5th International Conference on Engineering Technology and Applied Sciences

02-06 August 2021
Sarajevo, Bosnia and Herzegovina
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Book of Abstracts

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Book of Abstracts of the 5th International Conference on Engineering Technology and Applied Sciences (ICETAS 2021)

Edited by Prof. Dr. Ayhan EROL
Assoc. Prof. Dr. Ahmet YÖNETKEN
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Welcome to ICETAS 2021

On behalf of the organizing committee The Conference organized every one years, respectively; Afyon Kocatepe University in 2016 – Afyonkarahisar, Technical Universityof Cluj-Napoca in 2017 Romania, 17-21 May 2018 in Skopje/Macedonia, 24-28 July, 2019 in Kiev/Ukraine, we are pleased to announce that the 5th International Conference on Engineering Technology and Applied Sciences (ICETAS 2021) is held from 02-06 July, 2021 in Sarajevo/Bosnia and Herzegovina ICETAS 2021 provides an ideal academic platform for researchers to present the latest research findings and describe emerging technologies, and directions in Engineering Technology and Applied Sciences issues. The conference seeks to contribute to presenting novel research results in all aspects of Engineering Technology and Applied Sciences. The conference aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of Engineering Technology and Applied Sciences. It also provides the premier interdisciplinary forum for scientists, engineers, and practitioners to present their latest research results, ideas, developments, and applications in all areas of Engineering Technology and Applied Sciences. The conference will bring together leading academic scientists, researchers and scholars in the domain of interest from around the world. ICETAS 2021 is the oncoming event of the successful conference series focusing on Engineering Technology and Applied Sciences. The scientific program focuses on current advances in the research, production and use of Engineering Technology and Applied Sciences with particular focus on their role in maintaining academic level in Engineering and Applied Sciences and elevating the science level. The conference's goals are to provide a scientific forum for all international prestige scholars around the world and enable the interactive exchange of state-of-the-art knowledge. The conference will focus on evidence-based benefits proven in clinical trials and scientific experiments. Best regards,

Chairman of Conference

Prof. Dr. Ayhan EROL

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SYNTHESIS OF NANOPARTICLES WITH GREEN SYNTHESIS FROM MEDICINAL PLANTS GROWN IN THE AEGEAN REGION AND INVESTIGATION OF ANTIBACTERIAL PROPERTIES

MINE SULAK[a]

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Abstract:

Nanoparticles are materials with sizes ranging from 1 to 100 nm. Nano particles; It is used in many fields such as bio-medical, catalysis, food, clothing, cosmetics industry and electronics. [1] Silver (Ag) has been used in antibacterial applications in many areas for many years due to its activity against bacteria and other microorganisms. It is reported by some researchers that it has a strong antibacterial activity. Various methods are used to obtain silver nanoparticles. Today, the biosynthesis of nanoparticles with plant extracts has become a very important research area. Green synthesis, safer chemistry for accident prevention, real-time analysis for pollution prevention, use of safer solvents and auxiliaries, use of renewable substances, energy efficiency designs, catalysis, reduction of by-product derivatives, safe chemical designs, safer compounding, atomic economy is one step ahead of other synthesis methods due to less harmful chemical synthesis, and both cost reduction in production and environmentally friendly approach [2]. For these reasons, an environmentally friendly green synthesis method was chosen to obtain the silver nanoparticle used in our research.

In this research, AgNPs synthesized with plant extract (extract) obtained from the leaves of medicinal plants grown in the Aegean region will be characterized and then their anti-microbial effects will be examined.

AgNPs obtained as a result of the reaction are UV visible spectrophotometer (UV-vis), fourier-converted infrared spectroscopy (FTIR), X-Ray diffraction (XRD), thermogravimetric and differential thermal analysis (TGA-DTA), scanning electron microscopy and energy. It will be characterized using a diffuse X-ray device (SEM-EDX).

[1] Gopinath, K., Kumaraguru, S., Bhakyaraj, K., Mohan, S., Venkatesh, K. S., Esakkirajan, M., Kaleeswarran, P.R., Naiyf, S.A., Kadaikunnan, S., Govindarajan, M., Benelli, G., Arumugam, A., 2016. Microbial Pathogenesis, 101: 1-11.

[2] Anastas, P. T., and Warner, J. C. (1998). “Principles of green chemistry. Green chemistry: Theory and Practice” (1st ed.) 29-56. Oxford: Oxford University Press.

Keywords: Green Synthesis,Antimicrobial Activity, Silver Nanoparticles

FACE RECOGNITION BY USING ARTIFICIAL NEURAL NETWORK TECHNIQUES

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Abstract:

Face recognition is an utmost important application in digital image processing, and it is used for security purposes with the help of biometric feature systems. Artificial neural networks (ANN) have been used in digital image processing and feature identification. There are many difficulties faced by the developer due to deficiency of literature survey, missing proper algorithms, or lack of awareness by most of the researches to use ANN in the field of image processing implementation in face recognition. Therefore, this study includes a general review of face recognition and related systems which are based on different ANN techniques and algorithms. The comparisons of different ANN algorithms were included, and conclusions are derived for the reader's attention.

Keywords: Pose Invariant, Virtual Frontal View, Neural Network(Nn), Radial Basis Function (Rbf), Convolutional Neural Network (Cnn), False

A COMPARATIVE STUDY ON MACHINE LEARNING ALGORITHMS FOR PRICE PREDICTION

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Abstract:

Machine learning based solutions are widely applied to price prediction problems. Generally, linear estimators (generalized linear models, linear regressors, etc.) are used to estimate the price of a product in the market by using its properties. However, more flexible nonlinear models are not preferred frequently. In this study, a gradient boosting model was developed for price estimation by taking the historical and current sales data of approximately 14 million cars together with their technical specifications and financial indicators at the date of sale. The performance levels were compared with the algorithms in the literature. In the light of this analysis, the performance of the developed model has been examined, and in determining the value of the car, besides its technical features, financial indicators that were ignored in previous studies were also taken into account. Learning curves, overfitting and underfitting situations and the error values were also be further investigated by testing the model on subsets of the data set with different characteristics.

Keywords: Machine Learning, Non-Linear Regression, Gradient Boosting, Estimation, Price Prediction,

REAL-TIME MASK DETECTION ON LIVE VIDEO STREAMING

FURKAN KADIR YALÇINDAĞ[a], MUSTAFA YENİAD[b]

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Abstract:

COVID-19 pandemic has rapidly affected our daily life disturb the world trade and movements. Wearing a mask has just become normal in our lives. In this thesis, it was determined that due to the positive effect of the use of masks on the course of the pandemic, using artificial intelligence technology to support using mask rate on detecting those who do not use masks on live video. This study presents an approach to achieving the goal of mask detection using open-source machine learning libraries such as Keras, TensorFlow, OpenCV, and Scikit-Learn and used Sequential Convolutional Neural Network model for explorization. The proposed method detects the face from streaming video and then identifies if it has weared a mask or not during movement. The method attains accuracy up to 94.47% and 92.38% separately on two different datasets.

Keywords: Machine Learning, Keras, Tensorflow, Opencv, Mask Detection, Face Detection

CULTURE OF QUALITY TRANSFER TO KANBAN 4.0 IN SMART MANUFACTURE

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Abstract:

Quality 4.0 aligns with the new trend in Industry 4.0, successfully moving through quality management to the digital environment. Companies that invest in Quality 4.0 will achieve significant improvements in the value chain through operational efficiency and services, thus maintaining customer satisfaction but at the same time and implementing a culture of company quality. Quality 4.0 refers not only to technology, but also to people who use technology in technological processes. Applying the traditional methods Kanban, Gemba and the 7 without technical solutions were found as the weak links of the technological processes. We can consider that this is how the first steps of the transfer and the awareness of the transfer to the Kanban 4.0 method were performed. The article presents the solutions taken by a factory to improve quality management. By applying a questionnaire to the three work teams of a technological process, it was possible to identify weaknesses in different stages of the process. The questionnaire was structured so that the following indicators were taken into account: visibility of the working method, stock of raw materials, workflow, continuous improvement through the feedback mechanism, teamwork, measures applied, quality and well-defined processes in the verification and maintaining the quality of production processes. By applying the questionnaire it was possible to identify the principles of the Kanban method: visibility, accessibility and standardization applying the Kanban method. The article presents the solutions taken by the factory to improve quality management and harmonize the technological process with the new concept of intelligent manufacturing. Quality 4.0 offers a variety of tools and techniques that can be implemented to automate compliance activities to the digital factory.

Keywords: Quality Management, Gemba, Culture Of Quality, Industry 4.0, Quality 4.0, Kanban 4.0

VARIATION OF THE DOSE TAKEN IN CT SCANNING ACCORDING TO THE HEIGHT OF THE PATIENT

İSMAİL HAKKI SARPÜN[a], TIMUR KOCA[b], YASEMIN ŞENGÜN[c], RAHMI ATIL AKSOY[d], ECE ATAK[e],MEHMET KIZILKAYA[f]

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Abstract:

Computed Tomography (CT) images taken in cancer treatments are important in treatment portal design and planning. The dose taken by the patient in CT scans are not considered in the treatment planning dose calculation and becomes important in calculating the limit doses of the critical organs with critical dose threshold. In this study, the change of the dose taken by some of the critical organs, namely the heart, liver, and kidneys, according to the height of the patient was investigated with the NCICT code using the Monte Carlo technique. As a result, doses were changed by the height of the patients.

Keywords: Monte Carlo, Ct, Radiation, Dose

THE CHANGE OF THE DOSE OF I-131 RADIOISOTOPE IN THE BODY ACCORDING TO THE AGE OF BOYS

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Abstract:

In nuclear medicine, the dose received by the critical organs becomes important due to the radioisotopes placed inside the body. Nuclear medicine is the second largest source of medical radiation exposure to the general population after computed tomography imaging. Informed decisions regarding the use of nuclear medicine procedures require a better understanding of the magnitude of radiation dose and associated health risks. In this study, when iodine radioisotope I-131 inserted into the thyroid gland of boys aged 0, 1, 5, 10 and 15, change of the dose received by the thyroid gland, thymus and lymph nodes was investigated by using the Monte Carlo based NCINM code.

Keywords: Monte Carlo, Nuclear Medicine, Radiation, Dose

STUDY OF THE 3HE(A, Γ)7BE REACTION AT LOW ENERGIES

ERCAN YILDIZ[a], EYYUP TEL[b], İSMAIL HAKKI SARPUN[c]

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Abstract:

Nuclear reactions involved in stellar evolution generally occur at energies much lower than the Coulomb barrier. This property makes the cross sections extremely small, and virtually impossible to be measured in the laboratory. We have studied the important astrophysical 3He(α,γ)7Be reaction at low energies. Although 3He(α,γ)7Be reaction is a widely studied reaction, its mechanism has not been fully explained yet. This reaction has a huge signification not only in Big Bang nucleosynthesis, but also in solar hydrogen burning. Since the 3He(α,γ)7Be reaction is the initial point of the 2nd and 3rd chains form, the 7Be and 8B where solar neutrinos originate, the ambiguity of its cross section must be decreased.

Keywords: Asrtophysical Nuclear Reaction, Nucleosynthesis

*

ASTROPHYSICAL S-FACTORS AND REACTION RATES OF 112SN(A,G)116TE REACTION IN LOW ENERGY REGION

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Abstract:

Nuclear reactions involved in stellar evolution generally occur at energies much lower than the Coulomb barrier. This property makes the cross sections extremely small, and virtually impossible to be measured in the laboratory.

In this study, the reaction cross sections of the 112Sn(α,g)116Te reaction have been theoretically calculated by Talys 1.95 nuclear reaction code in low energy range. These theoretical data compared with experimental cross sections which are available in EXFOR nuclear reaction data library. The astrophysical S-factors of this reaction in low energy range were calculated by using theoretical reaction cross sections. In addition, the reaction rates have been calculated by Talys code.

Keywords: Nuclear Reaction, Astrophysical S-Factor

INVESTIGATION OF TADF PROPERTIES OF NOVEL DONOR-ACCEPTOR TYPE PHENAZINE DERIVATIVES

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Abstract:

In this study dibenzo[a,c]phenazine based acceptor was combined with donors to obtain donor-acceptor type potential thermally activated delayed fluorescence (TADF) emitters.

All molecules' structural and electronic properties were computed theoretically at the level of Density Functional Theory (DFT) and Time Dependent Density Functional Theory (TDDFT) with the application of three different hybrid functionals. Most of the designed structures have been found to possess the potential to be TADF compounds because they have very narrow energy gap between their first excited singlet and triplet states. As a result, derivatives could have been calculated as the best candidate for the purpose and have a very strong potential to serve as an efficient OLED material.

Keywords: TADF; Phenazine; Donor-Acceptor; OLED; Tddft

INVESTIGATION OF ANTIBACTERIAL PROPERTIES OF SOME SULFONAMIDE COMPOUNDS BY MOLECULAR DOCKING METHOD

ZEYNEP ŞILAN TURHAN[a], NURI YORULMAZ[b], MUSTAFA DURGUN[c], HILAL ÖZTÜRK[d], İSMAIL HAKKI SARPÜN[e]

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Abstract:

Prontosil, the sulphonamide compound that started the antibacterial age, is the first antibacterial agent on the market. Sulphonamide functional groups have been important motifs in medicinal chemistry since the first announcement of antibacterial drugs. Synthetic sulphonamides are generally used for the treatment of bacterial infections in biological systems, as well as antifungal, anti-inflammatory antioxidant, diuretics, anticancer, carbonic anhydrases, antitumor and GSK inhibitors, Alzheimer's diseases, anti-tubercular, anti-diabetic, anti-HIV inhibitors, antiviral, anti-malaria and so on. It has aroused high curiosity in biology and medicine due to its wide range of biological applications. In this study, molecular docking studies were applied to investigate the potential antibacterial properties of sulphonamide derivative compounds synthesized in our previous studies. Molecular docking was performed using Autodock 4.2 to analyse the probability of settling. Docking simulations of sulphonamide compounds at the active site of E. coli betaketoacyl-acyl carrier protein synthase III (KAS III, PDB ID: 1HNJ) were performed to determine possible binding patterns and inhibitory effects. Docking results were also compared with triclosan used as a commercial antibacterial agent. Docking results were analysed by Autodock 4.2 and Biovia Discovery Studio Visualizer 2020.

Keywords: Moleculer Docking, Sulphonamide, Autodock

VARIATION OF THE DOSAGE TAKEN BY PATIENTS IN CT SCANNING ACCORDING TO THE WEIGHT OF THE PATIENT

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Abstract:

CT images taken before and during radiotherapy is important for treatment portal design, planning and providing patient position. However, the dose taken by the patient in these CT scans are not included in the planning dose escalations. Especially in adaptive treatments, the dose taken from daily CT images becomes very important in calculation of the limit doses of critical organs. In this study, with the NCICT code using the Monte Carlo technique, the change of the dose taken by some of the critical organs of the patients, namely the heart and liver, according to the weight of the patient, was investigated.

Keywords: Monte Carlo, Ct, Radiation, Dose

THE EFFECT OF ACTIVITIES OF RADIOISOTOPES USED IN NUCLEAR MEDICINE ON ORGAN DOSE

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Abstract:

Nuclear medicine is the second largest source of medical radiation exposure to the general population after computed tomography imaging. Informed decisions regarding the use of nuclear medicine procedures require a better understanding of the magnitude of radiation dose and associated health risks. In nuclear medicine, due to the radioisotopes placed in the body for therapeutic purposes, some doses are not given only to the organ and/or tissues where the tumor is placed, but also to other organ and surrounding tissues. In this study, the change in the doses received by the thyroid gland, thymus and lymph nodes according to the activities of the iodine radioisotope I-131 placed in the thyroid gland of an adult male and female phantoms were investigated with the Monte Carlo-based NCINM code.

Keywords: Monte Carlo, Nuclear Medicine, Radiation, Dose

CO-INJECTION SIMULATION OF FOOD PACKAGING MANUFACTURING WITH POLYPROPYLENE HAVING TWO DIFFERENT MELT FLOW INDEXES

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Abstract:

Co-injection is a new developed plastic injection technology to manufacture a plastic product using polymer having especially same or different MFI values. In this study, the food packaging manufacturing using polypropylene grade by co-injection is focused to utilization of the costly production scrap and furthermore, thence-injection simulation is conducted using Moldex3D software to determine the suitable die design, chosen of co-injection parameters and secondary furnace. Co-injection input parameters are determined as follows: clean PP MFI (37 g/10 min), scrap clean PP MFI (70 g/10 min), clean PP ratio, scrap clean PP ratio. In addition, after doing co-injection simulation, the temperature distribution, die filling ratio and filling time, layer thickness, required injection pressure, die closing tonnage and secondary slot capacity at wall of food packaging with 1 mm of wall thickness and 10 kg capacity tried to be predicted.

Keywords: Co-Injection Simulation, MFI, Moldex3D, Polypropylene Food Packaging.

[*]*This study is supported by Şekeroğlu Chemistry and Plastic Industry and Trade Incorporated Company.*

DETERMINING THE MECHANICAL BEHAVIOR OF TERMOPLASTIC COMPOSITE PLATE HAVING DIFFERENT MATERIAL DESIGN UNDER TENSION BY FINITE ELEMENT ANALYSIS (FEA)

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Abstract:

While the common matrix material in polymer based composite manufacturing is known as thermosetting; thermoplastics (TP) have become attraction matrix material due to theirs able to serial prepreg manufacturing, able to transform net shape from prepreg by rapid pressing, able to recycle and able to flexible and rigit composite materials design according to using applications. The pultrusion is known as a manufacturing method providing to combine carbon or glass fabrics with TP and besides there are two parameters to determine TP composite properties: pultrusion manufacturing parameters and composite materials design. In this study, in order to research the effect of woven material and its ratio in TP composite structure, fiber orientation on vonMises stress, shear stress, hole bearing stress and strain and displacement vector sum as were realized a serial finite elements analyses after doing pultrusion method and combining methods of woven and TP materials, TP and fabric materials. According to FEA, the possible flexible and rigid TP composite designs together with fiber orientation to fixing hoke in composite plate were recommended.

Keywords: Thermoplastic Based Composite, Pultrusion, Fiber, Finite Element Analysis

[*]*This study is supported by Şekeroğlu Chemistry and Plastic Industry and Trade Incorporated Company.*

PRELIMINARY DATA ANALYSIS ON COLLISION IMAGES AT LHC WITH MACHINE LEARNING TECHNIQUES

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Abstract:

A preliminary analysis have been implemented to distinguish the background images from signals using image recognition tools. All images from Monte Carlo simulations are created with Vp1 tool of ATLAS experiment at CERN. The experimental dataset contains 100 images of background and 50 images of the signals in two different capture angles as sides and front. Because of less number of training dataset, we utilized Image Data Augmentation from Keras library and increased the number of images to 500 images with shift, flip, brightness, and zoom image data. Furthermore, we utilized transfer learning from Image net database because of overfitting problems. Different types of well-known models are employed for classification task such as Mobil Net V2, Inception V3, Resnet-50 and Vgg-16. Space 10 pt.

Keywords: Machine Learning, Monte Carlo Simulations, Image Data Augmentation, ATLAS, Cern

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AN INVESTIGATION OF ALLOSTERIC MECHANISM OF CHEY BY MOLECULAR DYNAMIC SIMULATIONS

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Abstract:

The bacterial flagellum, a biological nano-machine for the locomotion of bacteria, is an ion-driven rotary motor which drives a long helical filament (5–10 μm long with a diameter of ∼15 nm) called a flagellum. Although the main activity of a flagellum is the locomotion of organism, but it also often functions as a sensory organelle, being sensitive to chemicals and temperatures outside the cell. The flagellum contains tens of thousands of protein molecules and more than 30 different kinds of proteins. Among these proteins, the chemo-taxis protein CheY plays a key role in directional switching of flagellar rotation, as it binds to the cytoplasmic switch complex of the flagellum to induce rotational switching of the flagellar motor in response to environmental signals sensed by chemo-sensory receptors. The direction of flagellar rotation is regulated CheY which promotes clockwise rotation the filament.

Here, we present a molecular dynamics (MD) simulations study of CheY protein, in which the rationale of the study was to explore the allosteric mechanism of the protein that is directly related to the flagellar rotation . 100 ns MD simulations were conducted both for CheY and CheY·FliM complex. Diverse statistical tools, such as mutual information(MI), transfer entropy(TE) and principal component analysis (PCA) techniques were applied to the resulting trajectories. Results shown that there is a information flow between the phosphorylation site (Asp57) and FliM binding region (Thr106) of CheY, which may explain to some extent the allosteric mechanism.

Keywords: Flagellum, Chey, Allosteric Mechanism, Molecular Dynamics Simulations

BIFUNCTIONAL HER-OER ELECTROCATALYST DESIGNED WITH CLICK ELECTROCHEMISTRY TECHNIQUE FOR WATER SPLITTING

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Abstract:

Due to the demand for energy, fossil fuel consumption is increasing day by day, so researchers focused on generating sustainable, clean and highly efficient energy by renewable energy resources. Among the innovative technologies researched for the transformation and storage of sustainable and clean energy sources such as solar and wind, electrocatalytic H2 production from water is considered as an attractive approach[1]. Electrochemical water splitting is a promising way to convert electrical energy (from renewable energy sources) to chemical energy (hydrogen), and hydrogen fuel produced can be used as sustainable clean energy sources[2]. The commercial electrolysers used theoretically operate at cell potentials higher than 1.23 V (1.8-2.0V) and their cost is high due to the use of noble metal-containing electrocatalysts, which limits practical applications. To overcome these disadvantages, the focus has been on simplifying overall system design and reducing cost by integrating the advantages of efficient HER and OER electrocatalysts. For this purpose, terminal alkyne functionalized multi-walled carbon nanotubes (TA-MWCNT) fixed on nickel foam(NF) was bonded with ferrrocenyl azide (Fc-N3) by a click electrochemistry (CEC) process for the first time. The designed electrode (NF/MWCNT-TA-N3-Fc) was characterized with SEM, FTIR, XPS and XRD techniques and was determined hydrogen evolution and oxygen evolution performances as in alkaline electrolyte. The result of NF/MWCNT-TA-N3-Fc the electrode as a bifunctional electrocatalyst at both the anode and the cathode, it was required a low cell voltage to reach a current density of 10 mA cm-2.

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Keywords: Bifunctional Electrocatalyst; Water Splitting; Click Electrochemistry; MWCNT.

This study is supported by Scientific Research Projects (BAP) (Project Number: 2020-A-105-25) of Gebze Technical University

ELECTROCHEMICAL CHARACTERIZATION AND SENSOR PERFORMANCE OF ELECTROPOLYMERIZED NON-PERIPHERAL COPPER PHTHALOCYANINE

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Abstract:

Dopamine (in the absence: Parkinson's disease and schizophrenia), Uric acid (in abnormal level: hyperuricaemia and gout disease) and Ascorbic acid (in treatment: mental illness, and cancer) are considered to be very important molecules for physiological processes in human metabolism, which are known to be involved in many biological reactions. The simultaneous detection of DA, UA and AA is very important for analytical application and diagnostic research[1]. However, these molecules are electroactive compounds with very similar electrochemical properties and cannot be distinguished when overlapping in an unmodified electrode, so researchers are working on sensors with high selectivity and sensitivity by modifying the electrodes. Metallophthalocyanines (MPcs) has an important place in numerous fundamental and technological applications because it can be functionalized with various inorganic and organic compounds, and therefore it exhibits structurally versatile and unique properties. The use of MPcs in the field of sensor application is closely related to its functional group, electrochemical and redox properties[2]. The electrochemical characterization of non-peripheral copper phthalocyanine (CuPc) were performed on glassy carbon electrode in electrolyte occuring dimethylformamide solvent and tetrabutylammonium hexafluorophosphate (TBAPF6) salt by cyclic voltammetry techniques. Electrochemical characterization results of complex exhibited three reversible reductions couples and one oxidation redox couple. The presence of these redox couples were supported with the in-situ spectroelectrochemical measurements. CuPc having electropolymerizable functional group were coated on glassy carbon electrode (GCE) surface via repeated cyclic voltammetry technique in dichloromethane solvent and TBAPF6. Sensor performance of CuPc modified on GCE were investigated toward ascorbic acid (AA), dopamine (DA) and uric acid (UA) in phosphate buffer.

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Keywords: Phthalocyanines; Electrochemistry; Spectroelectrochemistry; Electropolymerization; Sensor.

A SCANNING ELECTRON MICROSCOPY STUDY OF BRANCHED ZNO MICROCRYSTALS.

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Abstract:

A scanning electron microscopy study of branched ZnO microcrystals.

The vapor growth of ZnO microcrystals was studied using the Scanning Electron Microscopy and Energy Dispersive Spectroscopy. The microcrystals were grown by annealing ZnO, CuO and ammonium chloride powders. As a result, the ZnCl2, ZnO and CuCl vapor was formed and condensed on Si substrate, which was gradually heated up to 350oC. It was established that the growth proceeded in two stages. Beginning from 240oC, the CuCl-ZnCl2 eutectic droplet with a low melting point was formed. With time, the droplet was oversaturated with ZnO, and ZnO's solid nuclei were precipitating from it. They served as seeds for the formation of hexagonal ZnO microrods, which were growing along the c-axis ([0001] direction) by the slow, thermodynamically driven Vapor–Solid mechanism. As a result, the rod-like ZnO microstructures were produced on Si substrate. The second stage of growth started when the substrate temperature reached 300oC. At this temperature, the secondary nucleation took place on the prism surfaces of ZnO microrods, causing brunched structures. The ZnO brunches were growing again along the c-axes, forming elongated 1D type microcrystals. In contrast to the slow growth of primer ZnO microrods, at elevated temperatures the ZnO brunches were growing significantly faster. This kinetically driven process caused the vanishing of the fast growing (0001) plains, resulting in the tapering of ZnO microcrystal tips.

ZnO has a high melting point and its vapor-phase synthesis normally needs a high temperature exceeding 600oC. This work showed that our technology enables the growth of ZnO micro- and nanocrystals, together with brunched ZnO structures, at a low temperature, close to 300oC.

This work was financially supported by the Shota Rustavely National Science Foundation grant YS-19-087.

Keywords: Zno, Microcrystal, Vapor Growth, Scanning Electron Microscopy

This work was financially supported by the Shota Rustavely National Science Foundation grant YS-19-087.

METASTABILITY INVESTIGATION OF PEDOT:PSS UNDER DIFFERENT ENVIRONMENTAL CONDITIONS.

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Abstract:

Poly(3,4-ethylenedioxythiophene) (PEDOT) is one of the most studied conducting polymers (CPs) and it has received great attention in various fields due to its high conductivity, electrocatalytic activity, high electrochemical stability, high thermal stability, easy synthesis, etc. [1]. So far, different methods have been used for synthesis of PEDOT such as chemical, vapor phase, interfacial and electrochemical polymerization methods. Among these methods, chemical polymerization is recognized as an efficient method to prepare PEDOT materials in high amount for large-scale applications [2]. Although PEDOT exhibits unique properties, it is not soluble in water making it difficult for processing. In order to solve this problem, poly(styrenesulfonate) (PSS) is generally used as a dopant and stabilizer to control the electrical conductivity and solubility of PEDOT.

In this work, PEDOT was synthesized according to the modified method reported in the literature [3]. Sodium persufate (used as an oxidant) and PSS were varied to obtain PEDOT:PSS with different electrical conductivity ranges. PEDOT:PSS samples were exposed to different atmosphere (laboratory atmosphere, vacuum atmosphere, high purity oxygen atmosphere, UV aging and Light soaking) in order to create electronic defect change in samples. Electronic defect change in PEDOT:PSS were characterized by electrical conductivity measurements system such as time dependent dark conductivity, temperature dependent dark conductivity, photoconductivity and flux dependent photoconductivity methods. Depending on obtained results PEDOT:PSS samples dark conductivities were not significantly affected by atmospheric condition such as laboratory atmosphere, vacuum atmosphere or oxygen atmosphere. Samples mainly effected by UV and light soaking aging procedure. These aging procedure changed defect profile of samples' band gap region so it can be defined by flux dependent photoconductivity and mobility-lifetime product.

Keywords: Pedot:Pss, Conducting Polymers, Metastability, Conductivity,

MAMOGRAFI GÖRÜNTÜLERİNDEN RLBP METODU ILE GÖĞÜS DOKULARININ İNCELENMESI

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Abstract:

Dünya geneli açısından bakıldığında, meme kanserinin kadınlarda en sık görülen kanser türü olduğu ifade edilmektedir. Son yıllarda her yaştaki bayanların korkulu rüyası haline gelen meme kanseri, daha çok 40 yaş üstü bayanlarda görülmektedir. Meme kanserinin gerek hastanın gerekse de yakınlarının üzerinde fiziksel, sosyal ve ruhsal etkileri bulunmaktadır. Meme kanserinin insan hayatı açısından taşıdığı riskler göz önüne alındığında, belirli aralıklarla mamografilerin çekilmesi gerekmektedir. Bu mamografi imgelerinin uzmanlar tarafından incelenmesi istenilen sonuçları tam olarak vermediğinden dolayı, sayısal ortamda işlenip incelenmesi daha faydalı olmaktadır. Bu çalışmada, mamografi görüntülerinden RLBP (Rotated Local Binary Pattern) metodu kullanılarak öznitelikler çıkarılmaktadır. Bu öznitelikler parametreleri belirlenmiş olan YSA aracılığı ile eğitilmiştir. Eğitim sonucunda ikili sınıflandırmada (M-B) %87,82, üçlü sınıflandırmada (F-D-G) ise %78 başarı oranı elde edilmiştir.

Keywords: Mamogram, Yapay Sinir Ağı (Ysa), Rlbp, Meme Kanseri.

CHARACTERIZATION OF PHYSICAL AND MECHANICAL PROPERTIES OF NI-CO-WC CERAMIC-METAL COMPOSITES USING ULTRASONICS

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Abstract:

The quality of WC-based ceramic-metal composites is generally represented by high strength and hardness criteria in powder metallurgy. The scope of this study is to investigate the physical and mechanical properties of Ni-Co-WC ceramic-metal composites and the variation of elastic modulus. In the study, it was sintered at different temperatures by microwave sintering to obtain 60%Ni-20%Co-20%WC ceramic-metal composites. After that, the velocities of the longitudinal and shear ultrasonic waves along the composite samples, the longitudinal attenuation values were measured using contact ultrasonic transducers operating in a pulse-echo mode. The elastic modulus of ceramic-metal composites was determined. using ultrasonic velocities and sample density. Characterization of ceramic-metal composites was done by hardness test, scanning electron microscope (SEM), X-ray diffraction (XRD) analysis. The results show that the elastic modulus increases with the increase of sintering temperature and ultrasonic wave speeds, but decreases with the longitudinal attenuation value. There is a linear relationship between elastic modulus and hardness (strength).

Keywords: Elastic Modulus, Sintering Temperature, Ultrasonic Velocity, Attenuation,Hardness

EVALUATION OF ANALGESIC AND SEDATIVE EFFECTS OF DEXMEDETOMIDINE–CLONIDINE COMBINATION IN RATS

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Abstract:

Objective: Clonidine (CLO) and dexmedetomidine (DEX) are α-2 adrenoceptor agonists that have analgesic and sedative effects. In our study, we aimed to evaluate the changes in analgesic and sedative effects by combining different doses of DEX with CLO.

Material and Methods: Forty-two adult male Wistar rats were equally randomized to groups: Control (saline), DEX-5 (5 µg/kg), DEX-10 (10 µg/kg), CLO (700 µg/kg), DEX-5+CLO (5+700 µg/kg) and DEX-10+CLO (10+700 µg/kg). All injections were performed intraperitoneally. The analgesic and sedative effects of the drugs were evaluated respectively by tail-flick (TF) and rotarod tests. TF and rotarod latencies were measured before (baseline) and after the injections (at 15, 30, 60, 90, and 120 minutes).

Results: In both TF and Rotarod tests, there were no significant latency differences between before and after the injections in the control, DEX-5, and DEX-10 groups. However, significant analgesia was observed as compared to baseline in CLO (at 30 and 60 minutes), DEX-5+CLO (at 15 and 30 minutes), and DEX-10+CLO (at 15, 30, and 60 minutes). Sedation was observed at all time points after injection in CLO, DEX-5+CLO, and DEX-10+CLO groups compared to their baseline values. This indicates that the sedative effect of CLO lasts longer than its analgesic effect. When the groups were compared to the same time points of the control group, it was determined that sedation occurred only in the CLO group, while the prolongation of rotarod latencies in the DEX-5+CLO and DEX-10+CLO groups was not statistically significant.

Conclusion: In the light of these data, it can be concluded that addition ineffective doses of DEX to CLO can alleviate CLO-induced sedation and may result in earlier onset of analgesia and prolonged duration of analgesia. We think that this interaction between α-2 adrenoceptor agonists should be supported by further research.

Keywords: Clonidine, Dexmedetomidine, Sedation, Analgesia, Rat

**This study was supported by the Scientific Research and Project Coordinatorship of IKCU (project Number: 2019-ONAP-TIPF-0001).*

HEART ATTACK AND ALTERNATIVE TREATMENT POSSIBILITIES

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Abstract:

Heart attack is one of the most common cardiovascular diseases in the world and in our country, and it is among the diseases in which the most research is done on experimental treatments. Also known as myocardial infarction or coronary thrombosis.

When a part of the heart muscle undergoes ischemia and is deprived of oxygen, the myocardium cannot perform its function and a heart attack occurs. In humans, many factors such as age, obesity, genetic predisposition, alcohol and cigarette use, malnutrition, etc., form the basis for heart attacks and many similar cardiovascular diseases and trigger disease formation.

According to the worldwide research statistics of the World Health Organization, the number of deaths from cardiovascular diseases is expected to reach 23 million in 2030. Losses due to cardiovascular diseases in Turkey correspond to 30% of all deaths, and this rate represents half of deaths from cancer.

Although there are different methods in the treatment of heart attack in the world and in our country, research on alternative treatment has increased, especially in countries such as China and India, together with classical medical and surgical treatment. Among the main drugs in the classical medical treatment are aspirin, blood thinners, blood pressure drugs and cholesterol drugs. Among the alternative treatments, such as garlic, green tea, temple tree, licorice root, clove, ginger, yellow centaury, pomegranate juice and cranberry juice, which are mainly used as preventive and protective against atherosclerosis.

In this review study, since the use and preference of complementary and alternative therapies, whose importance and usability is increasing day by day, in different diseases as well as against heart attacks; It is aimed to talk about the importance, types and use of alternative medicine for the prevention and treatment of heart attack.

Keywords: Heart attack, Alternative therapies, Treatment

HIDRONIK ISITMA SISTEMLI ASFALT ÜSTYAPILARDA GÖMÜLÜ BORULARIN FARKLI TABAKALARDA YER ALDIĞI DURUMLARDA AŞINMA TABAKASINDA MEYDANA GELEN GERILMELERIN İNCELENMESI

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Abstract:

Asfalt betonu yollarda yüzeyde kar birikmesi ve buz oluşumunun önlenmesi için üstyapı içerisinde gömülü bir hidronik ısıtma sisteminin kullanılması geleneksel kar ve buz mücadelesi uygulamalarına alternatif olarak önerilmektedir. Hidronik ısıtma sistemleri, kaplama tabakasında biriken kar ve buzu eritmek için kaplama tabakası altına yerleştirilen bir boru şebekesinden ısıtılmış bir sıvıyı sirküle eder ve bu sayede yol yüzeyinin buzlanması önlenebilmektedir. Güvenilir ve ekonomik olarak uygulanabilir bir hidronik kar eritme sistemi için çeşitli parametrelerin değerlendirilmesi gerekmektedir. Bu çalışmada hidronik ısıtma sistemlerinin kullanıldığı esnek üstyapılarda trafik yükü sonucu meydana gelen gerilmeler ile hidronik ısıtma sistemi kullanılmayan esnek üstyapılarda trafik yükü sonucu meydana gelen gerilmelerin sonlu elemanlar yazılımı kullanılarak karşılaştırılması yapılmıştır. Beş farklı hava sıcaklığında ve üç farklı giriş suyu sıcaklığı kullanılarak değerlendirmeler yapılmıştır. Yapılan çalışmada gömülü boruların aşınma tabakası, binder tabakası, bitümlü temel tabakası ve alttemel tabakasında yer aldığı durumlarda, aşınma tabakasında meydana gelen gerilmeler incelenmiştir. Ek olarak sistem içinde kullanılan pe-x borularda trafik yükü sonucu meydana gelen gerilmeler de değerlendirilmiştir.

Keywords: Hidronik Isıtma Sistemleri, Gerilme Analizi, Sonlu Elemanlar Yöntemi

ROBOT ARM DESIGN AND CONTROL WITH RASPBERY Pi

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Abstract:

This Paper is about controlling the robot arm, which is a part of a robot or robots that have gained more place in our lives with Industry 4.0, with Raspberry Pi. The robot arm is equipped with color and distance sensors and transformed into a structure that perceives and decides, as a result, realizes the desired movement. Controls are provided by a software compiled with Python on the Raspberry Pi board, driving the servo motors. In addition, the system can provide information about its own status by making a notification via an LCD. Using these processes and features, a project has been developed for classification and transport.

Keywords: Python, Raspberry pi, Arduino, Sensor, Robot Arm, Servo

THE RELATIONSHIPS BETWEEN CHICK LENGTH AND EGG WEIGHT, CHICK WEIGHT, CHICK QUALITY İN DAILY AGED DOMESTIC GOOSE CHICK

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Abstract:

This study was focused on the relationships between chick length and weight of egg, live weight and chick quality in domestic goose chicks at daily age. Chick length; it is a method that fast, reproducible and does not harm the animal. In this study, a significant positive correlation was found between chick length and weight of egg, chick weight and chick quality. In other words, as egg weight, chick weight and chick quality increase, chick length also increases. Since the parameters used in chick quality assessment vary from person to person and are time-consuming, it may be advisable to take chick length as a criterion for evaluating chick quality in order to make the work practical and to make the quality reproducible.

Keywords: goose chick, chick length, chick quality, chick weight

STATIC SYNCHRONOUS SERIES COMPENSATOR EXAMINATION OF POWER SYSTEM STABILITY WITH CASCADE CONTROLLER (PID MATLAB/ SIMULINK)

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Abstract:

This system must perform well in the face of disturbing when there is any disturbance to the system in the control system cascade control and alternative to the classical control system has been increases the performance of control system especially in presence of unforeseen disturbance this study stability of the system was improved by using the cascade controller structure in the single machine power system connected the infinite bus with this study and work static synchronous serial compensator classic PID, type controllers are used in cascade control structure inside and outside cycle Pİ, consists of inner loop cycle of the cascade control system structure in this study PID, control in the external cycle were used. Adjustment parameter value of the controllers inside and outside the cascade control system structure were obtained using genetic algorithm method of the performance and proposed cascade control system is compared with conventional PID, control system performance for static synchronous serial compensator of the single machine power control system connected to the infinite bus in the literature. As a result of the result of the these comparisons of the proposed cascade control in case of normal load showed by a performance of %19 better than the damper controller for static synchronous serial compensator better than classical PID controller.

Keywords: SSSC (static synchronous serial compensator), PID (proportional integral derivative)

KANATLILARDA IN OVO UYGULAMALARI

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Abstract:

Yumurta içerisine besin maddelerinin verilmesi damızlıkçı ve kuluçka işletmeleri için kuluçkada çıkış gücünün artmasına, yüksek yaşama gücü ve performansı arttırdığına dair çalışmalar son yıllarda hız kazanmıştır. Yumurta içi beslemenin göstermiş olduğu olumlu sonuçlar kanatlı sektöründe verimlilik ve karlılıkta önemli iyileşmeler sağlayacaktır. Bu derlemede, in ovo tekniği hakkında bilgi verilerek, uygulanabilecek olası besinlerin çeşitliliği ve etkileri özetlenecektir.

Keywords: *in ovo uygulamaları, kanatlı, büyüme, kuluçka, embriyo.*

GEOPOLYMER CEMENT WITH GRAPHENE REINFORCEMENT FOR REDUCED CARBON EMISSION

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Abstract:

There is a worldwide increase in greenhouse gas emission which is causing adverse effect on environment by trapping heat and warming up the earth. CO2 (55%) is major component of greenhouse gases emitted from various sectors. Cement is the key ingredient of concrete, and one of the prime construction materials. Cement production contributes about 3.2% of CO2 emission worldwide. The present work describes the synthesis of geopolymer cement reinforced with an industrial grade graphene nanomaterial (5% wt) with the Portland Pozzolana Cement (PPC) which is mixture of ordinary Portland cement (OPC) with fly ash (30% wt). The samples were cured for 7, 14 and 28 days curation periods. It is reported that the compressive strength of cement is increased by the introduction of graphene significantly. Introduction of graphene also resulted in high compressive strength as compared to PPC in a minimum time period. Thus the study reports that the graphene and fly ash induced cement is stronger, durable efficient and helps in reducing CO2 emission.

Keywords: Carbon dioxide emission, greenhouse gases, geopolymer cement, nanographene composite.

THE IMPACT OF ZNO FOR ENHANCING THE PHYSICAL AND PHOTON SHIELDING PROPERTIES OF SB_2O_3-B_2O_3-NA_2O-GD_2O_3-$TİO_2$ GLASS

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Abstract:

In the last decade, radiation shielding has become more popular due to the increasing irradiation sources. For this purpose, we conducted a theoretical study to determine the impact of ZnO content on the Sb_2O_3-B_2O_3-Na_2O-Gd_2O_3-TiO_2 glass system. The glass system of $20Sb_2O_3$-$50B_2O_3$-$(20-x)Na_2O$-$5Gd_2O_3$-$5TiO_2$-xZnO where x: 0, 5, 10, 15, and 20 mol% (N20Z0 to N0Z20 series) was examined within the perspective of physical and photon shielding characteristics. From the physical property calculations, it was evident that the insertion of ZnO from 0 to 20 mol% paved the way for ascending the overall glass density from 3.3060 to 3.9740 g.cm-3. Moreover, the molar volume, oxygen molar volume, and oxygen packing density ranged between 38.61 and 33.09 cm3.mol-1, 15.14 and 12.98 cm3.mol-1, and 66.05 and 77.05 cm-3.mol-1 for the glass series of N_20Z0 to $N0Z_20$, respectively. According to the photon shielding computations via Phy-X/PSD software in the photon energy level from 0.015 to 15 MeV, one can deduce that the linear attenuation coefficient effectively increased as a function of the increasing ZnO content. Further, the half-value layer, as well as the tenth-value layer thicknesses, considerably reduced by inserting ZnO in replacement for Na_2O. Consequently, it was seen that $N0Z_20$ can be used as an alternative radiation shielding material when compared to commercially used materials.

Keywords: ZnO, radiation shielding, glass density, X-rays, Phy-X/PSD

AN ESSENTIAL STUDY FOR GREENER MATERİALS: FOAM GLASS FABRICATION USING DIFFERENT GLASS WASTES AND BLAST FURNACE SLAG

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Abstract:

In parallel to raising environmental concerns for a more sustainable future, great efforts on greener materials have lately been devoted. For the sake of these endeavors, the present study aims at fabricating foam glass that is composed of pharmaceutical glass (PG), green packaging glass (GPG), flint packaging glass (FPG), and ground granulated blast furnace slag (GGBFS). The following compositions were designed to determine the effect of varying GGBFS content: (30-x)PG+(30-x)GPG+(30-x)FPG+xBFS+2Glycerol+6Waterglass+2Water (x: 0, 9, 18, and 27 wt%.). Once weighing, mixing, and homogenizing steps were carefully completed the pellets were prepared by using uniaxial pressing under 0.6 MPa. The prepared pellets were then heated up to 850 ^{o}C by applying 5 ^{o}C.min-1 followed by dwelling for 30 min at the peak temperature. For understanding the impact of GGBFS on foaming characteristics, we performed density measurement, porosity estimation, and compressive strength test to the fabricated foam glass series (GGBFS0 to GGBFS27). According to the density measurements, one can say that the increasing GGBFS content caused an increase in density values. That is, GGBFS0 to GGBFS27 samples achieved 0.231, 0.264, 0.462, and 0.716 g.cm-3 in the respective order. Additionally, the estimated porosity values were equal to 90.3, 89.1, 81.2, and 71.2 percentages for GGBFS0 to GGBFS27. Lastly, the compressive strength test clearly showed that the ascending GGBFS amount (0 to 27 wt.%) paved the way for increasing resistance to mechanical failure (0.591 to 1.027 MPa). In conclusion, we can report that a fully-waste-derived foam glass can effectively be produced with acceptable technical properties for building materials applications.

Keywords: Pharmaceutical glass, green packaging glass, flint packaging glass, blast furnace slag, foam glass, green materials, building material.

EMISSIONS IN BIOMASS POWER PLANTS

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Abstract:

The anthropogenic greenhouse gas density in the atmosphere started to increase, especially with the industrial revolution that started in the 1850s. As a result, an increase has been observed in the global energy demand and a significant increase in the use of natural resources (especially fossil fuels) has been observed to meet this increase.According to the predictions of the International Energy Agency, the demand for fossil fuels will increase until 2050, and accordingly, a 130% increase in carbon emission values will be observed.

The scarcity of non-renewable energy is an increasing part of all-reproducible manufacturing facilities. This would not be limited to being adversely affected by the chance of consuming a different fossil fuel than would be adversely affected by a biomass power plant. It can be designed for this purpose, because it is more usable for the environment and human.

Keywords: Renewable Energy, Biomass, Emission, Emission Results

EFFECT OF PARTICLE SIZE AND SHAPE ON STRESS-DILATANCY RESPONSE OF GRANULAR MATERIALS

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Abstract:

The shear strength defined as the greatest stress that the soil can sustain without failure along a certain plane is the most important engineering feature of the soils. This feature is very important as it directly affects the design parameters of any types of engineering structure. The shear strength of soils composed of granular materials such as sand is characterized by friction. Friction is expressed as the sum of three different terms: mineral friction ($\phi\mu$) depending on particle surface roughness, additionally particle rearrangement (ϕr) and dilation (ϕd) depending on initial density and confining pressure. In the correlation of these components that comprise these terms, basic concepts such as Reynold's (1885) dilation and Casagrande's (1936) critical void ratio are used. For this purpose, based on the relevant basic concepts, during the shear strain the external (Taylor, 1948; and etc.) or internal work (Rowe, 1962; and etc.) of the soil is theorized by energy principles. Although existing theoretical and empirical correlations derived in literature describe the volumetric strain behavior of granular soils as relative density and confining pressure, the effect of particle characteristics on this behavior has not been adequately evaluated. In this study, it is aimed to eliminate the deficiencies in this field by evaluating the particle characteristics (particle size and shape) of granular materials in terms of volumetric strains, and thus to make important contributions to the literature. In this study, rounded particle shaped Gocenoluk sand (D50 = 0.40 mm, Cu = 1.33, Cc = 1.09, emin = 0.98, emax = 0.60, Gs = 2.64), rounded/subrounded particle shaped CEN standard sand (D50 = 0.70 mm, Cu = 6.5, Cc = 2.04, emin = 0.46, emax = 0.69, Gs = 2.64) and angular particle shaped Cifteler-Sakarıbaşı sand (D50 = 1.35 mm, Cu = 1.71, Cc = 0.93, emin = 1.15, emax = 0.81, Gs = 2.64) were used as granular material. In order to measure the effect of particle size, three different mean particle sizes were defined (D50), with reference to CEN standard sand, and other sands were adapted to these chosen sizes. A total of 54 samples prepared by the moist tamping method were tested under monotonic loading with deformation control. In this study, in which the triaxial test method (CD type) is used, initial relative densities was chosen at 55% and 95%, confining pressure at 50 kPa, 150 kPa and 250 kPa and axial constant strain rate at 0.05%/min. Bolton (1986) and Vaid and Sasitharan (1992) empirical flow rules derived for axisymmetric triaxial conditions that take into account the common effect of the peak and critical shear strength angles and the dilatation angle were used in the evaluation of the test results. As a result of the study, it was observed that the particle size and particle shape substantially affected the stress-dilatancy behavior of granular soils. This effect is that flow rules make more extreme estimates as mean particle size and relative density increase, particle roundness and confining pressure decrease. This result is related to the fact that the experimental studies used in the derivation of the flow rules were at limited relative density and confining pressure range, moreover, the mean particle size range and particle shape were ignored. All these

results are very important in terms of showing that existing or regenerated flow rules should be evaluated by taking into account the relative densities, confining pressures and particle characteristics of granular materials.

Keywords: Granular Material; Particle Size; Particle Shape; Shear Strength; Stress-Dilatancy Response; Drained triaxial.

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DETECTION AND PROPAGATION OF STRUCTURAL FAULTS OF COMPOSITE AIRCRAFT JOINT USING DIGITAL IMAGE CORRELATION TECHNIQUES

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Abstract:

In the present work, an experimental study is carried out using digital image correlation (DIC) technique to analyze the damage and behavior of carbon/epoxy composite laminates under tensile loading. The tension mechanisms associated with failure modes of bolted joints in advanced composites is studied, as well as displacement distribution and Strain distribution. In order to compare the distribution of displacements and strains along the surface, figures of image mapping is made. Several factors that are responsible for the failure of fiber reinforced polymer composite materials are observed. It was found that strain concentrations observed in the specimens can be used to identify full-field damage onset and to monitor damage progression during loading. Moreover, there is interaction between laminate pattern, laminate thickness, fastener size and type, surface strain concentrations and out-of-plane displacement. Conclusions include a failure analysis and observations by scanning electron microscopy (SEM) on the fracture surfaces learned during the experiment. Finally The DIC results can be used to develop and accurately validate numerical models.

Keywords: digital image, Carbone/epoxy composite; bolted joint; anisotropy.

TWO-STAGE THREE-PHASE GRID-TIED PHOTOVOLTAIC SYSTEM WITH MPPT METHOD

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Abstract:

This paper explains the transfer of the power generated by the photovoltaic (PV) system to the three-phase alternating current (AC) power grid with maximum efficiency by controlling in two stages. With the designed PV system, it is aimed to transfer the energy received from the source with high efficiency to the network by using the maximum power point tracking (MPPT) method in order to ensure power stability. In addition, with a second control mechanism, the current at the output of the inverter is instantly controlled and the voltage value of the generated power is kept constant. Thanks to this control system, which consists of two stages, solar energy has been kept under control from electrical energy generation to its transfer to the power grid. In order to predict the quality of the generated power, the total harmonic distortion (THD) rate of the current at the output of the PV system was determined as a result of the simulations made in the computer environment. It is seen that the simulated PV system, according to the values of different solar radiation levels, tends to keep the voltage value of the power to be transferred to the grid constant at the desired level and that the THD value has been reduced below 3 percent at the time of maximum power generation.

Keywords: Photovoltaic System, Renewable Energy Sources, Maximum Power Point Tracking, DC-DC Converter, DC-AC Inverter, Power Grid

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