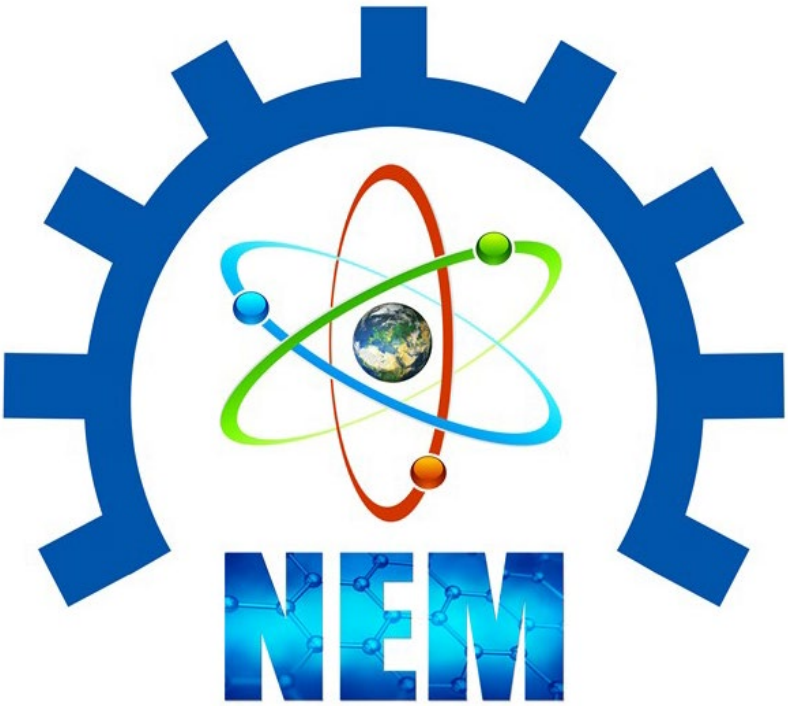
ISBN: 978-605-68918-2-3

NEM 2019
ABSTRACT BOOK



International Natural Science, Engineering and Material Technologies Conference

(NEM 2019)

Sep 9-10, 2019 - İstanbul / TURKEY

FOREWORD

It is a pleasure for us to offer you this Book of Abstract for the International Natural Science, Engineering and Material Technologies Conference (NEM2019). Our goal was to create a platform that introduces the newest results on internationally recognized experts to local students and colleagues and simultaneously displays relevant Turkish achievements to the world. The positive feedback of the community encouraged us to proceed and transform a single event into a conference series. Now, NEM 2019 is honored by the presence of over 152 colleagues from various countries. We stayed true to the original NEM 2019 concept and accepted contributions from all fields of materials science and technology to promote multidisciplinary discussions. The focal points of the conference emerged spontaneously from the submitted abstracts: energy applications, advanced materials, electronic and optoelectronic devices, organic electronic materials, chemistry, physics, environmental science, applied and engineering science, computer simulation of organic structures, biomedical applications and advanced characterization techniques of nanostructured materials. Further fields of interest include e.g. new advanced and functional materials, advanced-functional composites, biomaterials, smart materials, dielectric materials, optical materials, magnetic materials, organic semiconductors, inorganic semiconductors, electronic materials, graphene, and more.

Therefore, we hope that getting first-hand access to so many new results, establishing new connections and enjoying the İstanbul / TURKEY ambience will make you feel that your resources were spent well in NEM 2019.

Our warmest thanks go to all invited speakers, authors, and contributors of NEM 2019 for accepting our invitation, visiting İstanbul and using NEM 2019 as a medium for communicating your research results.

We hope that you will enjoy the conference and look forward to meeting you again in one of the forthcoming **NEM 2020** event.

Best regards,
Chairmen's of Conference

Asst. Prof. Burhan COŞKUN

Prof. Dr. Fahrettin YAKUPHANOĞLU

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Editor:
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Published, September-2019

nem2019.klu.edu.tr
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International Natural Science, Engineering and Material Technologies Conference
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INTERNATIONAL NATURAL SCIENCE, ENGINEERING AND MATERIAL TECHNOLOGIES CONFERENCE

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PROGRAMME
9 SEPTEMBER 2019 (MONDAY)
HALL 1

09:00-18:00	Registration (Tüyap Palas Otel, Floor 1)
11:00	**Opening Ceremony**
11:10-12:10	**1st session (Oral Talks) Chair: F. Yakuphanoğlu**
11:10-11:40	**Invited Talk-1: N. S. Sarıçiftçi "ORGANIC AND BIO-ORGANIC ELECTRONIC DEVICES"**
11:40-12:10	**Invited Talk-2: Y. Azizian "QUANTIFICATION OF SELF-HEALING CHARACTERISTICS OF NONDIFFRACTIVE STRUCTURED BEAMS"**
12:10-13:30	**Lunch**
13:30-15:30	**2nd session (Oral Talks) Chair: M.Kuş**
13:30-14:00	**Invited Talk-3: S. Güneş "PAST, PRESENT AND FUTURE OF ORGANIC SOLAR CELLS"**
14:00-14:15	F. Gökçe, M. A. Sarıgöl: "ON ABSOLUTE LUCAS SERİES SPACES"
14:15-14:30	A. Dilaver, A. Özata, A. Bideci, Ö. Sallı Bideci: "EXAMINATION OF FACADE DAMAGES IN BUILDINGS; ZONGULDAK KARADENIZ EREĞLI ATATÜRK CULTURE CENTER (AKM)"
14:30-14:45	A. Özata, A. Dilaver, A. Bideci, Ö. Sallı Bideci: " DAMAGES THROUGH AESTHETIC PROBLEMS IN BUILDING FACADE: DUZCE KALICI KONUTLAR (YENIKENT) SAMPLE"
14:45-15:00	N. Cengiz: " GLUTATHIONE-RESPONSIVE SMART POLYMERIC MATERIALS"
15:00-15:15	C. Gül, N. Çömez, H. Durmuş: " HARDNESS AND MICROSTRUCTURAL PROPERTIES OF AA7075 SWARF/Al_2O_3 COMPOSITES DEPENDING ON DIRECTION"
15:15-15:30	C. Gül, H. Durmuş, N. Çömez: "EFFECT OF SiC AND NANO-FeB ON MICROSTRUCTURE AND CORROSION RESISTANCE OF ALUMINUM"
15:30-15:45	T. Okay: " POLYPROPYLENE MATERIALS IN GLOSSY MOLD IN COLOR APPLICATIONS"

15:45-16:00	**Coffee Break**
16:00-17:45	**3rd session (oral talks) Chair: H. H. Karayer**
16:00-16:15	İ. Kılıç, S.G. Gök, A.O. Savaş: " THE EFFECT OF WATER/CEMENT RATIO ON MECHANICAL PROPERTIES OF ROLLER COMPACTED CONCRETE"
16:15-16:30	G. B. Ergün, S. Nazlibilek, S. Güney: "USING CONVOLUTIONAL NEURAL NETWORK AS A FEATURE SELECTION METHOD FOR MULTI-FINGERED ROBOT HAND PRESHAPING"
16:30-16:45	K. Güven, S. Güney: "PREDICTION OF THE ISE100 INDEX USING PATTERN RECOGNITION ALGORITHMS"
16:45-17:00	S. Pirim: "GENERAL STRUCTURES OF AUTOMOTIVE GLASSES AND REQUIREMENTS OF FILM COATING APPLICATIONS"
17:00-17:15	M. Üçüncü, B. Kazandır: "EVALUATION OF TECHNOLOGY TRENDS AND PROPOSAL FOR TECHNOLOGY INVESTMENT WAY AHEAD"
17:15-17:30	A. B. Tapan, M. Çakırca, Ö. Şengör, O. Yavuz: "A CLOSE LOOK UP AT RECENT DEVELOPMENTS IN ROAD SIMULATORS"
17:30-17:45	F. Gökçe, M. A. Sarıgöl: "A NOTE ON ABSOLUTE FACTORABLE MATRIX SUMMABILITY METHOD"
18:00-19:00	**Poster Session**
20:30	**Cocktail + Award Ceremony**

PROGRAMME **9 SEPTEMBER 2019 (MONDAY)** **HALL 2**	
13:30-15:45	**4th session (oral talks) Chair: M. Çamur**
13:30-14:00	**Invited Talk-4: H. M. Tütüncü "A First-Principled Study of Superconducting Properties for Heusler Compound $LiGa_2Rh$"**
14:00-14:15	İ. Dökme, Ş. Altındal : "THE INVESTIGATION OF EFFECTS OF (NANOCARBON DOPED-PVP) POLYMER INTERFACIAL LAYER ON THE MAIN ELECTRICAL PARAMETERS AND CONDUCTIVITY"
14:15-14:30	İ. Dökme, P. Durmuş: "DEVIATIONS FROM THERMIONIC EMISSION IN CURRENT-VOLTAGE (I-V) CHARACTERISTICS OF SCHOTTKY STRUCTURES"
14:30-14:45	N. P. Aydınlık, D. Ozdal , J. B. Bodapatı, H. Icıl: " SELF-ASSEMBLY, OPTICAL, THERMAL AND ELECROCHEMICAL PROPERTIES OF A NEW INTELLIGENT MATERIAL FOR PHOTOVOLTAIC APPLICATIONS"
14:45-15:00	D. Kısa, N. Korkmaz, P. Taslimi, Ş. Tekin, A. Karadağ: "THE EFFECT OF COORDINATION COMPOUNDS ON CHOLINESTERASE ENZYME ACTIVITIES"

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15:00-15:15	A. Bouhafsoun, J.Ouali, A. Rouan Serik, R. Anouche, A.Tebib: "CHEMICAL AND BIOCHEMICAL COMPOSITION OF FRUITS AND SEEDS OF PHOENIX CANARIENSIS L."
15:15-15:30	S. Duman: "CATALYTIC ACTIVITY OF GREEN DEHYDROGENATION OF DIMETHYLAMINE BORANE BY CATALYZED RUTHENIUM(4%)@CELLULOSE NANOPARTICLES"
15:30-15:45	S. Duman: "COPPER(%1)@STARCH NANOPARTICLES: SYNTHESIS AND CATALYTIC ACTIVITY OF GREEN DEHYDROGENATION OF DIMETHYLAMINE BORANE"
15:45-16:00	**Coffee Break**
16:00-18:00	**5th session (oral talks) Chair: S. Aközcan**
16:00-16:15	Z. Kozak, M.Gul, Fatma Kartal Ersoy: "PALLADIUM-CATALYZED HECK REACTION OF THE THIAZOLE USING TPAS"
16:15-16:30	R. Taşdemir, S.G. Erzengin, S. Yiğitarslan: "THE SINGLE OPTIMIZATION OF LEAD (II) ADSORPTION ONTO CROSS-LINKED POLYCARBOXYLATE-BASED ADSORBENT"
16:30-16:45	S. Polat Çakır: "THE ADDITION OF SELECTED ORGANOALUMINUM AND ORGANOZINC REAGENTS TO THEPROTECTED IMINO AND α-KETO PHOSPHONATES"
16:45-17:00	E. Hasanoğlu Özkan, N. Sarı: " PREPERATION OF MAGNETIC NANOPARTICLES FOR USAGE MANY APPLICATIONS"
17:00-17:15	P. Durmuş, A. Kaymaz: " CAPACITANCE-VOLTAGE (C-V) AND CONDUCTANCE-VOLTAGE (G/ω-V) CHARACTERISTICS BEFORE AND AFTER IRRADIATION IN AU/N-SI/AG SCHOTTKY BARRIER DIODES (SBDS)"
17:15-17:30	P. Durmuş, İ. Dökme: "^{60}CO GAMMA-RAY IRRADIATION EFFECTS ON THE MAIN ELECTRICAL PARAMETERS OF THE AU/(ZNO:MN-PVA)/N-SI (MPS) STRUCTURES AT ROOM TEMPERATURE"
17:30-17:45	A. Serpengüzel: " RESONATORS AND WAVEGUIDES FOR FIBER OPTICS AND INTEGRATED PHOTONICS"
17:45-18:00	E. Demirel, E. Karaca, Y. Yuksel Durmaz: "DEVELOPMENT OF TARGETTED, DUAL DRUG DELIVERY SYSTEM AND EXAMINATION OF ANTICANCER EFFECT"
18:00-19:00	**Poster Session**
20:30	**Cocktail + Award Ceremony**

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PROGRAMME 9 SEPTEMBER 2019 (MONDAY) HALL 3	
13:30-15:30	**6th session (oral talks) Chair: E. Durgun**
13:30-14:00	**Invited Talk-5: D. Eroğlu "EFFECTIVE NETWORKS: A MODEL TO PREDICT NETWORK STRUCTURE AND CRITICAL TRANSITIONS FROM DATASETS"**
14:00-14:15	A. Sarıoğlu, H. Eşgin, H. Kaya, F. E. Atalay, F. Semerci : "COORDINATION POLYMER DERIVATIVED BINARY METAL OXIDES NANOSTRUCTURES PREPARED BY DIRECT PRECIPITATION METHOD FOR SUPERCAPACITOR APPLICATIONS"
14:15-14:30	T. Demir Çalışkan, L. Wei, I. Luzinov: " EFFECTS OF CHANGING FLUORINATED POLYESTER END-GROUPS ON SURFACE WETTABILITY"
14:30-14:45	N. Kurnaz Yetim, E. Hasanoğlu Özkan, N. Sarı, Cemile Özcan: "MONITORING THE INHIBITION REACTION OF BETWEEN CHLORPYRIFOS AND IMMOBILIZED AChE USING HPLC-DAD SYSTEM"
14:45-15:00	I. Bolova: "EVALUATION OF ADHESION OF ALKOXY BASED SILICONE ON SURFACE TREATED POLY(PROPYLENE) EXTERIOR TRIMS OF VEHICLES BEFORE AND AFTER AGEING TESTS"
15:00-15:15	S. Öztürk: "THE INVESTIGATION OF POLYLACTIC ACID BASED NATURAL FIBER REINFORCED BIOCOMPOSITES FOR AUTOMOTIVE APPLICATIONS"
15:15-15:30	E. Marıl: "THE INVESTIGATION OF NSS, RS AND INTERFACIAL LAYER ON THE ELECTRICAL CHARACTERISTICS OF Au/Ca3Co4Ga0.001OX/n-Si/Au"
15:45-16:00	**Coffee Break**
16:00-18:15	**7th session (oral talks) Chair: D. Eroğlu**
16:00-16:15	O. Masalcı: "MICELLIZATION AND THERMODYNAMIC PROPERTIES OF CATIONIC SURFACTANT CETYLTRIMETHYLAMMONIUM CHLORIDE (CTACL) IN AQUEOUS MIXTURE OF POLYVINYLPYRROLIDONE (PVP)"
16:15-16:30	S. Demirci, S. Ertürk, U. Üzel: " SURFACE QUALITY COMPARISON BETWEEN TRADITIONAL AND ONE STEP PLASTIC PART PAINTING CYCLE"
16:30-16:45	M. Celiker, M. Kocabas, A. C. Karaoglanli: "INVESTIGATION OF MICROSTRUCTURAL AND ELECTROCHEMICAL CORROSION BEHAVIOR OF THERMAL BARRIER COATINGS (TBCs)"
16:45-17:00	Y. Kamacı, R. Taş, S. Rajendrachari, A.C. Karaoğlanlı: " SYNTHESIS OF METAL OXIDE NANOPARTICLES BY AN EFFECTIVE COMBUSTION METHOD"
17:00-17:15	Z. Körpınar, M. İnç: " ON SOLITON SOLUTION OF THE (3+1)-DIMENSIONAL NLSE WITH KERR LAW NONLINEARITY"
17:15-17:30	Z. Körpınar, M. İnç: " OPTICAL SOLITONS FOR MODIFIED UNSTABLE NONLINEAR SCHRÖDINGER'S EQUATION"

17:30-17:45	T. Körpınar, Y. Ünlütürk, S. Baş: " A NEW CHARACTERIZATION OF SMARANDACHE TNB CURVES OF HELICES IN THE SOL SPACE Sol3"
17:45-18:00	T. Körpınar, Y. Ünlütürk, R.C. Demirkol : " ON B-SURFACES OF BIHARMONIC CONSTANT Π_1-SLOPE CURVES ACCORDING TO TYPE-2 BISHOP FRAME IN THE SOL SPACE SOL^3"
18:00-18:15	E. Altan, M. Çeliker, M. Kocabaş, A.C. Karaoğlanlı: "INVESTIGATION OF MICROSTRUCTURAL AND ELECTROCHEMICAL CORROSION BEHAVIOR OF THERMAL BARRIER COATINGS (TBCS)"
18:00-19:00	**Poster Session**
20:30	**Cocktail + Award Ceremony**

PROGRAMME **10 SEPTEMBER 2019 (TUESDAY)** **HALL 1**	
09:30-10:30	**8th session (oral talks) Chair: S. Güneş**
09:30-10:00	**Invited Talk-6: A. Bay Karabulut "MIRACLE'S OF APRICOT KERNEL PRODUCT AND AMYGDALIN PREVENTION OF CANCER MANAGEMENT"**
10:00-10:15	S. Baş, R. C. Demirkol, T. Körpınar : "INEXTENSIBLE FLOWS OF DUAL CURVES ACCORDING TO BİSHOP FRAME IN DUAL EUCLIDEAN SPACE"
10:15-10:30	S. Baş, T. Körpınar, R. C. Demirkol: " INEXTENSIBLE FLOWS OF TIMELİKE CURVES WITH PARALLEL TRANSPORT FRAME IN MINKOWSKI SPACE-TIME"
10:30-11:00	**Coffee Break**
11:00-12:00	**9th session (oral talks) Chair: H. İcil**
11:00-11:15	R. C. Demirkol, T. Körpınar, S. Baş: " TIMELIKE SPHERICAL MAGNETIC CURVES IN THE DE-SITTER SPACE S_1^2"
11:15-11:30	R. C. Demirkol, S. Baş, T. Körpınar: " NORMAL FORCE MAGNETIC CURVES IN 3D RIEMANNIAN MANIFOLDS"
11:30-11:45	U. Akoguz, H. Karagulle, S. Yavuz: "FREQUENCY BEHAVIOUR ANALYSIS AND TEST OF PORTABLE MEASURING DEVICE: Cartesian Magnetic Flux Mapper Example"
11:45-12:00	Ö. Özkan Önür, Ö. Yerli : " RESTORATION WORKS OF İBRAHIM PILAVCI HOUSE BELONGING TO CIVIL ARCHITECTURE EXAMPLES IN TARAKLI"
12:30-13:30	**Launch**
13:30-15:15	**10th session (oral talks) Chair: S.Koyuncu**

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13:30-14:00	**Invited Talk-7: E. Durgun "FUNDAMENTALS AND FUTURE DIRECTIONS OF NITRIDE-BASED SEMICONDUCTORS AND THEIR COMPOSITES IN TWO-DIMENSIONAL LIMIT"**
14:00-14:15	A. Abou Rajab, Ş. Tüzmen, H. İcil: " PERYLENE DYES INTERACTING WITH G-QUADRUPLEX STRUCTURES FOR FUTURE THERAPEUTIC AGENTS"
14:15-14:30	T. Daştan, İ. Timur, S. Durna Daştan: "VARIOUS ELEMENT LEVELS IN SOME HONEYS PRODUCED IN BİNGÖL PROVINCE"
14:30-14:45	M. T. Sariaydin, T. Korpinar: "QUASI ADJOINT CURVES AND THEIR CHARACTERIZATIONS IN 3-DIMENSIONAL SPACE"
14:45-15:00	M. T. Sariaydin, V.Asil: "ON QUASI PEDAL CURVES AND QUASI PEDAL SURFACES IN 3-DIMENSIONAL EUCLIDEAN SPACE"
15:00-15:15	A. Yazla, M. T. Sariaydin: " AW(K) TYPE CURVES ACCORDING TO QUASI FRAME IN MINKOWSKI SPACE"
15:30-16:00	**Coffee Break**
16:00-18:00	**11th session (oral talks) Chair: B. Akgenç**
16:00-16:15	Y. Kara: "MODULES WITH EXTENDING CONDITIONS"
16:15-16:30	Y. Kara: "ANNIHILATOR CONDITIONS ON RINGS"
16:30-16:45	M. Coşkun: "THE TEMPERATURE DEPENDENT CAPACITANCE-VOLTAGE CHARACTERISTIC OF AL/YMNO3/P-SI/AL STRUCTURE"
16:45-17:00	F. M. Coşkun: " TEMPERATURE DEPENDENT CAPACITANCE AND OTHER ELECTRICAL PROPERTIES OF THE DEVICES WITH A STRUCTURE OF Al/YMn0.95Os0.05O3/p-Si/Al"
17:00-17:15	A. T. Dincel: "FOURTH-KIND CHEBYSHEV WAVELETS BASED APPROXIMATION METHOD FOR SOLVING BAGLEY-TORVIK EQUATION"
17:15-17:30	S. Bilgiç: " METHODS FOR CORROSION RATE DETERMINATION"
17:30-17:45	S. Bilgiç: " PASSIVATION IN CORROSION"
17:45-18:00	A. T. Dincel: "FOURTH-KIND CHEBYSHEV WAVELETS BASED APPROXIMATION METHOD FOR SOLVING BAGLEY-TORVIK EQUATION"
19:30	Award Ceremony

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PROGRAMME 10 SEPTEMBER 2019 (TUESDAY) HALL 2	
09:30-12:30	**12th session (oral talks) Chair: Ş. Altındal**
09:30-10:00	**Invited Talk-8: M. Kuş " PEROVSKITE SOLAR CELLS; EFFICIENCY, LONG TERM STABILITY AND REPRODUCIBILITY"**
10:00-10:15	I. Atalar: "THE EFFICACY OF MILK PROTEIN AS AN ENCAPSULATION MATRIX TO IMPROVE SURVIVAL OF PROBIOTICS DURING SIMULATED DIGESTION"
10:15-10:30	M. Erdem, Y. Varol: "NUMERICAL INVESTIGATION OF $PbLi^{17}$ FLUID FLOW FORCED CONVECTION HEATING UNDER MAGNETIC FIELD"
10:30-11:00	**Coffee Break**
11:00-12:30	**13th session (oral talks) Chair: T. Körpınar**
11:00-11:15	M. Kurban, B. Coşkun: "BAND ENGINEERING AND PHOTOPHYSICAL PROPERTIES OF C-DOPED F8T2 ORGANIC COMPOUND"
11:15-11:30	H. Kurban, M. Kurban, M. Dalkılıç: "SIZE DEPENDENT ELECTRONIC STRUCTURE AND STRUCTURAL PROPERTIES OF CUPRIC OXIDE (CuO) NANOPARTICLES"
11:30-11:45	M. Arslan: "NOVEL BIO-BASED BENZOXAZINES WITH CATALYTIC CHARACTERISTICS"
11:45-12:00	O. C. Bodur, E. Hasanoğlu Özkan, Ö. Çolak, H. Arslan, N. Sarı, A. Dişli, F. Arslan: "PREPARATION OF ACETYLCHOLINE BIOSENSOR FOR THE DIAGNOSIS OF ALZHEIMER'S DISEASE"
12:00-12:15	T. Çakıcı, M. Özdal, M. Kundakçı: "COMPLEX GO:Cu:In NANOPARTICLES SYNTHESED BY BACTERIA AND FABRICATION OF GO:Cu:In/P-Si STRUCTURE"
12:15-12:30	T. Çakıcı, M. Özdal, M. Kundakçı: "INVESTIGATION OF BACTERIAL SYNTHESIZED COMPLEX CUZNSE NANOPARTICLES AND FABRICATION OF CUZNSE THIN FILM"
12:30-13:30	**Launch**
13:30-15:30	**14th session (oral talks) Chair: Y. Ünlütürk**
13:30-14:00	**Invited Talk-9: Ş. Altındal " ON THE FREQUENCY AND VOLTAGE DEPENDENCE OF COMPLEX DIELECTRIC, COMPLEX ELECTRIC MODULUS, AN AC ELECTRICAL CONDUCTIVITY IN AU/(ZNO_2FE_4-PVP)/N-SI (MPS) CAPACITORS"**
14:00-14:15	H. Caliskan, D. Gulen, M. Ozer, T. Sabudak: "ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF THREE EXTRACTS FROM CIRSIUM ITALICUM (SAVI) DC."

14:15-14:30	M. Ozer, D. Gulen, H. Caliskan, T. Sabudak: "ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF THREE EXTRACTS FROM CIRSIUM CRETICUM SUBSP. CRETICUM"
14:30-14:45	B. Sandal, Y. Hacioglu, N. Yagiz: "INVESTIGATION OF A HEATING SYSTEM UNDER ON-OFF CONTROL"
14:45-15:00	A. Arı, P. Ertürk Arı: "VOCS EMISSIONS FROM LASER PRINTERS AND HEALTH RISK ASSESMENT OF OFFICE EMPLOYEE"
15:00-15:15	A. Arı, P. Ertürk Arı, E.O. Gaga: "HEALTH RISK ASSESMENT OF PAHs IN SIZE SEGRAGATED PM SAMPLES COLLECTED FROM SEMI-URBAN LOCATION IN SUMMER AND WINTER SEASONS"
15:15-15:30	Ç. Ş. Güçlü, A. F. Özdemir: " VOLTAGE DEPENDENCE OF EFFECTIVE BARRIER HEIGHT (BH) REDUCTION IN (Au/Ti)/Al2O3/n -GAAS SCHOTTKY BARRIER DIODES (SBDs) IN TEMPERATURE RANGE OF 80-380K"
15:30-16:00	**Coffee Break**
16:00-19:00	**15th session (oral talks) Chair: M. M. Koç**
16:00-16:15	A. Arı, P. Ertürk Arı, E. O. Gaga: " HEALTH RISK ASSESMENT OF VOLATILE ORGANIC COMPOUNDS (VOCs) IN THE AMBIENT SEMI-URBAN LOCATION IN SUMMER AND WINTER SEASONS"
16:15-16:30	P. Ertürk Arı, A.Arı: "ORGANIC and ELEMENTAL CARBON CONCENTRATIONS on SIZE-SEGREGATED AMBIENT PARTICULATE MATTER in BOLU"
16:30-16:45	N. Turkten: " THE EFFECT OF OPERATIONAL PARAMETERS ON THE PHOTOCATALYTIC DECOLORIZATION OF REACTIVE YELLOW 145"
16:45-17:00	M. Üçüncü, Ö. Aydemir: "EEG BASED PERSON AUTHENTICATION USING K NEAREST NEIGHBOR"
17:00-17:15	B. Ceylan, N. Aslan, M. M. Koç: "METALLIC NANOPARTICLES AS X-RAY COMPUTED TOMOGRAPHY (CT) AND MULTIPURPOSE CONTRAST AGENTS"
17:15-17:30	R. Gulaboski, D. Uzun, F. Scholz, H. Icil: " TWO NAPHTHALENE DIIMIDE WITH ELECTRON ACCEPTOR SUBSTITUENTS: THEIR EFFICIENT SYNTHESIS, PHOTOPHYSICAL AND SOLID STATE ELECTROCHEMICAL PROPERTIES"
17:30-17:45	M. M. A. Usal, H. Özer: "NUMERICAL INVESTIGATION OF DYNAMIC BEHAVIOR OF COMPOSITE BEAMS CONNECTED WITH SINGLE-LAP JOINT"
17:45-18:00	I. Kucuk: "THE EFFECT OF PEG-40S SURFACTANT CONCENTRATION ON THE STABILITY OF ALGINATE MICROBUBBLES PRODUCED BY T-SHAPED MICROFLUIDIC JUNCTION DEVICE METHOD"
18:00-18:15	E. Taşdemir, Y. Soykan: "ON THE GLOBAL STABILITY ANALYSIS OF SOME RATIONAL DIFFERENCE EQUATIONS"
18:15-18:30	E. Taşdemir: "ON THE STABILITY OF A NON-SYMMETRIC SYSTEM OF DIFFERENCE EQUATIONS"

18:30-18:45	H. Özdemir, E. Çiftçioğlu, M. A. F. Öksüzömer: "PREPARATION AND CHARACTERIZATION OF Ln2O3 (Ln=La, Sm) STRUCTURES WITH DIFFERENT MORPHOLOGIES FOR OXIDATIVE COUPLING OF METHANE"
18:45-19:00	A. E. Ateş, S. Ateş: "THE EFFECT OF LIGHTING PERIOD ON THE TREATMENT EFFICIENCY OF DAIRY INDUSTRY WASTEWATER BY AEROBIC PHOTOBIOREACTOR"
19:30	Award Ceremony

PROGRAMME **10 SEPTEMBER 2019 (TUESDAY)** **HALL 3**	
09:30-10:15	**16th session (oral talks) Chair: Y. Azizian**
09:30-10:00	**Invited Talk-10: A. Koşar " PHASE CHANGE PHENOMENA ON STRUCTURED SURFACES WITH APPLICATIONS"**
10:00-10:15	A. B. Bayram, M. Kaleli: "THE EFFECT OF ANNEALING ON STRUCTURAL PROPERTIES OF P3HT THIN FILMS"
10:30-11:00	**Coffee Break**
11:00-12:30	**17th session (oral talks) Chair: Z. Körpınar**
11:00-11:15	M. A. Demirtaş, A. Özsunar, B. Altıntaş: "MEASUREMENT OF THERMAL STRAIN ON A PRINTED CIRCUIT BOARD"
11:15-11:30	D. A. Aldemir, A. F. Özdemir, N. Uçar: "THE ANALYSIS OF CAPACITANCE-VOLTAGE AND CONDUCTANCE-VOLTAGE CHARACTERISTICS OF Zr/P-Si SCHOTTKY DIODES WITH A NATIVE OXIDE INTERFACIAL LAYER AT HIGH FREQUENCIES"
11:30-11:45	Y. Ünlütürk, T. Körpınar: "INEXTENSIBLE FLOWS OF PSEUDO NULL CURVES DUE TO THE BISHOP FRAME IN MINKOWSKI 3-SPACE"
11:45-12:00	Y. Ünlütürk, T. Körpınar: "SOME CHARACTERIZATIONS OF TYPE-3 NULL CARTAN SLANT HELICES DUE TO THE BISHOP FRAME IN MINKOWSKI SPACE TIME"
12:00-12:15	O. Nogay, B. Balkan: " ANTIMICROBIAL ACTIVITIES OF VARIOUS PLANTS AGAINST FOODBORNE STAPHYLOCOCCUS AUREUS ATCC 6538 AND STAPHYLOCOCCUS AUREUS ATCC 29213 MIXTURE"
12:15-12:30	M. K. Bingöl, E. Demirci: "THE EFFECTS OF SURFACE QUALITY OF AISI 1045 GRADE STEEL ON PROCESSES PERFORMED BY CW LASER"
12:30-13:30	**Launch**
13:30-15:30	**18th session (oral talks) Chair: S. Bilgiç**

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13:30-14:00	**Invited Talk-11: H. İcil "NOVEL BAY SUBSTITUTED PERYLENE DYES FOR SOLAR CELLS"**
14:00-14:15	N. Akkurt, S. Elcin, L. Torun: "IONIC LIQUID CRSYTALS BASED ON TRIAZINE"
14:15-14:30	S. Türkdoğan, B. Kılıç: "NANOSHEET HETEROSTRUCTURE BASED CORRELATED COLOR TEMPERATURE (CCT) TUNABLE LIGHT EMITTERS"
14:30-14:45	S. Türkdoğan, B. Kılıç: " GROWTH AND CHARACTERIZATION OF HYBRID STRUCTURES FOR HIGH EFFICIENCY SOLAR CELLS"
14:45-15:00	A. E. Ateş, M. İ. Aydın, H. Selçuk: "THE TREATMENT OF DYE INDUSTRY WASTEWATER BY SOLAR PHOTOFENTON OXIDATION AND EFFECT OF RESIDUAL HYDROGEN PEROXIDE ON COD: A LABORATORY SCALE STUDY"
15:00-15:15	A. E. Ateş, M. İ. Aydın, H. Selçuk: "COMPARISON OF TREATMENT EFFICIENCY OF DYE PRODUCTION INDUSTRY WASTEWATER BY FENTON, POST-FENTON UV, AND PHOTO-FENTON METHOD"
15:15-15:30	T. Çarkıt, M. Alçı: "INVESTIGATION OF THE POSITIVE EFFECTS OF BATTERY ENERGY STORAGE SYSTEMS ON SOLAR ENERGY COMBINED INTERCONNECTED NATIONAL GRID"
15:30-16:00	**Coffee Break**
16:00-19:15	**19th session (oral talks) Chair: S. Koyuncu**
16:00-16:15	A. Kaya: "QUANTUM MECHANICS APPROACH TO MODEL RISK PROCESSES"
16:15-16:30	Y. Azizian-Kalandaragh, G. Pirgholi-Givi, J. Farazin: "THE EFFECT OF THE ETCHING RATE ON THE MAIN ELECTRICAL PROPERTIES OF p-Si"
16:30-16:45	H. H. Karayer: "ANALYTICAL SOLUTION FOR DOUBLE CONFLUENT FORM OF HEUN EQUATION"
16:45-17:00	O. Günay, S. Aközcan: " INVESTIGATION OF Cs-137 IN THE ENVIRONMENTAL SOIL SEGMENTS OF THE BUYUKCEKMECE DISTRICTS OF ISTANBUL, TURKEY"
17:00-17:15	S. Aközcan, S. Özden: "RADIOACTIVITY MEASUREMENTS IN SEDIMENTS COLLECTED FROM ALIAGA, IZMIR (TURKEY)"
17:15-17:30	B. Akgenç: "PREDICTING 2H-PHASE MONOLAYERS OF MXENES"
17:30-17:45	M. M. Koç: " METAL-CARBON COMPOSITE PHOTODIODES"
17:45-18:00	A. Tuna, S. Koyuncu: "VANADIUM OXIDE BASED ELECTROCHROMIC ENERGY STORAGE DEVICES via FACILE THIN FILM PREPERATION"
18:00-18:15	S. Koyuncu: "NOTRAL STATE COLORLESS/TRANPARENT ELECTROCHROMIC POLYMERS FOR SMART WINDOW APPLICATION"
18:30-18:45	F. Yakuphanoğlu, A. Dere: "SYNTHESIS OF NANOMATERIALS FOR QUANTUM ELECTRONIC APPLICATIONS"

18:45-19:00	A. Dere, F. Yakuphanoğlu: "FULL AUTOMATIC SOLAR SIMULATOR SYSTEMS FOR PHOTOVOLTAIC APPLICATIONS"
19:00-19:15	B. Akgenç: " Mo_2C-BASED DOUBLE-M ELEMENTS MXENES IN THE 1T- AND 2H-PHASE"
19:30	**Award Ceremony**

INVITED TALKS

ORAL PRESENTATIONS

ORAL PRESENTATIONS

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ORAL PRESENTATIONS

ORAL PRESENTATIONS

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ORAL PRESENTATIONS

POSTER PRESENTATIONS

POSTER PRESENTATIONS

POSTER PRESENTATIONS

POSTER PRESENTATIONS

INVITED TALKS

ORGANIC AND BIO-ORGANIC ELECTRONIC DEVICES

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Organic electronic devices are maturing from the academic research into the industrial development, entering the markets. In order to account for a sustainable future, the application of biodegradable and biocompatible systems for organic optoelectronics are needed. The use of cheap electronic devices in a large scale will introduce a "consumable electronics" into the market of "consumer electronics". Therefore environmentally friendly materials are important to use. This is a next great challenge to material science in organic electronics. New developments of bio-inspired and/or bio-origin, bio-compatible materials are interesting. Such materials can also be used to interface the biological and biomedical research with the organic electronics field.

Last but not least the conversion of CO_2 to methane (or other synthetic fuels) using solar energy is an important step to make an efficient, large scale energy storage. At the same time this will make a cyclic and sustainable CO_2 economy. We report organic as well as bio-organic catalysts which can be used in photo-electro-catalytic conversion devices. Such bio-catalysts can be enzymes as well as living bacteria immobilized on electrodes. Selectivity of such bio-catalysts is very high and combined with the room temperature operation of such bio-electro-catalytic systems makes them industrially highly attractive.

MIRACLE'S OF APRICOT KERNEL PRODUCT AND AMYGDALIN PREVENTION OF CANCER MANEGEMENT

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We evaluated the ability of apricot to attenuate apoptosis and oxidative stress developed during the process of 7,12-dimethylbenz[a]anthracene (DMBA) and radiotherapy in the liver of rats bearing liver damage. Fifty female Wistar rats were divided into 7 groups; (i) normal control rats; (ii) rats fed with standard diet with apricot (20%), (ii) rats fed with standard diet and administrated 6 gray radiotherapy with Co 60 device applied to a single fraction, (iv) rats fed with standard diet and administered intraperitoneally DMBA (20 mg/kg), (v) rats fed with standard diet and administered DMBA and 6 gray radiotherapy, (vi) rats fed with standard rat diet and administered DMBA and supplemented apricot, (vii) rats fed with standard diet supplemented apricot administered DMBA and radiotherapy (RT) for 6 weeks. Expression of Bax, caspase 3, and glutathione activity decreased in the liver but liver expression of NF-κB, AP-1, CREB, Bcl-2 and ALT, AST, 5′NT, MDA, NO levels increased in DMBA-induced liver damage rats. In conclusion, the results suggest that apricot supplementation and irradiation given in combination, offer maximum protection against DMBA-induced hepatic carcinogenesis.

ON THE FREQUENCY AND VOLTAGE DEPENDENCE OF COMPLEX DIELECTRIC, COMPLEX ELECTRIC MODULUS, AN AC ELECTRICAL CONDUCTIVITY IN Au/(ZnO_2Fe_4-PVP)/n-Si (MPS) CAPACITORS

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Frequency and voltage dependence of complex-dielectric, complex-electric modulus, and dielectric loss tangent (tanδ) of the Au-(ZnO_2Fe_4-PVP)-nSi (MPS) capacitors were investigated in wide range of frequency (10kHz-5MHz) and voltage (-2V/+5V) by using capacitance/conductance-voltage (C/G-V) measurements to get accuracy and reliable results on the dielectric properties. The value of dielectric constant (ε') was changed from 5.407 (at 10 kHz) to 0.781 (at 5 MHz). The decreases of ε' and dielectric loss (ε'') with increasing frequency was attributed to the interfacial/dipole polarization and surface states (N_{ss}). The value of M' goes to zero at low frequencies at accumulation-region which is possibly related to a long-range mobility of charge carriers. Tanδ-V and M''-V plots show a peak behavior and changes their magnitudes and positions with frequency were attributed a special distribution of Nss, their life-time, and polarization. Frequency dependent of the tanδ is the result of dipole polarization because of at low frequencies, dipoles have enough time to orient themselves in the direction of the alternating field contrary to high frequency. All experimental results show that the -(ZnO_2Fe_4-PVP) organic interlayer can be successfully used instead of traditional insulator materials in respect of low cost, low weight, flexibility, required low energy consumption, and easy grown processes.

Keywords: Frequency and voltage dependence dielectric properties; Interfacial (ZnO_2Fe_4-PVP) organic interlayer; Surface states and polarization effects on dielectric parameters

PAST, PRESENT AND FUTURE OF ORGANIC SOLAR CELLS

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Electricity generation through cheap and easy routes is seen as one of the biggest problems of our time. Since solar energy is abundant, clean and inexpensive, generating electricity directly from solar energy is seen as one of the best ways to solve this problem. Organic solar cells, which fall under the category of third generation solar cells, have attractive properties such as easy tunability of the chemical and physical properties of organic semiconductors via synthetic methods and production through energy and cost effective routes.

In this talk, the development of organic solar cells over time and also, present and future expectations for organic solar cells will be discussed

NOVEL BAY SUBSTITUTED PERYLENE DYES FOR SOLAR CELLS

Basma A.Khateeb, Meltem Dinleyici, J. B. Bodapati, Duygu Uzun and Huriye ICIL

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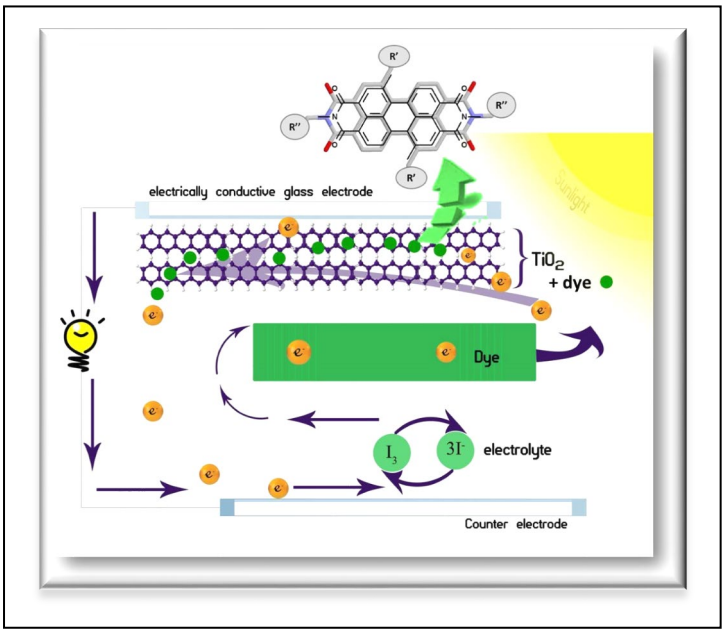
N,N'-substituted perylene-3,4,9,10-tetracarboxylic diimides (PDIs) have received substantial research attention due to their outstanding absorption and emission in the spectral region from visible to near infrared (NIR), photochemical and electrochemical properties, and thermal, chemical and photochemical stabilities. Their potential applicability in fluorescent dyes, NIR dyes, organic solar cells, sensors, optical switches, organic solar cells and photoconduction materials have been studied in detail owing to their unique characteristics.



The short π–π contacts of the fluorophores could be prevented by using sterically hindered imido-substituents to force out of the PDI chromophore, thereby reducing the face-to-face π–π stacking. This approach to improve solubility and also fluorescence intensity in solid state is very important for the development and future fabrication of photovoltaic devices for solar energy conversion. However, the imide substituent changing does not significantly affect either the optical and electronic properties of perylene dyes due to the existence of nodes in the HOMO and LUMO orbitals at the imide nitrogen's. Importantly, modification of the optical and electronic properties could be only possible with the bay-positions functionalization of the perylene core.

In this line of thought we report herein the synthesis of several bay-substituted symmetrical perylene diimide from perylene-3,4,9,10-tetracarboxylic dianhydride in three different steps we kept our focus on photophysical, thermal and electrochemical properties of each individual chromophore, toward the applications of photovoltaics. Bay-substituted symmetrical perylene diimides showed different optical, electrochemical and thermal properties. Aggregation, fluorescence quenching, HOMO and LUMO energies are investigated in detail.

[1] F. Würthner, V. Stepanenko, Z. Chen, C.R. Saha-Möller, N. Kocher, D. Stalke, Preparation and characterization of regioisomerically pure 1, 7-disubstituted perylene bisimide dyes, J. Org. Chem. 69, 7933–7939 (2004).

[2] S. Melika Mostafanejad, Jagadeesh B. Bodapati, Saim Özkar, Huriye Icil, New nonplanar D–A–D type perylene chromophore with thiophene moieties for effective charge transfer: synthesis, photophysics and electrochemistry,Journal of optical materials, 82, 30–38, (2018)

NOVEL SCAFFOLD MATERIALS FOR PEROVSKITE SOLAR CELLS

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Perovskite solar cells (PSCs) are one of the most attractive class of photovoltaic (PV) technologies and have been gaining great attention due to their high efficiency and low cost. However, reproducibility and long term stability problems prevent them to be strongest alternative for silicon PVs. Improvement of interfacial parameters based on some simple techniques such as self-assembly monolayer (SAM) enhances the stability and efficiency of PSCs. On the other hand, similar effects are observed by using a novel fibre-like scaffold layer in PSCs. Some simple SAM molecules such as boronic acid derivatives are very effective surface modification agents for both inverted and normal structure of PSCs. SAM molecules plays important role for tuning the work function of applied surface and wetting parameter of perovskite solution as well. On the other hand, a novel fibre like scaffold layer shows considerable improvement in reproducibility, stability and efficiency of PSCs due to its' nature. Efficiency improvement is observed to be around %30 according to reference PSCs by using fibre like scaffold layer. All observed results encourage researchers to large area fabrication of PSCs.

[1] Kara, D.A et al. ACS Applied Mat. Int, 2018 (in press)
[2] Kirbiyik C. et all, Appl. Surf. Sci. 2017, 521-527.
[3] Yenel E. PhD Thesis, Selcuk University, 2018

PHASE CHANGE PHENOMENA ON STRUCTURED SURFACES WITH APPLICATIONS

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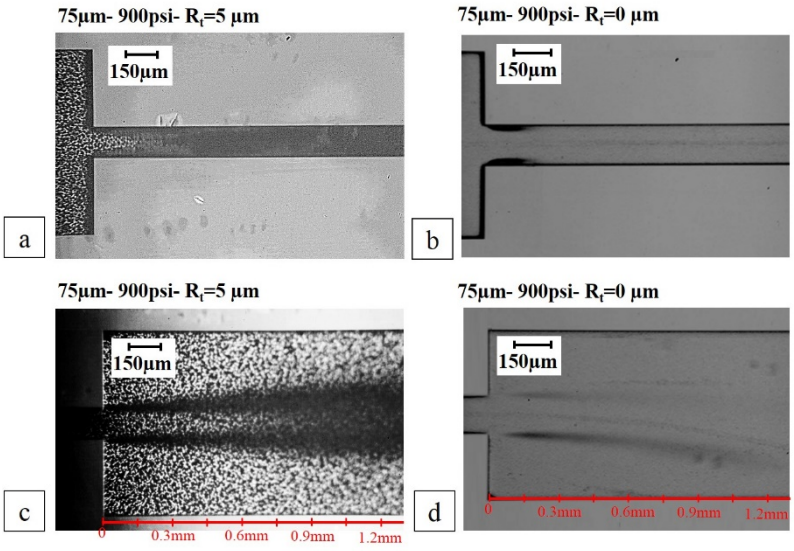
Heat dissipation from high power microelectronic devices is continuously rising due to their increasing functionality and demands. New cooling technologies are emergently sought to address to the requirement for effective heat dissipation capabilities. For this, compact and functional devices involving boiling heat transfer are needed so that research has been focused on boiling heat transfer on new generation structured surfaces. The aim of the talk will be to discuss about recent advances in this field and research efforts of the speaker related to this subject.

In the second part of the talk, the focus will be on cavitating flows in microfluidic systems with structured surfaces. Biomedical, energy and nanoparticle applications of hydrodynamic cavitation will be included in the talk along with research results and contributions of the speaker in this field. The speaker will include future research directions in this subject.



Ghorbani, M. Chen, H., Villanueva, L.G., Grishenkov, D. and Koşar, A., "Intensifying Cavitating Flows in Microfluidic Devices with Poly(vinyl alcohol) (PVA) Microbubbles," Physics of Fluids, 2018, 30(10).

FUNDAMENTALS AND FUTURE DIRECTIONS OF NITRIDE-BASED SEMICONDUCTORS AND THEIR COMPOSITES IN TWO-DIMENSIONAL LIMIT

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Despite the tremendous advances in silicon technology, specific demands in electronics and optoelectronics have brought compound semiconductors into focus. Due to their outstanding electronic and optical properties, three-dimensional (3D) group III-V compound nitride semiconductors, namely, GaN, AlN, InN, and their heterostructures have gained importance as wide-band gap semiconductors with critical and wide range of technological applications because of their band gap tunable in the blue-green region of the visible spectrum and ultraviolet (UV) range. Since the first time prediction of 2D SL graphitic (or honeycomb) structures of GaN and AlN, theoretical studies continued to unveil the diverse aspects of these materials for their potential use in a new field in electronics, namely, 2D nanoelectronics. The theoretical studies have predicted 2D GaN and AlN structures being wide band gap semiconductors and showing electronic and optical properties different from those of their bulk parents. Research on these 2D structures have gained importance with recent experimental studies achieving the growth of ultrathin 2D GaN and AlN on substrates. It is expected that these two materials will open an active field of research like graphene, silicene, and transition metal dichalcogenides.

This study aims at the evaluation of theoretical works in order to provide input for further research attempts in this field. To this end, starting from 3D GaN and AlN crystals, we review 2D SL and multilayer (ML) structures, which were predicted to be stable in free-standing states [1]. First, we discuss the dynamical and thermal stability of these SL structures, as well as the predicted mechanical properties. Next, their electronic and optical properties with and without the effect of strain are reviewed and compared with those of the 3D parent crystals [1,2]. The formation of multilayers, hence prediction of new periodic layered structures and also tuning their physical properties with the number of layers are other critical subjects that have been actively studied and discussed here [3,4,5,6]. In view of the fact that SL GaN and AlN can be fabricated only on a substrate, the question of how the properties of free-standing, SL structures are affected if they are grown on a substrate is addressed. We also examine the composite structures of GaN and AlN joined commensurately along their zigzag and armchair edges and forming heterostructures [5,6,7]. Finally, outlooks and possible new research directions are briefly discussed.

[1] A. Onen, D. Kecik, E. Durgun, and S. Ciraci, Phys. Rev. B 93, 085431 (2016).
[2] D. Kecik, C. Bacaksiz, R. T. Senger, and E. Durgun, Phys. Rev. B 92, 165408 (2015).
[3] A. Onen, D. Kecik, E. Durgun, and S. Ciraci, Phys. Rev. B 95, 155435 (2017).
[4] A. Onen, D. Kecik, E. Durgun, and S. Ciraci, J. Phys. Chem. C 121, 27098 (2017).
[5] E. Gurbuz, S. Cahangirov, E. Durgun, and S. Ciraci, Phys. Rev. B 96, 205427 (2017).
[6] A. Onen, D. Kecik, E. Durgun, and S. Ciraci, Nanoscale, 10, 21842-21850 (2018).
[7] M. Kanli, A. Onen, A. Mogulkoc, and E. Durgun, Comp. Mater. Sci. 167, 13-18 (2019).

EFFECTIVE NETWORKS: A MODEL TO PREDICT NETWORK STRUCTURE AND CRITICAL TRANSITIONS FROM DATASETS

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Real-world complex systems such as ecological communities and neuron networks are essential parts of our everyday lives. These systems are composed of units which interact through intricate networks. The ability to predict sudden changes in the dynamics of these networks, known as critical transitions, from data is important to avert disastrous consequences of major disruptions. Predicting such changes is a major challenge as it requires forecasting the behaviour for parameter ranges for which no data on the system is available. We address this issue for networks with weak individual interactions and chaotic local dynamics. We do this by building a model network, termed an effective network, consisting of the underlying local dynamics and a statistical description of their interactions. We show that behaviour of such networks can be decomposed in terms of an emergent deterministic component and a fluctuation term. Traditionally, such fluctuations are is filtered out, however, we show that it is key to accessing the interaction structure and to our approach. We illustrate this approach by reconstructing the dynamics and structure of realistic neuronal interaction networks of the cat cerebral cortex. We reconstruct the community structure by analysing the stochastic fluctuations generated by the network and predict critical transitions for coupling parameters outside the observed range.

A FIRST-PRINCIPLED STUDY OF SUPERCONDUCTING PROPERTIES FOR HEUSLER COMPOUND $LIGA_2RH$

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The structural, electronic, phonon and electron-phonon interaction properties of Heusler superconductor $LiGa_2Rh$ compound have been calculated by using *ab initio* pseudopotential method. An analysis of electronic density of states reveals that the contribution of Li atom is very small and featureless while the contribution of Ga and Rh atoms are widely distributed in the energy region below and above the Fermi level. From this, it is deducted that the Li atom almost does not make any contribution to the conduction properties of $LiGa_2Rh$ while Ga and Rh atoms are strongly contributed its conduction properties. Vibrational properties suggest that while the low-frequency region is overwhelmed with the Ga and Rh atoms coupling vibrations, the high-frequency region arises from lighter Li or Li-Ga phonon modes. Eliashberg spectral function examination depicts that the scattering of electrons is mainly consist of acoustic phonon modes instead of optical phonon modes. With the help of Allen-Dynes modified McMillan formula, the value of superconducting transition temperature is calculated to be 2.64 K which is in agreement with its experimental value of 2.4 K.

QUANTIFICATION OF SELF-HEALING CHARACTERISTICS OF NONDIFFRACTIVE STRUCTURED BEAMS

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One of the most important properties of structured light is its self-healing properties because of the applications quantum information, optical microscopy, and optical manipulation, structured beams with good self-healing properties have been attracted by scientists and researchers. In this talk, I briefly introduce some important structured nondiffractive beams and then the investigation of their self-healing characteristics. There are several papers about the self-healing characteristics of the beams, but they're no published work which depicts the self-healing quantity in various structured beams. In this talk, I introduce the quantification of self-healing characteristics of Bessel and laguar-gaussian beams. As various beams show different self-healing characteristics, comparative studies have been done on the healing percentage in the case of different structured beams. Our investigation shows Bessel beams good self-healing characteristics in comparison with LG beams. There are some techniques which we can control and improve the self-healing characteristics quantitatively. Superposition of two similar LG beams and also the super position of LG beams with mirrored LG beams shows better self-healing characteristics. In the case of Bessel beams with mirrored Bessel beam shows better results. In all cases Huygens convolution method was used for the investigation.

Keywords: Self-healing, optical manipulation, structured light, Bessel beams, LG beams

ORAL PRESENTATION

USING CONVOLUTIONAL NEURAL NETWORK AS A FEATURE SELECTION METHOD FOR MULTI-FINGERED ROBOT HAND PRESHAPING

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In this study, the aim is to extract the features from an object image in order to develop a decision making mechanism for multi-fingered robot hand which is capable of deciding automatically its hand grasping shapes based on the images taken by a camera from a work space. A hand has an action for grasping that consists of first deciding how to grasp an object and then activating the fingers to shape the hand which is appropriate for grasping. This study covers the process which consists of extracting the most effective image features for classification. Due to accomplish this task, one of the most popular deep learning method is used: convolutional neural network (CNN). On the other side, we utilized as a classifier Support Vector Machine (SVM).

Keywords: classification, convolutional neural network, deep learning, feature selection, multi fingered robot hand, image processing.

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PREDICTION OF THE ISE100 INDEX USING PATTERN RECOGNITION ALGORITHMS

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In this study, models have been developed to predict the daily changes of the ISE100 index. First, raw data is trained without any pre-processing. K-Nearest-Neighbor, Naive Bayes, Support Vector Machines and Neural Networks have been used. In order to increase the success of the model, from the feature extraction algorithms, Principal Component Analysis and Independent Component Analysis were selected. The results of algorithms and the contribution to the models of the feature extraction methods were investigated.

Keywords: k-Nearest-Neighbors; Naive Bayes; Neural Networks; Support Vector Machines; Principle Component Analysis; Independent Component Analysis

INVESTIGATION OF THE POSITIVE EFFECTS OF BATTERY ENERGY STORAGE SYSTEMS ON SOLAR ENERGY COMBİNED INTERCONNECTED NATIONAL GRID

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Energy has become an indispensable position into the development goals of today's countries. The need for energy is increasing in parallel with the development of the age and technology. To meet the energy demand; the use of alternative energy sources such as wind, solar, geothermal, hydroelectric, biomass, wave power, solar cell that support the conventional energy methods such as coal, oil, natural gas and nuclear is becoming widespread. To respond the increasing energy demand of the countries, various sources should work in the energy production and distribution systems coordinately. In such a system, energy management systems are planned in accordance with the determined policies. Following this planning, appropriate operational real-time working strategies were carried out. As is known, the electrical energy production conditions of some plants may vary depending on atmospheric conditions. Energy storage systems (ESS) are used to eliminate the instability and the distrust that may occur in electricity generation facilities. Since energy constitutes the basic input of all industrial sectors, a small improvement in this direction will affect all industrial sectors with the butterfly effect and the parties will gain huge profits. Therefore, there is a need for optimization applications and functional algorithms on ESSs to increase the stability, reliability, sustainability and demand responsiveness of energy. ESSs reduce the domino effect of grid failures because they convert interconnected networks into a decentralized form. In this study, the solar energy data obtained through PVGIS (Photovoltaic Geopraphical Information System), GSA (Global Solar Atlas) and PVSYST programs are adapted to the operational strategic working algorithm which is created in Matlab program. The most suitable output data are obtained according to the changing situations with the support of the battery energy storage system. The established system that is aim to benefit the user, was interpreted in the presence of BEDS and in the absence of BEDS.

Keywords: Battery energy storage system, energy storage, battery, solar energy, grid

THE EFFECT OF WATER/CEMENT RATIO ON MECHANICAL PROPERTIES OF ROLLER COMPACTED CONCRETE

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Roller compacted concrete (RCC) is a construction material that can be used in road and dam constructions, and is being used recently compared to conventional concrete. RCC is one of the rigid road pavement types and is an alternative road pavement which is produced similar to flexible pavements by the construction technique. It provides economic benefit by the way of being used quickly after the production and being produced by using conventional building materials.

In this experimental study, CEM I 42.5 R Portland cement was used as binder, dolomitic limestone and natural sand were used as aggregates, and water was used to produce roller compacted concrete. C 30/37 concrete with four different water/cement (w/c) ratios changing as 0.32, 0.35, 0.38 and 0.41 were produced. Cylinder samples of 15 cm in diameter and 30 cm in height were used for determination of compressive strengths at the ages of 7 and 28 days, and prismatic samples with the dimensions of 15 cm×15 cm×75 cm were used for determining 28-day flexural strength of RCC. Using the obtained data, the effect of water/cement ratio on mechanical properties of roller compacted concrete were determined.

Keywords: Flexural strength, Compressive strength, Concrete pavement, Roller compacted concrete.

International Natural Science, Engineering and Materials Technology Conference

Sep 9-10, 2019, İstanbul / TURKEY

HARDNESS AND MICROSTRUCTURAL PROPERTIES OF AA7075 SWARF/Al_2O_3 COMPOSITES DEPENDING ON DIRECTION

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Aluminum is one of the most important metallic material that has a combination of various features such as high specific strength, corrosion resistance against harsh environments and lightness [1, 2]. In order to improve both the strength and toughness of the alloys, hard particles such as TiC, SiC and Al_2O_3 are being used currently [2]. But today, recycling is needed to support environmentally friendly production techniques [3]. In this study, Al_2O_3 reinforced composites were produced by the swarf of AA7075 aluminum alloy as matrix material. Samples were produced by hot pressing. Changes in the mechanical properties of the produced composites depending on pressing direction were investigated.

AA7075 swarf have 5-25 mm length and 3 mm width and Al_2O_3 powders were hot pressed for 1 hour at 500 ºC and 300 MPa. Microstructural investigations were fulfilled by Nikon Eclipse LV 150 optical microscope using Clemex Software. Hardness measurements were carried out by using Duravision 2000 EMCO Test Brinell hardness tester under 6.25 kg load. The investigations were made both from parallel to the pressing direction and from the vertical surfaces. And the differences between the hardness values of these two surfaces were evaluated.

Microstructural images showed that the grains of AA7075 swarf are equiaxed. Samples have micro-sized pores within the matrix phase. This can be attributed to the low compressibility of the swarf matrix phase which resulted in the insufficient bond between the soft phase particles at this level of pressure. Hardness test results revealed that both the pressing direction and reinforcement amount affected the hardness of the composite. When the hardness test results were examined, it was increased by ≈ 27 % on the surface and by 29 % on the cross-section.

Keywords: Aluminum, 7075, Swarf, Metal matrix composites (MMCs), Recycling

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EFFECT OF SiC AND NANO-FeB ON MICROSTRUCTURE AND CORROSION RESISTANCE OF ALUMINUM

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Aluminum is one of the most important metallic material that has a combination of various features such as high specific strength, corrosion resistance against harsh environments and lightness [1, 2]. In order to improve properties of aluminum such as corrosion or wear resistance, toughness or hardness, hard particles are being used currently [2]. This study concerned with the corrosion behavior of Al and Al/SiC/nano-FeB metal matrix composite samples. These composites which include various weight contents of SiC and nano-FeB (0%, 10%) are produced by powder metallurgy-hot pressing method. Optical microscopy was used to study the effect of SiC and nano-FeB on microstructure. Then the samples were exposed to corrosion in 3.5 % NaCl solution. From the results of the electrochemical potentiodynamic test SiC and nano-FeB reinforced composite was exhibited higher corrosion resistance compared to pure Al.

Keywords: Aluminum, SiC, FeB, Metal matrix composites (MMCs), Corrosion

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EXAMINATION OF FACADE DAMAGES IN BUILDINGS; ZONGULDAK KARADENİZ EREĞLİ ATATÜRK CULTURE CENTER (AKM)

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In this study, facade damages on Atatürk Cultural Center (AKM) building, which is a socio-cultural structure located in the coastal band of Ereğli Atatürk Boulevard in Zonguldak-Karadeniz (Kdz.), were investigated. Facade investigations were carried out in the headings of the problems caused by damages (aesthetic problems, usage and comfort problems, health and safety problems) and human faults (wrong detail design, wrong applications, wrong use and maintenance of the building) that caused damage on the facade. As a result of the study, the facade damages that occurred on the Eregli AKM facade were determined and a base was prepared to prepare the data on the measures that could be taken in order to prevent the permanent damages. Possible damage to new buildings has been identified and it has been concluded that necessary measures have to be taken during the design process.

Keywords: Atatürk Cultural Center (AKM) Building, Facade Damage, Physical Building Problems.

DAMAGES THROUGH AESTHETIC PROBLEMS IN BUILDING FACADE: DUZCE KALICI KONUTLAR (YENIKENT) SAMPLE

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In this study, the damages of the buildings in the Düzce Kalıcı Konutlar (Yenikent) area built for earthquake victims in Düzce province after the 17 August 1999 and 12 November 1999 earthquakes were investigated. The aim of the study is examination of the facade damages, analyze the causes and suggest solutions. Four different buildings of two different types, two buildings with two apartments on the floor and two buildings with four apartments on the floor, were selected from four different islands in the region. Elevations and orientations diffrence of the selected buildings were considered. A field study was carried out in order to identify the damages causing aesthetic problems and photographs of the damaged areas on the facades were taken. Damages that cause damage to building façade materials and aesthetic problems were identified; flowering, surface deterioration, color changes, atmospheric contamination, slight erosion, obsolete appearance, deterioration due to usage errors and surface corrosion of metals.

When the errors made during the design, application and usage process were examined, it was found that the most damaging factor was caused by the errors in the application phase.

Keywords: Duzce Kalıcı Konutlar, Facade Damages, Physical Building Problems.

International Natural Science, Engineering and Materials Technology Conference

Sep 9-10, 2019, İstanbul / TURKEY

ON THE GLOBAL STABILITY ANALYSIS OF SOME RATIONAL DIFFERENCE EQUATIONS

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In this paper, we investigate the global character of following rational difference equation $x_{n+1} = \frac{\beta x_n}{A+Dx_{n-2}}$ where β, A, D positive parameters and the initial conditions positive numbers. We also study the bounded or unbounded solutions of related difference equation. In addition, our study gives answer to Conjecture 5.25.1 asserted by Camouzis and Ladas in their book (Dynamics of third order rational difference equations with open problems and conjectures. CRC, Boca Raton, 2008).

Keywords: Difference equation, stability, global stability, boundedness

ON THE STABILITY OF A NON-SYMMETRIC SYSTEM OF DIFFERENCE EQUATIONS

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In this study, we deal with the global asymptotic stability of following non-symmetric rational difference equations $x_{n+1} = 2 + \frac{y_{n-1}}{y_n}, y_{n+1} = 3 + \frac{x_{n-1}}{x_n}$ with positive initial values. We also investigate the boundedness of related system.

Keywords: Difference equation, stability, global stability, boundedness, non-symmetric system

NANOSHEET HETEROSTRUCTURE BASED CORRELATED COLOR TEMPERATURE (CCT) TUNABLE LIGHT EMITTERS

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In this work, we present the growth of monolithic nanostructures with multiple segments possessing dissimilar chemical compositions. This is realized by a novel growth method using chemical vapor deposition system and we have demonstrated tuning and control of correlated color temperature of trichromatic white light emission from a single ZnCdSSe nanosheet. By using various growth parameters we demonstrated trichromatic white light emission with the CCT ranging from 2700K to 14400K. It was also shown that by adjusting the growth parameters and growth paths we can grow any number of segments in a monolithic structure and color can be tuned by segment width or pumping power density. The results pave the way for various applications in solid state lighting and displays. People can choice their favorite type of white light in a wide range of CCT by utilizing this technology and therefore we call it personalized white light.

GROWTH AND CHARACTERIZATION OF HYBRID STRUCTURES FOR HIGH EFFICIENCY SOLAR CELLS

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In this work, we present the growth of full composition graded quaternary alloy ZnCdSSe thin film structures on a single substrate with and without nanowire addition and propose a method to develop solar cells' efficiency with a new 3D junction idea. The growth of materials is realized by a temperature dependent composition deposition method in a CVD reactor. In addition to thin film growth, we also grew nanowires on top of various compositional thin films within the ZnCdSSe material system. After the successful growth of those materials we proposed a method to build thin film/nanowire hybrid structures to form 3D junctions for enhanced solar conversion efficiencies in solar cells. It is known that producing planar junctions with conventional methods for bulk materials are easy; however creating 3D junctions require a dozens of steps taken in clean room environment. By utilizing bottom-up approach we can easily form 3D junctions and problems related to the limited diffusion length can be solved through our proposed method with minimum number of steps. The results show that by applying a few simple steps we are able to produce thin film/nanowire hybrid structures to form 3D junction and those structures pave the way for high efficiency solar cells by eliminating the short diffusion length and short circuiting issues.

DEVIATIONS FROM THERMIONIC EMISSION IN CURRENT-VOLTAGE (*I-V*) CHARACTERISTICS OF SCHOTTKY STRUCTURES

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The temperature dependence of current-voltage characteristics permits us to know various aspects of current transport mechanisms of Schottky structures. Over the years, many studies have shown that the forward bias current-voltage characteristics of Schottky structures deviate from the ideal Thermionic Emission Theory [1]. It was often observed that the ideality factor n was found to increase, while the zero-bias barrier height of Schottky structures Φ_{Bo} decreases with decreasing temperature [2]. Especially at low temperatures the changes are more remarkable. At low temperatures the standard Thermionic Emission Theory can fail to for explaining experimental results. If the temperature decrease, the lower barrier patches will carry a larger fraction of the current because of the lower temperature dependence of the current through these patches.

In this study, the experimental forward bias current-voltage characteristics of Al/SiO_2/p-Si Schottky diodes with an insulator layer are reported low temperature ranges. The barrier height, ideality factor and series resistance were extracted from forward bias current-voltage measurements. The zero-bias barrier height decreases practically linearly with decreasing temperature to relatively low values. The series resistance R_s estimated from Cheung's method was strongly temperature dependent and abnormally decreased with decreasing temperature [3]. This behavior as could be expected for semiconductors in the temperature region where there is no carrier freezing out which is non-negligible at low temperatures [4].

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THE INVESTIGATION OF EFFECTS OF (NANOCARBON DOPED-PVP) POLYMER INTERFACIAL LAYER ON THE MAIN ELECTRICAL PARAMETERS AND CONDUCTIVITY

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In this study, both Al/p-Si (MS) and Al/(Nanocarbon-PVP)/p-Si (MPS) structures were fabricated on the same p-Si wafer in the same conditions to see the effects on the main electrical parameters and conductivity of them at room temperature. For this purpose, the forward and reverse bias current-voltage (I-V) measurements of them were performed in wide range of applied bias voltage (± 3V) by 50 mV steps. Some main electrical parameters such as the reverse-saturation current (I_o), ideality factor (n), barrier height (Φ_B (I-V)), series (R_s) and shunt (R_{sh}) resistances, and rectifying rate ($RR=I_F/I_R$) of them were extracted from the I-V data as $2.36x10^{-8}$A, 6.23, 0.69 eV, 2.94 kΩ, 1.90 MΩ, $6.44x10^2$ for MS type SBD and $4.27x10^{-9}$A, 2.86, 0.73 eV, 1.25 kΩ, 6.33 MΩ, $5.06x10^3$ for MPS type structure, respectively. Al these experimental results were confirmed that the used (nanocarbon-PVP) interlayer between Al and p-Si semiconductor leads to a decrease in the leakage current and Rs and increase of BH and RR and hence improved the performance of MS type SBD [1]. It is mean that such a (nanocarbon-doped PVP) polymer interlayer can be successfully instead of conventional insulator or oxide layer in respect of easy grown methods, low cost, low weight, low energy requirement, and flexibility when compared with insulator materials [2,3].

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RESTORATION WORKS OF İBRAHİM PİLAVCI HOUSE BELONGING TO CIVIL ARCHITECTURE EXAMPLES IN TARAKLI

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Wood, which constitutes the original texture of Anatolian architecture, is an important building material that maintains its sustainability even today, transferring its existence to future generations throught history. It is useful in historical buildings due to its features such as processing, obtaining and easy transportation.Wooden structures are more common in forested areas.

İbrahim Pilavcı House, which is one of the examples of civil architecture of Taraklı architecture, the interior layout, construction system, roof features and environmental compatibility with the original quality. Considering these characteristics, the damage status of the building was examined and information was obtained by interviewing the landlord.

İbrahim Pilavcı House's roleve, restitution, restoration projects were prepared and their facade features, plan properties were supported with pictures and reports were prepared and documented with the approval of Kocaeli Regional Cultural Heritage Protection Board. After the architectural, structural and structural analysis of İbrahim Pilavcı House, the techniques applied during the application phase and the use of natural materials without deteriorating the originality of the structure were controlled under the supervision of the repair techniques and the works were completed.

CHEMICAL AND BIOCHEMICAL COMPOSITION OF FRUITS AND SEEDS OF *PHŒNIX CANARIENSIS* L.

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Palms are an economically important family of Monocot comprising 188 genera and 2600 species ([1], [2]. It belongs to the Arecaceae (Palmae) family, The aim of this study was to determine the chemical and biochemical composition of fruits and seeds of *Phœnix canariensis* L. collected from West coastal region of Algeria.

The proximate moisture, ash, total soluble solids, crude fiber, protein and lipids analysis were performed using standards analytical methods. The moisture content in fruits was higher (68.68%) than in seeds (37.52%). The pH values and the titrable acidity were relatively close together. The soluble solids (SS) level in fruits was four times that in seeds (2.6%, 0.6%) respectively. The chemical study showed that the seed contained more lipids (8.2%) than the fruit (4.73%). Both of these parts are low in protein.

The extraction of the parietal polysaccharides was carried out by alkaline solutions of 24% KOH and 17.5% NaOH to solubilize the hemicelluloses H1 and H2 respectively. The pectins were first solubilized by cold water (P1) then boiling and water (P2), then by using 0.5% ammonium oxalate (P3). Lignins were studied by used Klason method using H_2SO_4. The cell wall content in the fruit was lower than that of the seed (40.33, 50.33%) respectively. In fruit, the klason lignin content was very high (46.66%) whereas the seed contains only 13.33%. The weight distribution of the parietal polysaccharides showed that the hemicelluloses come in first position followed by cellulose and finally pectins, the amount of hemicelluloses is higher in the seed (46%) than in the fruit (24%). The amount of cellulose extracted from the fruits and seeds was 17.8% and 19.43% respectively. The amount of total pectins is higher in the fruit (3.62%) than in the seed (2.8%).

The thin-layer chromatography analysis of the parietal polysaccharides showed that the pectins contained rhamnose, arabinose and xylose. In The hemicelluloses arabinose, xylose and galactose have been revealed.

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FOURTH-KIND CHEBYSHEV WAVELETS BASED APPROXIMATION METHOD FOR SOLVING BAGLEY-TORVIK EQUATION

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In this paper, an efficient method based on fourth-kind Chebyshev wavelets is introduced to approximate the solution of Bagley-Torvik equation. The properties of the fourth-kind Chebyshev wavelets are used to convert this equation into a system of linear algebraic equations which are solved through Newton iterative method. The fractional derivative is explained in the Caputo sense. The results show that the method is very effective and reliable.

THE SINGLE OPTIMIZATION OF LEAD (II) ADSORPTION ONTO CROSS-LINKED POLYCARBOXYLATE-BASED ADSORBENT

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Lead is one of the refracter and toxic material in water. It causes various illnesses and the permissible limit for lead in drinking water is 0.05 mg/l according to World Health Organization [1]. Therefore, it is important to remove lead ion from aqueous medium by an effective treatment method. Heavy metals are removed from wastewaters by electrodeposition, chemical precipitation, cementation, ion exchange, membrane filtration and adsorption [2]. Adsorption has various advantages including cost effectiveness, efficiency and simplicity of the method. There are several adsorbents such as active carbon, organic or inorganic polymers, metal organic frameworks, nanocomposites, zeolite and biosorbents. In the present study, lead ion was removed from aqueous solution by a new cross-linked polycarboxylate based polymer adsorbent. The new polymer adsorbent, having methacrylic acid in the main chain and proper amounts of cross-linkages, was synthesized by free radical polymerization. The polymer has an anionic backbone, due to the presence of carboxyl ions in the structure positive charged metal ions like lead (II) are adsorbed from the medium. The characterization of polymer adsorbent was achieved by using Fourier Transform Infrared Spectroscopy, Scanning Electron Microscopy and X-Ray Diffraction.

The adsorption of lead ions was carried out in batch experiments. The single optimization of adsorption was investigated by the parameters like initial concentration of lead (II) (5-500 mg/l), contact time (3-120 min.) and temperature (25-65°C). In the experiments, the pH of the medium was set at 6 and 0.15 g of adsorbent was used in 100 ml of stock solution. At the end of the adsorption, the concentration of supernatant was analyzed by Atomic Absorption Spectroscopy. The results showed that, 54% of adsorption capacity was achieved at initial concentration of 25 mg/l, temperature of 25°C and contact time of 60 min. With this study, single optimization of the adsorption parameters of lead (II) onto the novel cross-linked polycarboxylate based adsorbent was examined and valuable outcomes were obtained. Research findings can be a horizon for multi-ion studies and for experimental model-based kinetic analyses.

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EFFECTS OF CHANGING FLUORINATED POLYESTER END-GROUPS ON SURFACE WETTABILITY

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Fluorinated oligomeric polyesters (FOP) with linear (PF_L) and branch structured (PF_B) end-groups were synthesized and used as additives to the thermoplastic polymers. The blending of oleophilic polyethylene terephthalate (PET) with FOPs has been used in order to fabricate oleophobic PET surfaces. The surface properties such as morphology, and wettability of PET/FOP films fabricated from solution were investigated using atomic force microscopy, and contact angle measurements, respectively. It is found that the wettability of the PET film surface depends on i) molecular architecture of end-groups of FOPs, ii) their concentration in PET, and iii) annealing treatment. The addition of PF_L or PF_B polyesters (even at low concentrations) to PET film allows fluoro carbon groups to migrate to the film surface and reduce the surface energy of films. As increasing the concentrations, the wettability of the surface reduces more. PET/PF_L films exhibited the higher water and oil repellency than PET/PF_B due to the entropic constraints of branch tails in PF_B. Annealing also allows blended films to reach a level of oil and water repellency comparable to that of polytetrafluorethylene (PTFE/Teflon).

CAPACITANCE-VOLTAGE (C-V) AND CONDUCTANCE-VOLTAGE (G/ω-V) CHARACTERISTICS BEFORE AND AFTER IRRADIATION IN Au/n-Si/Ag SCHOTTKY BARRIER DIODES (SBDs)

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It is important to evaluate the capacitance-voltage (C-V) and conductance-voltage (G/ω-V) characteristics of Schottky Barrier Diodes (SBDs) or such as similar semiconductor-based structures in order to investigate the response of these structures after exposure them to the ^{60}Co-γ-irradiation. Some previous studies such as [1] have shown that the change in current-voltage I-V characteristics of SBDs especially in the forward bias region to the γ-ray source is lower than the C-V characteristics. In addition, the C-V characteristics give us information about the barrier height changing of the metal-semiconductor (MS) structure when viewed from the metal side, so that it can be obtained more detailed information about the reverse bias currents, which affected a lot by irradiation [2-4].

In this study, the C-V and G/ω-V measurements of the Au/n-Si/Ag (MS) structure which have prepared is performed at high frequency (500 kHz) before irradiation and after 60 kGy irradiation. The reason of the measurement at 500 kHz is that effects of the interface state caused by the fabrication stage loss at high frequencies (f≥500 kHz) [5, 6] and thus it can be evaluated the effects of radiation accurately. As a result of these measurements, they are calculated basic diode parameters such as diffusion potential (V_D), doping concentration of donor atoms (N_D), Fermi energy level (E_F), maximum electric field (E_m), depletion layer width (W_D) and barrier height (Φ_B) using reverse bias C^{-2}-V characteristics and it is obtained thatV_D, E_F, E_m, W_D and Φ_B values decreased while N_D value increased due to the reordering and restructuring of interface states under γ-irradiation effect.

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^{60}Co GAMMA-RAY IRRADIATION EFFECTS ON THE MAIN ELECTRICAL PARAMETERS OF THE Au/(ZnO:Mn-PVA)/n-Si (MPS) STRUCTURES AT ROOM TEMPERATURE

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In this study, both the current-voltage (I-V) and capacitance-voltage-frequency (C-V) characteristics of the fabricated Au/(ZnO:Mn:PVA)/n-Si (MPS) structures have been investigated before and after 30 kGy ^{60}Co gamma-ray irradiation at room temperature. Experimental results show that ^{60}Co gamma-ray irradiation is very effects on the main electrical parameters such as ideality factor (n), barrier height (Φ_B), series and shunt resistances (R_s and R_{sh}), doping concentration atoms, and surface states (N_{ss})of the electrical characteristics especially in the reverse bias region due to the effect of high-external electric field in this region. ^{60}Co gamma-ray irradiation leads to degrade in the reverse leakage current. Both the value of C and G/ω at 500 kHz become increase under 30 kGy ^{60}Co gamma-ray irradiation due to the radiation induced electro-hole pairs.

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International Natural Science, Engineering and Materials Technology Conference

Sep 9-10, 2019, İstanbul / TURKEY

INVESTIGATION OF Cs-137 IN THE ENVIRONMENTAL SOIL SEGMENTS OF THE BUYUKCEKMECE DISTRICTS OF ISTANBUL, TURKEY

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People are constantly exposed to environmental radiation. Environmental radioactivity consists of natural and artificial radiation. The main source of the natural radioactivity of soils is originating from radioactive decay series (U-238 and Th-232 series) and K-40 radionuclide. Whereas the anthropogenic radioactivity arises from the human activities, such as generation of electricity, nuclear weapons trials, nuclear accidents, nuclear medicine applications and particle accelerators etc.

The most important fallout anthropogenic radioactive containment is Sr-90 and Cs-137, because of their long half-life, very high toxicity and relatively high uptake by bio-systems. Cs-137 is the most abundant fission product with half-life of more than 30 years. It is distributed globally through the upper atmosphere. In 2011 Fukushima Daiichi and in 1986 in Chernobyl, nuclear power plant accidents caused massive anthropogenic radioactivity. Since the Chernobyl nuclear accident is close to Istanbul, it is likely to be affected by radioactive fallout. So it is important to know and evaluate the amount of artificial radioactivity in the soil.

This study was carried out to determine the artificial radioactive Cs-137 concentration of some soil samples in Buyukcekmece district of Istanbul. 5 sampling points were determined in the study area and gamma-ray spectroscopic measurements were made with high purity germanium detector (HPGe).Cs-137 radioactivity concentrations were found to range from 0.27±0.27, $Bqkg^{-1}$ to 0.92±0.25 $Bqkg^{-1}$.

Keywords*:* Cs-137, Soil, Radiation, Buyukcekmece

NUMERICAL INVESTIGATION OF DYNAMIC BEHAVIOR OF COMPOSITE BEAMS CONNECTED WITH SINGLE-LAP JOINT

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As a result of the tendency towards low-weight constructions in manufacturing there has been a significant increase in the use of adhesive bonded binders in engineering structures and components. Comprehensive dynamic analysis is essential for the minimal vibration response in the design of mechanical systems consisting of joints bonded using adhesive.

The increasing complex coupling geometry and its three-dimensional nature further increase the difficulty in obtaining a general system of executive equations necessary to predict the dynamic behavior of adhesive bonded structures. To overcome such problems, finite element analysis (FEA) is often used in the analysis of the vibration behavior of beams joined by a single-lap joint.

The aim of this study is to propose an effective numerical method for predicting the dynamic behavior of composite beams connected by single lap jointing and to investigate the compatibility of the results with previous studies. In this study a suitable finite element analysis software will be used to find the natural frequencies, mode shapes and frequency response functions of the connected beams.

Keywords: Single-lap joint, Dynamic analysis, Finite element analysis

SURFACE QUALITY COMPARISON BETWEEN TRADITIONAL AND ONE STEP PLASTIC PART PAINTING CYCLE

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Surface quality behavior was investigated for one step production system compared to traditional painting process. This study was conducted to compare and analyze the effect of one step production cycle with PU systems on surface quality when compared with traditional acrylic paint and production system. Sample plates were chosen as piano black color because this is most problematical color that surface quality defects are seen strikingly. Plates were taken from these two different process and surface quality of plates were analyzed regarding scratch resistance, gloss retention after thermal aging and orange peeling formation. Test methods were determined according to painted plastic part qualification norms. This study contributes to methods of producing painted parts that are more resistant to scratch, thermal conditions and having much fewer surface defects like orange peeling.

EVALUATION OF ADHESION OF ALKOXY BASED SILICONE ON SURFACE TREATED POLY (PROPYLENE) EXTERIOR TRIMS OF VEHICLES BEFORE AND AFTER AGEING TESTS

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Silicone adhesives are used commonly for sealing and binding of exterior and engine trim parts, which have different thermal expansion values, in automotive industry due to their stable chemical structure under low and high temperature conditions, resistancy to ultraviolet (UV), moisture, oxygen, ozone and chemicals and their high gas permeability. In addition, silicones are very flexible materials even if it is exposed to very low temperature (-90°C and -115°C) and very high temperature (~300°C). In this regard, the aim of this study was evaluation of adhesion of alkoxy based silicones on mostly used plastic material poly(propylene) (PP) parts by bead peel tests at natural condition, after heat ageing and damp heat ageing. Before tests, plasma treatment was applied on poly(propylene) parts. Surface energy of untreated PP parts was measured as 28 dynes/mm. After plasma treatment, this value increased to 36 dynes/mm. Painted metal panels were used in order to simulate vehicle body. According to bead peel test results, silicone adhesive separation from PP samples was cohesive at natural conditions. After heat ageing, samples were conditioned for 2h and 24h at room temperature, silicone adhesive separation was cohesive. However after damp heat ageing test when samples were conditioned for 2h at room temperature, its separation was adhesive that silicone adhesive separated from sample surface completely there was no adhesive on PP parts. When they were conditioned for 24h at room temperature, silicone separation was cohesive and adhesion was evaluated as positive. The negativity of silicone separation from PP parts after conditioning 2h at room temperature depends on penetration of water into the cured silicone and occlusion of water there. Occlusion of water reduced the adhesion between PP and the alkoxy based silicone by playing a lubricant role between the polymer chains (plasticizer effect) and caused easily sliding of chains past each other. For damp heat aged samples, after 24h room temperature conditioning, samples dried and the cohesive characteristics of silicone from PP part surface occurred again. However performance was not on the original level.

Keywords: Alkoxy-based Silicone, Adhesion, Bead Peel, Polypropylene, Surface energy

THE INVESTIGATION OF POLYLACTIC ACID BASED NATURAL FIBER REINFORCED BIOCOMPOSITES FOR AUTOMOTIVE APPLICATIONS

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An automotive application with renewable sources as environmentally sustainable solution has been studied for weight reduction. Hemp as non-woven natural fiber (NNF) and PLA (Polylactic acid) non-woven fibers has been used to form continuous mat. This biobased structure was then hot formed to achieve good mechanical properties. The composition of the fiber was 50:50 / NNF:PLA and the density of the final mat was 1300 gr/m^2, the final thickness of the biocomposite after themoforming was 2.2 mm with 2100 MPa Flexural Modulus and 17 MPa Tensile Strength and 2.2% elongation at break. In this study, the mechanical performance of this biocomposite structure under water immersion, 40ºC and 80ºC was studied. The charpy impact strength was found 21kJ/m^2 which was sufficient for automotive applications. The biocomposite cold performance with an impact steel ball striker was able to withstand without breakage under 2.5 J impact after conditioning at -20ºC±2ºC. Another important concern was the flammability which was able to compile with ISO 3795 test. The major outcome of this study is replacing conventional reinforcement materials with renewable sources which offers lower weight, tolerable mechanical strengths and good sound absorption.

INVESTIGATION OF ELECTROCHEMICAL CORROSION BEHAVIOR OF CoNiCrAlY BOND COAT AND YTTRIA STABILIZED ZIRCONIA THERMAL BARRIER COATINGS

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The thermal spray coating methods were employed to deposit the CoNiCrAlY bond coats and the ceramic top coats of thermal barrier coating (TBC) systems. Corrosion experiments were carried out electrochemically on electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization curves in 0.1 M sodium chloride (NaCl) solution at room temperature. A conventional three using electrode cell, with a graphite counter electrode and a reference electrode (Ag/AgCl), and the coating as the working electrode, was employed. Open circuit potential (OCP) was applied for at least 5 min. The potentiodynamic polarization scan was started from the starting potential (-0.250 mV vs. OCP) to ending potential (+1.500 mV vs. OCP) with a scan rate of 1 mV/s. Electrochemical experiments were performed using a potentiostat/galvanostat (Gamry Interface 1010B). The frequency range of EIS analysed went up from 20 kHz to 10 mHz. The study discusses the electrochemical corrosion behaviour of uncoated, and coated with different conditions in NaCl solution. In addition to the improvements in other mechanical properties, the coatings slightly improved the corrosion resistance of the substrate material.

SYNTHESIS OF METAL OXIDE NANOPARTICLES BY AN EFFECTIVE COMBUSTION METHOD

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In recent years, fabrication of metal oxide nanoparticles is intensively gaining the interest of various chemists as well as biochemist due to their applications in different fields. Among all the transition metal oxides, CuO and ZnO are the important metal oxide nanoparticles exhibiting tremendous properties and a wide range of applications. Both CuO and ZnO nanoparticles were prepared by combustion method effectively with very less time. In the present method, the stoichiometric ratio of oxidizer-to-fuel plays an important role in determining the morphology of the metal oxide nanoparticles [1].

The author had done the complete literature review and experimental trials to finalize the stoichiometric ratio of oxidizer and fuel. The combustion of copper (II) nitrate and urea at stoichiometric ratio results in CuO nanoparticles. Similarly, combustion of zinc (II) nitrate and urea at stoichiometric ratio results in ZnO nanoparticles. The combustion prepared CuO and ZnO nanoparticles are washed several times and then centrifuged and dried further study. Both CuO and ZnO nanoparticles were characterized by X-ray diffraction to study the different phases present in them. Scanning electron microscopy (SEM) is used to study the microstructure and the composition of prepared metal oxide nanoparticles was studied by using energy dispersive spectroscopy attached to SEM. The optical studies were carried out by using UV-Visible spectrophotometer. Particle size analyzer is used to determine the mean average particle size of prepared metal oxide nanoparticles [2].

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ON SOLITON SOLUTION OF THE (3+1)-DIMENSIONAL NLSE WITH KERR LAW NONLINEARITY

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In this paper, the (3+1)-dimensional nonlinear Shrödinger equation with kerr law nonlinearity is analysed. An exact 1-soliton solution is obtained in closed form using the solitary wave ansatz. Then the conserved quantities are investigated via this soliton solution.

Keywords: Optical solitons, Nonlinear Shrödinger equation, Kerr law nonlinearity, Conserved quantity.

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OPTICAL SOLITONS FOR MODIFIED UNSTABLE NONLINEAR SCHRÖDINGER'S EQUATION

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In this paper, the process of the extended direct algebraic method (EDAM) is used to obtain the optical solitons in modified unstable nonlinear Schrödinger's equation. Firstly, this equation is changed into the ordinary differential equation by using the wave variables transformation. Then new several forms of optical solitons are obtained by using EDAM.

Keywords: Optical solitons, Modified unstable nonlinear Schrödinger's equation, Extended direct algebraic method.

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A NEW CHARACTERIZATION OF SMARANDACHE TNB CURVES OF HELICES IN THE SOL SPACE Sol^3

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In this paper, we characterize Smarandache **TNB** curves of helices in the Sol space Sol^3. We characterize Smarandache **TNB** curves of helices in terms of their curvature and torsion. Finally, we find out their explicit parametric equations.

Keywords: General helix, Sol Space, Curvature, Torsion, Smarandache **TNB** curve.

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ON B-SURFACES OF BIHARMONIC CONSTANT Π_1-SLOPE CURVES ACCORDING TO TYPE-2 BISHOP FRAME IN THE SOL SPACE SOL^3

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In this paper, we study **B-** surfaces of biharmonic constant Π_1-slope curves according to type-2 Bishop in the SOL^3. We characterize the **B-** surfaces of biharmonic constant Π_1-slope curves in terms of their Bishop curvatures. Finally, we find out their explicit parametric equations in the SOL^3.

Keywords: Sol Space, Curvature, Torsion, **B-** surfaces.

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INEXTENSIBLE FLOWS OF DUAL CURVES ACCORDING TO BİSHOP FRAME IN DUAL EUCLIDEAN SPACE

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Inextensible flows of curves plays an important role in practical applications. We construct a new method for inextensible flows of dual curves in dual space D^3. In this paper, we study inextensible flows of dual curves according to Bishop frame in dual space D^3. The concepts with the inextensible flows are analyzed by using Bishop frame.

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INEXTENSIBLE FLOWS OF TIMELİKE CURVES WITH PARALLEL TRANSPORT FRAME IN MINKOWSKI SPACE-TIME

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In this paper, we study inextensible flows of timelike curves in Minkowski space-time. Necessary and sufficient conditions for an inextensible curve flow are expressed as a partial differential equation involving the curvature.

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TIMELIKE SPHERICAL MAGNETIC CURVES IN THE DE-SITTER SPACE S_1^2

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We take the De-Sitter space S_1^2 and the transformation $\delta: I \to S_1^2 \subset R_1^3$. Considering their definition in terms of spherical geometry in the Minkowski space, we investigate the magnetic curves of the spherical vector field. An entire characterization is developed for timelike spherical magnetic curves, denoting particularly the changes of their energy with respect to time, the influence of the magnetic force on them, and the existence condition for the uniformity of these curves.

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NORMAL FORCE MAGNETIC CURVES IN 3D RIEMANNIAN MANIFOLDS

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In this study, we investigate the special type of magnetic trajectories associated with a magnetic field B defined on a 3D Riemannian manifold. Firstly, we consider a moving charged particle which is under the action of a normal force, N_{f}, in the magnetic field B. Then, we assume that trajectories of the particle associated with the magnetic field B correspond to normal magnetic curves (N_{f}-magnetic curves) of magnetic vector field B on the 3D Riemannian manifold. Thus, we are able to investigate some geometric features and physical consequences of the particle, which is assumed to be under the action of normal force in the magnetic field B on the 3D Riemannian manifold.

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MICELLIZATION AND THERMODYNAMIC PROPERTIES OF CATIONIC SURFACTANT CETYLTRIMETHYLAMMONIUM CHLORIDE (CTACL) IN AQUEOUS MIXTURE OF POLYVINYLPYRROLIDONE (PVP)

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Surfactants and water-soluble polymers have very large ranges of applications [1]. Combination of polymer with surfactant is important in the industry beside of the research. The interaction of polymer and surfactant in aqueous solution depends on the molecular properties of the polymer and the surfactant [2]. Also combination of polymer surfactant mixture is influenced by different factors, such as hydrophilic polar head group, hydrophobic hydrocarbon tail, cosurfactant, temperature, PH etc.

Thermodynamic of the micellization process of surfactant in water absence and presence of the polymer has been widely studied with conductometry technique. Conductometric measurements have been provided to gain a comprehensive insight into the interactions between surfactant and polymer in solution. Taking into consideration the significance of the polymer−surfactant system, intermolecular interactions in solution which containing of Cetyltrimethylammonium chloride (CTACl) in different solvent concentrations of polymer (PVP) have been investigated.

In the present study, critical micelle concentration(CMC), critical aggregation concentration (CAC) and degree of ionization (α) of aqueous solution which contain of CTACl surfactant and PVP have been determined by electrical conductivity at distinct temperatures. The thermodynamic parameters (Gibbs free energy, enthalpy and entropy) of the surfactant have been calculated in the absence and presence of the polymer.

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SELF-ASSEMBLY, OPTICAL, THERMAL AND ELECROCHEMICAL PROPERTIES OF A NEW INTELLIGENT MATERIAL FOR PHOTOVOLTAIC APPLICATIONS

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Perylene chromophore dyes are versatile materials with great potential in various fields of applications. Numerous perylene derivatives have been designed, synthesized and characterized till date to improve material properties based on the strong π–π interactions of the perylene core. The perylene flat and rigid aromatic core system in association with its electronic structure operate the strength of intermolecular and π–π interactions which plays important role for their applicability in organic electronics. These dyes were extensively investigated relying on the ease of synthesis and manipulation of their structures for the targeted optical and electrical properties. It is, however, important to note that the optimization of various optical, electronic and solubility properties of perylene derivatives for their applications in photonics is still a challenge. Specifically, the improvement on solubility, absorption in the red or near-infrared (NIR) region, thermal stability and conductivity properties of perylene dyes is of fundamental importance.

The main aim in this work is to synthesize a new intelligent material and use it in the production of intelligent material based organic photovoltaic solar cells which have low cost of production, ease of production, high abundance of raw materials, the potential for treatment and sustainability and the use of different dyes to achieve different colors and to have applicability to different flexible soles and its self-assembled microstructures.

The characterization of synthesized new intelligent material is done by UV-Vis, Fluoresce, and IR, MS, DSC, TGA, CV measurements and elemental analysis techniques.

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International Natural Science, Engineering and Materials Technology Conference

Sep 9-10, 2019, İstanbul / TURKEY

PERYLENE DYES INTERACTING WITH G-QUADRUPLEX STRUCTURES FOR FUTURE THERAPEUTIC AGENTS

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The application of perylene dyes as transcriptional regulators [1] and telomerase inhibitors [2] has been a topic of interest due to their potential role as anticancer drugs. One perylene diimide derivative and two novel perylene dianhydride derivatives were studied with regard to their G-quadruplex formation/stabilization potential on the Polymerase Chain Reaction (PCR) [3] amplified region of the human beta-globin gene and on the two oligonucleotides, c-kit and a-coreTT. Observations were made using absorption and fluorescence spectroscopy techniques, agarose gel electrophoresis and MTT assay on human hepatic adenocarcinoma cell line, K-HEP-1. Furthermore, the individual effects of cytotoxicity of different concentrations for these dyes were investigated by the MTT assay.

Investigations showed genesis of novel peaks in absorption spectra upon complexation of the primers with the compounds. One of the three perylene dyes was found to be the highest potent based on the adenocarcinoma cell line viability. Furthermore, that compound was found to have a higher binding potential towards the guanine rich region as observed via the gel electrophoresis technique. The dye that has shown a better binding to the PCR product up on increasing concentration of the dye was investigated with the aid of gel electrophoresis.

The results of the investigations may help to elucidate the feasibility of the perylene derivatives as future therapeutic agents.

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QUASI ADJOINT CURVES AND THEIR CHARACTERIZATIONS IN 3-DIMENSIONAL SPACE

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In this paper, we obtain some characterizations of quasi adjoint curves. The relationship between quasi adjoint curve and a spatial curve are examined according to quasi frame in three-dimensional Euclidean space. Additionally, some results and theorems are presented with special cases. Then, we provide some examples of quasi adjoint curves.

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ON QUASI PEDAL CURVES AND QUASI PEDAL SURFACES IN 3-DIMENSIONAL EUCLIDEAN SPACE

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Notions of the pedal curves of regular curves are classical topics in differential geometry. Pedal curves are the loci of the feet of perpendiculars to the tangents of a fixed curve to a fixed point called the pedal point. In this paper, we present the concept of pedal surface of a pedal curve according to quasi frame in 3-dimensional Euclidean space. Additionally, some results and theorems are presented with special cases. Then, we provide some examples of quasi pedal curves.

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AW (K) TYPE CURVES ACCORDING TO QUASI FRAME IN MINKOWSKI SPACE

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In this paper, we obtain some characterizations of AW (K) types curve in Minkowski 3-space. Additionally, some results and theorems are presented with special cases. We give the relations between the Quasi curvatures k1, k2, k3 of a curve in Minkowski space. Then, we provide some examples of AW (K) types curves.

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RESONATORS AND WAVEGUIDES FOR FIBER OPTICS AND INTEGRATED PHOTONICS

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Spherical optical microcavities are the building blocks of three dimensional photonics, as linear optical microcavities are the building blocks of one dimensional photonics. Dielectric and semiconductor based lightwave circuit elements are being integrated into fiber optics and integrated photonics. Silicon microspheres lead themselves to various lightwave circuit element applications such as channel dropping filters, tunable filters, and optical modulators using optical fiber half couplers manufactured from single mode optical fibers.

Silicon on oxide (SOI)-distributed feedback (DFB) meandering waveguides, as novel integrated optical elements, can exhibit a variety of spectral responses such as coupled resonator induced transparency filter, Fano resonator, hitless filter, Lorentzian filter, Rabi splitter, self coupled optical waveguide, and tunable power divider.

We focus on properties of various novel resonators, such as diamond spheres, and SOI-DFB meandering waveguides, and their potential for practical applications in optics and photonics.

THE TEMPERATURE DEPENDENT CAPACITANCE-VOLTAGE CHARACTERISTIC OF Al/$YMnO_3$/*p*-Si/Al STRUCTURE

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In this study, $YMnO_3$ powder was synthesized by solid-state reaction method using Y_2O_3 and Mn_2O_3 powders as source materials. $YMnO_3$ thin film was grown on the *p*-Si substrate by using radio frequency (rf) sputter technique and single $YMnO_3$ sputter target. Capacitance-Voltage (C-V) characteristics of Al/$YMnO_3$/*p*-Si/Al structure were performed in wide temperature range of 40 K-320 K. Temperature dependent barrier height $\Phi_{CV}(T)$ showed a linear behavior with decreasing temperature. It was obtained a value of 2.24 eV for the barrier height at T= 0K and a temperature coefficient of α=3.30 mV/K from the Φ_{CV} versus T plot. Carrier concentration N_a showed a slight fluctuation up to 150 K and then increased from 7.25×10^{15} cm^{-3} at 150 K to about 9×10^{15} cm^{-3} at 300 K with increasing temperature. The depletion layer width, w, always decreased from 0.60 µm around 50 K to around 0.40 µm at 340 K with increasing temperature. The diffusion potential V_p between the Fermi energy level and bottom of conduction band increased as linearly with increasing temperature.

TEMPERATURE DEPENDENT CAPACITANCE AND OTHER ELECTRICAL PROPERTIES OF THE DEVICES WITH A STRUCTURE OF Al/$YMn_{0.95}Os_{0.05}O_3$/*p*-Si/Al

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Al/$YMn_{0.95}Os_{0.05}O_3$/*p*-Si/Al devices were fabricated within the scope of this study. The 5% Os doped YMnO3 thin layers were coated on a *p*-Si substrate by RF sputtering technique under 2 mTorr pressure, 100 W power and with a substrate temperature of 500 C. In this report, the capacitance to voltage (C-V) characteristics of those devices with varying temperature between 40 and 320 K were presented. According to this data, C^{-2} vs V characteristics plotted and the barrier heights were calculated from the intercepts of the C^{-2} vs V plot with V axis for each temperature. The temperature dependent barrier height $\Phi_{CV}(T)$ behavior was almost linear and decreased with increasing temperature. The barrier height value at 0 K was obtained as 1.85 eV. The graph of the carrier concentration N_a showed a little fluctuation; it reached a peak with a value of $9x10^{15}$ cm^{-3} at 75 K, and decreased linearly till 150 K, which is about $8x10^{15}$ cm^{-3}, then showed almost a constant value of this concentration up to 300 K and finally made a rigid peak at 350 K with a concentration of $8.8x10^{15}$ cm^{-3}.

THE EFFICACY OF MILK PROTEIN AS AN ENCAPSULATION MATRIX TO IMPROVE SURVIVAL OF PROBIOTICS DURING SIMULATED DIGESTION

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The aim of the study is to improve the survival of probiotic cells in conditions as in the stomach by encapsulation with milk proteins. Two types of L.plantarum microcapsules were produced by the emulsification method in combination with the enzyme-induced gelation techniques. Two different options were studied as: (1) skim milk powder was treated with rennet and gelation was induced by temperature change and $CaCl_2$ addition and (2) sodium caseinate was treated with transglutaminase and gelation was induced by temperature change. By using the emulsification method it is possible to produce relatively small microcapsules with a high encapsulation yield. It was determined that skim milk powder was treated with rennet had higher encapsulation yield than sodium caseinate treated with transglutaminase enzyme. The decrease in the free cells at low pH was found as 7-8 log while the decrease in encapsulated samples was found as 3-4 log during 120 min treatment. The decrease in the survival rate dominated in the first 5 min in gastric conditions. Microcapsules thus form a protective barrier around the probiotic cells, at least partly because of the pronounced buffer capacity of the proteins. During intestinal medium treatment, microcapsules were not affected by intestinal juice and brine salts. Encapsulation of bacterias with skim milk by rennet gelation technique led to spherical microparticle size than sodium caseinate treated with transglutaminase enzyme. As a result, using skim milk by with rennet enzyme showed better results than sodium caseinate treated with transglutaminase enzyme. It was determined that by using the emulsification method it is possible to obtain capsule sizes that are small enough to have a positive effect on organoleptic properties.

NUMERICAL INVESTIGATION OF $PbLi^{17}$ FLUID FLOW FORCED CONVECTION HEATING UNDER MAGNETIC FIELD

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This study is concerned with the numerical investigation of flow characteristics of $PbLi^{17}$ fluid in a three-dimensional pipe under magnetic field. The magnetic field is applied perpendicularly to the pipe. Magnetic field forces have selected as B = 0, 0.075 and 0.15T, but at constant Re number (1000). The temperature of wall is greater than the temperature of the fluid. The analysis has performed with ANSYS Fluent commercial software. The numerical results obtained are consistent with the literature. As a result, it has been observed that the magnetic field reduces the flow rate of $PbLi^{17}$ fluid, but increases the pressure and heat transfer.

Keywords: Magneto-hydrodynamics, CFD, forced convection, $PbLi^{17}$, magnetic field

International Natural Science, Engineering and Materials Technology Conference

Sep 9-10, 2019, İstanbul / TURKEY

BAND ENGINEERING AND PHOTOPHYSICAL PROPERTIES OF C-DOPED F8T2 ORGANIC COMPOUND

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Organic semiconductors (OSs), recently, have been of important attention in a wide variety of applications such as electronic and photonic applications [1, 2]. Among OSs, poly[(9,9-dioctylfluorenyl-2,7-diyl)-co-bithiophene] (F8T2), especially, is a promising class in organic field-effect phototransistors as the active material due to its high ionization potential (5.5 eV) [3, 4]. Also, the transistors show highly stable and reproducible performance under heat treatment [3].

The electronic and optoelectronic properties of materials are considerably tunable as a function of an atom substitution [5]. Herein, the changes in the bandgap and photophysical properties of F8T2 have been investigated using the self-consistent charge density-functional based tight-binding (SCC-DFTB) which is based on the density functional theory (DFT) [6]. Later, the electronic and optical properties of F8T2 by substitution of Carbon (C) single atom were performed. The HOMO, LUMO and bandgap energies, dipole moments, refractive index and Fermi levels were investigated. Absorption spectral analysis has also been obtained by time-dependent (TD)-DFTB calculations-based on the Casida's approach [7].

The results show that the HOMO and LUMO energy levels of F8T2 were found -5.045 and -2.729 eV, respectively, which are compatible with experimental HOMO (-5.44 eV) and LUMO (-2.95 eV) energy levels. The band energy (2.32 eV) is also consistent with experimental findings (2.49 eV). The gap energy for F8T2 decreased from 2.32 eV to 0.13 eV which is about 2.19 eV shorter than that of F8T2. The calculated maximum absorbance peak of F8T2 is 437 (2.83 eV) nm which is shorter 266 nm (4.66 eV) than that of C-doped F8T2 (703 nm; 1.76 eV).

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SIZE DEPENDENT ELECTRONIC STRUCTURE AND STRUCTURAL PROPERTIES OF CUPRIC OXIDE (CuO) NANOPARTICLES

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Nanoparticles (NPs) have attracted very wide interests in many applications including energy, electronics, biomedical and optical fields due to their excellent size and shape dependence properties comparing with their bulk materials. Taking into consideration the various types of NPs such as metal, semiconductor, and insulator, semiconductor nanoparticles have been widely investigated because the materials have been found useful in important applications [1-3].

Metal oxide NPs have a very important place in material science. Among them, for instance, cupric oxide (CuO) NPs have been the hot topic because of their monoclinic structure, narrow band gap with p-type and semiconducting properties [4, 5]. In these regards, CuO NPs have been widely studied in various fields such as photodetector [6], energetic materials [7], supercapacitors [8].

In this study, a density functional based tight binding (DFTB) which is based on the density functional theory (DFT) and molecular dynamics (MD) methods [9, 10] have been performed to study the size-dependent electronic structure properties such as HOMO, LUMO and band gap energies, total energies, dipole moments and Fermi levels. The results were compared with experimental results and discussed in detail. In addition, we have performed the structural analysis using R which is an open source programming language and is found in virtually all computational and data science analyses and has become one of the most common scientific computational tools. To make the program more accessible to non-computational scientists, we have designed and implemented R programs to simplify structural analysis. These includes functions to analyze the number of bonds, segregation phenomena, and RDF of the CuO NPs based on the size. We also have made the code open source freely available online. Additionally, these programs include high resolution visualizations to plot data.

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International Natural Science, Engineering and Materials Technology Conference

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NOVEL BIO-BASED BENZOXAZINES WITH CATALYTIC CHARACTERISTICS

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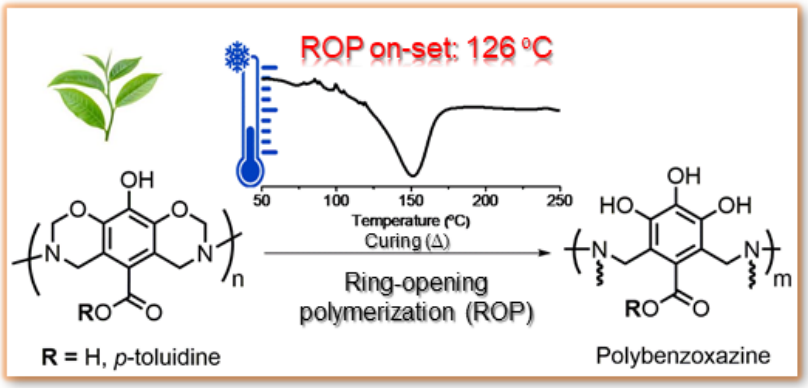
A novel bio-based main chain benzoxazine with two oxazine rings and one phenolic hydroxyl group in the same aromatic ring was synthesized and characterized. The method includes the synthesis of polymeric benzoxazine precursors from simple chemicals by using traditional main chain synthesis methodology[1,2]. The precursors were successfully characterized by the spectral and thermal investigations using ^{1}H NMR, FTIR, GPC, DSC and TGA. The results demonstrated that phenolic hydroxyl groups in the benzene ring which are adjacent to the two oxazine rings have a great effect to reduce ring-opening polymerization (ROP) temperature of benzoxazines. The clear reduction in ROP temperature was demonstrated by tracking exotherm in DSC analysis with an onset value around 125 °C. Moreover, thermal stability of the final products were investigated by TGA and high char yields observed.



Scheme 1. Schematic representation of bio-based benzoxazines with catalytic characteristics

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International Natural Science, Engineering and Materials Technology Conference

Sep 9-10, 2019, İstanbul / TURKEY

PREPARATION OF ACETYLCHOLINE BIOSENSOR FOR THE DIAGNOSIS OF ALZHEIMER'S DISEASE

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AChE sensing behavior of modified pamam dendron (PAMAM-Sal) synhesized by condensation [1]. Structure of PAMAM-Sal was characterized by means of spectral analyses. And then, a bienzymatic biosensor system was prepared. We known that Alzheimer's disease (AD) is a neurodegenerative disorder resulting from an impaired cholinergic function [2]. The incidence of AD occurs in individuals age 65 years and older. The disease may substantially impact not only on the patients, but also the society [3]. Therefore, we developed biosensor for diagnosis of Alzheimer's disease.

In this study, a bienzymatic biosensor system with acetylcholine esterase and choline oxidase was prepared with carbon paste electrode modified with PAMAM-Sal-dendron for determination of the amount of acetylcholine. Acetylcholine esterase and choline oxidase enzymes were immobilized onto modified carbon paste electrode by cross-linking with glutaraldehyde. Determination of acetylcholine was carried out by the oxidation of enzymatically produced H_2O_2 at 0.4 V *vs.* Ag/AgCl. The linear working range for acetylcholine determination of biosensor was identified. The effects of pH and temperature on the response of the biosensor were examined. Reusability and storage stability of the biosensor were determined. Interference effects of interferants which might be in biologic media on the response of the biosensor were also studied.

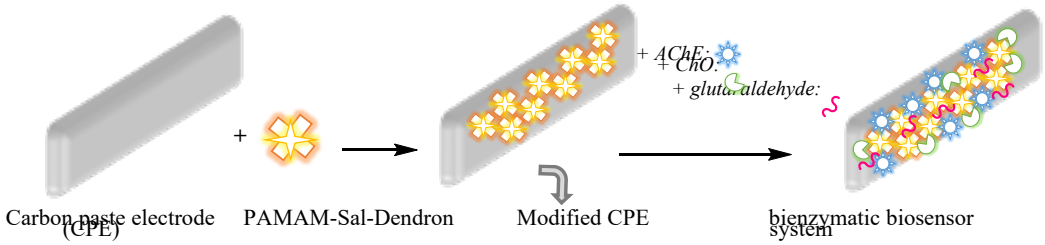

Figure: Bienzymatic biosensor design method

Acknowledgements: The authors are grateful to the Research Foundation of Gazi University (05/2017-13), for supporting this study.

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COMPLEX GO: Cu: In NANOPARTICLES SYNTHESED BY BACTERIA AND FABRICATION OF GO:Cu:In / p-Si STRUCTURE

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A novel approach of bacterial biosynthesis complex nanoparticles is simple, ecofriendly and economic. In this research, complex cooper and indium metals doping graphen oxide (GO: Cu: In) were reduced together via a special type of bacteria in Luria-Bertani medium under dark conditions for the first time. The synthesized GO:Cu:In nanoparticles characterized by transmission electron microscopy (TEM).

GO:Cu:In nanoparticles in solution dropped on glass and p-Si substrates and then they were dried for the formation thin film structure in 300ºC temperature. Optical properties of the GO: Cu: In thin film have been investigated by UV-Vis. Spectrophotometer method. Indirect band gap of GO:Cu:In thin film obtained as 1.95 eV. Structural characterization of the thin film was investigated by X-ray diffraction (XRD) and Field-emission scanning electron microscopy (FE-SEM) with energy dispersive techniques (EDS) techniques. GO: Cu: In thin film had good nano-crystalline nature. Then rectifying (Au) and ohmic (Al) metal contacts were performed on direct GO: Cu: In thin film and p-Si substrate, respectively. Au/ GO: Cu: In /p-Si/Al structure was obtained and its electrical properties were investigated by current-voltage (I-V) measurements. Some electrical parameters of the Au/ GO: Cu: In /p-Si/Al structure as ideality factor (n), saturation current (I_o) and potential barrier height (Φ_b) were calculated. Au/ GO: Cu: In /p-Si/Al structure was shown in Fig. 1.

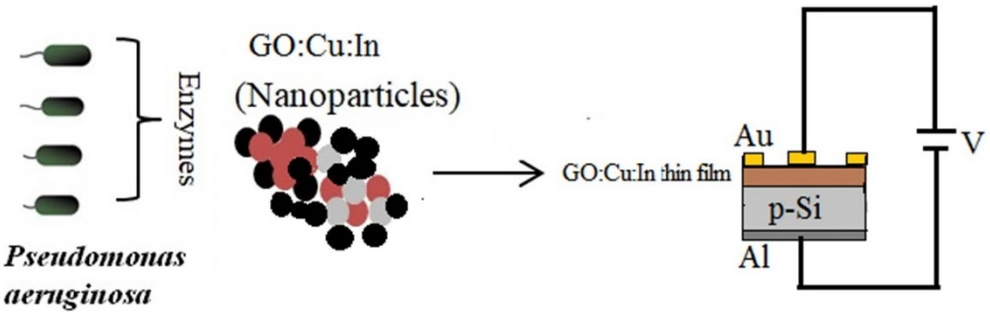

Fig. 1: Bacterial synthesis of GO: Cu: In nanoparticles and Au/ GO: Cu: In /p-Si/Al structure

INVESTIGATION OF BACTERIAL SYNTHESIZED COMPLEX CuZnSe NANOPARTICLES AND FABRICATION OF CuZnSe THIN FILM

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Many different methods such as chemical, physical, and biological methods are used to synthesis nanoparticles. Among the different synthesis methods, using microorganisms for nanoparticles synthesis can be suitably scaled up for large-scale synthesis of nanoparticles. Bacterial synthesis of nanoparticles is a green chemistry approach that non-toxic and economic. Among the bacteria, some special bacteria is unique to tolerate high chemical concentration [1-2].

In this research CuZnSe nanoparticles were synthesized by using selected special bacterium under dark conditions for the first time. The synthesized CuZnSe nanoparticles were characterized by transmission electron microscopy (TEM). Then their solution dropped on different substrates (glass and p-Si) and then they were dried at 65ºC. Optical properties of the CuZnSe thin film was investigated by UV-Vis. Spectrophotometer method. Structural properties of CuZnSe thin film were characterized X-ray diffraction (XRD), Atomic force microscopy and Field-emission scanning electron microscopy (FE-SEM) with energy dispersive X-ray spectroscopy (EDS) techniques. CuZnSe

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INVESTIGATION OF A HEATING SYSTEM UNDER ON-OFF CONTROL

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The primary aim of this research is to study the dynamic behaviour of the on-off controller-controlled HVAC system in the heating and humidifying operation under the disturbance effect. Heat loss and humidity variation due to natural ventilation caused by the open window to the outdoor air has a disturbing effect on the system. The entire system's mathematical model is presented with mathematical models of HVAC system components. The model was divided into two sub-loops: temperature loop and humidity loop. Both the flow rates of hot water passing through the heating coil and the flow rate of water added by the humidifier into the air were controlled by an on-off controller to keep indoor air conditions within acceptable limits. The air temperature and relative humidity graphs of the zone were obtained from the simulations of the proposed model under winter climate conditions of Istanbul/Turkey. The results demonstrated that the designed on-off controller performed well.

Keywords: HVAC, Heating, Dynamic Model, Simulation, Disturbance, On-Off Controller

METHODS FOR CORROSION RATE DETERMINATION

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The methodologies developed to specify the corrosion rate is divided into two distinct groups: "chemical" and "electrochemical" methods. Chemical methods are based on the detection of mass loss and atomic absorption spectroscopy analysis. However, electrochemical methods are more widely used and more important in determining the corrosion rate.

Electrochemical methods are known as (i) Tafel extrapolation, (ii) linear polarization, and (iii) impedance spectroscopy methods. The Tafel extrapolation method is based on the implementation of the Tafel equation found by Tafel. The corresponding Tafel equation is given by the following formula; $\eta = a+b\log i$; where η is overvoltage, i represents the corrosion current density, a and b are the constants. Another method used to determine the corrosion rate is named as linear polarization or polarization resistance method. The theoretical basis of this method is given by Stern-Geary (Figure 1).

$$\frac{\Delta E}{\Delta i} = \frac{\beta a \times \beta c}{2.303 \times i_{cor} \times (\beta a + \beta c)}$$

Figure 1. Equation of Stern-Geary

In the above-given equation; ΔE and Δi signify the potential and current differences, respectively. icor represents the corrosion current density and βa-βc define the anodic and cathodic Tafel constants. In order to determine the corrosion rate, Electrochemical Impedance Spectroscopy (EIS) could also be used to obtain accurate and error-free results. Besides, this method is also crucial for developing electroplating and electro-organic synthesis methodologies, and it provides an effective way to generate and modify high-technology semiconductors and batteries. During an EIS analysis, we measure the resistance and capacitance properties of the studied materials via the application of a sinusoidal AC excitation signal (0.2-10 mV). The corresponding spectrum obtained by the variation frequency in a defined range. This spectral method is more sensitive and effective than the other techniques discussed herein.

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PASSIVATION IN CORROSION

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In general terms, passivation is defined as the loss of a metal's ability to react under certain environmental conditions. Alternatively, passivation is also referred as the anodic potential applied to the system externally in order to substantially reduce the rate of corrosion or the addition of an oxidizing component to the corrosive medium in which the metal is present.

The corrosion rates decrease by 10^4-10^6 when the metal goes from active to passive state, and the passive state is usually unstable. The passivation state may be degraded due to electrochemical or mechanical effects. Electrochemical effects include altering the potential of the metal or its alloy, excessive oxidation, and dissolution processes. Eliminating the passivation by scraping the metal surface with a glass rod is an example of the mechanical effect. The metals that are first passivated and then reactivated are described as active-passive metals. Following the elimination of passivation, the current in the solution will start to rise, and the crude metal will dissolve again into the solution by generating its cation species but in a higher state. For example, in the beginning, if the reaction environment consists of the iron ion, which is in Fe^{+2} state, after the elimination of the metal passivation step, the metal will dissolve in +3 state. The region that occurs following the passivation is known as the transpassive region. In the case of anions such as chloride are present in the solution medium where the passivation is carried out, the degradation potential of the passivation shifts to less noble values so that the passivation zone becomes narrower, and therefore the metal will be corroded. The shape of the passivation curves depends on the type of the studied metals, the passivation medium, and the specific ion species present in this medium. For instance, in the same acidic environment, the passivation curves obtained from Ti, Cr, and stainless steel will be different from each other. Howbeit, for the same stainless steel sample, the passivation curves obtained in three different media will also be distinctive. The temperature and increase in acid concentration also affect the passivation curve of the active-passive metals.

In this context, metal passivation is crucial for many engineering applications, but its mechanism is still not fully understood. The basis of passivation is based on a very thin film formed on the surface of the metal. It is determined that this film is composed of various metals and metal oxides and that the film thickness is at most 30 Aº. Many metals (Fe, Cr, Ni, Ti) and their alloys show passivation in their solutions. However, it should be noted that not all the metals show passivation.

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VOCs EMISSIONS FROM LASER PRINTERS AND HEALTH RISK ASSESMENT OF OFFICE EMPLOYEE

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Photocopiers and laser printing devices have been used commonly in offices. These devices have emited potentially harmful pollutants such as toxic elements, carbon black, volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) which are used in toner as filling materials. Numerous studies have shown that both short- and long-term exposures to high concentrations of such as toxic compounds increases the health risks in indoor environment [1,2] . Measurements of chemical pollutants released from printers in photocopy centers and office environments have been investigated in various studies[1,2,3] However, it is necessary to increase the number of health risk studies related to the risk of exposure to pollutant components in office environments where intensive printing and photocopying activities are performed. To this purpose current study, a general evaluation of indoor air quality in an office room with heavy printing activity was investigated. Indoor air quality was determined in a controlled staff room in an academic institution to idendify VOCs concentration behavior while printing periods of a laser printer operation. Besides, carcinogenic and non-carcinogenic health risks arose due to the exposure of indoor concentration of the VOCs were determined. As a result of the higher indoor concentration of the VOCs, a total hazard quotient (HQ) value was $9.9x10^{-2}$ and a total CR higher than $1.3x10^{-5}$ were estimated in the study atmosphere.

Keywords: Printer emissions; health risk assessment;VOCs; indoor air quality

Acknowledgments: This work was supported by the Scientific Research Council of Bolu Abant Izzet Baysal University (BAIBU-BAP) under the grants of 2017.09.02.1232 and 2018.09.02.1327. We also appreciate to Dr. Eftade O. GAGA, Dr. Serpil YENİSOY KARAKAŞ for their allowance in their laboratories and equipment in the study.

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HEALTH RISK ASSESMENT OF PAHs in SIZE SEGRAGATED PM SAMPLES COLLECTED FROM SEMI-URBAN LOCATION IN SUMMER AND WINTER SEASONS

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Polycyclic aromatic hydrocarbons (PAHs) are important organic pollutants which are mainly released into atmosphere from anthropogenic sources as a result of incomplete combustion of fossil fuels and biomass [1]. PAHs are increasing concern in urban and semi-urban atmosphere because of their toxic, carcinogenic and mutagenic effects [2]. On the other hand, health effects of particulate matter mainy depend on the particle size distribution [3].

Size-segregated atmospheric particulate matter (PM) samples were collected from the Bolu Abant Izzet Baysal University campus for 30 days period of both summer and winter seasons. Size-segregated PM samples were collected using Sioutas Cascade Impactor (SCI) with 4 stages: >2.5, 2.5-1.0, 1.0-0.5, and 0.5-0.25 µm. To determinate PAHs concentrations, filters were sonicated with organic solvents and analysed with a gas chromatography coupled with a mass spectrometry (GC-MS) system. The most dominant PAH compounds in PM phase were Phe, Flt and Pyr both summer and winter samples. The highest concentrations of PM were obtained on the smallest PM size (PM<0.25 µm) both summer and winter seasons. Carcinogenic and non-carcinogenic health risks were determined for PAH compounds for two seasons. Lung cancer risk by the PAH exposure was founded higher in winter period than summer period.

Keywords: Size distribution, PAHs, carcinogenic potential

Acknowledgments: This study is financially supported by BAİBÜ Scientific Research Council by the grant of 2018.09.02.1327. Authors thank to the BAİBÜ for their support.

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International Natural Science, Engineering and Materials Technology Conference

Sep 9-10, 2019, İstanbul / TURKEY

ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF THREE EXTRACTS FROM CIRSIUM CRETICUM SUBSP. CRETICUM

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The Asteraceae family is one of the largest families of flowering plants (almost 1600 genera and over 23,000 species) [1] and *Cirsium* is one of its widespread species. Since *Cirsium* species have been defined to have a wide range of biological activities, it has gained a rising interest in scientific area [2]. Genc and Ozhatay [3] reported *C. creticum* are used as cure against mushroom poisoning. Also, it was explored that *C. creticum*'s stem can be eaten as raw vegetable or cooked in a meal after peeling its barks [4]. The objective of this study was to investigate the effect of antibacterial and antifungal activity on the three raw extracts of *Cirsium creticum* subsp. *creticum* L..

C. creticum plants collected from natural habitat in Trakya region. The whole plants parts were ground and powder-homogenized after dried. Then they were macerate d at room temperature with *n*-hexane, diethyl eter, ethyl acetate and methanol, respectively. The extracts were individually concentrated on a rotary evaporator under vacuum. The experiments were carried out to determination of antimicrobial activity in extracts by using microdilution method. Six micro-organisms were used for antimicrobial activity testing; *Staphylococcus aureus, Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa, Proteus mirabilis, Salmonella typhimurium*. Six fungus were used for antifungal activity testing; *Candida albicans*, *Candida parapilosis, Candida glabrata, Candida krusei, Aspergillus funigatus, Penicillium chrysogenum*.

The results showed that the antibacterial activity of *C. creticum* on *B. subtilis*, *E. coli*, *P. aeruginosa* and *P. mirabilis* was found similar with a MIC (Maximum Inhibition Concentration) level of 31.25 mg/ml and inhibition effects were determined higher than *C. creticum* methanol extract the other bacterial strains. The highest inhibition effect of *C. creticum* methanol extract was found againts *C. albicans*, *C. parapilosis* and *A. fumigatus* with a MIC level of 7.8125 mg/ml. *C. creticum* methanol extract also showed higher inhibitory effect against *C. glabrata* and *C. krusei* than other fungal strains.

In this study, it is the first time reported the antimicrobial and antifungal activities of *C. italicum* three extracts.

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ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES OF THREE EXTRACTS FROM CIRSIUM ITALICUM (SAVI) DC.

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Increasing resistance of microorganisms against available antimicrobial agents is of major concern among scientists and clinicians worldwide. In general, it is observed that pathogenic viruses, bacteria, fungi, and protozoa are more and more difficult to treat with the existing drugs, so need to plant source [1]. *Cirsium italicum* (Savi) DC. belongs to the Asteraceae family and some parts of *Cirsium* species, especially the roots or whole plants have been used for treatment some diseases such as hemorrhaging, inflammation of the liver and kidney, and a variety of abdominal and intestinal disorders [2]. It was reported that the extract from *C. italicum* prepared by boiling seeds can be effective for the treatment of haemorrhoid [3]. The objective of this study was to investigate the effect of antibacterial and antifungal activity on the three raw extracts of *Cirsium italicum* (Savi) DC.

Dried whole plants extracted by using n-hexane, dicholoromethane, ethyl acetate and n-butanol as solvent and solvents evaporated under vacuum. The experiments were carried out to determination of antimicrobial activity in extracts by using microdilution method. Six micro-organisms were used for antimicrobial activity testing *Staphylococcus aureus, Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa, Proteus mirabilis, Salmonella typhimurium*. Six fungus were used for antifungal activity testing; *Candida albicans*, *Candida parapilosis, Candida glabrata, Candida krusei, Aspergillus funigatus, Penicillium chrysogenum*.

The results showed that the antibacterial activity of *C. italicum* ethyl acetate extract on *B. subtilis* was found with a MIC level of 2.38 mg/ml. The highest inhibition effect of *C. italicum* ethyl acetate extract was found againts *C. parapilosis* with a MIC level of 1.98 mg/ml.

In the literature, there is no study on the antibacterial and antifungal activities of dichloromethane, ethyl acetate and n-butanol extracts of *C. italicum.*

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THE ADDITION OF SELECTED ORGANOALUMINUM AND ORGANOZINC REAGENTS TO THE PROTECTED IMINO AND α-KETO PHOSPHONATES

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Nucleophilic additions of Grignard and organolithium reagents to a compound having carbonyl functional group to form C-C bond are well known chemistry.[1] Same addition chemistry is also performed for imine derivatives. The former reaction leads to formation of secondary alcohols and the latter addition reaction is used to prepare secondary amines. The syntheses of α-hydroxy phosphonates and α-amino phosphonates are very important in medicinal and synthetic organic chemistry because of close analogs of α-hydroxy phosphonic acids and α-amino phosphonic acids. Compounds containing this functional group in their structure are likely to exhibit a wide range of biological activities i.e. antibacterial, antitumor, antibiotic, enzyme inhibition.[2-4] For that reason synthesis of phosphorous-containing α-hydroxy and α-amino compounds are crucial. Grignard and organolithium reagents are very reactive towards the aroyl phosphonates and imino phosphonates. With these reagents C-P bond breaks very easily. Herein, the investigation of direct addition of the selected organoaluminum and organozinc reagents to the protected imino and aroyl phosphonates will be presented at this conference.

Last part of the investigation (addition of selected oraganozinc reagents to α-keto phosphonates) has been supported financially by Çanakkale Onsekiz Mart University the Scientific Research Coordination Unit (Project number: FBA-718).

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HEALTH RISK ASSESMENT OF VOLATILE ORGANIC COMPOUNDS (VOCs) IN THE AMBIENT SEMI-URBAN LOCATION IN SUMMER AND WINTER SEASONS

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Volatile organic compounds (VOCs) are emitted into the ambient from both anthropogenic (e.g., motor vehicles, petrochemical plants, refineries) natural (e.g., emissions from forests, wildfires) sources[1,2]. VOCs are great concern due to their potential acute and chronic adverse effects to urban health [3] the concentrations of atmospheric VOC concentrations is varied from depending on sources, meteorological conditions and photochemical reactions [4]. Ambient VOCs were collected from the Bolu Abant Izzet Baysal University campus for 30 days periods of both summer and winter seasons by using stainless steel tubes containing Tenax TA sorbent. Analyses of the samples were performed by a Thermal Desorber (Markes, Unity 2) connected to a Gas Chromatograph (GC) (Agilent, 6890) - Flame Ionization Detector (FID). In this study, inhalation cancer risk values were calculated for benzene by using data from USEPA's Integrated Risk Information System.

Keywords: VOCs, health risk assesment, seasonal variations

Acknowledgments: This study is financially supported by BAİBÜ Scientific Research Council by the grant of 2018.09.02.1327. Authors thank to the BAİBÜ for their support.

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ORGANIC and ELEMENTAL CARBON CONCENTRATIONS on SIZE-SEGREGATED AMBIENT PARTICULATE MATTER in BOLU

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It is well known that carbonaceous aerosol comprises a major fraction of atmospheric PM [1]. Organic components constitute a significant percentage of atmospheric fine mode aerosol, as much as 50% or above by mass [2]. This organic components of PM have been subjected to comprehensive research in recent years, due to their crucial impacts on many environmental aspects including the climate change, visibility reduction, source apportionment and also adverse human health effects.

Size-segregated PM samples were collected from a sub-urban location of Bolu in winter and summer periods of 2019 and OC/EC concentrations were determined. Percent OC and EC both increased by the decreasing PM size indicating that the anthropogenic emissions are the main sources of organic aerosol in ambient air together with the secondary organic aerosol formation. Contribution of the secondary organic aerosol to total PM mass was evaluated by using EC-Tracer approach. More than 50% of the fine and quasi-ultrafine mode aerosol were estimated to be secondary.

Keywords: OC, EC, secondary organic aerosol, size-segregated PM

Acknowledgments: This work was supported by the Scientific Research Council of Bolu Abant Izzet Baysal University (BAIBU-BAP) under the grant of 2018.09.02.1327.

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THE EFFECT OF OPERATIONAL PARAMETERS ON THE PHOTOCATALYTIC DECOLORIZATION OF REACTIVE YELLOW 145

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Heterogeneous photocatalysis is an advanced oxidation process and this alternative approach has gained an enormous interest to degrade organic contaminants in wastewater in recent decades. The process is based on the combined use of UV-A light and semiconductors to decompose organic pollutants. Owing to its chemical inertness, photostability, low-cost, non-toxicity and high oxidative power, TiO_2 is the most efficient photocatalyst for this process. However, TiO_2 is active under only UV light because of wide band gap. This disadvantage, limits its usage under solar light as a renewable energy source. Overcoming this issue, TiO_2 is doped with metal or non-metal ions to improve its activity under solar light in recent years [1-3].

In this study, solar light sensitive copper doped TiO_2 photocatalyt containing 0.25 wt% Cu (0.25%Cu-TiO_2) was prepared by a simple wet-impregnation method and followed by a heat treatment. $Cu(NO_3)_2 \cdot 3H_2O$ was used as the dopant source. The photocatalytic activity of 0.25%Cu-TiO_2 photocatalysts was determined by investigating the photocatalytic decolorization kinetics of Reactive Yellow 145 under solar light irradiation. The effect of operational parameters such as amount of catalyst, the initial dye concentration, and the initial pH on the rate of dye decolorization was also studied.

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GLUTATHIONE-RESPONSIVE SMART POLYMERIC MATERIALS

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Over the past decades, investigation of novel polymeric smart materials responding to external stimuli such as pH, temperature, electric field and reducing agents has gained great attention due to the various potential applications in drug delivery systems, biosensors, tissue engineering and environmental remediation [1]. Redox-responsiveness is one of the key stimulus in bio-based applications since extracellular fluids and intracellular compartments has different redox states [2]. There are some redox-responsive chemical groups such as disulfide bonds, diselenide bonds, succinimide-thioether linkages and ‘‘trimethyl-locked’’ benzoquinone [3]. Among those redox-responsive groups disulfides are most reliable groups since they are well-studied in many investigations and they can easily be cleaved by glutathione to be used in release studies. Glutathione is known to exhibit in the range of 1-10 mM concentrations within the intracellular compartment which will facilitate the degredation of disulfide linkages in polymeric materials.

In this research, glutathione-responsive multifunctional hydrogels with disulfide bonds were synthesized utilizing condensation reaction between bifunctional poly (ethylene)glycol diamine and epoxy disulfide monomer. After gelation, hydrogel properties were evaluated with swelling tests, rheological and surface morphology analysis. The degradation profiles were also investigated through rheological tests in glutathione solution. Functionalization of free reactive groups of hydrogels were also demonstrated with model dyes and biomolecules.

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Acknowledgements

The Scientific and Technological Research Council of Turkey (TUBITAK. 115Z661)
The Center of Life Sciences and Technologies at Bogazici University

METALLIC NANOPARTICLES AS X-RAY COMPUTED TOMOGRAPHY (CT) AND MULTIPURPOSE CONTRAST AGENTS

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Since the invention of X-ray computed tomography (CT), it has been vastly used in many applications such as engineering, medical science, anatomy, entomology etc [1]–[3]. Every year millions of CT scans were performed for diagnostic purposes. Since X-ray is highly permeable, it can pass through almost any object depending on its thickness and X-ray absorption coefficient. Human body consist of hard and soft tissues that X-ray can easily pass it through. Organs and soft tissues in human body has quite similar stiffness which makes diagnostics difficult using CT applications. To overcome this problem, contrast agents were used in both biological and medical applications [4]. Iodine based contrast agents are popular contrast agents used in medical applications. Developing technologies request new generation multipurpose contrast agents with targeted drug delivery, multipurpose imaging and photothermal therapy properties. Iodine based contrast agent cannot meet the requirements of the developing technologies. However, metallic nanoparticles show magnetic, photocatalytic, photothermal properties where modification made on the nanoparticles make them available as targeted drug delivery, hyperthermia, contrast enhancement agents. In this work we reviewed the *in vivo* biological applications or metallic nanoparticles reported in the literature and evaluated their contrast enhancement and targeted drug delivery properties.

Acknowledgments: This work was supported by the Kırklareli University Research Fund (Project number: KLÜBAP-179).

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PREPERATION OF MAGNETIC NANOPARTICLES FOR USAGE MANY APPLICATIONS

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The last two decade years, there has been increasing syntheses in the design of new magnetic nanoparticles [1]. They are widely used in numerous fields especially nanotechnology. Redox-active macromolecules, particularly those containing late transition-metal sandwich complexes have been studied in various fields. The Bis(η5-cyclopentadienyl)iron complexes are the most common ones because of their stability in different oxidation states M^{2+}, M^{3+}) on the electrochemical time scale.

It is known that the immobilization of enzymes is very important. Enzymes can use many times for the same reaction thanks to immobilization.[3] Nanoparticles have been investigated for immobilize of enzyme. GOx enzyme has been extensively used in fabrication of determination for glucose.

In this study, magnetic nanoparticles were synthesized by convergent methods using template reactions of Bis(η5-cyclopentadienyl)iron with 2,4,6-triamino-1,3,5-triazine. (Fig. 1). The physical and chemical properties of the magnetic nanoparticles were characterized using FT-IR, SEM, GPC and optical microscope as well. The experimental results showed that the prepared ferrocene attached nanosphere had high sensitivity and good operational stability for detection glucose.

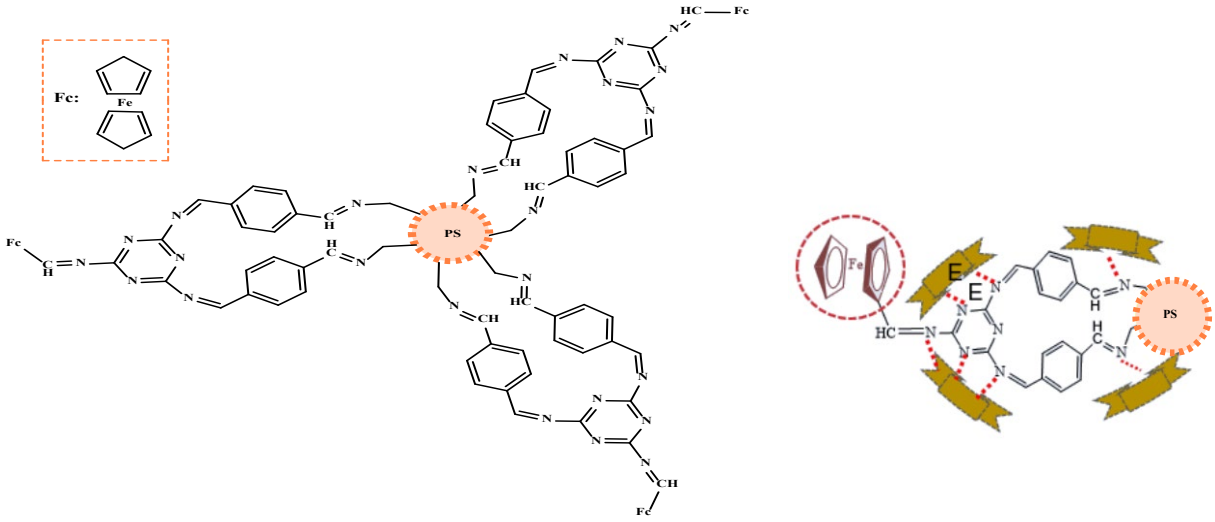

Figure 1. Synthesized of nanoparticules (Fc-2G-PS).

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CATALYTIC ACTIVITY OF GREEN DEHYDROGENATION OF DIMETHYLAMINE BORANE BY CATALYZED RUTHENIUM (4%)@CELLULOSE NANOPARTICLES

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There are many methods for hydrogen obtained from dimethylamine borane used as the solid hydrogen storage materials. Generally, hydrogen is obtained from dimethylamine boranes activated by suitable catalysts in the solvent medium or thermally at high temperatures. Although good results are also obtained with both approaches, these methods are toxic, time consuming, costly and nonatom-economic because in these methods are used solvents that are expensive and pollution created or carried out in unsuitable reaction temperature for practical applications. Because of the relatively high use of oil derivatives many chemical industry attempts to produce solvents with high E-factor [1,2]. In addition to supercritical fluids, ionic liquids and fluorinated solvents produced and used for this purpose, "The best solvent is no solvent" approach [3] has been the focus of our attention in this project. However, thanks to solventless reaction applications (green synthesis) will not need to expensive and environmental pollution created solvents and additional energy and cost for removal of solvents, therefore environmental pollution will be prevented while both energy and solvent savings will be provided.

It is aimed with this study that generation of hydrogen from suitable solventless catalytic dehydrogenation of dimethylamine borane to green synthesis principles using simple mechanical stirring technique, definition of many parameters (ratio of amine borane/catalyst, catalytic activity, temperature, time, activation energy, reusability, TOF etc) of active Ruthenium (4%)@Cellulose nanoparticles as catalyst.

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COPPER (%1)@STARCH NANOPARTICLES: SYNTHESIS AND CATALYTIC ACTIVITY OF GREEN DEHYDROGENATION OF DIMETHYLAMINE BORANE

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Recently, dimethylamine borane (DMAB, Me_2NHBH_3) has been appealed as one of the most promising hydrogen storage materials owing to its high gravimetric capacity of hydrogen (3.5 wt%) that is higher than the material-based gravimetric target set by the US Department of Energy (DOE) for 2022 [1]. Up to now, dimethylamine borane and related boron-nitrogen compounds have also attracted much research interest as a candidate for hydrogen storage [2].

In the scope of this study, it has been investigated; (i) *in situ* synthesis of Cu(%1)@Starch nanoparticles (NPs) in the green (solventless) dehydrogenation of dimethylamine borane, (ii) effect of extensive kinetic data under stirring conditions depending on the substrate and catalyst concentrations to define the rate law of Cu(%1)@Starch NPs catalyzed dehydrogenation of DMAB at 35.0 $\pm$ 0.1°C, (iii) determination of activation parameters (E_a, $\Delta H^{\#}$ and $\Delta S^{\#}$) for Cu(%1)@Starch NPs catalyzed green dehydrogenation of DMAB; (iv) demonstration of the catalytic lifetime of Cu(%1)@Starch NPs in the green dehydrogenation of DMAB at 35.0 $\pm$ 0.1°C, (v) quantitative carbon disulfide (CS_2) poisoning experiments to find a corrected TTO and TOF values on a per-active-copper-atom basis, (vi) testing isolability and reusability of Cu(%1)@Starch NPs in the green dehydrogenation of DMAB at 35.0 $\pm$ 0.1°C.

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International Natural Science, Engineering and Materials Technology Conference

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MONITORING THE INHIBITION REACTION OF BETWEEN CHLORPYRIFOS AND IMMOBILIZED AChE USING HPLC-DAD SYSTEM

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Organophosphorus (OP) and carbamate pesticides are widely used in modern agriculture. However, they are very toxic substances that can have a negative effect on human health. They cause malignant diseases through food chain contamination. It also inhibits the acetylcholinesterase (AChE) enzyme in many organophosphorus and carbamate pesticides such as trichlorfon, carbaryl. Therefore, rapid, precise and low-cost detection of pesticide residues is important to ensure the quality of the environment and food safety [1]. The free AChE enzyme has some disadvantages such as high cost, low stability, low temperature storage and only one time availability. The immobilization of AChE on the carrier is an effective method for solving these problems.

In this study, the AChE enzyme was immobilized on the polymeric microspheres for detection of Chlorpyrifos pesticide and the optimum parameters were determined. After 8 months, immobilized 2AEPS-5-NO_2Fur support the relative activity of the enzyme was determined to protect approximately 75%. Method validation of chlorpyrifos was studied using HPLC-DAD system. Inhibition reaction of pesticide with immobilized enzyme was monitored using this system.

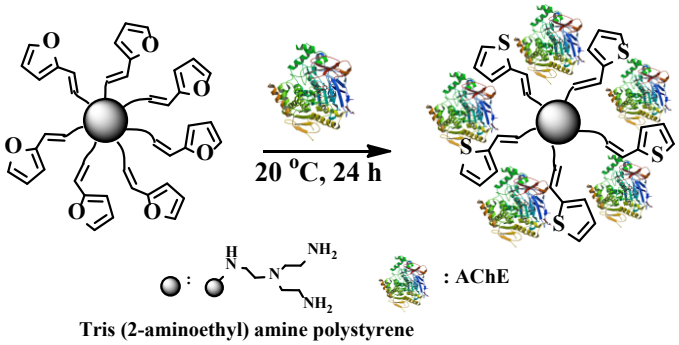

Fig. 1. Immobilization of AChE enzyme on polymeric supports

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PREPARATION AND CHARACTERIZATION OF Ln_2O_3 (Ln=La, Sm) STRUCTURES WITH DIFFERENT MORPHOLOGIES FOR OXIDATIVE COUPLING OF METHANE

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Methane, which is the main constituent of natural gas, is used for many important chemical syntheses besides its use for heating and electricity production today. However, it is being costly to transfer natural gas via pipelines due to the many natural gas reserves are far from populated and industrial sites. Therefore, the conversion of methane into transportable and valuable products becomes an important subject for both academic and industrial aspect.

Among the methane conversion processes, oxidative coupling of methane (OCM) has come into prominence by allowing the production of petroleum-based ethane and ethylene (C_2) directly. But the main obstacle in front of this process for commercialization is the absence of a catalyst that could give C_2 yield over 30% with C_2 selectivity of 90%. For this purpose, many catalysts have been developed and among these, it has been determined that rare earth metal oxides (Sm_2O_3, La_2O_3 etc.) were quite active and selective. Recent studies have shown that this process, requiring high temperature (>700°C), can be performed at lower temperatures (<600°C) with rare earth metal based catalysts such as La_2O_3 in nanorod and nanofiber structures [1]. These results show that the catalyst structure seriously affects the reaction performance and that the catalyst OCM performance can be improved by increasing the catalyst surface area/volume ratio.

For this purpose, La_2O_3 and Sm_2O_3 catalysts were prepared in nanoparticle, nanofiber, nanorod and flower-like morphologies for the oxidative coupling of methane, characterized and the reaction performances were examined. The prepared catalysts were characterized by using Brunauer–Emmett–Teller (BET) Surface Area, X-ray diffraction (XRD), scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS) and temperature programmed desorption (CO_2, NH_3 and O_2 TPD) methods. Activity and selectivity tests were actualized with Microreactor-Gas chromatography (Microreactor-GC) system.

It was determined that nanorod and nanofiber structures were active and selective even at low temperatures (<500°C). La_2O_3 nanofibers showed the highest C_2 yield (11.7%) at 450°C and nanorods showed lower C_2 yield (9.1%) at this temperature. Nanoparticles and flower-like structures showed no activity and selectivity at this temperature.

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Acknowledgement This work was supported by the Scientific and Technological Research Council of Turkey (TÜBİTAK), Grant No: 118M053

THE EFFECT OF COORDINATION COMPOUNDS ON CHOLINESTERASE ENZYME ACTIVITIES

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Inhibition properties of some coordination compounds having remarkable biological activities were investigated on activities of acetylcholinesterase (AChE - E.C.3.1.1.7) and butyrylcholinesterase (BChE - E.C. 3.1.1.8). AChE and BChE belongs to the family of cholinesterases (ChEs) that break down ester bounds of choline. Cholinesterase class includes AChE which hydrolyzes the neurotransmitter acetylcholine and BChE which utilizes butyrylcholine as substrate. Coordination polymers have been used in medicine as antiulcer, antiarthritic, antimalarial, antimicrobial, and anticancer drugs because of their therapeutic properties. These complexes containing silver have effects on the inhibition of enzymes that play a role in biochemical reactions, which are significant reactions for human life quality.

In the current study, we examined inhibitory effect of three coordination compounds ([Ni(hydeten)2Ag(CN)2][Ag(CN)2], [Ni(bishydeten)2Ag(CN)2][Ag(CN)2].H2O and [Ni(edbea)Ag3(CN)5]) synthesized by our project team on AChE and BChE, and inhibition studies of these enzymes were performed spectrophotometrically. Inhibition constant (Ki) was obtained from drawn Lineweaver Burk graphs. These metal complexes exhibited effectively inhibitory effects on AChE and BChE. Ki constant of AChE found as 352.23 µM, 46.20 µM and 54.11 µM, respectively. Ki values for BChE are 310.63 µM, 35.54 µM and 101,50 µM, respectively. The IC_{50} values of the compounds against AChE and BChE were between 41.27 µM and 272.72 µM. Inhibition type of the complexes is noncompetitive against to AChE enzyme activity, but two complexes showed competitive inhibition against to BChE.

In conclusion, it has been indicated that novel coordination molecules have in vitro inhibitory effect both enzymes. In the future, the inhibitory effect of novel complexes can be investigated in animal experiments for therapeutic effects and these results may lead to designing potent new inhibitors.

Keywords: Acetylcholinesterase, butyrylcholinesterase, cyanido complexes, enzyme inhibition

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MEASUREMENT OF THERMAL STRAIN ON A PRINTED CIRCUIT BOARD

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Contraction or expansion of printed circuit boards (PCB's) due to thermal effects can damage solder joints or directly cause failures due to deformations on the PCB itself. In this study, a PCB used in a missile being carried on an unmanned aerial vehicle (UAV) is being examined. Finite element analysis is conducted to determine the time for the PCB to reach the minimum temperature specification limit (-35°C) in UAV cruising altitudes. A specimen was cut-out from the PCB and subjected to cold test chamber using the temperature and time data. Strain data from the sample are gathered using a strain gauge and a data acquisition system. Obtained strain values are compared to industry standards to see if there is failure risk or not. Strain levels are found out to be fairly under acceptable standard limits.

THE EFFECT OF ANNEALING ON STRUCTURAL PROPERTIES OF P3HT THIN FILMS

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Poly (3-hexylthiophene) (P3HT) thin films are widely used in different application fields because of their high hole mobility and low production cost. P3HT thin films which are used as active layers in field effect transistors (OFET) and perovskite solar cells can be deposited by spin coating, spray pyrolysis, ultrasonic spray pyrolysis and electro-polymerization techniques. In this study, P3HT thin films were deposited on the glass surface by using ultrasonic spray pyrolysis technique. Then, the films were annealed in atmosphere at 100, 125, 150, 175, 200, 225 and 250 °C for 15 minutes. As-grown and annealed thin films were analyzed by, X-ray diffraction (XRD), scanning electron microscopy (SEM), and atomic force microscopy (AFM) systems. The thickness of the films was determined as 600 nm by cross-sectional SEM images. AFM analysis showed that the surface roughness did not change with annealing and XRD analysis showed that the ideal annealing temperature was at 200 °C.

THE ANALYSIS OF CAPACITANCE-VOLTAGE AND CONDUCTANCE-VOLTAGE CHARACTERISTICS OF Zr/P-Si SCHOTTKY DIODES WITH A NATIVE OXIDE INTERFACIAL LAYER AT HIGH FREQUENCIES

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Zirconium (Zr) with a work function of 4.05 eV is a valve metal [1,2]. The capacitance-voltage (C-V) and conductance-voltage (G/w) measurements of Zr/native oxide layer/p-Si Schottky diodes are taken at room temperature as a function of frequency. The characteristics of the diodes have shown dependency on frequency. The oxide thickness of 2.33 nm was calculated from the measurements at 1 MHz. The average value of series resistance of 70.5 Ω was calculated by using the capacitance and conductance values at strong accumulation region.

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INEXTENSIBLE FLOWS OF PSEUDO NULL CURVES DUE TO THE BISHOP FRAME IN MINKOWSKI 3-SPACE

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In this work, we study inextensible flows of pseudo null curves according to the Bishop frame in Minkowski 3-space E_1^3. We present some necessary and sufficient conditions as a partial differential equation involving the curvatures for inextensible flows of pseudo null curves according to the Bishop frame in E_1^3.

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SOME CHARACTERIZATIONS OF TYPE-3 NULL CARTAN SLANT HELICES DUE TO THE BISHOP FRAME IN MINKOWSKI SPACE TIME

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In this work, we extend null Cartan slant helix by using Bishop frame to Minkowski space-time. In an analogous way, we define type-3 null Cartan slant helices due to the Bishop frame in Minkowski space-time E_1^4. Moreover, we present some characterizations of such curves.

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ANTIMICROBIAL ACTIVITIES OF VARIOUS PLANTS AGAINST FOODBORNE STAPHYLOCOCCUS AUREUS ATCC 6538 AND STAPHYLOCOCCUS AUREUS ATCC 29213 MIXTURE

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In this study, antimicrobial activities of *Thymus longicaulis* C. Presl, *Sambucus ebulus* L., *Origanum vulgare* L. and *Clinopodium vulgare* L. aqueous extracts were determined against *Staphlococcus aureus* mixture obtained by using 1: 1 ratio of *Staphylococcus aureus* ATCC 6538 and *Staphylococcus aureus* ATCC 29213. In addition, the effects of temperature and pH stability on the antimicrobial activities of the extracts were investigated. We assessed bacterial cell viability in cheese and meat broth for 24 h at 7ºC and 37ºC. *S. ebulus* and *C. vulgare* aqueous extracts showed no inhibitory effect on the mixture of *S. aureus*. For *O. vulgare* and *T. longicaulis*, the minimum inhibitory concentrations (MIC) against the mixture of *S. aureus* were 1000 and 500 µg/mL, respectively. When the aqueous extracts of *O. vulgare* and *T. longicaulis* were heated at 100ºC and 121ºC for 15 minutes, an increase in antimicrobial activity against *S. aureus* mixture was determined. The inhibitory effect for *T. longicaulis* was better at pH 4.0 and 5.0. The *O. vulgare* and *T. longicaulis* (4MIC) reduced the viable counts of *S. aureus* mixture in cheese and meat broth over 24 h at 7ºC and 37ºC. We can say that these findings strengthen the potential of *O. vulgare* and *T. longicaulis* as natural antimicrobials to control *S. aureus* mixture in cheese and meat.

THE EFFECTS OF SURFACE QUALITY OF AISI 1045 GRADE STEEL ON PROCESSES PERFORMED BY CW LASER

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When we look at laser material processing technologies, it is seen that there are application areas in many fields such as cutting, drilling, laser welding, laser insertion production, marking and ablation. In each of these processes, there are many sensitive parameters and selection criteria such as laser power, wavelength, laser type, gases used according to the process and material to be processed. These parameters directly affect the results to be obtained in laser operations. The information related to these issues is discussed within the scope of the thesis.

When working on the interaction of lasers with steels, the properties of the laser and the material to be used must be meticulously handled. Knowing the parameters such as wavelength, power density, angle of incidence for lasers is very necessary for adjusting the effect of laser on the material. In addition, parameters such as surface roughness and chemical structure of the target material to be used, oxide layer, and percentage of pollution affect the result of the laser material interaction. Within the scope of the study, both the type of laser, the wavelength to be used and how the laser is directed on the material in an experimental configuration are described. Regarding the material, theoretical information about the surface topography, oxide layer and its properties, and the effects of the chemical structure of the surface were mentioned. The results after interaction with the surface properties were evaluated on the basis of samples. Since there is a material interaction with the laser, the optical properties of the material must also be known. Light interacts with solids; the incoming light beam performs reflection, absorption, scattering and partial refraction on the material.

In this thesis, the change of reflectance and absorption properties of different surface roughness of AISI 1045 steel in near infrared region at 1070 nm wavelength was investigated. In particular, detailed experimental studies were carried out on how much energy of the laser is converted to heat by the smooth and diffuse reflections of surface roughness. The thermal effects of the laser emission energy on the target were examined in the context of puncture quality (heat-affected zone, ablation and re-nucleation) and damage threshold energy. The optical properties (absorbance / reflectance / refraction / transmission) of the samples prepared at different surface roughnesses were measured using a special reflecting sphere.

COORDINATION POLYMER DERIVATIVED BINARY METAL OXIDES NANOSTRUCTURES PREPARED BY DIRECT PRECIPITATION METHOD FOR SUPERCAPACITOR APPLICATIONS

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Supercapacitors are electrochemical energy storage devices can be located between dielectric capacitors and batteries. In the recent decades, supercapacitors are supposed to become a sort of promising candidate for energy storage devices owing to their advantages including high power density, fast charging and discharging, long cycle life, and superior reversibility. Transition metal oxides are widely researched as they can provide multiple oxidation states for Faradic reactions, leading to the high pseudocapacitance [1, 2].

Two new single crystals of heterometallic coordination complexes $\{[Co(H_2O)_6][Cu(pydc)_2]\}_n$ and $[Ni(pydc)_2][Cu(pydc)_2]$ were synthesized by using pyridine-2,3-dicarboxylate (pydc) ligand. Furthermore, the resulting complexes were re-synthesized by direct precipitation method in the bulk form were calcinated in air at 400 °C for 2 h to produce the binary metal oxides (Figure 1). The electrochemical behaviour of the binary metal oxides were studied by cyclic voltammetry and chronopotentiometry (charge–discharge curves) aiming at its application as a positive electrode for supercapacitors. The results showed that binary metal oxide electrodes exhibited the good electrochemical characteristics. Capacitance values were determined by using discharge curves are 286 F/g at 1 A/g for Co-Cu oxide and 272 F/g at 1 A/g for Ni-Cu oxide could be obtained within the potential range of 0 to 0.6 V versus Ag/AgCl electrode in 6 M KOH electrolyte.

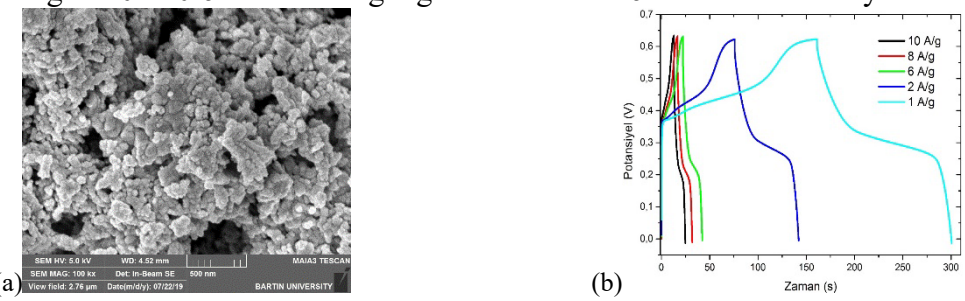

Figure 1. (a) SEM images and (b) charge-discharge curves of Ni Cu oxide electrodes

This work has been supported by The Scientific and Technological Research Council of Turkey (Project No: 118Z594).

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GENERAL STRUCTURES OF AUTOMOTIVE GLASSES AND REQUIREMENTS OF FILM COATING APPLICATIONS

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Glass is suitable to use in different areas. It is a very important material for the automotive and construction industry. It offers a variety of products in different structures. Glass production is also a very difficult and fragile process. Especially in recent years, window film applications are in high demand by users. The main reason for this demand is the aesthetic concerns of the users. However, the place of window film applications in the automotive industry is not only to eliminate aesthetic concerns. with technological advances, many innovative solutions are offered to customers through the use of window film applications. Some requirements must be met for window film applications. In addition to the sun block function, window film applications have a significant contribution to increasing the level of safety in the vehicle. Glass, which is suitable for different production and application methods, is a component that goes far beyond a visual element with its film applications. In this article, besides the basic information about the glass used in the automotive sector, information about production processes, technological developments and window film applications are given.

Keywords: Gadolinium aluminum garnet, Thermoluminescence, Kinetic parameter

EVALUATION OF TECHNOLOGY TRENDS AND PROPOSAL FOR TECHNOLOGY INVESTMENT WAY AHEAD

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It has become challenging to counteract against security threats recently. Therefore, the modernization planning in defense area and the procurement of necessary assets has become cumbersome since the way to handle these issues differs from planner to planner. The globalization, the developments in technology, never ending conflicts and problems are strongly related to the selection of the technology. The involvement of terrorist organization to the conflicts has forced the government bodies to change their approaches towards modernization. On the other hand, the convergence of civil and military technology has come close to each other. Therefore, it is a mutual benefit to use civil and military technology in a mixed way which is beneficial for the use of resources efficiently. Conflicts and wars experienced so far has demonstrated the importance of the technology for the result achieved at the end. In parallel to new technologies, it is certain that the strategy and tactics are also changing every day. Therefore, it is strictly necessary for the planners and capability developers to consider the developments very carefully in a systematic manner. This approach is not only confined to the development of military technology, but it also covers new and mixed type of threats, social changes etc. due to the developments in technology. To predict the emerging technologies and at the same time, understanding the threats are very helpful to technology developers. If defense and security planning experts fail to plan the necessary defense and security requirements and the associated supporting technology, it is a high probability that the defense against these new threats will not be enough. The main reason for USA to fall behind Russia in space program 1950's is stated to be the lack of predicting the future technology. In this study, a detailed survey of technology analysis conducted by several agencies has been reviewed and a technology way ahead is proposed for capability managers. We studied intensively several open source detailed reports on emerging technologies including NATO Science and Technology Organization and USA DARPA (Defense Advanced Research Advanced Program Agency). In our study, all these technologies has been categorized and a Technology Road Map for the next 20-years together with some considerations has been developed by utilizing well known scenarios. The aim of the study is to bring academician, industry and defense people to come together and develop technology capability for civil and defense sector. Thus, the study we believe will inform a guideline to all technology developers, and facilitate the technology investments planning. Finally, we propose 21 emerging technologies as a game changer.

A CLOSE LOOK UP AT RECENT DEVELOPMENTS IN ROAD SIMULATORS

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Nowadays, new product development process has become increasingly competitive. The automotive industry also needs technological innovations to develop and validate new vehicles in a short time. Durability road simulation tests, one of the validation activities, are increasingly important. However, duration of them is still considered to be long. There are still available durability road simulators which has single axis road load application capability. However, simulating one axis road load could not be sufficient to validate the vehicle life and may need several assumptions.

Accordingly, with the advances in testing technology, multi axis road simulators become available in the markets which named 6 degrees of freedom. With this sophisticated test systems, durability road simulation tests could be performed reasonably in a short time. Also, they could give more realistic road simulation results in laboratory environment. 6 DOF test systems basically having a design to test complete vehicle or semi-cut vehicle. Therefore, they can be classified into two main groups as Full Vehicle and Half Vehicle road simulators which have their pros and cons with several parameters. This article discusses the basic technological features and test capabilities of these systems and gives information about their major selection criterias.

THE TREATMENT OF DYE INDUSTRY WASTEWATER BY SOLAR PHOTOFENTON OXIDATION AND EFFECT OF RESIDUAL HYDROGEN PEROXIDE ON COD: A LABORATORY SCALE STUDY

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The dye production industry has high pollutant concentration compared to other industrial sectors in terms of wastewater volume and composition. Properties of dye produced for different industries vary according to the industry in which they are used. Dye production industry wastewaters contain different types of dyes, salts and other chemicals. High COD and colorants worsen wastewater treatability, make it difficult to treat wastewater, reduce the light transmission when discharged to environment and adversely affect photosynthetic activity. In addition, the accumulation of dyes in aquatic organisms increases the risk of toxic and carcinogenic products. Advanced oxidation, chemical coagulation, and adsorption are the most used treatment methods of dye production industry wastewaters.

In this study, Fenton and Photofenton studies carried out since the sources of pollutants in dye production wastewaters are generally chemicals and dyestuffs used during production processes. It is observed that high COD and color removal rate is achieved with both Fenton and Photofenton methods. One of the advanced oxidation methods, Fenton oxidation process provides high treatment efficiency for dye wastewater. The Fenton process is based on the reaction which produces hydroxyl radicals of Fe^{2+} ions with hydrogen peroxide under acidic conditions. Iron ions reacts with H_2O_2, thus forming hydroxyl radicals. The formation of hydroxyl radicals is a complex reaction chain in aqueous solutions. The Fenton process generally takes place in four stages: pH adjustment, oxidation reaction, neutralization-coagulation and precipitation. In this study, the effect of hydrogen peroxide removal by UV system during Photo-Fenton and its effect on treatment efficiency were investigated.

COMPARISON OF TREATMENT EFFICIENCY OF DYE PRODUCTION INDUSTRY WASTEWATER BY FENTON, POST-FENTON UV, AND PHOTO-FENTON METHOD

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The dye production industry has highly polluted wastewater due to various paint production and boiler washing processes. The dye production industry has wastewater which has high COD, TSS, and toxicity, due to various dye production and boiler washing processes. The discharge of this colored and toxic wastewater into the environment is may cause a devastating effect on aquatic ecosystems.

Although the treatment of dye production industry wastewater is done by different methods, color and toxicity removal is not useful by each method such as coagulation. Fenton and UV-enhanced treatments like photo-Fenton have mainly been investigated as alternative treatment methods to remove color and pollution from dye production wastewater. In this study, a raw wastewater from dye production industry was treated with different methods such as ozonation, Fenton, and coagulation, and Fenton was found that the most effective method. Photo-Fenton and post-Fenton UV applications were performed because the Fenton treatment efficiency is high. The high content of chloride (Cl^-) is one of the important limitations related to the application of Fenton for the treatment of dye production wastewater. The concentration of chloride (Cl^-) in wastewater may reduce $OH^{\cdot}$. Post-Fenton UV and photo-Fenton processes are the most efficient and low-cost solar energy and are more effective in wastewater treatment. In the scope of the study, the efficiency of Fenton, photo-Fenton, and post-Fenton UV treatment methods were compared. Post-Fenton UV treatment provided a better treatment efficiency and reduced Fenton reaction time compared to other methods.

International Natural Science, Engineering and Materials Technology Conference

Sep 9-10, 2019, İstanbul / TURKEY

DEVELOPMENT OF TARGETTED, DUAL DRUG DELIVERY SYSTEM AND EXAMINATION OF ANTICANCER EFFECT

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Regulation of mRNA and protein levels by DNA/RNA transfection is able to treat many different diseases including cancer. Genetic materials used for transfection can be carried by viruses or synthetic vectors. Efficiency of the treatment performed by DNA/RNA transfection can be improved by addition of chemotherapeutic agents to the drug carrier, which gave birth to dual drug delivery systems. By this strategy genetic material weakens tumor cell where drug kills cancer cells [1].

In order to obtain an ideal drug carrier a graphene based, targeted, dual drug delivery system have been designed and anticancer efficiency have been studied. Preparation of the platform started by synthesis of P(PEGMA-*co*-MMA-*co*-PMA-*co*-AzPMA) and followed by P(HMA-*co*-DMAEMA-*co*-TMAEMA) copolymer synthesis which is responsible as gene carrier and endosomal escape. Copolymers were grafted by employing azide groups on PEG containing copolymer and alkyne group on cationic copolymer via CuAAC and graft copolymer was coated on graphene oxide (GO) surface by employing π- π interactions and GO was in-situ reduced to reduced graphene oxide (rGO). Product PEG-CatPol-rGO was conjugated with targeting agent EPPT1, chemotherapeutic agent Doxorubicin (Dox) was loaded on rGO surface and anti-BCL-2 siRNA was complexed with drug carrier system. To better understand synergetic effect of siRNA and Dox, various combinations of drug carrier system have been prepared, and tested for targeting ability, cellular uptake, cytotoxicity and transfection efficiency on MCF-7 and MDA-MB-231 cell lines.

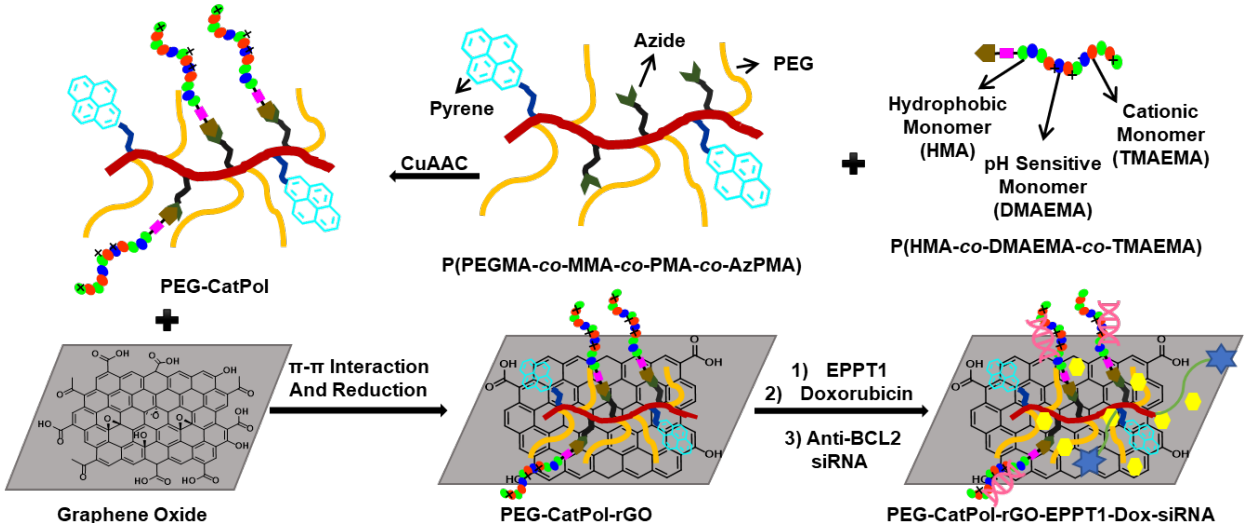

Figure 1. Schematic representation of targeted dual drug delivery system.

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EEG BASED PERSON AUTHENTICATION USING K NEAREST NEIGHBOR

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Electroencephalogram (EEG) is the most often used for diagnosing epilepsy, sleep disorders, depth of anesthesia. On the other hand, it is also used in brain computer interface (BCI) applications, which enables to control electronic devices just by thoughts. In another EEG based research, it showed that EEG signals could be used in security systems as biometric identification technology. This technology can be used in numerous applications such as e-health, e-government, e-voting, homeland security.

In this paper we propose fast and accurate method for authentication of three person using EEG data which was recorded during up/down/right/left computer cursor movement imagery. Data sets were acquired from three healthy human subjects in age group of 24-29 years old and on different days in two sessions. Extracted feature vectors based on variance of derivative of the EEG signals were classified by k-nearest neighbor method. The proposed methods were successfully applied to the data sets. We achieved 94.70%, 97.37%, 87.61% and 91.23% classification accuracy rates using up, down, right and left computer cursor movement imagery data sets, respectively. The results showed that the proposed method can be successfully used for authentication of subjects by EEG signals.

THE EFFECT OF PEG-40S SURFACTANT CONCENTRATION ON THE STABILITY OF ALGINATE MICROBUBBLES PRODUCED BY T-SHAPED MICROFLUIDIC JUNCTION DEVICE METHOD

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Preparation of porous alginate films with a well-controlled architecture useful for tissue engineering is still a challenge [1]. Here, T-shaped microfluidic junction device method is utilized to design highly monodispersed porous alginate scaffolds with a contribution of PEG-40S surfactant. The mechanism of pore formation is studied considering two factors affecting the pore size: i) stability of bubbles and ii) evaporation of solvent during the drying environment and time [1, 2]. Microbubble stability can achieve a control in determining coating surface morphology because the microbubbles often get destroyed during the drying process in coating formation [1, 3, 4]. Optimizing the concentration of the surfactants on its shell layer is crucial for minimizing microbubble destruction. Presence of surfactants greatly influence the size and stability of the microbubbles and thus different surfactant concentrations and alginate polymeric solution concentrations were examined. This could potentially determine duration of microbubble destruction time and affect surface morphology of alginate film structures.

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TWO NAPHTHALENE DIIMIDE WITH ELECTRON ACCEPTOR SUBSTITUENTS: THEIR EFFICIENT SYNTHESIS, PHOTOPHYSICAL AND SOLID STATE ELECTROCHEMICAL PROPERTIES

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Naphthalenediimides are used as industrial colorants in the form of dyes and pigmens due to their fluorescence quantum yield, favorable photophysical and electrochemical properties. They are also effectively used in different application area such as in organic, bioorganic, supramolecular, organic electronics and medicinal chemistry. The uses of these compounds in chemotherapy and as fluorescent labeling systems are new findings. On the other hand, they are used as optical brighteners, laser dyes, electrophotography, conducting materials, metallomacrocycles, intercalators for DNA, models for the photosynthetic reaction center, chemical sensors and optoelectronic devices such as organic solar cells, light emitting diodes and field effect transistors.

Different naphthalene diimide derivatives can be synthesized by functionalization through imide and/or core substitution which gives opportunity to vary the absorption and fluorescence properties. In general, electron donating and electron widthdrawing substituents are used for functionalizaton to change also the electrochemical properties of the naphthalene diimides. The preparation of naphthalene diimides did not work especially for electron withdrawing substituted derivatives. Here in this work, two naphthalene diimide with electron acceptor substituents have been successfully synthesized under special conditions in high yields. The optical, thermal and electrochemical properties of the synthesized compounds were investigated in detail. In contrast to the absorption spectra, the emission spectra were strongly dependent on the solvent polarity. The excimer-like emission and low fluorescence rate constant suggest the formation of the ground state complex in DMF. While the cyclic voltammetry measurement in solution is restricted due to the very poor solubility, the electrochemical properties have been investigated by the voltammetry of immobilized microparticles. This technique is a simple and powerful tool for characterizing the thermodynamics and elucidating the redox mechanisms of electroactive compounds which are poorly soluble in water.

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METAL-CARBON COMPOSITE PHOTODIODES

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Carbon structures attract the interest of researchers due to their outstanding electrical and electronic properties. Previously, diamond like crystals (DLC), amorphous carbon, graphene and other forms of carbon can successfully be co-deposited with metal atoms. Doping carbon with metal atoms and/or producing metal-carbon composites significantly enhances the electrical properties of the photodiodes. Electrical and optoelectronic properties of the metal- carbon composites were investigated in our work. Current – voltage (I -V), current – time (I – t) characteristics were assessed. Ideality factor, barrier height, saturation current and photoresponse of metal-carbon composite photodiodes were assessed. It was seen that photodiodes are responsive to light. Ideality factor, barrier height, saturation current and photoresponse values were found to be within the range of values reported in the literature.

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IONIC LIQUID CRSYTALS BASED ON TRIAZINE

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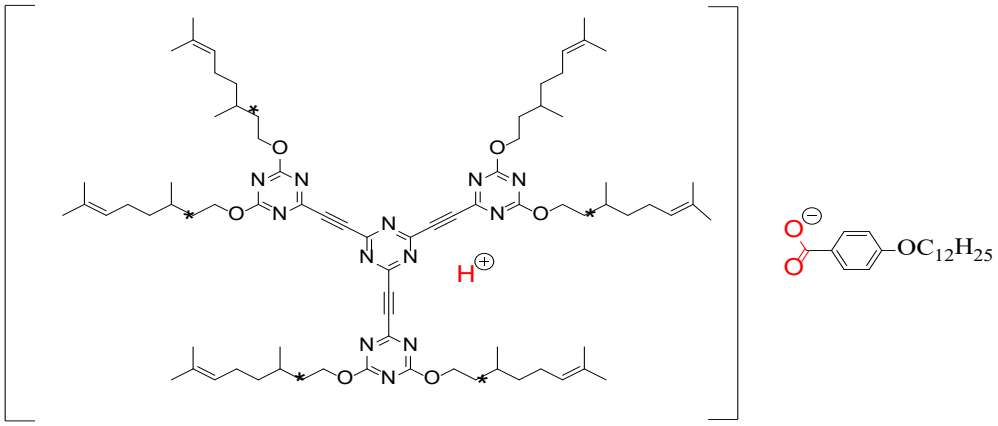

We report here in the synthesis of a new type tribranched chrial citronelloxy substituted triazines bonded to the central triazine core through aceynele bridges, which exhibited a columnar mesophase when mixed with 4-dodecyloxybenzoic acid with 1:1 ration. The liquid crystalline properties of the triazine-based both compounds were investigated by DSC (differential scanning calorimetry (DSC) and POM (polarizing optical microscopy). (POM).

Authors acknowledge funding from TUBITAK. Project No 114Z72

RADIOACTIVITY MEASUREMENTS IN SEDIMENTS COLLECTED FROM ALIAGA, IZMIR (TURKEY)

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People are exposed to both external and internal radiation due to naturally occurring radionuclides that are present since the creation of the earth. Naturally occuring radionuclides present in soil, rock, water, plant, sand and air and they are not uniformly distributed depending on the geographical conditions in the world [1]. The activity of naturally existing radionuclides in sediment change depending on the type of rock which they originate [2-4]. The knowledge of concentration and distribution of natural radionuclides in sediment is important since the level of activity concentration influence human exposure to radiations.

In this study sediment collected from 30 different locations in Aliaga were analyzed to identify natural gamma-emitting radionuclides. A coaxial high purity germanium (HPGe) detector was used to investigate ^{226}Ra, ^{232}Th and ^{40}K activity concentrations. The radiological parameters such as absorbed dose rate, annual effective dose equivalent, radium equivalent activity, external hazard index and excess lifetime cancer risk of sediment samples were determined.

The activity concentrations of the sediment samples range from 23.5 ± 1.7 to 59.5 ± 1.6 for ^{226}Ra, 37.5 ± 0.9 to 64.4 ± 0.6 for ^{232}Th and 354.7± 5.6 to 978.4 ± 5.8 for ^{40}K. The mean values for absorbed dose rate, annual effective dose equivalent, radium equivalent activity, external hazard index and excess lifetime cancer risk were determined as 81.64 nGyh^{-1}, 100.13 µSv y^{-1}, 173.31Bq kg^{-1}, 0.47 and 0.40, respectively.

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QUANTUM MECHANICS APPROACH TO MODEL RISK PROCESSES

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Forecasting the final statement and the future reserve of the insurance companies is one of the most significant part of the risk theory. Several mathematical methods are generated and applied to compute the ruin probabilities and to find the optimal premium price for customers and insurance companies.

In this study, non-ruin operator and Quantum mechanics; which is a novel approach; are used to model risk processes. We consider the Classical Surplus Process with the initial value, constant premium rate and claim amounts which are i.i.d. random variables. We assume that each claim has several distributions such as small claim, huge claim and infinite claim with different probabilities.

Then, we generate the methods and techniques for transform of transition operator and finite time non-ruin operator with chosen semi-group. The operator matrices are formed by using transition probabilities for discrete time process and transition rate λij from state i to j for continuous time process. Interest rate was also added to make the model more advance and realistic.

Furthermore, non-ruin probability is modelled, probability of ruin is computed, and several advanced examples are treated for chosen Hamiltonian in discrete and continuous space with traditional basis and eigenvalues of Hermitian operator in two- and three-dimensions by using tensor product of operators and standard Dirac matrix formalism with bra-ket notations.

FREQUENCY BEHAVIOUR ANALYSIS AND TEST OF PORTABLE MEASURING DEVICE: Cartesian Magnetic Flux Mapper Example

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Portable yet precise robot manipulators are needed for field applications when phenomena or source of it which is wanted to measure is not able to carry to laboratories or measuring rooms or just need to on field measurement. Precision in the design of such machines should be considered according to the characteristics of the sensor to be used. In this paper "Cartesian Magnetic Flux Mapper" is studied. Measuring of magnetic flux is important to find force index in specifics distance from magnetic circuit and find to find broken magnets. In this study Solidworks has been used for developing design and run for analysis. At the end the cartesian robot has been assembled, tested and operated.

Magnetic Circuit (MCs) are commonly used in Magnetic Separators (MSs). MSs have wide range of uses in many industrial applications such as Recycling, Food Processing, Construction, Casting, etc [1]. MS branches two main branches, those are Permanent Magnetic Separators (PMSs) and Electromagnetic Separators (ESs). In this paper chassis of Magnetic Flux Mapper (MFM) for use of quality control and measure of PMS is studied.

When designing or building of MC those are inside of MSs, MCs are designed to achieve to Force Index (FI) at the desired distance to attract ferrous object to separate from bulk. Any failure on manufacturing MC will affect FI [2] thus brings failure on separation process.

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VOLTAGE DEPENDENCE OF EFFECTIVE BARRIER HEIGHT (BH) REDUCTION IN (Au/Ti)/Al_2O_3/*n* -GAAS SCHOTTKY BARRIER DIODES (SBDs) IN TEMPERATURE RANGE OF 80-380K

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In this study, the value of BH variation and its dependence of forward bias voltage of the (Au/Ti)/Al_2O_3/*n*-GaAs (MIS) type SBDs have been investigated by using forward bias current–voltage (*I-V*) characteristics in the wide range of temperature (80–380K) and voltage (0-1V) by 50 mV steps, respectively. The value of BH evaluated from the forward bias *I-V* data increases with increasing temperature for each bias voltage. This result shows that the apparent BH is strongly dependent on the barrier inhomogeneity, applied bias voltage as well as temperature. The increase of BH with increasing temperature disagrees with the reported negative temperature coefficient of the forbidden band gap and BH for ideal diodes. For the determination of the voltage dependent BH, the modified Richardson plot for any forward bias voltage was drawn as a function of *q/kT* and so the value of activation energy (E_a) was obtained from the slope of modified Richardson plot for each bias voltage. The obtained value of E_a decreases with increasing applied bias voltage. Such behavior of E_a with bias voltage was attributed to the interfacial layer effects with a small contribution because of image force lowering.

Keywords: (Au/Ti)/Al_2O_3/*n*-GaAs (MIS) type SBDs; Temperature and voltage dependence; BH reduction in SBDs; Voltage dependent BH and activation energy.

VARIOUS ELEMENT LEVELS IN SOME HONEYS PRODUCED IN BİNGÖL PROVINCE

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Honey is produced by honey bees (Apis mellifera) by using nectar secreted from the flowers or other living parts of the plants. It is a natural, sweet and functional food produced by collecting, changing the compositions, storing in the honeycomb cells and maturing the nectars by honey bees. The chemical composition of honey varies according to geographical and climatic conditions, environmental factors and plant diversity. It is known that honey content is approximately 0.7% mineral [1]. Inorganic compounds known to be present in honey are potassium (K), calcium (Ca), magnesium (Mg), copper (Cu), manganese (Mn), iron (Fe), chloride (Cl), sulfur (S), phosphorus (P) and silicon (Si). However, the mineral content of honey varies according to the geographical characteristics of the region where it is produced.

Metal contents were monitored by flame atomic absorption spectrometer (FAAS, Shimadzu AAS-6300 model) equipped with a D2 background correction. Calibration graphs are prepared using the aqueous standards of each analyte. By using these calibration graphs, the quantities of the relevant metals in the honey samples were determined. The amount of the metal elements in the studied honey samples are given with the maximum and minimum values.

The amounts of metal elements in honeys are as follows respectively with their maximum and minimum values: Zn (142.0-446.2 µg kg^{-1}), Pb (13.6- 301.2 µg kg^{-1}), Mn (10.4- 229.5 µg kg^{-1}), Co (28.4-278.4 µg kg^{-1}), Cd (21.4- 275.9 µg kg^{-1}), Cu (39.9- 289.5 µg kg^{-1}), V (10.5- 274.7 µg kg^{-1}), Fe (128.5- 484.2 µg kg^{-1}). The mineral content and trace elements of honey can be used to determine the geographical origin of honey.

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MODULES WITH EXTENDING CONDITIONS

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Let M be a right R-module. Recall that M is called *extending (or CS)* if every submodule of M is essential in a direct summand of M. It is proved that extending property is closed under direct summands, however, it is not closed under direct sums, in general. Therefore, in order to avoid this unpleasant situation, it is natural to consider the extending property on suitable classes of submodules of M. To this end, it is investigated generalizations of extending modules including the following classes:

(1) A module M is called *FI-extending (fully invariant-extending)* if every fully invariant submodule of M is essential in a direct summand of M.

(2) A module M is called *π-extending (projection invariant-extending)* if every projection invariant submodule of M is essential in a direct summand of M.

Not only module theoretic properties of the former classes are provided, but also the connections between these classes are presented. Furthermore, we attract our attention to the ring R as a right R-module which satisfies the above extending conditions.

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ANNIHILATOR CONDITIONS ON RINGS

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Recall a ring *R* is *Baer* if the right annihilator of each nonempty set is generated by an idempotent. The concept of Baer rings has its roots in operator algebras and functional analysis. This class of rings has close links to C*-algebras and von Neumann algebras. A ring R is *quasi-Baer* if the right (left) annihilator of each ideal is generated by an idempotent element of R. Each of these conditions (Baer and quasi-Baer) have certain advantages over the other. In general, the Baer condition works well with one-sided ideals, whereas the quasi-Baer condition works well with two-sided ideals. Therefore, it is natural to investigate a class of rings which is strictly between the Baer and quasi-Baer classes. To this end, we investigate a new class of ring which satisfies the former condition. We present our results including some applications to polynomial rings and matrix rings.

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THE EFFECT OF LIGHTING PERIOD ON THE TREATMENT EFFICIENCY OF DAIRY INDUSTRY WASTEWATER BY AEROBIC PHOTOBIOREACTOR

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Dairy industry wastewater, often discharged thousand cubic meters/day, has a high content of organic matter due to lactose, fat, and protein. Products such as cheddar, cheese, oil not only increase organic pollution in wastewater, but also increase COD, BOD, and TSS. Discharging of the wastewater without treatment may adversely affect aquatic life as it could cause eutrophication, which is a big problem. Many different methods are used in the treatment of dairy wastewaters such as biological treatment (generally anaerobic), electrocoagulation and coagulation. Among the treatment methods, anaerobic treatment is preferred because of low energy requirement and low sludge production.

In this study, Treatment of dairy industry wastewater by photobioreactor is provided by Chlorella Vulgaris microalgae in aerobic reactors. Photobioreactors were continuously aerated at the controlled condition (18-22 °C and pH=6,7-7,5) and the real dairy industry wastewater was used for treatment. COD, BOD, oil grease, TSS and other parameters were analyzed for treatment efficiency. Along with these parameters, growth rates and oil contents of microalgae were regularly monitored. Different lightening periods affected not only the treatment efficiency but also the microalgae growth rate. When compared to treatment yields by photobioreactor were higher than the study about anaerobic methods in the literature. Moreover, this method allows the use of microalgae for renewable energy and thus life cilcular economy in the industry.

ON ABSOLUTE LUCAS SERİES SPACES

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In the present study, we introduce the absolute Lucas space $|L(r,s)|_p$ where $r,s \in \mathbb{R}$ and $1 \leq p < \infty$. Then, we give some topological and algebraic properties of this space such as a BK- space, norm and show that the absolute Lucas space *is* isomorphic to the space l_p.

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A NOTE ON ABSOLUTE FACTORABLE MATRIX SUMMABILITY METHOD

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In this study, we obtain necessary and sufficient conditions for $|A_f, \theta|_k \Longrightarrow |B_f, \varphi|_s$ for the case $1 < k \leq s < \infty$ where θ, φ are nonnegative sequences and $|A_f, \theta|_k$ is absolute factorable summability. Then, in the special cases, we obtain some well-known results.

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THE INVESTIGATION OF NSS, RS AND INTERFACIAL LAYER ON THE ELECTRICAL CHARACTERISTICS OF Au/Ca3Co4Ga0.001OX/n-Si/Au

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In order to determine the N_{SS}, R_s and interfacial layer on the electrical characteristics, both the c-v and G/ω-V measurements were performed at 10 and 500 kHz at room temperature.

Experimental results were confirmed that the main electrical parameters such as diffusion potential (V_D), series residence (R_s), Fermi energy level (E_F), barrier height (F_B (C-V)) and surface states (N_{SS}) are found a strong a function of frequency and voltage.

Both the R_s and N_{SS} were excepted from the Nicollian-Brews and high-low C_{HF}-C_{LF} frequency method, respectively [1]. They show a distinctive peak at about depletion region due to surface state and interfacial layer.

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INVESTIGATION OF MICROSTRUCTURAL AND ELECTROCHEMICAL CORROSION BEHAVIOR OF THERMAL BARRIER COATINGS (TBCS)

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The aim of this study is to observe the performance of the thermal barrier coatings (TBCs) applied to Inconel 718 under aggressive working environment conditions. The electrochemical corrosion effect of the TBCs was investigated microstructurally under acidic-basic environments and seawater environments. TBC systems were composed of a CoNiCrAlY bond coat and a ZrO_2–8% Y_2O_3 (YSZ) ceramic top coat on Inconel 718 nickel-based superalloy disk-shaped substrate. In this study, both the high-velocity oxygen fuel (HVOF) technique was used to produce CoNiCrAlY metallic bond coats. As for the ceramic YSZ top coats, the atmospheric plasma spraying (APS) technique was applied. Electrochemical tests were performed after the production of the coatings and structural changes of the coatings were examined. 0.1 molar NaCl (sodium chloride) solutions were prepared to immerse the samples to be corroded. Experiments were carried out at room temperature and at 3-electrode classical system. Three different corrosion tests were applied to the samples including open circuit potential (OCP), impedance measurement (EIS) and potentiodynamic polarization test (PDP). Electrical values of the experiment was performed in the frequency range of 20 kHz-10 mHz and 10 mV AC depending on the OCP test. Gamry Echem Analyst software program was used in the analysis of the tests. The starting potential of the curves obtained from the potentiodynamic (PDP) tests is determined as ± 250mV and the ending potential is +1500 mV.

Keywords: Thermal barrier coatings (TBCs), Atmospheric plasma spraying (APS), High-velocity oxygen fuel (HVOF), Electrochemical corrosion.

POLYPROPYLENE MATERIALS IN GLOSSY MOLD IN COLOR APPLICATIONS

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In Automotive Industry, interior/exterior parts are painted because of aesthetical and functional requirements of the vehicles. Painting is a significant and sensitive process due to process failures and aesthetical problems on painted surfaces. Not only quality problems but also cost disadvantages are exist in generally. The environmental impact of paint is diverse. Traditional painting materials and processes can have harmful effects on the environment, including those from the use of lead and other additives. [1], Hence, nowadays paint elimination alternatives come to the forefront. This study mentions mold in color polypropylene material details in injection molding grade and automotive approaches.

Elimination of paint requires similar paint performances from mold in color applications, in polypropylene material such as; high gloss levels, acceptable scratch and UV resistances, and also material properties need to comply automotive industry mechanical and thermal requirements.

Polypropylene types, minerals, elastomeric groups, scratch resistance additives exist in this study. Also, UV performances are controlled with weatherometer equipment. Evaluations supported with Differential Scanning Calorimeter analysis in high gloss black polypropylene materials.

Keywords: High Gloss materials, Paint elimination, Mould in Colour (MIC), Polypropylene applications

PALLADIUM-CATALYZED HECK REACTION OF THE THIAZOLE USING TPAs

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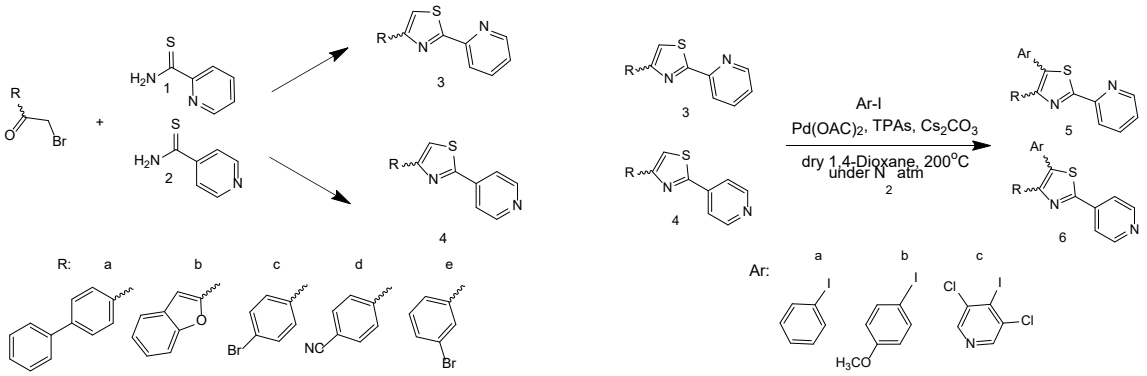
Thiazole are five membered heterocyclic skeleton, which have been display biological activities for instance; antimicrobial, antitumor, anti-diabetic, Parkinson disease anticonvulsant activities [1]. Due to the pharmacological properties of the thiazole compounds were synthesized newly compounds via Hantzsch synthesis (Scheme 1).



Scheme 1. Synthesis of thiazole compouds **3**/**4** and arylationcompounds **5**/**6**

The C–C coupling reaction, as named Heck, has been used on the heterocyclic bicyclic, and tricyclic systems [2]. As ligands, in arylation reactions, triphenyl arsine has proved to be superior to triphenylphosphine in both selectivity and yield [3]. This methodology provides a simple way to construct a 5-aryl(or hetaryl)-thiazole moiety. The synthesized compounds were characterized by NMR, MS, FT-IR, UV-Vis, Florescence, TG-DTA, DSC analyzes. We thank the Amasya University (Grant No. FMB-BAP-17-0255 and FMB-BAP-18-0308) for financial support of this study.

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PREDICTING 2H-PHASE MONOLAYERS OF MXENES

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In the past decade, many MXenes are intensively investigated due to their high surface area and unique properties in various field. Using a set of first-principle calculations, we have studied structural, magnetic and electronic properties of 2H-phase monolayers of MXenes. We have established 2H-phase MXenes (Cr_2C, Mo_2C, V_2C and Nb_2C). Our electronic structure calculations indicate that 2H-phase monolayers of MXenes exhibit metallic properties. We have also demonstrated that these MXenes are thermodynamically stable. This research will deepen understanding of the electronic properties of 2H-phase monolayers of MXenes.

Keywords: MXenes, Density Functional Theory, Electronic Properties, Ab-initio Molecular Dynamic.

ANALYTICAL SOLUTION FOR DOUBLE CONFLUENT FORM OF HEUN EQUATION

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Double confluent Heun equation (DHE) is studied analytically by using extended NU method. Heun equation in which Gauss hypergeometric, confluent hypergeometric, Mathieu, Ince, Legendre, Laguerre, Bessel functions are involved, is a general second order linear differential equation. The Heun equation is a Fuchsian type equation with four regular singular points. The DHE which is derived from Heun equation when two regular singular singularities coalesce, has two irregular singularities at zero and infinity and contains four parameters. Since there is no regular singular points, the DHE has not got convergent Frobenius solutions. On the other hand, solutions have the DHE have great importance in some physical problems as in gravitational theory. Therefore, eigenvalue problem of the DHE must be solved analytically.

Acknowledgement: This work has been supported by the Scientific and Technological Research Council of Turkey (TUBITAK) with the project number 118F245.

SYNTHESIS OF NANOMATERIALS FOR QUANTUM ELECTRONIC APPLICATIONS

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The hydrothermal system produce all materials from the solutions such organic materials and metal oxides and all-in solutions for various applications. FYHD-8000 produce materials from the solution as powder and thin films on any substrate. System ıncludes a high pressure reactor and temperature controller. This system includes High pressure reactor Reaction temperature: 50-300 ºC 100 ml PTFE or black carbon:TFE sample holder PID Temperature controller System automatically adjusts internal-pressure from low to high pressure by temperature or solution volume or external gas.

Currently, quantum dot sensitized solar cells (QDSSCs) have been remarkable attention due to low cost, easy production and clean energy potential [1]. Hydrothermal method is the most suitable and inexpensive method for these applications.

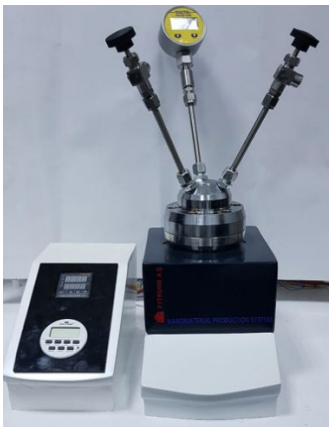

Fig.1. NANOMATERIAL FYTRONIX F 8000

Keywords: Nanomaterial, quantum electronic, fytronix.

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International Natural Science, Engineering and Materials Technology Conference

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FULL AUTOMATIC SOLAR SIMULATOR SYSTEMS FOR PHOTOVOLTAIC APPLICATIONS

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This system analyze all photovoltaic and photoconducting characteristics of all solar cells such Dye sensitized solar cell, quantum dots solar cells, Organic solar Cells, Silicon Solar cells, Thin films solar Cells under various solar light intensities from 0.1 W/cm2 to 1500 W/m2. This system is a complete current-voltage (I-V), current-time (I-t) and power-voltage (P- V) measurement environment. Voltage range: -45 V to +45 V Current range: 100 pA to 200 mA. 19 independently controlled LED wavelengths from 400 nm – 1100 nm. System should have sample holder and it is comprised of two probes. Holder size should have 132.5mmx132.5mm. System should have software to control measurements and analysis of data. Solar Simulator should automatically measure open circuit voltage Voc and short circuit current, ISC , Shunt resistance (Rsh) • Conversion efficiency (n), Maximum power output (Pmax), Voltage at Pmax (Vmax), characteristic resistance, Rch , Fill factor (FF) • Series resistance (Rs).

Fig.1. FYTRONIX FY 7000 Solar Simulator

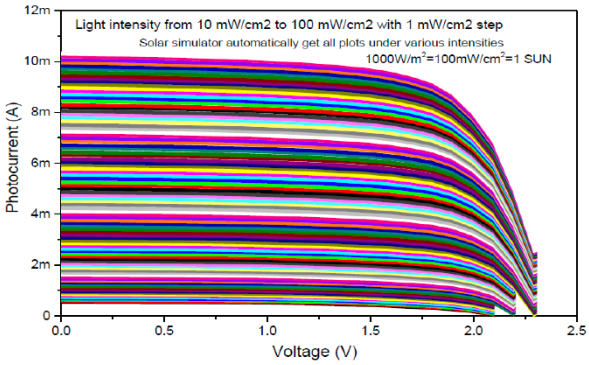

Fig.2. Solar Simulator system automatically measures current-voltage (I-V) under various light intensities

Keywords: Solar simulator, electrical properties, diode, solar cell.

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THE EFFECT OF THE ETCHING RATE ON THE MAIN ELECTRICAL PROPERTIES OF p-Si

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In this research, the electrochemical etching process has been used for surface modification of p-Si semiconductor material and their morphological and electrical properties have been investigated. Five regions of porous silicon with different etching rates are selected for comparison and called P_1, P_2, P_3, P_4, and P_5. The purity, Surface morphology and roughness of the prepared samples have been investigated by Energy-dispersive X-ray spectroscopy (EDX) and Field Emission Scanning Electron Microscopy (FE-SEM) and the results show a meaningful effect of the etching on the porosity. The electrical parameters of the porous silicon (PS) at different etching conditions have been investigated by the I-V characteristic in the range of voltage (1.5V). The ideality factor (n), barrier height in zero bias (φ_0), voltage-dependent barrier height (φ), saturation current (I_0), resistance in forwarding bias (R_s), resistance in inverse bias (R_{sh}) and rectifying rate (RR) in different etching conditions have been investigated. The Rs value of the different regions of PS has obtained from different methods such as Ohm's law and Cheung method and compared to each other. The surface states (N_{ss}) versus energy (E_{ss}- E_v) plots were obtained from the forward bias I-V data by considering the voltage dependence of BH and n. The results obtained from electrical characteristics show that, by increasing the etching process, the performance and rectifying of the Schottky structures are improved.

Keywords: p-Si, porous silicon(PS), etching process, electrical properties

Mo_2C-BASED DOUBLE-M ELEMENTS MXENES IN THE 1T- AND 2H- PHASE

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Graphene-like two-dimensional materials have garnered tremendous interest as emerging device materials in the field of material science and engineering due to their remarkable properties. Based on recent experimental and theoretical findings of transition metal carbides/nitrides (also known as MXene), we have performed the structural, electronic, magnetic, vibrational properties of alloy forms of MXenes by using first-principle calculations. Performance in device applications that used MXenes is directly related to electronic and magnetic properties. To further improve performance, there is a need to increase MXenes' electronic conductivity. For the motivation, we also investigated the effect of double M-elements on Mo_2C based MXene in 1T- and 2H- phase to understand their role in manipulating its electronic, magnetic and vibrational properties. Moreover, ab-initio molecular dynamic simulations (AIMD) are also performed to check the thermal stability of these MXenes. Our results highlight a new promising material with tunable magnetic and electronic properties toward nanoscale spintronics and electronics applications.

Keywords: DFT, First-principle calculations, Double-M ordered MXenes, Structural properties, Electronic properties, Dynamical properties.

NEM 2019

INTERNATIONAL NATURAL SCIENCE, ENGINEERING AND MATERIAL TECHNOLOGIES CONFERENCE

Sep 9-10, 2019, İstanbul / TURKEY

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POSTER PRESENTATION

SYNTHESIS AND CHARACTERIZATION OF NOVEL POLYSTYRENE-SILICA COMPOSITE INCLUDING AZOMETHINE

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Composite materials are structures formed by combining two or more materials with different physical and chemical properties. Polymer composites are generally organic structures formed by the addition of inorganic reinforcing material [1]. Polymer-silica composites have unique mechanical and physical properties such as high modulus, high hardness, low thermal expansion coefficient, flame resistance and low gas permeability [2]. They have enzyme immobilization applications, dye adsorption applications, column applications [3]. Silica based materials have good bioactivity and excellent biocompatibility properties. They are also highly suitable for various medical applications such as drug delivery, tissue engineering [4]. Because of their wide surface area and suitable interface interactions, polymer silica composites also have potential application as reinforcing substances for various engineering polymer systems.

Herein, a novel polystyrene-silica composite containing azomethine has been reported. For this purpase, the polymer including azomethine (**L1**) was prepared from condensation reaction of 4-benzyloxybenzaldehyde with 2-aminophenol [5]. Then, the polymer-silica composite (**L2**) was synthesized the reaction of the polymer (**L1**) with 3-chloropropyl-functionalized silica gel. The novel polymer-silica composite including azomethine was characterized by spectral techniques.

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ESTIMATING RISK LEVELS OF DIFFERENT WORKING POSTURES WITH DIFFERENT MACHINE LEARNING ALGORITHMS

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Working posture is regarded as the configuration of the body's head, trunk and limbs in space according to the task performed. Working with the body in a neutral position reduces stress and strain on the muscles, tendons, and skeletal system and reduces your risk of developing a work-related musculoskeletal disorder (WRMSDs). For this reasons, to determine risk levels of working postures is important for production productivity. In this study, Rapid Upper Limb Assessment (RULA) was performed to evaluate risk degrees of working postures for a worker that perform bottle labelling. RULA is a practical and valid analysis tool that evaluate postures of upper limbs. It has been applied for many different tasks successfully. However, it is an observation based tool and only a few postures that found important by observer can be evaluated. In this study, to able to evaluate the risk degrees of all postures represented by a worker in a task, integrated risk degrees of task in term of working postures is aimed to estimate by using different classifiers. The risk degrees of the working postures can be determined automatically from the video by using classifiers. The different postures from the right and left side of the body are obtained by observation. In order to achieve high success in the estimation of risk degrees, many different classification methods were applied such as k-Nearest Neighbor, Support Vector Machines, Linear Discriminant Analysis and Decision Trees etc.. For the left and right side of the body, the highest estimation accuracy is obtained as 81.9% and 86.7% respectively by using ensemble decision tree classifier. For the future works, angles of the body parts can be obtained from the image automatically and the results of the classifier can be combined with the image results.

EFFECT OF STABILIZERS ON THE SHAPE AND MAGNETIC PROPERTIES OF Co_3O_4 STRUCTURES

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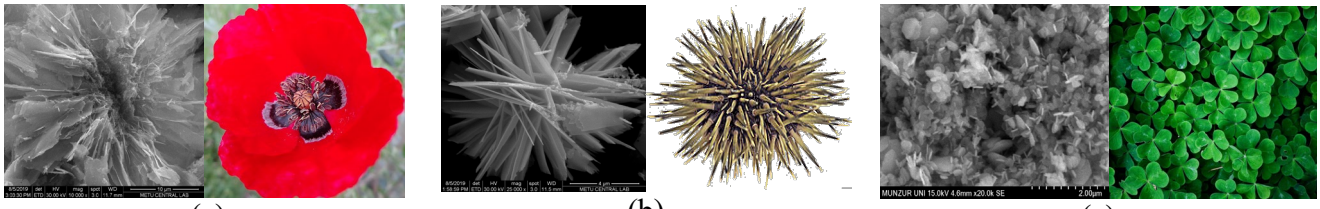
Nowadays, nanostructures attract the interest of the researchers due to their technological implications in semi-conductor technologies. It was known fact that magnetic, electronic, optic and catalytic properties of the nanomaterials strongly depends on the shape and structural geometry of the nanoparticles [1]. Co_3O_4, which is a p-type semiconductor, vastly investigated for their gas sensor, magnetic material, catalysis and electrochemical device applications. Co_3O_4 nanoparticles in different shapes and structures such as nanosheets, nanowires, nanorods, nanotubes, microspheres, nanoparticles, thin films, composites, 3D structures have been reported in the literature [2]. Such shapes and formations are produced using various production methods. It was known fact that, it is difficult to obtain nanoflower like forms in 3D structures, therefore, it is rarely reported in the literature [3].

In this work, Co_3O_4 nanostructures were produced using hydrothermal method, where starting material keep stable and additives were changed. Parameters such as temperature, size and stabilizer used in the production process have effect upon magnetic properties of Co_3O_4 nanostructures. Such effect was evaluated in this report.



(a) (b) (c)

Fig. 1. SEM images of poppy flower -like Co_3O_4 structures (a), urchin-like Co_3O_4 structures (b), clover field-like Co_3O_4 structures (c).

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International Natural Science, Engineering and Material Technologies Conference

Sep 9-10, 2019, İstanbul / TURKEY

SYNTHESIS AND INHIBITION ON THE ACETYL CHOLINESTERASE ENZYME OF PIPERAZINE DERIVATIVES CONTAINING PYRAZINE

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According to investigaiton on Alzheimer's disease (AD), the stimulation of cholinergic neurotransmission has been the principal strategy of many researchers. AD is characterized by a progressive degeneration of the brain that leads to loss of memory, disorientation, anxiety, delusion, depression, insomnia, wandering, learning impairment, and deterioration of cognitive functions [1].

Acetyl cholinesterase is a specific enzyme, having decreasing effect to neurotransmitter (acetylcholine) in the nerve synapses. Therefore in AD, the cholinesterase inhibitors such as Donepezil. HCl, Rivastigmine, Physostigmine, Tacrine are used to provide communication between the nerves [2].

As an alternative to these drugs, in this study we have synthesized new piperazine derivatives containing pyrazine to provide communication between the nerves, which show inhibition on the acetyl cholinesterase enzyme. Structures of these compounds (Figure 1) are illuminated by FT-IR, ^{1}H-NMR and elemental analyses. Finally, we have examined the inhibition effect against the acetyl cholinesterase enzyme, purified from *Electrophorus electricus* (electric eel) Type V-S, activity of 100 unit/mL [3].

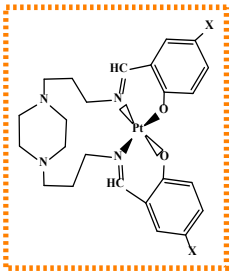

Figure 1. Display of piperazine derivatives containing azomethine.

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FACADE DAMAGES IN MARINE STRUCTURES INVESTIGATION OF THE BLACK SEA EREĞLİ SCALE

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In this study, the damages of the facades in the structures located on the coast of Ereğli in Zonguldak-Karadeniz (Kdz.) were investigated. The structures on the coast are in direct or indirect contact with the sea. Marine causes different physical and chemical effects on structures. Structures are constantly facing external factors. The facades that make up the outer shell of the building and are directly affected by the ambient conditions are the structural elements where these effects are seen the most and can be observed in the best way. Various damages occur in buildings exposed to external factors such as water, heat, and moisture and air pollution. In this study; the facades of Kdz. Ereğli seaside structures have been examined in the headings of damages that cause aesthetic problems, damages that lead to use and comfort problems, and hazardous damages in terms of health and safety. It is aimed to raise awareness about the damages of facades in the buildings located on the coast of Kdz Ereğli, to provide feedback to the designers, to reduce these damages and to make preliminary studies and determinations to make the necessary repairs. For this purpose, the damage of the structures on the coast of the sea was identified and photographed.

Keywords: Facade Damage, Durability, Physical Building Problems.

PHYSICOCHEMICAL EVALUATION OF CİTRUS RETİCULATA PEEL

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Citrus reticulate called Mandarin is one of the most economically important crops in Algeria. It originated in the China but is widely grown in Mediterranean region. It belong to the Rutaceae family and the Eudicot clade. Citrus is an important crop mainly used in food industries for fresh juice production. The peel is used fresh, whole or zested, it can be used as a spice for cooking, baking, drinks, or candy. Essential oil from the fresh peel may be used as a flavoring for candy, in ice cream and pastry products.

The present investigation reports on the chemical composition of *Citrus reticulate* peel. The proximate moisture, ash, total soluble solids, crude fiber, analysis were performed using standards analytical methods.

The results of physicochemical analysis of fresh peel shown that the moisture content was high (76.16%). The soluble solids soluble (TSS) content is about 0.2%. pH value of peel is 4.69. However, the content of ash is about 0.75% and titrable acidity is 0.086%.

The extraction of the parietal polysaccharides was carried out by alkaline solutions of 24% KOH and 17.5% NaOH to solubilize the hemicelluloses H1 and H2 respectively. The pectins were first solubilized by cold water (P1) then boiling and water (P2), then by using 0.5% ammonium oxalate (P3).

The cell wall content in the peel was high (41.1%). The weight dosage of the parietal polysaccharides showed that the hemicelluloses come in first position, the amount of hemicelluloses H1 is higher (68.36%) than H2 (8.96%). The amount of cellulose extracted from the peel was 8.67%. The amount of pectins obtained is higher for the P3 (9.73%) than for P2 and P1 (1.16 and 0.55%), respectively.

The thin-layer chromatography analysis of the parietal polysaccharides showed that the pectins contained rhamnose and arabinose, so it's a rhamnoarabinane type. The extracted cellulose contains only glucose which implies that this polymer is not contaminated by other oses of pectins or hemicelluloses which is often found.

VALORISATION OF CELL WALL CARBOHYDRATES OF *CHAMAEROPS HUMILIS* L. IN SYNTHESIS OF PLASTIC BIOFILM

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The substitution of petrochemical plastics with vegetable raw materials renewable energy is a crucial perspective. This substitution is carried out by chemical modification of polysaccharides which are present in large quantities in plants and therefore represent an abundant and biodegradable raw material.

Chamaerops humilis L. belongs to the Commelinids clade, Arecales order, Arecaceae (Palmae) family, Coryphoideae subfamily [1]. It is variously called European fan palm, or Mediterranean dwarf palm. The aim of this study is to investigate the quantitative analysis of the cell wall carbohydrates extracted from the *Chamaerops humilis* L. leaflets. The extraction was carried out by aqueous alkaline solutions of 24% KOH and 17.5% NaOH to extract the hemicelluloses 1 and 2 respectively. The pectins were solubilized by boiling water for P1 and by ammonium oxalate for P2.

The results showed that the cellulose is predominant fraction 48.94%, followed by hemicelluloses 07.46% (H1, 5.10% and H2, 2.36%). However, pectins represent the lowest fraction 5.31% (P1, 3% and P2, 2.31%).

New cellulose-based and hemicelluloses based plastic films were synthesized. After extractions, the cellulose and the hemicelluloses were modified by dissolution by a LiCl / DMA solvent system followed by acylation in lauric acid in the presence of DMAP, this step resulted in the formation of a final ester which is obtained after air drying, it represents a plastic film [2].

As regards the esterification tests, it has been demonstrated that the wall polysaccharides of *Chamaerops humilis* L. could be used as a substrate for the synthesis of plastics after esterification with lauric acid chloride. It would be necessary to revive the work by essentially going through a study of the conditions of esterification.

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PHYSICO-CHEMICAL & SPECTROSCOPIC CHARACTERIZATION OF HYALURONIC ACID HYDROGELS

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Hyaluronic acid has a remarkable market share in worldwide due to its superior properties such as biocompatibility, biodegradability, perfect water absorptivity, bioactivity and lack of immunogenicity or toxicity. Owing to these properties, HA has a wide range of biomedical and industrial application areas such as drug delivery, tissue engineering, dermal fillers, skin moisturizers, orthopedic surgery, plastic surgery, osteoarthritis treatment, and ophthalmic surgery. [1]

In this study, it was aimed to determine thermodynamic parameters and perform spectroscopic characterization of crosslinking reaction of HA hydrogels. Calculation of number average weight between junction points of networks, investigation of crosslinking density, equilibrium swelling ratio, and drug release profiles are other scopes of this study. The detailed network characterization of the HA hydrogels, quantitative determination of free epoxide groups which could minimize the cytotoxic effect and preparing a detailed report on the physico-chemical characterization of hyaluronic acid are the significance of this study.

Five different compositions of hyaluronic acid hydrogels were prepared at different crosslinking ratios using different amounts of 1,4-Butanediol diglycidyl ether (BDDE) (30 µl, 40 µl, 50 µl, 60 µl, and 80 µl) and afterwards, their equilibrium swelling degrees at 25oC were determined. Equilibrium swelling degree of hydrogels at five different pH (2,4,6,8,10) was followed and the number average molecular mass of the hydrogels (Mc) was calculated using Flory-Rehner theory. It was observed that swelling ratio decreased, as the amount of crosslinker increased. Finally, injectable suitable hydrogels were obtained for the treatment of arthritis and drug release behavior of these hydrogels were examined using UV-Vis spectrophotometry.

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SURFACE MODIFICATION WITH PERFLUORO ACIDS FOR REDUCTION OF SURFACE WETTABILITY WITH HDYROCARBON LIQUIDS

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Perfluoro carboxylıc acids with different lenghts were used for surface modification of Si wafers in order to create an hydrophobic and oleophobic surfaces First of all, surface of silicon wafer was modified with poly(glycidyl methacrylate) (PGMA), used as an anchoring layer. Next, perfluoro acids were grafted to attach fluorinated functional groups to the surface. Variation of temperature of the attachment allowed controlling the concentration of fluorinated species on the surface. Finally, wettability of the coatings with aqueous solvents, such as water, and non-aqueous solvents, such as hexadecane was determined using contact angle measurements. The obtained fluorinated grafted layers demonstrated significantly reduced wettability. The lenght of the perfluoro acid influence the surface wettability. Increasing the acid lenghtreduced surface energy of surfaces, leading to higher oleohobicity.

PREPARATION AND CHARACTERIZATION OF BACTERIAL CELLULOSE AND POLYETHYLENE OXIDE BLEND FILMS

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Cellulose ($(C_6H_{10}O_5)_n$)is the most abundant, inexpensive and available linear polysaccharide which founds in the nature and can be extracted from plants or their wastes in the world [1]. Plant and bacterial cellulose (BC) differ from each other by their production method although they have the same molecular structure. There are several use and applications of BC in different areas such as food industry, cosmetics, antimicrobial activities, biocompatibility, tissue engineering, bioelectronics, biosensors, etc. [2].

In this study, the effect of the different ratios of BC addition on chitosan/PEO blend films were studied as a potential food packaging material. Four different BC/chitosan/PEO films were prepared and their physico-chemical characterization was performed. Energetic interactions and missibility of blend components were characterized using FTIR, the effects of hydrogen bonding on the morphology and thermal stability of the blend films were investigated using thermal analysis techniques (TGA and DSC). Dynamic mechanical analysis and stress-strain tests were used to characterize mechanical properties while XRD measurements were used to investigate the morphology of the films and determine the effect of compositions on crystalline tendency. Contact angle and AFM were used for surface characterization. Total surface energy of the films and its components were calculated from Contact Angle measurements using van Oss-Good contact-angle evaluation methodology.

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BIOMASS OBTAINING HIGH ENERGY EFFICIENCY BIOFUEL VIA TORREFACTION PROCESS

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Biomass energy sources; wood and wood wastes, animal wastes, food production wastes, energy crops etc. were used for energy generation [1]. In recent years, the torrefaction process is applied to prevent the negative effects of biomass usage and to improve the physicochemical properties of biomass. In this way, the moisture content is reduced, the calorific value and energy density is increased, and also because of the breakage of the bonds between the lignocellulosic polymers, the products can be obtained with improved grindability [2]. During torrefaction, hemicellulose, cellulose and lignin polymers in the biomass structure are thermally degraded and depolymerized. As a result of the process, volatile gases and moisture in the biomass content move away from the structure, while degradation occurs in lignin, cellulose and hemicellulose structures [3,4]. Different organic wastes are used as additives to increase the energy potential of the endemic plants which are considered as an alternative to the traditional energy sources commonly used in our country.

In this study, processed carob samples were used as organic additive to improve energy content. Verbascum plants were evaluated as biomass source. For torrefaction process, carob samples taken from molasses factory were subjected to torrefaction process at low heating rate (10°C/min) between 200-300ºC and under inert nitrogen environment. In addition, in order to determine the effects of different torrefaction conditions on biomass yield, particle size (1000-5000 µm), process temperature (200-300°C) and process residence time (15-60 min) of the biomass were investigated in detail. The results were evaluated in terms of mass yields, energy densities, energy yield and mass loss values.

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Acknowledgments

This work was supported by Research Fund of the Yildiz Technical University. Project Number: FDK-2019-3605.

PHOTOELECTRICAL PROPERTIES OF SOLAR SENSITIVE CUO DOPED CARBON BASED PHOTODIODES

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The Cu doped carbon thin films were produced by using electrophoretic deposition and the surface characteristics of the photodiodes were investigated using the scanning electron microscopy and infrared (IR) spectroscopy. Illumination behaviours and current – voltage (I-V) characteristics were assessed where reverse voltage current and illumination densities showed increasing/decreasing characteristics with applied bias voltage. I -V characteristics curves were used to calculate the average ideality factor (n) and barrier height (Φ_B) which were found as 3.74 and 0.51 eV, respectively. Moreover, capacitance – voltage (C – V) and conductance voltage curves were assessed. Capacitance were showing increasing/decreasing trend with increasing frequency. Detailed investigations of Cu doped C photodiodes revealed that photodiodes exhibited quite good solar and photo sensitivity. Overall performance of the photodiodes indicate that Cu doped C diodes have great potential to be used as a solar sensitive diode in optoelectronic devices and their applications.

A NEW BIHARMONIC CURVES WITH EXTENDED DARBOUX FRAME

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In this study, we firstly characterize biharmonic curves and associated curvature tensor field by considering extended Darboux frame. Then, we obtain the relation of each quasi curvatures of curve. Finally, we give some new conditions with the normal curvature, the geodesic curvatures, and the geodesic torsions of the curve.

Keywords: Extended Darboux frame, biharmonic curve, curvatures.

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GEOTHERMAL ENERGY ASSESSMENT OF MARMARA REGION USING PLAY FAIRWAY ANALYSIS

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Geothermal energy is a clean and sustainable energy source which is located under the ground naturally and utilized with applicable temperatures. Depending on the temperatures, geothermal energy can be used for heating and cooling purposes or to generate clean electricity. Marmara Region has enough capacity in terms of geothermal resources. It is an important element of the tectonic structure including the North Anatolian Fault Zone. Surfer software is used to overlay the Marmara Region map and the location of well, temperature, population data, etc. Play fairway analysis is used as a method of integrating various types of geospatial data for the determination of most favorable areas to provide the development of geothermal energy potential in Marmara Region, especially Thrace Basin.

Key Words: Geothermal Energy, Thrace Basin, Temperature, Slope, Population, Energy Lines

INVESTIGATION OF MECHANICAL PROPERTIES OF POLYUREA COATED METAL PLATES

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In this study, 1mm, 2mm and 3mm thicknesses polyurea coating has been applied on different types of metal plates. Mechanical properties of coated and uncoated plates were studied and contribution of polymer coatings to durability of materials was investigated.

Polyurea has been greatly used in coating applications and other surface reinforcement or insulation technologies because of its superior physical properties. Polyurea is classified as an elastic copolymers and it's composed by mixing two reactive components. This polymerization reaction verifys between isocyanate and amine groups 1:1 by volume [1]. There are several recent studies about impact resistance of polyurea in the literature. Mohotti et al. (2014) [2] investigated polyurea-coated aluminum plates under low velocity impact. The data obtained from the study proved that, polyurea coating decreases deformation of aluminum plates and that coated plates absorbs more energy than uncoated plates. These results show that polyurea can be used as an efficient energy absorber / damping material against low velocity impact.

In our study, we have implemented three different thicknesses (1,2 and 3mm) polyurea coatings on three different metal types (aluminum, steel and DKP) all is same thicknesses (4mm) and tensile strength test was applied to those coated and uncoated plates. The results were evaulated in terms of coating thicknesses and plate types. Tensile tests were carried out on 12 plates, 3 of which were uncoated and 9 of which were coated. By checking the obtained results, formation of the metal plates was investigated under variable tensile strength with coating thickness.

Acknowledgments: This study was supported by FYL-2018-3409 project of Yıldız Technical University Scientific Research Projects Coordinator.

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SYNTHESIS, PHOTOPHYSICAL AND ELECTROCHEMICAL PROPERTIES OF A NOVEL BAY-FUNCTIONALIZED PERYLENE ANHYDRIDE AND DIIMIDE

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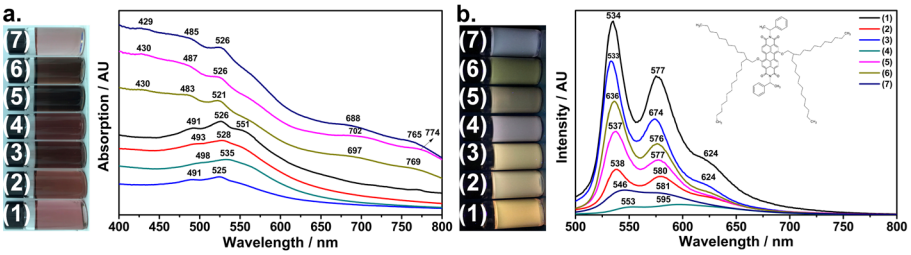
Perylene chromophore has a great aromatic conjugation and offers numerous advantages in many fields of application. One of their greatest advantages is the capability to functionalize the perylene chromophore at its core/bay and imide positions with various substituents according to the desired application. Perylene derivatives have been widely applied in various optical devices due to their excellent photophysical, electrochemical, charge transfer properties, as well as outstanding chemical, thermal and photochemical stability.

In the present research on perylene dyes, we have synthesized a new core substituted perylene anhydride and diimide in three consecutive steps focusing the application toward solar cell applications. Firstly, the starting raw material perylene-3,4,9,10-tetracarboxylic was brominated at 1,7-positions of the perylene chromophore to yield 1,7-dibromoperylene-3,4,9,10-tetracarboxylic dianhydride. In the second step, bromine atoms was exchanged by alkynyl group to produce bay- substituted perylene dianhydride. Finally, bay- substituted perylene diimides were synthesized through N, N‘- imidization.

The final compounds were purified and characterized by FTIR, UV-vis and Emission measurements. The electrochemical properties of the compounds were investigated by cyclic voltammetry (CV) in deoxygenated DMF solution containing 0.1 M of NaBF4 as supporting electrolyte. The potential was externally calibrated by ferrocene/ferrocenium couple (Fc/Fc^{+}). The thermal stability of the compounds was studied by differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA) at a heating rate of 10 °C min^{-1}. For comparison, photophysical, electrochemical and thermal properties of the intermediate products were carried out in parallel.



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International Natural Science, Engineering and Material Technologies Conference

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A NOVEL PERYLENE POLYMER AND MONOMER BASED ON THE 1,3,5-TRIAZINES

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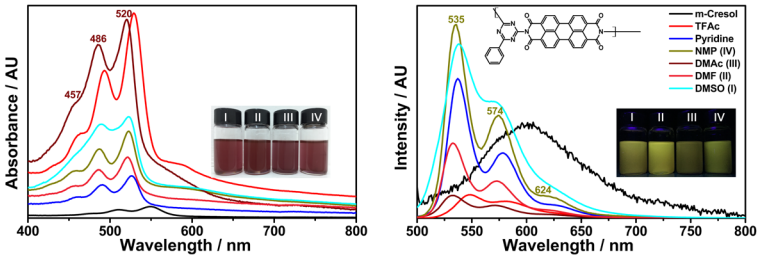
Conjugated polyimides containing perylene core have received great attention for the past two decades due to their superior chemical, thermal stabilities and mechanical resistance, good film forming ability, novel optoelectronic properties and high photoluminescence efficiency [1]. Fluorescent perylene polyimides can be utilized in plenty of potential applications such as high temperature adhesive and coatings, interlayer dielectrics, polymer matrices for high temperature advanced composites owing to their excellent photoactive and electro active properties. However, most of them suffer from high melting and softening temperatures, poor solubility and heavy aggregation in common organic solvents because of their strong intermolecular $\pi \rightarrow \pi$ interactions and rigid perylene polyimide backbones which can greatly limit their usage in some area.

Functionalization of the perylene fluorophores with sterically hindered imido-substituents is the main strategy to reduce the intermolecular $\pi \rightarrow \pi$ stacking between the aromatic cores and to prevent intermolecular electronic coupling. Incorporating sterically hindered substituents in perylene skeleton from imide position able to enhance the solubility of perylene dyes and packing of perylene units as nano molecules. But the properties and electronic structure of the perylene dyes cannot be affected by substitution on nitrogen atom because of the nodes on both HOMO and LUMO levels prevent the electronic interaction between perylene unit and corresponding substituents.



In the present study, the novel triazine containing chromogenic perylene polyimide by one-step polycondensation mechanism and for comparison its monomeric diimide by one-step condensation mechanism have been efficiently synthesized in high yields. The photo physical, electrochemical and thermal properties were systematically studied in detail. It is important to note that, different absorption and emission properties have been observed due to different intermolecular interactions. Notably, the novel polymer and its monomer have shown great potential for further photonic technology.

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SOME CHARACTERIZATIONS OF PARALLEL CURVES IN 3-DIMENSIONAL EUCLIDEAL SPACE

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In this paper, we give some characterizations of parallel curves of a spatial curve. The relationship between parallel curve and a spatial curve are examined according to quasi frame in three-dimensional Euclidean space. Additionally, some results and theorems are presented with special cases. Then, we provide some examples of parallel curves.

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MAGNESIUM (Mg) METALLED WATER SOLUBLE PHTHALOCYANINES

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Phthalocyanines (Pcs) contain four isoindole units and these units create 18-π electron system. Many metal ions can insert Pc ring core, therefore different metalled Pcs (MPcs) can be synthesized. [1] MPcs have used widely as dyes and pigments since when they were discovered. Nowadays they are used in many different areas, such as photodynamic therapy (PDT), sensitive sensors, organic light emitting diodes, electronic devices, photovoltaic cell elements, etc. [2]

Photodynamic therapy (PDT) is an innovator medical technique which is obtaining an alternative treatment of the cancer types in a nonsurgical way. Pcs have found applications as photosensitizers in PDT since diamagnetic central metals, such as Zn or Mg enhance phototoxicity of Pcs. Low solubility in common organic solvents or water is the main problem for PDT applications. This problem has been solved by positioning of different bulky groups into the non-peripheral or peripheral location of the Pc ring. When amino or carboxyl groups have attached to Pc derivatives, their water solubility increase. [3]

The aim of study is designing new Pc compounds which are potential sensitizer for PDT applications. Novel Mg metalled Pcs including at peripheral or non-peripheral positions with 7-oxy-4-(pyridine-3-yl)coumarin substituents and their quaternized ionic derivatives were prepared (Fig. 1). Additionally, aggregation, photophysical (fluorescence quantum yields and lifetimes) and photochemical (singlet oxygen and photodegradation quantum yields) properties of the synthesized compounds were analyzed.

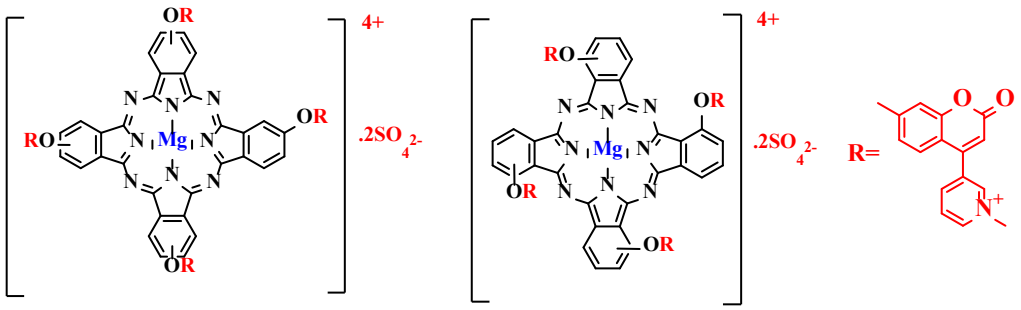

Figure 1. Mg metalled water soluble Pcs.

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A METHOD FOR SOLVING OF DIFFERENCE EQUATIONS FROM ANALYSIS OF CRYSTALS WITH BROKEN TRANSLATIONAL SYMMETRY

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Analysis of the properties of condensed matter, especially of the nanostructured samples [1,2], is solved using the operator method and the second order non-linear difference equations [3]. The general character of solution is verified through two concrete applications. Difficulties related with solving difference equations were analyzed in this work and discussed in detail.

This method gives the compact solution if the variable coefficient is of exponential type and it can be applied to the problem of finding molecule displacements in crystalline chain with finite and very small length. It is shown that the molecule displacement can be represented as the specific superposition of harmonic functions depending on the space position phonon occurrence.

Further, we considered the polymer molecular chain of the finite and ultra-short length with substitution impurities. In this particular case appear two types of exciton states: collective and localized ones.

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APPEARANCE OF DISCRETE ABSORPTION IN ULTRATHIN MOLECULAR NANOFILMS

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We have supplemented already formulated microscopic theory of optical properties of ultrathin molecular films, i.e. quasi 2D systems parallel to XY planes bounded by two surfaces [1]. Exposure of nanofilms to the external electromagnetic fields has result in creation of low concentration of Frenkel's excitons, but different than bulk ones in one direction perpendicular to surfaces [2].

Analysis of the dielectric response of this exciton system show that optical properties of these crystalline nanosystems strongly depend on surface parameters and the thickness of the film. In addition, absorption and refraction indices show very narrow and discrete dependence of external electromagnetic field frequency, which is the consequence of confinement effects [3].

Influences of boundary conditions on optical characteristics (through analyses of dynamical absorption and refraction indices) of these nanostructures were explored in details. Unlike the bulk structures which are total absorbers of near IR radiation, ultrathin perturbed films (with the very same crystallographic structure) manifest interesting possibility of appearance of discrete absorption peaks.

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INFLUENCE OF CHARGE CARRIER AND PHONON SCATTERINGS TO ELECTRIC AND HEAT TRANSPORTS IN GRAPHENE

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The planar atom layer of carbon arranged in a two-dimensional hexagonal lattice is called graphene [1]. It possesses a range of interesting characteristics such as mechanical hardness of ≈ 1 Pa and high thermal conductivity ≈ $5 \cdot 10^3$ $W \cdot m^{-1} \cdot K^{-1}$ and the highest electron mobility of all known materials ≈ 10^4 $cm \cdot V^{-1} \cdot s^{-1}$. All this makes graphene the most perspective material for application [2].

Temperature dependence on heat and electric conductivity, in the wider temperature interval of 3 – 5000 K, has been analyzed in this work, by solving the Boltzmann transport equation in approximation of relaxation times, introduced phenomenologically [3].

Thermal conductivity of graphene is essentially phonon-based. The coefficient of thermal conduction is proportional to T^2, and at high temperatures to T^{-1}. The electronic conductivity decreases with increasing temperature for $T > T_{BG}$ and increases for $T < T_{BG}$ in the event that we take into consideration the effect of all the relaxation mechanisms.

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MULTICOMPONENT CONDENSATION REACTIONS OF 3-AMINOPYRAZOLES

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Multicomponent reactions are one of the most attractive and significant subjects of organic chemistry because it allows synthesis of new carbon-carbon and carbon-heteroatom bonds by reducing the synthesis steps and energy consumption by a one-pot method [1].

Synthesis of N-heterocycles by MCR methods has been the main objective of synthetic chemists, since the nitrogen-containing moieties form an integral part of many biologically active molecules and natural products [2]. Nitrogen heterocycle has emerged as an important pharmaceutical entity due to their parasiticidal, bactericidal, antiviral and antimalarial properties. They have also found application as vasodilators, and has been extensively studied for their enzyme inhibiting activity [3].

Herein, we described an efficient three component synthesis of pyrazoloquinolinone derivatives under conventional and ultrasonic techniques.

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BAND ENGINEERING AND PHOTOPHYSICAL PROPERTIES OF C-DOPED F8T2 ORGANİC COMPOUND

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Organic semiconductors (OSs), recently, have been of important attention in a wide variety of applications such as electronic and photonic applications [1, 2]. Among OSs, poly[(9,9-dioctylfluorenyl-2,7-diyl)-co-bithiophene] (F8T2), especially, is a promising class in organic field-effect phototransistors as the active material due to its high ionization potential (5.5 eV) [3, 4]. Also, the transistors show highly stable and reproducible performance under heat treatment [3].

The electronic and optoelectronic properties of materials are considerably tunable as a function of an atom substitution [5]. Herein, the changes in the bandgap and photophysical properties of F8T2 have been investigated using the self-consistent charge density-functional based tight-binding (SCC-DFTB) which is based on the density functional theory (DFT) [6]. Later, the electronic and optical properties of F8T2 by substitution of Carbon (C) single atom were performed. The HOMO, LUMO and bandgap energies, dipole moments, refractive index and Fermi levels were investigated. Absorption spectral analysis has also been obtained by time-dependent (TD)-DFTB calculations-based on the Casida's approach [7].

The results show that the HOMO and LUMO energy levels of F8T2 were found -5.045 and -2.729 eV, respectively, which are compatible with experimental HOMO (-5.44 eV) and LUMO (-2.95 eV) energy levels. The band energy (2.32 eV) is also consistent with experimental findings (2.49 eV). The gap energy for F8T2 decreased from 2.32 eV to 0.13 eV which is about 2.19 eV shorter than that of F8T2. The calculated maximum absorbance peak of F8T2 is 437 (2.83 eV) nm which is shorter 266 nm (4.66 eV) than that of C-doped F8T2 (703 nm; 1.76 eV).

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PHOTOCATALYTIC DECOLORIZATION OF A REACTIVE DYE IN AQUEOUS TiO_2 SUSPENSIONS: A PLAUSIBLE DEGRADATION MECHANISM

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Reactive dyes are anionic dyes that are widely used in textile industry. These azo dyes contain one or more azo bonds which are attached to two aromatic rings combined with reactive groups. This property makes their degradation difficult. Discharging of these dyes into water streams can cause severe environmental and health problems. Thus, removal of these colored effluents from waste water of the textile industry is greatly significant and many studies have been performed with using TiO_2 photocatalysis is used to remove textile dyes in recent years [1]. This technique is based on the generation of highly reactive hydroxyl radicals upon UV irradiation and these reactive species responsible for the degradation reactions.

In this study, Reactive Blue 221 was chosen as the representative member of reactive azo dyes and commercial Evonik TiO_2 P25 was used as photocatalyst. The photocatalytic decolorization of Reactive Blue 221 under UV-A light irradiation was investigated and and monitored by UV–vis. With the intend to determine a plausible photocatalytic degradation mechanism of RB 221, Conceptual Density Functional Theory was applied and reactivity descriptors were calculated by means of DFT/B3LYP/6-31G* level of theory. Eventually, the reactive sites of the molecule for •OH radical attack were determined and the reaction mechanism was predicted by combining the results of the DFT calculations with the experimental FTIR and GC-MS analyses.

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INVESTIGATION OF ANNEALING OF SURFACES OF ITO AND PEDOT:PSS FOR PERFORMANCE IMPROVEMENT OF ORGANIC AND HYBRID SOLAR CELLS

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Organic and hybrid solar cells have been the subject of deep research in recent years. The lightness, flexibility, ease of production and easy adjustability of chemical and physical properties of organic materials via chemical synthesis routes make them advantageous over their inorganic counterparts. Organic solar cells are prepared by blending two different organic materials, one of which is a donor and the other is an acceptor, and sandwiching the resulting thin film between two metal electrodes whereas hybrid solar cells are fabricated by blending two different materials, one of which is an organic and the other is an inorganic material, and sandwiching the obtained thin film between two metal electrodes. Although the power conversion efficiency of organic and hybrid solar cells has increased rapidly in recent years, it is still not comparable to silicon solar cells which dominate the photovoltaic market. Therefore, Research and Development studies to increase the efficiency of organic and hybrid solar cells are of great importance.

In this study, the effects of thermal, UV and surface modification processes applied to ITO and PEDOT: PSS surfaces on charge transfer kinetics were investigated. Organic and hybrid solar cells were prepared and the device performances were examined. UV effect was observed to improve the photovoltaic performance.

GOLD NANOPARTICLES AS X-RAY COMPUTED TOMOGRAPHY (CT) AND MULTIPURPOSE CONTRAST AGENTS

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Since the discovery of the X-ray, it has been vastly used in many different implications. Invention and development of X-ray tomography enabled researcher to obtain image of objects in 3D in any angle. Such important invention find area of implication in different fields such as biomimetics, marine science, biology, entomology, anatomy medical sciences etc. Today, X-ray tomography mostly used in medical applications for medical purposes where millions of CT scan was performed every year. The purpose of the medical implications are diagnostics, since X-ray tomography provide high quality images of tissues and organs. All in all, sometimes it may be difficult to obtain high quality image of soft tissues since soft tissues cannot absorb the X-ray. Therefore, contrast agents were used to enhance the image quality obtained from the soft tissues. Iodine based contrast agents are frequently used in medical implications [1]. At this point, new generation contrast agent which can be used in the medical applications are still in development process. Gold nanoparticles have strong potential to be an alternative to iodine based contrast agents. Gold nanoparticles has higher X-ray attenuation coefficient than iodine itself at same molar concentration [2]. Gold nanoparticles have very low or no toxicity depending on production method. The surface of the gold nanoparticles can also be modified with antibodies and functional groups to targeted drug delivery implications [3]. Moreover, core-shell structure gold nanoparticles has dual imaging properties. In addition, chelating nanoparticles with different materials alter the properties of them that enables nanoparticles to be used in theranostic purposes. In this work, we investigated *in vivo* biological applications of gold nanoparticles as X-ray contrast agent. We evaluate the contrast agent properties of nanoparticles such as contrast enhancement, target organ, multimodal properties and cytotoxicity etc.

Acknowledgments: This work was supported by the Kırklareli University Research Fund (Project number: KLÜBAP-179).

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BIZMUT NANOPARTICLES AS X-RAY COMPUTED TOMOGRAPHY (CT) AND MULTIPURPOSE CONTRAST AGENTS

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Millions of people having X-ray computed tomography (CT) scan every year. CT is vastly used in medical applications for diagnostic purposes since it provides high quality 3D image of scanned region. It is well known fact that X-ray is absorbed and deflected by the investigated object. Any human tissue has different stiffness and X-ray attenuation properties which has important role in CT imaging. Soft tissues such as muscles and organs has quite similar attenuation and stiffness properties where having detailed image of such tissues may demand prolonged CT scanning time. Such time increases radiation exposure of patience. To enhance the image quality and minimize the radiation exposure contrast agents are used in CT applications. Iodine based contrast agents are the most popular CT contrast agents used in the clinical applications [1]. However, iodine based contrast agents may be harmful for thyroid patience and/or who has iodine intolerance. Bi nanoparticles have great potential to overcome this problem where Bi high atomic number with high X-ray attenuation[2]. Functionalization of the surface of the Bi nanoparticles enables them to be used in targeted drug delivery implications where X-ray contrast enhancement at certain points were obtained. Moreover, Bi nanoparticles have photothermal properties which makes these particles a suitable candidate for multimodal imaging where diagnostic and therapy can be applied to the patient simultaneously [3]. In this work, we assess the pre-clinical *in vivo* implications of Bi nanoparticles and their X-ray contrast and multi modal properties.

Acknowledgments: This work was supported by the Kırklareli University Research Fund (Project number: KLÜBAP-179).

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SYNTHESIS OF DANDELION-LIKE Bi_2S_3 NANOSTRUCTURES USING HYDROTHERMAL METHOD

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Nowadays, energy crisis and environmental pollution are two of the biggest problems' that humankind have been facing. Photocatalysis attract the interest of the researchers for water cleaning that photocatalysis has great potential to separate organic molecules from inorganics [1]. Most of the photocatalysis reported in the literature are found to be metal origin. Among those metal catalysis Bi_2S_3 stands out due to its outstanding properties such as having low band gap (1.3eV), high photodegradation efficiency, photothermal effect, therefore, find application in photodiodes, sensors, and photothermal therapy implications [2-3]. Having control on surface characteristics and size parameters are important to adjust photothermal, photocatalytic and catalysis properties of Bi_2S_3 nanostructures Up to now, many different structures were reported such as nanowires, nanorods, nanobelts, nanotubes etc. In this work, we produce dandelion like Bi_3S_4 nanostructures using hydrothermal method.

Fig 1. SEM images of the dandelion-like Bi_2S_3 prepared at 150 ˚C for 1 h

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DEVELOPMENT OF CYCLODEXTRIN BASED HISTOTRIPSY AGENTS

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Acoustic cavitation mechanism with pressure inside tissue cells using mechanical histotripsy is an emerging and promising method to ablate tissues. Developing new histotripsy agents with high contrast, efficacy, optimal size etc. are the challenges which need to be adressed along with developing a green and easy synthetic route. [1-2] In this study, Cyclodextrin (CD's) and Perfluorocarbons (PFC's) host-guest complexes (Nanocones-NC's) as a novel generation of histotripsy agents have been explored. Different cyclodextrin derivatives (α-CD, β-CD, and γ-CD) with different PFC (perfluorohexane and perfluoropentane) as nanocones (NC's) were studied using molecular dynamics simulations computationally followed by experiments to find out the most effective complex derivative. CD derivatives have different functionality which affects their solubility and complexation potential. Therefore, the complexation potentials of methylated-β-CD and hydroxy-propyl-β-CD derivatives with different PFC derivatives' were investigated. Elemental analysis using SEM-EDAX mapping tool was done to follow the trace of Fluorine inside the cyclodextrin complex. Complexation efficiency was calculated using gas chromatography to determine exactly the amount of PFC amount inside the NC complex. Dynamic light scattering method was used to determine the stable complex sizes. For histotripsy activities, cavitation threshold pressures of the complexes suspended in agarose gel were determined and concentration-dependent changes were investigated.

Keywords: Histotripsy, Tissue Ablation, Cyclodextrin, Perfluorocarbons, Nanocones.

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A COMPARISON OF THE ELECTRICAL CHARACTERISTICS OF THE Au/n-Si (MS) AND Au/(MgO-PVP)/n-Si (MPS) TYPE SCHOTTKY BARRIER DIODES (SBDs) AT ROOM TEMPERATURE

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Au/n-Si (MS) type SBDs with and without an organic (MgO-PVP) interlayer was fabricated on the same n-Si wafer to determine the effect of the organic interlayer on main electrical parameters. For this purpose, the forward and reverse bias current-voltages (I-V) between -2V and 3V. The reverse saturation current (I_o), ideality factor (n), zero-bias barrier height (Φ_{Bo}), series and shunt resistances (R_s, R_{sh}) of the SBD, rectifying-rate ($RR=I_F/I_R$) were found as $2.33x10^{-8}$ A, 6.181, 0.721 eV, 2.94 kΩ, 1.90 MΩ, 640 for MS and $2.61x10^{-10}$ A, 3.418, 0.834 eV, 8.09 kΩ, 440 MΩ, 54000 for MPS, respectively. Additionally, the Rs, n, and the barrier height (Φ_B) were obtained from the forward bias I-V data by using Cheung functions as 5.55 kΩ, 8.108, 0.766 eV for MS and 4.935 kΩ, 5.292, 1.13 eV for MPS, respectively. When we compared these results, we discovered the value of Io and n for MPS to be lower than MS, but Φ_B, Rsh, RR are higher than MS. Therefore, we can conclude that the use of the (MgO-PVP) organic interlayer can considerably improve the performance of the MS type SBD and that it can successfully be used instead of traditional insulator layers.

INVESTIGATION OF DIFFERENT PEG BRUSHES AND EPPT1 PEPTIDE CONTAINING TARGETED GRAPHENE BASED DRUG DELIVERY

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Recently, the superior properties of graphene to other biomaterials have made graphene an indispensable and unique material for anticancer drug delivery research, gene and peptide transport [1]. On the other hand, undeniable beneficial effects of graphene that provided by wide surface area could be limited by toxic effects. So, reduced graphene oxide is chosen due to having better biocompatibility and wider surface area. In this research, not only a targeted anticancer drug loaded graphene nanocarrier is produced but also a solution is made in order to eliminate toxic effects of graphene and obtain high yield on loading and releasing of anticancer drug at different pH intervals. In order to obtain more biocompatible nanocarrier system, Copolymer P[PEGMA-ko-MMA-ko-PMA-ko-AzPMA] that contains different Poly (ethylene glycol) (PEG) brushes and multiple pyrene groups are synthesized by atom transfer radical polymerization than coated to graphene surface with high efficiency by π-π interactions. Due to the azide groups of copolymer and alkyne groups of EPPT1 peptide, click reaction is yielded. EPPT1 peptide is able to include to structure of nanocarrier as targeting agent which recognizes the high rate of MUC1 receptor exhibited by breast cancer cells [2]. The effects of two different lengths of PEG brushes (500 g/mol and 2000 g/mol) and ionic azide groups on loading and releasing of Doxorubicin (Dox) were investigated. Additionally, the releasing profiles of Doxorubicin loaded graphene nanocarrier which loading yield is 95% are observed for two different pH interval pH: 5.5 and physiological pH: 7.4 values. In order to observe cell viability MTS experiments are applied for the anticancer effect of EPPT1 targeted drug-delivery system and target selectivity on healthy breast cells such as MCF-10A and breast-cancer cells of MCF-7 and MDA-MB-23.

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ON DARBOUX HELICES DUE TO THE BISHOP FRAME

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In this study, using Darboux vector of an curve according to the Bishop frame, we give a characterization of Darboux helices in Euclidean 3-space E^3. We obtain the position vector of non zero fixed direction U. Then we present some characterizations related to the main theorem.

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PHOTOBIOREACTOR DESIGN, HARVESTING, AND EXTRACTION OF MICROALGAE AS A NON-EDIBLE RENEWABLE ENERGY SOURCES

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Water pollution from the growing population and industrial activities has become a rapidly increasing concern recently. It is crucial to treat the wastewater by methods that will improve the discharge quality, suitable for reuse and preventing water pollution. Researchers have been considerably interested in the grew of microalgae in photobioreactors for biodiesel production by wastewater treatment and removing inorganic pollutant from the wastewater.

The photobioreactors which using solar light as an energy source to perform the photobiological reaction are used to grow large amounts of microalgae under controlled conditions. Whether a photobioreactor is an optimum choice for industrial wastewater treatment varies by industry, because daily wastewater amounts and quality are quite variable. For instance, inorganic pollutant and nutrients existing in dairy wastewater were accomplished treated with microalgae at a cost-effective in a photobioreactor operated by UV lamps. Some of the essential things in the selection of photobioreactors are wastewater discharge standards and the type of biomass to be used in treatment. Tubular photobioreactor, flat plate photobioreactor, and column photobioreactor are some of the types of photobioreactors.

Microalgae is a sustainable renewable energy resource due to its potential to generate significant quantities of biomass and lipid. There is an interrelatedness of steps such as harvesting process of microalgae, extraction of the lipid, and production to biodiesel. However, different major challenges in the production of the biodiesel, including the large-scale microalgae growing and the harvesting of microalgae. After harvesting wet or dry microalgae, the other step is lipid extraction from the microalgae by various methods such as chemical cold press, enzymatic extraction, supercritical extraction. For the efficient extraction of lipids, the method that doesn't demolish the lipid content and which is simple to scale should be selected.

SYNTHESIS AND PROPERTIES OF MACROMOLECULAR STRUCTURES CONTAINING TRIAZINE UNITES

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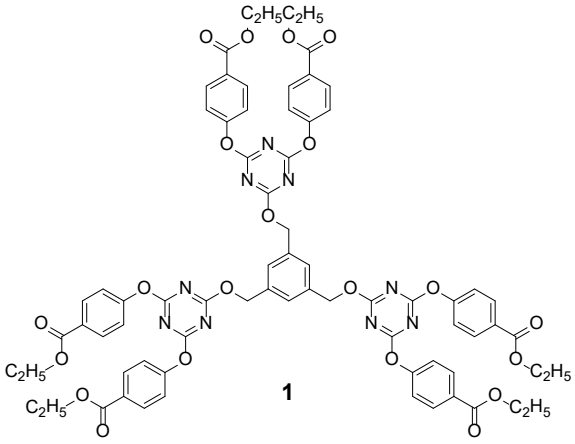

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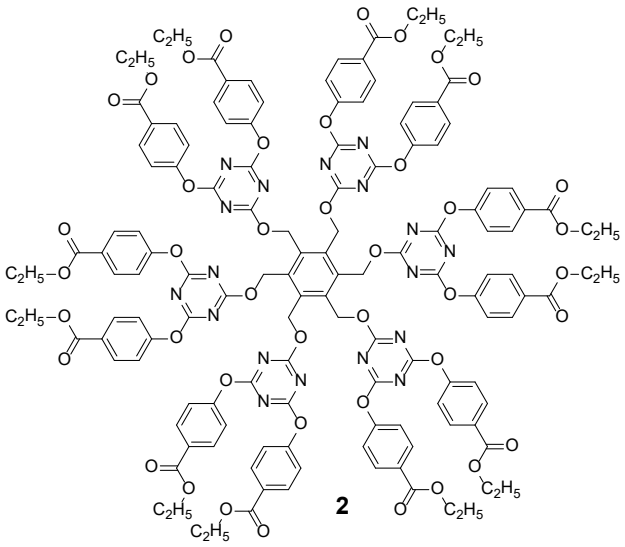

2

Although triazines are aromatic compounds, their resonance energy is much lower than in benzene. So that, nucleophilic aromatic substitution is easier than typical chlorinated benzenes and also triazine is known to have a good electron transporting properties. Because of its unique properties of triazine, triazine-based materials have been a focus of both academic and indusial researches, and found wide spread application in various fields. As a part of an ongoing investigation on triazine-based materials and their properties, we have prepared macromolecules **1** and **2**. Their synthesis and properties will be presented.

DETECTION OF ANTIBIOTIC RESISTANCE GENE IN BACTERIA ISOLATE

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The antibiotic resistance is a global threat for us in the near future. An extreme increase of antibiotic resistance genes has been observed in various natural environments but terrestrial subsurface microbial life has received relatively little attention.

The aim of this study was to attain more insight into the frequency and diversity of antibiotic resistance genes present in the terrestrial subsurface environment using direct cloning tools. As a result of our studies, a beta-lactamase gene was isolated from terrestrial underground environment. The three different isolates were then tested for growth with antibiotics rifampicin (100 µg/ml), neomycin (50 µg/ml), kanamycin (100 µg/ml), ampicillin (100 µg/ml), or tetracycline (10 µg/ml) at 37°C for 24 h.

It has been found that the germs present in this bacterial population are very similar to Bacillus spp. The resistance gene was confirmed by subcloning and the minimum inhibitory concentration values were measured against several test betalactam antibiotics. This study extends information about resistance to antimicrobials that can help to minimize future threats.

OXIDATIVE STRESS FACTORS MEASUREMENT IN MICROALGAL LIPID

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Schizochytrium sp. is widely studied microalgae to obtain high content of polyunsaturated fatty acids especially docosahexaenoic acid (DHA). They contain various bioactive compounds that can be used as pharmaceutical raw material, food additive, aquaculture and animal feed.

The aim of this study is to measure the lipid peroxide and free fatty acids which are oxidative stress factors. PUFAs are prone to autoxidation (oxidative rancidity) because of double bonds in their structure. Generally, autoxidation is determined by the peroxides which are intermediates in the autoxidation reaction. Autoxidation reaction leads to form free radical is formed. Total peroxide value was determined by using asedic acid-chloroform method in this study. The free fatty acids (FFAs) and the non-polar components are separately recovered and measured with phenolphthalein assay

Free fatty acid, anisidin, peroxide and unsaponifiable matter values of microalgal lipid were determined and compared to fish oil. It has been found that microalgal lipid free fatty acid 0.1 ppm, Anisidine value 20 mg KOH / gr, peroxide value 5 meg / kg.

CHEMICAL AND ELEMENTAL ANALYSIS OF *SHIZOCHYTRIUM* SP DERIVATED POLAR AND NON-POLAR LIPID

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It is known that the major commercial source of omega-3 fatty acids is fish oil, which faces challenges such as odor/taste problems, heavy metal specially mercury contamination, and limited supply. Neutral lipids are generally known as storage lipids such as TAG and extracted with non-polar solvents such as hexane, chloroform, benzene, diethyl ether. Neutral lipids interact with their long hydrophobic fatty acid chains with Van der Waals attraction. Therefore, non-polar lipids in cytoplasm come together and form globules. Polar lipids are generally associated with cellular membrane and dissolve in polar solvents such as ethanol or methanol.

Heterotrophic cultivation of *Schizochytrium* sp. is an excellent opportunity to provide alternative omega-3 sources since it contain high amount of DHA with very low heavy metal content. Because of LC-PUFAs are more prone to oxidation, it was suggested to add antioxidant solution to algal culture. In this case, algae was grown on F/2 medium, samples were withdrawn at different times for the first 100 hours of the culture, and elemental composition was determined using a Carlo Erba EA 1108 elemental analyzer. Qualification of extracted lipid of *Schizochytrium* sp. was tested by analyzing chemical and elemental characteristics.

According to results, Arcenic, Cadmium, Copper, Iron, Lead and Mercury level were below the limit (≤0,2) when it was compared to fish oil. The fatty acids can be extracted from algae and used in foods, or the biomass can be used directly as a feed additive in various animal industries such as aquaculture.

NON-RUIN OPERATOR AND HAMILTONIAN TECHNIQUE TO RUIN PROBABILITY

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Risk theory is interested in forecasting the insurance companies' future reserve and their situations: profit or loss. To protect the company from debt and to find the optimal premium price for the customers, some mathematical methods are treated, and the probability of ruin calculated by using them.

In this poster, we consider the Classical Surplus Processes to compute the ruin probability of a risk; and finite time non-ruin operators are shown in order to model Risk Processes when claims are i.i.d. random variables.

Then, the non-ruin operator in discrete time process for t={0,1,2,…} is defined with a semi-group. The time interval is divided by N+1 steps and the non-ruin probability is found via the discretization technique. The operator matrices are formed by using transition probabilities. Also, the non-ruin operator in continuous time process is also defined with a semi-group and the operator matrices are formed by transition rate λij from state i to j. λ_{ij}

Furthermore, by using standard Dirac formalism with bra-ket notations and tensor product of operators, we treat several advanced examples in discrete and continuous space for chosen Hamiltonian with traditional basis and eigenvalues of Hermitian operator in two- and three-dimensions.

SCRATCH RESISTANCE HYBRID COATING ON PC

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Hybrid materials have been receiving considerable attention as a new class of materials for their new, original properties based on a combination of organic and inorganic polymer [1]. This combination of organic and inorganic materials within the same material creates new properties in terms of mechanical, electrical, physical or optical properties. They contribute to the increase of scratch resistance, UV resistance, durability, hydrophobicity or hydrophilicity, easy to clean property and flexibility of the coating surfaces [2]. Nowadays, there is numerous thin film coating methods. Sol-gel method is one of the most widely applied methods, since it is easy, cheap, and handy. Sol-gel method is an appropriate method for obtaining both inorganic and hybrid inorganic-organic polymers [3,4]. The aim of this study is to produce anti-scratch thin films. In this study, epoxy based silane coupling agent is used together with metal alkoxides to form a hybrid coating system that has strong adhesion with polycarbonate surface. In the experimental study, an organic–inorganic molecular hybrid compound was first prepared by sol-gel method. Silane and metal alkoxides were dissolved in ethyl alcohol and mixed at 60°C for 1 hour. After being cooled down to ambient temperature, modified solution was coated on a polycarbonate sheet by dip coater with heater. After evaporation of solvents, samples were characterized by Fouirer Transform Infrared Spektrofotometre (FTIR), Differential Thermal Analyzer/ Thermogravimetry (DTA/TG), X-ray diffraction (XRD), scanning electron microscope with energy dispersive X-ray spectroscopy (SEM-EDX) and Contact Angle Goniometer. Anti-scratch surface was obtained metal doped modified silane.

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PREPARATION OF SUPERHYDROPHOBIC SURFACES BY SOL-GEL PROCESS

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Many surfaces of materials in nature and coatings have hydrophobic or hydrophilic character [1]. Contact angle is one of the common methods to describe hydrophobic or hydrophilic character of material. If the water contact angle is smaller than 90°, the surface is considered hydrophilic and if the water contact angle is larger than 90°, the surface is considered hydrophobic [2]. When the contact angle is greater than 150°, the surface is interpreted as superhydrophobic [3]. Superhydrophobic coatings are attracting the attention in many industrial applications such as metal, polymer, ceramic, glass, tile, etc [4]. Artificial superhydrophobic surfaces have been fabricated by electrodeposition [5], chemical etching [6], laser treatment [7], electrospinning [8], sol-gel processing [9], chemical vapour deposition [10], layer by layer assemblies [11], solution-immersion process [12] etc. In this study, an organic–inorganic molecular hybrid compound was first prepared by the chemical modification of carboxylic acid-silane coupling agents. Zinc oxide (ZnO) was used as a doping compound. Different silanes and carboxylic acid with equal mole were dissolved in ethyl alcohol and mixed at 50°C for 1 hour. After being cooled down to ambient temperature, modified solution was coated on a clean glass slide by dip coater with heater. After evaporation of solvents, samples were characterized by Fouirer Transform Infrared Spektrofotometre (FTIR), Differential Thermal Analyzer/ Thermogravimetry (DTA/TG), X-ray diffraction (XRD), scanning electron microscope with energy dispersive X-ray spectroscopy (SEM-EDX) and Contact Angle Goniometer. Superhydrophobic surface was obtained ZnO doped modified silanes.

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POTENTIALS, CHALLENGES AND CURRENT STATUS OF HYDROGEN PRODUCTION FROM BIOMASS APPLICATIONS

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The researchers have investigated sustainable energy sources which can replace fossil fuels in reducing environmental pollution and global warming. Hydrogen, produced by way of thermochemical or biological processes, is promising alternative energy to fossil fuels because of releases energy without air pollutants. Biohydrogen production process is performed at 20-25 °C, and ambient pressures, and so is less energy requirement than chemical or electrochemical methods.

Microalgae or cyanobacteria can be generated hydrogen via different methods such as biophotolysis, catabolism of endogenous substrate, and dark fermentation by anaerobes. While biohydrogen can be produced by biophotolysis because of the effect of light on the microbial reaction, dark fermentation produces hydrogen by heterotrophic fermentation under anaerobic environment. Some studies have doubts about the applicability of hydrogen production by direct biophotolysis. One of the drawbacks of the hydrogen production process is the hydrogenase enzyme is sensitive to oxygen because there is simultaneous oxygen production in this process. To prevent oxygen inhibition in the hydrogen production process, the method which provides biological hydrogen production and separation oxygen in structure has been needed [1].

Poor hydrogen energy yield is a difficulty at the method development as biohydrogen production methods have by now obtained just low production efficiencies. Developments at studies about renewable energy resources have demonstrated that a promising energy source of biohydrogen production, besides its ability to independence produce on fossil fuels.

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THE EFFECTS OF EXTRACTION METHODS ON BIODIESEL PRODUCTION EFFICIENCY: A LABORATORY SCALE STUDY

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Biodiesel is one of the most popular research topics in recent years as it is renewable, environmentally friendly, and substitutes for fossil fuels, but biodiesel is expensive than petrodiesel because of product from expensive vegetable oil. There are many raw materials, such as oilseeds, microalgae, and waste oils as a source of biodiesel. The challenge for researchers is to reduce the cost of biodiesel production. Cost reduction studies are generally in the process of obtaining oil necessary for biodiesel production. Nowadays, researchers are interested in finding a low cost as well as an efficient method for the sustainable source of biodiesel. Extraction is one of the most important steps for obtaining oil necessary for biodiesel production. Some of the extraction methods are steam distillation, solvent extraction such as Soxhlet extraction, CO2 extraction, cold press extraction, dry extraction, and water distillation. Factors such as chemicals, process times, and the temperature used for each process affect oil quality and also biodiesel production efficiency. In addition to these factors, the quality, and properties of the oil to be used as raw material affect the yield significantly.

The extraction methods used for biodiesel production vary according to the raw material. For example, wet extraction is usually used for oil extraction from microalgae, while dry extraction is selected for oil extraction from activated sludge. In the study using the coffee bean as raw material, solvent extraction has been preferred because it is simple, inexpensive, and relatively fast technic. In this study, laboratory-scale studies are carried out to determine suitable extraction methods for different raw materials and to determine optimum conditions.

A SERIES OF NOTRAL STATE COLORLESS ELECTROCHROMIC POLYMERS WITH DOUBLE BOND AND POLYETHER SIDE CHAIN

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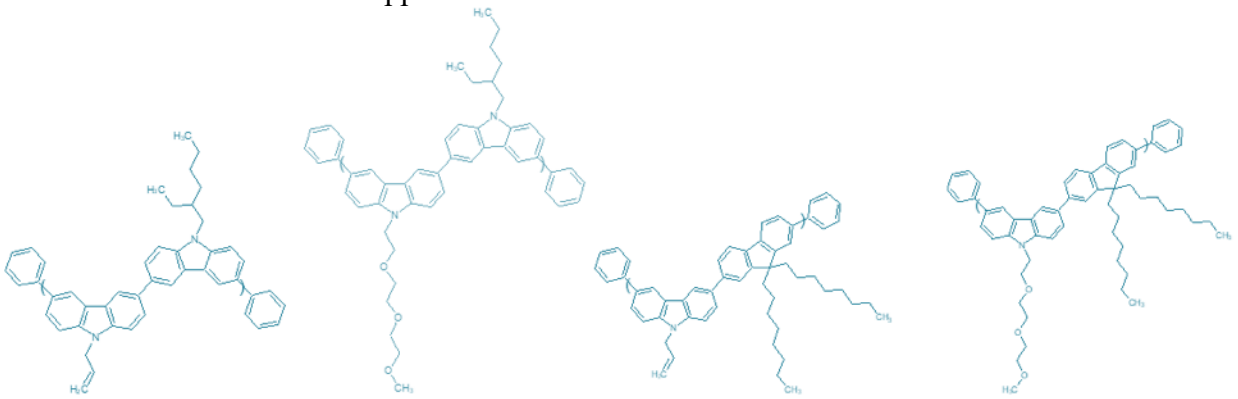
Rapidly developing polymer based flexible/transparent device technology is important for smart glasses. To improve the electrochromic device based smart windows, it is necessary to adjust of the coloration efficiency, fast response time, long time durability [1]. Compared to inorganic materials, organic semiconductors have some advantages such as a wide range of colors, high color contrast, tunable band gap and especially simple coating processes [2].

In this study, we aimed side chain functionalization effect on the neutral state colorless/transparent Carbazole and fluorene based conjugated polymers with double bond and polyether subunit which do not absorb visible light (400-700 nm) at the neutral state. Sandwich type transmissive electrochromic devices (ECD) were fabricated on indium tin oxide (ITO) covered glass substrates with a sandwich configuration of ITO/CP-X polymers (Anodic layer) / gel electrolyte /PEDOT–PSS (Cathodic layer) /ITO. All devices having colorless/transparent at the neutral state were turned into dark blue and black when applied positive potentials. It is observed that CP-2 and CFP-2 based ECDs have better electrochromic performance when compared the other polymers having double bound subunit. Finally, these polymers are good alternating materials for Smart Windows application.



CP-1 CP-2 CFP-1 CFP-2

Keywords: carbazole, fluorine, electrochromic device, smart windows

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SYNTHESIS OF FLUORENE-BENZIMIDAZOLE BASED POLYMERS AND THEIR OPTICAL AND ELECTROCHEMICAL CHARACTERIZATION

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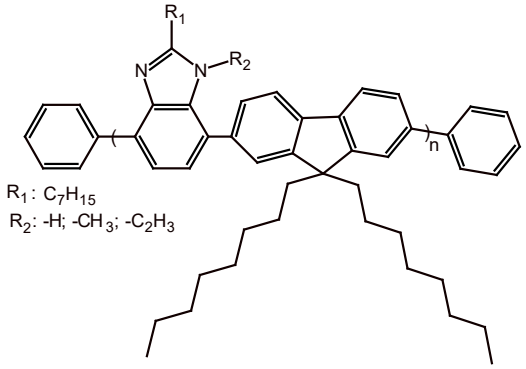
Organic semiconductors consisting of donor and acceptor groups have many advantages like a tunable band gap properties, solution processability and mechanical flexibility. Therefore, they are widely used as active materials in optoelectronic devices [1]. Flourene based polymers are a class of effective blue light-emitting materials and they show high photoluminescence (PL) quantum yields, charge carrier mobility and good processibility due to their good solubility in common organic solvents [2].

In this study, we have designed and synthesized a series of benzimidazole- fluorene based polymers (FLBI-X) by Suzuki coupling reaction. In the polymer structures were used different benzimidazole monomers that functionalized to -N position with different alkyl side chain. Structure of synthesized polymers were determined from FT-IR, ^{1}H-NMR and GPC. Electrochemical and optical properties of the FLBI-X polymers were investigated by cyclic voltammetry, UV-Vis absorption and fluorescence spectroscopy. According to electrochemical and optical measurements, all polymers have sharp blue photoluminescence respected to the band gap at about 3.1 eV. It is clearly seen that this property is an advantage to used as active materials in blue OLEDs.



Keywords: Benzimidazole, fluorene, OLEDs

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APPLICATION OF RADIO OVER FIBER MODULATION TECHNIQUES IN INTELLIGENT TRANSPORTATION SYSTEMS

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The objectives of ITS (Intelligent Transportation System) include standardized data transmission in multidimensional data exchange between human-vehicle-infrastructure-center, controlling the traffic flow according to the capacities of rail roads thereby improving traffic safety, enhancing mobility and reducing harmful effects on environment by implementing energy efficient systems. Fiber optical communication systems are important in monitoring and controlling rail systems by facilitating accurate and rapid transmission of data. Recently introduced Radio over Fiber (RoF) technology is based on analog optical communications that transmit modulated RF signals from a central location to remote antenna units by means of optical fiber connections. Due to the low loss of optical fiber and ultra-wide bandwidth of intelligent transportation systems, RoF systems with high data rates have begun to be preferred for wireless broadband communications [1, 2].

In this study, a fiber optical system is analyzed by means of OptiSystem tool for different modulation techniques and the most suitable modulation method is determined. Two random bit sequence generators are implemented to modulate two different data signals. This data is used to modulate two different electrical carrier frequencies. After passing through the optical band pass filter, the signals are combined by means of an electrical power combiner, and then the combined signal modulates an optical carrier by means of a Mach-Zehnder modulator. These optical signals are then fed to an Bessel optical filter. Thereafter filtered signals are fed to a photodetector which converts optical signals directly to base-band signals. Finally the initially transmitted data is recovered by filtering high frequency components by low pass filters.

In this study, Q-factor and BER parameter of the systems with DPSK, OQPSK, PAM, PSK and QAM modulation techniques are calculated and the results are compared. As a result of this study, it is found that performance of RoF systems is enhanced by implementing DPSK modulation technique because of its higher quality factor and low Bit Error Rate. The results reveal that the proposed system has great potential for future broadband multimedia applications in intelligent transportation systems.

Keywords: Communication Technologies, Optical Communications, Radio over Fiber, Intelligent Transportation Systems, Optical Fiber, Modulation.

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International Natural Science, Engineering and Material Technologies Conference

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NEW THIAZOL-PYRIDINE HYBRIDS TARGETING ANTIMICROBIAL AND ANTIOXIDANT

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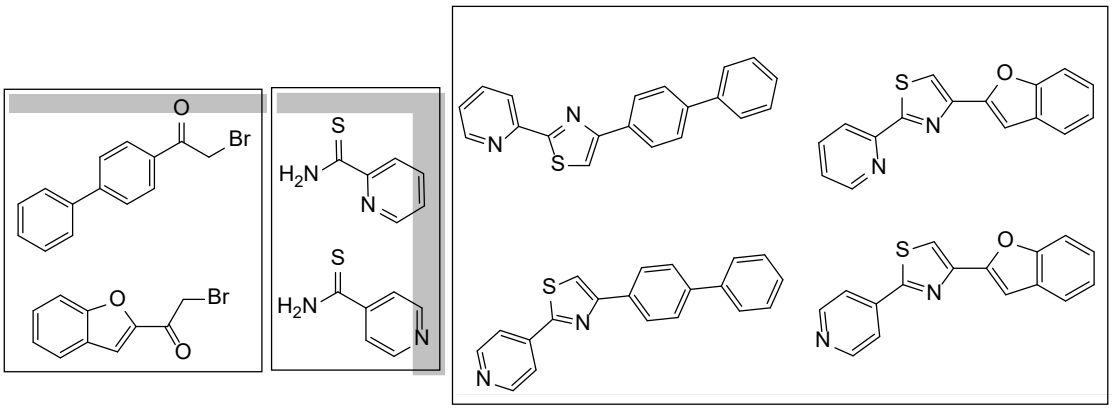
Thiazol, are known for their broad spectrum of pharmacological properties, thus showing antibiotic, fungicidal, analgesic, anxiolytic, and cytostatic effects [1]. In this study, A new thiazole-pyridine hybrid, compounds were prepared via Hantzsch reaction [2], and characterized with FTIR, UV-Vis, NMR, MS, TG-DTG, and DSC (Scheme 1). HOMO-LUMO energy level and chemical reactivity descriptors of the synthesized compound were studied using DFT. The antimicrobial activities of the thiazole-pyridine hybrid compounds were studied for its minimum inhibitory concentration. The antioxiant activity of the compounds were studied with the free radical scavenging activity.



Scheme 1. Synthesis of thiazole-pyridine hybrid compouds

We thank the Amasya University (Grant No. FMB-BAP-17-0255) for financial support of this study.

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THEORETICAL INVESTIGATION OF X-METHOXY-3,4-DIHYDRONAPHTHALEN-1(2H)-ONE MOLECULES BY DENSITY FUNCTIONAL THEORY (DFT) CALCULATIONS

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Tetralone (3,4-dihydro-2H-naphthalen-1-one) derivatives have been attracted significant attention due to their unique inhibitors properties for biomedical researches and medicine industry during the last decade [1]. In this study, molecular and electronic properties of X-Methoxy-3,4-Dihydronaphthalen-1(2h)-One (X=5, 6 and 7), which are both tetralone derivatives and isomers of organic compounds, have been investigated by using Density Functional Theory (DFT) calculations. To explain the most stable ground states of isomers, Potential energy scans (PES) have been performed by DFT/B3LYP method with 6-31G basis set level for all title molecules. Optimized molecular structures and ground state energies of isomers have been calculated using DFT/B3LYP method with 6-311++G(d,p) basis set level.

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RECOVERY of CHROMIUM WITH MEMBRANE TECHNOLOGY

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Pervaporation, one of the membrane based processes using for separation of liquid mixture, provides the varius advantages of ease of application and operation, energy efficiency, eco-friendliness, economical, and high separation efficiency. The pervaporation process consists of 3 stages which based on the solution-diffusion model. These are the selective sorption of the feed solution on the membrane surface, selective diffusion through the membrane, and desorption of permeate to a vapor phase [1,2]. Metals accumulate in human tissues, muscles, bones and joints and cause various diseases. The widespread use of chromium (Cr) in various industries such as steel production, electroplating, cement, painting, metal and textile processing has caused pollution of natural waters due to unsuitable treatment techniques. The chromium compounds consist essentially of Cr (III) and Cr (VI). Cr (III) is a less toxic element in the human body compared to Cr (VI) [3,4].

In this study, it is aimed to differentiate Cr / water (Cr (III), Cr (VI)) mixtures having different oxidation step by using pervaporation technique by using poly (vinyl alcohol) (PVA) and sodium Y (NaY) zeolite mixture membranes.

Acknowledgments: This work was supported by the Kırklareli University Research Fund (Project number: KLÜBAP-192).

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PENTACANE BASED ON THIN FILM ORGANIC PHOTOTRANSISTOR

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The zinc oxide semiconductor thin film transistor was fabricated on a SiO_2/Si substrate by sol gel method. The ZnO film is consisted of nanofibers with the changing diameter along the fibers. Electrical characteristics of the zinc oxide transistor under dark and white light illuminations were analyzed. The mobility value of the ZnO TFT was found to be $1.86 \times 10{-}2$ cm^2/V s. The ZnO thin film transistor works in an n-channel operational mode because the drain current increases with the positive gate voltages. A significant increase in the drain current of ZnO TFT is observed with a maximum photosensitivity of 100 under visible light illumination. It is concluded that the ZnO thin film transistor can be used in visible photo-detecting device applications.

International Natural Science, Engineering and Material Technologies Conference

Sep 9-10, 2019, İstanbul / TURKEY

THE EFFECTS OF Zn DOPING ON CdO THIN FILM GROWN BY SOL-GEL METHOD

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The molar ratio of ZnO:CdO has an important effect on the photo-induced charge activities of the composite/n-Si structures constructed. Thus, the relationship between the molar ratio of ZnO:CdO and the photo-induced charge generation was revealed in detail. The optical characteristics of thin films obtained by different molar ratio of two semiconductors were studied analytically by using absorbance, transmittance and reflectance measurements. The current-voltage (*I-V*), transient photocurrent (*I-t*) and transient photocapacitance (*C-t*) techniques were used to investigate the photoresponse properties of Al/ZnO:CdO/p-Si/Al diodes. The results reveal that the composites with 5/0, 4/1 and 3/2 molar ratio of ZnO:CdO display the photo-induced charge activity, the results further manifest that the electronic parameters of the diodes depend on the molar ratio of ZnO:CdO.

SYNTHESIS AND CHARACTERIZATION OF Mn DOPED CdO PHOTODETECTORS

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In this study, undoped Cd0, % 0,2 Mn doped CdO, % 6 Mn doped CdO and % 10 Mn doped CdO thin films were deposited on Si substrate. Films were produced by Sol-Gel method at room temperature. Surface properties of the samples were investigated by using atomic force microscopy (AFM). AFM results indicated that CdO formed in the granular structure on the substrate and spread homogeneously on the substrate surface. To assess the electrical properties of the thin films Current – Voltage (I-V), Capacitance – Voltage (C-V), Current – Time (I-t) measurements were performed in different illumination intensities. It was also seen that samples show corrective properties. It was evidenced that the photocurrent of photodiodes shows increasing properties with increasing illumination intensities. When the light source was shut off, the photocurrent properties return to the initial state. It was also noted that photodiodes show decreasing characteristics with increasing frequency. Optical properties of the thin films were measured by using UV-vis spectrophotometry and band gap energies were calculated using reflectance spectrum