

# Table of Contents

Part I SCET 2014 Conference Schedule .....	2
Part II Invited Speeches.....	3
Part III Oral Sessions .....	9
Session 1: Agriculture and Food Engineering (AFE-S) .....	9
Session 2: Mathematics and Physics (AEM-S&CAP-S)-Invited Speech .....	10
Session 3: Material Sciences and Technology I (MST-S).....	10
Session 4: Chemical Engineering (CEN-S).....	11
Session 5: Biomedical Engineering and Biotechnology (BEB-S) .....	13
Session 6: Applied Mathematics (AEM-S).....	14
Session 7: Material Sciences and Technology 2 (MST-S) .....	15
Session 8: Advances in Physics (CAP-S) .....	16
Part IV Appendix.....	18
Session 3: Material Sciences and Technology I (MST-S).....	21
Session 4: Chemical Engineering (CEN-S).....	25
Session 5: Biomedical Engineering and Biotechnology (BEB-S) .....	32
Session 6: Applied Mathematics (AEM-S).....	36
Session 7: Material Sciences and Technology 2 (MST-S) .....	39
Session 8: Advances in Physics (CAP-S) .....	44
Part V Instructions for Presentations .....	50
Part VI Hotel Information.....	51
Contact Us .....	52

# Part I SCET 2014 Conference Schedule

## Registration April 16~18, 2014

<b>14:00 - 17:00</b>	<b>April 16</b>	<b>Location:</b> 1st floor, Grand Mercure Baolong Shanghai
<b>08:30 – 12:00</b>	<b>April 17</b>	3rd floor, Grand Mercure Baolong Shanghai

## Thursday Morning, April 17, 2014

<b>Time</b>	<b>Activity</b>	<b>Location:</b> 3rd floor, Grand Mercure Baolong Shanghai
<b>08:30-12:30</b>	<b>Session 1:</b> Agriculture and Food Engineering	HuiRen Room (荟仁厅)
	<b>Session 2:</b> Mathematics and Physics-Invited Speech	HuiXian Room (荟贤厅)
	<b>Session 3:</b> Material Sciences and Technology (1)	HuiZhi Room (荟智厅)
	<b>Session 4:</b> Chemical Engineering	HuiLI Room (荟礼厅)

## Thursday Noon, April 17, 2014

<b>12:00 – 13:00</b>	<b>Lunch Buffet</b>	<b>Location:</b> TianDi Restaurant (天地自助餐厅), 1st floor, Grand Mercure Baolong Shanghai
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## Thursday Afternoon, April 17, 2014

<b>Time</b>	<b>Activity</b> (Coffee Break 15:20 – 15:40)	<b>Location:</b> 3rd floor, Grand Mercure Baolong Shanghai
<b>14:00 – 18:00</b>	<b>Session 5:</b> Biomedical Engineering and Biotechnology	HuiRen Room (荟仁厅)
	<b>Session 6:</b> Applied Mathematics	HuiXian Room (荟贤厅)
	<b>Session 7:</b> Material Sciences and Technology (2)	HuiZhi Room (荟智厅)
	<b>Session 8:</b> Advances in Physics	HuiLI Room (荟礼厅)

## Thursday Evening, April 17, 2014

<b>18:00 – 19:00</b>	<b>Dinner Buffet</b>	<b>Location:</b> TianDi Restaurant (天地自助餐厅), 1st floor, Grand Mercure Baolong Shanghai
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## Friday 18, 2014

<b>8:00-18:00</b>	<b>Tour to Zhouzhuang</b> (at own expense)
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## Part II Invited Speeches

### Invited Speech: Boosting the food Functionality (In Vivo and in Vitro) of locally Grown Spirulina by Gamma Radiation: An Inspiring Approach

**Speaker:** Prof. Hossain Uddin Shekhar, University of Dhaka, Bangladesh

**Time:** 08:30-09:10, April 17, 2014

**Location:** Oral session 1, HuiRen Room (荟仁厅), 3rd floor, Grand Mercure Baolong Shanghai



#### Abstract

Functional food contains known biologically active compounds, which provides a clinically proven and documented health benefit, and thus, an important source in the prevention, management and treatment of chronic diseases of the modern age. Spirulina, a well known functional food worldwide is treated by gamma radiation for enhanced functionality. The samples are irradiated by  $^{60}\text{Co}$  gamma radiation by different doses such as 5, 10, 15, 20, 25 and 30 kGy at a dose rate of 5 kGy per hour. Biological activity of the irradiated samples was tested both in vitro and in vivo. Samples exposed to 15kGy was found to be most functionally active in terms of Triglyceride, cholesterol and low density lipoprotein (LDL) lowering activity; sugar and fat binding capacity ; water retention, holding and swelling capacity and phenolic contents and free radical scavenging activity. The results are very inspiring and show its high potentiality as a food supplement for lowering risk of heart disease and diabetic mellitus.

### Invited Speech: A Survey of Natural Variation in Metabolites and Transcripts among Conventional Maize Hybrids to Evaluate Omics Technologies for Crop Safety Assessment

**Speaker:** Dr. Xiaofeng Sean Yang, Monsanto Company, USA

**Time:** 09:10-09:50, April 17, 2014

**Location:** Oral session 1, HuiRen Room (荟仁厅), 3rd floor, Grand Mercure Baolong Shanghai



#### Abstract

Genetically-modified (GM) crops have been developed to increase productivity from current agricultural practices. Their current safety assessment includes in-depth studies of phenotypic,

agronomic, morphological, and compositional profiles to identify potential harmful effects. Advances in open-ended molecular profiling technologies (i.e. Omics) raises the question of whether these methods should be used for the safety assessment. One of many challenges to the use of Omics technologies for this purpose is the rational determination of biologically meaningful differences in the GM crops in relation to control samples. To this end, the extent of the inherent natural variation in non-GM crops must first be known to ascertain if changes detected by an analytical technology are due to the introduced transgene or are the result of changes due to genetic and environmental variability. In this report we have evaluated metabolite and RNA profiling technologies to begin to understand the natural variation in these biomolecules found in commercial-quality, conventional (non-GM) maize hybrids. Our analyses focus on mature grain, the article of commerce that is most typically subjected to the rigorous studies involved in the comparative safety assessment of GM products. We have used a population of conventionally-bred maize hybrids that derive from closely related inbred parents grown under standard field conditions across geographically similar locations. This study highlights the large amount of natural variation in metabolites and transcripts across conventional maize germplasm grown under normal field conditions, and underscores the critical need for further extensive studies before these technologies can be seriously considered for utility in the comparative safety assessment of GM crops.

## **Invited Speech: Adapted Solution, Numerical Methods and Analysis via Malliavin Calculus for a Unified B-SPDE and Their Applications in Finance**

**Speaker:** Prof. Wanyang Dai, Nanjing University, China

**Time:** 08:30-09:10, April 17, 2014

**Location:** Oral session 2, HuiXian Room (荟贤厅), 3rd floor, Grand Mercure Baolong Shanghai



### **Abstract**

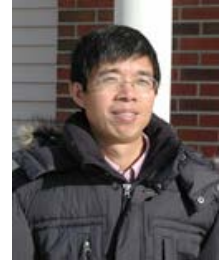
The aim of this research is to study the adapted solution, numerical methods, and related convergence analysis for a unified backward stochastic partial differential equation (B-SPDE). The equation is vector-valued, whose drift and diffusion coefficients may involve nonlinear and high-order partial differential operators. Under certain generalized Lipschitz and linear growth conditions, the existence and uniqueness of adapted solution to the B-SPDE are justified. The methods are based on completely discrete schemes in terms of both time and space. The analysis concerning error estimation or rate of convergence of the methods is conducted. The key of the analysis is to develop new theory for random field based Malliavin calculus to prove the existence and uniqueness of adapted solutions to the first-order and second-order Malliavin derivative based B-SPDEs under random environments. Furthermore, we will also address the related issues of our unified B-SPDE involving jumps. In addition, we will present the applications of our unified B-SPDE in finance, particularly, in the fields of optimal portfolio decision-making and mean-variance hedging with external random environmental risk factors.

## Invited Speech: Complex systems and emergence: How theory meets reality

**Speaker:** Prof. Jianbo Gao, Wright State University, USA

**Time:** 09:10-09:50, April 17, 2014

**Location:** Oral session 2, HuiXian Room (荟贤厅), 3rd floor, Grand Mercure Baolong Shanghai



### Abstract

Emergent behaviors of complex systems have fascinated mankind for aeons. It is only in recent decades that extensive efforts have been made to quantitatively study them, resulting in important theories and tools such as chaos theory, random fractal theory, and multiscale analyses. This talk aims to convey the best practices in this vast field, emphasizing theory meets reality. As illustrative examples, cyber-security, financial crises, river flow dynamics, and world-wide political conflicts will be briefly discussed. Important future research directions will also be outlined.

## Invited Speech: Discrete Symmetry in Relativistic Quantum Mechanics

**Speaker:** Prof. Guang-Jiong NI, Portland State University, USA

**Time:** 09:50-10:30, April 17, 2014

**Location:** Oral session 2, HuiXian Room (荟贤厅), 3rd floor, Grand Mercure Baolong Shanghai



### Abstract

1. Introduction
2. Why the wavefunction (WF) and relevant momentum-energy operators for antiparticle were overlooked for so long? (Since Konopinski-Mahmaud's paper in 1953 and the experimental data of neutral kaon-antikaon correlation measurement in 1998, even the correct WF can be derived easily from the quantum field theory (QFT)).
3. Is Klein-Gordon (KG) equation imperfect and needs to be rescued by the QFT?  
In fact, the KG equation and in general, relativistic quantum mechanics (RQM) can be revealed to have an exact discrete symmetry between particle and antiparticle via a specific "space-time (or mass) inversion ". Thus RQM becomes self-consistent and serves as a sound basis for QFT.
4. In QFT, Pauli-Luders ' strong reflection implies that the ordinary space-time cannot be detached from the Fock space. The invariance of field operator and Hamiltonian under the strong reflection is one of cornerstones of QFT and particle physics.
5. What we found in RQM is just the counterpart of strong reflection in QFT, showing a special discrete symmetry in space-time and the equal existence of particle versus antiparticle in nature.

6. Reinterpretation of WF: Following Feshbach-Villars' deep insight, we are able to divide each and every WF in RQM into two parts in confrontation. For example, a fermion's explicit helicity is determined by which one of two hidden left-handed and right-handed spinning fields is in charge. In this way, we may have an interesting understanding on the strange effects predicted by Einstein's theory of special relativity (SR).
  7. In today's physics, why a possible parity violation phenomenon was overlooked since 1956-1957? (A prediction by Shi-Ni since 2002).
  8. Why we believe neutrinos are likely the tachyons? (An equation proposed by Chang-Ni in 2000).
  9. Why we believe in the antigravity between matter and antimatter? (Modified Einstein field equation for gravity, proposed by Ni in 2004).
  10. Summary.
- (We will try to highlight various paradoxes in physics and the intuitive observation by means of simple pictures on the screens).

## Invited Speech: A classical approach to the modeling of quantum mass

**Speaker:** Prof. Donald C. Chang, Hong Kong University of Science and Technology, China

**Time:** 10:50-11:30, April 17, 2014

**Location:** Oral session 2, HuiXian Room (荟贤厅), 3rd floor, Grand Mercure Baolong Shanghai



### Abstract

This work focused on one question: Where does the rest mass of a particle come from? In modern physics, a particle is regarded as the quantum excitation of a field. Then, how can a particle have a rest mass? According to the Standard Model, a particle acquires mass through its interaction with a hypothetical Higgs field. The rest mass is essentially identified from the Klein-Gordon equation of a free particle (through its associated Lagrangian density). It was reported recently that a key feature of this theory (i.e., prediction of Higgs boson) is supported by experiments conducted at LHC. Nevertheless, there are still many questions about the Higgs model. Particularly, the physical meaning of the rest mass  $m$  based on the Higgs mechanism would be intrinsically different from energy  $E$  or momentum  $p$ . This does not seem to be very satisfactory. In this paper, we would like to explore a different approach based on more classical concepts. We think mass should be treated on the same footing as momentum and energy, and the definition of mass should be strictly based on its association with the momentum. By postulating that all particles in nature (including fermions and bosons) are excitation waves of the vacuum medium, we propose a simple wave equation for a free particle. We find that the rest mass of the particle is associated with a “transverse wave number”, and the Klein-Gordon equation can be derived from the general wave equation if one considers only the longitudinal component of the excitation wave. Implications of this model and its comparison with the Higgs model are discussed in this work.

## Invited Speech: Atomistic Multiscale Simulation of Amorphous Organic Functional Materials

**Speaker:** Prof. Alexander A. Bagaturyants, Russian Academy of Sciences, Russia

**Time:** 8:30-09:10, April 17, 2014

**Location:** Oral session 3, HuiZhi Room (荟智厅), 3rd floor, Grand Mercure Baolong Shanghai



### Abstract

Atomistic multiscale simulation is applied to modeling amorphous organic functional materials with specific optical or electronic properties. Materials for optical chemical gas sensors and for organic light-emitting devices (OLED's) are considered as examples. The functionality of such materials is provided by constituting molecules that determine their specific functional properties. In the case of sensing devices, these are so-called indicator molecules (IMs) changing their optical response (mostly, luminescence) upon interaction with a target molecule (detected or analyte molecule, AM). The goal of simulation in this case is to predict the optical properties of the entire structure (sensing material) and its response to various AMs. In the case of OLED's, these are light-emitting and electron- or hole-transporting molecules. The goal of simulation here is to predict the main electronic parameters of these molecules that determine the efficiency of a particular OLED. In both cases, the properties of functional molecules strongly depend on their local supramolecular environment, that is, on the microstructure of the amorphous material. Therefore, a multiscale atomistic approach is used, in which molecular dynamics simulations are used to describe the microstructure of the material, and quantum chemical methods are used to calculate the required electronic properties of the functional molecules in the material. Commonly, a statistical treatment is required to obtain the distribution of wanted molecular properties or their averaged values in the real amorphous material. Problems arising at each step of modeling are analyzed, and current approaches to their solution are discussed. The possibilities of modern atomistic simulation methods are considered using specific examples.

## Invited Speech: Design and testing of nano-particle embedded affinity membranes for chemical and environmental applications

**Speaker:** Dr. Paul Chen, National University of Singapore, Singapore

**Time:** 8:30-09:10, April 17, 2014

**Location:** Oral session 4, HuiLI Room (荟礼厅), 3rd floor, Grand Mercure Baolong Shanghai



### Abstract



Due to industrialization, both surface and ground-water has been heavily contaminated. Nano particles have their unique physical and chemical properties and are found to be powerful in water treatment. In this talk, the approaches for fabrication of nano particles will be first presented. Several materials such as adsorbents and membranes can be further used in association of the nano particles in order that the separation of nano particles after use can become easier. A series of research works will be presented to illustrate the application of the technology in water treatment. In particular, the treatment of toxic substances such as arsenic and fluoride will be discussed in details. It has been demonstrated that the materials outperform the commercially available adsorbents, ion exchange resin and membranes. pH plays an important role in the treatment. The presence of competing substances such as heavy metal, anions and organic matters seems to have less effect on the treatment. Several mathematical models have been developed to illustrate the removal mechanisms. Such important issues as toxicity study of nano particles and industrial-scale application of the technology will be presented. Finally, it is demonstrated that the said materials can be recycled and reused through low-cost engineering measures, by which makes the technology more sustainable for water treatment.

## **Invited Speech: Thermally-Assisted-Occupation Density Functional Theory**

**Speaker:** Dr. Jeng-Da Chai, National Taiwan University, Chinese Taipei

**Time:** 11:30-12:10, April 17, 2014

**Location:** Oral session 2, HuiXian Room (荟贤厅), 3rd floor, Grand Mercure Baolong Shanghai



### **Abstract**

In this talk, I will briefly describe the formulation of our recently proposed thermally-assisted-occupation density functional theory (TAO-DFT) [J.-D. Chai, J. Chem. Phys. 136, 154104 (2012)] and the density functional approximations to TAO-DFT [J.-D. Chai, J. Chem. Phys. 140, 18A521 (2014)]. In contrast to Kohn-Sham DFT, TAO-DFT is a DFT with fractional orbital occupations given by the Fermi-Dirac distribution (controlled by a fictitious temperature), for the study of large ground-state systems with strong static correlation effects. Relative to TAO-LDA (i.e., the local density approximation to TAO-DFT), TAO-GGAs (i.e., the generalized-gradient approximations to TAO-DFT) are significantly superior for a wide range of applications, such as thermochemistry, kinetics, and reaction energies. For noncovalent interactions, TAO-GGAs with empirical dispersion corrections are shown to yield excellent performance. Due to their computational efficiency for systems with strong static correlation effects, TAO-LDA and TAO-GGAs are applied to study the electronic properties of acenes with different number of linearly fused benzene rings (up to 100), which is very challenging for conventional electronic structure methods. Some interesting results will be presented in this talk.



## Part III Oral Sessions

### Session 1: Agriculture and Food Engineering (AFE-S)

Session Chair: Prof. Hami Alpas, METU

Invited Speech: Prof. Hossain Uddin Shekhar, University of Dhaka, Bangladesh

Dr. Xiaofeng Sean Yang, Monsanto Company, USA

HuiRen Room (荟仁厅), 3rd floor

08:30-12:30, Thursday Morning, April 17

Paper Id	Paper Title	Author	Affiliation
80185	Water scrubbing for removal of hydrogen sulfide (H <sub>2</sub> S) in biogas from hog farms	Cheng-Chang Lien	National Chiayi University
80221	Production of citric acid from dates	khalid alshoaily	Ministry of agriculture and fisheries
80220	Influence of Physicochemical, Microbiological Counts, and Sensory Properties of Dry-cured Ham in Processed Sulfur-fed Pigs during Storage	Ji-Han Kim	Konkuk University
80219	Comparison of physicochemical properties of extruded whole and germinated barley	Gi-Hyung Ryu	Kongju National University
80212	Local role of food producers' communities for a Global One-Health framework: the experience of traslational research in an Italian dairy chain	Chiara Frazzoli	Istituto Superiore di Sanità
80198	Ohmic heating for tofu making – a pilot study	CHING-HU A TING	National Chiayi University
80080	Effect of Ultrasonication on Polyphenol oxidase (PPO) in Amasya Apple Juice	Hami Alpas	METU
80087	Protective Effect of Gingo Biloba Extract on Carbendazim-Induced Hepatotoxicity in Albino Rats	Faiza Mahboub	Umm Al Qura University
80181	Evaluation of the antioxidant activity of ethanolic extracts of some varieties of onions	Fernando Reina	National Technological University (UTN-FRBA)
80262	Phenotypic and genetic diversity of rhizobia isolated from nodules of the legume genera Sulla flexuosa in North West region of Morocco	Ezzakkioui Fatima	FST Tanger
80259	Sensor with intact or modified yeast cells as rapid device for toxicological test of chemicals	Roberto Dragone	National Research Council (CNR)
80203	Chemical characterisation of the industrial residues of the pineapple (Ananas comosus)	Maria Elena Sanchez Pardo	ISTITUTO POLITECNICO NACIONAL
80263	Development and Characterization of Antimicrobial Packaging Films	Zinash Assefa	Addis Ababa Science and Technology Institute

## Session 2: Mathematics and Physics (AEM-S&CAP-S)-Invited Speech

Session Chair: Prof. Wanyang Dai, Nanjing University, China

Invited Speech: Prof. Wanyang Dai, Nanjing University, China

Prof. Jianbo Gao, Wright State University, USA

Prof. Guang-Jiong NI, Portland State University, USA

Prof. Donald C. Chang, Hong Kong University of Science and Technology, China

Dr. Jeng-Da Chai, National Taiwan University, Chinese Taipei

Time: 08:30-12:30, 3rd floor, Thursday Morning, April 17

Location: HuiXian Room (荟贤厅), 3rd floor, Grand Mercure Baolong Shanghai

## Session 3: Material Sciences and Technology I (MST-S)

Session Chair: Prof. Fabio Jose Pinheiro Sousa, Technische Universitaet Kaiserslautern

Invited Speech: Prof. Alexander A. Bagaturyants, Russian Academy of Sciences, Russia

HuiZhi Room (荟智厅), 3rd floor

08:30-12:30, Thursday Morning, April 17

Paper Id	Paper Title	Author	Affiliation
50037	The Extrusion Behavior of AZ31 Mg Alloys by Finite Element Simulation	Ping LI	University of Jinan
50038	The Extrusion Behavior of Mg Alloys Interpenetrating with Stainless Steel Wire	Ping LI	University of Jinan
50136	Electrospun Absorbable Polycaprolactone (PCL) Scaffolds for Medical Applications	Yingchu Wang	Donghua University
50135	EVOLUTION OF WEAR ON THE ABRASIVE TOOL DURING THE POLISHING OF PORCELAIN TILE USING MORPHOLOGICAL SPACE	Fabio Jose Pinheiro Sousa	Technische Universitaet Kaiserslautern
50152	Preparation and In Vitro Degradation of PDO Intravascular Stents with Braided Structure	CongR Wang	DongHua University
50151	Effect of H3BO3 coating on the microwave dielectric properties of BZN ceramics	biao jin	Henan University of Urban Construction
50159	Synthesis and luminescence properties of Ba3Y1 - xEuxB3O9 (0.05 ≤ x ≤ 0.35) under UV excitation	Xiao Xia Li	Jiangxi University of Finance and Economics
50029	Micro-structural properties of zinc oxide nano-particles synthesized by bio-polymeric templates	Sujata Mandal	CSIR - Central Leather Research Institute
50174	Photo-thermal Conversion and Stability of Gold and Silver Nanostructures	Yuan Ni	Nanjing University of Aeronautics and Astronautic
50175	Performance Improvement of Dye-Sensitized Solar Cell by Optimizing TiO2-Photoanode Structure	lifeng liu	Peking University
50154	PRODUCTION AND CHARACTERIZATION OF GOLD NANOPARTICLES FROM ITAGUNMODI GOLD DEPOSIT	Olasupo Ogundare	Engineering Materials Development Institute Akure

Paper Id	Paper Title	Author	Affiliation
50198	Feature recognition of Corrosion Pit for Pre-corroded AA 2524 and Statistical Analysis	zhi li	xiamen university
50196	Structural and mechanical properties of Poly( $\epsilon$ -caprolactone) Biocomposites Reinforced with Different Silk-fibroin Fabric Structures	Yongmin Wu	Wuhan Textile University
50220	Improvement in the Low-fire dielectric compositions with middle permittivity for LTCC applications	yonggang zhang	Taiyuan University of Technology
50075	Calculations of absorbed dose in heavy-ion irradiated phase-change memory cells	Nevena Zdjelarevic	University of Belgrade
50081	Simulation of ion beam irradiation effects in perovskite oxide memristors	Ivan Knezevic	University of Belgrade
50246	Study of band structure and optical gain of navel vertical cavity surface emitting lasers	D. H. Zhang	Nanyang Technological University

## Session 4: Chemical Engineering (CEN-S)

Session Chair: Prof. Cheng-tung Chou, National Central University

Invited Speech: Dr. Paul Chen, National University of Singapore, Singapore

HuiLI Room (荟礼厅), 3rd floor

08:30-12:30, Thursday Morning, April 17

Paper Id	Paper Title	Author	Affiliation
50065	Application of Vinyl Polymer Reinforced with Knitted Fabric for Producing Curative Garments	Albina Bikbulatova	Ufa State University of Economics and Service
50105	DFT study of Diels-Alder reaction of 12-N-methylcytisine	Sophia Borisevich	Ufa State University of Economy and Service
50148	Regeneration of Activated Carbon Using Photo-Oxidation Process	Salam Al-Dawery	University of Nizwa-Sultanate of Oman
50059	Biocompatible LDH-Alginate Composites for the Adsorption of Naphthalene Anionic Dye AG 120: Influence of Alginate concentration on the Adsorption Characteristics	Sanil Sebastian	CSIR-National Chemical Laboratory
50146	Rechargeable alkali and alkaline earth metal-air batteries – Potential and challenges	Hua Cheng	Newcastle University
50183	Thermal Behaviour of Slurry Prepared from Clermont Bituminous Coal and Oil Palm Empty Fruit Bunch Bio-Oil	Hazlin Hamdan	Universiti Teknologi MARA, Malaysia
50119	Epoxidation of Palm Kernel Oil-based Crude Oleic Acid	Mohd Jumain Jalil	University Technology Mara
50179	Effect of Pretreatment on Adsorption of Nickel by Oil Palm Mesocarp Fiber	Siti Nor Izuera Nor Azemi	Universiti Teknologi MARA
50225	Gasification of Oil Palm Biomass to Produce Syngas for Electricity Generation – Cost Benefit Analysis	Nur Hanina Malek	University Technology Of Mara
50224	Recent Development of Biomass Fast Pyrolysis	Nurul Suhada Ab	Universiti Teknologi Mara

Paper Id	Paper Title	Author	Affiliation
	Technology and Bio-oil Upgrading: An Overview	Rasid	
50043	Kinetics of Hydrogenolysis of Glycerol to Ethylene Glycol over Raney Ni catalyst	Tao Jiang	East China University of Science and Technology
50066	Production of high-purity hydrogen and carbon dioxide capture by sorption enhanced WGS reaction process	Cheng-tung Chou	National Central University
50086	Preparation and Characterization of Fibrous Cellulose/Polypyrrole Nanocomposites	Mahnaz M. Abdi	Universiti Putra Malaysia
50125	Synthesis of Hydrophilic Coating Solution and Its Application on Transparent Polymer Films	Je Hun Kim	Intech Nano-Materials Co., Ltd.
50143	A Study on the inhibitive effects of plant extract and Magnetic fields on 0.5M sulphuric acids corrosion of copper metal.	Kelechukwu Okeoma	Federal University of Technology
50186	Molecular Insight into Affinity Interaction between Cibacron Blue and Proteins	Juan Liang	Hamburg University of Technology
50192	Increasing depth in flow field plates as a tactic against the pressure loss in a Proton Exchange Membrane Fuel Cell	Pablo M. Belchor	UFRGS
50195	Sulfonate Functionalized Metal Organic Coordination Framework for Cycloaddition of Carbon Dioxide and Styrene Oxide	Dae-Won Park	Pusan National University
50203	Synthesis of Cyclic Carbonates by Using Quaternized MIL-53-NH <sub>2</sub> Catalyst	Youngson Choe	Pusan National University
50239	Research Of Structure And Properties Of The Filled Polyaniline Compositions Applied For Combings Of Industrial Sewage And Flue Gases	Abdusamad Nabiev Hayrullo Baqoev	Tashkent State Technical University
50057	The Possible Application Of Waste Manufacture Of Nitric Fertilizers At Development Of Composite Polymer Chemical Reagent To Produce Clayless Drilling Mud Is Applied In The Process Of Drilling Oil And	Komila Negmatova	Tashkent State Technical University
50053	Polymer Composite Materials Functional Purpose On The Basis Of Polyethylene	Nodira Abed-Negmatov a	Tashkent State Technical University
50124	Spontaneous Polymerization Of The Tetrahydro -1,4-Oxazine With 3- Chlorine -1,2- Epoxypropane	Ulugbek Urinov	Tashkent State Technical University
50061	Development Of Optimal Composition Of Solution Of Polymer Composition In Order To Refine Regenerated Protein Fiber And Researching Its Physical – Chemical Feature	Rasul Davlatov	Tashkent State Technical University
50214	Research And Development Of New Powder Colorific Compositions Based On Salts Of Polyvalent Metals For Dyeing The Natural And	Shokhista Rasulova	Tashkent State Technical University

Paper Id	Paper Title	Author	Affiliation
	Synthetic Fibers And Textile Materials On Their Bases		
50101	MODIFIED ANTICORROSIVE POLYMER COATINGS FOR PROTECTION OF METALS FROM CORROSION	Khamza Shodiev	Tashkent State Technical University
50211	IMPROVEMENT OF TECHNOLOGICAL PROPERTIES OF NATURAL WOOLEN FIBRES BY SOLUTIONS OF A POLYMERIC COMPOSITION	Rasul Davlatov	Tashkent State Technical University
50022	Modeling Biogas Generation Rate Sensitivity to pH, Leachate-level and Ash-loading during Anaerobic Biodegradation of Organic Solid Waste at Mesophilic Conditions using Laboratory Scale Bioreactor	Wanasolo William	University of Dar es Salaam

## Session 5: Biomedical Engineering and Biotechnology (BEB-S)

Session Chair: Prof. Hassane Oudadesse

University of Rennes

HuiRen Room (荟仁厅), 3rd floor

14:00-18:00, Thursday Afternoon, April 17

Paper Id	Paper Title	Author	Affiliation
80070	Reducing Radiation Dose By Using Pulse X-Ray Apparatus	Komarskiy Alexander	The Institute of Electrophysics of the Ural Division of the Russian Academy of Science
80102	Incorporation of carboplatin in microporous granular calcium phosphate biphasic matrix	Cleomar Copatti	Santa Catarina University
80038	The Prevalence Of Haemoparasitic Infection In Dogs Attending Ecwa Vertinary Clinic, Bukuru, Jos South Local Government Area, Plateau State, Nigeria.	Nonyelu Ifeoma	Delta State University
80055	In vitro immersion behavior of cold sprayed hydroxyapatite/titanium composite coatings	Xuan Zhou	Kettering University
80195	Robust Spatial Filters on Three-Class Motor Imagery EEG Data Using Independent Component Analysis	Bangyan Zhou	Anhui University
80230	Hemodynamic effect of different types of plaques in the left coronary artery models	Zhonghua Sun	Curtin University
80062	The new bone cement based on magnesium phosphate and $\alpha$ TCP	Aneta Zima	AGH- University of Science and Technology, Krakow, Poland
80247	Converging parallel plate flow chambers for studies on the effect of the spatial gradient of wall shear stress on endothelial cells	Yiling Lu	University of Derby
80260	Influence of synthesis parameters on the structure, pore morphology and bioactivity of a new mesoporous glass	Hassane Oudadesse	University of Rennes
80209	A surface plasmon resonance biosensor utilizing	How-foo	National Yang Ming

Paper Id	Paper Title	Author	Affiliation
	parabolic mirrors for a large dynamic range	Chen	University
80125	Light curable nanocomposite hydrogels from poly- $\gamma$ -glutamic acid as drug delivery system	Csaba Hegedus	University of Debrecen
80091	Creep-Recovery and Relaxation Behavior of High Density Polyethylene/ Hydroxyapatite Nano Particles for Bone Substitutes: Effects of Gamma Radiation	Othman Alothman	King Saud University

## Session 6: Applied Mathematics (AEM-S)

Session Chair: Pritha Das, BES University

HuiXian Room (荟贤厅), 3rd floor

14:00-18:00, Thursday Afternoon, April 17

Paper Id	Paper Title	Author	Affiliation
80169	Random Integral Equation of the Volterra Type with Applications	HAMDIN ALAFIF	Khartoum University
80008	Remarks on the Harnak inequality for local-minima of scalar integral functionals with general growth conditions	Tiziano Granucci	Istituto P. Calamandrei
80096	Limiting Behavior of MHD Flow with Hall Current, due to a Porous Stretching Sheet	FAIZA M.N. EL-FAYEZ	Princess Nora Bint Abdul Rahman University
80101	Parameter identifiability and parameter estimation of a diesel engine combustion model	Lilianne Denis-Vidal	University of Compiègne
80176	Framework of Penrose Transforms on DP-Modules to the Electromagnetic Carpet of the Space-Time from the Moduli Stacks Perspective	Francisco Bulnes	TESCHA COMECYT
80194	The Asymptotic Eigenvalues of First-Order Spectral Differentiation Matrices	Jue Wang	Union College
80128	Iterative Construction of Common Fixed Point of Quasi-Nonexpansive Mappings in a Convex Metric Space	Hafiz Fukhar-ud-din	King Fahd University of Petroleum and Minerals
80067	Eigenpairs of a Sylvester-Kac type matrix and a general stochastic model for deposition and evaporation of particles	Carlos Fonseca	Kuwait University
80196	Is there Chaos In Inflation Data?	Pritha Das	BES University
80225	Bifurcation and chaos in delayed cellular neural network model	Pritha Das	BES University
80206	The traffic flow model for road networks	Yaroslav Kholodov	Moscow Institute of Physics and Technology
80180	Globally Convergent methods for inverse problems in Diffuse Optical Tomography and its applications	Jianzhong Su	University of Texas at Arlington
80190	Mode Stresses for the Interaction Between Straight and Curved Cracks Problem in Plane Elasticity	Nik Mohd Asri Bin Nik	Universiti Putra Malaysia

Paper Id	Paper Title	Author	Affiliation
80126	Common Fixed Point Iterations of Generalized Asymptotically Quasi-Nonexpansive Mappings in Hyperbolic Spaces	Long Abdul Rahim Khan	KFUPM
80151	Crop water Requirements in Egypt Using Remote Sensing Techniques	Mohammed El-Shirbeny	National Authority for Remote Sensing and Space Sceinces (NARSS)

## Session 7: Material Sciences and Technology 2 (MST-S)

Session Chair: Dr. Kalman Varga  
HuiZhi Room (荟智厅), 3rd floor

Vanderbilt University  
14:00-18:00, Thursday Afternoon, April 17

Paper Id	Paper Title	Author	Affiliation
50217	Effect of process on the dielectric properties of BaTiO <sub>3</sub> -based X9R ceramics	Baolin Zhang	China Academy of Space Technology, 529
50221	Low temperature sintering of lead-free BaTiO <sub>3</sub> -based X9R ceramics with Bi <sub>2</sub> O <sub>3</sub> dopant and assisted by LiF-CaF <sub>2</sub> Flux Agent	Baolin Zhang	529
50204	Experimental study on axial tensile strength of low volume fraction of ternary hybrid fiber reinforced concrete	Yuting Zhu	Hubei university of technology
50001	High efficient photoreduction CO <sub>2</sub> with H <sub>2</sub> O on metal Cu-modified graphitic ordered mesoporous carbon supported TiO <sub>2</sub> catalysts under simulated solar	Chengli Zhang	Fudan University
50014	Electrochemical Corrosion Behavior of Different Graphite shapes Cast Irons in Acidic Solution	zhuhuan yu	Xi'an University of Science And Technology
50015	Facile Preparation and Growth Mechanism of Newly Shaped Gold Nanoplates	Caixia Kan	Nanjing University of Aeronautics and Astronautics
50013	Time-dependent Density Functional Simulation of the Interaction of Matter and Electromagnetic Fields	Kalman Varga	Vanderbilt University
50018	A fluorescence quenching Study for the interaction of 2,6-bis(5-(p-methylphenyl)-1-H-pyrazol-3-yl)pyridine with Zn <sup>2+</sup> ion	Yan Pi	Hubei Normal University
50067	Formation and properties of nitrogen rich Ca-Si-(Al)-O-N glasses and Ceramics.	Sharafat Ali	Linnaeus University
50077	Induction Heating And Cell Viability Studies Of Polyol Synthesized Superparamagnetic Znfe <sub>2</sub> o <sub>4</sub> Nanoparticles For Cancer Hyperthermia Applications	Sandip Sabale	Jaysingpur College
50112	Eco-Friendly Synthesis Of Catalysts Using Flash Light Irradiation For A Direct Methanol Fuel Cell	Sung-Hyeon Park	Hanyang University
50114	The Effect Of Poly (N-Vinylpyrrolidone) (PVP) Molecular Weight On Flash Light Sintering Of Copper	Chung-Hyeon Ryu	Hanyang University



Paper Id	Paper Title	Author	Affiliation
	Nanoink		
50116	Highly Conductive Copper Precursor/Nanoparticle Pattern with Low Porosity via Flash Light Sintering for Printed Electronics	Wan Ho Chung	Hanyang University
50180	The Change Of Processing Maps In Hot Compression Procession For Ti-6.0Al-7.0Nb Biomedical Titanium Alloy	Yanhui Liu	Northwestern Polytechnical University
50188	Statistical Analysis of Pit Dimensions for Pre-corroded AA 7075-T6	Yongfang Huang	Xiamen University
50215	Flexural toughness of hybrid fiber reinforced concrete under notched beam three-point bending	Dongtao Xia	Hubei University of Technology
50216	Utilisation of Magnetic Intelligent Material for Rotor Systems Control	Katarzyna Majewska	Institute of Fluid-Flow Machinery Polish Academy Of Sciences
50228	Spiropyran Conjugated Biomaterials as Colorimetric detector	Chan Jin Jeong	Korea National University of Transportation
50244	Multifunctional glazes by using nanotechnology	Julian Jimenez REINOSA	Instituto de Cerámica y Vidrio (CSIC)

## Session 8: Advances in Physics (CAP-S)

Session Chair:

HuiLI Room (荟礼厅), 3rd floor

14:00-18:00, Thursday Afternoon, April 17

Paper Id	Paper Title	Author	Affiliation
80086	Experimental tests on the lifetime asymmetry	Zhi-Qiang Shi	Shaanxi Normal University
80057	Thermonuclear plasma steady states generation	Fisenko Stanislav	Rusthermosynthesis JSC
80114	Advanced Concept Ramjet Propulsion System Utilizing In-Situ Positron Antimatter Derived From Ultra-Intense Laser With Fundamental Performance Analysis	Robert LeMoyne	Independent
80110	Fundamental Architecture and Analysis of an Antimatter Ultra-Intense Laser Derived Pulsed Space Propulsion System	Robert LeMoyne	Independent
80069	Information Mechanics	John Haller	CCC Information Services
80015	Gravito – Electric Power Generation	Roger Ellman	The-Origin Foundation, Inc.
80167	On Five Independent Phenomena Sharing a Common Cause	Roger Ellman	The-Origin Foundation
80178	Gravitation in Flat Space-Time and General Relativity	Walter Petry	Universitaet Duesseldorf
80160	Structure and curvatures of trajectories of a 2D log-gas	Mauricio Pato	Universidade de Sao Paulo, Brazil

Paper Id	Paper Title	Author	Affiliation
80077	Some New Particles Beyond the Standard Model	hesham mansour	Cairo University
80197	Planck's constant as adiabatic invariant characterized by Hubble's and cosmological constants.	Anton Lipovka	Sonora University
80208	Electron Correlation in High Temperature Cuprates	Takashi Yanagisawa	National Institute of Advanced Industrial Science
80218	Magnetic Properties and Hyperfine Interactions in M-Type BaFe <sub>12</sub> -2xMoxZnxO <sub>19</sub> Hexaferrites	Sami Mahmood	The University of Jordan
80245	Laser-plasma source of tunable mid-infrared pulses	Nikolay Vvedenskii	University of Nizhny Novogorod
80211	Gradient-Index Optical Cavity and Quantum Oscillator System	Pi-Gang Luan	National Central University
80210	Twisted-Dielectric-Rod Arrays as Effective Chiral Photonic Crystal	Zhang XueEr	National Central University
80239	Maxwell's Equations as the Basis for Model of Atoms	Milan Perkovac	The First Technical School Tesla

## Part IV Appendix

### Session 1: Agriculture and Food Engineering (AFE-S)

**Article ID:** 80185

**Title:** Water scrubbing for removal of hydrogen sulfide (H<sub>2</sub>S) in biogas from hog farms

**Name:** Cheng-Chang Lien

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#### ABSTRACT

Biogas from anaerobic digestion of biological wastes is a renewable energy resource. H<sub>2</sub>S in biogas may cause corrosion or other damage to engines if it is not removed from the gas before utilization. Because the solubility of H<sub>2</sub>S in water is higher than methane, water can be used as an adsorbent to remove H<sub>2</sub>S from biogas. A simple water scrubbing column to reduce the H<sub>2</sub>S content was designed in this study. The biogas purification process took place in the scrubbing column with water where the gas was continuously fed from the bottom of the column through the diffuser which could produce bubbles. The biogas bubbles and the water can accelerate the reaction inside the column. The water in the column was circulated by means of a pump. H<sub>2</sub>S content in raw biogas was about 6000 ppm. First, the efficiencies of H<sub>2</sub>S removal for different biogas flow rate and water level were conducted at 30 and 90 sec. Second, the efficiencies of H<sub>2</sub>S removal with water recycling system was induced. The results showed that the concentration of H<sub>2</sub>S in biogas decreased significantly with water level and increased with biogas flow rate through the water scrubbing. It was an effective technique for removing H<sub>2</sub>S in a short operation time, but absorption capability of water declined rapidly with time. To maintain high absorption rate, water scrubbing after adsorption needed to be replaced or regenerated. The water scrubbing system is a simplest and cheapest method. This work is investigated the feasibility of water scrubbing system and its application to a small hog farm.

**Article ID:** 80221

**Title:** Production of citric acid from dates

**Name:** khalid alshoaily

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#### ABSTRACT

The production of citric acid from dates of the date palm *Phoenix dactylifera* was studied using a full factorial design with two design variables; *Aspergillus niger* strain, and starter juice treatment. Analysis of data have shown that mould type and the interaction between *Aspergillus niger* strain + juice treatment had significant effect ( $p \geq$

0.05) on the final total acidity. It was also found that all design variables and the interaction between them had significant effect ( $P \geq 0.05$ ) on the final pH and Total Soluble Solids. The highest total acidity expressed as citric acid was achieved with a commercial strain of *Aspergillus niger*, and filtered and centrifuged date juice.

**Article ID:** 80220

**Title:** Influence of Physicochemical, Microbiological Counts, and Sensory Properties of Dry-cured Ham in Processed Sulfur-fed Pigs during Storage

**Name:** Ji-Han Kim

**Affiliation:** Konkuk University

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#### ABSTRACT

Study was performed to investigate the changes in physicochemical, microbiological counts and sensory properties of dry-cured ham from sulfur-fed pigs during the drying and ripening period. Moisture content of dry-cured ham from 0.3% sulfur-fed pigs was significantly ( $p < 0.05$ ) higher than that from non-sulfur fed pigs (CON). Fat content of sulfur-fed pigs was significantly ( $p < 0.05$ ) lower than that of the control group. The sulfur fed pig groups showed excellent lipid oxidation stability compared to that of CON. Volatile basic nitrogen of sulfur-fed pigs was significantly ( $p < 0.05$ ) higher than that of CON during the drying and ripening period. Fatty acid and free amino acid concentrations in all groups increased significantly ( $p < 0.05$ ) during the drying and ripening period. In particular, methionine and glutamic acid in the sulfur-fed groups was significantly higher than those in the CON. The dry cured ham from sulfur-fed pigs showed prolonged storage and improved meat quality.

**Article ID:** 80219

**Title:** Comparison of physicochemical properties of extruded whole and germinated barley

**Name:** Gi-Hyung Ryu

**Affiliation:** Kongju National University

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#### ABSTRACT

Whole and germinated barley flour were extruded under different die temperatures (90 and 130°C), screw speed (150 and 200 rpm) and CO<sub>2</sub> injection (0 and 150 mL/min). The physicochemical properties of extruded whole barley

(EWB) were compared to extruded germinated barley (EGB). The EGB contained higher level of protein, reducing sugar and soluble arabinoxylans content while  $\beta$ -glucan and phytic acid content was lower than EWB. EGB significantly decreased SME input resulting in reduction of expansion ratio and water absorption index as compared to EWB but increase of specific length, piece density, lightness and water solubility index ( $P < 0.05$ ). The die temperature is a main effect in overall characteristics, following screw speed played a minor effect. The use of CO<sub>2</sub> injection increased the expansion ratios at low die temperature, lightness, WSI and improved microstructure. EGB with CO<sub>2</sub> injection appear to be an alternative approach to nutritional snack or ingredient in food product.

**Article ID:** 80212

**Title:** Local role of food producers' communities for a Global One-Health framework: the experience of traslational research in an Italian dairy chain

**Name:** Chiara Frazzoli

**Affiliation:** Istituto Superiore di Sanità

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**ABSTRACT**

Community is the foundation of public health: the present paper reports the approach and strategy for intervention on the dairy production community developed by the Italian project ALERT ([www.alert2015.it](http://www.alert2015.it)), which implements the transfer of technical innovation and technological know-how from public research. Starting from the local role of primary producers, North-South and South-South networking ([www.noodlesonlus.org](http://www.noodlesonlus.org)) is needed to share solutions for transnational problems like climatic change, contaminated agro-farming sites and food waste and losses in the era of food crisis. Based on risk analysis, science-society dialogue and global health, the main drivers of this experience of traslational research are One Health, i.e. the web of inter-relationships among environment, farm animals and human health, and sustainable food safety (prevention actions on diet of young women, today, to protect next generation's health) to increase population life expectancy in good health.

**Article ID:** 80198

**Title:** Ohmic heating for tofu making – a pilot study

**Name:** CHING-HUA TING

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**ABSTRACT**

The aim of this study is to explore the relationship between temperature and electrical conductivity of soya milk under ohmic heating in tofu making. The soya milk of 10% Brix was heated to a steady temperature of 90°C. The applied voltage was increased

and the temperature rising rate was investigated for adequate heating profiles in tofu making. Experimental results showed that the electrical conductivity of soya milk is proportional to the heating time. The temperature rising rate was increased from 1.46 to 3.82 °C/min as a result of increased voltage. Hence ohmic heating could be an efficient, convenient heating measure in tofu making.

**Article ID:** 80080

**Title:** Effect of Ultrasonication on Polyphenol oxidase (PPO) in Amasya Apple Juice

**Name:** Hami Alpas

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**ABSTRACT**

The inactivation of ultrasonication (US) effect on Amasya apple juice polyphenoloxidase (PPO) was investigated the different combinations of amplitudes (50% and 100%) and pulse modes (PM) (0.5 and 1.0) at different time intervals (0-35 min). Changing amplitude of ultrasonic waves, PM and temperature affected the PPO inactivation. Increasing amplitude and PM caused by increasing the inactivation of PPO. During the experiment, temperature was uncontrolled and increased from 25°C to 71°C and 82°C for 50% and 100 % amplitudes, respectively at a constant PM 1.0. The temperature affected negatively the PPO inactivation by US. US treatment increased PPO activity at sub-lethal temperatures at max amplitude and PM. The inactivation by thermal treatment (TT) (60 to 80°C) and the inactivation by US treatment were compared. The PPO inactivation due to US treatment and TT followed first order kinetics. Although the max condition of US treatment (100% amplitude, PM 1.0) and TT (80°C) showed similar PPO inactivation rate, when the conditions of US treatment decreased, TT process more efficient on reducing the enzyme activity than US.

**Article ID:** 80087

**Title:** Protective Effect of Gingo Biloba Extract on Carbendazim-Induced Hepatotoxicity in Albino Rats

**Name:** Faiza Mahboub

**Affiliation:** Umm Al Qura University

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**ABSTRACT**

Carbendazim is a broad spectrum carbamate fungicide used in the control of various fungal pathogens. The present work studied the effect of carbendazim on the liver of albino rats and the possible protective role of Ginkgo biloba extract (EGB). Liver of carbendazim-treated animals showed histopathological and

histochemical alterations. The histopathological changes include hepatic tissue impairment, cytoplasmic vacuolization of the hepatocytes, and congestion of blood vessels, leucocytic infiltrations and fatty infiltration. Histochemical results showed reduction of carbohydrates and total proteins in hepatic tissues. Moreover, liver function enzymes (ALT, AST) were elevated in sera of carbendazim-treated animals. Coadministration of EGB with Carbendazim improved the histological and histochemical changes observed in animals treated with carbendazim. In addition, EGB treatment leads to a significant decrease in ALT and AST. According to the present results, it is concluded that EGB can improve the hepatotoxicity of carbendazim and this effect may be attributed to antioxidant properties of Ginkgo biloba extract.

**Article ID:** 80181

**Title:** Evaluation of the antioxidant activity of ethanolic extracts of some varieties of onions

**Name:** Fernando Reina

**Affiliation:** National Technological University (UTN-FRBA)

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**ABSTRACT**

The content of polyphenolic substances in commercial onions has been determined. The antioxidant activity of their ethanolic extracts, as well as their effects on the oxidation of edible corn oil during accelerated ageing, was studied. Maceration of taxonomically identified commercial vegetable samples, previously peeled and thinly sliced, was carried out at ambient temperature, out of direct light, with occasional agitation and ultrasound, employing 95% ethyl alcohol as the extraction solvent, allowing them to stand for 7 days. The total polyphenolic contents were determined on the filtrated extracts using the Folin-Ciocalteu method. The antioxidant activity was evaluated on emulsions of ethanolic extracts of onion prepared in edible commercial corn oil, using sorbitan monooleate as emulsifying agent. The peroxide values were analyzed using the iodometric method; oxidation induction times were obtained from the peroxide evolution graphs, using the tangent method. Oil samples emulsified with ethanolic onion extracts showed an extension of the induction period. A 7 day ageing study at 45°C was additionally performed to determine the conjugated dienes on pure commercial corn oil and its emulsions by visible spectrophotometry. The spectral analysis showed an increase of the measured absorbancies in oil samples without additives and no change for the oils emulsified with onion extract. An increasing of diene values was observed for corn oil without additives during ageing; no changes in the value were observed in oils emulsified with onion extracts.

**Article ID:** 80262

**Title:** Phenotypic and genetic diversity of rhizobia isolated from nodules of the legume genera *Sulla flexuosa* in North West region of Morocco

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**ABSTRACT**

*Sulla* (*Hedysarum flexuosum* L., syn. *Sulla flexuosa*) originating from the western Mediterranean region and North Africa. In Morocco, the specie grows on marl and limestone clay substrates and it is represented by small populations in areas of Tangier, Tetouan, Asilah, ksar sghir and Ouazzane. But these phylogenetic resources are currently damaged by severe genetic erosion due to overgrazing, irregular rainfall and reduction of rangeland. Phenotypic and genetic diversity of 70 strains, isolated from root nodules of *Sulla flexuosa* grow in North West region of Morocco, were studied using both phenotypic and genetic techniques. The phenotypic tests, (growth rate, tolerance to salinity, pH, temperature, resistance to antibiotics and metals ...), revealed that most of strains are belonging to rhizobia and genetic tests clustered all strains into 30 different profiles. Results of 16S rRNA sequencing revealed that *Hedysarum rhizobia* were phylogenetically related to *Rhizobium sullae* strain IS 123T in 17 groups. All rhizobial strains identified in this study produced effective symbiosis with their original host.

**Article ID:** 80259

**Title:** Sensor with intact or modified yeast cells as rapid device for toxicological test of chemicals

**Name:** Roberto Dragone

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**ABSTRACT**

Aerobic catabolism of *S. cerevisiae* (cell respiration) is a rapid, cost-effective, and reproducible toxicological endpoint of the whole cells biosensor. To increase the signal intensity, a protocol for the immobilization and modification of the yeast cells is described. In particular, the enzymatic treatment of the immobilized yeast cells allows removing the cell wall and obtaining structurally modified cells namely spheroplasts. Both immobilization and exposure of sensitive cells like spheroplasts confirmed to improve the method's sensitivity vs. the chemicals. The present paper reports the test of different chemicals (including Mercury and wood preservative like Tanalith) present in consumers' products, performed both by sensor with intact and modified whole cells. formation (1.21 g/L).

**Article ID:** 80203

**Title:** Chemical characterisation of the industrial residues

of the pineapple (*Ananas comosus*)

**Name:** MARIA ELENA SANCHEZ PARDO

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#### ABSTRACT

In Mexico pineapple processing produces industrial residues with a high concentration of dietary fibre. The aim of this study was quantify the constituents of the fibrous residues from the industrial processing of pineapples which exhibited low concentrations of lignin.

**Article ID:** 80263

**Title:** Development and Characterization of Antimicrobial Packaging Films

**Name:** Zinash Assefa

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#### ABSTRACT

The purpose of this work was to develop and study the effect of bioactive component towards the inhibition of microbial activities of films; aiming to assess their performance in employing for antimicrobial packaging film. In order to achieve appropriate inhibition effect of the antimicrobial agent, the structure of the films was changed from a highly asymmetric and porous to the dense by the

modulation of the composition of the initial casting solution. The results on inhibition effect of starch-based films prepared from 90-100% (w/w) starch and 0-10% (w/w) bioactive component (saponin) revealed antimicrobial activity in a growth of bacteria (*Escherichia coli*, *Salmonella typhi* and *Enterobacter erogenous*). An increase in saponins concentration in the casting solution decreased the growth of microorganisms and the inhibition activities of the films increased. Results on moisture content, transparency, swelling, solubility and mechanical properties of the films at different concentrations of bioactive component and levels of film thickness revealed significance differences at  $p < 0.05$ . The film with 10% saponins concentration showed better inhibition effect in a growth of *Salmonella typhi*, *E. erogenous* and *E. coli* for 0.02 and 0.04mm film thickness. The maximum antimicrobial activities and tensile strength of the films increased with an increase in an amount of the bioactive component in the casting solution. In conclusion, this study confirms that the saponins extracted from haricot bean seeds and incorporated in the films had antibacterial activity on pathogenic bacteria. The films may be used for food packaging that are extremely vulnerable to microbial growth or directly used as a surface coating on perishable fruits and vegetables consecutively to augment their microbial safety and extend shelf stability of food products. Undoubtedly, this area of research holds considerable potential on food delivery systems

### Session 3: Material Sciences and Technology I (MST-S)

**Article ID:** 50037

**Title:** The Extrusion Behavior of AZ31 Mg Alloys by Finite Element Simulation

**Name:** Ping LI

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#### ABSTRACT

The three-dimensional finite element (FE) numerical simulation of extrusion forming of AZ31 matrix magnesium alloy was analyzed in four extrusion velocities. The flow pattern and the influence of extrusion velocity for the temperature, the distribution of effective stress and strain of composites were analyzed. The results showed that, when the extrusion velocity increased from 1.5 mm/s to 4.5 mm/s, the heat flux under steady extrusion state would change from  $-2.77 \times 10^4$  (W&#8229;m<sup>2</sup>) to  $1.14 \times 10^5$  (W&#8229;m<sup>2</sup>), meanwhile the effective stress and strain increased at first and then decreased, and the average effective strain and stress value were smallest when  $v = 4.5$  mm/s. It showed that along with the increase of the extrusion velocity, the rise degree of the temperature increased and the distribution of the effective stress and strain tended to be more evenly. Finally, the

best extrusion technical parameters of AZ31 magnesium alloy were determined, that was the extrusion velocity was equal to 4.5 mm/s when extrusion ratio was 25 and extrusion temperature was 350 oC.

**Article ID:** 50038

**Title:** The Extrusion Behavior of Mg Alloys Interpenetrating with Stainless Steel Wire

**Name:** Ping LI

**Affiliation:** University of Jinan

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#### ABSTRACT

The interpenetrating magnesium composites reinforced by three-dimensional braided stainless steel wire reinforcement were fabricated. And, the deformation behavior of materials was analyzed in four extrusion velocities by DEFORM-3D software. The results show that with the increases of extrusion velocities, the equivalent stress values exhibit a gradually increasing and then decreasing trend. Owing to the effect of three dimensional reinforcement, the basal plane orientation occur tilt. And, the microstructure turns refined.

**Article ID:** 50136

**Title:** Electrospun Absorbable Polycaprolactone (PCL) Scaffolds for Medical Applications

**Name:** Yingchu Wang

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#### **ABSTRACT**

The electrospun scaffold plays a crucial role in tissue engineering for its unique structure which can mimic the structure and biological functions of the natural extracellular matrix (ECM). This study discusses the effects of electrospinning parameters, such as applied voltage, tip-collector distance, DMF content percentage and polymer concentration, on the porosity and the surface area of electrospun fibrous scaffolds. The results show that the fiber diameter of electrospun scaffold can be increased with the lower applied voltage, the shorter the tip-collector distance, the smaller DMF content percentage or the higher the polymer concentration. The PCL electrospun scaffolds have high porosity ranging from 85.5 to 92.4%. Furthermore, the surface area to volume ratio exhibits a clear relationship with the fiber diameter. The surface area can be improved through decreasing the diameter of nanofibers.

**Article ID:** 50135

**Title:** Evolution of Wear on the Abrasive Tool during the Polishing Of Porcelain Tile Using Morphological Space

**Name:** Fabio Jose Pinheiro Sousa

**Affiliation:** Technische Universitaet Kaiserslautern

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#### **ABSTRACT**

Costs with the polishing process represent nearly a third of what costumers pay for polished floor tiles. This is in part due to the high consumption of cemented-matrix abrasive tools, whose demand is about half kilogram per square meter final product. The present study addresses the wear of such abrasive tools, colloquially known as fickerts in the industrial polishing process of ceramic tiles. The focus was set on the evolution of the fickert 磚 surface during polishing. The fickert 磚 topography was periodically measured by both optical and confocal microscopy. The abrasive tool was submitted to a sequence of ten polishing steps of one second each. All variations were quantitatively characterized and were successfully represented by means of the morphological space. Such space is in turn composed by two statistical parameters: the skewness and kurtosis, both based on the distribution of heights collected from roughness profiles taken along the fickert 磚 active surface. The experimental points showed a linear relationship between skewness and kurtosis, in a very good accordance with the behavior expected for typical abrasive wear.

**Article ID:** 50152

**Title:** Preparation and In Vitro Degradation of PDO Intravascular Stents with Braided Structure

**Name:** CongR Wang

**Affiliation:** DongHua University

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#### **ABSTRACT**

In this paper, in vitro degradation behaviors of the PDO monofilaments and the stents were studied. The mechanical properties, morphology observation and Differential Scanning Calorimeter(DSC) of PDO monofilaments were determined, as well as the compression strength of the stents. The experimental results showed that the PDO monofilaments contained half of its original strength after 6 weeks degradation and lost its strength in the 10th week. DSC outcomes showed that the crystalline regions of PDO haven't been hydrolyzed after 16 weeks of degradation. The stents demonstrated good compression behaviors for 12 weeks and therefore can be utilized in short-term application.

**Article ID:** 50151

**Title:** Effect of H3BO3 coating on the microwave dielectric properties of BZN ceramics

**Name:** biao jin

**Affiliation:** Henan University of Urban Construction

**E-mail:** jinbiao8732@163.com

#### **ABSTRACT**

(Bi1.5Zn0.5)(Zn0.5Nb1.5)O7 (BZN) ceramic samples were prepared by solid state reaction. B2O3 was introduced by liquid coating technology with H3BO3 solution in the BZN ceramic specimen to reduce its sintering temperature. The sintering behavior, phase composition and dielectric properties of ceramics were investigated by X-ray diffraction, scanning electron microscopy and vector network analyzer. The (Bi1.5Zn0.5)(Zn0.5Nb1.5)O7 ceramic composite could be sintered well at 900°C for 3h when 0.9M/l H3BO3 was added and showed good dielectric properties of  $\epsilon_r=150$ ,  $Q \times \pi f=215$ ,  $\tau_f=-362$  ppm/°C.

**Article ID:** 50159

**Title:** Synthesis and luminescence properties of Ba3Y1-xEuxB3O9 (0.05 ≤ x ≤ 0.35) under UV excitation

**Name:** Xiao Xia Li

**Affiliation:** Jiangxi University of Finance and Economics

**E-mail:** lixiaoxia04@sina.com

#### **ABSTRACT**

Single phase of Ba3Y1-xEuxB3O9 (0.05 ≤ x ≤ 0.35) samples was prepared by the solid state reaction. The crystal structure, the surface, the particle size and luminescence properties were characterized by X-ray diffractometer, scanning electron microscopy and spectrophotometer. The results showed that the obtained samples with the particle size from 0.3 to 1.5 μm were hexagonal structure. Monitored by 592 nm emission, the



excitation spectra of  $\text{Ba}_3\text{Y}_1 - x\text{Eu}_x\text{B}_3\text{O}_9$  were dominated by the charge transfer band of  $\text{O}^{2-} \rightarrow \text{Eu}^{3+}$  peaking at about 259 nm until  $x = 0.15$ ; the transition from 7F0 to 5L6 level of  $\text{Eu}^{3+}$  at about 395 nm was maximum after  $x \geq 0.15$ . The strongest emission peak due to the  $5\text{D}_0 \rightarrow 7\text{F}_1$  transition of  $\text{Eu}^{3+}$  was all located at about 592 nm in the emission spectra of  $\text{Ba}_3\text{Y}_1 - x\text{Eu}_x\text{B}_3\text{O}_9$ , and the maximum emission was obtained at  $x = 0.15$  and 0.3 under 254 and 395 nm excitation, respectively. The excitation process under the two excitation energies was analyzed. It indicated that only the centrosymmetric lattices could be excited under 254 nm excitation; both the centrosymmetric and noncentrosymmetric positions could be excited by 395 nm, accordingly, the ratio of the red emission ( $5\text{D}_0 \rightarrow 7\text{F}_2$ ) to the orange one ( $5\text{D}_0 \rightarrow 7\text{F}_1$ ) increased, leading to a better chromaticity of the phosphors.

**Article ID:** 50029

**Title:** Micro-structural properties of zinc oxide nano-particles synthesized by bio-polymeric templates

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#### ABSTRACT

Zinc and iron oxide nano-particles were synthesized using natural bio-polymeric templates viz. cellulose and sodium alginate. Cellulose fibres from different sources viz. filter- and blot- papers, were used as templates for this purpose. The synthesized Zinc oxide nano-particles were characterized by X-ray diffraction (XRD), fourier transform infra-red spectra (FT-IR), UV-Visible spectrophotometer (UV-Vis) and scanning electron microscopic (SEM) studies. XRD studied confirmed the formation of highly crystalline hexagonal wurtzite phase of ZnO in all the synthesized nano-particles. The average crystallite sizes of the nanoparticles obtained using different templates, were well below 50 nm. Characteristics of the zinc oxide nano-particles obtained by template-based techniques were compared with those obtained by co-precipitation technique. Influence of various templates on the characteristics of metal oxide nano-particles was studied.

**Article ID:** 50174

**Title:** Photo-thermal Conversion and Stability of Gold and Silver Nanostructures

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#### ABSTRACT

Gold and silver nanostructures (such as Au nanorods and Ag nanoplates) exhibit strong and tunable surface

plasmon resonance in the near-infrared region (NIR). Under a certain NIR laser irradiation, noble metal nanostructures achieve a high photo-thermal effect, which would be useful in the therapy. In this work, Au nanorods with longitudinal surface plasmon resonance (SPR) shifting in the region of 650 ~1100 nm were synthesized by a "seed" method. Ag nanoplates and nanocubes with SPR located in the region of 650~850 nm were produced by a hydrothermal method. Through adjusting laser power and irradiating time, the photo-thermal conversions of these nanostructures were studied under NIR laser irradiation. Under low power laser (808 nm, <1W) irradiation, the shape of the Au nanorods are stable and the temperature of colloid increase from room temperature to ~57°C. However, Au nanorods undergo deformation from rod to spherical particle under irradiation of high power (808 nm laser; 6W; 1064nm laser, 7W), resulting in the disappearance of SPR. Morphology evolutions and photo-thermal conversion of Ag nanostructures were also studied. Ag nanostructures have a lower photo-thermal conversion compared with that of Au nanorods colloid. Snipping and dendrite can be observed for Ag nanoplates after irradiating, while Ag nanocubes have no obvious shape change.

**Article ID:** 50175

**Title:** Performance Improvement of Dye-Sensitized Solar Cell by Optimizing TiO<sub>2</sub>-Photoanode Structure

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#### ABSTRACT

A composite TiO<sub>2</sub> photoelectrode structure is explored to optimize the dye-sensitized solar cell (DSSC) properties. The composite TiO<sub>2</sub> photoanodes consist of two nanoparticulate TiO<sub>2</sub> layers with different size and thickness. The impact of film thickness on the performance of DSSCs was also investigated. In the optimized composite photoelectrode structure with large sized TiO<sub>2</sub> nanoparticle as light scattering layer, the significantly improved performance of DSSC with 25% increase of current density and 13.1% increase of conversion efficiency was experimentally demonstrated.

**Article ID:** 50154

**Title:** Production and Characterization of Gold Nanoparticles from Itagunmodi Gold Deposit

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#### ABSTRACT

The paper has investigated the production and characterization of gold nanoparticles from Itagunmodi

gold deposit in Atakumosa West LGA in the State of Osun Nigeria. The gold ore was weighed and physically processed by hand picking the gangues and other physical impurities. It was then fractionated into different sizes with the aid of sieves of sizes ranging from 0.1mm and 3.5 mm. The production of gold nanoparticles was achieved using the top down technique through mechanical attrition (ball milling) of the physically processed gold ore. The gold nanoparticles obtained were subsequently characterized using Scanning Electron Microscopy (SEM) with Energy dispersive-X ray (EDX) attachment and X-Ray Diffraction (XRD).

**Article ID:** 50198

**Title:** Feature recognition of Corrosion Pit for Pre-corroded AA 2524 and Statistical Analysis

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#### ABSTRACT

Corrosion morphology image is one of the most important features for the evaluation of the corrosion damage of materials. By using white light confocal profiler, the corrosion morphologies of AA2524 aluminum alloy specimen are obtained after full immersion to experimental 3.5% salt solution for different time. Through digital image processing, typical corrosion morphology characteristics are extracted, such as the fractal dimension, the depth of pit, the area of pit. By extended 3D box-dimension method, the fractal dimensions of the corrosion surface under immersing time of 24 and 120 hours are determined. The statistical analyses show that the corrosion areas and the characterization parameters  $ab/2c^2$  obey Gumma distribution, and the corrosion depth obeys Gumbel, normal, Weibul and log-normal distributions.

**Article ID:** 50196

**Title:** Structural and mechanical properties of Poly( $\epsilon$ -caprolactone) Biocomposites Reinforced with Different Silk-fibroin Fabric Structures

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#### ABSTRACT

To develop novel biocomposites, three different silk-fibroin fabrics (plain woven fabric, plain weft-knit fabric and non-woven fabric) were, respectively, blended with poly( $\epsilon$ -caprolactone) (PCL) by a solution blending method. The effects of various fabric structures on the mechanical and microstructure properties of silk-fibroin fabric reinforced (SF-fabric-reinforced) PCL biocomposites were investigated. It was obvious that the breaking strength and elongation of SF-fabric-reinforced

PCL biocomposites decreased while the Young's modulus increased. Scanning Electron Microscopy (SEM) photographs showed that silk-fibroin fabrics were well bonded with PCL matrix. From Wide-Angle X-ray Diffraction (WXRd) analysis, plain woven and plain weft-knit fabrics showed higher ability to increase the crystallinity of PCL matrix compared with non-woven fabric.

**Article ID:** 50220

**Title:** Improvement in the Low-fire dielectric compositions with middle permittivity for LTCC applications

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#### ABSTRACT

The shrinkage behavior has been critical as a sensitive parameter in the design of embedded microcircuit passive components. Several glass compositions were examined for the low-temperature firing of middle permittivity dielectrics, and their compositions were further modified for shrinkage matching between middle-permittivity dielectric and the substrate. In this study, The effect of borosilicate glass and fluoride glass additives on the shrinkage, microstructure, and microwave dielectric properties of  $\text{BaO}-(0.4\text{Nd}_2\text{O}_3, 0.6\text{Bi}_2\text{O}_3)\text{-TiO}_2$  (abbreviated as BNBT) ceramics was investigated. It was found that the shrinkage behavior, the densification and dielectric properties of BNBT ceramics could be improved by adding a small amount of borosilicate glass additives. With the addition of 1 wt.% fluoride glass, the ceramics sintered at 850°C showed higher permittivity and shrinkage than single borosilicate glass. It indicated that BNBT ceramics with appropriate mixture of these two kinds of glass additives have a number of potential applications on passive integrated devices based on the low-temperature co-fired ceramics technology.

**Article ID:** 50075

**Title:** Calculations of absorbed dose in heavy-ion irradiated phase-change memory cells

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#### ABSTRACT

Heavy ion irradiation on phase change memory cell was conducted using Monte Carlo simulations. Absorbed dose in the whole memory cell, as well as in its active layer was assessed. Phase change memory cell was modeled as a sandwiched structure of two TiW electrodes and  $\text{ZnS-SiO}_2$  films as insulators surrounding the active region. The most commonly used phase change material,  $\text{Ge}_2\text{Sb}_2\text{Te}_5$ , was used as active layer of the cell.

Ionization effects of heavy ion irradiation were investigated for various thicknesses of phase change layer and different ion energies.

**Article ID:** 50081

**Title:** Simulation of ion beam irradiation effects in perovskite oxide memristors

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#### ABSTRACT

Radiation effects of ion beams in perovskite oxide memristors are analyzed and linked to absorbed dose values, calculated from simulations of ion transport. Several ion species were used in simulations, chosen to represent certain commonly encountered radiation environments. Results indicate that considerable formation of oxygen ion - oxygen vacancy pairs, as well as advent of displaced rare earth and alkaline atoms, is to be expected. Oxygen vacancies can lead to a decrease or increase of active layer resistance, depending on applied voltage polarity. The loss of vacancies from the device is bound to impair the performance of the memristor. Calculated absorbed dose values in the memristor for various incident ion beams are typically on the order of several kGy.

**Article ID:** 50246

**Title:** Study of band structure and optical gain of navel vertical cavity surface emitting lasers

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#### ABSTRACT

The vertical-cavity surface-emitting lasers (VCSELs) are more attractive for their advantages and properties, and high-index-contrast subwavelength grating (HCG) can be applied to replace top DBR to fabricate VCSELs with better performance. Before fabrication the HCG VCSELs devices, the active region of the wafer should be studied and investigated. The electronic structures of In<sub>0.17</sub>Ga<sub>0.83</sub>As/GaAs<sub>0.92</sub>P<sub>0.08</sub> QWs which are embedded in the active region of 980nm-emission VCSELs are investigated using the 8-band k.p model. The dispersion and the wave functions of conduction bands and valence bands have indicated that the effective overlapping and interactions between electrons and holes can occur in QWs to produce photons efficiently. The spontaneous emission rate and optical gain of TE and TM modes show the emission wavelength is close to 980nm. The simulated results are verified by the PL measurements which show the peak at 968-969 nm. So the simulated and the measured results are consistent to verify the quality and emission wavelength of the wafer.

## Session 4: Chemical Engineering (CEN-S)

**Article ID:** 50065

**Title:** Application of Vinyl Polymer Reinforced with Knitted Fabric for Producing Curative Garments

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#### ABSTRACT

Today polymeric composite material (PCM) is widely used almost in all industries. Polymer reinforced with fibers and knitted fabric changes its physical and mechanical properties: reinforcement increases its strength, wear resistance, etc. However most often scientists' research in the sphere of reinforced PCM is directed towards developing structural plastics used in construction projects, machine building, and less often for meeting people's needs. The authors suggest using the world experience in developing reinforced PCM for creating innovative curative garments: elegant and ergonomic ones. To develop such cloth polymers and knitted fabrics underwent a testing on their safety and to what extent they meet the criteria (rigidity, decreasing amount of possible permanent deformations, providing the proper level of compression). Technology of applying

polymeric composition onto the basis has been developed. The analysis of the properties of the composites obtained made it possible to draw a conclusion that using these composites in producing curative garments will allow to take preventive measures against diseases of musculoskeletal system and to provide their treatment. The additional effect of the material is its aesthetic characteristics which makes producing functional garments (also for disabled people) possible.

**Article ID:** 50105

**Title:** DFT study of Diels-Alder reaction of 12-N-methylcytosine

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#### ABSTRACT

Our research reports the results of DFT calculations for [4+2]-cycloaddition of a number of dienophiles (such as N-phenylmaleimide, maleic anhydride, 1,4-benzoquinone, dimethyl acetylenedicarboxylate, tetracyanoethylene and methyl acrylate) to 12-N-methylcytosine performed in order to estimate the compound reactivities. Analysis of the thermodynamic regularities of the Diels-Alder

reaction between 12-N-methylcytosine and a number of dienophiles is consistent with the experimental data indicating the highest reactivity of N-phenylmaleimide. This is due to a number of factors: high chemical potential, the hardness differing little from that of the diene and commensurable activation energies of the forward and reverse Diels-Alder reactions, i.e., thermodynamic stability of the resulting adducts.

**Article ID:** 50148

**Title:** Regeneration of Activated Carbon Using Photo-Oxidation Process

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**ABSTRACT**

Activated carbon has been used as an adsorbent for centuries. For purpose of regeneration, advanced oxidation processes is suggested, this approach could be viable from the economic and environmental point of view, and appears as an alternative to the many of inefficient single-step processes actually applied for the regeneration process. The results showed that the Titanium dioxide can easily regenerate the AC by oxidizing the organic compounds adsorbed on the surface of AC. The increase of UV light intensity has a positive effect on the adsorption capacity. However, the increase of TiO<sub>2</sub> concentrations have a small negative effect on the adsorption capacity of the AC.

**Article ID:** 50059

**Title:** Biocompatible LDH-Alginate Composites for the Adsorption of Naphthalene Anionic Dye AG 120: Influence of Alginate concentration on the Adsorption Characteristics

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**ABSTRACT**

Layered double hydroxide (MgAl LDH) and its composites containing different quantities of sodium alginate were synthesized. The adsorption characteristics of these materials were evaluated for the adsorption of Acid Blue 120 (AB 120). The adsorption capacity of the composites for the dye was higher than that of pristine LDH. The adsorption capacity varied with alginate concentration and was the highest when the alginate concentration was 5.9 wt%. The maximum adsorption capacity of the composite enhanced by 40%, compared to pristine MgAl LDH. The rate of adsorption of the dye on the composites was also higher than that of pristine MgAl LDH up to an alginate concentration of 11%. The results reveal that LDH composites are more efficient adsorbents compared to pure LDH. Sodium

alginate, being a biopolymer can also improve the biocompatibility of the LDH for biological applications.

**Article ID:** 50146

**Title:** Rechargeable alkali and alkaline earth metal-air batteries – Potential and challenges

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**ABSTRACT**

In order to resolve environmental and sustainable energy concerns, significant efforts are required to find ways to minimise the use of fossil fuels and to shift to renewable energy resources such as solar, wind, and geothermal power generation. The key to success lies in developing reliable large scale high power energy storage devices. The lithium-air battery has been suggested as one candidate because of its exceptionally high energy storage capacity. Non-aqueous metal-air batteries utilising alkali and alkaline earth metal anodes also offer great gains in energy density over the state-of-the-art Li-ion battery. They are also unique power sources because the cathode active material (oxygen) does not have to be stored in the battery but can be accessed from the atmosphere. Moreover, alkali and alkaline earth elements are much more abundant than lithium and therefore would offer a more sustainable energy storage solution for even beyond the long-term. This work is to enable the uptake of this technology by fully analysing its principle and by exploring the application of nano-structured catalytic cathode materials. The potential of alkali and alkaline earth metal-air batteries will be demonstrated by their electrochemical cycling performance and will be compared with the lithium-air battery. The challenging issues will be discussed according to experimental observations.

**Article ID:** 50183

**Title:** Thermal Behaviour of Slurry Prepared from Clermont Bituminous Coal and Oil Palm Empty Fruit Bunch Bio-Oil

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**ABSTRACT**

Investigation on the pyrolysis behaviour of coal-biooil slurry (CBS) fuel prepared at different ratios (100:0; 70:30; 60:40; 0: 100) were conducted using a Thermogravimetric Analyzer (TGA). The selected coal sample was Clermont bituminous coal (Australia), while Empty Fruit Bunch (EFB) was used as source of bio-oil that was thermally converted by means of pyrolysis. Thermal degradation of CBS fuel was performed in an inert atmosphere (50mL/min nitrogen) under

non-isothermal conditions from room temperature to 1000&#176;C at heating rate of 10&#176;C/min. The proportions of CBS fuel at 70:30 and 60:40 blends were observed to have influenced the fuel properties of the slurry. The addition of bio-oil will shift the temperature region towards early devolatilization. Meanwhile, the thermal profiles of the blends, showed potential trends that followed the characteristics of an ideal slurry fuel where highest degradation rate was found at the blend ratio of 60:40 biooil/coal. These findings can be useful to the development of a slurry fuel technology for application in the vast existing conventional power plants.

**Article ID:** 50119

**Title:** Epoxidation of Palm Kernel Oil-based Crude Oleic Acid

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#### ABSTRACT

Most vegetable oils have high content of unsaturated bond and can be converted into epoxidized fatty acids. These days, epoxidized vegetable oils are great concern as they are obtained from sustainable, renewable natural resources and are environmental friendly. The epoxidation of palm oleic acid was carried out by using in situ generated performic acid (HCOOOH) to produce epoxidized oleic acid. The degree of temperature, the molar ratio of formic acid or hydrogen peroxide and types of catalyst was considered. Epoxidation results were based on complete conversion oxirane, rate of epoxidation and stability of the oxirane. It was found that a maximum relative conversion oxirane (RCO) of epoxide is 88% at optimal condition.

**Article ID:** 50179

**Title:** Effect of Pretreatment on Adsorption of Nickel by Oil Palm Mesocarp Fiber

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#### ABSTRACT

In this study, the usage of abundantly available oil palm mesocarp fiber as biosorbent for nickel removal from aqueous solution is discussed. The effect of NaOH and HCl pretreatment on the nickel removal by oil palm mesocarp fiber is one of the objectives. Varieties of NaOH concentration were examined to determine the effect of concentration on nickel removal. Other than pretreatment, effect of initial nickel concentration is also determined. XRD analysis was done in order to proof the existence of nickel phase on the oil palm mesocarp fiber. From the result, oil palm mesocarp fiber treated with NaOH results

in higher nickel adsorption compared with the treatment using HCl and the nickel nitrate phases was successfully attached on the oil palm mesocarp fiber with crystalline size between 28-52 nm.

**Article ID:** 50225

**Title:** Gasification of Oil Palm Biomass to Produce Syngas for Electricity Generation – Cost Benefit Analysis

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#### ABSTRACT

Fossil fuel burning for energy production creates two major issues: the global warming effect and the weak energy security. These problems can be minimized by utilizing renewable energy sources such as biomass. In order to assess the potential contribution of these technologies to the future energy security and sustainable development, a thorough evaluation of gasification technology towards economic aspects is required. This study aims to determine whether the syngas production from EFB gasification for electricity generation is viable in terms of cost-benefit analysis by evaluating the economic aspects of these technologies.

**Article ID:** 50224

**Title:** Recent Development of Biomass Fast Pyrolysis Technology and Bio-oil Upgrading: An Overview

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#### ABSTRACT

The increasing demand of energy has led to the development of renewable energy in order to mitigate the dependency of fossil fuels. Fast pyrolysis of biomass is one of the most anticipated renewable energy technologies since it has a huge potential to become the efficient, environmentally sustainable, and cost effective technology for energy. Fast pyrolysis process produces liquid bio-oil as a main product, along with solid char and combustible gas. Bio-oil can be utilized for heat and power generation as well as it can be used as a feedstock for pure chemicals production. Over the last decades, numerous researches have been conducted in order to develop the process in terms of reactor design and process optimization in order to achieve the high yield of liquid with high organics and less water content. The aim of this review is to provide the state-of-the-art on fast pyrolysis of biomass with some suggestions presented on upgrading the bio-oil. Based on the recent reactor configurations, current status of biomass fast pyrolysis in commercial scale around the world, the fuel and chemical characteristic of bio-oil compared to the conventional fossil fuels, and the potential application of bio-oil in the future, some recommendations are proposed.

**Article ID:** 50043

**Title:** Kinetics of Hydrogenolysis of Glycerol to Ethylene Glycol over Raney Ni catalyst

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#### ABSTRACT

The rapid development of biodiesel production yields large amount of glycerol as a by-product. It is a resource-utilization efficient and biological technical process to employ hydrogenolysis of glycerol aqueous solution for ethylene glycol generation. In this work, Raney Ni catalyst was prepared through conventional means and tested for hydrogenolysis of glycerol to produce ethylene glycol. The experiments were performed by varying the reaction time and rotate speed at a hydrogen pressure of 6.0-10.0MPa over a temperature range of 453-493K using a batch reactor. The effect of reaction conditions on the conversion of glycerol and the product distribution were also investigated and discussed. The results indicated that with the increase of reaction time the conversion of glycerol and the selectivity of 1,2-PDO tended to rise but the concentration of ethylene glycol decreased after reaching a peak point. The conversion of glycerol reached as much as 100% and the selectivity of ethylene glycol reached a maximum of 40%. Based on the experimental data, the reaction kinetics was studied and the parameters involved a two-site Langmuir-Hinshelwood model were acquired by the parameter estimation method. In the end, residual error distribution and statistic test showed that the obtained kinetic model was suitable and acceptable.

**Article ID:** 50066

**Title:** Production of high-purity hydrogen and carbon dioxide capture by sorption enhanced WGS reaction process

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#### ABSTRACT

Global warming has become more and more serious, which is caused by greenhouse gases. Cutting down the emission of CO<sub>2</sub> has already become one of the major research target in the world. This study is numerically investigating Thermal Swing Sorption Enhanced Reaction Process on water gas shift (WGS) reaction by Na<sub>2</sub>O-promoted alumina. According to Le Chatelier's law, the forward reaction rates and conversion can be increased by removing some products selected. Therefore, this concept can be used to generate product of high-purity hydrogen. The purified H<sub>2</sub> can be sent to gas

turbine for generating electrical power or can be used for other energy source. Carbon dioxide can also be recovered and sequestered to reduce greenhouse gas effects. The method of lines is utilized in simulation, combined with upwind differences, cubic spline approximation and LSODE of ODEPACK software to solve the problem. The concentration, temperature, and adsorption quantity in the bed are integrated with respect to time by LSODE of ODEPACK software. The simulation is stopped when the system reaches a cyclic steady state. In this study, we first simulate breakthrough curve of Na<sub>2</sub>O-promoted alumina cited from literatures to prove the accuracy of simulation program. The optimal operating conditions of the WGS TSA (temperature swing adsorption) single-bed six-process is obtained by varying operating variables, such as feed time and rinse time. Furthermore, WGS TSA single-bed six-process could achieve 99.89% purity of H<sub>2</sub> (dry-basis) as the top product and 90.95% purity and 98.22% recovery of CO<sub>2</sub> (dry-basis) as the bottom product.

**Article ID:** 50086

**Title:** Preparation and Characterization of Fibrous Cellulose/Polypyrrole Nanocomposites

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#### ABSTRACT

In this research, composite of Polypyrrole-Microfibrillated Cellulose (PPy-MFC) prepared in the presence of different surfactant. Conducting Polypyrrole (PPy) was synthesized via chemical polymerization method using different concentration of Pyrrole and Ammonium persulfate (NH<sub>4</sub>)<sub>2</sub>S<sub>2</sub>O<sub>8</sub> as oxidant. The morphologies of resulting composite were greatly dependent on the monomer concentration and surfactant chain length. The results of FTIR showed that pyrrole was polymerized successfully on the MFC fibers and when an anionic surfactant was used to prepare the composites, it served as counter ion for the PPy chains. The FESEM micrographs of polypyrrole have exhibited presence of globular, micrometer-sized particles with a bulky and non-porous structure. However, the composite of PPy-MFC showed an open porous structure of fiber with average size of nanometer. Ribbon-like polypyrrole nanostructures have been prepared by chemical polymerization of pyrrole in the presence of long-chain cationic surfactant, Cetyltrimethylammonium bromide (CTAB), whereas no polypyrrole nanostructure was obtained in the presence of anionic surfactant of Sodium dodecylbenzenesulfonate (SDBS). When the composite of PPy-MFC prepared in the presence of CTAB, nanofibers presented the mean diameter of 71.27 nm that showed a value between the size of PPy-MFC and PPy-CTAB. The Thermal Gravimetric Analysis result has shown that incorporation

of MFC leads to enhancement in thermal stability of pure PPy.

**Article ID:** 50125

**Title:** Synthesis of Hydrophilic Coating Solution and Its Application on Transparent Polymer Films

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#### ABSTRACT

Nowadays, a wide range of self-cleaning building materials such as outer wall tile or glass, or colloidal solutions for the fabrication of hydrophilic coatings are already commercially available. However, some practical limitations still restrict their widespread use in the building sector due to difficulty of their replacements. In this study, we synthesized the hydrophilic coating solutions using various organic and inorganic sources, which can be applicable to the flexible polymer film. Such hydrophilic layer coated polymer film seems to be attached and removable more easily. Considering different intrinsic properties of the organic film substrate and inorganic coating solution, this study was focused to get the reasonable adhesion property between flexible substrate and coated layer and the hardening temperature below 110 °C by controlling linear and organic - inorganic polymerization of binder and additive. Thin films were coated on the flexible polymer film by a roll to roll process. Their characteristics were investigated in terms of hydrophilicity, adhesion and transparency. [Acknowledgement] This work (Grants No. C0124327) was supported by Business for Cooperative R&D between Industry, Academy, and Research Institute funded Korea Small and Medium Business Administration in 2013.

**Article ID:** 50143

**Title:** A Study on the inhibitive effects of plant extract and Magnetic fields on 0.5M sulphuric acids corrosion of copper metal.

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#### ABSTRACT

The inhibitive effects of Newboldia Laevis and static magnetic fields on 0.5M sulphuric acid corrosion of copper metal have been undertaken using gravimetric techniques. Fifteen copper coupons are exposed to the corroding media with and without the plant extract, and the magnetic fields for two hours. The magnetic fields were produced from laboratory made electromagnet, while different concentrations of the extract were gotten by reflux techniques. It is found that both the plant extract

and the magnetic fields resulted to inhibition of the corrosion process. The inhibition efficiency increased with increase in concentration of the extract, hence increase in activation energy. Increase in temperature caused a decrease in the inhibition efficiency, this possibly suggest physical adsorption. The magnetic field caused a drastic decrease in corrosion rate of the inhibited samples, while it has very small effects on the corrosion of uninhibited samples. This result suggests that the particles of the plant extract may have aligned themselves so as to cover corroding areas of the metal. This suggests for further investigation into the morphology of the adsorbed surface. And also may form basis to identify the purity of copper metal.

**Article ID:** 50186

**Title:** Molecular Insight into Affinity Interaction between Cibacron Blue and Proteins

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#### ABSTRACT

Dye-ligand affinity chromatography has been widely utilized for protein separation and purification. Immobilized textile triazine dyes, particularly Cibacron blue have been used as affinity chromatography tools for a long time. Cibacron blue is characterized by its low cost, the ease of its immobilization, its resistance to biological and chemical degradation and high protein-binding capacity of the corresponding adsorbents. However, its interaction with a large number of seemingly unrelated proteins inevitably compromises its protein binding specificity. This endows Cibacron blue with a serious drawback. To cope with the lack of specificity of textile dyes, a better understanding of the binding and specific mechanisms between dye-ligand and different proteins is required. Molecular dynamics simulation provides clear and direct microscopic information. It has been successfully used in our former work to explore the ion-exchange chromatographic adsorption of proteins. For a comprehensive investigation of the interaction between Cibacron blue and proteins from both microscopic and macroscopic point of view, a research project combining molecular dynamics simulation and adsorption experiments has been planned. Two different proteins, serum albumin and hemoglobin, have been introduced as model proteins to study and compare their interactions with Cibacron blue. In this presentation, the first part of this project, molecular dynamics simulations investigating the interactions between Cibacron blue and these two proteins will be shown. All-atoms models of these affinity interaction systems were applied for a precise study. The interaction as well as the binding sites of proteins will be analyzed and discussed in detail. For a better understanding of the specific mechanism, the simulations of these two proteins will be compared. These



simulation results will be compared with the former experimental results. They guide the further experimental part of this project. Moreover, the simulation results will be combined with the experimental results to obtain a comprehensive understanding of these interactions, which is important for the design of new dye-ligands, as well as the optimization of dye-ligand affinity chromatography.

**Article ID:** 50192

**Title:** Increasing depth in flow field plates as a tactic against the pressure loss in a Proton Exchange Membrane Fuel Cell

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#### ABSTRACT

Fuel cells are electrochemical devices that can efficiently convert the chemical energy of the fuel directly into electrical energy. They operate like batteries but they do not get exhausted and are environmentally friendly. As long as fuel is supplied to the cell along with an oxidant, the fuel cell continues to produce electrical energy and heat. Several types of fuel cells exist but the Proton Exchange Membrane Fuel Cell (PEMFC) is well suited for applications where quick start-up and quick response to load changes is required and where a low operating temperature and high power density are benefits. One of the worst problems in a PEMFC is the pressure loss of the gas in flow field plates. The aim of this research was to test the influence of the increased of the flow channel depth on the pressure loss. For the tests and visualization of the pressure loss on the flow channels was used the SolidWorks 2013 software. In the both situations we had a volume flow of 1 L/min in the inlet (water in room temperature) and a environment pressure in the outlet. The temperature of the plate was controlled in 100oC. In the first situation the inlet and the outlet had 2 mm depth and the channel length had 50 mm. In this case the pressure loss was 5121.09 Pa. In the second situation the inlet had 2 mm depth and the outlet 2,6 mm depth, the channel length had 50 mm. In this case the pressure loss was 871.99 Pa. According to results is possible realize that the variation of pressure between inlet and outlet is lesser in the second situation and therefore we can conclude that increasing the depth of the flow field channels decrease the pressure loss, improving the fuel cell performance but increases the thickness of the flow fields plate and thus lowers the power density of the stack.

**Article ID:** 50195

**Title:** Sulfonate Functionalized Metal Organic Coordination Framework for Cycloaddition of Carbon Dioxide and Styrene Oxide

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#### ABSTRACT

To develop novel biocomposites, three different silk-fibroin fabrics (plain woven fabric, plain weft-knit fabric and non-woven fabric) were, respectively, blended with poly( $\epsilon$ -caprolactone) (PCL) by a solution blending method. The effects of various fabric structures on the mechanical and microstructure properties of silk-fibroin fabric reinforced (SF-fabric-reinforced) PCL biocomposites were investigated. It was obvious that the breaking strength and elongation of SF-fabric-reinforced PCL biocomposites decreased while the Young's modulus increased. Scanning Electron Microscopy (SEM) photographs showed that silk-fibroin fabrics were well bonded with PCL matrix. From Wide-Angle X-ray Diffraction (WXRd) analysis, plain woven and plain weft-knit fabrics showed higher ability to increase the crystallinity of PCL matrix compared with non-woven fabric.

**Article ID:** 50203

**Title:** Synthesis of Cyclic Carbonates by Using Quaternized MIL-53-NH<sub>2</sub> Catalyst

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#### ABSTRACT

Functionalized metal organic framework (MIL-53) having quaternary ammonium group was prepared by microwave. They showed good catalytic performance for the cycloaddition of allyl glycidyl ether (AGE) and carbon dioxide without any solvent. The synthesized catalysts were characterized by x-ray diffraction (XRD), FT-IR, BET and TGA. The effects of reaction time, reaction temperature, CO<sub>2</sub> pressure and alkyl halides on the reactivity were discussed. The MIL-53-NMe<sub>3</sub>I showed good reactivity at moderate temperature and CO<sub>2</sub> pressure from 80 - 160 °C and 0.6 - 1.6 MPa. The catalytic performance results revealed that AGE conversion increased with increasing reaction temperature and CO<sub>2</sub> pressure. The functionalized MIL-53 exhibited much higher AGC yield than MIL-53. MIL-53-NMe<sub>3</sub>I with more nucleophilic anion exhibited better reactivity for the cycloaddition reaction

**Article ID:** 50239

**Title:** Research Of Structure And Properties Of The Filled Polyaniline Compositions Applied For Combings Of Industrial Sewage And Flue Gases

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## ABSTRACT

Receiving and properties the interpolimernykh of sorbents polyaniline compositions with components of Nuratinsky bentonite is probed. Optimum conditions of receiving and property of polyaniline sorbents of industrial sewage used for cleaning and flue gases are studied. Ingredients of a polyaniline aggregate are defined optimum a ratio.

**Article ID:** 50057

**Title:** The Possible Application Of Waste Manufacture Of Nitric Fertilizers At Development Of Composite Polymer Chemical Reagent To Produce Clayless Drilling Mud Is Applied In The Process Of Drilling Oil And

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## ABSTRACT

Based on the analysis of the results of comprehensive studies on the physico-chemical properties of the carbonate polymer waste nitrogen fertilizer production association "Ferganaazot" – not suite and their influence on the properties of polymer composites KHR-1 identified and developed the optimum compositions of composite polymer chemicals for drilling fluids clayless used in drilling oil and gas wells in complicated geological conditions and to pre improve.

**Article ID:** 50053

**Title:** Polymer Composite Materials Functional Purpose On The Basis Of Polyethylene

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## ABSTRACT

Based on the analysis of the results of comprehensive research on the changes in the physical and mechanical properties of polyethylene filled with various ratios of mineral, fiber and carbon-graphite fillers and the optimal formulation. Developed more efficient composite polymeric materials functional purpose, having good strength properties, high wear resistance and high reliability in operation in the climatic conditions of Uzbekistan.

**Article ID:** 50124

**Title:** Spontaneous Polymerization Of The Tetrahydro -1,4- Oxazine With 3- Chlorine -1,2- Epoxypropane

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## ABSTRACT

In the work spontaneous polymerization of the tetrahydro-1,4-oxazine with 3-chlorine-1,2-epoxypropane in mass and in the medium of various organic solvents have been studied. It is shown, that a limiting stage of process of polymerization is quaternization reaction, that is the formation of quaternary salts which are involved in the polymerization. The influence of the nature of solvent, temperatures and concentration of initial reagents on polymerization process has been studied.

**Article ID:** 50061

**Title:** Development Of Optimal Composition Of Solution Of Polymer Composition In Order To Refine Regenerated Protein Fiber And Researching Its Physical – Chemical Feature

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## ABSTRACT

Processing by compositions was applied to improving of quality indicators of a natural proteinaceous fiber on the basis of water-soluble polymers and their polyquaternary salts of polyatomic alcohols. Existence as a part of composition of water-soluble polymers and their salts will promote lowering of a level of damage of a surface of fibers, and also increase in forces between fibers, and it in turn brings to lowering of hairiness both separate fibers, and a yarn as a whole. Besides, macromolecules of water-soluble polymers and their salts as hydrophilic substances too promote stabilizing of humidity of a fiber.

**Article ID:** 50214

**Title:** Research And Development Of New Powder Colorific Compositions Based On Salts Of Polyvalent Metals For Dyeing The Natural And Synthetic Fibers And Textile Materials On Their Bases

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## ABSTRACT

On the basis of comprehensive studies were designed the optimum compositions of powder colorific compositions based on salts of polyvalent metals for cellulosic and protein and polyamide fibers and fabric dyeing technology based on them. Powder colorific compositions for textiles based on cellulose, protein and polyamide fibers, due to their interaction with the fiber, help creating salt, coordination and covalent connections and creating the coloring on fibers, which has a high resistance to various physical and chemical effects. Dyeing of cotton, protein and polyamide fibers with colorific composition is carried out in an acidic environ at pH 3-4. At the boiling temperature reaches its equilibrium in the case of dyeing textile materials based

on cotton fabrics - 6-7 minutes, protein fibers for 2-3 minutes, polyamide for 35-40 minutes. The obtained colorings are characterized by high resistance to various physical and chemical factors: washing, dry cleaning, abrasion and light.

**Article ID:** 50101

**Title:** MODIFIED ANTICORROSIVE POLYMER COATINGS FOR PROTECTION OF METALS FROM CORROSION

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#### ABSTRACT

In the work studied the effect of fillers on the mechanical properties of coatings based on modified epoxy resin ED-20. It is shown that the filling composition can significantly reduce the curing compositions are hardening polymer matrix ensuring a high homogeneity of the system and improve the physical, mechanical and performance properties.

**Article ID:** 50211

**Title:** IMPROVEMENT OF TECHNOLOGICAL PROPERTIES OF NATURAL WOOLEN FIBRES BY SOLUTIONS OF A POLYMERIC COMPOSITION

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#### ABSTRACT

By us it was shown that wool processing by water solutions on the basis of water-soluble polymers and their salts, polyatomic alcohols promotes improving of its mechanical properties. The highest mechanical properties the fiber into which composition the solution

consisting of 2,5% polidimetilaminoetilmetakrilat from allilbromidy, 5,0% of glycerin and 92,5% of water is entered possessed. Therefore in operation were in more detail probed influence of the solutions consisting from polidimetilaminoetilmetakrilat with allilbromidy, glycerin, both on mechanical properties, and on technical performances.

**Article ID:** 50022

**Title:** Modeling Biogas Generation Rate Sensitivity to pH, Leachate-level and Ash-loading during Anaerobic Biodegradation of Organic Solid Waste at Mesophilic Conditions using Laboratory Scale Bioreactor

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#### ABSTRACT

Anaerobic biodegradation of food-residues mixed with fruit-waste was carried out at mesophilic conditions. The goal was to model the sensitivity of biogas generation rate to pH, leachate-level and ash-loading main-effects. Two process parameters were analyzed at their centre-points while the third factor set at its low-, mid- and high-level. The simulation results showed that at pH of 5 (low-level), the biogas generation rate was more sensitive to ash-loading than at high-level pH values. The minimum and maximum attainable biogas generation rates due to perturbations in ash-loading were 0.79 and 1.89 mL/min, respectively, representing a sensitivity of 1.10 mL/min. At pH of 7, the sensitivity due to perturbations in ash-loading was 0.59 mL/min, while at pH of 9 the sensitivity due to ash-loading perturbations was much lower, i.e., 0.09 mL/min. It was concluded that the sensitivity of biogas generation rate to changes in ash-loading decreased with increasing pH. Simulation of other process factors was also conducted and results reported.

## Session 5: Biomedical Engineering and Biotechnology (BEB-S)

**Article ID:** 80070

**Title:** Reducing Radiation Dose By Using Pulse X-Ray Apparatus

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#### ABSTRACT

Pulse X-ray diagnostics is capable of reducing the radiation exposure considerably. As for pulse X-ray diagnostic machines, which form pulses with the duration of 0.1  $\mu$ s, using them one can get outstanding results in this area. This fact can be explained by the long period of luminophor per-sistence in intensifying X-ray luminescent screens. In this paper we present

experimental data, comparing radiation doses, measured at pulse X-ray apparatus and apparatus of constant radiation.

**Article ID:** 80102

**Title:** Incorporation of carboplatin in microporous granular calcium phosphate biphasic matrix

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#### ABSTRACT

The HA/ $\beta$ -TCP biphasic bioceramics stand out on researches in different areas of biomedical applications. These bioceramics with microporous microstructures also

stand out in biomedical applications on controlled drug release. This study aimed at the synthesis of the biphasic HA/ $\beta$ -TCP powder, and at the elaboration and characterization of the microporous biphasic HA/ $\beta$ -TCP granular biomaterial. The microporous granular material was elaborated through the process of ceramic powder sieving (200&#181;m &lt; d &lt; 500&#181;m mesh sizes). The granular material was sintered at 1100&#186;C/2h, providing the microporous biphasic granular biomaterial. The drug loading in the biomaterial was performed through the high vacuum method. The results here presented are related to the synthesis method and elaboration of the biphasic biomaterial. The results obtained from the drug loading through the high vacuum method conducted the incorporation of the drug onto the surface and into the microporous granular biomaterial.

**Article ID:** 80038

**Title:** The Prevalence Of Haemoparasitic Infection In Dogs Attending Ecwa Veterinary Clinic, Bukuru, Jos South Local Government Area, Plateau State, Nigeria

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#### ABSTRACT

This study was conducted to investigate the prevalence of haemoparasites of dogs attending ECWA veterinary Clinic, Bukuru, Jos south local government area in Plateau state, Nigeria, and to determine the effective control strategy. From July to September 2011, blood samples of 150 dogs were collected and examined under light microscope. The age, sex and breed of the dogs were also recorded. Wet and unstained blood film shows no motility hence no motile haemoparasite while the Giemsa stained blood smear techniques of both thick and thin film, showed the presence of only *Babesia* spp in 89 (59.3%), while 61 (40.7%) were negative for any haemoparasite.

**Article ID:** 80055

**Title:** In vitro immersion behavior of cold sprayed hydroxyapatite/titanium composite coatings

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#### ABSTRACT

In previous study, dense and homogenous 20wt% HAP/Ti composite coatings were successfully deposited on Ti substrates by cold gas dynamic spray technique. The results revealed that the phase composition of the HAP in the deposit is identical to that of the precursor powder and the bonding strength of the deposit is comparable/better to that of the plasma sprayed HAP. A relatively higher

corrosion current of HAP/Ti composite than that of pure Ti coating in simulated body fluid indicates a good bioactivity for composite coating. In the present study, in vitro immersion test is carried out for various period of time and the formation of apatite layer on surface of composite coating proves the good bioactivity of the composite coating furtherly. The cold sprayed HAP/Ti composite can be anticipated to be a promising load-bearing implant material for biomedical applications.

**Article ID:** 80195

**Title:** Robust Spatial Filters on Three-Class Motor Imagery EEG Data Using Independent Component Analysis

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#### ABSTRACT

Independent Component Analysis(ICA) was often used to separate movement related independent components (MRICs) from Electroencephalogram (EEG) data. However, to obtain robust spatial filters, complex characteristic features, which were manually selected in most cases, have been commonly used. This study proposed a new simple algorithm to extract MRICs automatically, which just utilized the spatial distribution pattern of ICs. The main goal of this study was to show the relationship between spatial filters performance and designing samples. The EEG data, which contains mixed brain states(preparing, motor imagery and rest), was used to design spatial filters. Meanwhile, the single class data was also used to calculate spatial filters to assess whether the MRICs extracted on different class motor imagery spatial filters are similar. Furthermore, the spatial filters constructed on one subject's EEG data were applied to extract the others' MRICs. Finally, the different spatial filters were then applied to single-trial EEG to extract MRICs, and Support Vector Machine (SVM) classifiers were used to discriminate left hand, right-hand and foot imagery movements of BCI Competition IV Dataset 2a, which recorded four motor imagery data of nine subjects. The results suggested that any segment of finite motor imagery EEG samples could be used to design ICA spatial filters, and the extracted MRICs are consistent if the position of electrodes are the same, which confirmed the robustness and practicality of ICA used in the motor imagery Brain Computer Interfaces(MI-BCI) systems.

**Article ID:** 80125

**Title:** Light curable nanocomposite hydrogels from poly- $\gamma$ -glutamic acid as drug delivery system

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## ABSTRACT

**Objective:** The poly- $\gamma$ -glutamic acid (PGA) and biodegradable polymers are more intensively researched area of the material science, because they are compatible, permeable and nontoxic, and they have tissue-like properties [1-3]. These polymeric systems can be used for delivery of antimicrobial drugs and biological active agents or different types of cells [4,5]. The aim of our work was to create light cured hydrophilic polymer gels. This injectable form of nanocomposites can offer more flexibility of dosage and creates the opportunity for the usage of these structures as a drug delivery system. [6, 7]

**Methods:** Transforming the PGA- backbone by methacryloyl pendant groups allows formation of hydrogels for biomedical applications. Using an acceptable photo-initiator this will be polymerizable with blue lights as it is used in the dental practice. In addition the PGA can be modified with diamino compound and in this way nanoparticles were obtained. These nanoparticles can be used as physically bonded filler, or it can be made reactive just as the PGA too. The methacryloyl-group bonded polymer and the nanoparticles were studied with NMR, DLS, and SEM. The biocompatibility of the nanocomposites, and the raw materials were investigated by MTT- and LDH-tests, and the swelling and release characteristic were measured.

**Results:** The success of the crosslinking and the bonding of methacryloyl group are proved by NMR spectra. The nano-sizes of PGA particles were showed by the DLS and the SEM analyses. A novel system can be built using nanoparticles physically or chemically bonded to the matrix. As the LDH-test showed ~ 2% cytotoxicity and MTT test results presented more than 98% for viability, it can be stated that the system and all of the components were not cytotoxic. According to the drug release measurements these new hydrogels were useful drug delivery systems. The swelling ratio was 140-160% after 24 hours, and the application of nanoparticles showed retentive effect for the drug release in the first 48 hours.

**Conclusion:** This is a model system for in situ cured local drug delivery devices for curing periodontal diseases as all of the components are biocompatible and biodegradable. The system can be modified by the crosslinking density of the PGA, but there are nanoparticles for potential controlling of properties. The local controlled release can raise the effectiveness of the drugs, using the minimal applicable dose. This work is supported by TAMOP 4.2.4. A/2-11-1-2012-0001 &#8222;National Excellence Program – Elaborating and operating an inland student and researcher personal support system convergence program, and by the TAMOP-4.2.2.A-11/1/KONV-2012-0036 project. The project was subsidized by the European Union and co-financed by the European Social Fund.

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**Article ID:** 80230

**Title:** Hemodynamic effect of different types of plaques in the left coronary artery models

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## ABSTRACT

**Purpose:** Coronary plaques have been shown to directly affect the blood parameters, however, hemodynamic effect due to various plaque configurations has not been studied. In this study we investigate the hemodynamic effects of various types of plaques in the left coronary artery using computational fluid dynamics.

**Materials and Methods:** Eight types of plaque configurations were simulated and located in various positions in the left main stem, the left anterior descending and left circumflex coronary branches to produce a significant stenosis (&gt;50% lumen narrowing). Hemodynamic effects caused by each type of plaque were analysed and characterised. Computational fluid dynamics was performed to simulate realistic physiological conditions that demonstrate the in vivo cardiac hemodynamics. Blood flow velocity, wall shear stress (WSS) and pressure gradient (PSG) in the left coronary artery were calculated and compared in all plaque configurations during cardiac cycles.

**Results:** Our results showed that the highest velocity and PSG were found in the type of plaque configurations which involved all of the three left coronary branches. Plaques located in the left circumflex branch resulted in highly significant changes of the

velocity, WSS and PSG ( $p < 0.001$ ) when compared to the other types of plaque configurations. Conclusion: Our analysis of the hemodynamic effects of different types of plaques provides an insight into the distribution of plaque at the left coronary artery, and corresponding hemodynamic effects, thus, improving our understanding of atherosclerosis.

**Article ID:** 80062

**Title:** The new bone cement based on magnesium phosphate and  $\alpha$ TCP

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### ABSTRACT

Bone cements based on calcium and magnesium phosphates are very interesting new implant materials which can be used as the bone fillers. Due to their properties combining the advantages of both components like fast resorption in the body (brushite cement) and high mechanical strength (struvite cement), these biomaterials may provide an alternative solution to the order generation calcium phosphate cements. The aim of this study was to obtain and evaluate the new brushite-struvite bone cement formed as a result of the reaction between tricalcium phosphate ( $\alpha$ TCP), magnesium phosphate and ammonium dihydrogen phosphate. As the liquid phases: distilled water, 0.5% methylcellulose solution and 1% sodium alginate solution were used. The optimal liquid to powder ratio and initial and final setting time were examined. After setting and hardening the phase composition, open porosity, microstructure, mechanical strength and chemical stability were determined. The physicochemical properties of obtained material were influenced by the type of liquid phase used in the cement pastes preparation. The high chemical stability and bioactivity were confirmed. Initial (I) and final (F) setting times of our material depended on the kind of applied liquid phase and differed in the range of 6 min (I) and 29 min (F). A sodium alginate solution slightly shortened the setting time. XRD analysis revealed the presence of two dominant phases, namely brushite (from 57 to 68 % wt.) and struvite (from 21 to 39 % wt.) and small amount of hydroxyapatite (up to 6 % wt.). The percentage of brushite and struvite phases in the samples depended both on the type of liquid phase as well as the time after setting and hardening. Open porosity of the studied material was in the range from 34.8 to 37.0%. Developed cement was characterized by a monomodal pore size distribution in the range of 0.1 to 0.4  $\mu$ m. After incubation in SBF solution formation of apatite layer on the sample surfaces was observed what indicates the bioactive character of the new bone filler. The compressive strength of obtained material was in the range from 10 to 16 MPa. The new

bone cement based on tricalcium phosphate ( $\alpha$ TCP), magnesium phosphate, ammonium dihydrogen phosphate and the 1% solution of sodium alginate is very interesting implant material for bone substitution. Its final evaluation will be possible after further studies, including biological tests.

**Article ID:** 80247

**Title:** Converging parallel plate flow chambers for studies on the effect of the spatial gradient of wall shear stress on endothelial cells

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### ABSTRACT

Many in vitro studies focus on effects of wall shear stress (WSS) and wall shear stress gradient (WSSG) on endothelial cells, which are linked to the initiation and progression of atherosclerosis in the arterial system. Limitation in available flow chambers with a constant WSSG in the testing region makes it difficult to quantify cellular responses to WSSG. The current study proposes and characterizes a type of converging parallel plate flow chamber (PPFC) featuring a constant gradient of WSS. A simple formula was derived for the curvature of side walls, which relates WSSG to flow rate (Q), height of the PPFC (h), length of the convergent section (L), its widths at the entrance ( $w_0$ ) and exit ( $w_1$ ). CFD simulation of flow in the chamber is carried out. Constant WSSG is observed in most regions of the top and bottom plates except those in close proximity of side walls. A change in Q or h induces equally proportional changes in WSS and WSSG whereas an alteration in the ratio between  $w_0$  and  $w_1$  results in a more significant change in WSSG than that in WSS. The current design makes possible an easy quantification of WSSG on endothelial cells in the flow chamber.

**Article ID:** 80260

**Title:** Influence of synthesis parameters on the structure, pore morphology and bioactivity of a new mesoporous glass

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### ABSTRACT

The main objective of the present work was to investigate the effect of surfactant type and synthesis temperature on the structure, porosity and the bioactivity of 92S6 (92% SiO<sub>2</sub>, 6% CaO, and 2% P<sub>2</sub>O<sub>5</sub> mol %) mesoporous sol-gel glasses. The aim was to provide a basis for controlling the bioactive behavior of the different 92S6 samples used for tissue regeneration and for biomedical engineering in order to obtain sufficient performances by

controlling the porosity of the glass. In this work, a series of mesoporous bioactive glasses were synthesized using three different surfactants (C<sub>10</sub>H<sub>20</sub>BrN, C<sub>19</sub>H<sub>42</sub>BrN, C<sub>22</sub>H<sub>48</sub>BrN) at different aging temperatures (20°C, 40°C and 60°C). The surfactant was removed by calcination, which was carried out by increasing the temperature to 650°C for 6h. A comparison among these synthesized glasses was conducted and the research emphasis was placed on the synthesis temperature and the surfactant type dependence on the textural properties and particularly porosity that were ultimately responsible for glass bioactivity. The structure and the morphology of synthesized glasses were studied by means of Wide Angle X-ray powder Diffraction (WAXRD), analysis of nitrogen adsorption/desorption isotherms, and by Scanning Electronic Microscopy (SEM). Bioactivity of glasses was investigated, in vitro, by soaking them for prolonged times in simulated body fluid and the resulting solutions were analyzed by Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES).

**Article ID:** 80209

**Title:** A surface plasmon resonance biosensor utilizing parabolic mirrors for a large dynamic range

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#### ABSTRACT

surface plasmon resonance (SPR) biosensor utilizing a pair of off-axis parabolic mirrors was employed to construct as a universal platform with a dynamic range covering from air to a water solution. Utilization of parabolic mirrors ensures that the incident angle of the

excitation light beam can scan over a large range while the light source and the interrogation system do not move with the tuning incident angle. Thus this platform can equip a complicated interrogation method requiring a precise optical alignment for high sensitivity without scarifying a large dynamic range. High sensitivity test of molecular binding under different solvents is thus possible. Angular inter-rogation and intensity interrogation were demonstrated in this system. The range of the incident angle is solely limited by the covering range of parabolic mirrors. The system can be easily integrated into a microscopy platform for further investigation of a detected target in micro scale.

**Article ID:** 80091

**Title:** Creep-Recovery and Relaxation Behavior of High Density Polyethylene/ Hydroxyapatite Nano Particles for Bone Substitutes: Effects of Gamma Radiation

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#### ABSTRACT

It is known that gamma radiation is used for sterilizing most of the medical products that made of plastics, because it decomposes the DNA molecules of living organisms. The material has usually been irradiated between 25 and 70kGy. The present study is intended to (1) fabricating of homogenous HDPE / HA nano-composite, and (2) studying the effects of HA nano particles percentage and gamma irradiation dose on hardness and creep-relaxation behavior of the HDPE/HA nano-composite. Main findings are the hardness increases with increasing the HA nano particles contents and with irradiation dose. Creep resistance increases significantly due to the addition of HA and due to aging.

## Session 6: Applied Mathematics (AEM-S)

**Article ID:** 80169

**Title:** Random Integral Equation of the Volterra Type with Applications

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#### ABSTRACT

In this Paper we shall investigate some of the most general results concerning random integral equations of the Volterra type. Some results of Tsokos [4] are given for the random integral equation . Using the theoretical techniques of probabilistic functional analysis we prove the existence and uniqueness of random integral equations of the Volterra type . Some applications of Eq (1.1) will be presented in the areas of telephone traffic theory. And a generalization of the classical poincare&#amp;#65533;Lyapunov theorem

**Article ID:** 80008

**Title:** Remarks on the Harnak inequality for local-minima of scalar integral functionals with general growth conditions

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#### ABSTRACT

In this paper we proof a Harnack inequality and a regularity theorem for local-minima of scalar integral functionals with general growth conditions.

**Article ID:** 80096

**Title:** Limiting Behavior of MHD Flow with Hall Current,



due to a Porous Stretching Sheet

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#### ABSTRACT

An electrically conducting fluid is driven by a stretching sheet, in the presence of a magnetic field that is strong enough to produce significant Hall current. The sheet is porous, allowing mass transfer through suction or injection. The limiting behavior of the flow is studied, as the magnetic field strength grows indefinitely. The flow variables are properly scaled, and uniformly valid asymptotic expansions of the velocity components are obtained through parameter straining. The leading order approximations show sinusoidal behavior that is decaying exponentially, as we move away from the surface. The two-term expansions of the surface shear stress components, as well as the far field inflow speed, compare well with the corresponding finite difference solutions; even at moderate magnetic fields.

**Article ID:** 80101

**Title:** Parameter identifiability and parameter estimation of a diesel engine combustion model

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#### ABSTRACT

In this paper an original method based on the link between a piecewise identifiability analysis and a piecewise numerical estimation is presented for estimating parameters of a phenomenological diesel engine combustion model. This model is used for design, validation and pre-tuning of engine control laws. A cascade algebro-differential elimination method is used for studying identifiability. This investigation is done by using input-output-parameter relationship. Then these relations are transformed by using iterated integration. They are combined with an original numerical derivative estimation based on distribution theory which gives explicit point-wise derivative estimation formulas for each given order. Then new approximate relations, linking block of parameters and outputs (without derivative) are obtained. These relations are linear relatively to the blocks of parameters and yield a first estimation of parameters which is used as initial guess for a local optimization method (least square method and a local search genetic algorithm.)

**Article ID:** 80176

**Title:** Framework of Penrose Transforms on DP-Modules to the Electromagnetic Carpet of the Space-Time from the Moduli Stacks Perspective

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#### ABSTRACT

Considering the different versions of the Penrose transform on modules and their applications to different levels of modules in coherent sheaves, we obtain a geometrical re-construction of the electrodynamical carpet of the space-time, which is a direct consequence of the equivalence between the moduli spaces that have been demonstrated in a before work. In this case, the equivalence is given by the Penrose transform on the quasi-coherent modules given by the generalized Verma modules diagram established in the Recillas conjecture to the group and consigned in the modules on which have been obtained solutions in field theory of electromagnetic type.

**Article ID:** 80194

**Title:** The Asymptotic Eigenvalues of First-Order Spectral Differentiation Matrices

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#### ABSTRACT

We complete and extend the asymptotic analysis of the spectrum of Jacobi Tau approximations that were first considered by Dubiner. The asymptotic formulas for Jacobi polynomials  $P_N^{(\alpha, \beta)}$ ,  $\alpha, \beta \geq -1$  are derived and confirmed by numerical approximations. More accurate results for the slowest decaying mode are obtained. We explain where the large negative eigenvalues come from. Furthermore, we show that a large negative eigenvalue of order  $N^2$  appears for  $-1 < \alpha < 0$ ; there are no large negative eigenvalues for collocations at Gauss-Lobatto points. The asymptotic results indicate unstable eigenvalues for  $\alpha > 1$ . The eigenvalues for Legendre polynomials are directly related to the roots of the spherical Bessel and Hankel functions that are involved in solving Helmholtz equation in spherical coordinates.

**Article ID:** 80128

**Title:** Iterative Construction of Common Fixed Point of Quasi-Nonexpansive Mappings in a Convex Metric Space

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#### ABSTRACT

The Banach contraction principle asserts that a contraction on a complete metric space has a unique fixed point and its proof hinges on "Picard iterations". This principle is applicable to a variety of subjects such as integral equations, partial differential equations and engineering of image processing. This

principle fails for nonexpansive mappings even on a Banach space. Mann [Mean value methods in iterations, Proc. Amer. Math. Soc. 4 (1953), 506-510] introduced an iterative scheme to approximate fixed points of a nonexpansive mapping on a Banach space. This scheme breaks down for pseudocontractive mappings on a Hilbert space. Consequently, Ishikawa [Fixed points by a new iteration method, Proc. Amer. Math. Soc., 44 (1974), 147-150] upgraded Mann iterative scheme. Our aim is to study strong convergence of a new iterative scheme, containing Ishikawa iterative scheme, for quasi-nonexpansive mappings on a uniformly convex metric space introduced by Takahashi [A convexity in metric spaces and nonexpansive mappings, Kodai. Math. Sem. Rep., 22(1970), 142-149]. The results established in this paper, in particular, hold for uniformly convex Banach spaces and CAT(0) spaces, simultaneously

**Article ID:** 80067

**Title:** Eigenpairs of a Sylvester-Kac type matrix and a general stochastic model for deposition and evaporation of particles

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#### ABSTRACT

A general random sequential model for deposition and evaporation on discrete cells of a finite lattice of any dimension leads to a matrix equation involving a Sylvester-Kac type matrix. Based on several combinatorial techniques, the eigenvalues and eigenvectors of the general matrix are determined for an arbitrary number of cells. These new mathematical results are used to find an exact solution for the time-dependent particle density for initial conditions relevant to the experimental technique of ionic self-assembly of nanoparticles. The usefulness and the limitations of this model are discussed by comparing it to both Monte Carlo simulations and experimental results.

**Article ID:** 80196

**Title:** Is there Chaos In Inflation Data?

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#### ABSTRACT

Economic indicators are snippets of financial and economic data published regularly by governmental agencies and the private sector. An exchange rate represents the value of one currency in another and it fluctuates over time. ForEx rates are affected by many highly correlated economic, political and even psychological factors. It was observed that changes in the exchange rate are related to news in the fundamentals

which covers In&#64258;ation for the country concerned. In a series of work, we investigated and confirmed the chaotic property of ForEx Rates of several countries. In this perspective, we concentrate on nonlinear data analysis of inflation data of nine countries. We find existence of chaos in inflation data for some countries.

**Article ID:** 80225

**Title:** Bifurcation and chaos in delayed cellular neural network model

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#### ABSTRACT

This paper deals with control of chaotic behavior of a delayed Cellular Neural Network (DCNN) model which is a one-dimensional regular array of four cells with continuous activation function. We investigate different dynamical behaviors including limit cycle, torus, and chaos for different range of weight parameters of the system. Regarding synaptic weight as parameter, Hopf bifurcations are obtained in the system without delay. In the delayed model condition for the Global asymptotic stability of the equilibrium point is presented. Numerical simulation and results are given to show the role of delay in chaos control of the CNNs.

**Article ID:** 80206

**Title:** The traffic flow model for road networks

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#### ABSTRACT

The traffic flow can be analyzed by different ways in depends of the personal preference relations. We restrict our discussion by "second-order" non-equilibrium continuum models because of the hyperbolic properties and the best compatibility for traffic jams modeling. It should be mentioned that the synchronized flow and the wide moving jams traveling through the bottleneck is considered to be the most difficult for modeling. Preferring the continuum macroscopic approach allows us to use all advantages enclosed.

**Article ID:** 80180

**Title:** Globally Convergent methods for inverse problems in Diffuse Optical Tomography and its applications

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#### ABSTRACT

In this talk, we present both theory and experimental applications of a numerical Globally Convergent Method (GCM) for an inverse problem in Diffuse Optical Tomography. The method is for an inverse problem for an elliptic partial differential equation with an unknown potential, an important problem at the core of Near-Infrared laser imaging technology for cancer and stroke detections. The GCM reconstruction method fundamentally differs from other current methods based on the Newton's method or optimization scheme. GCM does not require a relative precise first guess and hence it is capable in dealing with complex media and realistic geometry for biomedical applications. Several sets of boundary data measurements are generated by placing the light source at several designated locations. Mathematically, a global convergence theorem assures the success of the numerical reconstruction method. Then we use this method in experiments of an optical phantom emulating rat brain suffering a stroke. We present the experimental setup of optical measurements and report accurate images and their physical parameters of hidden interior objects inside an optical phantom, which are reconstructed based on light intensity data collected on the object's surface.

**Article ID:** 80190

**Title:** Mode Stresses for the Interaction Between Straight and Curved Cracks Problem in Plane Elasticity

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#### ABSTRACT

In this paper, the complex variable function method is used to obtain the hypersingular integral equations for the inter-action between straight and curved cracks problem in plane elasticity. The curved length coordinate method and suitable quadrature rule are used to solve the integrals for the unknown function, which are later used to evaluate the stress intensity factor, SIF. Three types of stress modes are presented for the numerical results.

**Article ID:** 80126

**Title:** Common Fixed Point Iterations of Generalized Asymptotically Quasi-Nonexpansive Mappings in Hyperbolic Spaces

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#### ABSTRACT

We introduce a general iterative method to approximate common fixed points of a finite family of generalized asymptotically quasi-nonexpansive mappings in a hyperbolic space. The new iterative method includes multi-step iterative method of Khan et al. [Common fixed points Noor iteration for a finite family of asymptotically quasi-nonexpansive mappings in Banach space, J. Math. Anal. Appl. 341(2008), 1-11] as a special case. Our results are new in hyperbolic space and generalize many known results in Banach spaces and CAT(0) spaces simultaneously.

**Article ID:** 80151

**Title:** Crop water Requirements in Egypt Using Remote Sensing Techniques

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#### ABSTRACT

The common Soil in Egypt is clay soil so common irrigation system is tradition surface irrigation with 60% irrigation efficiency. The area of cultivated land is 3277311 ha. Agricultural sector consumes more than 80% of water resources under surface irrigation (tradition methods). In arid and semi-arid regions consumptive use is the best index for irrigation requirements. A large part of the irrigation water applied to farm land is consumed by Evapotranspiration (ET). Irrigation water consumption under each of the physical and climatic conditions for large scale will be easier with remote sensing techniques. In Egypt, Agricultural cycle is often tow agricultural seasons yearly; summer and winter. Common summer crops are Maize, Rice and Cotton while common winter crops are Clover and Wheat. 16 day MODIS Normalized Deference Vegetation Index (NDVI) used to detect the period of winter and summer season. Landsat8 data and Monthly MODIS actual evapotranspiration (ETa) data were used to estimate actual quantity of water consumed by Agricultural sector in Egypt. The results of ETa\_MODIS will be compared with the results of ETa\_landsat8. The main objective of this paper is studying the actual Evapotranspiration in Egypt using remote sensing techniques..

## Session 7: Material Sciences and Technology 2 (MST-S)

**Article ID:** 50217

**Title:** Effect of process on the dielectric properties of BaTiO<sub>3</sub>-based X9R ceramics

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#### ABSTRACT

The effect of milling time and sintering process on the dielectric properties of BaTiO<sub>3</sub>-based X9R ceramics was

investigated. The characterization of the raw powders and the sintered ceramic was carried out by X-ray diffraction and scanning electron microscopy. The particle size distribution of the mixed powders was examined by Laser Particle Size Analyzer. The results shown that with the milling time extended, the Cruie Peak was depressed, or even disappeared. Moreover, with the rise of sintering temperature, the dielectric constant of the ceramics increased and the dielectric loss decreased gradually. Eventually, by milling for 11h and sintering at 1090°C for 2h, good dielectric properties were obtained, which were  $\epsilon_{25}^{\circ}\text{C} \geq 2526$ ,  $\epsilon_r/\epsilon_{25}^{\circ}\text{C} \leq 177$ ; 12% (-55~200°C),  $\tan\delta \leq 1.12\%$  (25°C).

**Article ID:** 50221

**Title:** Low temperature sintering of lead-free BaTiO<sub>3</sub>-based X9R ceramics with Bi<sub>2</sub>O<sub>3</sub> dopant and assisted by LiF-CaF<sub>2</sub> Flux Agent

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#### ABSTRACT

The sintering temperature of BaTiO<sub>3</sub> powder was reduced to 950°C due to the Bi<sub>2</sub>O<sub>3</sub>-LiF-CaF<sub>2</sub> addition. Excellent densification was achieved after sintering at 950°C for 10h. The low sintering temperature of newly developed capacitor materials allows a co-firing with pure silver electrodes. The dielectric constant and the temperature stability of the dielectric constant satisfied the X9R standard, which dielectric properties of were  $\epsilon_{25}^{\circ}\text{C} \geq 1115$ ,  $\Delta C/C_{25}^{\circ}\text{C} \leq 177$ ; 12% (-55~200°C),  $\tan\delta \leq 1.5\%$  (25°C).

**Article ID:** 50204

**Title:** Experimental study on axial tensile strength of low volume fraction of ternary hybrid fiber reinforced concrete

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#### ABSTRACT

In this paper, according to the national standard and testing methods, the direct tension strength, splitting tensile strength and cubic compressive strength test were carried out for 8 different groups of hybrid fiber (containing steel fiber, macro-polypropylene fiber and dura fiber) reinforced HPC specimens. The results showed that when the volume proportion of ternary hybrid fiber was less than 1%, there was not obvious influence for the concrete compressive strength, but the splitting tensile strength increased by 26% ~ 69%; the ratio between splitting tensile strength and compressive strength for HFRC increased to 1/12~1/9. When added 0.7% steel

fiber, 0.19% macro-polypropylene fiber and 0.11% dura fiber, the confounding effect was the best. Based on the advantages and disadvantages of tensile splitting strength and direct tensile strength test and the results of tests, the concept of equivalent tensile strength and calculative formula was put forward.

**Article ID:** 50001

**Title:** High efficient photoreduction CO<sub>2</sub> with H<sub>2</sub>O on metal Cu-modified graphitic ordered mesoporous carbon supported TiO<sub>2</sub> catalysts under simulated solar

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#### ABSTRACT

Cu-modified graphitic ordered mesoporous carbon supported TiO<sub>2</sub> catalyst was synthesized based on a hard template method. X-ray diffraction, nitrogen adsorption-desorption, scanning electron microscopy and transmission electron microscopy analysis techniques were used to characterize the sample. It was observed that copper and anatase TiO<sub>2</sub> nanoparticles were well dispersed in the Cu-modified mesoporous graphitic carbon, and the resulting composite with ordered mesostructure and high specific surface area exhibited an exceptionally high activity in the photocatalytic reduction of CO<sub>2</sub> with H<sub>2</sub>O under simulated solar irradiation.

**Article ID:** 50014

**Title:** Electrochemical Corrosion Behavior of Different Graphite shapes Cast Irons in Acidic Solution

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#### ABSTRACT

The effect of graphite shapes on the electrochemical corrosion behavior of cast iron was studied by means of weight loss tests, electrochemical measurements and electron microscopy. It was found that the electrochemical corrosion behavior of graphite is significantly different from one other, and the corrosive potential difference between carbide and the matrix is the main driving force of the different phase corruptions. Among them, the center A type and edge D type graphite exhibited the highest corrosion resistance. The corrosion of white iron is worst, because there are so many type carbides in white iron and so there is an obvious tendency to produce micro-cell in white iron.

**Article ID:** 50015

**Title:** Facile Preparation and Growth Mechanism of Newly Shaped Gold Nanoplates

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#### ABSTRACT

When sticky gel of aqueous HAuCl<sub>4</sub> solution mixed with surfactant poly(vinylpyrrolidone) (PVP) was kept at room temperature (about 30 °C), HAuCl<sub>4</sub> can be reduced by surfactant PVP, resulting in the formation of nanostructures. In this study, gold nanoplates with new-type shapes, characterized by single-crystalline in nature, several micrometers in lateral size, and tens of nanometers in thickness, were mass-synthesized through adjusting the crystal growth conditions. For example, through inducing temperature decrease in the early stage of crystal growth, the product is dominated by star-like gold nanoplates, together with some other new shapes, such as shield-like, concave and convex triangle, corner-snipping, triple-branched, and step-rich in side plane. Based on theoretical calculation, we present the growth mechanism of the new-type Au nanoplates. Under a certain growth condition, the (111) plane of gold crystal can grow not only along  $\langle 110 \rangle$  direction into regular triangle or hexagonal nanoplates, but also along other directions, such as  $\langle 211 \rangle$  and  $\langle 321 \rangle$ , into new-type nanoplates with high-index side surfaces.

**Article ID:** 50013

**Title:** Time-dependent Density Functional Simulation of the Interaction of Matter and Electromagnetic Fields

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#### ABSTRACT

We will present our study of electron and nuclear dynamics induced by strong laser pulses in the framework of the time-dependent density functional theory in real-time and real-space. Several prototypical examples will be used to highlight the correlated electron and nuclear dynamics in strong fields, including Coulomb explosion of clusters, laser-enhanced field emission from nanostructures, and laser-assisted desorption of hydrogen from surfaces of silicon clusters and graphene flakes. Our simulations of the Coulomb explosion of hydrocarbon molecules (see the figure) show that the dissociation is a sudden, all-at-once, “concerted” fragmentation where the ionization step is followed by an explosive ejection of the charged fragments. The study of the dynamics of hydrogen desorption from H-terminated silicon surface clusters demonstrates that by choosing an appropriate frequency and intensity of the laser it is possible to remove the hydrogen layer from the surface without destroying the structure of underlying silicon. The possibility of creation of short electron pulses by laser illumination of nanostructures will also be discussed

**Article ID:** 50018

**Title:** A fluorescence quenching Study for the interaction of 2,6-bis(5-(p-methylphenyl)-1-H-pyrazol-3-yl)pyridine with Zn<sup>2+</sup> ion

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#### ABSTRACT

The synthesis of a novel bispyrazole derivative 2,6-bis(5-(p-methylphenyl)-1-H-pyrazol-3-yl)pyridine (BMPP) was described and its structure was confirmed by <sup>1</sup>H NMR, FTIR, MS techniques and elemental analysis. The interactions of Zn<sup>2+</sup> ion with BMPP were assessed by fluorescence quenching techniques. The results revealed that the quenching effect is resulting from the formation of Zn<sup>2+</sup>-BMPP nonfluorescent complex. The Stern–Volmer curves suggested that the quenching effect was the static quenching. The main action forces of these reactions was spontaneous, mainly hydrogen bonds and  $\Delta S$ -driven obtained by using thermodynamic equations.

**Article ID:** 50067

**Title:** Formation and properties of nitrogen rich Ca-Si-(Al)-O-N glasses and Ceramics

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#### ABSTRACT

Oxynitride glasses are a branch of high performance glasses, obtained by incorporation of nitrogen atoms into oxide glass network. It has been widely established that the incorporation of a relatively small amount of nitrogen leads to a significant change of the glass network, and therefore to a strong change of the properties. Oxynitride glasses and ceramics have traditionally been synthesized by melting mixtures of glass modifier metal oxides, SiO<sub>2</sub> and Si<sub>3</sub>N<sub>4</sub>, yielding glasses with nitrogen content up to typically ca. 25 e/o. However, a novel synthesis method (developed by our group), in which the modifier is introduced as a pure metal (for glass) or metal hydride (in case of ceramics) has enabled the preparation of oxynitride glasses and ceramics with significantly higher concentrations of nitrogen up to 60 e/o as well as modifier additives up to 45 e/o. The obtained glasses are found to be homogenous, translucent gray to opaque black. Compared with their oxide glass counterparts, Ca-Si-O-N glasses show high values of glass transition temperature (1050°C), microhardness (10.50 GPa), Young's modulus (151 GPa) and refractive index (1.93). Similarly, the obtained Ca- $\alpha$ -SiAlON ceramics demonstrate a combination of both high hardness (> 21 GPa) and high fracture toughness (> 5.5 MPa·m<sup>1/2</sup>). **Keywords:**

Oxynitride glass; Ca-SiAlON ceramics, glass forming region; high nitrogen content; glass transition temperature; hardness; refractive index.

**Article ID:** 50077

**Title:** Induction Heating And Cell Viability Studies Of Polyol Synthesized Superparamagnetic ZnFe<sub>2</sub>O<sub>4</sub> Nanoparticles For Cancer Hyperthermia Applications

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#### ABSTRACT

Superparamagnetic ZnFe<sub>2</sub>O<sub>4</sub> nanoparticles were synthesized by polyol reflux method with simplicity and time efficiency. The structural, morphological, magnetic and induction heating properties of synthesized ZnFe<sub>2</sub>O<sub>4</sub> nanoparticles have been investigated for application in magnetic particle hyperthermia. The as synthesized MNPs show superparamagnetism with minor coercivity of 67.3 Oe and 41.06 emu/g magnetization. The synthesized MNPs exhibited SAR value of magnitude 42.26 W/g. The MNPs have been also studied for its cell viability using Adenocarcinoma Lung Cancer Cell lines A549. This study shows low toxicity of MNPs on these cell lines proved their suitability for cancer hyperthermia as well as adjuvant studies of hyperthermia.

**Article ID:** 50112

**Title:** Eco-Friendly Synthesis Of Catalysts Using Flash Light Irradiation For A Direct Methanol Fuel Cell

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#### ABSTRACT

The electrochemical performance of pure platinum and Platinum-Ruthenium alloy nanoparticle catalysts fabricated by a combination method with sol-gel and flash light irradiation are investigated. Pt100 and Pt50-Ru50 alloy nanoparticles are decorated onto multi-walled carbon nanotubes (MWCNTs) followed by flash light irradiation to enhance the surface area. The fabricated pure Pt and Pt-Ru alloy nanoparticles/MWCNTs were characterized by X-ray diffraction and scanning electron microscopy. In order to evaluate the electro-catalytic activities for hydrogen characteristics and methanol oxidation, cyclic voltammetry studies was conducted. As the results, it is determined that the Pt50-Ru50/MWCNT catalyst has higher activity and stability with regard to methanol electro-oxidation than the Pt100/MWCNT.

**Article ID:** 50114

**Title:** The Effect Of Poly (N-Vinylpyrrolidone) (PVP)

Molecular Weight On Flash Light Sintering Of Copper Nanoink

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#### ABSTRACT

In this study, the effect of poly (N-vinylpyrrolidone) (PVP) molecular weight on flash light sintering of copper nanoink was investigated. The copper nanofilms were printed on the polyimide substrates using doctor blade methods. PVP was used as reducing agent of copper nanoinks for flash light sintering. Some flash light irradiation conditions (pulse numbers, on-time and off-time durations) and amounts of PVP are fixed. The effects of irradiation energy on the flash light sintering process and PVP molecular weight were investigated. To analyze the microstructures of the sintered copper nanofilms, scanning electron microscopy and x-ray diffraction was performed. The sheet resistance of the sintered copper nanofilms was measured using a four-point probe method. From this work, it was found that the flash light sintered copper nanofilms have the sheet resistance of 54 m<sup>2</sup>/sq without any damages to the substrate.

**Article ID:** 50116

**Title:** Highly Conductive Copper Precursor/Nanoparticle Pattern with Low Porosity via Flash Light Sintering for Printed Electronics

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#### ABSTRACT

In this work, the fabrication and flash light sintering process for hybrid copper nano-inks was studied. The hybrid copper nano ink was made of various copper precursors (e.g. copper (II) chlorid, copper (II) nitrate trihydrate, copper (II) sulfate pentahydrate and copper (II) trifluoroacetylacetonate) and copper nano particles. The effects of each copper precursor and the effect of weight fraction of copper precursor in hybrid copper nano ink on the flash light sintering process were investigated. The printed hybrid copper nano-ink was sintered at room temperature and under ambient conditions using an in-house flash light sintering system under various light conditions (light energy and on-time). The surface of the sintered hybrid copper film was analyzed using a scanning electron microscope (SEM). To investigate effect of copper precursor a crystal phase analysis using X-ray diffraction (XRD) were performed. In addition, the sheet resistance of hybrid copper film was measured by a four point probe method. The measured sheet resistance of hybrid copper film (19 m<sup>2</sup>/sq) was similar to the sheet resistance of bulk copper (1.68 m<sup>2</sup>/sq, thickness: 10 μm).

**Article ID:** 50180

**Title:** The Change Of Processing Maps In Hot Compression Procession For Ti-6.0Al-7.0Nb Biomedical Titanium Alloy

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#### ABSTRACT

Isothermal compression tests were carried out on Ti-6.0Al-7.0Nb biomedical titanium alloy at the temperatures of 750–900°C (all below  $\beta$  phase transition temperature about 1010 °C ) and strain rates of 0.001–1.0s<sup>-1</sup>. The processing maps were constructed to evaluate the efficiency of power dissipation ( $\eta$ ) and recognize the flow instability regimes. True strain takes great effect on the efficiency of power dissipation  $\eta$  under the different temperatures and strain rates. The value of power dissipation  $\eta$  increases from 0.1 to 0.7 in most areas. When the strain is 0.9, the value of power dissipation  $\eta$  in most regimes is from 30% to 40%. There are two instability regimes respectively located around 780 °C /1.0s<sup>-1</sup> and 860-900 °C /0.001-0.01s<sup>-1</sup> when the strains are below 0.5. One of the instability regimes disappears when the strains are 0.5-0.7. When the strain is 0.9, there are still two instability regimes. The “safe” regime located around 780-840°C/0.1-0.01s<sup>-1</sup>, and hot deformation can be carried out in this area.

**Article ID:** 50188

**Title:** Statistical Analysis of Pit Dimensions for Pre-corroded AA 7075-T6

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#### ABSTRACT

Aluminum alloy 7075-T6 specimens were corroded in 3.5% NaCl solution for 120 hours and 240 hours, respectively. Morphology and dimensions of corrosion pits on specimen surface were inspected with Sensofar PLμ confocal imaging profiler. Statistical analysis shows that pit dimensions can be fitted well with log-normal and Gumbel distribution. After surface inspections, we performed high-cycle fatigue tests for the specimens. Fracture analysis shows that fatigue cracks initiate from single pit or two adjacent pits, and the crack-initiation pit shape and dimensions were examined with SEM. It is found that initiation pit dimensions can be well described with the log-normal distribution. Additionally, initiation pit dimensions are significantly larger than those measured on specimen surface before fatigue tests.

**Article ID:** 50215

**Title:** Flexural toughness of hybrid fiber reinforced

concrete under notched beam three-point bending

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#### ABSTRACT

In order to focus on hybrid fiber reinforced concrete flexural toughness, mixed 0.7% steel fiber/0.3% modified polypropylene fiber reinforced concrete, mixed 0.89% steel fiber/0.11% Dura&#160;fiber reinforced concrete were chosen to perform flexural toughness test. The test method is giving a central point load to the notched beam specimens (H\*B\*L1:150mm\*150mm\*550mm, h1\*B1:2mm\*25mm) with a 0.2 mm/min loading rate. The load we carry out should not stop until the mid span deflection is more than 3mm. Based on calculating the contribution of the fiber to the energy absorption value Dcr when the concrete cracking, the contribution of the fiber to the energy absorption value D1f when mid-span deflection is  $\delta_1$ , the contribution of the fiber to the energy absorption value D2f when mid-span deflection is  $\delta_2$  and the equivalent flexural tensile strength feq1, feq2, the effect of the way use to hybrid fiber on the flexural toughness of concrete were investigated. The results shows that the hybrid fiber can significantly improve the flexural toughness of concrete, have favorable deformability and the ability to control crack. The result of 0.7% steel fiber/0.3% modified polypropylene fiber reinforced concrete is shown: Dcr=2185 N&#8226;mm, D1f=7634.26 N&#8226;mm, D2f=2198.67 N&#8226;mm, feq1=4.89 MPa, feq2=2.83 MPa, hence it shows the positive enhancement effect of hybrid fiber and flexural toughness increase significantly.

**Article ID:** 50216

**Title:** Utilisation of Magnetic Intelligent Material for Rotor Systems Control

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#### ABSTRACT

The Authors present an idea of MSM actuator and MR damper usage as a multifunctional material device for control, altering, reducing and tuning of forced vibration responses of a rotor system.

**Article ID:** 50228

**Title:** Spiropyran Conjugated Biomaterials as Colorimetric detector

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## ABSTRACT

Spiropyrans are demandable photochromic compounds, which can easily be interconverted between ring-closed colorless spiropyran (SP) and colored ring-opened merocyanine (MC) form.[1] Upon UV light irradiation, colorless SP forms show facile ringopening reaction, resulting in colored MC form.[1,2] Due to photochromic behavior, if spiropyran is conjugated to a polymer that can be used as a drug carrier, then it is possible to figure out the position of the carrier via imaging. First we designed thermo- and photodual responsive behavior of biocompatible SP-PL micelles after successful conjugation of spiropyran onto Pluronic backbone as fluorescent biomaterial. Also we synthesized spiropyran conjugated hyaluronic acid (HA-SP). The next mixed grapheme oxide (GO). Functionalization was performed by HA-SP, where HA serves as the target molecule and spiropyran constructs the whole composition as fluorescent material. Final we synthesized spiropyran conjugated polyethylene glycol(PEG). This fluorescent biomaterial coated PS bead. This fluorescent biomaterials are clearly indicates that there is no fluorescence of SP form in the cell. But after illumination, these cells with UV light for 2s, a strong red fluorescence was observed. This indicates the formation of ring-open MC form from SP form. Also indicate the cellular uptake of the developed fluorescent biomaterials by the cell where fluorescent biomaterials are seen to present within the cytoplasm. Therefore, our exploitation fluorescent biomaterial can be a novel applicant as a fluorescent probe to identify the cancer cell along with a potential biocompatibility.

**Article ID:** 50244

**Title:** Multifunctional glazes by using nanotechnology

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## ABSTRACT

Glazed tiles were studied to exploit new and unusual properties in a multifunctional way (all in one) by using nanotechnology. Our study was founded in the formation mechanism of ancient lusters from copper added to glazes sintered in reducing conditions. These aspects were translated to industrial furnaces in the production of stoneware: air atmosphere and temperature at 1200 oC. In order to obtain the unusual effect on glazes dispersed nanoparticles of copper were added to the glaze composition and both the amount and the particle size of copper as a function of the glaze layer thickness were taken into account. The samples were characterized by XANES, RBS and Confocal Raman Spectroscopy to obtain chemical analysis with high spatial resolution. The study by SEM and AFM was also performed in order to correlate the structure with a cellular type micro-nanostructure. Samples with different optical effects, as bright metallic effect, were obtained depending on the thickness of the glaze layer due to dissolution and precipitation processes of copper into the glassy matrix. A copper-gradient towards the surface of the samples produced the appearance of the Benard currents mechanism that was found as the origin of a surface cellular microstructure. Copper at the surface forms a microstructure and in turn, a nanostructure is also presented. The combination of both structures is responsible of the optical effects and the hydrophobic properties observed in these inorganic coatings. The presence of copper in the sample provides bactericide properties

## Session 8: Advances in Physics (CAP-S)

**Article ID:** 80086

**Title:** Experimental tests on the lifetime asymmetry

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## ABSTRACT

The experimental test problem of the left-right polarization-dependent lifetime asymmetry is discussed. It shows that the existing experiments cannot demonstrate the lifetime asymmetry to be right or wrong after analyzing the measure-ments on the neutron, the muon and the tau lifetime, as well as the g- 2 experiment. However, It is pointed out emphatically that the SLD and the E158 experiments, the measurements of the left-right integrated cross section asymmetry in Z boson production by e+ e&#8722; collisions and by electron-electron M 駢ler scattering, can indirectly demonstrate the lifetime

asymmetry. In order to directly demonstrate the lifetime asymmetry, we propose some possible experiments on the decays of polarized muons. The precise measurement of the lifetime asymmetry could have important significance for building a muon collider, also in cosmology and astrophysics. It would provide a sensitive test of the standard model in particle physics and allow for exploration of the possible V + A interactions.

**Article ID:** 80057

**Title:** Thermonuclear plasma steady states generation

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## ABSTRACT

This report is a systematic and complemented summary



of the earlier published works by the authors [1,2,3,4]. The concept of gravitational radiation as a radiation of one level with the electromagnetic radiation is based on theoretically proved and experimentally confirmed fact of existence of electron's stationary states in own gravitational field, characterized by gravitational constant  $K=1042G$  ( $G$  — Newtonian gravitational constant) and by irremovable space-time curvature. The received results strictly correspond to principles of the relativistic theory of gravitation and the quantum mechanics. The given work contributes into further elaboration of the findings considering their application to dense high-temperature plasma of multiple-charge ions. This is due to quantitative character of electron gravitational radiation spectrum such that amplification of gravitational radiation may take place only in multiple-charge ion high-temperature plasma.

**Article ID:** 80114

**Title:** Advanced Concept Ramjet Propulsion System Utilizing In-Situ Positron Antimatter Derived From Ultra-Intense Laser With Fundamental Performance Analysis

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**ABSTRACT**

The fundamental performance analysis of an advanced concept ramjet propulsion system using antimatter is presented. Antimatter is generated by ultra-intense laser pulses incident on a gold target. The scientific foundation for the generation of antimatter by an ultra-intense laser was established in the early 1970's and later demonstrated at Lawrence Livermore National Laboratory from 2008 to 2009. Antimatter on the scale of  $2 \times 10^{10}$  positrons were generated through a  $\sim 1$ ps pulse from the Lawrence Livermore National Laboratory Titan laser that has an intensity of  $\sim 10^{20} \text{W/cm}^2$ . The predominant mechanism is the Bethe-Heitler process, which involves high-energy bremsstrahlung photons as a result of electron-nuclei interaction. Propulsion involving lasers through chemical rather than non-chemical interaction has been previously advocated by Phipps. The major utilities of the ultra-intense laser derived antimatter ramjet are the capability to generate antimatter without a complex storage system and the ability to decouple the antimatter ramjet propulsion system from the energy source. For instance the ultra-intense laser and energy source could be terrestrial, while the ramjet could be mounted to a UAV as a propulsion system. With the extrapolation of current technologies, a sufficient number of pulses by ultra-intense lasers are eventually anticipated for the generation of antimatter to heat the propulsive flow of a ramjet. Fundamental performance analysis is provided based on an ideal ramjet derivation that is

modified to address the proposed antimatter ramjet architecture.

**Article ID:** 80110

**Title:** Fundamental Architecture and Analysis of an Antimatter Ultra-Intense Laser Derived Pulsed Space Propulsion System

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**ABSTRACT**

Antimatter has been generated in large quantities by the Lawrence Livermore National Laboratory Titan laser. The Titan laser is an ultra-intense laser system on the order of approximately  $10^{20} \text{W/cm}^2$  with pulse durations of roughly 1ps. With the Titan laser incident on a high atomic number target, such as gold, antimatter on the scale of  $2 \times 10^{10}$  positrons are generated. Roughly 90% of the generated positrons are ejected anisotropic and aft to the respective target. The mechanisms for the laser-derived positron antimatter generation involve electron interaction with the nuclei based on bremsstrahlung photons that yield electron-positron pairs as a consequence of the Bethe-Heitler process, which predominates the Trident process. Given the constraints of the current and near future technology space, a pulsed space propulsion configuration is advocated for antimatter derived space propulsion, similar in concept to pulsed radioisotope propulsion. Antimatter is generated through an ultra-intense laser on the scale of a Titan laser incident on a gold target and annihilated in a closed chamber, representative of a combustion chamber. Upon reaching a temperature threshold, the closed chamber opens, producing a pulse of thrust. The implication of the pulsed space propulsion antimatter architecture is that the energy source for the antimatter propulsion system can be decoupled from the actual spacecraft. In contrast to conventional chemical propulsion systems, which require storage of its respective propulsive chemical potential energy, the proposed antimatter propulsion architecture may have the energy source at a disparate location from the spacecraft. The ultra-intense laser could convey its laser energy over a distance to the actual spacecraft equipped with the positron antimatter pulsed space propulsion system. Hydrogen is considered as the propulsive fluid, in light of its low molecular weight. Fundamental analysis is applied to preliminarily define the performance of the positron antimatter derived pulsed space propulsion system. The fundamental performance analysis of the antimatter pulsed space propulsion system successfully reveals the architecture is viable for further evaluation.

**Article ID:** 80069

**Title:** Information Mechanics

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#### ABSTRACT

In the governing thought, I find an equivalence between the classical information in a quantum system and the integral of that system's energy and time, specifically  $I = \int \frac{2\pi}{h} E dt$ , in natural units. I solve this relationship in four ways: the first approach starts with the Schrödinger Equation and applies the Minkowski transformation; the second uses the Canonical commutation relation; the third through Gabor's analysis of the time-frequency plane and Heisenberg's uncertainty principle; and lastly by quantizing Brownian motion within the Bernoulli process and applying the Gaussian channel capacity. In support I give two examples of quantum systems that follow the governing thought: namely the Gaussian wave packet and the electron spin. I conclude with comments on the discretization of space and the information content of a degree of freedom.

**Article ID:** 80015

**Title:** Gravito – Electric Power Generation

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#### ABSTRACT

It is now possible to deflect gravitational action away from an object so that the object is partially levitated. That effect makes it possible to extract energy from the gravitational field, which makes the generation of gravito-electric power technologically feasible. Such plants would be similar to hydro-electric plants and would have their advantages of not needing fuel and not polluting the environment. However, gravito-electric plants could be much smaller than hydro-electric plants; their location would not be restricted to suitable water elevations, and the plants and their produced energy would be much less expensive. Gravito-electric power can be placed into operation now. It can replace all existing nuclear and fossil fuel plants, and would essentially solve the problem of global warming to the extent it is caused by fossil fuel use. The physics development is comprehensively presented. That is followed by the engineering design. [Patent Pending (P), January 13, 2011, USPTO #13/199,867.]

**Article ID:** 80167

**Title:** On Five Independent Phenomena Sharing a Common Cause

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#### ABSTRACT

Over the past century a succession of four different independent unexplained astronomical phenomena have been discovered. They appear to be the result of a common underlying cause that also produces an unaccounted-for acceleration that is quite small, centrally directed in the system exhibiting each phenomenon, non-gravitational, distance independent, and of a common magnitude. The present paper analyzes the unexplained phenomena and proposes the underlying common cause, a common solution to the problem that they present. The four in the order of their discovery are as follows. 1 – In 1933, the indication by galactic rotation curves that there is such an acceleration in galaxies but with no observable cause [hence the postulating of “Dark Matter”]. Here the acceleration is directed toward the galactic center, the dominant factor in the mechanics of galaxy rotation. 2 – In 1998, the Pioneer Anomaly in which the acceleration is directed toward the Sun, the dominant factor in the mechanics of the Pioneer spacecrafts' motion. 3 – In 2008, the Flybys Anomaly for which the acceleration is directed toward the center of the Earth, the dominant factor in the mechanics of the flyby motion. 4 – Also in 2008, confirmed in 2010, the Dark Flow anomaly for which the acceleration is directed toward the central origin of the overall universe, the dominant factor in the mechanics of the overall universe. In addition the common cause also modifies the earliest: 5 – In the 1920's the LeMaitre - Hubble redshifts of the light from various distant astral bodies.

**Article ID:** 80178

**Title:** Gravitation in Flat Space-Time and General Relativity

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#### ABSTRACT

A covariant theory of gravitation in flat space-time is stated and compared with general relativity. The results of the theory of gravitation in flat space-time and of general relativity agree for weak gravitational fields to low approximations. For strong fields the results of the two theories deviate from one another. Flat space-time theory of gravitation gives under some natural assumptions non-singular cosmological models with a flat space. The universe contracts to a positive minimum and then it expands for all times. Shortly, after the minimum is reached, the cosmological models of two theories approximately agree with one another if models in general relativity with zero curvature are considered. A flat space is proved by experiments.

**Article ID:** 80160

**Title:** Structure and curvatures of trajectories of a 2D log-gas

**Name:** Mauricio Pato

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#### ABSTRACT

A model is constructed to study the statistical properties of irregular trajectories of a log-gas whose positions are those of the complex eigenvalues of the unitary Ginibre ensemble. It is shown that statistically the trajectories form a structure that reveals the eigenvalue departure positions. It is also shown that the curvatures of the ensemble of trajectories are Cauchy distributed.

**Article ID:** 80077

**Title:** Some New Particles Beyond the Standard Model

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#### ABSTRACT

In this work a simulated B-L model at Large Hadrons Collider is presented using Monte Carlo simulation software .B-L model is one of the scenarios proposed to add an extension of the standard models. B-L model predicts the existence of three new particles at the LHC .They are a new neutral massive gauge boson, three heavy neutrinos and a heavy Higgs boson.

**Article ID:** 80197

**Title:** Planck's constant as adiabatic invariant characterized by Hubble's and cosmological constants.

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#### ABSTRACT

Within the framework of the Einstein – Cartan – Schroedinger program with non-symmetric connections, the Planck constant is calculated from first principles (from geometry of our Universe), as the adiabatic invariant of free electromagnetic field on the Riemann – Cartan manifold. The Planck constant, calculated with actually measured cosmological parameters, coincide with that one, measured in laboratory with precision up to the second digit. The non-local generalization of quantum theory is suggested. The fundamental sense of the Quantum Theory is discussed, and physical sense of the cosmological constant is revealed. Within the mentioned framework, the quantum theory is naturally unified with gravity.

**Article ID:** 80208

**Title:** Electron Correlation in High Temperature Cuprates

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#### ABSTRACT

Electron correlation plays a key role in high-temperature cuprate superconductors. Material-parameter dependence of cuprates is important to clarify the mechanism of high temperature superconductivity. In this study, we examine the ground state of the three-band Hubbard model (d-p model) that explicitly includes oxygen p orbitals. We consider the half-filled case with the large on-site Coulomb repulsion  $U_d$  by using the variational Monte Carlo method. The ground state is insulating when  $U_d$  is large at half-filling. The ground state undergoes a transition from a metal to a Mott insulator when the level difference  $\epsilon_p - \epsilon_d$  is increased.

**Article ID:** 80218

**Title:** Magnetic Properties and Hyperfine Interactions in M-Type  $\text{BaFe}_{12-2x}\text{MoxZnxO}_{19}$  Hexaferrites

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#### ABSTRACT

A series of M-Type barium hexaferrites with the general composition  $\text{BaFe}_{12-2x}\text{MoxZnxO}_{19}$  were synthesized at  $1100 \pm 176^\circ\text{C}$  by a simple wet chemical mixture route. The properties of the prepared samples were examined by X-ray diffraction, scanning electron microscopy, vibrating sample magnetometry, and Mössbauer spectroscopy. The diffraction patterns for all samples were found to agree well with the standard pattern of  $\text{BaFe}_{12}\text{O}_{19}$  hexaferrite with no extraneous diffraction peaks. The products formed as well crystallized hexagonal platelet-like particles while the EDS measurements revealed the stoichiometric cationic ratios of the prepared samples. The spectral variations elucidated by Mössbauer spectroscopy were utilized to determine the different cation preferential site occupations as a function of  $x$ . Finally, the saturation magnetizations, magnetic anisotropies, and the anisotropy fields, determined from the magnetic measurements, showed consistency with the relative subspectral Mössbauer intensities and the single ion model for the anisotropy constant.

**Article ID:** 80245

**Title:** Laser-plasma source of tunable mid-infrared pulses

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## ABSTRACT

We examine a new method for generation of the coherent few-cycle mid-infrared pulses. The method utilizes the gas ionization by ultrashort incommensurate two-color laser pulses. These incommensurate two-color pulses contain the fields at two different frequencies. One of the frequencies is detuned from the doubled value of the other one. Such incommensurate pulses can be obtained with the use of the nonlinear crystal (for example, BBO or KDP) or with the use of the optical parametric amplifier. In the latter case, the main (in the respect of intensity) field component has greater central frequency than the weaker field has; and the frequency of the weaker field can be reasonably easy tuned around the halved value of central frequency of the main field, which stays fixed. We calculate the electron current which is excited by such two-color pulse in a gas medium during ionization through the use of the semiclassical approach both analytically and numerically and find out that the low-frequency component of that current can have central frequency in the mid-infrared range, which can be controlled by tuning the frequency of the weaker optical field. The full-dimensional simulations based on the quantum-mechanical approach (the solution of the 3D time-dependent Schrödinger equation) support the results obtained from the semiclassical approach. We estimate energy radiated by that current and discuss the possibilities of employing the phenomenon for creating the tunable source of coherent few-cycle mid-infrared pulses. This work was supported by the Government of the Russian Federation (Agreement No. 14.B25.31.0008) and the Russian Foundation for Basic Research (Grant No. 14-02-00847).

**Article ID:** 80211

**Title:** Gradient-Index Optical Cavity and Quantum Oscillator System

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## ABSTRACT

In this work we propose to find the high-Q cavity modes of a circular dielectric disk cavity having a dielectric distribution of parabolic form in the radial direction by considering their correspondence with the eigenstates of a 2D quantum harmonic oscillator system characterized by the radial and azimuthal (angular momentum) quantum numbers. Numerical simulations confirm the predictability of this strategy and give us their discrepancies. Both the TE and TM cavity modes are studied and the reasons for their different performances are explained.

**Article ID:** 80210

**Title:** Twisted-Dielectric-Rod Arrays as Effective Chiral Photonic Crystal

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## ABSTRACT

A new kind of chiral photonic crystal (CPC) consisted of dielectric materials which has significantly optical activity is proposed. This CPC is formed by a twisted multilayer structure; each layer is a 2D photonic crystal consisted of cross-shaped dielectric rods of appropriate rotation angle. Unlike other chiral metamaterials usually made of metallic structures, this new design has the advantage of avoiding the absorption problem while keeping its optical activity at a high enough level. This structure can be used as an optical rotator.

**Article ID:** 80239

**Title:** Maxwell's Equations as the Basis for Model of Atoms

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## ABSTRACT

Classical physics a century ago couldn't explain many atomic physical phenomena. Now the situation has changed. It's because within the framework of classical physics with the help of Maxwell's equations we can derive Schrödinger's equation, which is the foundation of quantum physics. The equations for energy, momentum, frequency and wavelength of the electromagnetic wave in the atom are derived using the model of atom by analogy with the transmission line. The action constant  $A_0 = (\mu_0/\epsilon_0)^{1/2} s_0^2 e^2$  is a key term in the above mentioned equations. Besides the other well-known constants, the only unknown constant in the last expression is a structural constant of the atom  $s_0$ . We have found that the value of this constant is 8.277 56 and that it shows up as a link between macroscopic and atomic world. After calculating this constant we get the theory of atoms based on Maxwell's and Lorentz equations only. This theory does not require Planck constant  $h$ , which is replaced with theoretically derived action constant  $A_0$ , while the replacement for fine structure constant  $\alpha^{-1}$  is theoretically derived expression  $2s_0^2 = 137.036$ . This way, the structural constant  $s_0$  is replacing both constants,  $h$  and  $\alpha$ . This paper also defines the stationary states of atoms and shows that the maximal atomic number is equal to  $Z_{\max} = 137$ . The presented model of the atoms covers three of the four fundamental interactions, namely the electromagnetic, weak and strong interactions.

## **Part V Instructions for Presentations**

### **Devices Provided by the Conference Organizing Committee:**

- Laptops (with MS-office & Adobe Reader)
- Projectors & Screen
- Laser Sticks

### **Materials Provided by the Presenters:**

- PowerPoint or PDF files

### **Duration of each Presentation:**

- Regular Oral Session: 15 Minutes of Presentation, 5 Minutes of Q & A
- Plenary Speech: 40 - 45 Minutes of Presentation, 5 Minutes of Q & A

## Part VI Hotel Information

### About Hotel

**Grand Mercure Baolong Shanghai** is close to major shopping and cultural centers such as Wu Jiao Chang Commercial precinct, Knowledge & Innovation Community Business Park and Fudan University. This classical hotel with warm and elegant décor, captures the essence of the old and new Shanghai. Conference facilities, restaurants and bars, healthy club & recreation centre, ideal for business and holiday travelers convenience, comfort and relaxation.

**Address:** 180 Yixian Road, Shanghai 200434, P.R. China  
中国上海逸仙路180号

**URL:** <http://www.grandmercurebaolong.com/En/>

**Tel:** (+ 86 21) 3505 9666

**Fax:** (+ 86 21) 5663 2710

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### How to Get to the Hotel

20km to the Hongqiao Airport (距离虹桥机场20公里)

50km to the Pudong International Airport (距离浦东国际机场50公里)

10km to the city center (距离市中心10公里)

8km to the railway station (距离火车站8公里)

**For non-Chinese author, please show the following info to the driver if you take a taxi:**

**请送我到:** 中国上海逸仙路180号 上海宝隆美爵酒店

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