk phase molecules. As the pressure rises, the wettability tends to be hydrophilic, and the amount of adsorption will rise, and the effects of the two will cancel each other out, causing the density of the adsorbed phase to change not sharply. An increase in heavy components leads to an increase in the density of the adsorbed phase.

The application of nanofluidic technology in the field of tight oil is still not widespread. This paper designs nanofluidic experiments, which can intuitively observe the influence of different influencing factors on the occurrence state, and lay a solid foundation for the accurate establishment of theory model.

Keywords: *occurrence state, nanopores, tight oil*

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O_175

Stability of imperfect elevated conical tanks under seismic excitation

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ABSTRACT

The elevated tanks are considered as very sensitive structures in seismic movement condition.In generally, the local geometric imperfection is the most responsible factor to define the shell structures buckling capacity. Several researchers studied the performance of this type of structure under seismic loading. The present work aims to demonstrate the local geometric imperfection effect on dynamic buckling of elevated water tank. Using the finite element technique to study the seismic response of perfect and imperfect elevated water tank was established taking into account the following factors; the interaction fluid structure (FSI), the wall flexibility, the local geometric imperfection, the nonlinear time history analysis , the material and geometric nonlinearity, The results found show that the critical PGA of the imperfect elevated water tank numerical models decreased compared to the elevated water tank numerical model without local geometric imperfection. In addition, the effect of supporting system on PGAcr are clearly shown.

Keywords: *Fluid structure interaction. Finite elements. geometric imperfection. Instability.tank staging*

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O_176

Heat Pipes Thermoelectric Ice Machine

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ABSTRACT

The efficiency of conventional vapor-compression refrigeration systems is higher than that of thermoelectric (TE) systems. However, despite their low efficiency, TE systems have certain advantages: they do not use toxins and flammable refrigerants, they do not have mechanical parts, they are compact, durable, and portable, therefore can be used in any environment. In this study, we propose a heat pipe Thermoelectric Ice Machine (TEIM) to save water and energy. The ice machine was designed to freeze the water in the ice box with direct thermal contact with the TE cooling unit. The cooling unit contains a thermoelectric module (TEM) placed between the ice box and the heat transfer system with dual fans-heat pipe. Water is automatically taken into the ice box, ice making time is calculated according to the ambient temperature, and once the ice is made, the system is rotated by the motor drive system, the TEM operates in heating mode for a short time, and ice is harvested. Conventional ice-makers make ice regardless of whether needed or not and need continuous power to preserve the form of the ice. Harvested by unused ice is discarded, which wastes water. Ice-makers with storage units are not widely used due to their bulky structure and constant power consumption. TEIM is a system that allows the user to make the required amount of ice quickly when needed. The system turns 10 g of water into ice in 5 minutes by spending 0.025 kWh of power, and harvests the ice automatically.

Keywords: *Thermoelectric ice maker, heat pipe, water cooling.*

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O_185

Determination of Gamma-Rays Absorption Parameters of Some Soil Samples from Sariyer-Istanbul in Turkey

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ABSTRACT

The purpose of this study is to determine gamma-rays absorption parameters of some soil samples from Sariyer-Istanbul in Turkey. Eighteen soil samples were collected different location of Sariyer-Istanbul in Turkey. Point sources which were 22Na, 60Co, 133Ba and 137Cs were counted with and without soil samples using high purity germanium detector. Spectra were collected and analyzed using computer software. Linear attenuation coefficient, mass attenuation coefficient, half value layer, tenth value layer, mean free path and radiation protection efficiency of soil samples were experimentally calculated as gamma-rays absorption parameters. Obtained results were compared with the results of scientific literature.

Keywords: *Gamma-rays Absorption, High Purity Germanium Detector, Soil Samples*

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O_187

Investigation of Physico-Mechanical Properties of Autoclaved Light Concrete at Different Temperatures

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ABSTRACT

Studies on the use of building materials as lightweight concrete continue rapidly nowadays. In this study, barite and quartz sand were used in the production of lightweight concrete. The physico-mechanical (apparent density, flexural strength, compressive strength, thermal conductivity) properties of the samples obtained by exposing the light concretes to different temperatures (100-140-180 oC) under constant pressure (13 bars) in the autoclave were investigated. Phase structures of the samples were investigated by XRD method. In addition, radiation permeability was examined on the same group of samples. As a result, it has been determined that as the temperature increases, the mechanical properties of the samples improve, the free CaO and SiO2 components of the phase structures decrease, the C-S-H phases develop, and the thermal conductivity properties improve.

Keywords: *Autoclaved lightweight concrete, thermal conductivity, radiation shielding, Physico-mechanical properties*

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O_189

Influence Of Structural Parameters On The Omnıdırectıonal Reflectıon Band

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ABSTRACT

One of the optical devices developed based on photonic band gap of photonic crystals, formed by the alternating arranging of different layers of dielectric material and known as the quarter- wave stack, is a multi-directional reflector. The light at appropriate wavelengths is reflected completely when it comes to periodic layered matter. Multilayer dielectric photonic structures reflect the incident light at the desired angle in a narrow frequency range. In this study, it has been investigated how the desired position and reflection band width can be affected by incident angle, layer thickness and refractive index of the material in a one-dimensional photonic structure. In our study, two different systems are used such as Si/SiO2 and Si/TiO2. Omnidirectional reflection bands are analyzed for TE (Transverse Electric) and TM (Transverse Magnetic) modes in these systems.

Keywords: *Photonic Band Gap, periodic photonic structure, electromagnetic mode, refractive index*

This work was supported by Scientific Research Project Commission of Eskişehir Osmangazi University, Project No.201519D23.

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O_190

The Band Gap Characterıstıcs In One-Dımensıonal Photonıc Structures

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ABSTRACT
The electromagnetic wave can easily propagate without scattering in photonic crystals with forbidden band gap. Photonic crystal structures and photonic waveguides designed by consecutive layers with different layer thickness or different refractive index allow obtaining forbidden band gaps of the desired width.

Keywords: *Photonic Band Gap, periodic photonic structure, electromagnetic wave*

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O_191

The transient Inflow Performance Relationship using semi-analytical model for unconventional reservoirs

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ABSTRACT

Production performance prediction of unconventional reservoirs has become a hot topic since the increasing numbers of low permeability or tight reservoirs developed in recent years. The Inflow Performance Relationship (IPR) could provide the expected oil rate with each flowing bottom hole pressure (BHP) of individual producing wells. However, conventional IPR curves may be not applicable to unconventional reservoirs due to the long period of transient flow which has the unsteady inherent characteristic. Based on the semi-analytical model of production forecast of multi-fractured horizontal wells in tight reservoir, this paper derived a new method to generate transient IPR for unconventional oil wells.

The semi-analytical model is conducted using the perturbation technique, Laplace transformation and linear source function, by which the transient pressure under different flow rates can be obtained. Using different sets of BHP-rate data, transient IPR can be plotted for any time of interest. The generated IPR is examined under different stress sensitivity scenarios and for different parameters of hydraulic fractures, and the results comparisons show the effects of each variable on the inflow performance of unconventional oil well.

Because of the prolonged period of transient flow in low permeability or tight reservoir, the time-dependent transient IPR could rigorously characterize the performance of unconventional reservoirs. Meanwhile, sensitivity analysis of IPR curves could also provide some guidelines for hydraulic fracturing parameters design and pressure drawdown management during production.

Keywords: *Inflow Performance Relationship, multi-fractured horizontal well, transient flow*

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O_196

Quantitative Analysis on Timing for Injection-To-Production Conversion of Wells in Tight Reservoirs Based on Fracture Volume Variation Model

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ABSTRACT

Conversion of injection wells into production ones, proved to be an effective way to improve the recovery of tight reservoirs, the conversion timing is essential for its efficiency. However, the determination of this timing mostly depends on complex numerical simulations with uncertainties. In this work, an analytical model was proposed based on fracturing fluid backflow model to provide a time-saving way to precisely determine the timing for injection-to-production conversion and thereby improving the recovery efficiency.

An analytical model was proposed considered the imbibition and cross-flow between fracture and matrix, based on mass conservation principle, the fracture volume variation could be determined with fracturing fluid injection, filtration loss and initial filtration loss. Formulas of fracturing fluid loss before fracture opening, of bottom-hole pressure opening natural fractures, and of pressure drop during fracture closure were derived. Parametric sensitivity analysis was conducted on multiple fracture equivalents, maximum and average fracture width, and fracture closure pressure, etc. The result was compared with simulation results, and a case study was conducted on tight reservoir in Daqing with the model proposed.

The results of the proposed model are consistent with the field data, and the error is within 1% when compared with the CMG numerical simulation results. Based on the derived bottom-hole pressure formula for natural fracture opening and the pressure drop equation during fracture closure, the time corresponding to the fracture closing pressure and fracture opening pressure were obtained. With the calculated bottom-hole pressure at different times, the wellhead pressure was determined accordingly, the variation curve of the wellhead pressure over time was hereby plotted. The opening pressure and closing pressure were at (Pfo, Pc), and the corresponding time were at (Pfo(t), Pc(t)), the variation trend of the fracture volume was first to enlarge and then to decrease. With the historical field data in the tight reservoir in Daqing and the parameters determined by the proposed model, it could be concluded that the best timing for injection-to-production conversion is two years after the high water cuts injection wells are closed, the oil recovery rate has increased by 40% after the conversion.

A method to determine the timing for injection-to-production conversion was proposed with the analytical fracture volume variation model, the results of which fit well with field data. Compared with existing methods, this time-saving method has higher stability and accuracy, improving the timing determination efficiency. The achievements in this work are of great significance in both theoretical and practical aspects in the effective development of tight reservoirs.

Keywords: *Tight reservoir; Improving recovery; Injection wells into production; fracturing backflow model; natural fracture opening*

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O_197

Numerical simulation of flow characteristics of shale oil multi-stage fracturing horizontal wells

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ABSTRACT

Horizontal well fracturing is adopted in shale reservoirs development. The induction of hydraulic fracturing and the naturally exsisted bedding in shale leads to a large number of micro-fractures. In this paper, a dual medium model is established to characterize the flow in the matrix and micro fractures of shale resevoir. Based on the embedded discrete fracture model, a shale matrix-micro fracture-large fracture coupling flow model is established, forming a shale oil horizontal well multi-stage fracturing production simulation technology. We simulate the flow in shale reservoirs after fracturing, and plot the corresponding pressure drop and pressure drop derivative double logarithmic curve, revealing the flow characteristics of shale oil after fracturing. We have carried out corresponding parameter sensitivity analysis studies on the half-length of hydraulic fractures, cluster spacing, permeability. Among them, the half- length of hydraulic fractures has a greater impact on the flow in the reservoir reconstruction area.

Keywords: *Multi-stage fracturing, Dual medium model, Shale oil resevoir*

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O_199

Experimental Study on the Feasibility of Explosion Prevention and Improving Oil Recovery by Gravity Assisted Oxygen-reduced Air Flooding

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ABSTRACT

Air injection technology has been widely applied in oilfields for improved oil recovery, while the safety of this process is of great concerns due to the explosion of injected air and natural gas, especially in the reservoir with larger dip angle or thick reservoir. Gravity assisted oxygen- reduced air flooding has been proposed as a new technology to eliminate the explosion risks and enhance oil recovery. In this study, the theoretical critical oxygen concentration has been studied by methane explosion tests at elevated pressures and temperatures. In addition, the feasibility of gravity assisted oxygen-reduced air injection for IOR in heavy oil reservoirs has been investigated using a rotatable testing facility (25mm×600mm). The theoretical critical oxygen concentration can be reduced to 5.74% at 100℃ and 20MPa from around 10% at the atmospheric conditions, indicating a larger explosion risk and safety concern. Thus the oxygen- reduced air has been applied to carry out oil displacement experiments in sand pack. It was found that with the increase of reservoir dip angle, the number of injected gas HCPV during gas breakthrough, efficient gas injection development time and the final displacement efficiency of gas injection development all increased through the effect of gravity stabilization generated by gravity differentiation. In the case of existing a dip angle, the cumulative oil production before gas channeling point exceeded 80% of the oil production in the whole production process, demonstrating the gravity assisted oxygen-reduced air flooding as an effective and safe IOR method for the targeted oilfield.

Keywords: *Gravity assisted, Oxygen-reduced air, Methane explosion, Theoretical critical oxygen concentration, Improved oil recovery*

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O_200

PCB Optimization for Automotive Lights

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ABSTRACT

Electronic demands, in every area of the industry, lead to the massive production numbers. Most electronics are integrated on printed circuit boards (PCB). Even if, one cent cost reduction is realized for each product, total savings can turns into millions of dollars. Any electronic components on PCBs have an operating temperature, which can restrict the design and property of PCBs. Many thermal considerations are taken into account in the electronic design. The life span may decrease from years to hours when these limits are exceed. Each design has to be thermally validated besides functionality.

Lighting design restrictions are relatively compelling because an automotive lighting product requires proper function with small size PCBs and at high ambient temperatures. Many functions can be light-on with a given OEM scenario simultaneously or separately. PCB thermal requirements come with electronic requirements. Electronic design outputs are directly linked to thermal inputs. Dissipated heats of the electronics have to be removed by either passive or active cooling. Thermal problems involving more than one objective function can be optimized simultaneously in multi-objective optimization. The design of experiments (DOE) was used in order to get optimum results. The aim of the study is to perform a DOE study to optimize the objectives. The objectives are given in the list below,

1. Lower PCB thermal resistance value
2. Minimum PCB area to satisfy the thermal requirements
3. Proper copper thickness for each LED power levels
4. Achieving optimum numbers of the thermal-vias

Each of the objectives will save time and cost undoubtedly. Although, these two important gains, the designs that can withstand harsh conditions are more desirable. Optimum design in automotive lights means the long-lifetime of a PCB or the product before economical options.

Keywords: *Thermal Optimization, Heat-flux Density, Thermal Resistance*

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O_205

Finite Element Analysis of Bushing Inner Tube Upsetting Operation

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ABSTRACT

Bushes are generally go into division as rubber bushes and metal bushes. Rubber bushes are made out of whole rubber or made as the metal tube is covered with rubber. Metal bushes are made as two or three metal tube telescopically positioned and rubber is injected to the space between metal tubes. Bushes are mounted to the suspension parts or engine mount etc. In this study, metal bushes are investigated. Some inner tube of metal bushes are not just straight but upsetting operation is applied on them and formed that way. Straight tubes are sliced in certain lengths and upsetting operation applied on them and the desired geometry is obtained. The dimension of the tube, like length, diameter etc. after upsetting operation is known but the dimensions of the straight tubes are unknown. That is why slicing of the straight tubes in certain length is done inferentially. Then upsetting process is done for certain geometry. But that process requires trial and error for many times. This study aims to reduce the trial and error time for the estimating of the dimensions of the straight tube before upsetting operation. Also, stress distribution on the part will be seen. Loss of time and material will be prevented with this study. With respect to analysis results, it is possible to obtain the best shape and appropriate dimensions for the bush inner tube design. The result of FE analysis makes it possible to determination of the best design characteristic

Keywords: *Finite Element Analysis (FEA), Steering and Suspension, Bushings*

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O_206

Investigation Of The Light Homogeneity On Position Functions In Automotive Rear Light Products With Digital Camera

Yılmaz SEVİL ✉

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ABSTRACT

In the beginning of automotive history, automotive lighting products which provide vision at night driving, started to become products that provide to able to be seen and provide signalization with increasing security needs. Nowadays, these products also start to become constitute the identity of the vehicle and brand, increase the competitiveness with being eye- catching thanks to occurred opportunity along with increasing technology. For this reason, the expectation of the manufacturers especially from the quality of automotive backlight products is increasing. In order to maintain this quality to a certain standard in each product, each manufacturer publishes its own standards.

The greatest expectations of the automotive manufacturers, especially from the exterior rear lighting products, in addition to meeting the legal regulations, are to meet the expectation of homogeneity that they have previously determined and standardized with mathematical evaluations. This expectation can be tested both in design and in the final products with the brightness camera.

This thesis aims to provide an alternative using a very expensive device such as a luminance meter camera in the testing of final products. In this study, an easy, fast and low cost way to evaluate the light homogeneity of real parts by image processing method is explained. This paper compares the luminance meter camera with the digital camera in particular and investigates the reliability of the digital camera for such an evaluation.

Keywords: *Light Homogeneity, Digital Camera, Luminance Meter, Imaging Process, Luminance Analysis, Imagej, Automotive Lighting*

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O_207

Relevance between immiscible CO2 EOR and Permeability

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ABSTRACT

Currently, the studies of immiscible CO2 improved oil recovery (EOR) were mostly done at a given individual permeability or in a small permeability range with its regularity study encompassing a large permeability range mostly missing. To fill this void, this work focused on the relevance between immiscible CO2 flooding and permeability within the range of 10-1- 103mD by oil displacement experiments. The results showed that the incremental oil recovery of CO2 flooding and post-gasflood waterflood both vary inversely with permeability and increase significantly when the permeability of core samples is less than a threshold permeability (~6.05mD for this experiment condition) suggesting the CO2 EOR performing better in lower permeability core samples. The ratio of CO2 breakthrough volume versus initial waterflood breakthrough volume showed that the microscopic sweep efficiency of CO2 increases with the decline of permeability and it is even better than that of initial waterflood when the permeability of core samples is below the threshold permeability which indicated that the better microscopic sweep efficiency of CO2 may be one of the main reasons of immiscible CO2 EOR significantly. The ratios of stabilize pressure of gasflood and post-gasflood waterflood versus initial waterflood showed that the asphaltene precipitates and deposits uniform throughout the core samples at higher permeability, but at this threshold permeability the asphaltene precipitation and deposition start to happen preferred near the outlet with the lower the permeability of core samples, the greater the difference of asphaltene precipitation and deposition between the inlet and outlet. Additionally, the asphaltene precipitation and deposition seems to have positive effect on the microscopic sweep efficiency of CO2 and brine in some degree.

Keywords: *immiscible CO2 EOR, permeability, microscopic sweep efficiency; stabilize pressure; asphaltene precipitation and deposition*

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O_208

Preparation and self-aggregation plugging characteristic of nanoparticle as a profile control agent

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ABSTRACT

To overcome the poor injectability of conventional profile control agents, and the drawbacks of existing elastic particles in in-depth conformance control in low permeability reservoirs, a hydrophilic modified cross-linked colloidal nanoparticles with controllable self-aggregation property were synthesized via emulsion copolymerization method. The influence of each reaction condition on the particle size of nanoparticles was studied with single factor experiment. The results showed that nanoparticles with the mean diameter ranging from 73 to 95 nm could be readily produced by moderately changing the polymerization conditions, and the yield could be larger than 80%. TEM analysis indicated that the prepared nanoparticles had core- shell heterogeneous characteristic. The property evaluation results showed that nanoparticles can stably disperse well under reservoir conditions and was able to properly propagate to deep formation and seal breakthrough areas, displaying the excellent injectivitility and in-depth profile control capability in low permeability reservoirs.

Keywords: *low permeability reservoir, in-depth profile control, emulsion polymerization, nanoparticles*

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O_209

Investigation of Radiation Attenuation Coefficients of PMMA blocks at 662 keV

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ABSTRACT

PMMA blocks are widely used in dentistry to make provisional crowns / bridges. In this paper, the linear attenuation coefficient of PMMA blocks was measured for gamma rays of energy 662 keV. The gamma rays for these of energy have been obtained from 137Cs point source. The measurement has been performed using a well calibrated gamma ray spectrometer which consists of 3‘‘x3’’ NaI(Tl) scintillation detector, Amplifier and Computerized gamma spectrum analysis carts

The linear attenuation coefficients (μ) were also calculated via calculation of the mass attenuation coefficients (μ/ρ) which were obtained using XCOM computer code. The XCOM is a data base and it can calculate mass attenuation coefficients at photon energies of 1 keV to 1 GeV The measured linear attenuation coefficients have been compared with the calculation obtained by XCOM.

Keywords: *Mass attenuation, PMMA blocks, XCOM, NaI(Tl) scintillation detector*

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O_213

Comparison of Energy Production of Fixed and Dual Axis Photovoltaic Systems and Design of a 5,2 kW Solar Tracking Dual Axis Photovoltaic System: A Pilot Application

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ABSTRACT

In this study, preliminary feasibility of the photovoltaic system planned to be established at Social Facility of Istanbul Metropolitan Municipality located in Kucukcekmece have been discussed. Simulations of the established photovoltaic system have been performed for fixed axis and solar tracking dual axis installments respectively. Identical data and conditions have been input to PVSOL and PVGIS software programs in order to compare the simulated harvested solar energy from both fixed axis type and solar tracking dual axis type systems. The results of the simulations carried out with PVSOL and PVGIS software programs by utilizing one year long solar radiation data, have been found out to be different. According to these results, for two aforementioned installment types, PVGIS provided 7% higher harvested energy than that of PVSOL. On the other hand, the results of the simulations by both PVSOL and PVGIS software programs have shown that solar tracking dual axis type system produces 25% higher electrical energy compared to that of fixed axis type system. Based on these results, 5.2kW solar tracking dual axis system has been selected, designed and installed to meet the electricity demand at Social Facility of Istanbul Metropolitan Municipality. The radiation amount on the horizontal surface of the location, where the 5.2kW solar tracking dual axis type system has been built, measured as 1364.5kWh/m2. Even though standard spectrum deviation and the negative effects of module reflection phenomenon was considered, due to the orientation and inclination of the module surface, additional 487.9kWh/m2 of radiation gain is targeted within the system having an area of 35m2 solar panels and 8489.4kWh electrical energy production is expected annually by taking into consideration the losses and the capacity factor of the overall system.

Keywords: *Solar energy analysis, Simulation prediction models, Energy conservation*

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O_215

Synthesis and EPR Analysis of Gamma Irradiated of 2,4,6-Tris(p-aminoanilino)- 1,3,5-triazine

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ABSTRACT

An important class of compounds consists of substituted s-triazine derivatives which have tripodal heterocyclic compound. Compounds classified as heterocyclic probably constitute the largest and most varied family of organic compounds. We have reported here that a cyanuric chloride and its diamine have been syntheses to be a new template. The reaction of cyanuric chloride with 3 equiv of p-phenylenediamine in acetone has given the desired triamine a tripodal 2,4,6-tris(p-aminoaanilino)-1,3,5-triazine (C21H21N9) in a single step, coded to be TRIPOD.

After synthesis, TRIPOD polycrystal sample was irradiated by 60Co-gamma (□) ray source with a dose speed of 0.981 kGy/h at the room temperature for 72h. EPR spectra of TRIPOD compound were measured at different orientations in magnetic field with X-band EPR spectrometer along the temperatures between 100-300 K. EPR measurements were performed in steps of 10□□intervals along each of three perpendicular planes (x,y,z) during the experiment using temperature control unit of EPR spectrometer. Isotropic spectrum was obtained without depending on temperature and radical structure. For this radical, a value of spectroscopic splitting factor g was calculated. Radical was simulated using the Bruker software WinEPR-Simfonia and the experimental isotropic g-value of radical was calculated.

Keywords: *Synthesis, EPR, Irradiation effects, Radical, Heterocyclic Compound, s-Triazine*

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O_216

Structural and Magnetic Properties of Cd-doped ZnO Nanoparticles

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ABSTRACT

Zn1-xCdxO (x=0.00, 0.01, 0.02, 0.03, 0.04, and 0.05) nanoparticles were synthesized by the sol-gel method to investigate the relation between structure and magnetic properties. The X- Ray Diffraction (XRD) method was used for the structural analysis and ZnO Hexagonal Wurtzite structure with single phases were found for all Cd doped ZnO nanoparticles. Scanning Electron Microscope (SEM) technique was used to determine the surface morphology, particle size, and the shapes of the nanoparticles. The elemental compositions of the nanoparticles were obtained by the Electron Dispersive Spectroscopy (EDS). ESR spectra of Zn1-xCdxO were collected at room temperature on a Bruker EMX model X-band spectrometer operating at a frequency of 9.71 GHz. ESR measurements have been performed and analyzed through concentration dependence of the g-factor and the linewidths of pike to pike (ΔHPP) of ESR spectra. Experimental and fitting X-band ESR spectra of Cd doped ZnO nanoparticles with a different doping concentration of Cd recorded at room temperature were presented.

Keywords: *Zinc oxide, Cadmium, Sol-gel method, Nanoparticles, Magnetic properties*

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O_217

Solar Energy and Atmospheric Circulation Effects

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ABSTRACT

As it is known, energy sources with a low factor of causing climatic pollution are priorities. The phenomenon of Atmospheric Circulation Effects occurs due to the temperature difference between the two regions. The temperature difference occurs due to the angle of sunlight when it hits the ground surface. When sunlight hits the earth perpendicularly, it can generate more heat, depending on the conditions, because more energy can be transferred. In this study, the source, measurement, and calculation of all data required for the calculation of reference evapotranspiration using the FAO Penman-Monteith method will be discussed. . In this study, only standardized relationships are presented.

Both global warmings caused by human-induced greenhouse gas emissions and atmospheric circulation effects include large-scale changes and can cause climate changes. Solar energy is considered to be one of the best solutions, with its long life and its advantages to reduce pollution compared to other energy sources. This study aims to calculate and compare the efficiencies in these parameters with the use of solar energy benefits in three countries. In this context, global energy needs and how these needs were met in the past are examined in this study. It is also reported how these needs can be met in the future. Solar energy trends in recent years are included in this study. In conclusion, the graphics presented in the research text showed that solar energy is an indisputable option when it is evaluated in the context of humans, atmospheric factors, and climatic parameters.

Keywords: *Solar Energy, Solar Radiation, Atmospheric Effects, Cilimate Change*

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O_218

Radiation Dose Rate Level in Scintigraphy

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ABSTRACT

People are constantly exposed to artificial and natural radiation. Artificial radiation sources are very diverse. Medical applications where people are most exposed. In health practices, people are often exposed to artificial radiation at radiology, radiation oncology and nuclear medicine departments. One of the most common procedures in nuclear medicine is scintigraphy. Scintigraphy is performed for diagnosis purposes. Many radiation-emitting substances are used in scintigraphy imaging. The most commonly used radioactive substance in scintigraphy imaging is Tc-99m. In scintigraphy, Tc-99m is injected intravenously to the patient. Tc-99m emits gamma rays with 140keV main energy to the environment with half-life as short as 6 hours. These gamma rays affect people near the patient.

In this study, radiation dose rates from patients undergoing scintigraphy were investigated across time and variable distances. The patients were intravenously injected with 99mTc in accordance with the protocol of the hospital. Then, the radiation dose rates to the environment were registered at different times and distances from the patient. Radiation dose rate measurements, calibration June 2018 Turkey Atomic Energy Agency (TAEA) made by was made by the GM detector.

It was found that the radiation dose rate emitted by the patients varies according to time and distance from the patient. The radiation dose rate was calculated to range from 1 μSvh-1 to 27 μSvh-1. The results were evaluated in terms of hospital quality management.

Keywords: *Hospital management, Radiation, GM detector*

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O_220

Microstructural and Mechanical Properties of WC-Co Alloy Obtained by Sintering

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ABSTRACT

In this investigation, 75Fe3C-20W-5Co alloy samples were prepared by mechanical alloying process and solid-phase sintering technique. The binder used in this investigation is cobalt. Several samples of standardized form are carried out by the technique of sintering at temperatures going up to 1300 °C at different compaction pressure (5Mpa, 10Mpa, 15Mpa and 18Mpa). Microstructure characterization of the sintered steel alloys was conducted by X-ray diffraction (XRD) and (OM) optical microscope. The result reveals that the structure of these sintered alloys was found to consist of the Fe matrix phase and the W-Co solid solution phase. Compaction pressure has influence on the number and size of pores.

Keywords: *5Fe3C-20W-5Co alloy, mechanical alloying process, solid-phase sintering*

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O_224

An investigation on utilization of waste bricks for porous geopolymer production

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ABSTRACT

Porous geopolymer materials take great significance due to the valorization of waste substances to fabricate added-value products. The present study focused on the fabrication of porous geopolymers (PG) for the valorization of waste bricks (WB). For this purpose, the varying amounts of WB (10, 20, and 30 wt%) in substitution for metakaolin were added in a solution composed of sodium silicate, hydrogen peroxide, and olive oil. The fabricated PG specimens (PG10, PG20, and PG30) were then subjected to the physical and mechanical measurements for the determinations of pores (P), density (ρ), and compressive strength (CS). The results showed that WB can be successfully utilized for PG production. Moreover, one can easily state that increasing amounts of WB leads to an increase in P%, which in turn can decrease ρ value. According to the CS measurements, we found out that the increasing WB addition causes to decrease in CS values. Lastly, interesting pore morphology was observed and reported.

Keywords: *Compressive strength, Density, Geopolymer, Metakaolin, Porosity, Waste brick*

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O_227

Optimization of removal synthetic dyes from wastewaters using date stems biomaterial: equiliberium and kinetic studies

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ABSTRACT

The objective of this work is to valorize a biomaterial which is the date stems and evaluate its performance in the elimination of organic dyes (methylene blue and basic fuchsine) in an aqueous solution by biosorption. Two samples of biosorbents were prepared: the powder and the pieces of the date stems. The dyes biosorption on the date stems powder showed a relatively fast kinetics. The equilibrium is reached after 90 minutes of contact between the adsorbate and the biosorbentwith 88% and 86% discoloration rates for methylene blue and basic fuchsine respectively. This time is estimated at 105 minutes in the biosorption on the pieces of date stems with relatively low levels (73% for methylene blue and 67% for basic fuchsin). The effect of the various operating parameters on the discoloration rate of the dyes showed that the biosorption rates depend on the pH of the solutions, the best discoloration rates were obtained at the natural pH of the solutions (pH = 6.62 for methylene blue and pH = 8.49 for basic fuchsine). The elimination of dyes decreases with the increase of the initial dye concentration and increases with the increasing of biosorbent mass. The structural characterization by Fourier transform infrared spectroscopy (FTIR) of the date stems powder after biosorption of the dyes showed an intensity reduction of the characteristic peaks of the hydroxyl groups and the apparition of novel peaks characteristic of amine groups indicating thus the fixation of dyes on the biomaterial.

Keywords: *Date stems, dyes, biosorption*

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O_228

Development Of Surface Features By Addıng Nano Partıcles In Isophthalıc Polyester Resın

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ABSTRACT

Surface properties can be developed with nanoparticles added to the polymer. With the nano- additives, many advanced surfaces such as surface contact angle, self-cleaning surfaces, corrosion resistance, resistance to UV rays, nonicing surfaces can be obtained. In this study, it is aimed to increase the contact angle and observe surface energy (interaction in the polar- polar or disperse portions) by adding various nano additives. SiO2 and ZrO2 nanoparticles were by added to the polyester matrix in %0,5-1,0-1,5 ratios. After addition of the powder additive to the matrix, through an hour on the mechanical mixer and it was mixed 15 min %30 amplitude ultrasonic mixer. After adding the hardener to the prepared mixture, the composite were produced samples for contact angle measurement by casting to the silicon molds. In result of tests at Dataphysics OCA15 device the SiO2 and ZrO2 nano powders increased the contact angle value by make the surface hydrophobic. The contact angle of the pure polyester increased from 70.6° to 104.3° with the addition of 2% nano SiO2.

Keywords: *Polyester, Nano Powder, Contact Angle, Surface Energy*

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O_229

Effect Of Cutting Parameters On Surface Roughness Of Waste Filled Terephthalic Polyester Resin Matrix Composite At Milling Operation

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ABSTRACT

Industrial waste is a problem for companies as well as for the environment. In recent years, an alternative solution to this problem has been found through to the using of waste in the production of new composite materials. It is not enough to produce only the composite. The machinability of the composite produced should also be investigated. In this study, a new composite material was obtained by using industrial waste produced by the production of glass fibre reinforced plastic pipes (GFRP). Terephthalic resin was used as matrix material. Waste powder was used as filling material in the ratio of 30%, 40% and 50% by weight compared to matrix material. Machinability of produced composites were investigated according to three parameters with three levels. According to the experimental results optimum cutting parameters obtained depending on surface roughness.

Keywords: *Industrial waste, composite, machinability, surface roughness*

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O_231

A Research On Machınabılıty Of Waste Fılled Vınyl Ester Polyester Resın Matrıx Composıte Materıal

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ABSTRACT

In this study, a new composite material was obtained by using industrial waste produced by the production of glass fibre reinforced plastic pipes (GFRP). Vinyl ester resin was used as matrix material. Industrial waste used in the production of GFRP pipes was produced during wet cutting and contains SiO2, glass fibre and polyester resin. Filtered the wet sludge was taken from the factory and then dried and sieved into powder form. The composites were produced by moulding by mixing vinyl ester resin, GFRP waste powder and process additions in the mixer. Waste powder was used as filling material in the ratio of 30%, 40% and 50% by weight compared to matrix material. Three parameters were chosen with three levels as milling conditions. According to the experimental results optimum cutting parameters obtained depending on surface roughness.

Keywords: *Industrial waste, composite, machinability, surface roughness*

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O_232

Drılling Performance Of Vınylester Matrıxed Gfrp Cuttıng Waste Fılled Composıte Materıal

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ABSTRACT

Drilling is one of the most used machining operations at composite materials. In this paper, vinyl ester matrixed GFRP (glass fibre reinforced plastic pipes) cutting waste filled composite material was produced and drilling performance of composites were investigated by experimental method. Two types of drills, three different cutting speeds and three waste filling ratios were used as parameters. Drilling parameters were optimized according to surface roughness and cutting force by response surface methodology.

Keywords: *Industrial waste, composite, drilling, response surface methodology*

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O_233

Physical, optical, and radiation shielding properties of lithium zinc silicate glass doped with CeO2

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ABSTRACT

In this work, the glass system of 3.95Li2O-9.95Na2O-0.85Al2O3-(100-x)SiO2-9.25CaO-4.7MgO-3.8ZnO-xCeO2 where x: 0, 2.5, 5, 7.5, and 10 mol% was investigated for a potential use in radiation shielding applications. For this purpose, the newly developed Phy-X/PSD software was utilized to determine the radiation shielding characteritics in the proposed lithium zinc silicate (LZS) glass system. Based on the linear attenuation coefficient (LAC) calculations, the half-value layer (HVL) and the radiation protection efficiency (RPE) were evaluated for the glass series. Further, some physical properties such as glass density (ρglass), molar volume (Vm), oxygen molar volume (OMV), and oxygen packing density (OPD) were estimated while various optical features like refractive index (n), molar polarizability (αm), molar refractivity (Rm), and metallization criterion (M) were also assessed. The findings clearly showed that the addition of CeO2 in the LZS glass system is a good choice for improving radiation shielding characteristics. That is, the LAC was efficiently enhanced as the concentration of CeO2 is increased from 0 to 10 mol%. Moreover, the physical calculations revealed that the ρglass can be increased from 2.8181 to 3.2751 g/cm3 with the insertion ratio of CeO2 as 0 to 10 mol%, respectively. More importantly, LZS4, having the highest CeO2 content, can compete with commercial radiation shielding glasses.

Keywords: *Attenuation characteristics, CeO2, Glass density, Lithium zinc silicate, Radiation shielding*

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O_237

Optimization Of Welding Application Parameters Of Thin Sheet Blocks Used İn The New Generation Ship Hull

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ABSTRACT

The main material of merchant ships is steel. Generally, block sheets forming the ship's hull are used between 7-12mm. In recent years, the sheet thicknesses of newly built ships in the world are selected very thin. This preference obliges shipbuilders to develop additional preventions and new methods. On a 60m ship hull; It consists of approximately 25-35 mega blocks and 45-60 blocks. Welding operations; It causes expansion and shrinkage on the part due to regional temperature differences. This causes distortions in this event. If distortion is forcibly avoided, then internal stresses grow. After the welding process, many problems such as cracks, pores and pits are seen on the surfaces.

The purpose of this study is; It covers the studies of determining the optimum welding parameter of panels with 48cmx1200cm dimensions and 5mm thickness. Because the sheet thickness used here is very thin, the size of the blocks to be welded and the large number of these welded mega blocks are used for the ship's hull; The most appropriate parameter in the process application includes uncertainty such as mechanical behavior on the weld. Application conditions were determined using Taguchi Experiment Design (L9) for the parameters to be used in the study. Submerged arc welding was applied to the panels in the determined parameters in horizontal position. With the eyes and radiographic tests were performed by taking 10x48cm sections, head-mid-end, from each combined panel. Tensile and notch-impact mechanical tests were also applied. Using Analysis of Variance (ANOVA), the Signal-to-Noise ratio (S / N) was calculated with the "highest better" quality control feature, and the percentage effects of each parameter on yield and notched-impact tests were obtained. 650amper, 32 volt and 150cm / min. parameters gave the best welding results. The impact percentage of the highest current has been determined; The results were 50.24% for the yield test and 51.43% for the notched-Impact test.

Keywords : *Submerged arc welding, sheet welding, Ship plate, radiographic examination*

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O_238

The effect of rock mechanical properties heterogeneity on wellbore stress distribution for geothermal well using under-balanced drilling

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ABSTRACT

Under-balanced drilling (UBD) is widely used in petroleum drilling engineering, an regarding wellbore safety, it is necessary to analyze stress distribution around the wellbore during drilling procedures. The heterogeneity of the rock mechanical properties has a significant impact on the stress distribution near wellbore. Aiming at seepage and thermal effects during UBD, combined with elastic theory, a model of pore pressure distribution under anisotropic seepage of was constructed. The Weibull probability density function is used to express the Young' modulus heterogeneity of granite. In addition, the influence of the heterogeneity on the stress distribution, pressure and damage factors of granite under the condition of thermal-liquid-solid coupling in the process of drilling is simulated by COMSOL Multiphsics. The influence of heterogeneity on the total energy, train energy, dissipative energy and the ratio of strain energy to dissipative energy is also studied. And the correlation of total energy, strain energy, dissipation energy, the ratio of strain energy to dissipation energy and damage factor is well. A characterization of rock damage caused by the inhomogeneity of elastic modulus in two-dimensional plane is proposed based on energy evolution. The characterization is that the ratio of strain energy and dissipation energy is used to describe the rock damage. And when the damage factor is closer to 1, the ratio of strain energy to dissipation energy approach 1. Moreover, wellbore and formation temperature fields was studied when heat sources (circulating pressure drops and mechanical friction) are considered. The study shows both pore pressure and seepage stress are present in an elliptical manner under anisotropic seepage. The annulus temperature is greater than the geothermal temperature, thus compressive thermal stress forms in the surrounding rock. Therefore, the result, considering the two factors, can provide a theoretical basis for subsequent wellbore stability analysis.

Keywords: *Under-balanced drilling, COMSOL Multiphsics, thermal-liquid-solid coupling, rock damage*

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O_239

Inclined Slipway Optimızation In Shipyard

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ABSTRACT

In most of the world's shipyards, ships over 2500 tons are launched using the inclined slipway method. The biggest problem in shipyards; Efficient use of the inclined slide capacities where the blocks turn into mega blocks directly affects the purchases of new projects. This scope of work; Inclined slipway layout optimization work among the ongoing projects at the shipyard and the placement of possible proposal projects to the current project flow with the best solution. Within the scope of the study, first the slipway restrictions and then the slipway activities were determined. Minimum and maximum limits have been established for restrictions. Constraints have been created for the start and end dates for the slipway use, the occupancy time of the sled, the occupancy capacity of the sled, the placement of the ship in the sled cells, the width and length of the ships. Accordingly, the interdependencies and durations of the activities were determined. The presence of 4 cells was assumed with the slipway angle of 5º and the slipway vessel settlement area to be 25x100m. Among the 19 ongoing projects in a shipyard, 4 proposal projects were tried to be placed with the best layout and cost. For this purpose; Greedy method was used in the selection of optimization algorithms. Afterwards, the Greedy + Local Search Algorithm and VNS Algorithm were tested and the optimization objective function was determined. For this, slipway capacity calculation, excess capacity calculation and cost calculation were created. By calculating these, it has been ensured that the cost and the time schedule are optimized so that the activities stay between the start and end dates. Although Greedy Algorithm was tried for Project-4, the best result was obtained in Greedy + Local Search and VNS Algorithms, as a result of the Local Search application we applied on the Greedy Algorithm for Project-3, the cost was lower, the best result for Project-2 was achieved with Greedy + Local Search, and the Greedy + Local Search and VNS Algorithms for Project-1 were run separately. cost is minimized.

Keywords: *Ship slipway placement, production optimization on inclined slipway, greedy algorithm*

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O_240

Molecular and Biochemical Investigation of Klebsiella Pneumonia Diagnosis From the Respiratory System of Patients

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ABSTRACT

Klebsiella pneumoniae. Hospital infections cause "traditional" strain and produce extended spectrum beta-lactamase. Strong strains of K. Pneumoniae are associated with an infectious infection but are more susceptible to antimicrobials. K. pneumonia support characteristic of developing malignant strains This study focuses on the isolation and diagnosis of Klebsiella pneumoniae from the respiratory tract. Some biochemical and diagnostic tests to know the pathological changes that occur as a result of the injury and molecular diagnosis The faster the diagnosis of Klebsiella pneumoniae is, the faster progress will be made in preventing infections caused by this bacterium. Different methods are used in studies aimed at diagnosing infections caused by bacteria. In this study, molecular diagnosis of Klebsiella pneumoniae is emphasized and PCR method is applied in this context. , an experimental study was carried out on the samples obtained from the respiratory tract of the patients who applied to the Research and (Application Hospital in Al-Anbar city of Iraq). Although the real- time PCR is fast, accurate, and technically specific but extremely costly despite recent advances in molecular biology and the evolution of recognition on the basis of commercially available phenotype combinations, identification of bacterial strains remains a challenging task for many routine microbiological laboratories. PCR ELISA is a precise technique used for gene detection. In this study, specific precursors and pathogens targeting 16S rDNA and rmpA genes were designed. The specific target DNA was amplified. Use of nucleotides labeled digoxigene. The most powerful infectious bacterium in Enterobacteriaceae and the most dangerous bacterium that causes respiratory infections are Klebsiella pneumoniae sequence analysis. The PCR-ELISA device was in this study used to diagnose therapeutic strains of Klebsiella pneumonia. DIG-labeled PCR products are designed to be connected to the microtiter plate specific genetically modified primers were manufactured.

Keywords: *Klebsiella Pneumoniae, Infection, Molecular Analysis, PCR-ELISA 16S, rDNArs, DNA Extraction, rmpA Gene*

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O_241

Electrochemical Study of a Nanostructured Magnetic Alloy Based on Copper

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ABSTRACT

The various nanostructured materials are more and more present in the world of industry, materials which include magnetic elements such as iron, cobalt or nickel have important applications in the magnetic recording industry.

In this work; We have developed Cu-Fe alloys with a nanometric structure by mechanosynthesis and following the mechanism of formation of these alloys, the production is followed by a very delicate step, which is cold compaction. The calculation of the various structural and microstructural parameters of our powders was obtained by the X-ray diffraction method (XRD), the evolution of the size of the particles was carried out by laser granulometry, followed by a description of the morphology of the powders, carried out by scanning electron microscopy (SEM), finally, we carried out a study of the electrochemical behavior to corrosion of our alloys.

Keywords: *, Nanostructured materials, Cu-Fe, Cold compaction, Electrochemical behavior to corrosion*

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O_244

The Study Of Relationship And The Effect Of İl-1, İl 6 And Some Biochemical Markers On Type-1 And 2 Diabetes Mellitus Development Risk

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ABSTRACT

Diabetes mellitus (type 1 and type 2) is a disease that widely separated in world and its frequency is increasing day by day. Understanding the causes of this disease (type 1 and type 2 diabetes) increases disease-fighting effectiveness and disease prevention capacity day by day. In this study, interleukin - 6, IL 1 level and some other biochemical markers were investigated in the development of diabetes. As a result of experimental studies, Cytokines produced by immunocompetent cells influence local as well as systemic inflammation and are therefore critical contributors to the pathogenesis of Type 1 and type 2 diabetes. It has been determined that interleukin - 6 level is slightly high in type - 1 and type - 2 diabetes patients while IL-1 high in the same age. In addition, interleukin - 6 level was found to be related to HbA1c and insulin hormone. On the contrary, there are Non-significant statistic for C-PR, Creatinine and Urea concentration. It is considered that an increase in the level of interleukin may be a sign of diabetes.

Keywords: *Type 1&2 diabetes,Insulin, Interleukin-1, Interleukin-6, and Cytokines*

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O_246

Study of the radiation attenuation coefficient of barite-added epoxy resin

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ABSTRACT

Radiation emitted in the form of waves and particles is a phenomenon that people have been exposed to from daily life since the existence of the world. The main causes of this exposure are natural radiation sources, medical use, industrial application, nuclear facilities and nuclear accidents. The use of radiation in so many areas has increased the importance of radiation protection. The three basic principles of radiation protection are time, distance and shield. Shield, which is one of these three principles, is a general of different types of materials placed between a human or a system and radiation. Researchers examine the radiation shielding properties of the composite materials they produce by combining different materials.

In this study, a composite material was produced by adding barite containing epoxy resin. The radiation shielding properties of the composite material produced were experimentally measured using a low level gamma counting spectrometer that includes a NaI (TI) detector connected to a multi-channel pulse height analyzer.

Keywords: *epoxy resin, barite, radiation shielding, NaI (TI) detector*

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P_31

Effects of Modified MoS2 Nanosheet on Oil-water Interfacial Tension

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ABSTRACT

Interfacial tension is one of the most important physical properties for newfangled injectants enhanced oil recovery (EOR) in oilfield. The effects of modified molybdenum disulfide nanosheets on oil-water interfacial tension were studied by experimental method and molecular dynamic simulations. Using the experimental method, first, 5 ml deionized water and 5 ml 0.005wt% modified molybdenum disulfide nanosheets solution were respectively added into the test tube. Then, 5 ml n-decane stained with Sudan III were added into them, respectively. The contact surface of n-octane with deionized aqueous solution was concave, and with modified molybdenum disulfide nanosheets solution was planar. Then, the dynamic behavior of modified molybdenum disulfide nanosheets at oil-water interface was studied via molecular dynamic simulation. The methods of experiment and theoretical simulation show that modified molybdenum disulfide nanosheets reduce the oil-water interfacial tension. Macroscope phenomena of oil-water interfacial was revealed based on the combination of theoretical simulation and experimental validation, providing an insight and pioneer the research at microscope scale for the development of enhanced oil recovery of newfangled injectants.

Keywords: *Enhanced Oil Recovery, Interfacial Tension, Interfacial Tension*

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P_33

Formulation of directly compressible coprocessed excipient for fast disintegrating tablet

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ABSTRACT

The purpose of this work is to develop a versatile dierctly compressible coprocessed excipient in order to formulate a novel pharmaceutical dosage form which is the fast disintegrating tablet by preparing matrix which represents a charge excipient for these tablets. his matrix comprises a diluent, a disintegrant and a binder.

For a first approach, preliminary tests made it possible to define the proportion of the binder in the formula. Corn starch is an excipient used in oral solid dosage forms as a binder, diluent or disintegrant. It was selected in our formulation as the binder. It has the property of playing a double role in the formulation of the tablets. It can combine binding and disintegrating properties. It is used at a concentration of 3-20% as a binder in wet granulation.

n order to optimize the disintegration time of the tablets, a disintegrating agent has been introduced into the retained formula. The disintegration time was improved by incorporating a super-disintegrant and a flow agent.

According to the European Pharmacopeia, the matrix obtained meets the objectives initially set: disintegration time less than 3 minutes and sufficient hardness of the tablets. The matrix retained has a disintegration time of less than 1 minute.

This matrix has been applied to several active substances. The results are in accordance with specifications of pharmacopeia.

Keywords: *fastdisintegration, matrix, coprosseced excipient, compressible, drug, formulation.*

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P_50

Impact of the loading of date palm fibers (DPF) on the thermal and mechanical performances of mortars in building construction.

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ABSTRACT

The development of eco-friendly composites as insulating materials in buildings offers practical solutions to reduce energy consumption, which is why scientists have started in recent decades to search for more sustainable and eco-friendly materials. It is well known that building materials are among the most commonly used materials and have an obvious negative impact on the environment. Therefore, this work presents a study on the use of new bio-composite material, composed of natural fibers of date palm (DPF), cement, and sand. The objective of this study is to assess the thermal insulation properties as well as the water absorption and mechanical performance of this material for the construction of buildings. The percentage by weight of date palm fiber in the test samples varied from 0% to 15% for a mixture of two fiber sizes (3mm and 7mm). The characteristics of these samples were determined experimentally in terms of compressive strength as well as thermal conductivity and diffusivity.

Keywords: *date palm fiber (DPF), bio-composite materials, eco-friendly materials, Mechanical performance, thermal conductivity.*

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P_56

Risk Factors Associated With Microalbuminuria In Hypertensive Patients

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ABSTRACT

Microalbuminuria (MA) is a strong and independent cardiovascular and renal risk factor, common in diabetes and hypertensives patients. Its prevalence among hypertensives varies from 4,7% to 67,8%.

The aim of our work is to determine the frequency of MA in a series of hypertensive patients, and to investigate the factors influencing its onset.

This is a prospective series of clinical cases of 220 hypertensive patients. Blood parameters such as renal profile (urea, creatinine and GFR), lipid profile (cholesterol, triglycerides, HDL cholesterol, and LDL cholesterol), fasting blood glucose, blood electrolytes, serum proteins and albuminemia, as well as urinary parameters such as microalbuminuria and creatinine were done.

A clear female predominance with a sex ratio of 2.24, the average age is 59.3 ± 3.54 years, 23.18% are diabetic. The frequency of microalbuminuria in our study population is 14.54% and the one of macro albuminuria is 3.64%. There was a significant association of microalbuminuria and duration of hypertension ($p<0.0000001$), smoking ($p=0.0014$), hyperglycemia ($p=0.0001$), hyper-creatinine ($p=0.01$), GFR ($p=0.000001$), and hypertriglyceridemia ($p=0.006$).

Microalbuminuria being an established cardiovascular risk factor, knowledge of the factors associated with its occurrence allows to prevent and better manage the patients in order to reduce the cardiovascular risk

Keywords: *microalbuminuria, arterial hypertension cardiovascular risk*

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P_97

Investigation of electrostatic sheaths properties of magnetized discharge plasma in the presence of multi-sized dust grains

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ABSTRACT

Dusty plasma represents a multi-component mixture of electrons, ions, neutral particles and macroscopic charged dust grains, that is frequently encountered in space and laboratory. In recent years, several works have been devoted to study the different aspects of collective processes in dusty plasmas, such as electrostatic sheaths, linear and nonlinear dusty waves, instabilities, as well as observation of the dust lattice formation mechanism, etc. In particular, dust grains with different sizes, from a few nanometers to tens of micrometers, have been observed in various laboratory experiments on complex plasmas.

In this work, we have investigated electrostatic sheaths properties of magnetized discharge plasma in the presence of multi-sized dust grains. The electrons are considered in thermodynamic equilibrium, however the ions and the dust grains are described by a fluid model, where the dust size distribution is modelled by a Gaussian law1. To describe the dust charge, we have used the orbit motion limited model (OML).

The numerical results show that the presence of magnetic field reduces the sheath thickness. Moreover, the increase of the values of the lower and the upper limits of dust grains radius decreases the sheath thickness and the oscillatory structure of electrostatic potential. The effects of the other parameters are also analysed and discussed.

Keywords: *Dusty plasma, electrostatic sheath, dust grains*

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P_101

Deep Learning for Sentiment Analysis of Algerian Dialect

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ABSTRACT

In this work, we present the issue of sentiment analysis on corpus of comments extracted from social media through Facebook, Twitter and YouTube. These comments concern Algerian dialect that could be either Standard Arabic, French or local spoken language which they are written in Arabic, Latin or mixed characters.

Although several studies have used sentiment analysis to examine social media content by using either; methods based on semantic rules such as linguistic extraction patterns obtained from the morpho-syntactic analysis; either statistical methods based on Word counts (Bag of words) or machine learning techniques (as Deep learning). This work studies the Word2vec model of deep learning algorithm applying on Algerian spoken dialect.

Word2Vec is created by Google in 2013, where they used as an entry a large text dataset and then produce a vector space usually of several hundred dimensions.

As a result, we achieved an improved accuracy for sentiment classification using Deep learning model and Word2Vec algorithms, more of 70% of cross-validation test of CNN and RNN Algorithms.

Keywords: *Deep learning, Word2vec, Sentiment Analysis, CNN, RNN, Algerian Dialect*

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P_105

Implementation of an Elliptic Curves Cryptography Coprocessor for Wireless Sensor Networks on an FPGA platform.

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ABSTRACT

A Wireless Sensors Network (WSN) is a group of distributed nodes that can communicate with each other wirelessly. In recent years, the growing need for wireless detection and monitoring applications has motivated the wide use of WSN networks. To meet security requirements in this type of networks, it is indispensable to include cryptographic schemes in the network taking into account the limited energy, memory and computation capacities of the sensor nodes.

Two main types of cryptographic algorithms are used in WSNs; the symmetric cryptography, for data encryption/decryption, and the asymmetric cryptography which is mainly used for a secure keys exchanges. However, the limited capacities of a sensor node makes asymmetric cryptography very slow and exhausts the sensor node processing unit. for this, the main objective of this work is to implement, on an FPGA platform, a dedicated coprocessor ECC-163 for the asymmetric cryptography based on elliptic curves. This coprocessor is able to handle all the complex calculations of elliptic curves cryptography and controlled by the softcore processor MicroBlaze in a co-designed architecture. The designed cryptographic elliptic curves coprocessor performs one scalar multiplication operation in an average time less than 400 us. Besides, results show that the utilized FPGA resources and the power consumption are appropriate for the use in wireless sensor networks.

Keywords: *ECC, FPGA, WSN, coprocessor, Soft-core.*

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P_107

Efficient implementation of deep learning based vehicle access control system

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ABSTRACT

The license plate is a unique information for each vehicle. It can be considered as its identity, and it is also a very effective way to identify each vehicle in a territory. The identification of license plates is used specifically in a security context. The information contained in the plate can be used for different purposes, such as access and flow control, surveillance of border crossings and tolls, search for suspicious vehicles or even the fight against crime, etc. In this paper, we propose an efficient implementation of automatic license plate recognition system. The number plate is used for access control. The reading process is carried out according to four stages: vehicle presence detection, plate localization, plate number segmentation, and plate number recognition. The system is built around a Raspberry Pi 3, a camera module and some components to ensure a robust and energy efficient implementation. We used a VGG16 convolutional neural network (CNN) architecture to improve the overall accuracy and efficiency of the system. To overcome the CNN time constraints, we used an Intel Neural Compute Stick, which is a toolkit that accelerates solution development and streamlines deployment.

Keywords: *License Plate Recognition, Optical Character Recognition (OCR), Convolutional Neural Networks, Deep learning*

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P_144

Removal of Phenol and Chlorophenols from Aquatic System Using Magnetical Modified Yeast

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ABSTRACT

Phenols and chlorophenols are toxic to other organisms in aqueous media even at very low concentrations. Phenols are the most common pollutants in aqueous media. This study deals with the removal of phenols and chlorophenols from the aqueous media in a batch system by the use of magnetical modified yeast. The equilibrium time of the adsorption of phenols and chlorophenols, the effect of the initial concentration upon the adsorption rate, the effect of the pH and the possibility of regeneration have been examined. The adsorption phenomenon of the phenols and chlorophenols on magnetical modified yeast samples at different time ranges was investigated to elucidate the equilibrium times with increasing phenol and chlorophenol concentration. The amount of adsorption onto yeast was observed to increase in the order of phenol, 3-chlorophenol, 4-chlorophenol and 2,4,6-trıchlorophenol and the maximum adsorption equilibrium time was found to be approximately 45 minutes. The amount of adsorption on the modified magnetic yeast cells followed the order of phenol<3- chlorophenol<4-chlorophenol< 2,4,6-trichlorophenol.

Apart from those the possibility of regenerating the used yeast samples with the use of 30 % (v/v) ethanol solution. Magnetical modified yeast is suitable for reuse for more than five cycles without noticeable loss of adsorption capacity. The adsorption studies carried out between 15oC, 25oC and 35oC suspension temperatures revealed that the adsorption values showed a decrease with the increasing temperature. The adsorption values of the yeast were found to increase with temperature.

Keywords: *Yeast, Modification, Adsorption, Phenols, Wastewater*

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P_146

Development and Characterization of Photocatalytic Antibacterial and Reflective Surface Coatings for Photovoltaic (PV) Panels

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ABSTRACT

In this research, the efficiency of PV panel surfaces due to environmental pollution (dust, dirt and CO2 etc.) pollution results in loss of output power. In order to eliminate this contamination; There is a need for frequent maintenance and cleaning on PV panel surfaces. Self-cleaning, photocatalytic, anti-reflection and antibacterial coatings developed to reduce this effect were coated on glass surfaces with the Sol Gel method and the effects of the coatings on the efficiency of PV panels were investigated. The optical and photocatalytic properties of the coatings made were characterized by contact angle measurement and SEM microscope, respectively. Panels coated with increased light transmittance on the PV panel surface; showed self-cleaning properties, anti-reflection effect and antibacterial surface formation of the coatings made on the panel surfaces; Photocatalytic and anti-reflection effect was achieved with TiO2, SiO2 elements, and an antibacterial surface was obtained with the B2O3 element. Four panels covered with TiO2, SiO2, B2O3 and TiO2 + SiO2 + B2O3 and uncoated panels were compared. PV panels are located in the external environment and the most efficient coating determination was made with the data received from the photovoltaic system scheme to measure the extra energy produced.

Keywords: *Photocatalytic, PV Panel, Anti Reflektive, Antibacterial, Sol Gel,*

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P_148

Preparation and Characterization of Antifungal hybrid coatings on PC and PMMA

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ABSTRACT

Essential oils are essential oils that are obtained by distillation from the seeds and tissues of the plant, which are strong, fragrant and caustic, and have many components. Approximately 1500 essential oils are known today and about 300 of them are stated to have commercial significance for different industries. They are derived from plants and contain many chemical components. Sometimes, oil can contain more than 100 ingredients. The peculiar smell and aroma therapeutic properties of each essential oil depend on the combination and amount of the components that make up the oil. Essential oils are antimicrobial, antioxidant, anticancer etc. . After determining that they have many functional features, many research groups focused on the research of the pharmacological properties of essential oils.

Many hybrid materials containing essential oils have been studied in different industrial areas in recent years. The biggest candidate for these hybrid materials are silane coupling agents. In this study, silane based hybrid coatings containing thyme, cumin, tea tree and pepper oil were applied on polycarbonate and polymethyl methacrylate. The prepared solutions were drawn onto the surfaces with a film applicator. UV and thermally cured surfaces are characterized by XRD, SEM-EDX and subjected to abrasion, scratch, roughness and antifungality test.

Keywords: *Essential oil, Silane, Coating, Surface modifcation*

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P_149

Preparation and Characterization of Antibacterial hybrid coatings on PC and PMMA

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ABSTRACT

Bacteria pose a big problem in a wide range of applications, from furniture and home walls to industrial facilities and hospital settings. When bacteria come into contact with material surfaces, they probably adsorb to the surfaces and then form biofilms that act as barriers against biocides, and the effects of biocides are significantly reduced. The main strategies for preventing bacterial attachment and biofilm formation are the design of special surface properties or a combination of two approaches that register antibacterial or biocidal materials into the coating matrix or make it difficult for bacteria to bind. Therefore, the production of antibacterial coatings has emerged as the most suitable method to protect surfaces from biofilm formation. Adding antibacterial material and biocides to the coating compositions is an easier and more traditional way to have antibacterial properties on the coating surface. The gradual release of antibiotics, silver ions and other antibacterial reagents into the environment can prevent bacteria from growing on the coating surfaces.

Although many antibacterial coatings have already been developed and have been commercially available for some time, effective antibacterial properties are often conditions that disrupt the mechanical properties of the coatings and thereby limit their widespread use. In this study, nano silver and nano TiO2 doped silane binding agent based hybrid coatings were applied to polycarbonate and polymethyl methacrylate surfaces. Silane-based hybrid coating surfaces are cured with thermal and UV. Samples were characterized by XRD, SEM, scratch and antibacterial activity for chemical, morphological, mechanical and antibacterial properties, respectively.

Keywords: *Nano Ag, Silane, Coating, Surface modification*

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P_158

Photocatalytic Degradation of Azo Dyes in Aqueous Suspension of ZnO under Solar Irradiation

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ABSTRACT

This study focuses on the photocatalytic degradation of food dye E110 and textile dye RO16 employing heterogeneous photocatalytic process under solar irradiation using ZnO. In the first part the semiconductor ZnO was synthesised, characterized and analysed by different techniques: X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM) coupled with Energy Dispersive Spectroscopy (EDS) and Infrared Spectroscopy (FTIR). While the second part was devoted to examine the photo degradation of the two azo dyes under different operating parameters such as PH of the solution, catalyst dose, initial concentration of dyes on the photocatalytic degradation of the pollutants. The optimum catalyst dose was found to be 0.5 g/L for E110 and RO16. In the case of E110, maximum rate of decolorization was observed at pH= 6.4, whereas the decolorization of RO16 reached maximum at pH = 6.3.

The kinetic study of photocatalytic degradation of the pollutants showed very good yields exceeding 88%. It was determined that the photocatalytic degradation follows pseudo first order kinetics, depending on the dye concentration. The trapping effects of different results proved that the oxidation of E110 and RO16 mainly occurred by the direct oxidization of h+ and •O2- radicals, while the •OH radicals played only a relatively minor role in the direct oxidization process.

Keywords: *Photocatalysis, Solar irradiation, Dyes, ZnO.*

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Experimental study of self-compacting mortar lightened by polystyrene beads and pumice aggregate

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ABSTRACT

The present work investigates the effects of the use of lightweight aggregates which are expanded polystyrene (EPS) and pumice on the fresh and hardened properties of lightweight self-compacting mortar (LWSCM), in order to develop structural lightweight concrete. In these SCM mixtures, natural sand has been replaced with the EPS beads and pumice at levels of 0, 25, 50 and 75% for the two types LWSCM. SCM was tested at fresh state with mini slump flow and mini V-funnel flow time. At hardened state, compressive strengths, density and thermal conductivity were measured.

The results indicated that all mixtures were carried out to examine the developing fresh state according to the standards of SCM. At the hardened state, the density of the LWSCM mixtures was reduced by 43% and 25% for 75% of each EPS and pumice substitutions respectively. This reduction is accompanied by a fall in mechanical strength by more than 50%. Finally, the thermal conductivity is improved proportionally to the increasing rate of EPS and pumice substitutions

Keywords: *Lightweight self-compacting mortar, polystyrene beads, density and insulation.*

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P_178

B2O3 Doped TiO2 Thin Films by Sol-Gel Method

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ABSTRACT

Titanium dioxide (TiO2) is a widely used material in nanotechnological applications. Especially in photocatalytic and optical applications, TiO2 thin films are an indispensable material. Metal- doped thin films are of interest to researchers for the development of these properties.

In this study, the effect of boron oxide (B2O3) additive on surface properties in coating TiO2 thin films on soda-lime glasses was investigated. In the experimental study, alkoxide solutions with a source of boron and titanium were used. TiO2 sol was prepared with Sol-Gel method. In addition, the sol was prepared by adding Triisopropylborate. Condensation and polymerization steps were completed in acid catalysis and the solution was obtained. In the home-made dip coater device, the solution is coated on the surface. The surface properties of dried thin films have been characterized by applying morphological analysis and contact angle measurement tests.

As a result, the Boron oxide-doped TiO2 coated surface was found to have better hydrophilic properties than the non-doped TiO2 surface. It has been observed that the boron oxide-doped TiO2 coated glass material has a superhydrophilic value.

Keywords: *Boron oxide, TiO2 Thin Films, Sol-Gel Method, Contact Angle.*

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P_179

Production and Characterization of Zircon Titanate Nanofiber Containing Sr and Pb by Electrospinning Method

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ABSTRACT

Lead zirconate titanate (PZT)-based ferroelectric ceramic materials are piezoelectric materials of commercial importance. Barium strontium titanate is preferred in new technological applications due to its superior properties. Strontium zirconate and strontium titanate perovskite materials also have a wide application area.

In this study, Strontium zirconate titanate (SZT) and lead zirconate titanate (PZT) nanofibers containing Sr and Pb were prepared by sol-gel method using electrospinning device. Solutions were prepared using metal salts and alkoxides as the precursor materials. Different parameters of electrospinning device were examined and the SZT and PZT nanofibers were produced with optimum properties. Morphological characterization of the produced nanofibers was done with SEM and EDX. Nanofibers size and distribution were determined using SEM images with Fibrauqnt 1.3 software.

Keywords: *PZT, SZT, Sol-Gel Method, Electrospinning Device.*

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P_194

Application of New Viscoelastic Acidizing of Diverting Technology in Horizontal Wells of Tarim Oilfield

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ABSTRACT

Donghe block of Tarim Oilfield is a long horizontal sandstone reservoir with many small layers and serious heterogeneity. After conventional acidification, there were some problems such as small production increased and water cut increased. Through the analysis, the main reason was that in the acidizing engineering, the acid fluid entered the high permeability zone preferentially, while the low permeability layer which needed to be reformed most cannot be improved, and the interlayer heterogeneity was intensified. In view of the problems such as the difficulty of uniform distribution acid and the unsatisfactory effect during the acidizing transformation of Donghe block, the acidizing of diverting-steering technology was proposed. On the one hand, it analyzed the mechanism of viscous diverting, on the other hand, it optimized the viscoelastic surfactant DCA-1, which is suitable for the steering of sandstone reservoir acid, and evaluated its diversion performance indoors. Field experiment and application showed that acidizing of diverting-steering technology has achieved good stimulation effect in Donghe block, so it has important reference significance for the transformation of sandstone reservoir acidizing uniformity in long well section.

Keywords: *Sandstone acidizing, Viscoelastic surfactant, Diverting-steering, Uniform distribution acid.*

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P_212

Investigation of mechanical, physical and radiation properties of nano-boron- added polymers

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ABSTRACT

In this study, the mechanical and radiation properties of pure epoxy, 20% and 40% ulexite, boric acid and colemanite boron mineral doped polymeric materials were investigated. It has been determined that the addition of boron mineral compared to pure epoxy increases the hardness and wear resistance of polymer composite materials. While boron mineral additives increased the unit volume weight and density values in materials, it caused a decrease in porosity and water absorption values. It has been observed that samples with boron minerals significantly lower the gamma radiation values compared to pure epoxy. The highest absorption coefficient was obtained in the sample with 40% ulexite.

Keywords: *Pure epoxy, Ulexite, Colemanite, boric acid, Radiation, Wear resistance*

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P_221

Study of the diffusion of copper in iron

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ABSTRACT

The study aims to study the effects of the percentage of the binder (copper) on the results obtained after diffusion of the latter into the matrix (iron). The microstructure and mechanical properties after diffusion of the copper in iron in technique of metallurgy powders .The different percentages of copper are: 20, 30, 40 and 50%.many samples produced by the diffusion the copper in iron at temperatures up to 1350 ° C. The results show that mechanical characteristics such as hardness, density and bending are sensitive to the variation in the content of the binder. We also notice from the metallographic structure that copper plays a big role in the elimination of porosity.

Keywords: *binder, mechanical alloying process, solid-phase sintering*

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P_222

Mechanical and structural properties of magnetic Fe-Ni Alloy obtained by sintering

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ABSTRACT

In the present work, alloys based on (Fe-Ni) with different compositions have been obtained using powder metallurgy (PM). These alloys were created in order to increase the mechanical, structural and magnetic properties of industrial parts. The compacts are produced according to the sintering manufacturing method at a temperature of 1328 ° C., the samples compressed at a pressure of up to 20 MPa. Metallographic characterizations, hardness' and density measurements were carried out in order to study the influence of the addition of nickel on the finishing product. The results obtained show that the addition of nickel to a mixture of iron powder creates areas rich in nickel due to the low diffusion rate of nickel in iron.

Keywords: *powder metallurgy, Fe-Ni alloys , sintering*

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P_225

Study on the Causes of Water Blocking Damage and its Solutions in Gas Reservoirs with Microfluidic Technology

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ABSTRACT

The water blocking damage to the reservoir caused by the invasion of external fluid is one of the main factors that affect the efficient development of tight sandstone gas reservoirs. In this paper, microfluidic chip technology is used to explore the causes of water blocking damage in porous media and to find suitable recovery solutions. The research results show that in the water wetting porous media, there are mainly four types of liquid hold-up: 1) Liquid hold-up in dead volume of non-connected pore; 2)The "Jiamin effect" formed between the gas and the liquid phase when the inner diameter of the pore changes, and the water phase in the pore throat with a small inner diameter cannot be driven away due to its larger capillary force; 3) Adsorption viscous force, the wetting phase is adsorbed on the surface of the solid phase; 4) Reservoir heterogeneity. The channeling will be produced when gas flooding and resulting in liquid hold-up in pore throats with relatively low permeability. The water blocking damage can be removed to a certain extent by changing the gas injection pressure, the gas injection method, or adding wetting modifier. Microfluidic chip technology has the characteristics of visualization, and provides visual and clear results for other researchers to study similar problems for reference.

Keywords: *Microfluidic technology, Water blocking damage, Removal methods, Wettability.*

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P_245

Evaluation of Residual Stresses by fuzzy Method in X70 Steel Weldments

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ABSTRACT

In this study we have use The Artificial Neural Network (ANN) by fuzzy method for investigates the residual stress in X70 steel weldments. This paper consists of three cases: (1) the experimental analysis was carried out on the measurement of residual stresses by XRD technique. Many different specimens that were subjected to different conditions were studied. The values and distributions of residual stresses occurring in welding of X70 plate under various conditions were determined. (2) The mathematical modeling analysis has proposed the use of fuzzy to determine the residual stresses based on the welding conditions. The proposed fuzzy model can be used to quickly and effectively determine the residual stress in X70 plate weldments, and finaly comparison for to method .

Keywords: *Welding, ANN, Fuzzy, Steel X70, HAZ, Residual Stress.*

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P_247

A tracer microrheology for determination of viscoelasticity of dilute ovalbumin colloids

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ABSTRACT

This study seems to be the first effort to determine the viscoelastic properties of diluteovalbumin colloids using dynamic light scattering (DLS)-based optical microrheologyusing the carboxylated melamine microparticles as the tracer probe. A generalizedform of the Stokes-Einstein equation constructed based on Laplace transformation ofmean square displacement, was employed to compute the viscoelastic moduli(storage modulus, G′ and loss modulus, G″). was determined to increase with timeby reaching a maximum plateau at time between 10 -3 and 10 -1 s with no furtherincrease, revealing the elastic nature of the dilute ovalbumin colloids within the giventime. On the other hand, the ovalbumin colloids exhibited different viscoelasticproperties at two different frequency ranges. The measurements and interpretation ofdata revealed that the technique used seems to ensure fast and effective method tomeasure viscoelastic properties of the ovalbumin colloids at very low concentrationlevels.

Keywords: *Rheology, Molecular properties, Thermal properties*

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Fabrication and characterization of bioactive nanoemulsion-based delivery systems

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ABSTRACT

In this work, nanoemulsion-based delivery system was developed by encapsulation of oregano essential oil (OEO) at different concentrations (0.5%, 0.75% and 1% v/v) within poly-vinyl alcohol. The nanoemulsion systems (NESs) were characterized in terms of nanodroplet size distribution, zeta potential, thermal, molecular, micro-structural and antifungal properties. The average droplet diameters were in the range of 70–75 nm while zeta potentials were recorded in the range of 3.13 and 19.90 mV. Increase in the OEO concentration did not affect size distribution of nanodrops. Change in concentrations showed no visible differences in FTIR spectra; however, for the concentrations of 0.5, 0.75 and 1%, endothermic peak temperatures were recorded as approximately 94, 105 and 117 °C, respectively. The antifungal activity of OEO in NES against mycelial growth of Aspergillus niger was determined and a significant enhancement in the antifungal activity was observed compared to that of free OEO.The zone diameter of mycelial growth could be reduced by around 20%, 55% and 65% over 6 days of incubation time for 0.5%, 0.75% and 1% v/v containing NESs, respectively. The results of this study revealed the increased antifungal efficiency of the encapsulation of OEO in NES as compared to that of free OEO.

Keywords: *Rheology, Molecular properties, Thermal properties*

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P_249

Annealing Effect on Structural and Morphological of Sn-ZnO Thin Film

Ali Flayyih HASAN

ABSTRACT

In this paper transparent and conductive Sn-ZnO films were deposited on glass substrate up to higher concentration of 4 wt% by ultrasoic spray pyrolysis technique. XRD, SEM measurement for Sn-ZnO films was investigated and Structural, microstructural analyzed were carried out. X- ray diffrac-tion (XRD) results suggest that the preferred orientation (00 1) direction, its was stable after annealing process, in addtion X-ray diffrac- tion (XRD) resulte showed that Sn-ZnO films has crystallise within the wurtzite hexagonal structure. XRD pattern was conform with that reported in (PDF 00-036-1451). SEM result showed the surface of film were smoth, uniform with large grain size. Doping ratio of 4 % enhanced crystalline properties this is evident through increases the grain size.The influence of annealing temperature on structural and morphological has been investigated. It is observed that the samples deposited at 400 °C showed best structure properties.

Keywords: *Sn, ZnO, Thin Film*

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P_250

Structure and morphological study of CuO semiconductor

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ABSTRACT

In this study, CuO thin films were deposited on the glass substrate by technique at a base temperature of 325 °C then annealed at 350 °C, 400 °C, 450 °C subsquancely. CuO thin films structure, surface morphologe and optical properties investigated. XRD results showed that all the CuO films have a uniform monoclinic phase structure with preferential orientation along the plane of the

(111) plane and all X-ray diffraction patterns comform with standard diffraction peaks that reported at (PDF: 01-073-6023). As the annealing temperature increased, the average grain size of CuO thin films increased. The intensity of the diffraction peaks showed recrystallization characteristics with an increase in the annealing temperature (especially at 400 ◦C annealing). It was noted that as the annealing temperature increased to 500 ◦C, the density of the diffraction peaks decreased, and the crystallization deteriorated. This behavior was explained as a change in the crystallization of the glass substrate affected CuO film structure. Scan Electronic Microscopy (SEM) data showed that the CuO nanoparticles were almost spherical and that the particle size was almost uniform. The effect of increasing the annealing temperature on the morphology of the CuO thin film clearly observed when the size of the spherical particle increased as increasing annealing temperature. It was seen that CuO nanoparticles were randomly distributed from AFM images.

Keywords: *CuO, thin film, Spray Pyrolysis*

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P_251

Silicon nitride characteristics: Photovoltaic application .

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ABSTRACT

In the directional solidification of polycrystalline silicon for photovoltaic application, a fused silica crucible is usually using .

At high temperature, generally, the crucible reacts with the molten silicon. This reaction promotes an adhesion between the two materials and creates stress and contamination of the silicon ingot and can cause its crack.

To remedy to this problem, a release coating must be apply to the inside of the silica crucible.

In this work, we will characterize the silicon nitride ceramic powder applied in the silica crucible coating to prevent the reaction between the crucible and the molten silicon.

For this purpose, The Elcometer fineness of grind gauge and optical microscopy were used to determine the particle size and fineness of the nitride ceramic.

The density of the ceramic powder was determined using the pycnometer method, the viscosity was tested using a Zahn #4 cup, and the morphology was observed using an optical microscopy and SEM microscopy, the chemical composition was determined using EDS technic.

Keywords: *silica crucible, coating, ceramic, Si3N4, characterization, photovoltaic.*

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P_252

Ni doped ZnO thin films using sol–gel spin-coating technique: properties characterization.

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ABSTRACT

Currently, zinc oxide is one of the most studied materials due to its vast potential for thin-film technology applications. Recently, many researchers have been investigated the structural, optical and electrical properties of doped-ZnO thin films. ZnO films doped with transitional metals, for example, Mn,Co, Fe, and Ni, have been widely studied as diluted magnetic semiconductors (DMS) because of their potential application in optoelectronic, magnetoelectronic and spintronic devices.

In this work, the spin coating sol–gel technique has been successfully used to deposit ZnO thin films with and without Ni-doping. Zinc acetate dehydrate, Nickel (II) chloride hexahydrate, methanol and monoethanolamine (MEA) were used as a starting material, dopant, solvent and stabilizer, respectively. The effect of Ni contents on the crystalline structure and optical properties of the films was systematically investigated by X-ray diffraction (XRD), scanning electronic microscopy (SEM), UV-VIS, and FTIR spectrometry.

Keywords: *ZnO, thin film, spin coating, sol gel, characterization.*

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Extraction, physico-chemical charcterization and functionnal properties of *Punica granatum L.* barksmucilage

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ABSTRACT

This study aims to the extraction, characterization and evaluation of functional properties of the mucilage in *Punica granatum L*. barks in order to be able to apply it in pharmaceutical formulations. Mucilage isolated showed a good swelling properties and a good emulsion capacity. The aqueous dispersion of mucilage showed pseudoplastic flow behavior. In addition, the mucilage has good flow properties which are probably suitable for a direct compression formulation. Structural analysis by FTIR indicated the presence of the characteristic binding of mucilage. The study of mucilage properties as well as suspension agent has shown that mucilage has good properties and has the potential to be used in the formulation of pharmaceutical products and in food sector.

Keywords: *punica granatum L., mucilage , physico-chemical properties, rheology*

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Extraction and Transfer of Ca^{2+} Species using Plasticized Polymeric Membrane Containing the Carrier Trioctyl Phosphine Oxide (TOPO): Parametric Study

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ABSTRACT

Extraction and transport of Calcium species from synthetic wastewater and brackish water were investigated in this work, using a plasticized polymeric membrane (PPM) which is composed of polyvinyl chloride (PVC), trioctylphosphine oxide (TOPO) as carrier and dioctyl phthalate (DOP) as plasticizer

Calcium species transfer conditions were optimized such as carrier mass, cations initial concentration, HCl concentration in the strip solution and temperature.

Prepared membranes were characterized by using FTIR, SEM, Raman techniques and by determining the flux (*J*), the permeability (*P*) and the diffusion coefficient of the complexed species (*D*). Stoichiometry, nature and formed complex transport mechanism in the organic phase were determined.

100% of a synthetic solution of 400 $mg.L^{-1}$ of calcium can be efficiently complexed with a permeability coefficient P = 0.450 $cm.s^{-1}$ during only 1 minute using 0.1g of TOPO and 0.05 M of HCl in the strip solution and a temperature of 30°C. Against only about 16% of calcium who crossed PVC/TOPO/DOP to the second compartment. The extracted-formed complexes are of the type of $\overline{CaCO_3TOPO}$ with an exothermic and spontaneous reaction in aqueous solution.

For Ca/Mg for various molar ratios, the extraction yields of the two species are respectively 100%. On the other hand, no transfer of these species was observed in the second compartment either in the synthetic mixture or in the brackish water sampled.This presents an interesting possibility for the use of this type of membrane (MPP) in the extraction and concentration of one or more species present in aqueous solutions including brackish water.

Keywords*: plasticized polymeric membrane; desalination; brackish water; calcium; magnesium.*

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