ICONAT 2021

INTERNATIONAL CONFERENCE ON NATURAL SCIENCES AND TECHNOLOGIES

Turkish Republic of Northern Cyprus

18-20 September 2021

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ESKISEHIR TECHNICAL UNIVERSITY

NATIONAL UNIVERSITY OF RADIO ELECTRONICS

UNIVERSITY OF MEDITERRANEAN KARPASIA

AZERBAIJAN UNIVERSITY

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CONFERENCE BOOK
2021

Turkish Republic of Northern Cyprus

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Official Opening of the ICONAT-2021

18 September 2021   Meeting Salon I – The University of Mediterranean Karpasia
Meeting ID: 939 7615 4284
Passcode: 564762

09.00   The Start of Registration Process

10.30   Official Opening of the ICONAT-2021
               Welcome by Conference

               Prof. Dr. Omarov Murad, Vice-Chairman Organization Committee
               Vice-Rector, NURE, (Ukraine)

               Prof. Dr. Abidin Kılıç, Eskisehir Technical University, Turkey
               Chairman of Organization Committee

               Prof. Dr. Mehmet Nesip Öğün, Rector, University of Mediterranean Karpasia
               HONORARY PRESIDENT OF CONGRESS

11.00   Invited Speaker
               Prof. Dr. Yüksel Ergun (Turkey)

12.00   **Lunch Break**

- **Oral presentations can take a maximum of 20 minutes.**
- **Poster presentations can take up to 5 minutes. Brief information about the content of the study will be presented. During the poster presentation, the image of the work will be shared on the screen.**

18-20 September 2021-Meeting Salon I
Meeting ID: 939 7615 4284   Passcode: 564762

18-20 September 2021-Meeting Salon II
Meeting ID: 97293960695   Passcode: 605017

18.09.2021 Saturday-14.00

	ORAL PRESENTATIONS	
	Chairing **Prof. Dr. Sedef Dikmen**	**Hall 1** **14.00**
01	Murat Başaran Turkey	The Importance of The Data Taken From The No, No2 and Co Sensors in The Ventılatıon Process in The Raılway Tunnels
02	Guram Chaganava Georgia	New Techniques for The Communication System of Sign Language Speakers
03	Mehmet Fidan Turkey	Texture Classification Based On Moment Statistics of Von Neumann Neıghborhood of Centroid

18.09.2021 Saturday-14.00

	ORAL PRESENTATIONS	
	Chairing **Prof. Dr. Dursun Aydın**	**Hall 2** **14.00**
04	Utku Kaya Turkey	Real-Time Skin Segmentation on Low Resolution and Gray Images
05	Ömer Aydın Turkey	Achieving Price and Performance Equality On and Off The Grıd By Examining Global Renewable Energy Trends
06	Nkiru E Ekechukwu Nigeria	A New method for sperm quantification in the African malaria mosquito Anopheles gambiae s.l
07	Meryem Akbelen Turkey	Investigation of Natural Analcime-Rich Zeolite Tuff From Turkey: A Combined Xrd, Xrf, Ft-Ir And Sem Study

19.09.2021 Sunday-10.00

	ORAL PRESENTATIONS	
	Chairing **Dr. Utku Kaya**	**Hall 1** **10.00**
08	Fatih Burak Özkanlı Turkey	Integration Of Electric Vehicles Into The Smart Grid
09	Nihal Kuş Turkey	Orbital Interactions And Stabilization Energies Of Methyl 5-6 Dihydro Benzo(H) Quinoline Carboxylate
10	Christy A.A. Norway	Drying Properties of Natural Bio-Polymers
11	Mokhtar Djehiche Algeria	Washing Of Contaminated Soil Usıng Solar Thermal Energy
12	Sedef Dikmen Turkey	Determination of Electrokinetic Properties of Natural Zeolites Belong to Manisa-Gördes

19.09.2021 Sunday-10.00

	ORAL PRESENTATIONS	
	Chairing **Dr. Mehmet Fidan**	**Hall 2** **10.00**
13	Anatoly Kozar Ukraine	Electromagnetic Wave Scattering by Pyramid-Shaped Photonic Crystal From Resonant Magnetodielectric Spheres
14	Süleyman Demir Turkey	Fluid Maxwell Equations in The Framework of Octonion Algebra
15	Olga Yunakova Ukraine	Exciton Absorption Spectrum of Kpb 2 Br 5 Thin Films
16	Nazire Burçin Hamutoğlu Turkey	The Mediation Effect of Critical Thinking Skills in The Relationship Between Lifelong Learning Tendency and Information Operational Thinking Skill

19.09.2021 Sunday-13.00

		ORAL PRESENTATIONS
	Chairing **Prof. Dr. Zafer Demir**	**Hall 1** **13.00**
17	Elif Öztetik Turkey	The Effects of Heavy Metal Applications on Antioxidant Defence Activation in Barley And Wheat Varieties
18	Afamefuna Moon Nigeria	A Method for Examining the Sequencing Models of Antisymmetric Structures
19	Dursun Aydın Turkey	Nonparametric regression with error-in-variables model based on different kernel functions
20	Nihal Kuş Turkey	Dft/Td-Dft Analysis Of 2-Chloro-7-Methylquinoline-3-Carbaldehyde Using Computer Computing Method

19.09.2021 Sunday-13.00

		ORAL PRESENTATIONS
	Chairing **Prof. Dr. Abidin Kılıç**	**Hall 2** **13.00**
21	Emel Ergene Turkey	Effects Of Echinophora Tenuifolia Essentıal Oil on Cytotoxic and Apoptotic Mechanism in Lung and Mesothelioma Cancer Cell Lines
22	Olga Yunakova Ukraine	Absorption Spectra of Thin Films Compounds in The Rbcl-Cucl System
23	Ayşegül Taşçıoğlu Turkey	Molybdenum Disulfide Thin Film Electrical and Optoelectrical Characterization under Different Atmosphere
24	Nazire Burçin Hamutoğlu Turkey	Determining the Challenges of Academicians During The Covid-19 Process: A Case Study

20.09.2021 Monday-10.00

	ORAL PRESENTATIONS	
	Chairing **Prof. Dr. Elif Öztetik**	**Hall 1** **10.00**
25	Çağdaş Allahverdi Turkey	Creating Awareness Regardıing Solar Energy and Its Use with Portable Solar Powered Generator
26	Evrim Güneş Altuntaş Turkey	Current Perspectives On Medicinal And Aromatic Plants in Food And Health Field
27	Paul Kozub Ukraine	Vector Approach for Modeling, Research And Optimizatıon of Complex Chemical Systems
28	Kazım Guliyev Azerbaijan	Synthesis and Properties of Cyclopropane-Containing Optically Transparent Copolymer
29	Evrim Güneş Altuntaş Turkey	Investigation of The Antilisterıal Activıiy of Lactic Acid Bacteria with Physiological and Chromatographic Way

20.09.2021 Monday-10.00

	ORAL PRESENTATIONS	
	Chairing **Prof. Dr. Nihal Kuş**	**Hall 2** **10.00**
30	Mehmey Fidan Turkey	Skin Pixel Recognition Based on Neighborhood Correlation and Moment Features
31	Utku Kaya Turkey	Comparison of Deep Learning with Machine Learning on Skin 4 Segmentation
32	Murad Omarov Ukraine	Developing the Generalized Approaches to Mathematical Modelling of Processes in Steam Generators, Water Level Automated Control Systems
33	Abidin Kılıç Turkey	The Determination of Stresses and Defects in GaAs Thin Films with HRXRD

20.09.2021 Monday-13.00

	ORAL PRESENTATIONS	
	Chairing **Prof. Dr. Nihal Kuş**	**Hall 1** **13.00**
34	Konul Jabbarova Azerbaijan	Salt Deposition Process with Graphene
35	Murad Omarov Ukraine	Detailing of the main directions and components for defining models for assessing the quality of knowledge
36	Storozhenko V.A. Ukraine	Filtering of Interference of Inhomogeneous Regular Structure in Thermal Non-Destructive Control Of Cellular Structures
37	Elif Öztetik Turkey	Is GSH-Conjugation Actıvıty Specific to SER-GSTs or NOT?
38	Erdem ONCU TRNC	Investıgatıon Of Dogecoin Price Movements: A Gsadf Analysıs
39	Mehmet Nesip Ogub	Terrorist Use of Cyber Technology
40	Şadiye Çakmak	The Log (FT) Values in Spherıcal And Deformed Nuclei for Some Odd-A Germanium Isotopes
41	Şadiye Çakmak	An Application of Clifford Algebra on The Semi-Symmetrical Archimedean Solid Icosidodecahedron

ABSTRACTS

1.

THE IMPORTANCE OF THE DATA TAKEN FROM THE NO, NO2 AND CO SENSORS IN THE VENTILATION PROCESS IN THE RAILWAY TUNNELS

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ABSTRACT

In railway tunnels, ventilation is carried out to prevent NO, NO2 and CO gas pollution caused by exhaust gases due to the diesel locomotives on the railway. Some ventilation calculations are used during ventilation. In these calculations, factors such as the location of the tunnel, the structure of the tunnel, and the pressure belts that may occur should be taken into the account one by one. After these calculations, control scenarios are prepared based on the locations and dimensions of the ventilation equipment to be used. These control scenarios are controlled by programmable logic controllers. In this system, data is needed for the devices to work efficiently and properly. These data are obtained in real time through sensors. These are NOx and CO sensors that measure toxic gases. The information received from the sensors provides the necessary information to start, continue, stop or switch to other scenarios. These sensors are needed to provide data necessary to operate jet fans and axial fans to ventilate the tunnels. In this article, the contribution of these sensors to the relevant ventilation scenarios and some other important aspects are mentioned.

Keywords: Railway tunnels, NOx sensors, CO sensors.

2

NEW TECHNIQUES FOR THE COMMUNICATİION SYSTEM OF SIGN LANGUAGE SPEAKERS

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ABSTRACT

The study described in this article examines the approaches of retraining of the deep learning model for hand palm keypoint detection in images. This is one of the studies conducted to create an innovative communication system for sign language speakers. The target of the given study is to find an optimal technique of retraining for increasing the degree of the keypoint detector generalization. So, it must be able to accurately detect keypoints in images it has not seen during training. It will make the communication system usable in real-life conditions. In the article, there are reviewed three approaches of retraining: Retraining in series, retraining using united dataset and retraining using mixed datasets. Experiments were conducted to test the effectiveness of each of them. The paper presents the results of the experiments and a relatively optimal method selected among them.

3

TEXTURE CLASSIFICATION BASED ON MOMENT STATISTICS OF VON NEUMANN NEIGHBORHOOD OF CENTROID

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[2] Department of Physics, Eskişehir Technical University Eskişehir, Turkey

ABSTRACT

Images of specific textures carry unique statistical information depending on the variability, sharpness, continuity and change frequency of the elements that construct the texture. In this study, gray level images belonging to 10 different texture classes are tried to be classified by using the moment statistics of Von Neumann neighborhood pixels with radius r according to the Manhattan distance of the center point. Obtained features were classified with support vector classifiers with different kernels and the comparative results were presented.

Keywords: Feature extraction, Support vector classifiers, Texture classification, Moment statistics

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4.

REAL-TIME SKIN SEGMENTATION ON LOW RESOLUTION AND GRAY IMAGES

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2 Department of Physics, Eskişehir Technical University Eskişehir, Turkey

ABSTRACT

In this study, the skin segmentation problem, which is frequently used in the literature, will be detected on a real-time webcam with semantic segmentation deep learning algorithms. Skin segmentation generally requires high processing power to distinguish it from images with high resolution. The deep learning algorithm and the proposed image processing method used in this study provide real-time, very low CPU usage, and lag-free skin detection via webcam.

Keywords: Skin segmentation, Deep learning, Semantic segmentation

5.

ACHIEVING PRICE AND PERFORMANCE EQUALITY ON AND OFF THE GRID BY EXAMINING GLOBAL RENEWABLE ENERGY TRENDS

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2 Department of Electricity and Energy, Porsuk Vocational School, Eskişehir Technical University, Eskişehir, Turkey

ABSTRACT

Renewable energy sources are an increasing trend in the world as an alternative solution to rapidly depleting fossil fuels. Due to the depletion of fossil fuel resources and the reduction of climate change, societies are forced to internalize these effects and to pave the way for sustainable energy technologies. Other reasons for preference are that these resources are cost-effective and environmentally friendly. Looking at rapidly falling cost curves such as solar and wind energy and the comparability of traditional production technologies in the global market help in establishing the price and performance balance. Today, with the storage options becoming more affordable, the popularity of renewable energy sources has increased. While storage methods provided an advantage for traditional energy sources in the past, today it has provided great convenience in terms of both distribution and transmission of electrical energy produced from renewable sources. The electrical energy obtained from renewable sources and the maturation of the technologies used to obtain this energy, the increase in distributed energy sources, the decrease in the costs of storage technologies, strong consumer behaviors affect the price-performance balance, as well as the way we produce, use and trade electricity. In this study, global renewable energy trends will be examined and information will be given on price and performance equality on and off the grid.

Key words: Renewable energy, energy sources, price and performance equality, energy trends

6.

A NEW METHOD FOR SPERM QUANTIFICATION IN THE AFRICAN MALARIA MOSQUITO ANOPHELES GAMBIAE

Nkiru E Ekechukwu, Nigeria

ABSTRACT

Insect seminal fluid proteins are powerful modulators of many aspects of female physiology and behaviour including longevity, egg production, sperm storage, and remating. The crucial role of these proteins in reproduction makes them promising targets for developing tools aimed at reducing the population sizes of vectors of disease. In the malaria mosquito *Anopheles gambiae*, seminal secretions produced by the male accessory glands (MAGs) are transferred to females in the form of a coagulated mass called the mating plug. The potential of seminal fluid proteins as tools for mosquito control demands that we improve our limited understanding of the composition and function of the plug. Here, we show that the plug is a key determinant of *An. gambiae* reproductive success. We uncover the composition of the plug and demonstrate it is formed through the cross-linking of seminal proteins mediated by a MAG-specific transglutaminase (TGase), a mechanism remarkably similar to mammalian semen coagulation. Interfering with TGase expression in males inhibits plug formation and transfer, and prevents females from storing sperm with obvious consequences for fertility. Moreover, we show that the MAG-specific TGase is restricted to the anopheline lineage, where it functions to promote sperm storage rather than as a mechanical barrier to re-insemination. Taken together, these data represent a major advance in our understanding of the factors shaping *Anopheles* reproductive biology.

7.

INVESTIGATION OF NATURAL ANALCIME-RICH ZEOLITE TUFF FROM TURKEY: A COMBINED XRD, XRF, FT-IR AND SEM STUDY

Meryem AKBELEN

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ABSTRACT

In this study, structural properties of natural analcime-rich zeolite tuff from Turkey and that of ion-exchanged forms investigated. Zeolites are naturally occurring hydrated aluminosilicate minerals of the alkali- and alkaline-earth metals. The microporous structure and the presence of extraframework cations are of great importance for characterizing the unique properties of zeolites. Ion-exchanged forms of analcime zeolite were prepared with 1 M KNO_3,1 M $Ca(NO_3)_2$ and 1 M HCl solutions in a shaker for 6 hours at 80 °C. The obtained samples were characterized by X-ray diffraction (XRD), X-ray fluorescence (XRF), Fourier transform infrared spectroscopy (FT-IR) and scanning electron microscopy (SEM) techniques.

Keywords: Natural zeolite; Analcime; XRF; XRD; FT-IR; SEM.

INTEGRATION OF ELECTRIC VEHİCLES INTO THE SMART GRID

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2 Department of Electricity and Energy, Porsuk Vocational School, Eskişehir Technical University, Eskişehir, Turkey

ABSTRACT

The need of human beings to use vehicles in transportation was met first by steam trains, then by various automobiles and other vehicles working with internal combustion engines. Today, electric vehicles are increasingly used for transportation. As in all industrial establishments and cities, it has been determined as a goal to cause less damage to the environment and to use vehicles more efficiently in transportation. Due to the increase in the use of fossil fuels and the fact that these resources are facing depletion in the coming years, developed countries have started to search for new ones. The use of electric vehicles, which emerged with these studies, is becoming widespread day by day. In addition to being environmentally friendly compared to internal combustion engines, another advantage of electric vehicles is that they can work in an integrated manner with smart grids. In this study, research will be conducted on the current status of electric vehicles, their types, charge levels, advantages, difficulties in development and statistics on electric vehicle use in different countries. In addition, various concepts that emerge with the integrated use of electric vehicles with smart grids will be evaluated. The advantages of including smart grids in the electricity grid infrastructure will be examined. The working principles of vehicle-to-grid (V2G) systems will be evaluated. The concept of "demand-side participation", which emerges with the use of vehicle-to-grid systems and contributes to the electricity supply-demand balance, will be examined.

Keywords: Energy, Electric Vehicle, Vehicle-to-Grid Systems (V2G), Demand Side Management

9.

ORBITAL INTERACTIONS AND STABILIZATION ENERGIES OF METHYL 5-6 DIHYDRO BENZO(H) QUINOLINE CARBOXYLATE

Nihal KUŞ and Saliha ILICAN

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ABSTRACT

In this study, methyl 5-6 dihydro benzo(h) quinoline carboxylate (MDQC) molecule, which is a quinoline derivative, was selected and analyzed. Calculations were made considering the conformers at two minimum energies at the theory level B3LYP/6-311++G(d,p). The energy difference (ΔE+ZPV) between the two conformers (MDQC -1 and MDQC -2) was calculated *ca*. 2.05 kJ mol^{-1}. The relative stability of the conformers was explained using the natural bond orbital (NBO) method and performed. Donor and acceptor pairs and orbital energies for NBO pairs were calculated by the Fock matrix equation. $\pi-\pi*$ transitions were observed in the ring structures for MDQC-1 and MDQC-2. Dominant orbital interactions of selected NBOs for MDQC-1 and 2 were calculated at the theory level B3LYP/6-311++G(d,p) and plotted. From the calculations, the total stabilization energy difference between the two conformers was found. The molecular electrostatic potential (MEP) surfaces were calculated by the DFT/B3LYP/6-311++G(d,p) method and drawn. NBO and Mulliken charges were calculated and analyzed.

Keywords: Methyl 5-6 dihydro benzo(h) quinoline carboxylate, NBO, Orbital interaction, Stabilization energy

10.

DRYING PROPERTIES OF NATURAL BIO-POLYMERS

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ABSTRACT

Desiccants are substances used in the dehumidification process which is vital in order to avoid the degradation of materials. Silica gel is the most prominent type of desiccant used and today the world has developed an interest in bio-polymers due to certain demerits of silica. Hence this study was conducted to investigate the desiccant properties of the four commercial flours wheat, corn, potato and gram and to compare them with the common silica gel desiccant. The bio-polymers were dried under vacuum at 120 ℃ and were studied over time using Near-Infrared (NIR) spectroscopy for their –OH combination peak which appears at around 5200 cm-1 and the derivative spectra were analyzed to recognize the specific –OH groups involved in hydrogen bonding process. Further, the gravimetric analysis was used to study the rate of adsorption and their long-term efficacies were detected using data loggers. The results clearly indicated that adsorption of water occurs at C1, C2+C3, C4 and C6-OH groups of the glucose units for wheat and corn flour while potato and gram flour showed only three peaks attributing to C1, C2+C3 and C6-OH. Further it was observed that C1 and C2+C3-OH groups have a similar and the highest rates. The rates of adsorption of all flours were greater than both analytical grade and commercial silica and corn flour was found to be an outstanding desiccant compared to conventional silica desiccant. Keywords: Adsorption, bio-desiccant, Near-Infrared (NIR) spectroscopy, Gravimetric

11.

WASHING OF CONTAMINATED SOIL USING SOLAR THERMAL ENERGY

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ABSTRACT

In this work we present a new process of soil remediation, which operates independently. This process consists in washing a polluted soil in a buckle based on the evaporation of water by solar thermal energy. The latter refers to the use of the thermal energy of solar radiation to heat a fluid (liquid or gas), using solar thermal captors. In order to realize this process, our study consists in developing and finding the right configuration of the reactor which will allow the passage of water, without loss, from the liquid state to the gaseous state. The system is composed of a solar collector for water evaporation and a reservoir for soil decontamination, with a passage that ensures water circulation.

Keywords: Soil washing, solar thermal technologies

DETERMINATION OF ELECTROKINETIC PROPERTIES OF NATURAL ZEOLITES BELONG TO MANİSA-GÖRDES

Sedef DİKMEN

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ABSTRACT

The electrokinetic properties of a substance, inorganic or organic, are used to explain the mechanism of dispersion, understanding the performance of physical processes such as flotation, coagulation, flocculation and sedimentation in an aqueous medium and identify the adsorption mechanisms of ions or molecules at a solid liquid interface. The zeta (ζ) potential is one of the most important electrokinetic properties of natural zeolite and clay minerals. To date, a remarkable effort has been made to measure and understand the surface charge of natural zeolite and clay particles. Many laboratory experiments have been reported on ζ potential of clays and a few have also been published for natural zeolites, however, there are very few reported measurements of ζ potential of natural zeolite particles to determine the isoelectric point (iep), potential determining ions (pdi), and the effect of mono- and multivalent cations.

The present study aims to understand the electrokinetic [mobility, (μm/s)/(V/cm) and ζ potential, mV] properties of natural zeolite particles. Therefore, a series of ζ potential measurements were carried out to determine the isoelectric point (iep), potential determining ions (pdi), and the effect of various salt (Na^+, K^+, Li^+, Ca^{2+}, Mg^{2+}) and metal (Al^{3+}, Fe^{3+}) cations which varied concentrations of these electrolytes on the ζ potential of natural zeolite. Also, the effect of surface active agent (Hexadecyltrimethylammoniumbromide, HDTMA-Br) on dispersions of natural zeolite was evaluated by electrokinetic measurements.

The iep of natural zeolite was determined by measuring the ζ potential as a function of pH in the absence of salt and metal cations. In the pH range of 2–12, the ζ potential was found negative in water and the highest ζ potential magnitude (~ -20 mV) was obtained around pH 2. At high pH, the negative ζ potential becomes smaller in magnitude and reached about -37 mV at pH 12. This displays that natural zeolite has no iep in the pH range of 2–12. The natural zeolite particles are therefore net negatively charge over the whole pH range. This can be attributed to either the adsorption of OH^- ions on the positive charge centers of natural zeolite or the deprotonation of surface hydroxyl groups. Results reveal that the ζ potential of the natural zeolite, in general, not able to reverse in the presence of mono-and divalent salt cations. In presence of metal ions (Al^{3+} and Fe^{3+}) the ζ potential of the natural zeolite has similar trends, i.e., an increase in the concentration of these ions causes an increase in the ζ potential to the positive values at 0.005 M, and then it becomes positive. An observed increase of ζ potential in the sample treated with varying concentrations of HDTMA (0.001–0.05 M) revealed a distinct broad maximum at 0.03 M. It was established that the observed significant increase of ζ potential, from -24 up to 54 mV, correlates with a specific complex formation ability of the studied surface active agent. The relative broadness of the maximum of the ζ potential within a wide concentration range of HDTMA could be associated with intensive dissolution cations such as Na^+, K^+, Ca^+, Mg^{2+} and Al^{3+} while an observed increase of ζ potential could be explained by adsorption of studied complexing agent on the surface of natural zeolite particles.

Keywords: Electrokinetic properties, Isoelectric point, Natural zeolite, Zeta potential

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13.

ELECTROMAGNETIC WAVE SCATTERING BY PYRAMID-SHAPED PHOTONIC CRYSTAL FROM RESONANT MAGNETODIELECTRIC SPHERES

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The solution of the problem of scattering electromagnetic waves with a discrete convex polyhedron - a pyramid of resonant magnetodielectric spheres based on a complex rhombic crystal lattice is presented.

Here we consider the case equivalent to the X-ray optics of crystals, when $a/\lambda' \ll 1$ and can be $a/\lambda_g \sim 1$, $d,h,l/\lambda' \sim 1$ where a is the radius of the spheres; λ', λ_g - the wavelength of the scattered wave outside and inside the spheres; d,h,l - the lattice constants. The solution of the problem is obtained on the basis of the integral equations of Fredholm electrodynamics of the 2nd kind, with non-local boundary conditions [1, 2, 3].

Expressions found in the work for a pyramid-shaped metacrystal can be used to study ras-seeded fields in the Fresnel and Fraunhofer zones, as well as to study its internal field.

The ratios obtained in the work can be used in studying the scattering of waves of various kinds by convex polyhedra, on their basis creating new types of limited metacrystals, including nanocrystals with resonant properties and in studying their behavior in various external media [4], and also when developing methods for modeling electromagnetic phenomena that can occur in real crystals in resonant regions in the optical and X-ray wavelength ranges [5].

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FLUID MAXWELL EQUATIONS IN THE FRAMEWORK OF OCTONION ALGEBRA

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ABSTRACT

Using the resemblances between basic equations of electrodynamics and fluid dynamics, the Maxwell type equations of compressible fluids have been reformulated in terms of eight component octonions. It has been proved that single octonionic expression can summarize the basic equations of compressible fluids. In this work, the field equations of fluids have been expressed in a compact, simple and elegant form. Moreover, the generalized wave equation has been derived by taking advantage of this hypercomplex number system.

Keywords: Octonion, Maxwell Equations, Compressible Fluids, Field Equations

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EXCITON ABSORPTION SPECTRUM OF KPb$_2$Br$_5$ THIN FILMS

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The KPb$_2$Br$_5$ compound exists in two modifications – tetragonal (I) (space group *I4/mcm*, $a = 8.14$ Å, $c = 14.10$ Å, $z = 4$) and monoclinic (II), (space group *P2$_1$/c*, lattice parameters are $a = 9.264$ Å, $b = 8.380$ Å, $c = 13.063$ Å, $\gamma = 90.06°$, $z = 4$). [1, 2]

KPb$_2$Br$_5$ thin films were prepared by evaporation in vacuum of a melt mixture of pure KBr and PbBr$_2$ powders of stoichiometric molar composition on cold quartz substrates $T_s = 278$K. The films, prodused by this method, correspond to KPb$_2$Br$_5$ (I). The phase composition of the films was monitored from the absorption spectra measured at $T = 90$K. Such control is possible due to the difference in the spectral position of the long-wavelength exciton bands in KPb$_2$Br$_5$ (3.66 – 3.84 eV), PbBr$_2$ (3.98 eV), and KBr (6.76 eV).

The absorption spectrum of the KPb$_2$Br$_5$ (I) thin film (Fig.1a) contains a long-wavelength A^1 band and a wide C band (the spectral positions of the bands are given in Table 1).
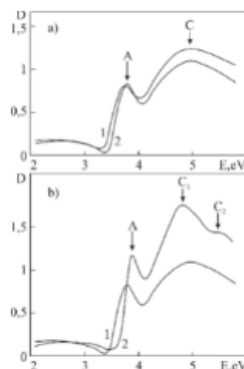

Fig. 1. Absorption spectra of a thin film of KPb$_2$Br$_5$, a) tetragonal structure (I) at T = 282K (1) and 90K (2) and b) monoclinic (II) (2) and tetragonal (I) (1) structures at T = 90K.

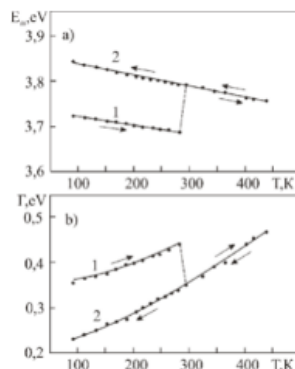
Fig. 2. Temperature dependence of the spectral position $E_m(T)$ (a) and half-width $\Gamma(T)$ (b) of the long-wavelength exciton band A in the KPb$_2$Br$_5$ thin film.

The A^1 band with increasing temperature shifts linearly to the long-wavelength region of the spectrum with $dE_m/dT = - =-(1,87\pm0,04)\cdot10^{-4}$ eV/K (Fig. 2) in the temperature range 90-282 K. At $T_c = 293$K there are short-wavelength shift of the long-wavelength exciton A^1 band, which indicates an increase of the unit cell volume, narrowing and sharpening of the band. A jump in the temperature dependences of the spectral position and half-width of the long-wavelength exciton band A at Tc = 293K indicates a first-order phase transition. This transition is irreversible. Cooling of the film down to a temperature 90 K does not restore the spectrum (Fig. 1b). Apparently, upon evaporation of the melt mixture on a cold substrate, the tetragonal compound KPb$_2$Br$_5$ (I) crystallizes. When the film is heated to $T \geq T_c$, a phase transition occurs to the monoclinic structure of KPb$_2$Br$_5$ (II).

The structure of the absorption spectra of KPb$_2$Br$_5$ thin films (I, II) is similar to the PbBr$_2$ spectrum and close in the position of the exciton bands, which is due to the similarity of the crystal structures of the compounds. Apparently, in thin films of KPb$_2$Br$_5$ (I, II), as in PbBr$_2$, excitons have a cationic character, which is indicated by the similarity of their spectra in structure and the close spectral position of the absorption bands. And also the close position of the long-wavelength exciton bands to the Pb$_2^+$ impurity band in KBr. In this case, exciton excitations are localized in the compound sublattice containing lead ions

Table 1: Spectral position of exciton bands E_m, band gap Eg, and exciton binding energy R_{ex} in KPb$_2$Br$_5$ (I, II) and PbBr$_2$.

Compound	E_{mA}, eV	E_{mC1}, eV	E_{mC2}, eV	E_g, eV	R_{ex}, eV
KPb$_2$Br$_5$(I) (thin film)	3.72	4.95		3.95	0.23
KPb$_2$Br$_5$(II) (thin film)	3.84	4.8	5.5	4.08	0.24
PbBr$_2$	3.98	4.86	5.69	4.23	0.25

In the cationic exciton model, the KPb$_2$Br$_5$ (I, II) spectrum, like the PbBr$_2$ spectrum, is determined by transitions in the Pb$_2^+$ ion. The long-wavelength shift of the absorption edge in the series of compounds PbBr$_2$, KPb$_2$Br$_5$(II), KPb$_2$Br$_5$(I) is due to a decrease in the ionicity of the compounds due to a decrease in the number of Br$^-$ ions surrounded by the Pb$^+$ ion. In PbBr$_2$, the coordination number of Br$^-$ ions is 9, in KPb$_2$Br$_5$ (II) is 8.5, in KPb$_2$Br$_5$ (I) is 7.

The temperature dependence of the spectral position $E_{mI,II}(T)$ and half-widths $\Gamma_{I,II}(T)$ in KPb$_2$Br$_5$ (I, II) is determined by the exciton-phonon interaction. An analysis of the temperature dependence of $\Gamma_{I,II}(T)$ established the two-dimensional 2D character of exciton excitations in KPb$_2$Br$_5$ (I, II).

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THE MEDIATION EFFECT OF CRITICAL THINKING SKILLS IN THE RELATIONSHIP BETWEEN LIFELONG LEARNING TENDENCY AND INFORMATION OPERATIONAL THINKING SKILL

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ABSTRACT

It is an inevitable fact that the continuous development of information and communication technologies necessitates lifelong learning. This situation entails also the acquisition of certain skills. The efficient use of 21st century skills of individuals facilitates the adaptation of individuals to the age they live in. In this study, it is aimed to examine the mediating effect of critical thinking skill on the relationship between lifelong learning disposition and computational thinking skills of students enrolled in the pedagogical formation certificate program, which is considered within the scope of lifelong learning in education faculties. The study was carried out in the relational screening model. Structural regression analysis was used to test the relationship between variables. Among the results of the research; that computational thinking skill has a direct and significant effect on critical thinking skill, and computational thinking skill has a direct effect on lifelong learning. It is seen that it also has an indirect effect on critical thinking skills. Accordingly, considering the effect of the computational thinking skill on lifelong learning in adapting to the age in which the individual lives, learning activities that will enable this skill to be acquired at an early age are recommended. Considering the effect of this skill on critical thinking, it reveals the issue of focusing on the depth and richness of the proposed learning activities.

Keywords: lifelong learning, critical thinking, computational thinking, 21st century skills

17.

THE EFFECTS of HEAVY METAL APPLICATIONS on ANTIOXIDANT DEFENCE ACTIVATION in BARLEY and WHEAT VARIETIES

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ABSTRACT

Heavy metals are known as agents for oxidative stress by formation of reactive oxygen species and accumulated on the earth [1]. This accumulation can than be transported via food chain to humans and causes some more serious health problems. As a multicellular higher organisms, plants are the first stop for heavy metal accumulation during this traffic. Therefore, plants are not only the vehicle of this transportation, but also another affected organisms together with animals and humans, due to their lowered self productivity. However, as antioxidant defence systems play a crucial defence against oxidative stress [2], these responses could be used as early biomarkers of heavy metal toxicity in plants. Based on this, we have examined whether antioxidant defence responses are reliable indicators for the toxicity of heavy metals cadmium and lead in different crop plants within this study. By using the seeds of *Hordeum vulgare* cv. Çıldır and *Triticum aestivum* cv. Gerek, different single and combined concentrations of $CdCl_2$ and $PbCl_2$ treatments were applied to investigate glutathione (GSH), protein contents and glutathione *S*-transferase (GST) activities in the roots and shoots of above mentioned varieties. Our results shown that, heavy metals had an effect on the tested parameters and variability in results reflect the differences in the rate of metabolism with regard to heavy metals between varieties. On the other hand, due to the high GSH and GST values observed in the studied plants, it should be mentioned that they are generally adaptable to stress conditions with regard to applied heavy metals in the study.

Keywords: Antioxidant mechanisms, barley, heavy metals, oxidative stress, wheat.

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18.

A METHOD FOR EXAMINING THE SEQUENCING MODELS OF ANTISYMMETRIC STRUCTURES

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ABSTRACT

Some Symmetric protein assemblies get important roles in many biochemical processes. This study for application of a general framework for modeling arbitrary symmetric systems. The various types of symmetries was described in this study. Because of the symmetric modeling capabilities was run simulations on symmetric systems.

19.

NONPARAMETRİC REGRESSİON WİTH ERROR-İN-VARİABLES MODEL BASED ON DİFFERENT KERNEL FUNCTİONS

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ABSTRACT

Estimation of error-invariable models is a specific problem in different fields such as medicine, economics, industry, and biostatistics. The main different between classical regression and error-in-variable models is that explanatory variables involve random error terms. Therefore, classical estimation methods that do not include the necessary adjustments for the contaminated explanatory variables give biased results. Regarding the error-in-variables, there are important studied in the literature such as Fan and Troung, (1993), Cook and Stefanski, (1994), Carroll, Maca, and Ruppert, (1999), Carroll and Hall, (2004) Delaigle and Meister, (2007) and Wang and Wang, (2011). In this paper, nonparametric regression with measurement error is considered and estimated by kernel smoothing estimator which is studied detailed by Wang and Wang (2011). This paper differs from their study with the idea of using two different kernel functions to compared them on quality of estimations. These functions are suitable for different error behaviors (see Fan ,1992). The goal of the paper is encouraged by a Monte Carlo simulation study and results are presented.

Keywords: Error in variables, kernel smoothing, nonparametric regression, kernel functions

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20.

DFT/TD-DFT ANALYSIS OF 2-CHLORO-7-METHYLQUINOLINE-3-CARBALDEHYDE USING COMPUTER COMPUTING METHOD

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ABSTRACT

Quinolines are essence of many natural products, drugs and were found synthetic compounds. They containing a quinoline ring is used various biological, and pharmaceutical activities, eg. anticancer, antibacterial, antifungal, antiplasmodial, antihistamine, antimalarial and antituberculosis. It is thought that the investigation and analysis of this molecule, which has such important functional areas, will make an important contribution to science and for that, in this study, 2-Chloro-7-Methylquinoline-3-Carbaldehyde (ClMQC) molecule, which is a quinoline derivative, was selected and analyzed. The stable structures of ClMQC molecule with minimum energy were investigated by density functional theory (DFT) together with B3LYP/6-311++G(d,p) method. It was seen that there are two different conformers (ClMQC-1, ClMQC-2) with minimum energy in the scanning made depending on the C—C—O—H dihedral angle. As a result of the B3LYP/6-311++G(d,p) method, the energy difference ($\Delta E+ZPV$) between the two conformers was calculated as 14.60 kJ mol^{-1}. Oscillator strength and excitation energies were analyzed by calculating the time-dependent DFT (TD-DFT). The energy differences between the excited energy levels are given in the graph. This was done by adding the ground state energies of both conformers. The energy corresponding to HOMO-LUMO was calculated to correspond to the $S_0 \rightarrow S_1$ transition for both ClMQC-1 and ClMQC-2. The excitation energy value was calculated as 4.02 eV for the most stable conformer and 4.06 eV for the other conformer.

Keywords: 2-Chloro-7-Methylquinoline-3-Carbaldehyde, DFT/TD-DFT, Excitation energies, HOMO-LUMO

21.

EFFECTS OF *Echinophora tenuifolia* ESSENTIAL OIL ON CYTOTOXIC AND APOPTOTIC MECHANISM IN LUNG AND MESOTHELIOMA CANCER CELL LINES

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ABSTRACT

Essential oils isolated from aromatic plants have different biological activities such as antimicrobial, antioxidant, antidiabetic, especially their anticarcinogenic potential. Today, in addition to the treatment of various diseases, it is also used in different industries such as food, cosmetics, biological control against ecological pests and biotechnological process development. *Echinophora tenuifolia* is locally called "tarhana grass" or "pickled grass" and its essential oil has been reported to have an antimicrobial effect against some microorganisms. The antimicrobial and antioxidant properties of the methanol extract of *E. tenuifoli* have been demonstrated and its antiproliferative effect in colorectal cancer, breast cancer and melanoma has been demonstrated in various studies. In this study; in order to explain the anti-carcinogenic activity of *Echinophora tenuifolia* essential oil, its effects on cytotoxicity, cell proliferation and apoptotic processes were investigated in lung and mesothelioma cancer cell lines. It was determined that *E. tenuifolia* essential oil has significant cytotoxic activity in lung cancer (A549) and mesothelioma cancer (SPC212) cell lines at all doses and incubation times. At 48 hours of incubation; the IC_{50} values of essential oil in A549 and SPC212 cells was determined as 0.05131% and 0.01760%, respectively. 10% increase in the number of cells in G_0/G_1 was observed in the A549 cell line treated with essential oil at an IC_{50} dose (0.05%) compared to the control. In the SPC212 cell line, an increase of 13.5% was determined in the number of cells in G_2/M. It was noted that *E. tenuifolia* essential oil decreased the cell cycle entry rate of lung cancer cells, but increased the number of cells in mitosis in mesothelioma cancer cells. Cell morphologies were examined with a fluorescent microscope, and it was observed that there was a significant increase in the number of early apoptotic, late apoptotic and necrotic cells in both cells treated with 0.05% essential oil. In the SPC212 cell line, it was determined that 0.05% essential oil caused a significant increase in the number of late apoptotic cells. It was observed that exposure to essential oil caused a dose-dependent significant increase in the late apoptotic/necrotic cell ratio of Annexin V-FITC & PI stained A549 cells, while a remarkable increase in the early apoptotic cell ratio in SPC212 cells. In conclusion, these findings show that *E. tenuifolia* essential oil triggers cytotoxic and apoptotic mechanisms, and This study shows that in order to elucidate the details of the anticarcinogenic mechanism of *E.Tenuifolia* essential oil, it should be supported by studies at the level of gene expression in lung and mesothelial cancers.

Keywords: *Echinophora tenuifolia*, essential oil, lung cancer, mesothelial cancer, apoptosis.

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ABSORPTION SPECTRA OF THIN FILMS
COMPOUNDS IN THE RbCl-CuCl SYSTEM

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Compounds of the RbCl-CuCl system have been studied by many authors. Basically, the search was conducted for the composition of the compound with the maximum ionic conductivity. Different compositions of the superionic compound were proposed - $RbCu_3Cl_4$ and $Rb_2Cu_3Cl_{10}$ [1], $Rb_3Cu_7Cl_{10}$ [2], $Rb_4Cu_6Cl_{15}$ [3]. However, according to the phase diagram, compounds $RbCu_2Cl_3$, $Rb_2Cu_3Cl_5$, and Rb_2CuCl_3 are formed in the RbCl - CuCl system [4]. $RbCu_2Cl_3$ compound has a high ionic conductivity $5 \cdot 10^{-3}$ $\Omega^{-1}cm^{-1}$ at room temperature. The absorption spectra of compounds of the RbCl-CuCl system have not been studied, although the crystal structure of many of the above compounds has been studied in detail.

The $(RbCl)_{1-x}(CuCl)_x$ thin films were prepared by evaporating in a vacuum a melt of a mixture of pure RbCl and CuCl powders of a given molar composition on quartz substrates heated to 100°C, followed by annealing the films for an hour at the same temperature. The study of the absorption spectra of thin films $(RbCl)_{1-x}(CuCl)_x$ showed that in the concentration range $0.5 \le x \le 0.66$ only two compounds with a stable spectrum are formed – $RbCu_2Cl_3$ and $Rb_2Cu_3Cl_5$ (Fig. 1). We failed to synthesize the compound Rb_2CuCl_3.
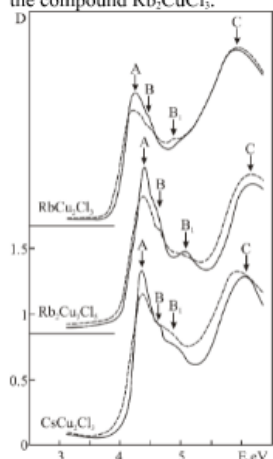

Fig. 1. Absorption spectra of $RbCu_2Cl_3$, $Rb_2Cu_3Cl_5$, and $CsCu_2Cl_3$ thin films at T = 90K (1) and 290K (2).

In the absorption spectra of thin films of $RbCu_2Cl_3$ and $Rb_2Cu_3Cl_5$ (Fig. 1), two narrow intense bands A and B, a weak band B_1 and a wide short-wavelength band C are observed. With increasing temperature, bands A and B shift to the long-wavelength region of the spectrum, broaden and weaken due to the exciton-phonon interaction (EPI), which indicates their exciton origin. The band C is not very sensitive to temperature and corresponds to interband transitions. The spectral positions of the absorption bands, the band gap E_g, the binding energy R_{ex}, and the exciton radius a_{ex} in $RbCu_2Cl_3$ and $Rb_2Cu_3Cl_5$ are given in Table 1.

In terms of the structure of the spectrum and the position of the main absorption bands, the spectra of thin films of $RbCu_2Cl_3$ and $Rb_2Cu_3Cl_5$ are close to the spectrum of the previously studied compound $CsCu_2Cl_3$ [5] (Fig. 1, Table 1). In $CsCu_2Cl_3$, excitons have a cationic character, are localized in the structural elements of the crystal lattice $CuCl_4^{3-}$ and their spectrum is interpreted proceeding from the state of the Cu^+ ion in a tetrahedral environment with Cl^- ions [5].

Table 1. Spectral position of absorption bands, bandgap width E_g, binding energy R_{ex} and exciton radius a_{ex} in compounds.

Compound	E_{mA}, eV	E_{mB}, eV	E_{mB1}, eV	E_{mC}, eV	R_{ex}, eV	E_g, eV	a_{ex}, Å
$RbCu_2Cl_3$	4.21	4.475	4.92	5.9	0.185	4.4	12.8
$Rb_2Cu_3Cl_5$	4.36	4.63	5.08	6.2	0.21	4.57	11.5
$CsCu_2Cl_3$	4.33	4.615	4.92	6.05			

The absorption spectra of compounds are linked to their crystal structure. Common to the crystal structures of the compounds $RbCu_2Cl_3$, $Rb_2Cu_3Cl_5$, and $CsCu_2Cl_3$ is the presence of structural elements $CuCl_4^{3-}$ in them [6, 7, 8]. Apparently, the absorption spectra of thin films of $RbCu_2Cl_3$ and $Rb_2Cu_3Cl_5$, like the spectrum of $CsCu_2Cl_3$, are due to transitions in the Cu^+ ion. Low-frequency excitations of the free Cu^+ ion correspond to the transition $^1S_0 \rightarrow {}^1D_2$. For the Cu^+ ion located in the center of the tetrahedron, $^1S_0$ transforms into $^1A_1$ and the 5-fold degenerate state $^1D_2$ splits into levels $^1T_2$ and ^1E. According to the selection rules for the local group T_d [5], the optical transition to a lower level $^1T_2$ is allowed, but the transition $^1A_1 \rightarrow {}^1E$ is prohibited. Since the Cu^+ ion is somewhat displaced from the center of the tetrahedron in the lattices of the studied compounds, the local group decreases to C_{2v}. Under the action of a weak axial intracrystalline field the prohibition on the transition $^1A_1 \rightarrow {}^1E$ is partially lifted, and the level $^1T_2$ is split into components. Correspondingly, the intense exciton bands A and B in the studied compounds, such as in $CsCu_2Cl_3$, correspond to the transition $^1A_1 \rightarrow {}^1T_2$, and the weak band B_1, to the transition $^1A_1 \rightarrow {}^1E$.

From the above, it follows that excitons in $RbCu_2Cl_3$ and $Rb_2Cu_3Cl_5$ are localized in the structural elements $CuCl_4^{3-}$ of the crystal lattice. With this localization, the top of the valence band in the studied compounds, such as in CuCl, is formed by the 3d states of the Cu^+ ion and the 3p states of the Cl^- ion, and the conduction band is formed by the 4s states of the Cu^+ ion.

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MOLYBDENUM DISULFIDE THIN FILM ELECTRICAL AND OPTOELECTRICAL CHARACTERIZATION UNDER DIFFERENT ATMOSPHERE

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ABSTRACT

Third generation solar cells, which are one of the renewable energy sources with the developing technology, are among the popular solar cells of recent years with their low costs and high efficiency. The most popular solar cell group in the third generation solar cell family are organo-halide hybrid solar cells. Among the advantages of organo-halide hybrid solar cells; There are features such as ease of production processes, controllability of the forbidden energy range and diversity. However, organo-halide hybrid solar cells suffering from degradation/metastability problems. In order to understand metastability problem, solar cells layers have to investigate layer by layer. In organo-halide hybrid solar cells, it is observed that two-dimensional materials and especially di-chalcogenides are used in the electron transfer layer and hole transfer layers. Because of their superior properties, scientists seem to focus on researching various versions of di-chalcogenides in the layered structures of photovoltaic materials. As a result of these researches, single layer molybdenum disulfide (MoS_2), which is a member of the di-chalcogenides group, has become a popular material in photovoltaic applications. MoS_2 is a promising, 2-dimensional semiconductor material for next generation optoelectronics applications with adjustable forbidden energy band gap.

In this study, MoS_2 thin films metastability behavior was investigated. MoS_2 thin films was produced by radio frequency (RF) sputtering method. MoS_2 was investigated by electrical and optoelectrical methods such as temperature-dependent dark conductivity, time-dependent dark conductivity and flux-dependent photoconductivity measurements. Morphological characterization was done by Scanning Electron Microscopy (SEM). MoS_2 thin films have been characterized under different atmospheric condition such as laboratory atmosphere, vacuum atmosphere, high purity oxygen atmosphere and under UV light..

Keywords: Di-chalcogenides, Molybdenum disulfide, Metastability, Temperature-dependent dark conductivity, Time-dependent dark conductivity, Flux-dependent photoconductivity, SEM.

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24.

DETERMINING THE CHALLENGES OF ACADEMICIANS DURING THE COVID-19 PROCESS: A CASE STUDY

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ABSTRACT

COVID-19 global epidemic has affected many sectors, especially in education all over the world. This situation undoubtedly brings about a 'new social transformation' that can affect not only classes, schools and universities, but also the world economy. Faculty members working in higher education institutions have also turned to using online environments for both academic and administrative processes. In this context, the aim of the research is to reveal the difficulties faced by academics during the COVID-19 pandemic process and how they overcame these difficulties. The data obtained within the scope of the research are collected through semi-structured interviews with academicians working in two state universities, unit managers of these universities (department head, dean, rector) and IT department heads who provide technical logistical support. The research will be carried out by following the qualitative paradigm. The data obtained will be subjected to content analysis; the difficulties encountered will be explained with themes, sub-themes and codes. Based on the results, good practice examples in our country and in the world will be examined and recommendations will be presented.

Keywords: COVID-19, higher education, technology, difficulty, academic

25.

CREATING AWARENESS REGARDING SOLAR ENERGY and ITS USE WITH PORTABLE SOLAR POWERED GENERATOR

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ABSTRACT

Increasing the share of renewable energy sources such as sun, wind, hydropower compared to energy sources which are not renewable such as fossil fuels, coal, nuclear energy in production of electricity is very important in terms of decreasing greenhouse gas emissions which cause global warming. Turkey targets to supply at least 30% of its energy production from renewable energy sources by 2023. In parallel with the activities of increasing the installed solar power capacity of ~49.9 MW in Mersin which is a city located in the south of Turkey, activities such as conferences, symposiums, festivals etc. which increase the knowledge and awareness level of the local community about solar energy and its use have been carried out. In order to contribute to the awareness regarding this matter, a portable solar powered generator of which its dimensions are ~520×400×110 mm has been built. Its mass is ~11 kg and it has 230 V AC and 1.1-10.2 V DC voltage output. The mechanical and electrical installation of the power generator is explained in this paper.

Keywords: Renewable energy, Public awareness, Solar generator, Semiconductor, Photovoltaics

CURRENT PERSPECTIVES ON MEDICINAL AND AROMATIC PLANTS IN FOOD AND HEALTH FIELD

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ABSTRACT

Plants, with the substances they contain, are of great importance in terms of nutrition as well as human and animal health. Although it has been known since ancient times that increasing the consumption of herbal products is beneficial for health, which special components were responsible for this beneficial effect was later started to be searched. In these days, the age of antibiotics, which has been on our agenda until recently, is about to end, it is seen that herbal control has gained more and more importance. In studies conducted in this context, new strains of microorganisms have shown resistance to drugs, and therefore, the use of drugs has decreased, and instead, the use of natural antimicrobials has begun. In this way, plants and essential oils obtained from plants gain importance as an alternative to synthetic preservatives again. Studies on plants have led to the discovery of new drugs used against various diseases. The discovery of secondary metabolites, which are bioactive compounds contained in plants, has triggered studies in this field. In many studies, it has been revealed that different secondary metabolites exhibit different biological activities such as antimicrobial, antiviral, anticancer and antioxidant. Based on their common usage areas, these plants are used as spices, herbal tea, food supplements and additives. The most important feature that an antimicrobial substance should have is that it has only a selective toxic and lethal effect. Conditions such as the structure and type of the plant, the concentration and the type of the test microorganism affect the antimicrobial activity. Temperature, pH, oils and proteins are important in observing the antimicrobial effects of phenolic compounds. Among the medicinal and aromatic plants, cinnamon (*Cinnamomum verum*), rosemary (*Rosmarinus officinalis*), fennel (*Foeniculum vulgare*) and thyme (*Thymus vulgaris*) essential oils have antimicrobial effects against Gram-positive and Gram-negative bacteria as well as yeast, molds and viruses. With the support of these studies, the use of limonene, carvacrol and thymol, which are the most preferred essential oil components in the food and pharmaceutical industry, has increased significantly. It has been determined that these oils are broadly effective against food spoilage pathogens including *Escherichia coli* O157:H7, *Salmonella*, *Shigella*, *Campylobacter*, *Listeria*, *Staphylococcus*, *Bacillus* and *Vibrio* genera. In addition, well-known medicinal and aromatic plant, in recent years, harem (*Peganum harmala L.*), tea tree (*Melaleuca alternifolia*) and propolis plants have started to attract attention. Endemic plants around 3700 in Turkey indicate that our country has the potential to provide many new alternatives to medicinal and aromatic plants. In this context, it is important to perform further investigate on the antibacterial, antiviral, anti-inflammatory, antiseptic, antioxidant, antiparasitic, antitoxic and insecticidal properties of medicinal and aromatic plants and essential oils, and to reveal their effectiveness on microorganisms that have gained resistance to antibiotics are gaining in the studies. For this purpose, although the importance of medicinal aromatic plants and essential oils obtained from these plants is sometimes overlooked, due to the richness of the molecules they contain and the antimicrobial effects they will create, today they are the strongest candidates that will serve the need in the field of food and health and provide an alternative use to chemical preservatives and additives.

Keywords: medicinal and aromatic plants, endemic plants, antimicrobials

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27.

VECTOR APPROACH FOR MODELING, RESEARCH AND OPTIMIZATION OF COMPLEX CHEMICAL SYSTEMS

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ABSTRACT

The main purpose of this project is a theoretical substantiation of a method that can predict all chemical reactions in different complex systems. Basic chemical laws, chemical thermodynamics and new vector approach to visualization of chemical compounds and interactions were used in the project. Methods: representation of chemical objects in the form of multidimensional vectors taking into account the elemental and energy (thermodynamic) coordinates, use of methods of chemical thermodynamics for calculations of the basic thermodynamic indicators of reactions, use of mathematical methods to determine the sequences of chemical reactions. The result of the project is an algorithm that can help scientists predict chemical reactions between different substances and calculate their possibility and thermodynamics parameters. In addition, an example of using this method was given. System of interaction that consists of methane, oxygen, carbon (II) oxide, carbon (IV) oxide, carbon, hydrogen and water was researched. The results of calculations are interesting, because they showed many new unknown interactions in this system, but calculations of possibility showed that well-known reactions are the most possible. Hence, this method can predict chemical interactions and calculate their possibility. Test system showed that the method gives real results, but also it complements them. This project has big prospects, because it can help scientists create new sources of energy, invite new synthesis routes of different useful materials and research chemical interactions in nature that can help us decrease harmful influence on the environment.

Keywords: chemical interactions, vectors, thermodynamics

28.

SYNTHESIS AND PROPERTIES OF CYCLOPROPANE-CONTAINING OPTICALLY TRANSPARENT COPOLYMER

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The efficiency of use of the polymer optical meanshas been based on reduction of the cost for materials and their processing. The optical copolymer of styrene with acrylonitrile (SAN) has good technological and exploitation qualities [1]. Polystyrene has a number of disadvantages: brittleness, low adhesive strength, low surface hardness, low atmospheric and chemical resistance. An introduction of methoxycarbonylcyclopropyl fragment into polystyrene chain favors the improvement of some indices.

With the aim of preparation of optically transparent copolymer of styrene the copolymerization of 2-methoxycarbonylcyclopropyl styrene (MCCPS) with acrylonitrile (AN) has been carried out. The preparation of copolymer on the basis of these monomers is carried out by radical copolymerization in mass and in benzene solution in the presence of dinitrileazodiisobutyric acid. MCCPS has been obtained by interaction of p-divinylbenzene with methyldiazoacetate in the presence of the catalyst of anhydrous $CuSO_4$. Yield − 93 %.

The synthesized copolymer is dissolved in the chlorinated hydrocarbons, acetone, benzene, etc. The polymerization of MCCPS+AN proceeds smoothly until the copolymer is formed with 85% yield. MCCPS+AH has higher optical indices than copolymer PS+AN.

On the basis of elemental analysis and spectral data the compositions and structures of the synthesized copolymers have been established. The results of study of the copolymerization process of these monomers showed that the reaction proceeds on double bonds of the comonomers without touching of cyclopropane ring, ether and nitrile group.

The chemical structure of the copolymer is expressed by the following formula:
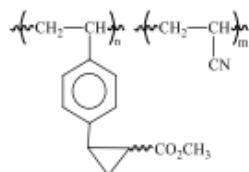
The copolymerization constant valuesof MCCPS (M_1) and AN (M_2) have been determined by Fainemann-Ross method and the factors of activity (Q_1=0.509 e_1=-0.176) have been calculated on scheme Q-$e$of Alfrey-Price. The found values r_1=0.60 and r_2=0.25 (r_1>r_2) evidence that M_1 is more active monomer than M_2 at radical copolymerization. In all cases of conversion of the comonomers, the soluble copolymers are obtained, i.e., at M_1 and M_2 copolymerization the chain transfer processesto polymer or structuring don't occur practically.

Forcreation of a copolymer with the highest light transmission, the ratio of MCCPS, equal to 75:25 (AN in the initial monomer mixture) is optimal. At a higher AN content, due to the formation of chromophore conjugated bonds ($C\equiv N$) aweak painting of the copolymer occurs. The obtained copolymer on the basis of monomers of MCCPS+AH shows higher optical transparency (n_D^{20}=1.5830) than the copolymer of polystyrene with acrylonitrile (1.568-1.570).

Most likely, this has been connected with the availability of a cyclopropane ring and ester fragment in the macromolecule links.

It has been revealed that a light transmission of the obtained copolymer is 82%. A distinctive feature of the obtained copolymer is its high physical-mechanical and adhesive properties.

Thus, as a result of the carried out investigations, an optical material exhibitingthe high optical transparency and light transmission has been obtained.

The copolymer of 2-methoxycarbonylparacyclopropyl styrene with acrylonitrile can be used as an optically transparent material in optotechnology, as well as in the manufacture of optical details for integral microscheme.

Key words: 2-methoxycarbonylparacyclopropyl, acrylonitrile, *copolymerization, optically transparent materials*

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29.

INVESTIGATION OF THE ANTILISTERIAL ACTIVITY OF LACTIC ACID BACTERIA WITH PHYSIOLOGICAL AND CHROMATOGRAPHIC WAY

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ABSTRACT

Lactic acid bacteria (LAB) can show antagonistic effects on pathogenic microorganisms through their metabolites. LAB has the potential to be a protective culture in the inhibition of important pathogens such as *Listeria* due to the bacteriocins they produce. In the current study, the inhibitory effect of LAB isolated from fermented food samples on the pathogen *Listeria monocytogenes* was investigated. In the study, the physically inhibitory effect was investigated by agar spot and well diffusion tests, supernatant samples of LAB were examined by HPLC and chromatogram images of the isolates were evaluated. It was found that 5 isolates (71, 91, 223, 9C, F2) included in the study and *Pediococcus pentosaceus* ATCC 43201 strain used as a reference strain had an inhibition effect on *Listeria monocytogenes* ATCC 7644 with the zone diameter ranged between 11.0 – 29.0 mm in the trial performed using direct active culture; In the experiment carried out with the supernatants of the isolates, it was determined that the LAB had an inhibitory effect on *Listeria monocytogenes* in the range of 9.0 – 20.0 mm. All of the strains were Gram positive tetracocci in microscopic examination and exhibited catalase negative features. It was determined that the strains whose genetic identification tests were carried out with universal primers over the 16S rDNA region were included in the lactic acid bacteria group such as *Lactilactobacillus*, *Lactiplantibacillus*, *Pediococcus*. The Agilent 1100 HPLC system was used during the HPLC analysis of the strains with antilisterial effect at the supernatant level, and analyzes were carried out with a Kinetex C18 protective column and a Kinetex Evo C18 (150x4.6, 5um) analytical column with a flow rate of 1mL/min. 220 nm was chosen as the detection wavelength. When the chromatograms obtained are examined, it is noteworthy that the peak obtained around the 6th minute is similar to the peak region of pediocin bacteriocin in previous studies. When the peak areas of the isolates in this region are examined; The peak areas of the F2 and 9C determined as 1114 and 1132 which were higher than the peak areas of other isolates. These results also revealed that the antilisterial activities of LAB isolated from fermented foods are likely due to lactate or other metabolites as well as pediocin-like bacteriocin production.

Keywords: Lactic acid bacteria, antilisterial activity, chromatography.

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30.

SKIN PIXEL RECOGNITION BASED ON NEIGHBORHOOD CORRELATION AND MOMENT FEATURES

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ABSTRACT

In this study, a new feature extraction method is proposed for the recognition of human skin pixels from color images. The variability in picture quality, the different skin colors of different human races, the existence of surfaces similar to human skin in ambient light, color and texture make it difficult to recognize the pixels of human skin in color pictures. In order to obtain a recognition as independent as possible from these challenging conditions, the relations of the pixels to be recognized with their neighboring pixels and the moment statistics of their neighborhood are used as distinguishing features. The obtained feature vectors were used in the k-Nearest Neighbors classification algorithm, and a significant skin recognition success was achieved.

Keywords: Feature extraction, k-nearest neighbors, Skin segmentation, Moment statistics, Correlation

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31.

COMPARISON OF DEEP LEARNING WITH MACHINE LEARNING ON SKIN SEGMENTATION

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ABSTRACT

In this study, a skin segmentation study is investigated with deep learning methods. The skin segmentation problem is chosen as a case study. The main reason for this is that there are numerous studies on this subject and the abundance of available data sets. In addition, images containing skin pixels contain multiple attributes. That's why human images are very suitable for comparative studies on machine learning and deep learning. In the first stage of this study, skin segmentation will be done by using RGB space, which contains deep information as an attribute in machine learning. At the same time, to show the success of the deep learning algorithm, the effect of deep learning will be tested by converting images to grayscale, and success differences will be given.

Keywords: Skin segmentation, Deep learning, Machine learning, Semantic segmentation

32.

DEVELOPING THE GENERALIZED APPROACHES TO MATHEMATICAL MODELLING OF PROCESSES IN STEAM GENERATORS' WATER LEVEL AUTOMATED CONTROL SYSTEMS

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ABSTRACT

The generalized approaches to mathematical modelling of processes in the steam generators' water level automation systems are developed. Due to the complicated nature of the steam generators as the automation object, the main principle of the proposed approaches is in possibility of having the most simple mathematical model which can be complicated in needed by the more detail considering of the processes as well as by taking into account the more kinds of existed processes. In agreement with the formulated principle, it is developed the basic simplest mathematical model representing the water level changing in the steam generators in depending with the generated steam and feed water consumptions as well as the design of the steam generator. This basic model is represented by the first order ordinary differential equation with the variable coefficients in general case and with the initial condition for the water level's height. It is shown that this simple model allows to represent in generalized view the mathematical models for vertical and horizontal types of steam generators used in modern nuclear power plants, so that the principal difference between these stem generators' types is in the possible evaporation mirror area which is the multiplier near the water level height time derivative in the deferential equation involved in the proposed mathematical model. Due to this model it is shown also that the mathematical model of water level changes in vertical types steam generators can be really linear initially in some case, but this model for horizontal type steam generators is initially nonlinear in principle due to the correspondent geometries relations inherent for these types of the steam generators. It is considered the linearization of the proposed mathematical model for the vertical and horizontal types of the steam generators widely used in the modern nuclear power plants, and due to this linearization it is shown that the horizontal type steam generators are more suitable for automated water level control because of the possible greater of the evaporation mirror area, which make smaller the water level changing under the given difference between consumptions of the generated steam and the feed water. To have the more complicated mathematical model of steam generators this basic simplest model must be complemented by other relations defining the generated steam amount and the feed water consumptions depending on supplied feed water's and heat carrier's temperatures on the basis of the heat and mass transfer processes, and taking into account influencing from the water level's automation control systems. In general, this complementary relations will be defined by means both partial and ordinary differential equations with the required boundary and initial conditions, and due to this the mathematical model of the water level changes in the steam generator will be significantly complicated. At the same time, to have the more understood mathematical model of the water level changes required for primary designing of the automated system it is possible to use the proposed simple mathematical model without these complicated complements. It is shown one possible approach to have such understood models for primary designing the water level automation systems and especially for defining the automatic governors' parameters of the feed water consumption providing the required water level height in the steam generators during their operational time. In this shown approach it is sufficiently to define the generated steam consumptions as the summation of the constant representing the average expected value and of some random time function representing the fluctuations naturally existing during the operation time. At the same time, the consumption of the feed water can be defined as the summation of the constant average value corresponded to the average expected value of the generated steam consumption and of some variable consumption defining in agreement with the governor's law accepted to the feed water. The mathematical models of water level changes in steam generators with the different governors' types for feed water consumptions including with the proportional, differential, integral as well as PI- and PID-governors, are considered using this simplified approach. Considering all these mathematical models allowed showing the effects of involving the different typical components to the feed water consumption's automatic governor on the steam generator as the automation object. It is shown, involving the differential components to the feed water consumption's automatic governor is equivalent to correspondent changing the evaporation mirror area, so it is theoretically possible to change the evaporation mirror area without changing the geometry of the steam generator's housing, and it is especially interesting for the vertical type steam generators which cannot provide such big evaporation mirror area like the horizontal type steam generators due to the understandable geometries specifics. It is shown also, involving the integral components to the feed water consumption's automatic governor leads to increasing on unit of the order of the differential equation defining

the water level changes in steam generators, so in this case the mathematical model of the water level's height in steam generators will be represented by the second order ordinary differential equation with the required initial conditions. Only due to the integral law component of the feed water consumption's automatic governor it is possible to provide the required water level's height in the case of inconsistency between the constant values defining the average expected steam generating and actually accepted feed water consumption. All the theoretical results are clearly illustrated by corresponding computer simulations, which are made by using the Scilab free open source software for the scientific and engineering computing. Computer simulations has shown that only PI- and PID-governors for the feed water automatic consumption can practically provide the required water level's height in the steam generators.

Keywords: Mathematical Modelling; Automation Control; Water Level; Steam Generator.

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33.

THE DETERMINATION OF STRESSES AND DEFECTS IN GaAs THIN FILMS WITH HRXRD

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ABSTRACT

Device-quality GaAs thin films have been grown on miscut Ge-on-Si substrates by different methods. The metal-organic chemical vapor deposition is the wekll known method. A method of two-step epitaxy of GaAs is performed to achieve a high-quality top-layer. The initial thin buffer layer at 360 °C is critical for the suppression of anti-phase boundaries and threading dislocations. The etch pit density of GaAs epilayers by KOH etching could reach 2.25×10^5 cm^{-2} and high-quality GaAs top epilayers are observed by transmission electron microscopy. The band-to-band photoluminescence property of GaAs epilayers on different substrates is also investigated and negative band shifts of several to tens of meVs are found because of tensile strains in the GaAs epilayers. To achieve a smooth surface, a polishing process is performed, followed by a second epitaxy of GaAs. The root-mean-square roughness of the GaAs surface could be less than 1 nm, which is comparable with that of homo-epitaxial GaAs.

34.

STUDY OF FULLERENE, GRAPHENE AND TAUNIT BASED NANOSTRUCTURAL INHIBITORS AGAINST SALT DEPOSITION PROCESS

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ABSTRACT

The presented work is dedicated to the development and study of nanostructured inhibitors to prevent the problem of salt deposition in oil production processes. Thus, the protective effect of nanostructured inhibitors based on fullerene, graphene and taunit nanoparticles against salinity has been studied and it has been determined to be very effective in overcoming this problem.

It is known that the salt deposition process is observed when the density of salts or ions forming deposits in produced waters exceeds the ion density limit corresponding to the equilibrium state. The formation of water-insoluble deposits occurs in consequence of mixing various types of produced water, evaporation of water, excessive saturation of water as a result of changes in thermobaric conditions in the well or deep well pump. This, in turn, leads to a reduction of time between overhauls, complication of the operation process, corrosion of equipment, and a decrease of oil production [1-4]. These types of problems are more common during the operation of flooded wells that are in the closing phase of development. The fact that the vast majority of oil fields are in the closing phase of development highlights the urgency of the problem.

Various methods are used to prevent salt deposition in oil and gas production equipment and in the wellbore zone [5, 6]. However, the methods used did not completely solve the problem in the oil industry, which necessitated the use of a new innovative method - nanotechnology [7].

A new nanostructured salt deposition inhibitor has been developed by adding nanoparticles to the compositions of nonionic and ionic surfactants. As a non-ionic surfactant can be used linear Laprol 4202 polyester resin or demulsifier containing linear polyester resins obtained from the copolymerization of ethylene oxide and propylene oxide - Alkan DE-202 B. As an ionic surfactant was used Sulphanol reagent.

The ionic and nonionic surfactants used in the treatment of the inhibitor prevent agglomeration by isolating the surface of formed salt crystals, and small salt crystals are removed from the system by fluid flow. The protective effect of ionic and nonionic surfactants, observed in different proportions from salt deposition, is higher than the additive amount of indicators in this ratio, in other words, the combined use of these reagents provides a synergistic effect.

Fullerene [8], graphene [9] and taunit [10] were used as nanoparticles in the development of the nanostructured inhibitor. The protective effect against salinity at 50 and 100 g / t was studied by gravimetric method with the addition of 0.001% of fullerene, graphene and taunit nanoparticles separately to the composition of Sulphanol and Alkan DE-202 B reagents in a 3: 1 mass ratio. Studies have shown that the protective effect of fullerene, graphene and taunit-based compounds against salt deposition is more than about 10% compared to non-nanoparticle formulations. An analysis of preliminary results shows that the protective effect against salt deposition of compounds based on graphene and taunit is approximately the same, while in general the protective effect against salt deposition of compounds based on fullerene is higher than that of others.

To ensure uniform distribution and stability of nanoparticles in working solutions, sodium carboxymethyl cellulose (Na-CMC) was added to the composition in an amount of 0.4-1.0%. The pH of the 2% water solution of the reagent is 6.5-11.0. The dynamic viscosity of a 2% reagent solution with a polymerization rate of 350 at a temperature of 25 ° C is 40.0 MPa · s.

In addition, inhibited hydrochloric acid is added to the nanostructed inhibitor to prevent the sedimentation of carbonate and hydrocarbonate salts. Thus, 20-23% hydrochloric acid used contains 0.5% inhibitor.

Numerous experiments were conducted to determine the optimal composition of nanostructured fullerene, graphene, and taunit based inhibitors. Therefore, the protective effect of inhibitors against salt deposition at a rate of 100 g / t was studied in experiments.

Experiments have shown that Laprol 4202 and Alkan DE-202 B have almost the same efficiency. When the amount of Na-CMC exceeds the range of $0.4 \div 1.0\%$, it leads to excessive reagent consumption and high viscosity of the working solution. High efficiency is observed during the development of a new nanostructured inhibitor in the amount of 0.05-0.2% of inhibited hydrochloric acid.

The protective effect against salt deposition of fullerene, graphene and taunit nanoparticles at concentrations of 0.0005 and 0.001% is approximately the same, but at a concentration of 0.0005%, the protection effect gets a high price with a slight difference.

Thus, the optimal composition of the nanostructured inhibitor against salt deposition is 0.1% non-ionic surfactant (Laprol 4202 or Alkan DE-202 B), 0.3% ionic surfactant (Sulphanol), 0.4-1.0% Na-CMC, 0.05-0.2% inhibited hydrochloric acid, 0.0005-0.001% fullerene or graphene or taunit, and the rest is water.

An analysis of the results shows that the presence of nanoparticles in the reagent increases the activity of the system in all cases. Among these nanostructured inhibitors, the fullerene-containing inhibitor has a higher protective effect (91.6%) than others.

It should be noted that the use of nanoparticles in the composition increases the effect of the composition, as well as, has a synergistic effect with surfactants in preventing from salt deposition. It is known that most atoms in nanoparticles are located on the surface, and their number on the surface increases due to decrease in particle size. As a result, an increase in surface energy is observed. Accordingly, the role of surface atoms in the formation of the system energy increases. This increases the activity of the nanoparticles and their ability to react, which, in turn, increases the effectiveness of the inhibitor against salt deposition.

In summary, a nanostructured inhibitor with an optimal composition and a high protective effect against salt deposition in oil and gas production and transportation system was developed, and its high efficiency was confirmed by investigations.

Keywords: nanoparticle, fullerene, graphene, taunit, salt deposition

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Detailing of the main directions and components for defining models for assessing the quality of knowledge

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ABSTRACT

The subject of research in the article is the perception, processing and transmission of data as one of the components used in various knowledge processing systems. **Objective**: to analyze such systems aimed at obtaining data, their dissemination, forming a knowledge base and conducting various assessments to determine the degree of data transformation into knowledge, the formation of adequate and simple queries to relevant knowledge bases in order to develop the necessary competence, knowledge dissemination and mastering (loss) of such knowledge during a certain period of time (phase of mastering or formation of knowledge). **The following tasks are solved in the article:** development of a management system from the point of view of knowledge formation in the educational process, which is reduced to a stable definition of input and output information flows, which are influenced by the "subject of knowledge" and "recipient of knowledge". These managerial influences that determine, in general, the detailing of the main directions and components for the definition of models for management in knowledge processing systems. The criterion for such management is the assessment of the level of knowledge by the "recipient of knowledge". Relevant disclosure of individual elements of content management of knowledge processing from the point of view of knowledge formation in the educational process. The key issues in this aspect are both the definition of a general model for the formation of knowledge (on the provision and development of relevant knowledge in general), and, in accordance with the selection and definition of a model, a method for assessing the level of such knowledge. At the same time, the formation of management influences from the point of view of the "recipient of knowledge" consists of: in mastering the knowledge provided by the "subject of knowledge", in determining and clarifying the need to adjust the input stream of information, as a function of the components of the output stream [1].

The following results were obtained: analyzed the relevance of the scientific problem, the essence of which is that the results of the analysis in the educational process can be divided into separate levels of so-called "subjects of knowledge", such levels can be formed according to individual educational programs, courses, areas, etc. At the same time, it is necessary to respect the formulation of the various models with the reasons for the communication system with subsystems. The same subsystem is used to formulate knowledge, how to use information. Until then, the food supply is by the initial, since such a subsystem is tied to the computerization and the manifestation of the possibilities to form knowledge for additional remote access. The subsystem of the commune between the subsystem of the management of the operations of knowledge is given one of the key meanings, since the subsystem is not deprived of the first form of knowledge, but the permission to use the necessary form of the tool. As a matter of fact, it's about the deforming of the forms and the formulation of knowledge. The price is tied to this, but it also allows the conversion of information technology to form knowledge. The possibility of introducing remote access systems for the dissemination and provision of knowledge to various subjects, they are mastered. Therefore, it is common to form and master knowledge without mediocre communication between those who provide such knowledge and those who receive this knowledge. Therefore, this imposes its own requirements on the assessment of knowledge in distance learning systems [2-3].

Conclusions: The developed system shows that knowledge forms the input stream, and inverse queries and responses form the output stream of the general formation of knowledge in the educational process. Consequently, the provision and development of relevant knowledge as a whole determines the general formation of knowledge, which is subject to the appropriate management influences and is one of the components of the knowledge processing management process. Thus "Subject of knowledge" according to a certain educational program, which conventionally defines the first level of knowledge processing management; In the future, such programs can be considered in terms of individual credits for certain phases of knowledge acquisition (for example, these are individual semesters), which will conditionally determine the second level of "subjects of knowledge" in the management of knowledge processing; "Subject of knowledge", which in general defines, coordinates and forms the management of knowledge processing, where on the example of the educational process it can be considered as a function of the dean's office.

Keywords: assessment of the quality of knowledge, knowledge formation, knowledge processing, subject of knowledge, recipient of knowledge.

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36.

FILTERING OF INTERFERENCE OF INHOMOGENEOUS REGULAR STRUCTURE IN THERMAL NON-DESTRUCTIVE CONTROL OF CELLULAR STRUCTURES

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ABSTRACT

Honeycomb constructions are the most widely used ma-terials in contemporary aviation and space technology. They are the basis for the housings of practically all products of this sector, where reliability of all parts should meet the in-creased requirements. Special attention is paid to the quality of composite materials and to the absence of defects such as the places of adhesion failure (exfoliation) between the skin and the honeycomb filler.Therefore, increase in the efficiency and reliability of thermal flaw detection, based on in-depth analysis of the processes of detecting defects and development of the prin-ciples of optimization of both the procedure of control and subsequent processing of the obtained information, is an important and relevant task.

Keywords: honeycomb structure, thermal flaw detection, emissivity.

Cellular structures are one of the most common structural materials in aviation, space technology and other industries, where the reliability of components is subject to increased requirements.

In order to improve the quality of the investigated materials, the present studies search for ways to suppress interference that reduces the accuracy of quality control by creating algorithms for processing thermograms obtained as a result of thermal non-destructive testing.[1]

To achieve the goal, a theoretical-experimental approach was used, combining the construction and analysis of a thermophysical model of a cellular structure [2] and the experiment on real samples with defects.

One of the most image affecting interference is the interference caused by the internal regular pattern of the control sample. It does not depend on the state (defect) of the sample and is present in all products of complex internal structure.

In this work, the second method was used much less universal, but in this case more efficient. The regular structure results in an alternating change in the thermal resistance of the RTs for which the condition $F=a/b=const$ is met, which leads to the appearance of temperature contrasts on its surface reaching values (as shown by the experiment) 2,1˚C, which is comparable to a useful signal ΔT caused by the presence of a defect. However, analysis of the experimental data obtained showed that these contrasts differ from the useful signal in space-time dependence $\Delta T(\tau, x)$. This fact formed the basis of the proposed method of suppressing this interference by computer processing of thermograms using dependence $\partial T(x) / \partial x$.[3]

The essence of this method is to calculate a two-dimensional matrix, the elements of which are the corresponding partial time derivatives.

By filtering the obtained image using the obtained dependencies, the final appearance of the thermogram is obtained. Comparison of this thermogram with the initial one confirms the fact that the reliability of detection of defects using the proposed method has increased significantly, after processing the detection of defects has increased by 1.3 times. [1.3]

This creates all the prerequisites for moving from a visual method of identifying defects to an automated method based on the corresponding technical means in production conditions.

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Is GSH-CONJUGATION ACTIVITY SPECIFIC to SER-GSTs or NOT?

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ABSTRACT

Detoxification is the process of removing toxic substances and is essential for the survival of living organisms. Toxic substances could be endogenous and/or exogenous are generally referred as xenobiotics. However, as living organisms are inevitably exposed to many xenobiotics during their life, they have managed to detoxify themselves from harmful effects of xenobiotics through highly evolved complex enzymatic detoxification systems. In cell, enzymatic detoxification takes place step by step through Phase I to III. The glutathione *S*-transferases (GSTs) are a superfamily of enzymes whose role in Phase II detoxification reactions is crucial. Conjugation of glutathione (GSH) to many electrophilic compounds by GSTs, forming highly hydrophilic compounds that are readily eliminated from the cell. GSTs have been found in all living species [1]. A total of 36 GST classes have been recognized from plants, animals, fungi, and bacteria. According to phylogenetic analysis, 14 of these classes belong to plants [2]. Of those 14 GST classes, some of them are specific in their GSH-conjugating activity which depends on the existing catalytic residue. However, since cytosolic plant GSTs have begun to show dual activity profiles regarding to the recent literature, they need to be discussed with particular attention to their origins, oligomerization states, active site residues and their altered functions in this context.

Keywords: Active site residue, detoxification, glutathione *S*-transferase (GST), GSH-conjugation, plants.

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38.

INVESTIGATION OF DOGECOIN PRICE MOVEMENTS: A GSADF ANALYSIS

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ABSTRACT

Today, people provide information through different channels. The information channels used can affect the decision-making mechanism due to asymmetric information or different tendencies. Especially in recent years, people use social media to reach information quickly. Therefore, notifications made on social media reveal economic results. Cryptocurrencies are digital currencies intended to be used as currency. Unlike their traditional financial rivals, cryptocurrencies are not backed by a central bank or authority.

The success of cryptocurrencies depends on its infrastructure, the block chain. Especially in recent years, the popularity of cryptocurrencies has increased. After the popularization of cryptocurrencies, digital currencies are discussed more especially in the media. In addition to the positive features, negative features are also included in the media. There are concerns about the misuse of cryptocurrencies. It is mentioned that cryptocurrencies provide financing for criminal organizations and are used in money laundering. Therefore, notifications made on social media reveal economic results. In addition to these, it is reported that cryptocurrencies are used for tax evasion.

The lack of intrinsic value of cryptocurrencies puts investors in trouble in terms of investment and price determination. Cryptocurrencies, which are digital currencies, have many digital price determinants such as social media. Two different objectives were determined in this study. The first is the detection of the presence of bubbles in Dodgecoin prices. The second is the examination of the relationship between balloons and tweeter notifications. In the study, Dodgecoin prices between May 2020 and May 2021 are examined with the GSADF test. From May 2020 until May 2021, 10 different price bubbles are observed. Some balloons can be associated with tweets by Elon Musk. However, the biggest bubble observed, the April 2021 price bubble, is due to a different reason.

Keywords: Dodgecoin, Tweets, GSADF

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39.

TERRORIST USE OF CYBER TECHNOLOGY

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ABSTRACT

The threat posed by terrorist use of cyber technology and cyber-terrorism have been of great concern to politicians, decision makers, security officials. This paper studies terrorist use of cyber technology and cyber terrorism along with history of cyber-terrorism. Moreover some concepts such as between cyber-crime, cyber-terrorism, cyber-warfare and "hactivism" will be analysed. Furthermore, the challenges faced by international organisations in tackling cyber terrorism will be discussed; measures introduced in some countries to address cyber terrorism treats are presented as well as discussions on the present and the future treat posed by cyber terrorism and terrorist use of cyber technology.

Keywords: Cyber Terrorism, Cyber Space, Critical Infrastructure, Cyber Attacks

40.

THE log(ft) VALUES IN SPHERICAL AND DEFORMED NUCLEI FOR SOME ODD-A GERMANIUM ISOTOPES

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Abstract: The log(ft) values of the allowed $\beta\pm$ decay between odd-A spherical and deformed nuclei are studied for germanium isotopes in this paper. The Pyatov Method (PM) and the Schematic Model (SM)) are used to the GT strength distributions, including the schematic residual spin-isospin interaction between nucleons in the particle-hole and particle-particle channels. Particle-hole and particle-particle interaction parameters are calculated respectively with $\mathcal{X}_{ph}^{GT} = 5.2\, A^{0.7}$ MeV and $\mathcal{X}_{pp}^{GT} = 0.58\, A^{0.7}$ MeV. Deformed Woods-Saxon potential is used in calculations of single-particle energies and wave functions. The results are also compared with previous theoretical calculations and experiment values wherever available.

Keywords: Pyatov Method, Schematic Model, Log(ft), Beta decay, Gamow-Teller Transitions.

41.

AN APPLICATION OF CLIFFORD ALGEBRA ON THE SEMI-SYMMETRICAL ARCHIMEDEAN SOLID ICOSIDODECAHEDRON

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Abstract: Mathematical systems are needed to explain and prove the concepts in physics. This could be in algebra. Various algebras have been introduced and discussed by physicists and mathematicians throughout history. In this work, one of them, Clifford algebra, or in other words geometric algebra, is discussed and its application in physics is examined. Today, Clifford algebra provides convenience in many fields. It is frequently used in application areas such as robotics, quantum mechanics, and crystallography. After presenting Clifford algebra and quaternions, symmetry operations with Clifford algebra and quaternions are defined in molecular physics. Here, these symmetry operations are also applied to the seventh Archimedean solid, the icosidodecahedron. Also, the vertices of this solid presented in Cartesian coordinates are calculated.

Keywords: Clifford Algebra, Platonic Solids, Semi-symmetric molecules, Archimedean solids, Icosidodecahedron.