



# The First International Conference on Materials, Energy & Environment (MEE'2020)

El Oued – Algeria  
January 20-21, 2020



## PROCEEDING ABSTRACT



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The First International Conference on  
**Materials, Energy & Environment**  
**(MEE'2020)**  
**El Oued – Algeria**  
**January 20-21, 2020**



**Honorary Chair**

**Prof.**  
**Omar Ferhati**  
 President of the  
 University



**General Chair**

**Dr.**  
**Mohammed**  
**El Hadi Attia**





The First International Conference on Materials, Energy and Environment will be held at El Oued University on January 20-21, 2020. Its goal is to bring together researchers, professors and industrialists concerned by technological and scientific advances in the Materials, Energy and Environment sciences. This first international edition is intended to be open to industrial concerns and the transfer of technology between universities and industries. This is why applied themes are programmed to better meet the needs of the industrial community.





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## TOPICS

### TOPIC 1: ENERGY

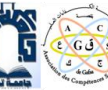
- Renewable Energy and Environment
- Phase Change, Flows and Energy Transfer Processes
- Optimization of Energy Systems
- Fuel Cells
- Drying and Porous Media
- Energy Storage
- Thermal and Mass Transfers
- Energy Management.

### TOPIC 2: MATERIALS

- Material Modeling
- Material Valuation
- Material Characterization and Behavior
- Nanotechnology
- Materials for Energy
- Biomaterials and the Environment
- Energy Storage and Conversion

### TOPIC 3: MATHEMATICS IN PHYSICS

- Application of Quantum Mechanics on Materials
- Numerical Methods and Simulations Applied in Technology
- Theory of Operators and Their Applications in Science
- Mathematical Physics and Limit Problems
- Plasma Physics







# **SCIENTIFIC COMMITTEE**



# The First International Conference on Materials, Energy & Environment (MEE'2020)

**El Oued – Algeria**

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**Dr. Mohammed Sadok MEHBOUB (U. El Oued, ALG)**

Pr. El Habib GUEDDA (U. El Oued, ALG)

Pr. Ahmed Kadhim HUSSEIN (U. Babylon, IRAQ)

Pr. Elimame ELALOUI (U. Gafsa, TUN)

Pr. Fethi BOURAS (U. El Oued, ALG)

Pr. Muthu Manokar (U. Tamilnadu, INDIA)

Pr. Zied DRISS (U. Sfax, TUN)

Pr. Said BOUABDALLAH (U. Laghouat, ALG)

Pr. Imad HAMADNEH (U. Jordan, JOR)

Pr. Hocine BENMOUSSA (U. Batna, ALG)

Pr. AbdElnaby KABEEL (U. Tanta, Egypt)

Pr. Zouhaier BEN AYADI (U. Gabes, TUN)

Pr. Fadwa ODEH (U. Jordan, JOR)

Pr. Badis YDRI (U. Annaba, ALG)

Pr. Ammar HIDOURI (U. Gafsa, TUN)

Pr. Miqdam Tariq CHAICHAN (U. Baghdâd, IRAQ)

Pr. Adel BOUCHAREB (U. Annaba, ALG)

Pr. Lassaad ELMIR (U. Gabes, TUN)

Pr. M. Tayeb MEFTAH (U. Ouargla, ALG)

Pr. M. Hichem HAMZAOUI (CNRSM, Tunis, TUN)

Pr. Djemal BECHKI (U. Ouargla, ALG)

Pr. Mouldi CHRIGUI (U. Gabes, TUN)





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Pr. Djemal DOU (U. El Oued, ALG)

Pr. Fateh OUDINA MABROUK (U. Skikda, ALG)

Pr. Mabrouk HECINI (U. Biskra, ALG)

Pr. Saadi BOUGOUL (U. Batna, ALG)

Pr. Boubaker BENHAOUA (U. El Oued, ALG)

Pr. Nourddine HAMDI (U. Gabes, TUN)

Pr. Farhat REHOUMA (U. El Oued, ALG)

Pr. Fouad KHALDI (U. Batna, ALG)

Pr. Ammar HOUAS (U. de Gabes, TUN)

Pr. Mosbah ZIDANI (U. Batna 2, ALG)

Pr. Zoubir AOULMI (U. Tébessa, ALG)

Pr. Mohamed Sallah ABID (U. Sfax, TUN)

Dr. Badia GHERNAOUTI (U. Laghouat, ALG)

Dr. Belhi GUERIRA (U. Biskra, ALG)

Dr. Abdelmelk ATIA (U. El Oued, ALG)

Dr. Fouad MENACEUR (U. Tebessa, ALG)

Dr. Salim BOULAHROUZ (U. Khenchela, ALG)

Dr. Mohamed Issam ZIANE (CRTSE, ALG)

Dr. Ridha MENECEUR (U. El Oued, ALG)

Dr. Ibrahim BELADEL (U. Djelfa, ALG)

Dr. BELGHAR Nourredine (U. Biskra, ALG)

Dr. Ali BOUKHARI (U. El Oued, ALG)







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Dr. Hamida BOUSSEHEL (U. Biskra, ALG)

Dr. Mosbah DIFALLAH (U. El Oued, ALG)

Dr. Nassima MEFTAH (U. El Oued, ALG)

Dr. Soria ZEROUAL (U. El Oued, ALG)

Dr. Yacine AOUN (U. El Oued, ALG)

Dr. Mohammed El Hadi ATTIA (U. El Oued, ALG)

Dr. Latbi HADDAD (U. El Oued, ALG)

Dr. Abdelkrim REBIAI (U. El Oued, ALG)

Dr. Abdelaziz ABOUDI (U. Khenchela, ALG)

Dr. Karima BELAKROUM (U. Ouargla, ALG)

Pr. Mohammed KHALID (U. Sunway, Malaysia)

Pr. Nouredine SETTOU (U. Ouargla, ALG)

Dr. Nouredine BESSOUS (U. El Oued, ALG)

Pr. Paulo Nobre Balbis dos Reis (U. Beira Interior, Portugal)

Pr. Müslüm ARICI (U. Kocaeli, Turkey)

Pr. Mourad Ben Zina (U. Sfax, TUN)





# **ORGANIZING COMMITTEE**



# The First International Conference on Materials, Energy & Environment (MEE'2020)

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Mr. Rachid AHMIM

Mr. Mourad MIMMOUNI

Mr. Ghani RIHIA

Mr. Mebrouk GHOUALI

Mr. Abderrahmane KHECHEKOUICHE

Ms. Nassima MEFTAH

Mr. Younes MOUSSAOUI

Mr. Belkhir TIWA

Ms. Majda MOKHTARI

Ms. Souhila ASKRI

Mr. Abdelhai BEN ALI

Mr. Abdelouahab KHATAR

Mr. Achour RAHAL

Ms. Fatima AHMED ZEOUARI

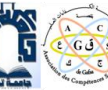
Mr. Ali HADJ AMMAR MOHAMMD

Mr. Said MEHALOU

Ms. Meriem AYADI

Mr. Abdelkrim REBIAI

Mr. Larbi HADDAD







# PLENARY SPEAKERS



# The First International Conference on Materials, Energy & Environment (MEE'2020)

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Prof. Hocine Ben Moussa is a professor & researcher at Mostefa Benboulaïd Batna2 University since 1982.

Former mechanical engineer of the National Polytechnic School of Algiers  
State Doctorate in Energy from the University of Poitiers (France).

Former director of the Applied Research in Renewable Energies Unit (URAER) Ghardaïa.

Scientific fields of interest: new and renewable energies, coupled transfers (heat and mass), two-phase flows ...



Prof. Imad Hamadneh is a Professor of Materials Chemistry at The University of Jordan, his research area focuses on the synthesis and characterization of high-temperature superconductors (HSTC), nano-metal oxides, colossal magneto-resistant materials (CMR), polymers, and clay-polymer nanocomposites. He is also actively involved in materials and systems used to improve human health and human life such as modified clay -polymer nanocomposites as a membrane for wastewater treatment.



Müslüm Arıcı is a faculty member in Thermodynamics and Heat Technique Division of Mechanical Engineering Department of Kocaeli University, Turkey. He received BS, MSc and PhD degree from Kocaeli University in 2000, 2004 and 2010, respectively. He completed Diploma Course at von Karman Institute, Belgium in 2007. He worked in Fluid Mechanics Research Group, University of Zaragoza, Spain in 2014 and 2016-2017 as a visiting professor. He has published more than 40 papers in international SCI journals and also presented many research papers in international conferences. He has served as an editorial board member in several journals, a referee in many international journals and as a scientific committee member in numerous international conferences. His fields of interest are Numerical Heat Transfer, Computational Fluid Dynamics, Thermal Management by Phase Change Materials, Solar Energy and Nanofluids.

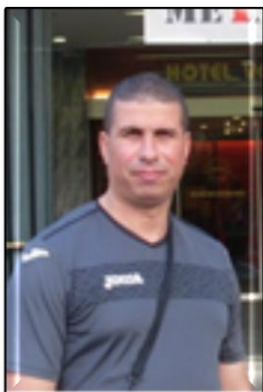




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Prof. Mosbah ZIDANI is a Professor in the Faculty of Technology at University of Batna 2 . He is the chief of a research team named: Study and Elaboration of Metallic Materials in the Laboratory of Energetic Engineering and Materials, LGEM at the University of Biskra. His research interests include the experimental study of microstructures, deformation of metal alloys and the recrystallization and grain growth mechanisms textures using SEM, EBSD, and RX and neutron diffraction. Also, he is interested in the experimental study of the reaction (precipitation/ dissolution) in metal alloys, corrosion of metals and the elaboration of metallic materials.



Prof. Lassaad El Mir is a professor in the Faculty of Sciences, Gabes University, Tunisia. He has published more than 400 publications (201 research articles and 202 contributions in national and international conferences). He was a supervision of 22 PhD students. He is reviewer in some journals as Thin Solid Films and Journal of Luminescence. His main research interest: synthesis and characterization of nanoparticles, thin films and nanocomposites for variety of applications such as solar cells, transparent electrodes, advanced catalyst supports, water treatment, energy storage and gas sensors.







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Prof. Fadwa Odeh is an associate professor at the university of Jordan, department of chemistry. She is mainly interested in Material Characterization Materials Nanomaterials Thin Films and Nanotechnology Adsorption Nanoparticles Materials Chemistry Nanotechnology Nuclear Magnetic Resonance Physical Chemistry Porous Materials Mesoporous Materials Zeolites Surfactants Dynamic Light Scattering Self-Assembled Monolayers Liposomes Surface Tension Colloid Dispersion Colloid Chemistry Emulsions Interface Science Micelles Aggregation Microemulsions Drug Delivery Systems Phase Behavior MAS-NMR Protein NMR Detergents



Prof. Paulo Nobre Balbis dos Reis is a professor at the University of Beira Interior. His scientific area activity is Mechanical behaviour of materials. His domain of specializations is Fatigue, static and creep behaviour of titanium and polypropylene glass fibre reinforced. His present research interests - Mechanical behaviour of composites and nano-composites, our of adhesive joints.

Summary of scientific activities:

PhD Thesis concluded: 2

PhD Thesis in progress: 5

Master Thesis concluded: 23

Master Thesis in progress: 6

Nr of papers: 91; ISI journals: 88





# **HONORARY GUESTS**



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Prof. Kabeel has several research interests including renewable energy systems, desiccant dehumidification systems, refrigeration and air conditioning, water desalination, and environmental service projects. He has about 320 international conferences and journal papers. He has several awards and honors, such as Tanta University recognition award prize in Engineering Sciences in 2001, the State Award for Excellence in Engineering Sciences, Egypt in 2013, Abdul Hameed Shoman's Award for Arab Researchers, Jordan in 2014, Tanta University Award for Excellence in Performance in 2014, Tanta University Award Appreciation in 2017. Tanta. Khalifa Award for for Excellent Professor in scientific research for the Arab Countries, (UAE) 2018, University Award for the highest record of international publishing researchers among the university researchers in 2013, 2014, 2016, and 2017, 2018, 2019.

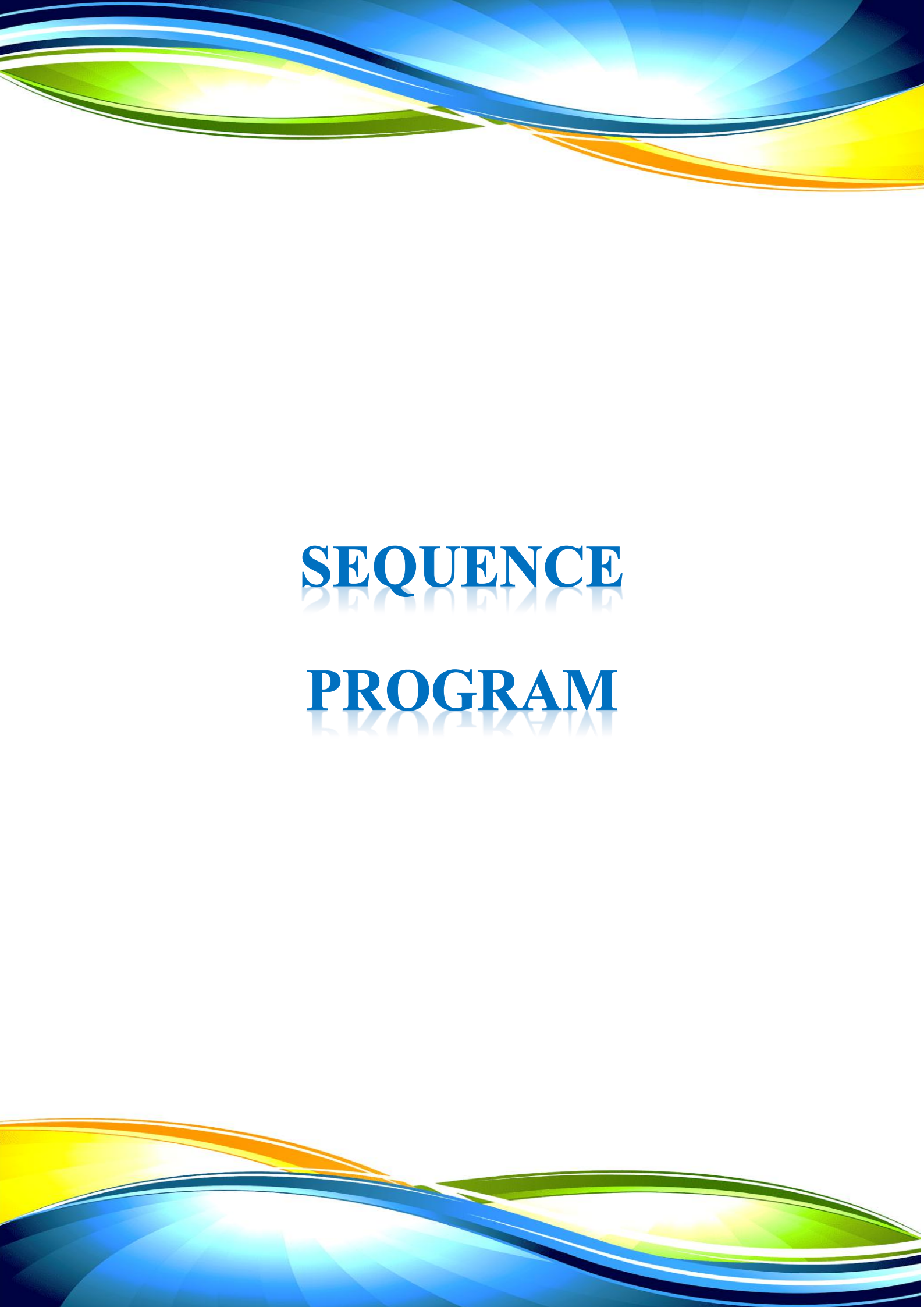


Prof. Elaloui Elimame currently teach at the Faculté des Sciences de Gafsa, University of Gafsa and a head of Material, Environment and Energy Research unit. My research is in Physical Chemistry, Green Chemistry and Materials Chemistry Fields. Spacelly I work on Sol Gel Process to synthesis an innovative material used in Photocatalysis and optoelectronics.



Prof. Zied Driss is Full Professor in the Department of Mechanical Engineering at National School of Engineers of Sfax (ENIS). Currently, he is a Chief of Project in the Laboratory of Electromechanical Systems (LASEM), an Editorial Board Member and reviewer for different international journals, an Editor for different books, a General Chair of two bi-annual international conferences and an active member in different national and international associations.





# **SEQUENCE PROGRAM**



The First International Conference on  
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**Sunday 19<sup>th</sup> January, 2020**

**14:00**

**Welcome subscribers and registration**

**(Souf Hotel – El Oued, Algeria)**





# The First International Conference on Materials, Energy & Environment (MEE'2020)

**El Oued – Algeria**

**January 20-21, 2020**



**Monday 20<sup>th</sup> January, 2020**

**Registration**

**08:00**

**(Central Library – 1<sup>st</sup> Floor University El Oued, Algeria)**

**Opening Ceremony 09:00 – 09:30**

**Chairpersons**

**Prof. Abd Elnaby Kabeel**

**Dr. Med Sadok Mahbous**

**Prof. Zied Idriss**

**09:30 – 10:00**

**Plenary Lecture 1 (Prof. Hocine Ben Moussa)**

**University of Batna 1, Algeria**

**Energies Renouvelables & l'Algérie (Circonstance)**

**10:00 – 10:30**

**Plenary Lecture 2 (Prof. Imad Hamadneh)**

**University of Jordan, Jordan**

**Green Synthesis of Metal Oxide Nanoparticles Using Neem Plant Extracts**

**10:30 – 11:00**

**Plenary Lecture 3 (Prof. Müslüm Arici)**

**University of Kocaeli, Turkey**

**Enhancement of Thermal Performance of Buildings by  
Incorporating PCM**

**11:00 – 11:30**

**Coffee break + Poster Session 1**

**(EP01 – EP40)**

**(MP01 – MP70)**

**(TP01 – TP26)**

**Oral Communications**

**Session 1**





# The First International Conference on Materials, Energy & Environment (MEE'2020)

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• **Room 1**

- Feti Bouras
- Ammar Hidouri
- Fateh Mebarek-Oudina

**Energy**



• **Room 2**

- Elimame Elaloui
- Mosbah Zidani
- Lassaad Elmir

**Materials**



• **Room 3**

- Ibrahim Beladel
- Fareh Abdelfeteh
- Rachid Ahmim

**Theory**



	Room 1		Room 2		Room 3	
Timing	Code	Communicating	Code	Communicating	Code	Communicating
11.30-11.40	EO01	Djamel Sahel	MO01	Walid Rezig	TO01	Afaf Ahmima
11.40-11.50	EO02	Abdelghani Belhanafi	MO02	Sabrina Bounab	TO02	Ahlem Gasri
11.50-12.00	EO03	Yousfi Aissa	MO03	Naima Zidi	TO03	Aicha Nemsy
12.00-12.10	EO06	Mansour Benyamina	MO04	Naima Benachour	TO04	Souhaila Askri
12.10-12.20	EO07	Zina Larabi	MO05	Ahlam Belgroune	TO05	Nourhane Attia
12.20-12.30	EO08	Yasmine Amara	MO06	M <sup>ed</sup> Farid Benlamnour	TO06	Said Beloul
12.30-12.40	EO09	Fateh Mebarek-Oudina	MO07	Linda Aissani	TO07	Zina Boussaha
12.40-12.50	EO11	Oussama Benhizia	MO08	Nour El Houda Bouabida	TO08	Hichem Elmoassaoui
12.50-13.00	EO12	Nadjet Gheraissa	MO09	Hayet Menasra	TO09	Abdelfeteh Fareh
13.00-13.10	EO13	M <sup>ed</sup> El Hadi Attia	MO10	Larbi Haddad	TO10	Tedjani Hadj Ammar
13.10-13.20	EO14	Ilyas Khelifa Kerfah	MO11	Jihen Soli	TO11	Lourabi Hariz Bekkar
13.20-13.30	EO15	Badia Ghernaout	MO12	Fares Fenniche	TO12	Larbi Saidia
13.30-13.40			MO15	Hakima Hachelef	TO13	Samia Bahlouli
13.40-13.50					TO14	Samia Dilmi
13.50-14.00					TO15	Khaoula Zaiz
<b>Lunch</b>						
<b>14:00</b>						
<b>Tourist Visit</b>						
<b>15:00</b>						







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**Tuesday 21<sup>st</sup> January, 2020**

**Registration 08:00**

**(Central Library – 1st Floor University El Oued, Algeria)**

**Chairpersons**

**Prof. Elaloui Elimame**

**Prof. Abd Elnaby Kabeel**

**Dr. Soria Zeroual**

**Prof. Zied Idriss**

**08:40 – 09:05**

**Plenary Lecture 4 (Prof. Mosbah Zidani)**

**University of Batna 2, Algeria**

**Analysis & Characterization of the Microstructure & Texture of  
Ferrous (Steel) & Non-ferrous Alloys by Advanced Technique (EBSD)**

**09:05 – 09:30**

**Plenary Lecture 5 (Prof. Lassaad El Mir)**

**University of Gabes, Tunisia**

**Nanomaterials Based on Sol-gel Technique for Innovative  
Technological Applications**

**09:30 – 09:55**

**Plenary Lecture 6 (Prof. Fadwa Odeh)**

**University of Jordan, Jordan**

**Remote Loading of Bioactive Molecules Into Liposomes**

**09:55 – 10:20**

**Plenary Lecture 7 (Prof. Paulo Nobre Balbis dos Reis)**

**University of Beira Interior, Portugal**

**The Effect of Hostile Solutions on the Mechanical Properties of  
Composite Materials**

**10:20 – 10:50**

**Coffee break + Poster Session 2**

**(EP41 – EP80)**

**(MP71 – MP141)**

**Oral Communications  
Session 2**







**PROGRAM**

**DAY 1**





The First International Conference on  
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**Monday 20<sup>th</sup> January, 2020**

**ORAL COMMUNICATIONS SESSION 1**

**Room 1 (Energy)**

EO01	Convection forcée dans un radiateur à faisceau de tubes ovales inclinés Sahel djamel, Alem karima
EO02	Influence des Paramètres Géométriques des Cuve Agitées sur le Comportement Rhéologique de fluide Belhanafi Abdelghani, bouzit Mohamed
EO03	Heat dissipation in an electronic device Aissa Yousfi, Djamel sahel
EO06	Robust Control of Reactive Power Compensation Using a Three-Level NPC Inverter Topology Benyamina Mansour, Ali Tahri, Abdelkader Boukortt
EO07	Design and Modeling of a DD- PMSG for Production and Injection of the Wind Energy to the Grid Zina Larabi, Kaci Ghedamsi, Djamel Aouzellag
EO08	Improved-fuzzy management algorithm for standalone PV Battery Micro-grid Amara Yasmine, Bradai Rafik, Boukenoui Rachid
EO09	Numerical Investigation of Convection Heat Transfer in a Horizontal Channel with an Open Trapezoidal Cavity and Different Heat Source Locations Fateh Mebarek-Oudina, H. Laouira, A. Aissa, A. K. Hussein
EO11	Study of the Natural convection of non-Newtonian Power-Law Fluid between an Outer Cylinder and Inner Horizontal Flat Tube Benhizia Oussama
EO12	Comparative Study of Thermo-chemical Properties of CH <sub>4</sub> and Biofuel Combustion Gheraissa Nadjet, Fethi Bouras, Abdallah Dogga, Fouad Khaldi
EO13	Computational Parametric Analysis of Non-Premixed Combustion of (Hydrogen-Propane)/Air Mohammed El Hadi ATTIA, Badia Ghernaout, Zied Driss, Said Bouabdallah And Ahmed Kadhim Hussein
EO14	Amélioration du Confort Thermique dans les Bâtiments Anciens en Algérie Ilyas Khelifa Kerfah, Sidi Mohamed Karim El Hassar, Abdelkader Larabi
EO15	3D Natural Convection Flow in an Open Agricultural Greenhouse in the Presence of the Plants Gheraout Badia, Attia Mohammed El Hadi, Bouabdallah Said and Benali Mahamed Lamine







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## Room 2 (Materials)

MO01	"Synthesis Diatomite ( Kieselguhr ) / Fe <sub>2</sub> O <sub>3</sub> / TiO <sub>2</sub> Composite as Photocatalyst for Dye Degradation
Rezig Walid, Hadjel Mohammed	
MO02	Density functional study of the structural, dynamic and Thermodynamic Proprieties of the III- Antimonides semiconductors (BSb, AlSb, GaSb, and InSb)
Bounab Sabrina A. Bentabet, Y. Bouhadda	
MO03	Synthesis and characterizations of NBT-BT doped lead-free piezoelectric ceramics
Zidi Naima, A. Chaouchi, S. d'Astorg, M. Rguiti, C. Courtois	
MO04	The effects of perpendicular magnetic field and current density on the electroplating of Zn-Ni
Benachour Naima, S.Chouchane, J-P. Chopart	
MO05	Mechanical and Tribological Behaviors of Nanocomposite Titanium Nitrides Coatings
Belgroune Ahlam, Linda Aissani, Corrine Nouveau, Akram Alhussein, Abdelaziz Abboudi	
MO06	Modelling and optimization of dissimilar welding using response surface methodology
Mohamed Farid Benlamnour, Tahar Saadi, Nabil Bensaid, Amar Boutaghane, Hania Hachemi, Riad Badji	
MO07	Nitrogen doping to improve the mechanical and tribological properties of vanadium coating
Linda Aissani, A. Belgroun, F. Salhi, S. Khenchoul, A. Cheriet, C. Nouveau, A. Alhussein	
MO08	Synthesis and characterization of nanocomposite by polymirization of Aniline and 4-Bromoaniline
Nour el Houda Bouabida, Aicha Hachemaoui, Ahmad Yahiaoui	
MO09	Structural and morphological properties of Ta-Ni co-doped Aurivillius Lead Free Ceramics
Menasra Hayet, K. Bounab, Z. Necira, A. Boutarfaia	
MO10	Polymer Coated Quartz Crystal Microbalance Sensor for VOC Detection
Larbi Haddad	
MO11	Synthesis and characterization of MTS oxides: ZnO and SnO <sub>2</sub>
Soli Jihen, Sana Kachbouri and Elimame Elaloui	
MO12	Electropolymerization of Polyaniline Thin Films by Two Different Methods
Fenniche Fares, Dhiya Elhak Djafri, Abdellah Henni, Djamel Zerrouki	
MO15	Study by electrochemical impedance the inhibitory efficacy of a propolis extract for an iron alloy immersed in a solution ethylene glycol / water, 0.1 M NaCl
Hachelef Hakima, A. Khelifa, A. Benmoussat	





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## Room 3 (Mathematics in Physics)

TO01	Energy decay for a nonsimple thermoelastic system with second sound thermoelasticity Afaf Ahmima, Abdelfeteh Fareh
TO02	Introduction et Application d'un Nouveau Type de Synchronisation IHFPS pour Sécuriser les Télécommunications Ahlem Gasri
TO03	Exponential decay of the solution of a porous-elastic system with double porosity Aicha Nems, Abdelfeteh Fareh
TO04	Spectral diagnostics of argon plasma and determination of the electron temperature Askri Souhaila, Ferouani. Abdel Karim And Guedda.El Habib
TO05	An Efficient Algorithm for Solving Generalized Equal Width Wave Equation Attia Nourhane, D. Seba, A. Nour
TO06	Application of strict coincidence and common strict fixed point to dynamical system via f-contraction Said Beloul
TO07	Performance and Analysis of an M/M/1 Retrial Queue with Orbital Search Zina Boussaha, Nadia Oukid, Halim Zaghdoudi
TO08	New Computer Experiment Designs Using Monte Carlo Markov Chain Method and Metropolis Hasting algorithm Elmossaoui Hichem, Oukid Nadia, Hannane Farouk
TO09	Exponential decay for a nonsimple thermoelastic system with thermoelasticity of type III Abdelfeteh Fareh, Afaf Ahmima
TO10	A Dynamic Elasto-viscoplastique Piezoelectric Contact Problem with Adhesion and Damage Hadj Ammar Tedjani
TO11	On Sylvester type equtions for bounded and subnormal operators in Hilbert spaces Hariz Bekkar Lourabi, Abdelouhab Mansour
TO12	Non-Equilibrium Plasma Discharge Modelling for Ozone Production in Carbon Dioxide with Dioxygen Gas Mixture Saidia Larbi, Belasri Ahmed, Bouadi Abed
TO13	Modelling Biomaterials by Using Computational And Statistical Methods: Application to The Cardiac Cells Bahloul Samia, Riane Houaria, Hamdache Fatima
TO14	Studies of Ionization Rate for Lithium Using the Electrons Energy Distribution Functions (EEDF) Dilmi Samia, Lifa Amal
TO15	Extended Spectrum of Polynomial function operators and applications Zaiz Khaoula, Mansour Abdelouahab





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## POSTER SESSION 1

**(EP01 – EP40)**

EP01	Etude des pertes thermiques d'un prototype solaire à concentrateur linéaire de Fresnel Hani Beltagy, Sofiane Mihoub and Noureddine Said
EP02	Conception et optimisation d'un STHE muni des obstacles orientés Mellal Mustapha, Sahel Djamel, Dada Mohammed Abderrahmane
EP03	Analyse des Champs Dynamique, Thermique et Massique d'un Ecoulement d'un Nano-fluide à Couple-Contrainte MHD en Convection Double Diffusive Assistée le Long d'un Canal Vertical Noureddine Messaoudi, Mouhamed Najib Bouaziz, Mhamed Tayeb
EP05	Étude d'un Générateur Photovoltaïque pour la Station d'épuration de la Commune de Maoussa Wilaya de Mascara Ibari Benaoumeur, Hebali Mourad, Bouzgou Kamel, Ayad Redouane , Larouci Benyekhlef, Ahmed-Foith Zoubir
EP06	Atmospheric Depollution by Non-Thermal Plasmas Gheraout Badia, Bellaouar Abderrahmane, Bouabdallah Said, Bouhicha Wafa and Segmane Imane
EP07	Influence of front and back contacts on photovoltaic performances of ZnO/CdS/CZTS solar cell Daoudi Fatiha, Radia Boudaira , Affeissa Saadia, Meglali Omar
EP08	Study of interactions organic pollutant/clay anionic for environmental protection Boudaoud Nacera, H. Milloudi , A. Tayeb, M. D. Ureña-Amate , A. Bengeddech, L. Boudaoud
EP09	A Comparative Analysis of Building Energy performance in Algeria, French and Spain Meftah Nabil, Mahri Zine Labidine
EP10	Étude de nouveau matériau $\text{Pr}_{1.95}\text{Sr}_{0.05}\text{Ni}_{0.95}\text{Co}_{0.05}\text{O}_{4\pm\delta}$ comme cathode des piles rechargeables Rekaik Mouna, Ferkhi Mosbah, Boukaf Abdelaziz
EP12	Numerical optimisation of an organic solar cell Abdallaoui Maroua, N. Sengouga, A. Chala, Af. Meftah
EP13	Modeling the thermal transfer of the injection of a powder into a gaseous medium at high temperature Fares Redouane, Aissa Abderrahmane, Houcine Naim, Bouadi Abed
EP14	Thermal Mixing Performances of Non-Newtonian Fluids flow for Open Chaotic geometry Naas Toufik Tayeb, Mostefa Telha, Amar Kouadri, Yahia Lasbet, , Embarek Douroum
EP15	Heat Transfer Analysis of Two Phase Change Materials in the Temperature Range 65–80°C for Thermal Energy Storage Ouzani Riadh, Benmoussa Fouzi, Benzaoui Ahmed, Benmoussa Hocine
EP16	Production de Biométhane à Partir des Déchets d'Abattoirs KHITOUS Mohamed, Aiouaz Fatma, Mohamadi Djamila Safa, Saber Meryem, Moussi Karima, Tirichine Nassima, Saidi Amina
EP17	Effect of tube configurations on vertical closed-loop geothermal heat exchangers sizing for residential application Korichi Sabrin, B. Bouchekima





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EP18	Identification of harmonics current by the Multi-Variable Filter method and compensation by a three level inverter controlled by the SVPWM strategy used for the shunt active filter Bouyakoub Ismail, Rachid Taleb, Faycal Mehedi, Hacem Mellah
EP19	Cu <sub>2</sub> ZnSnS <sub>4</sub> thin film solar cells performance optimization by the SCAPS-1D simulator Latrous Ahmed Redha, Mahamdi Ramdane, Touafek Naima
EP20	Thyristor Controlled Series Compensator Based Automatic Generation Control Incorporating Superconducting Magnetic Energy Storage Using Firefly Algorithm Yousfi Boutheina, Delassi Abdelmoumène, Arif Salem
EP21	Inside greenhouse temperature estimation with the external region parameters Lalmi Djemoui, Hebbir Nacer, Abdelouahab Benseddik, Hocine Bensaha, Kherrou Sofiene, Zarrit Ridha and Guermoui Mawloud
EP22	Microstructural studies of materials and kt <sub>2</sub> by x-ray diffraction Lakel Abdelghani, Lami khier
EP23	Study of Natural Convection Melting of Phase Change Material inside a Rectangular Cavity with Sinusoidal temperature boundary condition Abdelghani Laouer, Boulaktout Nesrine, Mezaache Elhacene, Laouar Salah
EP24	Drying Kinetics of Rosemary Leaves: Experiments and Modelling Bensebia Ouahida
EP25	Numerical simulation of combustion heat transfer in single-cylinder diesel engine Menacer Brahim, Bouchetara Mostefa
EP26	Rheological Properties Investigation of an Organophilic Clay Containing in a Diesel Fuel-Based Drilling Mud Bergane Cheikh, Hammadi Larbi
EP27	Intelligent Design of an Advanced MPPT Controller of Photovoltaic System: A Fractional Approach Ammar Soukkou, Sofiane Haddad, Abdelhamid Rabhi, Redha Meneur
EP28	Mixed convection with entropy generation in a square cavity filled with hybrid nanofluid Zeghibid Ilhem, Bessaih Rachid
EP29	Etude et Caractérisation de Nano-Cellule Solaire à Base de Silicium sans Défaut par 2D-Atlas SILVACO Mourad Hebali, Benaoumeur Ibari, Menaouer Bennaoum, Hocine Abdelhak Azzeddine, Mohammed Benzohra And Djilali Chalabi
EP30	Ebullition à l'extérieur d'un Tube Horizontal à des Pressions sous Atmosphérique, Comparaison de Corrélations Baki Touhami
EP31	Modeling and simulation of a steam generator of a thermal power at different operating loads Deghal Cheridi Amina Lyria, Chaker Abla, Dadda Amel, Bouam Abdellah, Graine Hassane
EP32	Contribution à la simulation numérique et étude de sensibilité de la dispersion atmosphérique induit par un événement accidentel Dahia Ahmed, Merrouche Djemai, Rezoug Tahar







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EP33	Étude et analyse de Cycle de Rankine Organique Fonctionnée avec des Concentrateurs Fresnel Mohammed Laissaoui, Housseyn Karoua, Amar Bouhallassa, Sabrina Lecheheb, Soufian Bouaichaoui, Mohamed Debache, Messaoud Hazmoune
EP34	Industrial Wastewater Treatment Using Solar photocatalysis for Achieving Zero Liquid Discharge Aoudjit Lamine, Djamila. Zioui , Belgassim. Boutra, Aicha.Sebti, Sadek. Igoud
EP35	Effect of passivation layer on the silicon solar cell performance Attafi Djemaa, Amjad Meftah, Rami Boumaraf, Noureddine Sengouga
EP37	Valorisation des Matériaux de Construction Biosourcés pour une Maison Passive dans la Zone Semi-Aride de Batna Boulebbina Cherif, Mebarki Ghazali, Rahal Samir
EP38	Graphene Electron Transport Layer and its Influence on the Performances of the Bulk Heterojunction Inverted Organic Solar Cell P3HT: PCBM Chahrazed Dridi, Naima Touafek
EP40	Effect of absorber tube position in parabolic trough solar collector Ben Messai Rahma, Belazizia Abdennacer





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## (MP01 – MP70)

MP001	Caractérisation des Joints Soudés par le Procède SMAW des Aciers pour Pipelines Khamouli farida M. Zidani, K. Digheche, A. Saoudi, L. Atoui
MP003	Étude du comportement électrochimique d'un acier au carbon boruré dans l'acide sulfurique Barkat Med Redouane
MP004	Removal of crystal violet dye from aqueous solutions by Illito-Kaolinitic local clay from El-Oued ( Algeria): Equilibrium and thermodynamic studies Sara Bahemmi, Ammar Zobeidi, Salem Atia, Djamel Atia , Abasse Kamarchou, Hibaterrahmane Yazi
MP005	Influence des sulfates des eaux de mer sur le béton des BCR du port de DjenDjen - Jijel Boumehraz Mohammed-Amin, Mekki Mellas, Farida Boucetta, Alaeddine Boufermel
MP006	The effect of the potential and diameter of silver wires on the performance of the reference electrode Ag / AgCl Seghir Mechaour Salah, Benbouaziz Oussama
MP007	Étude de l'élimination du Co <sup>2+</sup> par adsorption sur une silice mésoporeuse de type CMI-1 Benatallah Lakhdar, Bidaoui Mourad. Sabour Smain, Ouenzar Abdelkader , Malki Abderrahim, Bouchnafa-Said Naima , Mohammedi Ourida
MP009	Theoretical investigation of structural, electronic and magnetic properties of Sr1-xTMxS (TM=Ti and Mn) ternary alloy Hamidane Nesrine, Hakim. Baaziz , Kamel. Baddari and Zoulikha.Charifi
MP010	Structure and proprieties of Al-Nb alloys synthetised by high-frequency induction fusion (Hf) process Layachi Fahima, Mohamed Yacine Debili and Hayette Bedboudi
MP011	A computational approach to reveal the structural geometry and physical properties of AsGen (n = 1-14) Nanoclusters Benaida Meriem, Kamal Eddine Aiadi, Sofiane Mahtout
MP012	Ab initio study of Phosphore-doped germanium clusters properties Zitouni Ikram, Kamal Eddine Aiadi, Omar Bentouila, Meriem Benaida
MP013	Galvanostatic deposition of zinc oxide nanostructures Fatima zohra Nouasria, Djamel Selloum, Abdellah Henni
MP014	Pomegranate peel extract as green corrosion inhibitor for steel in 0.5m hcl solution Marmi Saida, Chala Abdelouahad, Marmi Hayat, Siad Chahinez, Nouadji Malika, Hemeir Abir
MP016	Application of intelligent algorithms for the calculation of interaction parameters in the equilibrium of ternary system Heptane (1), Toluene (2), Aniline (3) at 293 k and 313 k Ayache BOULTIF, Azeddine Kabouche, Noureddine Gherraf, Souad Djermane , Mebarka Sahraoui
MP017	Analysis of Static Bending Behavior of Functionally Graded Plates with Porosities Subjected to Mechanical Loading Using of High Order Shear Theory Merdaci Slimane, Adda Hadj Mostefa, Belghoul Hakima, Hellal Hadjira, Boutaleb Sabrina





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MP018	Effect of the narrow bandgap of n-type Layer on the Performance of a-Si:H Solar Cells Idda Ahmed, Ahmed Idda, Leila Ayat
MP019	Synthesis, crystal structures and characterizations of two new copper(ii) complexes including thioheneacetic acid and imidazole ligands Bouchareb Hasna, Sabrina Benmebarek
MP020	Numerical Modelling of Gravelly Clay Hana Agraine Meriem Fakhreddine Bouali, Abdelhamid Messameh
MP021	Contribution à l'analyse de l'évolution des charges déposées sur des matériaux isolants par la méthode de DPS Zenina Med Laid, K.Smili, L.Herous
MP022	Activation energy of hydroxyapatite formation in kaolin - natural phosphate mixtures Fateh Chouia, Hocine Belhouchet, Toufik Sahraoui
MP023	Caractérisation d'échantillons de sable de dunes de Sidi Slimane et Zaouïa El Abidia en utilisant la diffraction des rayons X (DRX) et la spectroscopie d'infrarouge à transformée de Fourier (FTIR) Benchaa Sayhia, Gheriani Rachid, Mechri Mohammed Laid, Achouri Abd Errahim
MP024	Effet de la structure poreuse sur les propriétés de transfert d'humidité des mortiers de ciment Guelmine Layachi, Deboucha Sadek, Amriou Abderrachid, Ziani Hocine
MP026	Preparation and characterization of new organic membranes for heavy metals separation Zioui Djamilia, lamine Aoudjit, Hanene Aburideh, Zahia Tigrine and Djillali Tassalit
MP027	Lanthanum Substitution Effect on Structure and modulation in Bi <sub>2</sub> Sr <sub>2-x</sub> La <sub>x</sub> CaCu <sub>2</sub> O <sub>8+d</sub> (0 ≤ x ≤ 0.3) Superconducting Compound Mourad Mimouni, Mahboub Mohammed Sadok, Mosbah Mohammed Fayçal, Rihia Ghani, Zeroual Soraya, Ghougali Mebrouk, Beggas Azzeddine
MP028	Réduction de la charge polluante organique de la margine par adsorption sur le charbon actif préparé à base de noyaux de pêches Ziati Mounir, Khelifi Ahmed
MP030	Experimental and simulation study of ZnO based transparent conductor oxide electrodeposited on n silicon substrate to improve the performance of heterojunction solar cells Selmane Naceur, Ali.cheknane, Hikmat S. Hilal
MP033	Etude Thermo-mécanique Des Briques En Terre Renforcées Par Des Fibres Végétale Locale Hachem Chaib, Abdelouahed Kriker
MP035	Effect of number layers on the properties of indium oxide thin film deposited by spin coating technique Rahima Nouadji, A.Attaf, A.Bouhdjer, H.Saaidi, O.Benkhata, S.Chala, R. Messemèche
MP036	Microstructure evolution of Mg-La alloy during annealing at 450 °C Bourezg Yousf Islem, Djazia Elfiad, Hiba Azzeddine, Djamel Bradai
MP037	Mechanical Behavior on damage of Filament Wound composite for hydraulic applications Rekbi Fares Mohammed Laid, Wahiba Djerir, Mabrouk Hecini, Abdelhak Khachai, Mohamed-Ouejdi Belarbi





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MP038	Selection of an Encased Composite Beam in the Process of Rehabilitating a Pre-Stressed Voids Concrete Girder: SHA'AR bridge, Aleppo, Syria
Badache Hacene, Abdul Qader Melhem	
MP040	Study of the mechanical properties of stabilized earth bricks (BTS) based on dam sediment
Gueffaf Nezha, Rebehi Bahia, Boumechedda Khaled	
MP041	Etude de l'effet des Molybdate de Sodium sur la corrosion de l'acier doux (0,19% C) en milieu salin 0,6M NaCl
Marmi Hayat, Siad Chahinez, Chala Abdelouahad, Marmi Saida	
MP043	Use of Treated Domestic Wastewater in Concrete Production "A REVIEW"
Dehane Sarah, A. Kriker	
MP044	On the high temperature magnetotransport properties of the double layered manganite $\text{La}_{1.6}\text{Ca}_{1.4}\text{Mn}_2\text{O}_7$
Belal Ibtihal, F. Denbri, F. Meriche, S.P. Altintas, N. Soyly, C. Terzioglu, N. Mahamdioua	
MP045	Élaboration des couches minces ZnS par déferant source de Zinc par Spin-coating
Aouf Djaber, Sellome Djamal, Hennie Abdellah	
MP046	Optical and electrical Properties, Photoluminescence mechanism of Ni-doped $\text{SnO}_2$ thin films
Teldja Boucherka, Meriem Touti, Nouredine Brihi	
MP048	Effect of cobalt doping on the physical properties of nanostructured nickel oxide thin films
Ghougali Mebrouk, Okba Belahssen, Mourad Mimouni, Ghani Rihia, Mohammed Sadok Mahboub and Azzeddine Beggas	
MP050	Magnetoresistance and thermal coefficient of resistivity of the double layered manganite $(\text{La}, \text{Pr})_{1.6}(\text{Ca}, \text{Ba})_{1.4}\text{Mn}_2\text{O}_7$
Bellouti Akrem, F. Denbri, N. Mahamdioua, A. Bellouti, F. Meriche, S. P. Altintas, N. Soyly, C. Terzioglu, A. Varilci	
MP051	Effet de la vitesse et de la nature du projectile sur le comportement mécanique des structures aéronautiques
Bachiri Abdessamed, Abdessamed Bachiri, Nouredine Djebbar, Benali Boutabout, Boualem Serier	
MP052	The effect of the number of layers on the properties of titanium oxide ( $\text{TiO}_2$ ) thin films deposited by Sol-Gel (spin-coating) technique
Zeribi Fatma, Abdallah Attaf - Lazhar Benmebrouk	
MP053	Etude paramétrique du comportement mécanique des assemblages soudés par points par friction malaxage FSSW
Lounis Abdellah, Ould Chikh El Bahri, Meddah Hadj Miloud, Hachellaf Kaddour, Khellafi Habib	
MP054	Effect of deposition time on structural and optical Properties of $\text{ZnO}$ thin films deposited by spray pyrolysis
Khediri Farid, Hafdallah Abdelkader	
MP055	Determination of the hole drift mobility in stabilized amorphous selenium
Serdouk Fadila, Benkhedir Mouhamed Loutfi	
MP056	Tamanrasset's clay characterization and use as low cost, ecofriendly and sustainable







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	material for water treatment: Progress and challenge in copper Cu (II)
	Aicha Kourim, Moulay Abderrahmane Malouki, Aicha Ziouche, Mouna Boulahba, Madjda Mokhtari
MP057	Effect of Mn doped on the structural, optical and electrical properties of NiO thin films Meriem Touati, Teldja Boucherka, Azzeddine Barbadj, Nouredine Brihi
MP058	Etude électrochimique et caractérisation des produits de corrosion formés à la surface d'acier galvanisé en milieu naturel Boucetta Farida, Belmokre Kamel, Boumehraz Mohammed-Amin
MP059	Influence of SiO <sub>2</sub> concentration on surface properties and corrosion behavior of Ni-SiO <sub>2</sub> nanocomposite coatings Louiza Guerguer, Aicha Ziouche, Ahmed Hamdi, Djamel Ben Bertal, Madjda Mokhtari
MP060	The structural and optical properties of the CH <sub>3</sub> NH <sub>3</sub> PbI <sub>3-x</sub> Cl <sub>x</sub> perovskite films deposited by spin coating Belaidi Itidel, Fatima Khelfaoui, Nadhir Attaf and Mohammed Salah Aida
MP061	Structural and optical properties of N and Mn co-doped ZnO thin films grown by ultrasonic spray pyrolysis method Chebbah Kheira, R. Baghdad, M. Belarbi, A. Belfedal, A. Zeinert, M. Cline
MP062	Optical and structural characterization of ZnS nanocrystals embedded in KBr single crystal matrix grown by Czochralski method Zeroual Soria, Mahboub Mohammed Sadok, Sebais Miloud, Rihia Ghani, Mimouni Mourad, Ghougali Mebrouk
MP063	Effect of dip-coating cycles on structural and optical properties of Fe doped ZnO thin films Bouabida Seddik, Salima Benkara, Houda Ghamri, Nassima Seghairi, Mourad Zaabat
MP064	Thermodynamic assessment of the Bi-Y system Supported by first-principles calculations Dziri Fatima, El-Djamai Belbacha, Yassine Djaballah, Aissa Belgacem Bouzida
MP065	Indium oxide (In <sub>2</sub> O <sub>3</sub> ) thin films : The role of growth rate Azizi Rahil, A. Attaf, H. Saidi
MP067	Simulation by finite element method of wind turbine materials Deghoum Khalil, GHERBI Mohammed tahar
MP069	Comportement d'un alliage d'aluminium (al-mg) déformé et recuit à la corrosion électrochimique Zermane Samira, Soumia Boukhoulouf and Nadjeh Sayeh
MP070	Numerical modeling of cfrp and gfrp strengthened reinforced concrete beams using ansys Sabiha Barour, Abdesselam Zergua, Farid Bouziadi,





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## (TP01 – TP26)

TP01	Cross Sections for Electron Impact Excitations of Beryllium Lifa Amel, Dilmi Samia
TP02	Calcul de la composition du plasma à basse température de mélange CH <sub>4</sub> -H <sub>2</sub> Askri Souhaila, Liani.Bachir, Ferouani. Abdel Karim ,Ailas.Smail, Guedda.El Habib
TP03	Dispersion des particules fines dans un milieu ambiant confiné ventilé Gheziel Athmane, Hanini Salah, Mohammedi Brahim
TP04	Electronic Stark broadening of Be I, Mg I and Ca I using an analytical model based on limits of impact parameter Yasmina Ben Nana, F. Khelfaoui, M. T. Meftah
TP05	The effective potential energy of a two-component plasma Bezzou Halima, Douis Said
TP06	ADS/CFT correspondance Bouraiou Loubna, Ydri Badis
TP07	Dense Astrophysical Plasma Expansion R. Fermous, Rima Mebrek, Mourad Djebl
TP08	Effet de la profondeur sur l'instabilité sous-harmonique des ondes interfaciales tridimensionnelles Ghachi Ibtissem, Debiene Mohamed, Allalou Nabil, Boughazi Dalila, Chikhi Sara
TP09	Modeling study of dielectric barrier glow discharge in Ar/NH <sub>3</sub> mixture at atmospheric pressure GHaleb Fatiha, S.Bendella, B.Larouci And A.Belasri
TP10	A mathematical formulation of the relationship between temperature and surface reaction probability of SiH <sub>3</sub> radicals during a-Si:H growth by PECVD process Hadjadj Saida,Oumelkheir Babahani , Fethi Khelfaoui
TP11	The Microstates of (2+1)-dimensional Black Hole and CFT Hadjer Benmabrek
TP12	Monte Carlo simulations for C/SiO <sub>2</sub> interface in a VP-SEM Hafsi Zoulikha, Mansour Omar, Kadoun Abd Daim
TP13	Exact Solutions of Scalar Bosons in cosmic string and global monopole spacetime Aounallah Houcine, Abdelmalek Boumali
TP14	Effet des températures sur les vitesses de réactions chimiques de mélange gazeux CH <sub>4</sub> /H <sub>2</sub> dans les procédés HWCVD Khelef Nour, Fethi Khelfaoui, Oumelkheir Babahani
TP15	Thermodynamics properties of graphene via a one- dimensional Dirac oscillator fractional Korichi Nabil, Abdelmalek Boumali
TP16	Study of Stokes dynamical system in a thin domain with Fourier condition and friction law Yassine Letoufa, Hamid Benseridi





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TP18	Numerical Analysis of the Electrostatic Potential in Ionosphere R. Mebrek, R. Fermous, M. Djebli
TP19	One Dimensions Modeling Of Dielectric Barrier Discharge in Pure Oxygen at Atmospheric Pressure Using Comsol Multiphysics Mohammed Habib Allah Lahouel, Djilali Benyoucef, Abdelatif Gadoum
TP20	Klein -Gordon equation in Rindler space time Rouabhia tarek imed , Tarek Imed Rouabhia, Adelmalek Boumali
TP21	Blow Up of Semilinear Hyperbolic Equation with variable-exponent nonlinearities Tebba Zakia, Degaichia Hakima, Boulaaras Saleh
TP22	On new extensions of F-contraction with application to integral inclusions Kaddouri Heddi, Said Beloul
TP23	The mathematical analysis of physical problem Otmani Sadok
TP24	The Fractional Schrodinger Equation For a Linear Potential Bouzenna Fatma El-Ghanbazia, Meftah Mohammed Tayeb
TP25	Comparative électron broadening for différent interaction models in plasmas Ghazel Amel, M.T. Meftah, S. Douis
TP26	Emergence of Ising Transition in Multitrace Matrix Model Cherine Soudani, Badis Ydri and Ahlam Rouag





**PROGRAM**

**DAY 2**







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**Tuesday 21<sup>st</sup> January, 2020**

**ORAL COMMUNICATIONS SESSION 2**

**Room 1 (Energy)**

EO16	Processus de passivation des défauts dans une cellule solaire en polysilicium hydrogénée sous plasma MW-ECR Madi Djamel, D. Belfanneche
EO17	Valorization of Low-Grade Iron Ore Applying Dry High-Intensity Magnetic Separation (Dhims), Case Of Rouina Deposit - Ain Defla – Algeria Ali Messai, Idres Abdelaziz, Aguado Juan Maria Minendez, Mebarkia Mohamed
EO18	Analysis of interactions between a centrifugal pump impeller and vaned diffusers with respect to vaneless configuration Sami Sara, A. Atif, A. Dazin, P. Dupont, G. Bois
EO19	Optimisation d'une Centrale Electrique à Cycle Combiné Brahimi Faiza, Khraimeche Hassiba, Khlifati Soumia
EO20	L'influence de nombre des pales et la vitesse spécifique sur les caractéristiques aérodynamique Riyadh Bekkai, Mdouki Ramzi
EO21	Dimensionnement d'un système photovoltaïque pour l'irrigation par pivot dans le Sahara algérien Brik Mohamed, Guerrah Ayoub, Hamidat Abderrahmane, Atia Abdelmalek, Hadji Mohammed Salah, Bouazza Khalifa, Guesba Chouaib, Belila Abdelhamid
EO22	Control of standalone wind energy conversion system based on the induction generator Laddi Toufik, Taib Nabil, Aouzellag Djamel
EO23	Use of glass powder and sand dune in concrete: technical, economic and environmental effects Sofiane Saggai, Wafa Bouaka, Amira Benhaddou, Ibtissam Belaid
EO25	Diagnostic des Différents Pivots D'irrigation Traditionnel Adopté dans la Région d'El-Oued Hadji Mohammed Salah, Guerrah Ayoub, Atia Abdelmalek, Mansouri Khaled and Brik Mohamed





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## Room 2 (Materials)

MO16	Barrage K'sob de Msila : Caractérisation de la Boue de Dragage en vue de sa Valorisation dans la Matrice Cimentaire d'un Béton Ordinaire
Riad Ali Halassa, Mekki Bibi, Mohamed-Aziz Chikouche	
MO17	Ab-initio study of structural, electronic and magnetic properties of Al <sub>1-x</sub> CaxP and Ga <sub>1-x</sub> CaxP alloys
Berrezzoug Djamila Bessa, Djebbar Houma, Lakdja Abdelaziz	
MO18	Amélioration de la réactivité d'une zéolite naturelle par activation thermique et chimique
Meziani Meriem, Baloul Massyl, Bellil Ahmed, Chelouah Nasser	
MO19	Effet des Propriété Mécaniques sur le Choc Thermique d'une Alumine ( $\alpha$ -Al <sub>2</sub> O <sub>3</sub> )
Fissah Belgacem, H. Belghalem, B. Mamen, M. Hamidouche, G. Fantozzi	
MO20	Infra-Red study of five Methods for Isolation Chitin from Algerian truffles Terfezia arenaria
Bouregghda Yehya, Hamid Satha, Farida Bendebane	
MO21	Realization and Characterization of CH <sub>3</sub> NH <sub>3</sub> PbI <sub>3</sub> /c-Si Heterojunction
Fatima Khelfaoui, Itidel Belaidi, Nadhir Attaf And Mohammed Salah Aida	
MO22	Impact du type de béton sur le comportement des ondes ultrasonores
Raach Youcef, Derouiche Yazid, Taleb Soumia	
MO23	Effects of time on the behaviour of concrete-filled steel tubular columns
Rahal Nacer, Beghdad Houma, Souici Abdelaziz, Sadoun Mohamed	





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## POSTER SESSION 2

**(EP41 – EP80)**

EP41	Modélisation et simulation de la machine à réluctance variable par la méthode des éléments finis
Chehda Rabeh, Kada Belghitri Naouel, Benouzza Noureddine	
EP42	Heat Transfer Enhancement of Heat Sources at its Optimum Position in a Square Enclosure with Ventilation Ports
Benouis Fatima Zohra, Yacine Ould Amer	
EP43	Numerical Study of a Heat Exchanger with Eccentric Annular Finned Tube
Issam Fourar, Abdelmoumene Hakim Benmachiche	
EP44	MHD free convection flow of a couple stress fluid in a vertical porous channel with cross diffusion effects and chemical reaction
Hamidatou Smail, M'hamed Tayeb, Messaoudi Noureddine	
EP46	"Heat and Mass Transfer in an Inclined bi-L-Shaped Layered Porous Media: Effect of Buoyancy Ration"
Latreche Abdelkrim, Mahfoud Djezzar	
EP47	Numerical study in three dimensions of influence of the fluids nature and obstacle position on the electronic component cooling
Chadi Kamel, Belghar Nourredine, Guerira Belhi	
EP48	Air Breakdown Characteristics in Rod-Plane Electrode Configuration Under Lightning Impulse
Abdelghani ROUINI, Nabil Derbel, Messaouda Larbi	
EP49	Thermodynamic Performance and Multi-objective Optimization of Regenerative Organic Rankine Cycle for Low Temperature Waste Heat Recovery
Laouid Youcef Abdellah Ayoub, Cheikh Kezrane, Yahia Lasbet	
EP50	"Rheological Study of The Contact Piston-Ring-Shirt in Internal Combustion Engine"
Soualmia Abdelkader, M.Bouchetara, B.Menacer	
EP51	Aspect ratio effect on the mixed convection in a horizontal duct using lattice Boltzmann method
Sahraoui N, M Houat S	
EP52	Upper openings ventilation system study of the building by the lattice Boltzmann model
Bouayed Zine Elabidine, Houat Samir	
EP53	Numerical study of the natural convection impact into a pcm within tubular capsule
Bouzennada Tarek, Farid. Mechighel And Abdelkader Filali	
EP54	Collection probability of back graded band-gap in the Cu(In,Ga)Se <sub>2</sub> absorber layer Solar Cells
Touafek Naïma, Mahamdi Ramdane, Dridi Chahrared	
EP55	Étude de l'influence du chauffage partiel sur la convection naturelle dans une cavité carrée par la méthode de Boltzmann sur réseau





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Benameur Bouamoud, Samir Houat	
EP57	Thermodynamic Remodeling of the Al-Np System Supported by First-Principles Calculations Houda Ghamri, Salima Benkara, Haroun Righi, Yassine Djaballah, Aissa Belgacem-Bouzida
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MP073	Caractérisation de la taille des grains dans un acier au carbone par courants de Foucault Dehina Hocine, Barkat Med Redouane, Halifa Bachir
MP074	Structural, microstructural, and optical properties of $ZnO, Zn_{0.90}Co_{0.05}M_{0.05}O$ (M= Na, Al, Cd, Cu) thin films by ultrasonic spray pyrolysis Roguai Sabrina, Nacira Mecheri, Saida Hoggas, Abdelkader Djelloul
MP075	Structural, Morphological and Optical Properties of Cadmium Carbonate $CdCO_3$ Nanowires Saadi Billal, Redouane Miloua, Khadraoui Mohamed, Mourad Medles, Attouya Bouzidi, Abdelkader Nakrela, Salim Karim, Walid Azzaoui
MP076	Effect of synthesis method on the structural behavior of $CaFeO_{2.5}$ compound Mohammed Sadok Mahboub, Soria Zeroual, Ghani Rihia, Mourad Mimouni, Ouarda Ben Ali, Mebrouk Ghougali
MP077	Influence of waste of plastic on compressive and flexural strength of hollow concrete blocks Sadek Deboucha, Mehsas, Hamoudi Mekhalfi, Abderrachid Amrio, Hocine Ziani, Layachi Guelmine
MP078	Simulation Numérique du Comportement de l'Insert Fémoral d'une Prothèse Totale de Genou Meddour Belkacem, Nessah Soumia
MP080	Caractérisation des structures sandwichs à base du renfort naturel unidirectionnel Bouzit Fatima, Dilmi H., Bezzazi B., Ferguen B., Bensifi H
MP081	Optimisation multi-objective de la rugosité de surface et du débit de copeau lors du tournage de l'acier fortement allié X210Cr12 Safi Khaoula, Mohamed Athmane Yallese, Salim Belhadi, Salah Hadjela, Tarek Mabrouki
MP082	Characterization of Concrete by using Bulk Longitudinal Ultrasonic Waves at Low Frequencies Slimani Hana, Cheniti Nesrine, Abdelli Kamal, Boutkedjirt Tarek
MP083	Study of New Antimony Phosphate Glasses Agti Fatima Zohra, Mohamed toufik Soltani, Mourad Baazouzi
MP084	Preparation of al-doped $TiO_2$ thin films deposited by sol-gel technique Hanini Faouzi, Faouzi Hanini, Abderrahmane Bouabellou, Yassine Bouachiba, Adel Taabouche, Fouad Kermiche
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MP086	Effect of europium doping on the garnet (gd1-xlux) 3al 5o 12 (x=0.2, 0.3) solid solutions
Lanez Imane, Brahim Rekik, Mourad Derbal, Manel Draï, Amir Chaib	
MP087	Claviceps purpurea fungus: a promising biosorbent for wastewater treatment
Amourache Mounia, Amira-Guebailia Habiba & Houache Omar	
MP088	On the low temperature magnetoresistance properties of La <sub>0.7</sub> Ca <sub>0.18</sub> Ba <sub>0.12</sub> Mn 0.95Al <sub>0.05</sub> O <sub>3</sub> simple perovskite manganite
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MP106	Structural and optical properties of Co-doped SnO <sub>2</sub> films Kadidja Chedala, Benhaoua Othman, Gherani Rachid, Segueni Leila and Lakdar Ayachi
MP107	Structural, Optical and Electrical Properties of NiO:Cu Thin Films Belahssen Okba, Mebrouk Ghougali
MP108	Study of the structural and optical properties of nanostructured copper oxide thin films Begui Mohamed, Mebrouk Ghougali
MP109	Structural and microstructural parameters of crystalline phases in Sand Dunes of Ouargla (Algeria) Khouloud Hadjadj, Smail Chihi and Mohamed.Bououdina
MP110	Inverse Problems using Genetic Algorithm for Characterization in Materials Ben Moussa Oum Salama, Bouchala Tarek and Ayad Ahmed Nour Elislam
MP112	Investigation of the structural, optical and electrical properties of Zinc Oxide Co-Doped with Fluorine and Cobalt Diha abdallah, Lahcene Fellah, Said Benrameche
MP113	Antioxidant Activity and Chemical Composition of the Essential oil of Brocchia cinerea growing wild in South East Algeria Abderrezak Abadi
MP114	Optical Properties of ZnO by Sol Gel Method Zaiour Asma, Benhaya Abdelhamid
MP115	Preparation and study of ceramics based on kaolin DD3 with the addition of tri-calcium phosphate Lazhar Foughali, Mariem Alleg, Zineb Djebayliya, Ferhat Bouzerara
MP116	Physicochemical properties of Sr <sup>2+</sup> , Fe <sup>3+</sup> and Al <sup>3+</sup> doped TiO <sub>2</sub> monolith prepared by Sol-Gel approach Abderraouf Jraba, Zohra Anna, Elimame Elaloui
MP117	Rare earth doped TiO <sub>2</sub> : Understanding the effect of Dy <sup>3+</sup> doping on the stabilization of TiO <sub>2</sub> sol and the sol-gel TiO <sub>2</sub> growth Elghniji Kais, Chaima Ouled Amor, Aurel Pui, Younes Moussaoui, Ridha Ben Salem, Elimame Elaloui
MP118	High efficiency and uniform distribution of pump-radiation absorption in Nd: YAG solar-laser system with end-side-end pumping configuration Noureddine Hamrouni, Said Mehellou, Ferhat Rehouma
MP119	Suppression of Superconductivity in the Bi <sub>2</sub> (Sr Ca) CuO <sub>y</sub> F <sub>x</sub> Compounds (x = 0, 0.2 and 0.4) of Fluorine-doped Bi-2201 Phase Boudjaoui Samia, Abderrezak Amira, Nabil Mahamdoua, Sevgi Polat Altintas, Nevin Soylu, Ahmet Varilci, Cabir Terzioglu
MP120	Influence of Sn/Zn Molar Ratio on the Structures Photoluminescence and Electrical Properties of SZO Film Grown by Nitrogen Pneumatic Spray Pyrolysis







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MP122	Evolution de la structure et de la conductivité électrique de la phase $r0.95Ce0.05TiO3$ en fonction de la methode de préparation Farida Bouremmad, F. Bouremmad, S. Shawuti, M.A. Gulgun
MP123	Propriétés structurale et optique des poudres de manganite $La0.7Ba0.2Ca0.1Mn1-xZnxO3$ ( $x=0.0$ et $0.1$ ) synthétisées par la méthode de réaction à l'état solide MERICHE Faiza, Mahamdoua Nabil, Bettine Khadidja, Zerrouk Imad-Eddine, Sevgi Polat-Altintas
MP124	L'effet de la Méthode de Synthèse sur la Formation de la Structure du Composé $Ca0,7sr0,3feo2.5$ Rihia Ghani, Mohammed Sadok Mahboub, Soria Zeroual, Mourad Mimouni, Mebrouk Ghougali
MP125	Etude expérimentale du retrait des bétons de sable renforcés par des fibres Mani Mohamed, Logbi. Abdelaziz, Tarekdjedid, Kriker Abdelouahed
MP126	The effect of thiourea concentration on the properties of CdS thin films prepared by CBD Beggas Azzeddine, Mahboub Mohammed Sadok, Rihia Ghani, Mimouni Mourad, Ghougali Mebrouk
MP127	Effet du traitement thermique sur la corrosivité de l'acier dans un milieu $H2SO4$ Largot Hanane, Bouzid Noureddine
MP128	Effects of Al content and annealing duration on the structural, morphological and photocatalytic properties of $TiO2$ thin films. Beldjebli Ouidad, Bensaha Rabah
MP129	Olive mill wastewater treatment by successive coagulation, flocculation, sedimentation and adsorption Muna A AbuDalo, Jehad Abdelnabi, Nathir A.F. Al-Rawashdeh, Borhan Albiss and Abeer AlBawab
MP130	Measurement Of the thermoelectric properties of $Pd81Ge19$ alloy as a function of time Achouri Abderrahim, Benkrima Yamina, Benmabrouk Lazhar, Mohammedi Lazhar, Bergoug , Benchaa Sayhia, Boukraa Aomar
MP131	On the bending and vibration analysis of skew multilayered sandwich plate BELARBI Mohamed-Ouejdi, A. Tati, A. Khechai, M. L. Djouama, F. M. L. Rekbi
MP132	Ab Initio study of structural, electronic and magnetic properties of $RhFeSi$ ternary Heusler alloy Benaddi Fatiha, Mohammed Ameri , Fadila Belkharroubi
MP133	Development and characterization of PZT ceramics with $ABO3$ perovskite structure, doping effect Yasmina Djoudi, Fares Kahoul
MP134	Electrical investigation of a photo-sensible heterostructure presenting a resistive switching phenomenon: $Au/TiO2/ZnO:Al4\%/p-Si$





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Baira Fayçal, M.Zidani, M.Bayarassou, T.Djimaoui, S.Messaoudi, And T.Baudin	
MP136	Microstructure and Mechanical Behavior of High-Carbon Steel Wires
Ahmed Kistrane-Bouzidi, Mosbah. Zidani, Fayçal. Baira, Salim. Messaoudi And Tahar. Abid	
MP137	Effet du traitement de vieillissement sur les propriétés structurales et mécaniques d'un fil en alliage AGS tréfilé industriellement
Bayarassou Mokhtar, M. Zidani, F.Baira	
MP138	Enhanced properties of metal supported nanoparticles : A structural and optical study
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MP140	Adsorption des margines par des argiles modifiées
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# ABSTRACTS



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ID: EO01

**Convection forcée dans un radiateur à faisceau de tubes ovales inclinés**

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**Abstract:** Le comportement de transfert de chaleur par convection forcée pour un écoulement d'air turbulent dans un échangeur de chaleur de tubes ovales à ailettes a été examiné dans ce travail. L'investigation est basée sur le test des effets de l'angle d'inclinaison des tubes ( $\alpha$ ) sur le coefficient de transfert de chaleur et le coefficient de frottement. L'angle d'inclinaison des tubes ovales varie de  $0^\circ$  (cas de référence) à  $90^\circ$  avec  $10^\circ$  de pas. L'écoulement de fluide et les caractéristiques de transfert de chaleur sont présentés pour des nombres de Reynolds varie de 3 000 à 12 000. Toutes les simulations sont réalisées à l'aide du CFD Fluent. Les résultats obtenus montrent que l'angle d'inclinaison de tubes de  $20^\circ$  représente une meilleure conception qui peut éliminer d'une manière significative les points chauds derrière les tubes, et en conséquence il génère une augmentation du coefficient de transfert de chaleur de 13% par rapport au cas de référence ( $\alpha = 0^\circ$ ).

**Keywords:** Convection forcée, tube ovale, nombre de Nusselt, Coefficient de frottement.







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ID: EO02

Influence des Paramètres Géométriques des Cuve Agitées sur le Comportement Rhéologique de fluide

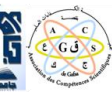
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**Abstract:** L'étude numérique de l'influence de la forme du fond bombé-plat en approchant de la turbine à pales inclinées sur la structure hydrodynamique d'une cuve agitée. Les équations de Naviers-Stokes régissant le phénomène sont résolues par une méthode de discrétisation aux volumes finis. Le model de turbulence utilisé est du type k- $\epsilon$  sur une plage étendue de nombres de Reynolds 45000, pour un fluide Newtonien non visqueux. Les résultats issus de l'application du notre code de dynamique des fluides numérique (CFD) CFX.

**Keywords:** Agitation, Turbine PBT6, hydrodynamique, CFD. turbulence.





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ID: EO03

**Heat dissipation in an electronic device**

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**Abstract:** The present numerical investigation which focuses on the forced convection mechanism is carried out to analyze both of the heat transfer and fluid flow characteristics in a pin fin heat sink (PFHS). A new pins design has been proposed, which consists in a pyramid pin fins form characterized by a parameter named ratio of pyramid (ROP), varies from 0 to 1 with a step of 0.2. A three others configurations (cylindrical, rectangular and square) are well carried out to validate the new design. The investigations are achieved using COMSOL Multiphysics 5.4 software based on the finite elements method for a Reynolds number ranging from 8547 to 21367. Some numerical results are validated with existing experimental data and a satisfactory agreement is found. The numerical results show the important role of the pyramid pin fins shape in the hydro-thermal performance enhancement, where the case of  $ROP = 0.8$  is the best design that assures 59 % rise in the heat transfer coefficient, with a lowest percentage in thermal resistance of 150 % compared with cylindrical pin fins.

**Keywords:** Pin fin; Heat transfer; Heat sink; Pyramid; Thermal resistance.



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ID: EO06

**Robust Control of Reactive Power Compensation Using a Three-Level NPC Inverter Topology**

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**Abstract:** This paper presents a dynamic performance analysis of an Advanced Static Var Compensator (ASVC) using three-level Neutral Point-Clamped (NPC) Voltage Source Inverter (VSI). The nonlinear state space model of the tree-level ASVC is obtained from the d-q axis frame. The effectiveness of this compensator highly depends on the choice of the control strategy. The proposed State Feedback Control (SFC) concept is applied to adjust the ASVC Var flow with the ac transmission network. The controller is evaluated under a variety of operating conditions and the simulation results demonstrate instantaneous and robust Var flow with the ac transmission system and the superiority of the performance compared to an ASVC based on Internal Model Control technique (IMC).

**Keywords:** FACTS; ASVC; IMC Control; State Feedback Control.



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ID: EO07

**Design and Modeling of a DD- PMSG for Production and Injection of the Wind Energy to the Grid**

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**Abstract:** The objective of this work is the design and the modeling of a low speed surface permanent magnet synchronous generator (SPMSG) for production and injection of the wind energy to the grid. The geometrical design of the generator is performed analytically according to the imposed technical specifications and constraints. To verify, and examine the geometrical design, an internal modeling concerning the electromagnetic behavior of the generator is done using a finite elements method under Ansys Maxwell RMXpert software. Afterwards, a modeling and a simulation of the designed SPMSG connected to the grid via a power electronic converter is simulated with Matlab/Simulink software to illustrate the produced and the injected wind energy to the grid.

**Keywords:** SPMSG; Design; Modelling; Finite Elements Method; Wind Energy Conversion System







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ID: EO08

**Improved-fuzzy management algorithm for standalone PV Battery Micro-grid**

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**Abstract:** A double stage single-phase photovoltaic islanded micro-grid is investigated within this paper. The used DC-DC boost converter, which steps up the Photovoltaic generator output voltage, is controlled applying an improved fuzzy based Maximum Power Point Tracking (MPPT) technique. A bidirectional DC-DC converter is incorporated between the battery storage and DC-inverter side to manage the power flow, through an outer PI voltage control and a fuzzy inner current control. The H-bridge inverter is used to supply AC loads. This latter is controlled via fuzzy-PWM regulator to get sinusoidal voltage and current. The control is fulfilled investigating the proposed management strategy. The whole system is implemented and tested in MATLAB/Simulink platform under illumination changes. The results obtained clearly show an increase in power quality, fast response time and better performances of the proposed structure.

**Keywords:** PV ; Standalone micro-grid; Management; Battery storage; MPPT; fuzzy control; PI control.





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ID: EO09

**Numerical Investigation of Convection Heat Transfer in a Horizontal Channel with an Open Trapezoidal Cavity and Different Heat Source Locations**

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**Abstract:** In this work, a numerical study of mixed convection inside a horizontal channel with an open trapezoidal enclosure subjected to a discrete heat source in different locations is carried out. The heat source with the length of  $\varepsilon = 0.75$ , is maintained at a constant temperature. The air flow with a fixed velocity and a cold temperature, enters the channel horizontally. The other walls of the enclosure and the channel are adiabatic. The results are presented in the form of the contours of velocity, isotherms and Nusselt numbers profiles for various heat source locations, Prandtl number ( $Pr = 0.71$ ) and Reynolds number ( $Re = 100$ ) respectively. The distribution of the isotherms depends significantly on the position of the heat source. We noted that the best heat transfer is detected where the heat source is placed in the middle of the left wall.

**Keywords:** Convection, Open trapezoidal enclosure; Heat source location; Heat transfer; Horizontal channel.





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ID: EO11

**Study of the Natural convection of non-Newtonian Power-Law Fluid between an Outer Cylinder and Inner Horizontal Flat Tube**

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**Abstract:** Natural convection in two-dimensional region formed by horizontal flat tube concentrically located in cooled horizontal cylinder is studied numerically. The model solved using the ANSYS CFX package. The numerical simulations covered a range of power-law index from 0.6 to 1.4,  $10 \leq Pr \leq 103$  and Rayleigh number  $103 \leq Ra \leq 105$ . The effects of the previous parameters on the average Nusselt number and the dimensionless temperature have been investigated. The results showed that the average Nusselt number increases with increasing Rayleigh number and decreases with increasing the power-law index. The best case among the range of parameters considered here is the heat transfer rate of pseudo-plastic fluids ( $n=0.6$ ), then the Newtonian fluids ( $n=1$ ) and finally, the dilatant fluids ( $n=1.4$ ). So the pseudo-plastic and dilatant fluids are more efficient than Newtonian fluids for cooling and insulating purposes, respectively. It is shown that as the Rayleigh number increases the cooling effect of pseudo-plastic fluids and the insulating effect of dilatant fluids become more pronounced. The results for the average Nusselt number and the dimensionless temperature had been compared with previous works and showed good agreement.

**Keywords:** Natural convection, Non-Newtonian fluid, Power-law model, Horizontal flat tube, Nusselt number.





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ID: EO12

**Comparative Study of Thermo-chemical Properties of CH<sub>4</sub> and Biofuel Combustion**

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**Abstract:** This work presents a numerical study of non-premixed combustion in burner supplied by two coaxial jets; for two type of fuel (Biofuel, Methane). The computational modeling is based on the coupled models LES/ PDF in order to describe the thermo-chemical characteristics of turbulent combustion: mass fraction of carbon monoxide and temperature. Indeed, the obtained results show a good agreement with the experimental data. Also, they confirm that the considering biofuel is a clean fuel, and it does not produce carbon monoxide emissions in combustion.

**Keywords:** Keywords—Non-premixed Combustion, Methane, Biofuel, Turbulence, LES/ PDF models, CFD.







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ID: EO13

**Computational Parametric Analysis of Non-Premixed Combustion of (Hydrogen- Propane)/Air**

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**Abstract:** In this study, we have numerically studied the behavior of non-premixed turbulent combustion (Hydrogen- Propane)/Air, generated by a cylindrical burner. Numerical simulations were performed using the CFD business calculation code "FLUENT". Mathematical methods were used to solve the Navier-Stokes equations governing the phenomenon flow. The characteristic parameters of the flow were calculated: axial velocity, temperature and the mass fraction of carbon monoxide CO. In addition, the previously considered parameters are used in the study of combustion behavior. The main objective of this work is to study the behavior of these parameters following the change of H<sub>2</sub>-C<sub>3</sub>H<sub>8</sub> fuels in the air. The results obtained show that fuel variation influences the parameters studied. Hydrogen is a clean fuel with no CO emissions in the environment. Besides this fact, the hydrogen gas velocity in the flame is significantly higher by comparing it to the propane gas velocity.

**Keywords:** CFD Simulation; Fuel Hydrogen; Fuel Propane; Non-Premixed Combustion; Turbulence.





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ID: EO14

**Amélioration du Confort Thermique dans les Bâtiments Anciens en Algérie**

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**Abstract:** Dans la plupart des logements en immeuble collectif en Algérie, le système de chauffage adopté est constitué d'un simple poêle à gaz posé à l'entrée de l'appartement. Ce système induit des surchauffes, des consommations énergétiques importantes pour le chauffage et un inconfort thermique. Il est d'usage de penser que pour pallier à ces inconvénients, il suffit de remplacer le poêle à gaz par un système de chauffage central à eau chaude. Ce travail montre à travers des simulations numériques pour un logement type situé à Alger que le confort thermique n'est atteint que si une isolation thermique des parois est envisagée.

**Keywords:** Bâtiment, confort thermique, chauffage, isolation thermique, simulations.





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ID: EO15

**3D Natural Convection Flow in an Open Agricultural Greenhouse in the Presence of the Plants**

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**Abstract:** In this work, we are interesting to the numerical simulation of natural convection in an open greenhouse heated by tubes in the presence of ridge (50 % and 100 %). A greenhouse box subjected to different boundary conditions on the roof like the imposed temperature; convective flux and mixed flux. The mathematical model is a system of differential equations formed by the continuity, momentum conservation and the energy equation. We used Fluent Software for numerical simulations based on a finite volume method. In each case, we have determined the average velocity and the average temperature of the air. The obtained results presented as well as isothermal lines, vectors velocity and the profiles of temperature and velocity.

**Keywords:** Greenhouse, Natural Convection, plants, 3D simulation.





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ID: EO16

## Processus de passivation des défauts dans une cellule solaire en polysilicium hydrogénée sous plasma MW-ECR

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**Abstract:** Le présent travail décrit un processus de passivation des défauts par l'hydrogène dans une cellule solaire en polysilicium afin d'améliorer les propriétés électriques du matériau et par la suite atteindre des rendements de conversion photovoltaïque élevés. Pour ce faire, nous avons exécuté des traitements d'hydrogénation, dans un réacteur à décharge micro-onde assistée par la résonance cyclotronique électronique (MW-ECR), sur des cellules solaires n+pp+ en polysilicium et n+p en monocilicium afin d'analyser et de corrélérer, respectivement, l'amélioration de la tension en circuit-ouvert et l'évolution de la désactivation du bore dans la région de la base p des cellules. Les résultats obtenus montrent clairement une augmentation significative de la tension en circuit-ouvert au fur et à mesure que la puissance de décharge micro-onde du plasma est élevée. Néanmoins, les valeurs mesurées sont nettement supérieures pour un émetteur moins dopé au phosphore comparé à ceux fortement dopés, ce qui confirme que la diffusion de l'hydrogène en volume de la cellule est d'autant empêchée que le niveau de dopage de la région de l'émetteur est élevé. Toutefois, la tendance des valeurs de la tension en circuit-ouvert à la saturation pour des puissances de décharge micro-onde du plasma élevées témoigne que l'hydrogène peut également produire de nouveaux défauts au sein du polysilicium. Ce dernier constat a été bien vérifié sur des cellules solaires en monosilicium. Par ailleurs, l'hydrogène neutralise le bore et engendre un gradient de concentration entre la limite de la zone de charge d'espace et la profondeur de la région de la base p de la cellule solaire. En conséquence, nous avons admis l'existence d'un champ électrique qui encourage la passivation des défauts à travers une diffusion plus profonde des atomes d'hydrogène en volume du polysilicium. De plus, l'analyse appropriée des résultats nous a permis de proposer un chemin crédible suivant lequel la passivation des défauts par l'hydrogène s'effectue dans des cellules solaires en polysilicium.

**Keywords:** cellule solaire; passivation; hydrogenation; désactivation; tension en circuit-ouvert







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ID: EO17

**Valorization of low-grade iron ore applying dry high-intensity magnetic separation (dhims), case of rouina deposit - ain defla – algeria**

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**Abstract:** The growing demand of iron ore as a raw material coupled with the deterioration and exhaustion of high-grade iron ore deposits is a serious problem for the steel industry on a global scale which attracted attention for utilizing slimes, rejects and low-grade iron ores. The deposit of Rouina is one of oldest operated mines of iron ore in Algeria, its product is destined to be used in the field of cement industry because the extracted raw material is considered like a low-grade ore. The present paper investigates in the one hand its physico-chemical and mineralogical composition and in the other hand studying the ability of Rouina iron to be upgraded. However, the characterization which was carried out by (XRD, XRF, and SEM) shows that this iron ore is classified as a low-grade iron ore (44.12%), rich of clay-siliceous materials such as Alumina and silica with 7.77%23.12% and respectively. The data collected after the application of washing monitoring by dry magnetic separation show significant results in magnetic products obtained with 75.83% of iron oxide against 2.15%  $Al_2O_3$  and 2.03%  $SiO_2$  which make it able to be used in other different fields.

**Keywords:** Rouina, Characterization, Low-grade, High-grade, Magnetic separation





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ID: EO18

**Analysis of interactions between a centrifugal pump impeller and vaned diffusers with respect to vaneless configuration**

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**Abstract:** The paper refers to the analysis of interactions between the impeller and the vaned diffuser of a centrifugal flow pump tested in air. The effects of interaction are highlighted by comparing to vaneless configuration. The vaned diffuser comes with two shapes: channel type and cascade type. The study deals with unsteady numerical simulations of the flow for complete 3D geometries of impeller and diffusers in order to capture the full interaction effects. The task is conducted close to design operating conditions. The results focus on the flow pattern at the outlet part inside the impeller and influence from the diffuser vanes. Results are compared to available PIV measurements. **Keywords:**

**Keywords:** Centrifugal Pump – Centrifugal impeller – Vaned Diffuser – Vaneless Diffuser – Impeller/Diffuser interaction – Flow Simulation





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ID: EO19

**Optimisation d'une Centrale Electrique à Cycle Combiné**

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**Abstract:** Ce travail est consacré à la comparaison des performances énergétiques et économiques de différents systèmes de captage post combustion de CO<sub>2</sub> appliqués aux centrales électriques de type cycle combiné à gaz naturel. Ces systèmes sont le captage par absorption chimique, par séparation membranaire et par distillation cryogénique. Ces systèmes sont évalués afin d'avoir des indices pour sélectionner les meilleures options pour diminuer les émissions de CO<sub>2</sub>, gaz à effet de serre, de l'installation électrique à cycle combiné. La comparaison de ces procédés a montré, qu'à court et à moyen terme, le captage par absorption chimique est le procédé le plus intéressant pour le cas de l'installation à cycle combiné.

**Keywords:** optimisation, captage CO<sub>2</sub>, cycle combiné, environnement, effet de serre





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ID: EO20

**L'influence de nombre des pales et la vitesse spécifique sur les caractéristiques aérodynamique.**

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**Abstract:** Ce travail a pour objectif de mettre en évidence l'effet du nombre des pales Nb et de la vitesse spécifique sur les efforts et les paramètres aérodynamiques. Les résultats d'une analyse basée sur la théorie de BEM montrent qu'il existe un nombre idéal des pales  $NB = 3$  qui donne à son tour le coefficient de puissance le plus élevé,  $C_p$ , pour les stations radiale et la vitesse spécifique  $\lambda = 12$  donne le meilleur facteur de puissance.

**Keywords:** Vitesse spécifique; Bem ; Le coefficient de puissance ; Aérodynamique ; Pales







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ID: EO21

**Dimensionnement d'un système photovoltaïque pour l'irrigation par pivot dans le Sahara algérien**

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**Abstract:** Ce travail porte sur l'exploitation de l'énergie photovoltaïque en tant qu'approche pour alimenter en énergie le pivot central d'irrigation adapté dans le secteur de l'agriculture dans le sud algérien. L'augmentation continue de l'installation de ces machines empêche le réseau de leur fournir de l'énergie, d'autant plus qu'un nombre important d'entre elles ont été installées à l'écart de ce dernier. Vu l'ensoleillement très présent en Algérie l'utilisation de l'énergie solaire pour l'agriculture est devenu très important. Quatre exploitations agricoles contenant quatre pivots, deux pivots modernes du type ANABIB et deux pivots traditionnels installés respectivement à El-Hadjera et El-oued ont été choisis pour évaluer expérimentalement leur consommation électrique à l'aide de l'analyseur d'énergie électrique. Le logiciel PVsyst a été utilisé pour simuler le système photovoltaïque autonome approprié de chacun des pivots étudiés.

**Keywords:** pivot central; consommation; évaluation; système photovoltaïque; pompage solaire; Sahara algérien



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**Control of standalone wind energy conversion system based on the induction generator**

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**Abstract:** In this paper, the control voltage at the output of a squirrel cage induction generator connected to a PWM rectifier is studied. This generator is used for a stand-alone wind energy conversion system. The control strategy should keep the dc voltage across the capacitor constant and equal to the reference value. For this, the passivity based control (PBC) is proposed. To highlight to its robustness and reliability, it is compared with the field oriented control (FOC). The two control techniques are being tested: In both control techniques, the effect of saturation is taken into account in the model of the machine. Finally, simulation results show the effectiveness of the proposed control strategy.

**Keywords:** squirrel cage induction generator, Wind turbine, Saturation phenomeneous, flux oriented control, passivity based control





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ID: EO23

**Use of glass powder and sand dune in concrete: technical, economic and environmental effects**

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**Abstract:** Cement and alluvial sand are very essential materials in concrete preparation. the first material its production contributes to the emission of greenhouse gases in particular CO<sub>2</sub> and the second its intense exploitation represents a danger on the extinction of its deposits. the use of glass waste to partially replace cement and dune sand to replace a small amount of alluvial sand appears as a magic solution that solves several problems at once (disposal of glass waste, reduction of emissions gas and preservation of construction sand deposits). the objective of this study is to verify the effects of these partial replacements on concrete properties, its cost and the reduction of CO<sub>2</sub> in the atmosphere. for this, three types of concrete are prepared: a control (0% of WGP); mixture 1 (10% WGP); and mixture 2 (20% WGP). in all three types, 5% of alluvial sand is replaced by dune sand. Obtained results show that these partial replacements do not affect the porosity, they give good indices as regards the speed of propagation of the sound in the concrete especially for the case of mixing 2 after 28 days but it does not increase the concrete performance with respect to compressive strength.

**Keywords:** WPG, dune sand, porosity, UPV, compressive strength, CO<sub>2</sub>.



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**Diagnostic des Différents Pivots D'irrigation Traditionnel Adopté dans la Région d'El-Oued**

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**Abstract:** Le système d'irrigation pivot traditionnel utilisé dans la région d'El Oued devenu très important, en particulier en tant que pilier économique national. L'objectif de ce travail est de évalué la performance hydraulique des différents systèmes pivot d'irrigation installé dans la région de El-Oued après, de développé une méthodologie basée sur des équations hydrauliques pour améliorer la performance de ces systèmes traditionnels. Les résultats montrent la possibilité et l'importance d'améliorer les performances hydraulique de ces systèmes par le changement de positions des buses jusqu'à attendre plus de 80% de coefficient d'uniformité de Hermann et Hein. Aussi, cette recherche réalise une comparaison hydraulique entre huit pivots différents installés sur la région de l'EL Oued. En termes de distribution régulière de l'eau sur le sol l'étude constate que la conception n'était pas conforme aux normes Internationales, car ces performances hydrauliques étaient extrêmement médiocres. Il est prévu que cette étude serve de point de départ à partir duquel une uniformité améliorée pourra être développée à l'avenir.

**Keywords:** Irrigation, pivot traditionnel, performance hydraulique, coefficient d'uniformité, buses.







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**Etude des pertes thermiques d'un prototype solaire à concentrateur linéaire de Fresnel**

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**Abstract:** L'absorbeur d'un concentrateur solaire de Fresnel s'échauffe et perd de la chaleur vers l'extérieur sous forme essentiellement de rayonnement et de convection. Cette perte peut être caractérisée par un coefficient de pertes thermique  $U$  généralement ramené à la surface des miroirs. Un fluide caloporteur refroidit l'absorbeur en emportant la chaleur utile qui est ensuite convertie ou transférée pour différents usages.

L'objectif du présent travail est de présenter une analyse du comportement thermique d'un récepteur solaire à concentration de type Fresnel.

Une simulation des transferts thermiques en utilisant le logiciel Fluent a été effectuée afin de déterminer les différentes pertes thermiques dans le récepteur à savoir les pertes convectives et radiatives et cela dans les différents éléments du récepteur (le tube, la vitre et le bardage).

La distribution de la température dans l'absorbeur, les pertes thermiques linéiques, et les pertes thermiques globales ont été déterminées, analysées et discutées.

**Keywords:** énergie solaire, concentrateur solaire à miroirs de Fresnel, les pertes thermiques, les pertes radiatives, les pertes convectives.





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**Conception et optimisation d'un STHE muni des obstacles orientés**

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**Abstract:** Le présent travail est consacré à l'étude de performance thermo-hydraulique d'un échangeur de chaleur à faisceaux tubulaire et calandre (STHE). Des simulations numériques tridimensionnelles ont été effectuées pour examiner l'effet de ces deux paramètres : l'espacement entre les chicanes (106.6, 80 et 64 millimètres) et l'angle d'orientation ( $45^\circ$ ,  $90^\circ$  et  $180^\circ$ ) afin d'évaluer le coefficient de performance thermique en fonction de nombre de Reynolds qui s'étend de 3000 à 10000. Par rapport à un échangeur de chaleur à faisceaux tubulaires sans chicanes le coefficient de performance thermique le plus élevé de 3.55 a été enregistrée pour l'angle d'orientation de chicane de  $180^\circ$ , à 64 millimètres d'espacement.

**Keywords:** énergie, échangeur de chaleur, chicanes segmentaire, efficacité énergétique, transfert thermique.





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**Analyse des Champs Dynamique, Thermique et Massique d'un Ecoulement d'un Nano-fluide à Couple-Contrainte MHD en Convection Double Diffusive Assistée le Long d'un Canal Vertical**

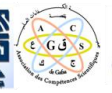
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**Abstract:** Dans ce travail, l'écoulement d'un nanofluide à couple-contrainte dans un canal vertical avec transfert de chaleur et de masse en présence d'un champ magnétique en tenant compte du mouvement Brownien et de la thermophorèse a été simulé numériquement à l'aide de Matlab suivant le code bvp4c. Les équations différentielles partielles non linéaires régissant cet écoulement particulier sont transformées en un système d'équations différentielles ordinaires via la technique de similarités. L'influence des paramètres, tel que le paramètre du mouvement Brownien et celui de thermophorèse, le nombre caractérisant la rhéologie du fluide ainsi que celui du champ magnétique, sur les champs de vitesse, de température et la fraction volumique en nanoparticules ainsi que le taux de transfert de chaleur et de masse est mise en évidence. La rhéologie du nanofluide et le champ magnétique sont fortement impactant sur le profils taux de transfert de chaleur et de masse, tandis que le paramètre du mouvement Brownien favorise le transfert de chaleur.

**Keywords:** Transfert de chaleur et de masse, MHD, Nanofluide à couple-contrainte, Similarité





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**Étude d'un Générateur Photovoltaïque pour la Station d'épuration de la Commune de Maoussa**  
**Wilaya de Mascara**

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**Abstract:** Dans cet article, nous avons étudié le dimensionnement et les performances d'un générateur photovoltaïque (GPV) pour la station d'épuration de la commune de Maoussa wilaya de Mascara. Pour la réalisation de ce travail, nous avons utilisé le logiciel PVsol pour étudier les différentes caractéristiques I-V et P-V en fonction de rayonnement à la température ambiante. Nous avons également étudié l'évolution du rendement de ce générateur en fonction de rayonnement et la température. Cette étude a donné des résultats très satisfaisants, ainsi que ces résultats ont montré que le générateur photovoltaïque étudié peut fournir l'énergie électrique nécessaire au fonctionnement de cette station

**Keywords:** Energie solaire, Photovoltaïque, PVsol







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**Atmospheric Depollution by Non-Thermal Plasmas**

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**Abstract:** The Pollution is a very present reality in our environment, and in many completely different forms. Although the various conventional techniques of depollution have been known for a very long time, the decontamination by "cold plasma, non-thermal" is a field research and very opens application. The use of non-thermal cold plasma reactors generated by Corona discharges is used as one of the most promising techniques for the creation or destruction of nitrogen oxides. For this reason, we constructed a geometric model from the gaseous mixture of a cylindrical corona discharge, and from the kinetic model, the simulation results of the discharge by COMSOL software are obtained, which allowed us to study the changes in the density of the mixture as a function of the radius of the discharge.

**Keywords:** Depollution, Cold plasma, Corona discharge, Nitrogen oxides, Density.





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**Influence of front and back contacts on photovoltaic performances of ZnO/CdS/CZTS solar cell**

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**Abstract:** The objective of this study is the improvement of the device efficiency while varying the contacts, thickness of the various layers, the CZTS system energy band-gap and the varying of the temperature. Our results showed that cells with optimal and available values of contacts of 0.27 eV for front contact and 0.79 eV for back contact give conversion efficiency of 18.22%. Furthermore, the higher performance of these cells is obtained for low operating temperature.

**Keywords:** CZTS, solar cell, efficiency, AMPS-1D.





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**Study of interactions organic pollutant/clay anionic for environmental protection**

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**Abstract:** "Because of the increased use of pesticides in order to satisfy the economic needs in the agriculture production which is more and intensive. Many studies are done on the consequence of these pesticides on the soil and their pollution treatment [1]. The interest of the double lamellaire hydroxides (HDL) in this field consist first of all in their exchange properties which offer the caught of the pollutants; on the other hand, in their use as a model of soil to the comprehension the pollution phenomenon. The present work deals with how to catch. The pesticide Methomyl within the phase  $Mg_{1-x}Al_x(OH)_2[X_nH_2O]$ . the isotherme modelisation absorption by Freundlich equation, completed RX and IR analyses permit to precise the interaction mechanism[1][4].

The isotherme shape varies depending on the intercalary nature. To move from type S to the type L (Giles and al classification) with in the some isotherme is attributed to the interaction first, of the surface then with the whole solid. The type S suggests the interactions between the Methomyl molecules are more important.

**Keywords:** Adsorption, Contamination, Methomyl, Layered Double Hydroxides, Hydrotalcites, Pesticides, Environment.





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**A Comparative Analysis of Building Energy performance in Algeria, French and Spain**

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**Abstract:** The population increase in Algeria, reached 42.2million inhabitants in January 1, 2018 (against 41.3 million inhabitants in first January, 2017), the demand for energy is increasing rapidly, because of this population and economic growth.

The building sector is the Algeria's largest energy consumer, absorbing 41% of total final energy consumption, a nonproductive but energy-intensive sector. This very high rate calls on the public authorities' attention, which launched the national

energy efficiency program in order to reduce the energy consumption. This paper aims to provide a comparative study of energy efficiency of three residential apartments that are located in the cities of Algeria, French and Spain. In this regard, an energy audit was performed using the block simulation software to calculate the heat balance of each apartment. An energy audit is to establish a diagnosis of the energy quality of each home and give it an energy class. Give an idea of the impact that certain choices made during the design of a building such as envelope, ventilation, heating system, and domestic hot water production and HVAC systems.

This complete diagnosis makes it possible to implement an inventory of the energy performance and the obsolescence of the building, in the objective to identify the sources of energy savings and to define the solutions to be implemented according to the technical and economic possibilities.

**Keywords:** Energy efficiency, Energy consumption, Building, Energy audit, Simulation, block-load 4 .15, thermal regulation for buildings, heat transfer, energy policy for buildings



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**Étude de nouveau matériau  $\text{Pr}_{1.95}\text{Sr}_{0.05}\text{Ni}_{0.95}\text{Co}_{0.05}\text{O}_{4\pm\delta}$  comme cathode des piles rechargeables.**

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**Abstract:** Les piles rechargeables zinc-air suscitent beaucoup d'intérêt en raison de leur énergie spécifique théorique élevée et de leur faible coût. Elles nécessitent une électrode performante pour la réaction de réduction de l'oxygène (RRO) lors de la décharge. Les recherches actuelles s'orientent vers des matériaux d'oxydes conducteurs mixtes dans le but de minimiser le coût de production des métaux nobles et d'autre part améliorer ses performances électrochimiques.

Notre travail se focalise sur la synthèse et la mise en œuvre de matériau  $\text{Pr}_{1.95}\text{Sr}_{0.05}\text{Ni}_{0.95}\text{Co}_{0.05}\text{O}_{4\pm\delta}$  qui peuvent présenter, en terme de leur application possible comme matériau de cathode de piles alcalines à des températures ambiantes, de bonnes propriétés électrochimiques vis-à-vis la réaction de réduction d'oxygène (RRO). L'étude de ce matériau est basée sur son utilisation comme cathode sous forme de disque tournant (RDE) à différentes vitesses de rotation. Le matériau a été synthétisé sous forme de poudres par la méthode sol-gel. Les propriétés structurale, morphologique et électrochimique de ces matériaux de cathode ont été étudiées et caractérisées par diffraction des rayons X (DRX), microscopie électronique à balayage (MEB) et voltamétrie linéaire.

**Keywords:** Pile, cathode, RRO, MEB, DRX.







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**Numerical optimisation of an organic solar cell**

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**Abstract:** In this work, Bulk Hetero-Junction Organic Solar Cells (BHJOSC), is optimized and studied using GPVDM software. In order to enhance the efficiency and find the best structure, several factors are studied including thickness of each layer constituting the OSC, and the type of materials used as Electron Transport Layer (ETL) and Hole Transport Layer (HTL).

**Keywords:** Organic solar cells, GPVDM Software, J-V Characteristics, Electron transport layer, Hole transport layer.



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**Modeling the thermal transfer of the injection of a powder into a gaseous medium at high temperature**

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**Abstract:** Numerical simulation of the interaction between spherical particles and plasma gas is performed. The motivation of this study is to study the heat transfer between the plasma gas and the solid particles during the plasma spraying process and to validate the Ranz & Marshall type empirical correlation generally used to avoid heavy flux computations. Under the conditions of a molten or semi-molten substrate, the medium (plasma jets) affected high particle velocities. Computational analysis using COMSOL Multiphysics direct digital simulation of heat transfer in atmospheric pressure and the mid temperature range ( $6000^{\circ}\text{K}$ - $12000^{\circ}\text{K}$ ) of a plasma flow on a spherical particle was performed.

**Keywords:** Nusselt number ; Ranz ; Marshall correlation ; Comsol.





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**Thermal Mixing Performances of Non-Newtonian Fluids flow for Open Chaotic geometry**

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**Abstract:** In this work, we characterized the thermal mixing (temperature homogenization) in two geometries, straight and chaotic channels for selected generalized Reynolds number ranging from 50 to 200 and different power law index values (0.5, 0.8 and 1). Two injection modes are used; horizontally and vertically. The mixing quality is highlighted using two criteria: the mixing degree  $D_m$  and the probability density function PDF.

These criteria confirmed that the capacities of the chaotic geometry in terms of the temperature homogenization of two pseudo plastic fluids (hot and cold) in the flow is more better compared to that prevails in the straight channel. The flow nature in the C-shaped geometry is chaotic while in the straight channel is regular and laminar. The evaluate of the mixing degree  $D_m$  outlines that the perfect mixing is reached rapidly in the chaotic geometry. Besides, the mixing time of the homogenization don't exceed 1 second in the worst cases, while in the straight channel, the mixing time is very important and it exceeds several tens of minutes. In addition, it is proven by the

PDF function that the temperature field is well and rapidly homogenized in the chaotic geometry. In contrary, for the straight channel the temperature field is much dispersed and it remains such that it is released at the inlet section.

**Keywords:** Chaotic advection, thermal mixing, non- Newtonian, mixing degree.





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**Heat Transfer Analysis of Two Phase Change Materials in the Temperature Range 65–80°C for Thermal Energy Storage**

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**Abstract:** "This paper presents a numerical investigation of the heat transfer mechanism of two phase change materials (PCMs) in the temperature range 65–80°C for thermal energy storage unit (TES). The unit is comprised of two PCMs having different melting temperatures; water is used as a heat transfer fluid (HTF). The whole unit is operated for different HTF inlet temperatures. The HTF mass flow rate is maintained constant during the numerical tests to a value of  $5 \times 10^{-4}$  kg/s.

The effect of the HTF inlet temperature on the heat transfer mechanism of the two PCMs was also assessed in the numerical work. The study demonstrates that the heat transfer mechanism presents three distinct periods for the change of temperature versus time in each PCM. Moreover, during charging process, the melting rate of PCM2 is the fastest and that of PCM1 is the slowest. It is also found that there is a decrease in the melting time of the PCMs with the increase in the HTF inlet temperature. When the HTF inlet temperature increases from 65°C to 80°C, the decreasing degree of melting time of PCM1 is the biggest from 52.83 min to 17.83 min, a reduction of about 66%; the decreasing degree of melting time of PCM2 is the smallest from 13.5 min to 7.5 min, a reduction of about 44%."

**Keywords:** Thermal energy storage, Thermal analysis, Heat transfer mechanism, Melting time.





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**Production de Biométhane à Partir des Déchets d'Abattoirs**

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**Abstract:** Cette étude vise la valorisation des déchets d'abattoirs pour la production du biogaz (riche en méthane) et un compost valorisable. Ceci permet une bonne gestion des déchets biodégradables. De ce fait, nous avons étudié la digestion anaérobie des déchets d'abattoirs en utilisant la boue de la station d'épuration comme inoculum. La méthanisation de ces déchets est conduite dans un digesteur pilote du laboratoire de 30 L de capacité en voie mésophile. Les résultats obtenus indiquent une bonne réduction de la matière organique, avec un taux d'abattement de la DCO de l'ordre de 67 %. Le biogaz produit était de bonne qualité avec des rendements de CH<sub>4</sub> supérieurs à 70 %, des faibles rendements de CO<sub>2</sub> et des concentrations négligeables d'H<sub>2</sub>S. La méthanisation de 2 kg de déchets d'abattoirs a permis de produire environ 82,04 L pendant 60 jours d'incubation, ce qui correspond à un potentiel biométhanogène de 214,20 L CH<sub>4</sub> / kg de MVS.

**Keywords:** Digestion anaérobie, Déchet d'abattoir, Biogaz, Boue, Méthane







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**Effect of tube configurations on vertical closed-loop geothermal heat exchangers sizing for residential application**

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**Abstract:** "Ground source heat pump (GSHP) system is one of the promising applications in the green power technology; it is gradually gaining attention and will have wide applications in the future of geothermal energy. The closed ground source heat pump systems are one types of ground source heat pump (GSHP) systems and are classified as low enthalpy geothermal systems since they make use of low temperature differences, it consists of heat exchanger loops that utilize the heat conduction mechanism of the ground to reject or extract heat.

In this paper, the study was conducted to examine the influence of tube configurations (configurations B and C) on the design of a vertical closed loop for a residential unit under the meteorological conditions of Ouargla, city located in the south-west of Algeria, using analytical design procedure (ASHRAE), which highlight the influence of heat exchanger properties and ground parameters. After the building loads calculations which were done using the TRNSYS simulation software, the comparison between the two identified types of tubes locations was performed. The results indicate that the depth of the GHX is significantly influenced by the position of tubes, a difference in the GHE depth exceeds 10 m between B and C configurations.

**Keywords:** Ground-source heat pumps, Ground Heat exchanger, vertical closed loop, Geothermal energy, low enthalpy system.





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**Identification of harmonics current by the Multi-Variable Filter method and compensation by a three level inverter controlled by the SVPWM strategy used for the shunt active filter**

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**Abstract:** In this paper the active parallel filter was studied in the power grid, the purpose of this filter is to minimize the harmonic currents generated by the non-linear loads (rectifier and RL load), the basic principle of this filter is to identify the harmonic currents, and filtered them by a DC / AC converter, In this paper we used a simple identification method is the multi variable filter method that extract the reference currents from the load (currents to be filtered). These currents that wanted identified by MVF will be compared by the inverter output currents, by using the PI controller. The converter used is a three-level inverter controlled by PWM Vector strategy (SPVWM). The objective of this study is to obtain an unpolluted source into the power grid, all the simulation results are obtained by using MATLAB Environment.

**Keywords:** Space-Vector Pulse Width, Multi Variable Filter, Shunt Active Power Filter.



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**Cu<sub>2</sub>ZnSnS<sub>4</sub> thin film solar cells performance optimization by the SCAPS-1D simulator**

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**Abstract:** In the present analysis, a comparative study on the effects of various thin films solar cells parameters based on Cu<sub>2</sub>ZnSnS<sub>4</sub> (CZTS) absorber layers was numerically simulated, using a conventional CdS buffer layer. Parameters influence of the absorber layer on the devices performances solar cells with MoS<sub>2</sub>/CZTS/CdS/TCO structure was analyzed by SCAPS-1D software. Improvements in efficiency were achieved by changing the back contact metal work function (BMWF). The thickness and the acceptor concentration of CZTS absorber layer were varied to observe their effects on the cell performance. Optimum thickness and doping values of CZTS at 2  $\mu\text{m}$  and 1016  $\text{cm}^{-3}$  respectively, have been found where the efficiency reaches high values. However, the parameters solar cell enhance as the Work function of a back contact rises. The optimization of the parameters of solar cell, the simulation results note the highest efficiency is 15.23%, with the thickness 2  $\mu\text{m}$ , an acceptor concentration 1016  $\text{cm}^{-3}$ , and 5.7 eV of back metal work function.

**Keywords:** CZTS, SCAPS-1D, CdS, solar cell, molybdenum



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**Thyristor Controlled Series Compensator Based Automatic Generation Control Incorporating  
Superconducting Magnetic Energy Storage Using Firefly Algorithm**

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**Abstract:** In this article, an attempt has been made to understand the dynamic performance of Automatic Generation Control (AGC) of two areas two units reheat thermal-thermal power system. Some non-linear constraints are taken into consideration such as Generation Rate Constraint (GRC) and Governor Dead Band (GDB). The PI-PD cascade regulator has been implemented in each area. To find the optimal parameters of controller, the firefly algorithm has been performed. Thyristor Controlled Series Compensator (TCSC) unit has been placed with the AC tie line and Superconducting Magnetic Energy Storage (SMES) units are employed in each area. The obtained results demonstrate clearly the efficiency of TCSC and SMES units.

**Keywords:** AGC, Interconnected Power System, PI-PD Cascade, TCSC, SMES, Non-linear Constraints.





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**Inside greenhouse temperature estimation with the external region parameters**

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**Abstract:** This work devised on two parts, in the first part the objective was to predict the inside greenhouse temperature via an artificial neural network (ANN) that incorporated environmental factors. The outside Temperature, time, solar radiation and wind speed were measured every 10 min over one year period in a greenhouse located in Ghardaïa, Algeria. Measured environmental data were used to train the ANN. Among the 24,552 data points used in the experiment, 11,000 and 6221 data points were used for training and testing, respectively. An ANN with an input layer with input neurons, two hidden layers with 32–2048 neurons, and an output layer with one neuron was selected. In the second parts, we are interesting to describe a Fuzzy logic controller of a dynamic model of an agricultural greenhouse in order to predict the inside air behavior temperature using Matlab/Simulink. The model based on the creasing the inside temperature at night and decreasing it during day. The efficiency of the proposed model is focus on the percentage of the error between the experimentation and the prediction. It have been see that it is possible to controller the inside temperature in greenhouse considering different parameters like the conserving the inside humidity. Taken on consideration the last point the microclimate of the greenhouse was varied with the weather conditions like outside temperature wind speed and solar irradiation.

**Keywords:** greenhouse, inside temperature, artificial neural network and Matlab/Simulink







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**Microstructural studies of materials dd and kt2 by x-ray diffraction**

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**Abstract:** "In this work, we made a study of kaolins DD and KT2 by the diffraction of x-rays. It appears very clearly that the principal phase of the various sintered kaolins, mullite, is free from internal microstrains. It is the case of the mixtures fritted not only at low temperature (1100 °C) during 1 hour but also the case of the mixtures of the type 'chamotte' cooks with 1350 °C during very long times (several weeks).

This result is very significant since it gives an element of explanation to a very significant quality of mullite: its mechanical resistance during uses repeated at high temperature.

**Keywords:** Kaolin DD, Kaolin KT2, Microstrains, Method of Stokes, Distribution of the sizes.





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**Study of Natural Convection Melting of Phase Change Material inside a Rectangular Cavity with Sinusoidal temperature boundary condition**

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**Abstract:** "in the present numerical study, the convection diffusion phenomena associated with solid-liquid phase transition processes during phase change material (PCM) melting within a rectangular cavity is studied. The cavity is heated from left wall with a sinusoidal temperature distribution. Initially the enclosure was filled by solid gallium at melting temperature  $T_m$ . The enthalpy-based lattice Boltzmann method (LBM) with D2Q9 particle

velocity model is used to solve density, velocity and temperature fields. The results indicate that natural convection of liquid phase change material (PCM) plays a significant role in the melting heat transfer of PCM.

**Keywords:** phase change material, melting, thermal boundary, lattice Boltzmann method





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**Drying Kinetics of Rosemary Leaves: Experiments and Modelling**

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**Abstract:** "The use of fresh herb is limited, and in the food industry the dry form of herb is commonly used. Due to their high moisture content and vulnerability to microorganisms, it is very important to provide optimum drying and storage conditions in order to prevent quality.

The purpose of this study is to determine and model the drying kinetics of rosemary leaves. The drying was carried out in a convection oven (40, 50 and 60°C) and at ambient air drying (21°C), by using five models reported in the literature and from the statistical view, the Page model fits well the results for oven drying and the Fick model for the ambient air drying. The total time of oven drying reduced substantially with an increase on the drying temperature. Both methods of drying show two distinct falling rate drying periods. Apparent moisture diffusivity ranged between  $0.2 \times 10^{-12}$  and  $9.4 \times 10^{-12}$  m<sup>2</sup>/s and increases with the air temperature, and an Arrhenius relation with an activation energy value of 66.3 kJ/mol expressed effect of temperature on the diffusivity.

**Keywords:** Drying kinetics, Modelling, activation energy, rosemary leaves



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**Numerical simulation of combustion heat transfer in single-cylinder diesel engine**

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**Abstract:** "This paper presents simulation results with application of GT-Suite software for the convective heat transfer from gas to cylinder wall, gas pressure and temperature for partial and full load engine as a function of crank angle for a single cylinder diesel engine. Radiation heat transfer, apart from convection, is an important mode of heat transfer in diesel engines. It was found that if the mass fuel injection in the cylinder increased, so leads to higher levels of pressure and temperature in the cylinder.

**Keywords:** Convective heat transfer, Radiation heat transfer, Wiebe function, Modeling, GT-Suite, Diesel engine.





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**Rheological Properties Investigation of an Organophilic Clay Containing in a Diesel Fuel-Based Drilling Mud**

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**Abstract:** The technical and economic success of a drilling operation for an oil well depends to a large extent on the quality of the drilling mud used. Drilling muds are rheofluidifying threshold fluids with a thixotropic behavior. In this paper, we synthesize the results of our research on the rheological properties of a diesel fuel-based drilling mud; we are particularly interested in showing the importance of the influence of the organophilic clay concentration (VG69) and the stability of inverse emulsions Water / Diesel fuel. The flow curves as a function of the concentration of organophilic clay were analyzed by the Herschel-Bulkely model. We have clearly shown that the increase of the dose in VG69 induces an increase of the yield stress, of the consistency index and a decrease of the flow index showing a solidification of the mud suspensions. The mixture of drilling muds studied was characterized by an elastic and a viscous appearance. We clearly noted that beyond 3 g in VG69, the diameter of the aqueous phase increases causing a destabilization of the inverse emulsion.

**Keywords:** Rheological properties, Organophilic clay, diesel fuel and drilling mud







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**Intelligent Design of an Advanced MPPT Controller of Photovoltaic System: A Fractional Approach**

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**Abstract:** In recent years, various methods have been suggested for Maximum Power Point Tracking (MPPT) in which a number of these methods are based on advanced computational intelligence techniques. Overall, the dynamic performance of a system can be substantially improved by the introduction of the advanced-based techniques for the intelligent control design. A new stable and robust maximum power point tracker (SR-MPPT) using an advanced fractional-order controller design for a stand-alone photovoltaic system has been proposed in this work. The system is able to deliver energy with high performances. The design of the proposed MPPT controller, based on the Hierarchically Multi-Objective Genetic Algorithm, is theoretically rigorous and represents a powerful and simple approach to provide a reasonable tradeoff between computational overhead, storage space, numerical accuracy and stability and robustness analysis of the closed control loop. Numerical simulations show the robust tracking property against modeling uncertainties and parameter variations, and verify the validity and the feasibility of the proposed MPPT control methodology.

**Keywords:** Photovoltaic systems, Advanced MPPT Controller, Fractional calculus, Multiobjective optimization, Genetic algorithm, Buck-Boost converter





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ID: EP28

**Mixed convection with entropy generation in a square cavity filled with hybrid nanofluid**

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**Abstract:** A numerical simulation was conducted in square cavities with different boundary conditions filled with  $\text{Al}_2\text{O}_3$ -Cu/water hybrid nanofluid, and heated by heat sources at a constant flux placed on the left vertical wall. The movable wall and the other walls of the cavities are maintained respectively at a cold local temperature  $T_c$ . The effects of the hybrid nanofluid on the flow of mixed convection and entropy generation in the four geometries with different boundary conditions are studied in the present work. The finite volume method was used to solve the thermal transfer flow equations across the physical domain with the SIMPLER algorithm. The influence of relevant parameters such as Richardson number and volume fraction of nanoparticles on entropy generation and heat transfer rate have been studied in detail. It has been found that entropy generation decreases with increasing Richardson number, Reynolds number, and incorporation of an  $\text{Al}_2\text{O}_3$ -Cu / water hybrid nanofluid in the basic fluid improves the high heat transfer rate of indoors cavities.

**Keywords:** hybrid nanofluid, entropy generation, mixed convection.



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**Étude et Caractérisation de Nano-Cellule Solaire à Base de Silicium sans Défaut par 2D-Atlas SILVACO**

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**Abstract:** Dans le domaine des nouvelles technologies pour l'énergie, le solaire photovoltaïque à nanotechnologie est en train de devenir un axe de développement industriellement important. Dans cet article, nous présentons les résultats de l'étude de l'influence de l'épaisseur du silicium TSi sur les caractéristiques et paramètres électriques de la nano-cellule solaire à base de silicium sans défaut en utilisant le logiciel 2D-Atlas SILVACO. Nous simulons les caractéristiques Courant-Tension (I-V) et Puissance-Tension (P-V) en fonction de l'épaisseur du silicium dans la gamme de 120 nm à 900 nm, à la température ambiante. En suite nous calculons les valeurs du facteur de forme FF pour les différentes valeurs de l'épaisseur du silicium. Les résultats de simulation montrent que la nano-cellule solaire en silicium sans défaut est caractérisée par bonnes caractéristiques et haute performance électriques.

**Keywords:** Silicium; Nano-Cellule solaire; Caractéristiques I-V et P-V; Paramètres électriques.





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**Ebullition à l'extérieur d'un Tube Horizontal à des Pressions sous Atmosphérique, Comparaison de Corrélations**

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**Abstract:** Une revue des données expérimentales a été faite et comparés avec des valeurs calculées avec cinq corrélations choisies de la littérature, elles ont été appliquées pour l'ébullition à l'extérieur d'un tube horizontal pour le cas des pressions en dessous de la pression atmosphérique ; les résultats montrent une dispersion des points trouvés pour quatre des corrélations, à part celle de Mc Nelly qui donne des résultats probants avec des erreurs minimales .

**Keywords:** Ebullition, tube horizontal, coefficient de transfert de chaleur, corrélation, pression sous atmosphérique



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ID: EP31

**Modeling and simulation of a steam generator of a thermal power at deferent operating loads**

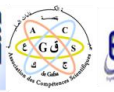
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**Abstract:** In this study, we simulate the behavior of a steam generator using Relap5 system code at different operating loads. Main thermal-hydraulic parameters are analyzed at steady-states corresponding to 60 %, 100 % and 110 % of the system nominal load. The steam generator studied herein is a water-tube natural circulation type used in a natural gas liquefaction complex for superheated steam production purposes, it is designed to produce 374 tons/h of superheated steam at 73 bars and 487°C. To perform this study, a detailed Relap5 model is built including all the parts of the steam generator. A strong qualification work is undertaken concerning the plant nodalization. It consists to make a comparison between the code results and the facility available data in steady-state operation mode at different loads. Therefore, the model qualification results at the steady-state are in good agreement with the experimental data. The steam generator Relap5 model has proved satisfactory; and the model was capable of predicting the main thermal-hydraulic steady-state conditions.

**Keywords:** Steam generator, Modeling and simulation, Relap5/Mod3.2, Steady-state, Model qualification, Deferent operating loads







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ID: EP32

**Contribution à la simulation numérique et étude de sensibilité de la dispersion atmosphérique  
induit par un événement accidentel**

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**Abstract:** L'étude se concentre sur la détermination des niveaux de la radioactivité dans l'air des émissions radioactives d'un accident nucléaire hypothétique. Le modèle utilisé est basé sur une approche Gaussienne standard d'un rejet ponctuel et continu appliqué pour un écoulement homogène et stationnaire sur un terrain plat, sans modification dans le temps et dans l'espace des conditions météorologiques et d'émissions. La paramétrisation empirique de la météorologie locale sert d'entrée pour les calculs de la dispersion. Pour la validation de ce modèle, les résultats obtenus par simulation numérique sont comparés aux mesures collectées durant l'accident. Les simulations réalisées par ce modèle montrent des comportements similaires aux mesures en conditions modérément stable en champs proche de la source d'émission. Cependant, les résultats analysés montrent quelques défauts de modélisation en champs lointain de la source d'émission. L'évaluation quantitative des coefficients de dispersion atmosphérique a permis d'aboutir à des valeurs promoteurs.

**Keywords:** Accident nucléaire, dispersion atmosphérique, modèle gaussien, radioactivité.





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**Étude et analyse de Cycle de Rankine Organique Fonctionnée avec des Concentrateurs Fresnel**

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**Abstract:** Ce travail analyse la faisabilité d'un mini central solaire à concentration CSP dans le sud algérien. Pour cela nous allons décrire les différentes filières à concentration solaires et leurs applications. À travers cette étude nous allons passer en revue les centrale solaire à concentration à miroirs FRESNEL. Nous allons décrire notamment les performances des différentes compartiments de l'installation qui est composé d'une unité solaire à concentration, un bloc de puissance de 1.2 MW de capacité nominale et une unité de dessalement, Où GREENIUS est le code utilisé pour le dimensionnement et l'analyse de l'installation. Par rapport aux performances dynamique de notre system, l'installation solaire CSP fonctionné par un facteur de capacité annuel de 20% avec un rendement globale solaire-électrique de 15%, Afin d'appuyer cette faisabilité on a évalué le coût actualisé de l'électricité produite qui est de 0.25\$/KWh. Pour finir on a évalué la période d'amortissement de l'installation solaire CSP (récupération des dépenses) qui est de 9.66 ans. Le bilan carbone établir montre l'importance de ce type d'installation par rapport aux systèmes conventionnels

**Keywords:** Concentrating solar power, Desalination, Organic ranic cycle, actualised cost,





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**Industrial Wastewater Treatment Using Solar photocatalysis for Achieving Zero Liquid Discharge**

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**Abstract:** The industrial activity, especially in developing countries, produce large amount of wastewater. This wastewater when disposed into natural channels may lead to high pollution risk. There are different methods for wastewater treatment. One of them is Advanced Oxidation Processes (AOPs), still it has some limitations. The present work has been concentrated on the degradation of real industrial effluent named as oily water. The said effluent was collected from Sonatrach base on life of Haoud Berkaoui (HBK) (Ouargla city ) was subjected to photocatalytic treatment using photocatalyst such as ZnO was analyzed before and after the treatment for their physiochemical parameters like color, COD, TOC and presence of inorganic ions. the photocatalytic degradation was found to be fruitful treatment for degradation of real oily water industrial effluent using solar energy and a photoreactor

**Keywords:** AOPs, Photocatalyst, Oily water, ZnO, Solar





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**Effect of passivation layer on the silicon solar cell performance**

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**Abstract:** The quality of highly efficient solar cells is often limited by recombination in the semiconductor contact with the metallic electrode. As a solution, an improvement in the material quality used and surface passivation. In this paper, contact passivation effect on a silicon solar cell performance is investigated by insertion of an ultra-thin tunneling layer (made of silicon dioxide ( $\text{SiO}_2$ ) or aluminium oxide ( $\text{Al}_2\text{O}_3$ ) between the n-type emitter and the polycrystalline silicon (pc) /Al contact. The solar cell achieve a high efficiency (more than 26%) using a thin passivation layer. The effect of the band gap are also simulated so that they can be used as bases for choosing suitable tunneling materials.

**Keywords:** Passivation, tunneling,  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ , silicon solar cell.





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**Valorisation des Matériaux de Construction Biosourcés pour une Maison Passive dans la Zone Semi-Aride de Batna.**

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**Abstract:** L'efficacité énergétique et économique est l'un des critères primordiaux lors du choix des matériaux de construction du logement à basse consommation énergétique. Plusieurs types de matériaux de construction existent sur le marché. Il est préférable économiquement et écologiquement d'utiliser les matériaux locaux et biosourcés tels que les pierres de montagnes, les fibres de pailles et le bois de palmier dattier. À cet effet, nous avons réalisé un prototype de maison passive pour étudier expérimentalement le comportement thermique de certains matériaux utilisés pour l'isolation ou pour la construction des murs à inertie thermique. Cette maison passive a été testée sous les conditions du climat semi-arides de la ville de Batna. Pour l'isolation thermique nous avons utilisé un matériau biosouré issu du tronc du palmier dattier de notre région. Pour la construction du mur de la façade de la maison exposé au soleil, nous avons testé la pierre des montagnes des Aurès et l'adobe renforcés par les fibres de pailles. Les résultats expérimentaux obtenus sont très satisfaisants. Les propriétés du matériau biosouré utilisé sont comparables à ceux des matériaux synthétiques tels que le polystyrène expansé.

**Keywords:** Matériaux biosourcés, Efficacité énergétique, Bois de palmier, Mur à inertie thermique, Maison passive, Adobe.







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**Graphene Electron Transport Layer and its Influence on the Performances of the Bulk  
Heterojunction Inverted Organic Solar Cell P3HT: PCBM**

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**Abstract:** "Organic solar cell device consist to a blend P3HT/PCBM as an active layer material, graphene as an electron transport layer, PEDOT/PSS as a hole transport layer, ITO is a front electrode and Al is back electrode . In this study the standard, normal and inverted organic solar cell, has been electrically simulated by SCAPS software.

First we noted that the photovoltaic effect has been well observed for the inverted structure and less well as for both others configurations (basic and normal). The inverted organic solar cell performances ( $V_{oc}$ ,  $J_{sc}$ , FF and  $\eta$ ) are affected by the thickness and carrier density of Graphene electron transport layer (ETL) and the best performances are obtained for ETL thickness ( $d=10\text{nm}$ ) and  $N_D$  inferior to  $10^{17}(1/\text{cm}^3)$ .

**Keywords:** graphene, inverted organic cell, SCAPS software





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**Effect of absorber tube position in parabolic trough solar collector"**

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**Abstract:** In this work we are interested in the numerical study about the effect of absorber tube position in parabolic trough solar collector, ANSYS FLUENT was adopted and coupled with User Defined Functions (UDFs) to investigate the heat flow density and temperature contours and also the outlet fluid temperature, the standard K-epsilon turbulent modelling is used in this study, the Reynolds number is between  $1979.5 < Re < 11151.6$  and the optical modelling is established with the SOLTRACE ray tracing software. The results shows that it is important to place the tube in the focal point where all the reflected solar rays meets together at one point, which means that the heat flux density is maximal, and also the temperature in the bottom side of the tube, this leads to a maximum heating of the fluid that can reach  $400^{\circ}\text{C}$  at the outlet, and this in turn makes the thermal efficiency maximal that can reach 80.72%

**Keywords:** Solar thermal energy, Absorber tube, Heat flux density, Focal point, Parabolic trough solar collector





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ID: EP41

**Modélisation et simulation de la machine à réluctance variable par la méthode des éléments finis**

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**Abstract:** Cet article donne description détaillée de la modélisation et la simulation de la machine à réluctance variable (MRV) en mode moteur. Plusieurs simulations ont été effectuées afin d'étudier le comportement dynamique de la MRV. La simulation du système global a été effectuée sous l'environnement ANSOFT MAXWELL à cause de sa flexibilité et ses performances particulières, Le modèle est basé sur la méthode des éléments finis (MEF). Nous avons aussi étudié l'influence de la variation de la position du rotor sur le flux et l'induction magnétique. L'association d'un onduleur à demi-pont asymétrique et la MRV étudiée a révélé un avantage très important de ce type de machine, Les résultats de simulation montrent l'intérêt et l'efficacité du modèle proposé.

**Keywords:** Modélisation et la simulation; machine à réluctance variable; méthode des éléments finis; Ansoft maxwell.





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**Heat Transfer Enhancement of Heat Sources at its Optimum Position in a Square Enclosure with Ventilation Ports**

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**Abstract:** Forced convection in a ventilated enclosure with aspect ratio 2 is studied. Three heat sources (generating different amount of heat) are placed in the bottom wall of the cavity. With swapping the location of theses heat sources, the optimal cooling strategy is identified. The governing equations of mass, motion and energy are solved by using the control volume method. The numerical results indicate that there exists an optimal location of heat sources for which the heat transfer is maximized for all range of Reynolds number.

**Keywords:** square enclosure, forced convection, heat source, heat enhancement, numerical simulation.



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**Numerical Study of a Heat Exchanger with Eccentric Annular Finned Tube**

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**Abstract:** In this work, we conducted a numerical investigation to understand the benefits of using an eccentric fins in place of concentric ones in an annular finned tube heat exchanger. This study was conducted under natural convection conditions. The objective of the study is to analyze the effect of eccentric coefficient on the heat flux rate as a function of the fin material, diameter, spacing and thicknesses. To perform the numerical simulations a 3D model was constructed and the results were validated using correlation found in the literature. The study has been conducted in laminar flow across a single annular finned tube with Rayleigh numbers within of ( $4 \times 10^4$ -  $7 \times 10^4$ ). From the numerical results can see that, a higher heat transfer can be achieved by using eccentric fins in a finned tube heat exchanger instead of concentric ones. The improvement in heat transfer can be more than 20%. It is concluded that the eccentricity effect appears better in high thermal conductivity materials with small fin diameter. Regardless of the fin eccentricity, thick fins produce the best heat transfer.

**Keywords:** Heat transfer, Heat exchanger, Annulare fins, Finned tube, 3D CFD, Natural convection







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**MHD free convection flow of a couple stress fluid in a vertical porous channel with cross diffusion effects and chemical reaction**

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**Abstract:** In this paper, the combined transfer of heat and mass, in an MHD natural convection flow through a vertical porous channel of a couple stress fluid with chemical reaction is our field of investigation. To obtain easy ordinary system, similarity transformations are used for the nonlinear partial differential equations. Then the resulting equations are numerically solved. Graphical illustrations containing non-dimensional velocity, temperature, and concentration are presented for different values of the magnetic, couple stress, chemical reaction parameters and in the tables values of heat and mass rate.

**Keywords:** Natural Convection, couple stress fluid, MHD, porous medium.



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**Heat and Mass Transfer in an Inclined bi-L-Shaped Layered Porous Media: Effect of Buoyancy Ration**

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**Abstract:** The effect of buoyancy ratio on the two dimensional natural convection heat and mass transfer generated in an inclined square bi-L-shaped layered porous cavity filled with Newtonian fluid has been investigated numerically. Each porous layer is considered isotropic, homogeneous and saturated with the same fluid. The cavity is heated and salted from below where as the vertical walls are assumed to be adiabatic and impermeable. The physical model for the momentum conservation equation makes use of the Darcy-Brinkman-Forcheimer model, and the set of coupled equations is solved using a finite volume approach. The power-law scheme is used to evaluate the flow, heat and mass fluxes across each of the control volume boundaries. Tri diagonal matrix algorithm with under- relaxation is used in conjunction with iterations to solve the nonlinear discretized equations. An in-house code developed for this study is validated using previous studies. The results are presented graphically in terms of streamlines, isotherms and iso-concentrations. In addition, the heat and mass transfer rate in the cavity is measured in terms of the average Nusselt and Sherwood numbers.

**Keywords:** Natural convection, Porous media, Darcy-Brinkman- Forcheimer model, buoyancy ratio.





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**Numerical study in three dimensions of influence of the fluids nature and obstacle position on the electronic component cooling**

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**Abstract:** "In this work, we have studied numerically the influence of the nature of nano-fluids and the position obstacles within the mini-channel of dimensions (10 x 10 x 108 mm<sup>3</sup>) on the electronic component cooling. The power of electronic component is constant. In these simulations we have considered the Al<sub>2</sub>O<sub>3</sub>-water, SiO<sub>2</sub>-water and TiO<sub>2</sub>-water as coolants. The numerical results are obtained by choosing a Reynolds number (Re) between 300 and 500 and considering that the flow regime is stationary. The simulation was performed using the commercial software, ANSYS FLUENT. The analysis of the simulation results shows that the position of obstacles within the mini-channel has considerable effects on the improvement of the temperature of the electronic component. The results also showed that among the nano-fluids studied, the liquid containing nanoparticles Al<sub>2</sub>O<sub>3</sub>-water is best to the cooling of the electronic component.

**Keywords:** Minichannels, Electronic composant, Laminar Flow, Ansys- Fluent.





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**Air Breakdown Characteristics in Rod-Plane Electrode Configuration Under Lightning Impulse**

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**Abstract:** The main problem in high voltage power (HV) equipment is the degradation of insulation quality of high voltage power equipment. As the high voltage power equipments are mainly subjected with spark over voltage causes by the lightning strokes and switching action. Experimental measurements of long gap discharges and its interpretation are the base of engineering equations and complex models to design clearance distances, lightning protection systems, among others. However, in high voltage engineering geometries are not only rod-plane arrangements but also rounded electrode geometries. In this paper, the Fuzzy Logic (FL) method is utilised to model the breakdown voltage, based on experimental data generated in the laboratory. The purpose of this paper is to study the discharge phenomenon for a plane of air points with an insulation barrier between them. Improving this fuzzy logic is a powerful tool that can be used to predict barrier properties.

**Keywords:** Fuzzy Logic Controller, Breakdown voltage, Barrier, Point to Plane.



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**Thermodynamic Performance and Multi-objective Optimization of Regenerative Organic Rankine Cycle for Low Temperature Waste Heat Recovery**

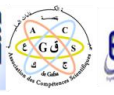
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**Abstract:** "The thermodynamic analysis for low temperature as well as the thermo-economic optimization of regenerative ORC using Non-dominated sorting genetic algorithm-II (NSGA-II), are performed in this paper. The exergy efficiency and the heat exchanger area per unit net power output (APR) are selected as the objective functions for multi-objective optimization under the low temperature heat source of 423 K. Two working fluids including R600 and R600a are selected to examine and optimize the performance of the system. According to analysis, R600 working fluid has represented the best performance with thermal and exergy efficiency and APR, while R600a gives more net power output. The optimization outcomes revealed that the R600 working fluid has the maximum exergy efficiency of 57.38 % and the lowest APR 3.42 m<sup>2</sup>/kW which is can be selected as the optimal working fluid from both thermodynamic and economic point of view.

**Keywords:** Organic Rankine cycle, Regenerative, Waste heat recovery, Optimization, Non-dominated sorting genetic algorithm-II (NSGA-II)







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**Rheological Study of The Contact Piston-Ring-Shirt in Internal Combustion Engine**

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**Abstract:** The purpose of this research paper is the internal combustion engine lubrication and particularly the piston ring liner contact. Starting from the knowledge of that system, and the various parameters and physical phenomena induced, a parametric analysis has been conducted in order to determine the optimal texturing parameters of the surfaces, and their effects on the performance of these components. this project aims to develop a numerical model of piston ring dynamics and lubrication in internal combustion engines, it is currently estimated that the piston ring - cylinder bore friction accounts for up to 25% of the power loss in a typical engine, while oil transported to the combustion chamber by the piston and ring-pack contributes significantly to engine emissions. A profile of piston ring model was first developed to allow fast calculation of approximate piston ring dynamics.

**Keywords:** piston ring, piston ring profil, hydrodynamic lubrication, friction coefficient, oil viscosity.





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**Aspect ratio effect on the mixed convection in a horizontal duct using lattice Boltzmann method**

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**Abstract:** In this work, a numerical study is carried out to investigate the effect of aspect ratio on mixed convection in a horizontal channel heated from below. The single relaxation time double population thermal lattice Boltzmann method (TLBM) is used in this case, with a combination of two lattices: the two dimensional, nine velocity model D2Q9, for the dynamic field and the two-dimensional, five velocity model D2Q5 for the thermal field. The isotherms, the streamlines, the velocity profiles and temperature profile at selected axial positions and times are presented and discussed for different aspect ratios ( $B = 8, 10, 12, 15, 20$ ) and compared to the aspect ratio  $B = 5$ . The influence of the aspect ratio on the heat transfer is also discussed.

**Keywords:** Thermal Lattice Boltzmann method, double population SRT, mixed convection, aspect ratio effect, horizontal channel.





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**Upper openings ventilation system study of the building by the lattice Boltzmann model**

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**Abstract:** "We present in this work a numerical study of a ventilated room with two openings and heated at the bottom by a source of heat at a constant temperature.

The Lattice Boltzmann Method with double populations is used. A computer code is developed with Boltzmann method with nine celebrities D2Q9 to reproduce the dynamic field and that simplified at five celebrities D2Q5 for the temperature field."

**Keywords:** Thermal comfort, Upper openings, ventilation building. Mixed convection, Lattice Boltzmann Method





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**Numerical study of the natural convection impact into a pcm within tubular capsule**

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**Abstract:** The present paper summarizes a numerical study investigating the behaviour of a phase change material PCM filling up a cylindrical container. The PCM is flowing between two tubes, the inner tube carries the heat transfer fluid HTF and it is posed to produce a heat flux. The investigation focuses mainly in comparing the effect of changing the inner tube position; up, centre and down, on the melting process. Results showed that moving the inner tube downward leads to a decreased melting time and the rate of the thermal energy storage becomes better.

**Keywords:** "PCM; Cylindrical container; Melting; Free convection; Thermal energy storage; mushy zone





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**Collection probability of back graded band-gap in the Cu(In,Ga)Se<sub>2</sub> absorber layer Solar Cells**

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**Abstract:** "The changes in the collection probability that happen in the absorber graded band-gap Copper-Indium-gallium-deselenide (CIGS) based solar cells are discussed by developing software by the Matlab language run on a pc computer. The non-uniform absorber band-gap profile can allow the better collection probability than the case without grading due to the quasi-electric field in the material bulk. The collection efficiency of linearly graded band-gap in the CIGS absorber layer increases with increasing the  $kT\xi$ .

The effect of the absorber thickness on the collection efficiency is also analyzed. The results exhibit that the collection efficiency decreases significantly with increasing  $d$  beyond  $3\mu\text{m}$ . However, the reduction of electron diffusion length  $L_n$  reduces hardly the collection probability. The collection efficiency is more sensitive to the Back Surface Velocity  $S_n$  at the back contact where the values drop for 85% to 5% passed from  $S_n = 102$  to  $106$  cm/s.

**Keywords:** "CIGS; Collection probability; Graded band-gap; Matlab; Solar Cells.







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ID: EP55

**Étude de l'influence du chauffage partiel sur la convection naturelle dans une cavité carrée par la méthode de Boltzmann sur réseau**

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**Abstract:** Dans le présent travail, un code numérique basé sur la méthode de Boltzmann sur réseau thermique à double population est utilisé dans la simulation de la convection naturelle dans une cavité carrée avec une paroi partiellement chauffée et renfermant un fluide  $Pr = 0.71$ . Les résultats obtenus pour le cas classique de la cavité carrée différentiellement chauffée ont montré une bonne concordance avec ceux trouvés dans la littérature. La validation est suivie par l'étude de l'influence du nombre de Rayleigh et la longueur de la partie chauffée sur la convection naturelle. Les résultats sont présentés sous formes des lignes de courants, des isothermes, du Nombre de Nusselt moyen et des profils de vitesse. L'analyse de ces résultats révèle que la structure d'écoulement et le transfert de chaleur sont pertinemment liés, à la fois, au nombre de Rayleigh et à la longueur de la partie chauffée.

**Keywords:** Convection Naturelle ; Cavité Carrée ; Méthode de Boltzmann sur réseau thermique à double population





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**Thermodynamic Remodeling of the Al-Np System Supported by First-Principles Calculations**

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**Abstract:** The phase diagram of Al-Np is optimized by coupling the CALPHAD approach and first-principles calculations. The enthalpies of formation of the intermetallic compounds Al<sub>2</sub>Np, Al<sub>3</sub>Np and Al<sub>4</sub>Np were calculated by first-principles calculation using density functional theory approximation as implemented in the VASP (Vienna Ab-initio Simulation Package) code and used in the CALPHAD approach to assess the Al-Np system. The liquid solutions are described by the Redlich–Kister polynomial model and the compounds are treated as stoichiometric phases. A set of thermodynamic parameters were obtained for this system. The calculated phase diagram and thermodynamic properties are in good agreement with most available data.

**Keywords:** First principles calculations, CALPHAD, Al-Np system, Thermodynamic assessment, Phase diagram.





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**Efficiency Estimation of a Solar Air Conditioner Using Numerical Methods**

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**Abstract:** this study aims to show factors that have a direct impact on solar air conditioners that use the ejector as an alternative to the compressor in order to reduce electricity consumption in the refrigeration field. The climatic conditions of the Bouzaréah region were selected as the main data for conducting this study. Parabolic trough solar collector has been made as a tool to provide the thermal energy needed for the generator. All the mathematical equations that dominate the system have been analysed and then numerically simplified. The optical efficiency of the solar collector used was 66.50%, while the maximum value of thermal efficiency was only 64.50%. As for the machine solar thermal ratio reached 40.75%. Serious exploitation of this technology will allow solving the problem of high consumption of electricity in the hot seasons, and also allows the preservation of the environment by using water (R718) as a refrigerant.

**Keywords:** solar energy; parabolic trough collector, air conditioner, ejector, solar thermal ratio.





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**Gas Holdup Determination and Prediction by New Approach in a Turbulent Contact Absorber**

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**Abstract:** In this paper an attempt has been made to predict gas holdup from measurement of bed pressure drop and bed expansion for air–water–solid particles in the fluidization regime. For this purpose, experiments were conducted over a wide range of operating variables, to investigate the hydrodynamics characteristics in a type II-TBC. From the data obtained (1494 points), and using a particular approach developed in this work and based on pressure drop profile through the bed and through the supporting grid, the gas holdup was determined and was compared with some correlations available in literature. The variations in gas holdup, with gas velocity, liquid velocity, static bed height, free-open area of the distributor grid are discussed. The reliability of the prediction method of the gas hold-up used in this work was tested by using an original method. A correlation has been developed to predict the gas holdup for three-phase fluidized bed with and it has been found that the gas holdup predicted was in good agreement with experimental values. A maximum of 4.88 % deviations was found in all flow conditions.

**Keywords:** Turbulent Bed Contactor; Gas Holdup, Pressure Drop; Liquid Holdup; Supporting Grid





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ID: EP60

**Control of Isolated Microgrid based Renewable Energy Generation using PID Controller**

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**Abstract:** This paper investigates optimal PID tuning using Particle Swarm Optimization for frequency control in the microgrid system. The proposed microgrid composed of renewable sources like wind turbine generation and solar system with diesel engine generator and storage systems such as the battery, aqua electrolyzer, and fuel cell. The intermittent nature of renewable sources causes important frequency and power deviations which must be controlled. The proposed controller gives better performance in terms of deviation reduction and elimination of the mismatch between generation and load.

**Keywords:** Microgrid, frequency control, ID controller, PSO Algorithm.







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دراسة لنموذج محاكاة لتركيز الإشعاع الشمسي بواسطة نظام الصحن المكافئ في منطقة ورقلة

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**ملخص :** في هذا العمل قمنا بإنجاز نموذج محاكاة لتركيز الإشعاع الشمسي بواسطة نظام الصحن المكافئ DP في منطقة ورقلة جنوب الجزائر خط الطول  $L=5.24$  دائرة العرض درجة  $\varphi=31.57$  والارتفاع عن سطح البحر درجة  $Z=141m$ ، من أجل استغلاله في أغراض الكترولوضونية، حيث تم تقدير شدة الإشعاع الشمسي والمردود الضوئي وكذا حساب شدة تدفق الإشعاع الشمسي المركز. المردود الضوئي الأعظمي كان في حدود 89,10 %، وقيمة شدة تدفق الإشعاع  $28256102 \text{ w/m}$  الشمسي المركز الأعظمية وجدت في حدود خلال شهر جوان. من خلال نتائج الدراسة، فإنه يمكن أن تستغل شدة التدفق الناتجة من أجل الضخ الليزري، مع مراعاة درجات الحرارة المرتفعة بسبب تأثيرها السلبي على الأوساط الإلكترونية.

**كلمات مفتاحية :** صحن مكافئ ، مركز شمسي ، الإشعاع الشمسي، المردود الضوئي.





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## الطاقة البديلة المتجددة

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**ملخص :** نظرا لان هناك مشاكل كبيرة في الطاقة الكهربائية بسبب الاحتلال الصهيوني البغيض وقلة مصادر الطاقة في فلسطين وقطاع غزة لجا اهل فلسطين لاجداد حلول بديلة فاستثمر الطاقة الشمسية في توليد الكهرباء بشكل كبير وجدي ولان الطاقة الشمسية متوفرة بساعات كبيرة في الوطن العربي الكبير من اسبانيا وحتى العراق أفضل مناطق العالم اشراقا للشمس حيث ساعات الاشماس في فلسطين حوالي 280 يوم صيفا وحتى شتاء فلسطين مشمس بحوالي 40 ساعه وعلى هذا يكون على مدار العام اشماس بمدة 320 ساعتهعاني فلسطين من شح في الموارد الطبيعية والثروات المعدنية؛ ولكن معاناة الفلسطينيين الأشد تكمن في ندرة مصادر الطاقة التقليدية، كالنفط والغاز، ومن ارتفاع أسعارها بما يوازي أعلى مدن العالم؛ وعلاوةً على ذلك، تتحكم السلطات الإسرائيلية بكمية المحروقات وأسعارها، ومتى يُسمح بدخولها، ومتى تُمنع ومن وحي هذه المعاناة وبسببها، يسعى الفلسطينيون لتجاوز هذه المعضلة بإيجاد مصادر بديلة عن الوقود التقليدي. وقد وجدوا ضالتهم – كما هو شأن العالم المتحضر – في مصادر الطاقة البديلة المتجددة، والتي يأملون من خلالها تقليل معدل اعتمادهم على المحروقات الإسرائيلية التي باتت في الآونة الأخيرة سيقاً مسلطاً على رقابهم، وأداة من أدوات الضغط والابتزاز السياسي. وأوضح مثال على ذلك أزمة المحروقات التي عانى منها قطاع غزة في منتصف عام 2013، والتي انعكست سلباً على حياة الناس، وبشكل خاص على قطاعي الصحة والمواصلات، حتى أصبحت غزة كأنها تعيش خارج العصر، باستخدامها الأساليب البدائية في التنقل والإنارة ولا شك أن التوجه الفلسطيني في الاعتماد أكثر على مصادر الطاقة المتجددة، يأتي منسجماً ومتماشياً مع التوجهات العالمية المتزايدة لاستغلال مصادر الطاقة البديلة، أن التوجه في فلسطين يتركز نحو طاقة الشمس والرياح والحرارة الجوفية للأرض؛ وذلك لعدم وجود مساقط مائية في فلسطين. والاتجاه العالمي يزداد يوماً بعد يوم؛ وذلك بعد تفاقم الأضرار الكبيرة الناجمة من مصادر الوقود الأحفوري ومخاطرها الواضحة على صحة الإنسان والبيئة على حد سواء، والتي نرى أبرز تجلياتها من خلال ظاهرة الاحتباس الحراري، وتقلبات المناخ، واتساع ثقب الأوزون، وتساقط الأمطار الحمضية في أكثر من منطقة، بالإضافة إلى تلويث البحار المتكرر من جراء تسرب النفط إليها في حوادث عدة، فضلاً عن ارتفاع أسعار الوقود الأحفوري واحتمالية نفاذه باعتباره من المصادر غير المتجددة؛ وقبل هذا وبعده، مخاطر الأمراض المختلفة، التي تسببها الغازات السامة والضارة الصادرة عن احتراق الوقود قد نجح الفلسطينيون إلى حد ما باستغلال الطاقة الشمسية، وبشكل خاص في الحصول على المياه الساخنة منذ منتصف سبعينيات القرن الماضي، وبات السخان الشمسي مكون اساسي في كل بيت فلسطيني، لكن توليد الكهرباء بالطاقة الشمسية بقيت تجربته محدودة ومرتبطة بمسائل بحثية او بنشاطات الهيئات المانحة لمساعدة سكان المناطق المحرومة، وهناك محاولات أولية في استغلال طاقة الرياح، وأيضاً طاقة الأرض الجوفية. وما زالت كل هذه التطبيقات في طور الجنيني، ولكنها تعد بالكثير والسلطة الوطنية الفلسطينية تدعم كل المبادرات والمحاولات الفردية والجماعية في هذا الاتجاه، ولكن الطريق ما زال في بدايته؛ فقد أدركت أهمية البحث عن مصادر للطاقة البديلة، خاصة إذا عرفنا أن فلسطين تقع على بعد 30 درجة شمال خط الاستواء؛ ما يعني أن الطاقة الشمسية التي تسقط على كل متر مربع فيها تقدر بثلاثة آلاف كيلو واط/ساعة، وهي نسبة عالية جداً بالمفهوم الإيجابي، كما تتمتع فلسطين بما يزيد عن 300 يوم مشمس في السنة؛ الأمر الذي يجعلها من أفضل المناطق في استغلال الطاقة الشمسية، ويجعل الاستثمار في هذا الجانب ممكناً؛ بل ونو جدوى اقتصادية؛ لذلك فقد أعدت السلطة الوطنية الفلسطينية المخططات والدراسات لزيادة الاعتماد على الطاقة البديلة لتصل إلى 10 % خلال السنوات العشرة القادمة؛ بينما يخطط الاتحاد الأوروبي مثلاً، لتصل هذه النسبة إلى 20 %. ومن بين أكبر المشاريع سيكون بناء محطة كبرى





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للطاقة الشمسية في منطقة الأغوار، لتزويد المنطقة بنسبة كبيرة من التيار الكهربائي، والمشروع متوقف حاليًا لأسباب عديدة، يأتي الاحتلال على رأسها، وكذلك منع الاحتلال الاستفادة من حق الغاز المكتشف قبالة شواطئ غزة.

**كلمات مفتاحية :** الطاقات المتجددة - غزة - فلسطين

ID: EP63

**A Space-Vector hysteresis Current Control of a Three-level VSI for Wind Conversion System**

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**Abstract:** One of the most inherent problems of the multi-level NPC topology is to maintain the neutral point voltage in a narrow band around the half of the DC voltage. This work presents a DC-link voltage balancing algorithm for three-level voltage source inverter using a Space-Vector hysteresis current control (SVHCC). In fact, the SVHCC controls the active and reactive power delivered to the grid by the doubly fed induction generator (DFIG) by means of controlling its rotor currents. The main task of this control technique is to force the actual current vector to reach its reference value. This strategy consists in defining three circular hysteresis bands around the error vector; then, according to the location of this error vector, a selection process of the next applied vector is used to minimize the error vector. In addition, it controls the neutral point voltage using the redundant inverter switching states. Therefore, this fact is exploited in order to balance the voltages of the DC bus capacitors. The performance of this control technique has been verified by simulation.

**Keywords:** Space-vector hysteresis current control, Three-level VSI, DFIG, DC-link voltage balancing, active and reactive powers control.





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**Etude du Transfert Thermique par Convection Mixte d'un Cylindre Carré et Poreux**

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**Abstract:** Dans ce travail, nous proposons une étude numérique d'un écoulement bidimensionnel et laminaire en convection mixte d'un fluide incompressible autour et à travers un cylindre carré maintenu à une température constante et confiné entre deux plaques parallèles et verticales. Les équations de transport sont résolues numériquement par la méthode des volumes finis et l'algorithme SIMPLE est adopté pour le couplage vitesses-pressure. Les résultats numériques sont présentés pour  $5 \leq Re \leq 40$ ,  $0 \leq Ri \leq 1$  et un rapport de blocage  $B=1/8$ . Les lignes de courant, les isothermes ainsi que la variation du nombre de Nusselt moyen et le coefficient de traîné sont présentés pour déterminer l'influence des différents paramètres sur la structure de l'écoulement du fluide et sur l'échange thermique.

**Keywords:** Cylindre poreux carré, Convection mixte, coefficient de traîné, Nombre de Darcy, Méthode des volumes finis.





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ID: EP65

**The Impact of Envelope Materials on Buildings Thermal Performance and Energy Consumption in a Hot and Dry Climate**

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**Abstract:** The building sector is one of the biggest energy consumers in the international level, this consumption mostly goes toward achieving acceptable indoor ambiances for the users. In a hot and dry climate context, energy required in buildings goes toward providing thermal comfort, especially in summer's sessions using various energy-consuming systems such as ventilation and air conditioning systems, etc. Building Envelope materials play an important role in architecture by providing protection requirements, comfort, and technical performance while promoting an architectural language and an image. The impact of the building materials varies according to their properties: physical, chemical, mechanical and thermal also, their interaction with the environmental factors. Therefore choosing the right building materials is a key factor in achieving a certain level of comfort inside the building which effect directly the energy use and consumption. this study investigates the thermal behavior and the final energy consumption of different buildings with different envelope materials under the climatic conditions of the city of Biskra a hot and arid climate, it analyzes the results of a different simulation using "DesignBuilder" to perform a thermal and energy consumption analysis. The results show that choosing local massive materials and thermal insulation can achieve that to a certain degree and for buildings in a hot and dry climate, minimizing the external heat gain through the building envelope is a good strategy to reduce the indoor thermal discomfort and the energy use passively.







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**Keywords:** Envelope, Building Materials, Thermal comfort, energy consumption, Hot and Dry Climate.

ID: EP66

**Etude Numérique du Stockage Thermique d'un Matériau à Changement de Phase dans un mur de Bâtiment**

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Loubna

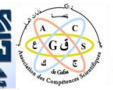
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**Abstract:** En vue de la création d'un environnement sain, habitable, économe en énergie, on a pensé à la création de nouveaux matériaux dits matériaux à changement de phase appelés MCP. Ces matériaux à changement de phase ont l'avantage de stocker de l'énergie thermique sous forme sensible ou latente afin d'atteindre l'objectif d'assurer une zone de confort thermique à l'être humain tout en minimisant les besoins énergétiques du bâti. Ils sont incorporés ou intégrés dans les murs de ces bâtiments, les planchers, les plafonds et les vitrages...Actuellement, le phénomène du stockage de l'énergie thermique par chaleur latente dans ces matériaux ou biomatériaux est d'une importance cruciale sur le plan international vu le nombre de travaux publiés. Le MCP employé dans notre étude est le sel de Glauber avec une température de fusion  $T_f=305K$ . Notre étude numérique de la modélisation du processus du MCP par la méthode enthalpique a été faite avec la méthode des différences finies (schéma explicite) où on a pu suivre l'évolution du changement de phase dans le MCP et voir le début de la création de l'interface liquide-solide selon la variation du temps et déterminer l'évolution de la fraction liquide du MCP (seule la conduction a été considérée)





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**Keywords:** "confort thermique, stockage thermique, MCP, méthode enthalpique , fusion"

ID: EP67

**Comparative study of two techniques for the purification of wastewater in an aridian environment  
(aerated lagoon and Phyto-purification) Case of the Wilaya of Ouargla**

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**Abstract:** The The present study consists in analyzing quality of wastewater (before and after treatment) of two treatment stations: the first one is installed in Temacine and uses treatment by standing bed of plants and the second one is installed in Said Otba and uses treatment by aerated lagoon. Analyses of different parameters were done at the laboratory of each station. To facilitate the study of the results, we used the seasonal averages of every parameter. Results showed efficiency of both processes but with an advantage for the process of treatment by standing bed of plants. The values registered in this process go with Algerian standards compared to those obtained by process of treatment by aerated lagoon. The most important parameter, which showed the efficiency of both processes, was elimination of suspended solids (SS). The elimination of SS in the station of treatment by standing bed of plants and in the station of treatment by lagoon were successively 93,84 % and 92,82%. For COD, rates of efficiency were: (i) from 82,580 % to 90,288 % for standing bed of plants process and (ii) from 71,848 % to 80,864 % for lagoon process. Concerning BOD5, the maximal rate of elimination (93,898 %) was registered in the station of treatment by standing bed of plants.

**Keywords:** wastewater, lagoon, standing bed of plants, treatment, efficiency, arid environment.





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ID: EP68

**Performing a two renewable sources hybrid system by using photovoltaics and wind turbines**

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**Abstract:** Decentralised electricity production using renewable energy sources makes it possible to better supply consumers while respecting the environment. The random nature and installation cost of such energy production imposes an important step in determining dimensions. In this work, we have used a combined system with an energy storage to supply a water pump in an isolated location in Adrar (south of Algeria). Based on weather conditions or estimated data, mathematical models describing the physical performance of each part of the system studied have been proposed.

**Keywords:** Renewable/sustainable energy, water pump, hybrid system, HOMER software.





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ID: EP69

**Exploitation of Geothermal Energy to Decrease Temperature of Water Irrigation for Date Palms in Biskra**

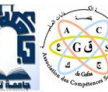
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**Abstract:** In this work, we conducted a numerical study of a three-dimensional convective flow under boundary conditions imposed by the problem addressed. The aim of this study is to reduce the temperature of the irrigated water for date palm forests in Biskra region, while taking advantage of the renewable aspect of geothermal energy. There are two main underground water resources exploited in the agrarian irrigation of this zone: ground water and the Albian aquifer. The latter is the most favored by technicians and farmers, because of the good quality/quantity of these waters but which has the disadvantage of its high temperature (more than 35 °C). An underground water / ground heat exchanger configuration has been proposed. Fluent is a CFD simulation software and with this software we simulate and model our problem and solve it. We obtained a good result to satisfying the specification (25 °C).

**Keywords:** Geothermal, heat exchanger, water, irrigation, cooling, CFD.





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ID: EP70

**Synthesis of cellular ceramics bricks starting from foamed slurry of Algerian clays**

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**Abstract:** Cellular ceramics bricks are elaborated starting from foamed slurry of clays. The solidification is carried out at room temperature, by adding a mineral binder which allows the transformation of the foamed slurry into a rigid cellular body after the drying. The heat treatment consolidates this green cellular body for giving an interconnected cellular ceramic with a good pore size distribution. The volume of porosity and the size of the cells are controlled exclusively by the volume of foam generated. Porosity varies from 60 % to 90 % of total volume of the material, and the size of the cell varies from 1/100 mm to 1 mm. This method of preparation of cellular ceramics can provide by using an easy formula, the volume of the pores with an acceptable accuracy.

**Keywords:** Elaboration, Clays, Cellular ceramic, Lightweight brick







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ID: EP71

**Application de la plasticité Associée et Non Associée pour les tôles inoxydables ferritiques**

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**Abstract:** "The characterization of the drawability of rolled sheets is based on the determination of several features, which serve as a tool of mastering and understanding the behavior of those rolled sheets destined to drawing operations. The objective of this work is to compare the thresholds functions for the plastic behavior of rolled sheets through quadratic criteria Hill48 of plasticity in case of simple uniaxial stress on the metal's plan for the mechanic values:

- a) Coefficient of anisotropy of Lankford
- b) The yield stresses

**Keywords:** Keywords: mechanical modelling, texture, Hill's criterion



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ID: EP72

**Analyse CFD de l'Effet de la Géométrie du Rotor sur un Ecoulement Tridimensionnel Turbulent  
de l'Air dans un Turbocompresseur**

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**Abstract:** Dans cette étude, nous avons considéré l'écoulement turbulent d'un fluide compressible (l'air) dans un compresseur centrifuge utilisé pour un turbocompresseur appliqué aux moteurs suralimentés. La résolution des équations de Navier-Stokes associées au modèle de turbulence k- $\epsilon$  standard est faite par le code CFD commercialisé FLUENT, le maillage a été conçu par le logiciel GAMBIT. Trois configurations des roues (rotors) en 3D sont considérées, de même taille (diamètres d'entrée et de sortie, largeur du diffuseur et hauteur), diffèrent seulement en mode d'orientation des aubes. Les résultats obtenus montrent l'effet remarquable de la géométrie du rotor sur les caractéristiques locales de l'écoulement et celles de la turbulence par conséquent sur les performances du turbocompresseur, ils sont avérés réalistes et comparables avec ceux de la littérature utilisée.

**Keywords:** turbocompresseur, écoulement turbulent, simulation numérique, géométrie du rotor





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ID: EP74

**Etude de la convection forcée lors de refroidissement d'un Dissipateur thermique à ailettes  
cylindriques en mousse métallique**

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**Abstract:** Cette étude présente une simulation numérique par le logiciel COMSOL 5.3 en 3D transitoire pour simuler le comportement thermo-hydraulique de l'air au sein d'un canal muni d'un système plaque – composant électronique refroidie par un dissipateur à ailettes cylindriques en mousse d'aluminium. L'objectif est de présenter et d'analyser la fiabilité et l'efficacité du dissipateur en mousse d'aluminium à ailettes cylindriques sous des conditions variables du flux thermique dissipé par le composant électronique ainsi qu'une vitesse de l'air variable à l'entrée du canal. Les résultats de simulation montrent clairement que sous des conditions similaires de flux thermique et de vitesse de l'air à l'entrée du canal et aux mêmes moments, la plage de température à la surface du composant électronique avec un dissipateur en mousse d'aluminium à ailettes cylindriques est nettement inférieure en comparaison avec le cas d'un dissipateur ordinaire d'aluminium ou avec le cas sans dissipateur, Ce qui favorise l'utilisation de ces dissipateurs en mousse métallique pour assurer la fiabilité et l'efficacité des composants électroniques de puissance.

**Keywords:** Mousse métallique, Dissipateur thermique, Comsol, Simulation, Milieu poreux, modèle Darcy-Forchheimer-Brinkman, Convection forcée.





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ID: EP75

**Comparative Study And Simulation Analysis For Two Models Of Autonomous Application For Photovoltaic System**  
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**Abstract:** "In this paper, we present a comparative study, analysis, and evaluation of a model of autonomous kit with electrochemical storage and autonomous kit with the wire of sun. by using the maximum power point Tracking efficiency of photovoltaic with different DC-DC converter topologies for photovoltaic Application. It provides different improvements to the electrical architecture. In fact, we present a new alternative for improving both the performance of photovoltaic (PV) systems and the efficiency of the energy conversion. This solar system represents the complete chain simulation in MATLAB / SIMULINK. Thus, we looking at the matching connection stage between the GPV, MPPT regulator, solar battery, circuit breaker, the DC load represents by an LED bulb. In addition, we using a new additive block represented by a voltage probe, current probe. Likewise, we will see the effect of the absence of MPPT regulator on the overall performance of PV system. The development of electronics in the field of power production, which makes the trade-off between power and cost level on the one hand and new control techniques on the other hand, allows us to better manage the environment our problematic on isolated site. One of the main components is the load DC and AC. The new trends in this area are the use of economy solution by using renewable energy. The simulation results show that this control (by use components of direct connected solar "Load DC", and with storage electrochemical "Load AC") gives us a good agreement performance in terms of electric product necessary in our saharan country especially in public lights.

**Keywords:** "Photovoltaic Generator, Maximum Power Point Tracker MPPT, performance, power, DC-DC, DC-AC Converters".





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ID: EP76

**Probing Radiative Neutrino Mass Models Using Trilepton Channel at the Large Hadron Collider LHC"**

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**Abstract:** Every second, over a billion neutrinos pass through your body, neutrino are by far the oddest of the fundamental particles, they are also the only electrically neutral lepton while the observation of neutrino oscillations for which the data can not be explained by massless neutrinos, the dark matter (DM), and the matter-antimatter asymmetry of the universe make in evidence one of the most popular mechanisms that generate small neutrino mass. Here we present one of the attractive way to induce naturally small neutrino mass, the KNT model proposed, where neutrino mass are generated radiatively at three loop, our model extends the SM with two singlet charged scalars  $S(1,2)$ , and one singlet fermion,  $N$ , all having masses around the TeV scale, making it testable at collider experiments such as DM relic density. In this work, we probe a class of neutrino mass models through the lepton flavor violating interactions of a singlet charged scalar,  $S$  at proton-proton collisions with 8 TeV and 14 TeV energies where this scalar produce neutrino missing energy.

**Keywords:** Radiative mass, Trilepton events , Charged scalar , Missing energy, LHC







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ID: EP77

**Production of Charged Scalars Particles via Proton-Proton Collision at High Energy Collider**

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**Abstract:** "The Standard Model is a physical theory of a spectacularly successful sort. It covers almost all known physical phenomena, and agrees precisely with the result of every single experiment ever done to test it but it leaves open a very small number of questions; identification of DM particle and their production mechanism are among the most challenging problems of astrophysics today as for the neutrinos. Proton proton collision events final states exhibit a most interesting investigation for testing and improving new physics phenomena at high energy. This study involve the search for lepton flavor violation (LFV) . Several extensions for Standard Model predict the existence of a heavy neutrino at high energies, where the radiative neutrino mass model is one of them which predict the existence of three heavy (right-handed) neutrinos one per generation. In the present work we study the production of charged scalars  $S_{1,2}$  via the Drell-Yan process and their decay in the Large Hadron Collider environment which they could leave some signals through two charged leptons and missing energy., events are producesd throught proton proton collision at  $ECM = 14$  TeV. The observation of an electron (positron) and anti-muon (muon), give us an indication for the signature of this model."

**Keywords:** charged scalar, high energy, neutrino, collider, lepton flavor, proton collision, cross section





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ID: EP78

**Simulation CFD avec Comsol multiphysique des phénomènes d'échange de chaleur et de masse à travers la zone de garnissage au sein d'une tour de refroidissement humide à contre-courant**

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**Abstract:** Cette étude présente une simulation CFD réalisée par le logiciel COMSOL multiphysique pour simuler le phénomène d'échanges de chaleur et de masse à travers la zone de garnissage au sein d'une tour de refroidissement humide à contre-courant. Un modèle mathématique en dimension 2D en régime transitoire est utilisé, cela permet de traiter le phénomène d'échange de chaleur et de masse entre deux fluides en contact (eau et air). L'utilisation de ce logiciel c'est simuler l'influence de certains paramètres sur les performances thermiques de la tour sous différentes conditions de fonctionnement. Deux géométries différents de garnissage triangulaire et sphérique (en zigzag et à vagues) sont représentés, le dimensionnement des deux géométries sont basés sur des données expérimentales ont été réalisés sur un prototype de dispositif d'une tour de refroidissement au laboratoire. Les résultats obtenus par les deux géométries de garnissage sont comparés, analysés et discutés.

**Keywords:** tour de refroidissement, garnissage, Comsol, transfert de chaleur et de masse.





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ID: EP79

**Dynamic characteristics of turbulent non-premixed flame provided by a coaxial burner**

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**Abstract:** This paper presents an experimental study of the dynamic characteristics of non-premixed turbulent swirling flame by the use of the stereo-PIV technique. In this study a coaxial swirl stabilized burner is used in the turbulent regime. The flame operates under a global equivalence ratio  $\phi = 1$ , a swirl number  $Sn = 1.4$ . The comparison between reacting and non-reacting flows shows that the presence of the flame affect the Central Recirculation (CRZ), increase the values of means velocity. The results shown also that with the presence of the flame, the flow have more fluctuations.

**Keywords:** turbulent flame, swirling flows, coaxial burner, Stereo-PIV





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ID: EP80

**Analyse des transferts de chaleur et de masse dans un milieu granulaire et mise en évidence des fronts de séchage et de réhumidification. Cas: silo"**

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**Abstract:** "Ce travail constitue un premier pas vers la prise en compte de la convection forcée dans la modélisation des transferts couplés survenant lors du stockage en silos de produits agricoles.

Nous avons étudié en premier lieu, le problème de transfert de chaleur pur (sans séchage) en convection forcée dans un milieu poreux granulaire pour une configuration cylindrique, et en second lieu, on a traité le transfert de chaleur et de masse pour la dite configuration.

La mise adimensionnelle des équations, avec des grandeurs de références reliées au problème physique et les conditions aux limites, ont permis de mettre en évidence la présence et la forme des fronts de séchage et de réhumidification dans le cas du séchage s'effectuant à une vitesse constante."

**Keywords:** Front de séchage, front de réhumidification transferts couplés, convection forcée, vitesse de séchage, milieu granulaire.





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ID: MO01

**Synthesis Diatomite ( Kieselguhr ) /  $\text{Fe}_2\text{O}_3$  /  $\text{TiO}_2$  Composite as Photocatalyst for Dye Degradation**

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**Abstract:** Diatomite (kieselguhr)/ $\text{Fe}_2\text{O}_3$  / $\text{TiO}_2$  composite as catalyst for heterogeneous photocatalysis of vat green 03 indanthren and characterized in this study. The diatomite/ $\text{Fe}_2\text{O}_3$  / $\text{TiO}_2$  Called “Diatomite FC” was made through surface modification treatments including  $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$  and NaOH then  $\text{TiO}_2$  degussa P25 deposition on raw diatomite. In the  $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$  and NaOH treatments, surface  $\text{SiO}_2$  of diatomite and  $\text{TiO}_2$  degussa P25 were partially dissolved in the  $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$  and NaOH by means of x-ray fluorescence ( XRF ), x-ray diffraction ( XRD ), scanning electron microscopy ( SEM ), thermogravimetric analysis ( TGA ) and differential scanning calorimetry ( DSC ) and UV-visible diffuse reflectance spectroscopy ( DRS ). The surface area of diatomite /  $\text{Fe}_2\text{O}_3$ / $\text{TiO}_2$  is  $970 \text{ m}^2/\text{g}$ . Diatomite/ $\text{Fe}_2\text{O}_3$ / $\text{TiO}_2$  “ Diatomite FC ” was  $E_g = 1.1 \text{ eV}$  by UV-visible DRS technique. The vat green 03 indanthren textile dye degradation has pH dependency, the better result is at  $\text{pH} = 10$  with colour remove about 92 %. The photodecolourisation rate follows pseudo-first order kinetic with respect to the dye concentration.

**Keywords:** Diatomite, catalyst, heterogeneous, pHPZC , band gap





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ID: MO02

**Density functional study of the structural, dynamic and Thermodynamic Proprieties of the III-Antimonides semiconductors (BSb, AlSb, GaSb, and InSb)**

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**Abstract:** In the present contribution, structural, dynamic, and some thermodynamic properties of the III-Antimonides are studied using the density-functional perturbation theory (DFPT) within the local density approximation (LDA) in combination with the harmonic approximation. Our results for the structural properties such as the lattice constant and the bulk modulus were found to agree well with the previous theoretical and experimental works. We have also calculated the phonon dispersion relation, and we found that our phonon calculations show that these compounds are dynamically stable in the zinc blende phase. Moreover, our results of the optical and acoustic phonon frequencies at the high symmetry points  $\Gamma$ , X and L are in good agreement with the available theoretical and experimental data. In addition, the thermodynamic properties, including the free energy, internal energy, entropy, and the heat capacity at constant volume were predicted and discussed.

**Keywords:** DFPT, III-Sb, Phonon frequencies, splitting LO-TO, Thermodynamic proprieties





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ID: MO03

**Synthesis and characterizations of NBT-BT doped lead-free piezoelectric ceramics**

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**Abstract:** Lead-free NBT-BT piezoelectric materials are most intensively studied in order to replace the traditional lead-based ferroelectric ceramics such as  $\text{Pb}(\text{Zr}, \text{Ti})\text{O}_3$ . In this work, The effects of modifying composition by doping on structure, dielectric, piezoelectric, and electrical properties of ceramics have been studied. NBT-BTdoped ceramics were prepared by solid-state reaction method. A single phase perovskite structure with morphotropic phase boundary was confirmed by X-ray diffraction. The grain morphologies were analyzed by Scanning Electron Microscopy (SEM) analysis. The temperature dependence of dielectric behavior and the frequency dependence of impedance relaxation were investigated. A broaden dielectric constant peak were observed over a wide temperature range and also indicate a relaxor behavior. The complex impedance plot exhibited one impedance semicircle which is explained by the grain effect of the bulk

**Keywords:** low sintering ; dielectric ceramic ; impedance spectroscopy ; NBT ; BT ; dielectric relaxation



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ID: MO04

**The effects of perpendicular magnetic field and current density on the electroplating of Zn-Ni**

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**Abstract:** Zinc-nickel alloy coatings were electrodeposited on stainless steel substrates in chloride acid bath at two current densities of -20 and -40mA/cm<sup>2</sup>, under low perpendicular applied magnetic field. A reverse effect was observed during a reduction process at the two current densities studied. For alloys obtained with low current density, surface is smoother and more uniform especially under B=1T

**Keywords:** Current density, Chloride bath, Perpendicular magnetic field, Zn-Ni alloy.





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ID: MO05

**Mechanical and Tribological Behaviors of Nanocomposite Titanium Nitrides Coatings**

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**Abstract:** "TiN coatings with a thickness of 2  $\mu\text{m}$  were deposited using the magnetron sputtering has developed rapidly over the last decade in such a way that it has become an established process of choice for the deposition of a wide range in various applications for different domains as it gives excellent performance in many aspects. In view of this, we have deposited the TiN coatings by magnetron sputtering using Ti target at different nitrogen content to study the influence of the nitrogen content on the mechanical properties and tribological behaviors of the TiN coatings were systematically investigated using nanoindentation and a pin-on-disk tribometer. Nanoindentation results shows that the hardness and Young's modulus of the TiN coatings increase with increasing N content in the coatings.

Wear test results indicate that the wear rate and friction coefficient of the XC100 steel substrate were significantly reduced by deposition of the TiN coatings, and the tribological behaviors of the TiN coatings are strongly dependent on the nitrogen content in the coatings and the testing ball material.

With increasing N content in the coatings causes an increase in the friction coefficient and the wear rate of the TiN coatings tested against 100Cr6 balls"

**Keywords:** TiN, nanocomposite coating, Mechanical property, Wear property, wear,



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ID: MO06

**Modelling and optimization of dissimilar welding using response surface methodology**

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**Abstract:** The success of the TIG welding process is based on various input parameters like current, speed and gas flow and on output parameters like tensile strength. The welding parameters were measured according to 33 full factorial parameter designs with independent variables of TIG dissimilar welding process between Austenitic stainless steel 304L and a high strength low alloy steel X70. The response surface methodology (RSM) and analysis of variance (ANOVA) were used to check the validity of quadratic regression model and to determine the significant parameter affecting the output responses. Results show that tensile strength is influenced principally by welding speed. Finally, the ranges for best welding conditions are proposed for serial industrial production.

**Keywords:** TIG welding; Dissimilar; Tensile strength; Response surface methodology; ANOVA





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ID: MO07

**Nitrogen doping to improve the mechanical and tribological properties of vanadium coating**

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**Abstract:** "V-N coatings were deposited by the magnetron sputtering in an argon and nitrogen atmosphere. Microstructures, mechanical properties and tribological properties of both coatings were comparatively investigated. By varying the film thickness and the nitrogen percentage in the gas atmosphere, the structure, hardness and wear resistance of V-N films were evaluated in a large range. With increasing nitrogen ratio in the deposition chamber from 15 to 25 %, the structure changed from (hc)V<sub>2</sub>N to multi phases of V<sub>2</sub>N and (fcc) VN (formation of different vanadium nitrides). The V-N coating exhibited higher hardness, lower friction coefficients and wear rates than VC coating in different nitrogen contents. The better mechanical and anti-wear property of the V-N coating were closely related to the dense structure and self-lubricating vanadium oxide, indicating its potential application as a lubricant coating for tribo-components in dry environment.

**Keywords:** V-N coating, Pulverization, Structural property, Hardness, Tribological property.





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ID: MO08

**Synthesis and characterization of nanocomposite by polymirization of Aniline and 4-Bromoaniline**

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**Abstract:** "Poly(Aniline- co-4-Bromoaniline) nanocomposites, wasprépared via in situ emulsion polymerization in a different molar ratio in the presence of Cu<sup>++</sup>-montmorillonite (Cu<sup>++</sup>-MMT). The X-ray diffraction (XRD) confirmed that the basal space of Cu<sup>++</sup> -montmorillonite increased after the organophilization. Poly( (Aniline- co-4bromoaniline )/M-Cu<sup>++</sup>)nanocomposites were prepared by intercalating the emulsion of aniline, a 4-Bromoaniline monomer with treated organically layers of (Cu<sup>++</sup>, MMT) using ammonium peroxydisulfate (APS). The basal spaces which enlarged after the polymerization process. The nanocomposite was characterized by FTIR, XRD, Uv-vis spectroscopy and voltammetry spectroscopy all this was confirmed the formation of P(ANI-co-4BANI), P(4-BANI) and studies of the composites revealed that there are a strong interaction and the electroactive of the nanocomposite."

**Keywords:** Aniline ; 4 ; Bromoaniline ; montmorillonite ; in situ polymerization.





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ID: MO09

**Structural and morphological properties of Ta-Ni co-doped Aurivillius Lead Free Ceramics**

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**Abstract:** The polycrystalline sample of (Ni Ta) modified  $\text{Bi}_4\text{Ti}_3\text{O}_{12}$ , was synthesised by the conventional solid-state reaction method. The effect of sintering temperature on the structural and morphological properties of co-doped aurivillius was examined. X- ray diffraction data of  $\text{Bi}_4\text{Ti}_{2.9}(\text{Ni}_{2/3}\text{Ta}_{1/3})_{0.1}\text{O}_{12}$  show the formation of single phase compound in the orthorhombic system with minority of pyrochlore phase. It has been found that the  $\text{Bi}_2\text{Ti}_2\text{O}_7$  values of the secondary phase decrease with increasing sintering temperature. The scanning electron microscopy of the sample confirms the formation of a single-phase compound and the uniform distribution of high density grains at high temperature.

**Keywords:** Aurivillius, Pyrochlore, Orthorhombic system, BIT





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ID : MO10

**Polymer Coated Quartz Crystal Microbalance Sensor for VOC Detection**

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**Abstract:** In this work, PDMS has been used for producing QCM chemical sensors. The sensor was exposed towards various VOC molecules. The measured isotherms on modified QCM electrode showed a good reproducibility and reversibility. Generally, the frequency shift ( $\Delta f$ ) of QCM increases linearly with the vapor concentration. The evolution of sensor response showed clearly an improvement of the QCM sensibility.

**Keywords:** QCM, sensor, VOC, drop coating, PDMS





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ID: MO11

**Synthesis and characterization of MTS oxides: ZnO and SnO<sub>2</sub>**

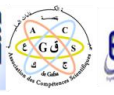
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**Abstract:** in recent years, the use of nanostructured oxides has attracted considerable attention due to their unique properties distinctive applications. This study demonstrated a sol-gel method of synthesis of two different oxides: zinc and tin oxides nanoparticles (ZnO & SnO<sub>2</sub>). CTAB (cetyltrimethylammonium bromide) was used as surfactant agent for the formation of different morphologies of 2 oxides nanoparticles. Different techniques have been exploited for the textural and morphological characterization of these synthesized oxides such as SEM, adsorption-desorption of liquid nitrogen and FTIR. The obtained results indicated that the MTS materials were successfully formed with different morphologies: nano-spheres and assembled hierarchical structure.

**Keywords:** MTS, ZnO, SnO<sub>2</sub> , NPs, Sol-gel, surfactant, morphologies







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ID: MO12

**Electropolymerization of Polyaniline Thin Films by Two Different Methods**

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**Abstract:** "Polyaniline (PANI) is an electrically conducting polymer with many potential applications, including use in energy storage and sensors devices. In this study we describe the effects electropolymerization of aniline to polyaniline (PANI) by two methods onto indium tin oxide coated glass substrate (ITO). For the first method using cyclic voltammetry (CV), it was found that the aniline with 0.1M in 0.1M H<sub>2</sub>SO<sub>4</sub> started to polymerize on ITO substrate at + 0.1 V vs SCE. However, the second method cronoamperometry (CA), was used to deposit the PANI onto ITO coated glass; two different applied potentials (ie: +0.75V and +1.0V) during 600s. The optical properties of PANI films were studied with the ultraviolet–visible (UV-Vis) absorption spectroscopy. We have found that the of PANI films obtained with CV method have more absorption intensity than to PANI obtained with CA."

**Keywords:** Polyaniline, Electrodeposition, electropolymerization, Cyclic Voltammetry, thin films.





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ID: MO15

**Study by electrochemical impedance the inhibitory efficacy of a propolis extract for an iron alloy immersed in a solution ethylene glycol / water, 0.1 M NaCl**

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**Abstract:** "The effect of propolis extract as a corrosion inhibitor of iron alloy in ethylene glycol / water 0,1M NaCl solution was studied by electrochemical impedance technique at different concentration. The maximum value of the inhibitory efficacy is 71,98 % at optimum concentration of 1,25 g /L of propolis extract. The activation parameters reveal that the inhibitor molecules on iron surface are absorbed by physisorption and a chimisorption and obey Langmuir isotherm adsorption. These results were supplemented by IR Spectroscopy, Scanning electron( microscopy (SEM) and EDX spectrum of chemical composition. The metal solution interface is simulated as a physical model by using Electrochemical Impedance Spectroscopy (EIS).

**Keywords:** Iron Alloy, Propolis extract, ethylene glycol; Corrosion inhibition; Adsorption, Electrochemical impedance Spectroscopy (EIS).





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ID: MO16

**Barrage K'sob de Msila : Caractérisation de la Boue de Dragage en vue de sa Valorisation dans la Matrice Cimentaire d'un Béton Ordinaire**

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**Abstract:** "Les barrages au niveau de plusieurs pays dans le monde sont confrontés au sérieux problème d'envasement qui est l'une des conséquences du changement climatique engendrant en conséquence une pluviosité irrégulière et une sécheresse durant une grande partie de l'année. Les pluies, durant les saisons humides, arrivent souvent sous forme d'averses de courtes durées drainant de grands volumes d'eau et entraînant l'érosion rapide des bassins versants. Ainsi, les barrages de retenue s'ensavent et perdent rapidement leurs fonctions initiales et se transforment beaucoup plus en récipients de vase ou de boue que d'eau. Devant cette situation d'envasement des barrages qui représente une des menaces les plus sérieuses qui affectent la bonne santé et le potentiel des barrages, le dévasement de ces derniers devient une urgence et une exigence nonobstant qu'il conduit à des volumes considérables de vase ou de boue soumis à l'environnement. Le but de cette étude est la caractérisation de cette boue issue du dragage des barrages en vue de sa valorisation dans le confectionnement d'un béton ordinaire par la substitution d'une partie de ciment peut présenter un triple objectif : écologique (minimiser la boue de dragage stockée dans la nature), technique (préparer des bétons à base de boue de dragage ayant des résistances intéressantes), économique (remplacer une grande part du ciment par de la boue de dragage traitée). Les premiers résultats d'études des aspects chimiques, physiques, minéralogiques et mécaniques de la vase draguée des barrages sont encourageants et promettent un avenir meilleur pour la vase et son utilisation dans la fabrication de béton.





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**Keywords:** Envasement, Caractérisation, valorisation, boue de dragage, vase, ciment, béton

ID: MO17

**Ab-initio study of structural, electronic and magnetic properties of  $\text{Al}_{1-x}\text{Ca}_x\text{P}$  and  $\text{Ga}_{1-x}\text{Ca}_x\text{P}$  alloys**

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**Abstract:** In this paper we investigated the structural, electronic and magnetic properties of  $\text{Al}_{1-x}\text{Ca}_x\text{P}$  and  $\text{Ga}_{1-x}\text{Ca}_x\text{P}$  by using density-functional theory as implemented in the Wien2k package. The results indicate that this two alloys prefer the ferromagnetic ground state by exception  $\text{Ga}_{0.5}\text{Ca}_{0.5}\text{P}$  which stabled in antiferromagnetic stat, and behave a half metallic character .the magnetic moment mainly comes from the Ca holes and that which is interesting and motivated to study this alloys.

**Keywords:** density functional theory ; alloys ; ferromagnetic ground state ; antiferromagnetic state ; half metallic ; magnetic moment ; Ca holes.





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ID: MO18

**Amélioration de la réactivité d'une zéolite naturelle par activation thermique et chimique**

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**Abstract:** "La présente étude vise à évaluer les propriétés d'une pâte cimentaire à base d'une zéolite naturelle, constitué principalement de mordénite, qui a récemment attirée l'attention des constructeurs et des chercheurs comme matériau de substitution du ciment Portland. On aborde par le biais d'une étude expérimentale paramétrique les propriétés de résistance et de temps de prise en cherchant la température de cure optimale et les proportions adéquate d'activateurs chimique pour l'amélioration de la réaction pouzzolanique. Les pâtes de zéolite naturelle-chaux ont été activées par 4% et 8% de NaOH, NaCl et  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  et ont été conservées dans des ambiances régulées à 20°C, 40°C et 80°C. Les résultats obtenus ont montré que la cure à haute température accélère la réaction pouzzolanique et augmente la résistance à la compression. L'utilisation des activateurs chimiques diminue le temps de prise et améliore la résistance mécanique. Le NaOH a montré une grande efficacité à une température de cure de 40°C, tandis que le NaCl et  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$  l'ont montré à 80°C"

**Keywords:** Zéolite, activation chimique, activation thermique, réaction pouzzolanique, résistance mécanique.







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ID: MO19

**Effet des Propriété Mécaniques sur le Choc Thermique d'une Alumine ( $\alpha$ -Al<sub>2</sub>O<sub>3</sub>)**

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**Abstract:** "Le but de ce travail est de faire une étude sur l'effet des propriétés mécaniques sur le choc thermique d'une alumine élaborée par deux voies (humide et sèche). Une alumine obtenue par frittage naturel et l'autre obtenue par frittage SPS. La nanopoudre de départ est une alumine  $\alpha$  ( $\alpha$ -Al<sub>2</sub>O<sub>3</sub>) commercialisée par Baikowski (Baikalox-BMA15, France), avec une pureté de 99.99 % et d'une taille moyenne de grains de 150 nm. Pour avoir des échantillons par coulage en barbotine, un mélange (poudre d'alumine et une eau distillée et une solution d'acide chlorhydrique dilué) sous pH à 3 a été réalisée. La barbotine est obtenue sous un broyage de 40 heures cette durée est suffisante pour la désagglomération. Le coulage a été fait dans des moules en PVC sous forme de plaques, et des barres. Pour éviter toute contamination un support en alumine a été utilisé., un cycle de séchage lent a été réalisé à 600°C pour minimiser la fissuration. Un déliantage est nécessaire pour éliminer la graisse de silicone utilisée sur les bords des moules. La voie sèche a été concrétisée pour fritter des échantillons par frittage flash «Spark Plasma Sintering (SPS)» la température de frittage est varié entre 1150°C et 1350°C avec un pas de 50°C, une vitesse de chauffage 100 °C•min<sup>-1</sup> et un temps de maintien de 3 mn et 10 mn. Deux pressions ont été utilisées (25 et 50 MPa). D'autre part le cycle de frittage naturel est concrétisé à différentes températures (1200°C, 1300°C, 1400°C et 1500°C) avec des temps de maintien de 1h et 3h. La densité des échantillons frittés a été déterminée selon le principe d'Archimède. La méthode dynamique a été utiliser pour mesurer le module de Young à travers l'appareil de type Grindo-Sonic. La microstructure des frittés naturels et par SPS a été étudiée par microscopie à balayage électronique. Un choc thermique sévère (refroidissement à Air) sous différentes conditions a été utilisé. La température critique a été déterminée à travers la méthode du défaut contrôlé. La propagation de ce défaut (fissures) se fait à travers l'émission (EA). Les résultats ont montré que le frittage SPS conduit à de meilleures caractéristiques mécaniques. Le premier paramètre coïncide avec l'approche thermoélastique de kingery."





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**Keywords:** Nanopoudre, Alumine, frittage naturel, frittageSPS, choc thermique, indentation.

ID: MO20

**Infra-Red study of five Methods for Isolation Chitin from Algerian truffles *Terfezia arenaria***

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**Abstract:** Chitin, the second most important bio-polymer in the world, this polymers exhibit widely differing physicochemical properties depending on the source and the conditions of production, a complete chemical and physicochemical characterization of chitin is not possible without using spectroscopic techniques. This study focuses on the Infra-Red methods for the structural analysis of Chitin isolated from fungal biomass.

**Keywords:** Chitin, Intra-Red, Isolation, Polymere, Truffle.



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ID: MO21

**Realization and Characterization of  $\text{CH}_3\text{NH}_3\text{PbI}_3$  /c-Si Heterojunction**

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**Abstract:** In the present work we have reported the realization and characterization of  $\text{CH}_3\text{NH}_3\text{PbI}_3$  /c-Si heterojunction. It was achieved by depositing  $\text{CH}_3\text{NH}_3\text{PbI}_3$  perovskite film on (P) single crystalline Silicon (c-Si) substrate by spin coating. The structural and optical properties of perovskite film were investigated. The device electric characterization was achieved through I(V) curve which exhibits rectifier behavior. The ideality factor, the saturation current, the series resistance and the potential barrier were measured and discussed.

**Keywords:**  $\text{CH}_3\text{NH}_3\text{PbI}_3$ , Perovskite, c-Si, spin coating, heterojunction .



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ID: MO22

**Impact du type de béton sur le comportement des ondes ultrasonores**

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**Abstract:** Les ondes ultrasonores constituent l'un des moyens les plus sophistiqués de caractérisation des matériaux. Dans le présent travail, nous étudierons l'influence de la variation des interfaces sur le comportement des ondes ultrasonores. La méthode proposée consiste à décomposer le faisceau ultrasonore en plan (2D) pour calculer et suivre la variation des coefficients de transmission et de réflexion. Cette étude repose sur deux hypothèses essentielles, la première est la continuité de la déformation élastique et la seconde est la continuité de la tension mécanique. Dans cette étude, nous étudierons l'influence du type de béton utilisé sur l'impédance acoustique en faisant varier l'angle d'attaque.

**Keywords:** Ultrasonic waves, Reflection, Transmission, Elastic strain, Mechanical tension, concrete





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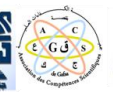
**Effects of time on the behavior of concrete-filled steel tubular columns**

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**Abstract:** In concrete filled steel tubes columns, the steel section contributes to the axial strength of the column and provides the containment pressure to the concrete core, while the concrete core balances the axial load and minimizes or delays the local buckling of the steel pipe. In addition, the columns reduce the construction costs because they do not require the formwork. Columns are subject to problems of increased deformations produced by the creep of concrete. Under the effect of creep, steel tubular columns filled with concrete can be subjected to longitudinal as well as circumferential stresses. To date, research is focused on delayed column response under longitudinal stress only using simple empirical expressions that can lead to unreliable results. However, no attention has already been given to the long-term behavior, with regard to circumferential stresses. In order to address this deficiency and to better understand the overall column behavior, the main objective of the present work is to provide researchers and designers with a new analytical tool that is both simple and sufficiently capable to predict the variation, in time, the axial and circumferential stresses and strains in the mixed circular section poles filled with concrete subjected to long term compressive loads. For this reason, the fundamental objective of our present contribution is a beginning to develop an analytical formulation allowing to calculate, at any time  $t$ , the additional normal and circumferential stresses brought by the creep of the concrete. It therefore leads to a real understanding of the delayed behavior of mixed poles in circular section filled with concrete and to highlight the most influential factors. Our current approach is a simple and precise work tool and device for predicting the local redistribution of concrete creep in a steel tubular column filled with concrete subjected to normal compression efforts.







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**Keywords:** tube, steel, time, circumferential stresses, compression

ID: MP001

**Caractérisation des Joints Soudés par le Procède SMAW des Aciers pour Pipelines**

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**Abstract:** Chimique, la microstructure et la formation des inclusions dans des soudures d'un acier de type X42. Pour cela, deux types d'électrodes à faibles teneur en carbone ont été utilisés et les flux qui les composent sont E6010 et E8018-G. Les résultats montrent que la microstructure de la zone de fusion pour chaque flux est constituée principalement de ferrite aciculaire et s'accompagne d'une diminution des pourcentages de C, de Si et de Mn mais d'une augmentation de celui du Ti et ce par rapport au métal de base. D'autre part, les inclusions non métalliques observées sont de deux types : blanches et noires indépendamment du flux utilisé.

**Keywords:** Acier X42, Flux, Soudage SMAW, MEB, EDAX.



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ID: MP003

**Étude du comportement électrochimique d'un acier au carbon boruré dans l'acide sulfurique**

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**Abstract:** Dans ce travail, nous avons étudié la boruration d'un acier (XC38) avec la technique de poudre à 900°C pendant 4 heures. La nature, la morphologie des couches de borures obtenues en surface ont été réalisées par microscopie optique (MO), et par (XRD). La résistance à la corrosion a été évaluée par la méthode gravimétrique et la méthode électrochimique dans une solution ( $H_2SO_4$  -0.25 et 0.5 mol/L). Les résultats obtenus ont révélé que la couche de borure formée est aciculaire. Les borures formés en surface constitués de deux borures ( $FeB$ ,  $Fe_2B$ ). Les résultats des essais de corrosion ont montré que le traitement de boruration permet d'augmenter la résistance à la corrosion. L'efficacité de la boruration dans l'amélioration de la résistance de corrosion est plus de 90% dans les deux concentrations.

**Keywords:** Acier au Carbone, Traitement Thermochimique, Boruration, Corrosion, électrochimique





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ID: MP004

**Removal of crystal violet dye from aqueous solutions by Illito-Kaolinitic local clay from El-Oued (Algeria): Equilibrium and thermodynamic studies**

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**Abstract:** In this study, the adsorption behavior of Crystal Violet (CV) dye from its aqueous solutions was investigated onto natural Illito- Kaolinitic clay from South-East of Algeria at El-Oued. A series of experiments were undertaken in a batch adsorption technique to access the effect of the process variables i.e. initial dye concentration, contact time, initial pH, adsorbent dose and temperature. The adsorption capacity of basic dye was higher (40mg/L) with the Lower value of the temperature (286,82 K), adsorbent dosage (90mg) higher values at pH (10) and the equilibrium in the solution was observed within (30 min) which indicated by UV-Visible absorption spectroscopy technique. The equilibrium data for adsorption were fitted to the Langmuir isotherm ( $R^2 = 0,996$ ). The thermodynamic parameters  $\Delta G^\circ$ ,  $\Delta H^\circ$ , and  $\Delta S^\circ$  have been calculated ( $-10,75 \pm 17,73 \pm 0,093$ ) respectively.

**Keywords:** Adsorption, clays minerals, Crystal Violet, isotherm, Batch methods, El-Oued





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ID: MP005

**Influence des sulfates des eaux de mer sur le béton des BCR du port de DjenDjen - Jijel**

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**Abstract:** Plusieurs dégradations ont été constatées sur les ouvrages maritimes dans la région de Jijel, à cause de la qualité du béton produit et l'agressivité de l'environnement extérieure. L'objectif de ce travail est d'étudier la durabilité du béton des blocs cubiques rainuré (BCR) immergé dans les eaux de mer de la jetée Nord-Ouest du port de Djen Djen sous l'effet des sulfates. Pour se faire, d'un carottage au BCR immergé dans l'eau de mer de Djen Djen à une durée de 25 ans et dont les résultats ont été comparés à ceux des éprouvettes témoins. D'après l'étude, nous avons conclu que le béton des BCR ont présenté des caractéristiques mécaniques faibles comparativement au béton témoins et une pénétration des agents agressifs assez lente, et où une régression en résistance mécanique à la compression de 45 % ont été enregistrées à l'âge de 25 ans.

**Keywords:** Durabilité, ciment résistant sulfates (CRS), bloc cubique rainuré (BCR), eau de mer, sulfates.





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ID: MP006

**The effect of the potential and diameter of silver wires on the performance of the reference  
electrode Ag / AgCl**

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**Abstract:** " Miniaturization of the reference electrode is a key technology required to produce sensors at nanometric scale. For miniaturized electrodes, an important problem is its voltage stability. In this work, we use the anodisation process to fabricate Ag|AgCl reference electrodes. In this paper, we report that the stability of a very small silver chloride electrode could be obtained if a specific potential is applied. The AgCl wires produced by electrodeposition are investigated by the chronoamperometry technique. Scanning electron microscopy (SEM) is use to study the properties of the wire surface obtained. We found that the stability depends on the silver chloride surface morphology. The proposed anodization process is a viable technique to produce stable microscale reference electrodes and may be used to make even smaller diameter ones for miniaturized electrochemical sensors.

**Keywords:** "Surface morphology ; Ag/AgCl reference electrode ; Electrical stability ; Electrodeposition.







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ID: MP007

**Étude de l'élimination du CO<sub>2</sub>+ par adsorption sur une silice mésoporeuse de type CMI-1**

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**Abstract:** "L'objectif de ce travail est de préparer un support de type mésoporeux pour l'utiliser comme un support adsorbant pour l'élimination des ions de cobalt contenus dans une solution aqueuse synthétique simulant aux effluents d'origine industriels. Le support CMI-1 préparé à base de silice selon le mécanisme d'auto-assemblage coopératif CTM. Le matériau obtenu est caractérisé par la diffraction des rayons X (DRX), la spectroscopie infrarouge à transformée de Fourier (IRTF) et adsorption-désorption d'azote à 77 K (BET). L'examen par DRX montre que le matériau obtenu est ordonné et possède des mésopores disposés en symétrie hexagonale. La physisorption d'azote montre la mésoporosité du matériau CMI-1 avec un diamètre de pore de 2,6 nm, et une surface spécifique supérieure à 600 m<sup>2</sup>/g. L'adsorption a été étudiée en fonction du temps de contact, le pH, la force ionique et le rapport solide-liquide. La cinétique d'adsorption a été bien décrite par le modèle de pseudo-deuxième ordre. L'adsorption du cobalt est fortement dépend aux paramètres étudiés. L'isotherme d'adsorption suit les modèles de Langmuir, Freundlich, Temkin et Dubinin-Radushkevich (D-R). Selon le modèle de Temkin l'adsorption des ions Co<sup>2+</sup> sur la matrice est endothermique d'après la valeur de  $\Delta Q$  (valeur positive)."

**Keywords:** Matériaux mésoporeux, silicates, métaux lourds, adsorption.





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ID: MP009

**Theoretical investigation of structural, electronic and magnetic properties of  $\text{Sr}_{1-x}\text{TM}_x\text{S}$  (TM=Ti and Mn) ternary alloy**

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**Abstract:** The structural, electronic and magnetic properties of  $\text{Sr}_{1-x}\text{TM}_x\text{S}$  (TM=Ti and Mn) ternary alloy are investigated at concentration (0.0 and 0.25) in the rock salt (B1) phase. The calculations have been made using the full potential linearized augmented plane wave plus local orbital (FP-LAPW+lo) method<sup>1</sup> within the framework of the density functional theory (DFT)<sup>2</sup>. The state stability of  $\text{Sr}_{1-x}\text{TM}_x\text{S}$  for concentration of  $x=0.25$  has been investigated by calculating the variation in total energy versus volume for the ferromagnetic (FM), antiferromagnetic (AFM) and nonmagnetic (NM) phases. The ferromagnetic structure proved stable in comparison to the other magnetic structures for all compounds. Features such as the equilibrium lattice parameter and bulk modulus are measured too. A reasonable agreement is found in comparing our binary results with other available theoretical and experimental values. The exploration of the energy band gaps, however, revealed that these compounds have direct gaps at ( $\Gamma$ - $\Gamma$ ) direction of the spin down case. The electronic structures are found to exhibit a semiconducting behaviours for  $\text{Sr}_{1-x}\text{Mn}_x\text{S}$  and  $\text{SrS}$  and a half metallic behavior for  $\text{Sr}_{1-x}\text{Ti}_x\text{S}$  alloys at  $x=0.25$ . The total magnetic moments value confirm the right ferromagnetic nature of the compounds used. With respect to the results achieved from the magnetic moments for all systems, it is clear that the Mn and Ti impurities components contributed enormously in comparison to the non-magnetic Sr and S elements. The integer value of the total magnetic moments of studied compounds have been evaluated to equal to  $2\mu_B$  and  $5\mu_B$  per Ti atom and Mn atom respectively. Therefore, the  $\text{Sr}_{1-x}\text{TM}_x\text{S}$  (TM=Ti and Mn) ternary alloy seems to be a new potential candidate for future spintronics applications<sup>3,4</sup>.

**Keywords:** Semiconducting, FP-LAPW, spintronics, DMSs, structural properties, Half-metallic behavior.





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ID: MP010

**Structure and proprieties of Al-Nb alloys synthetised by high-frequency induction fusion (Hf) process**

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**Abstract:** "The structural and mechanical properties of Aluminum can be improved by the modification of the chemical composition of basic material by introducing one or more elements. In this work we study the system Al-Xwt%Nb (X: 10, 20, 25, 30, 40, 50) and follow the effect of Niobium addition on the structural evolution. Al-Nb is an important binary alloy system which possesses high strength, high melting point, low density as well as good oxidation resistance. This system were synthetized by high-frequency induction fusion (HF) process. X-ray diffraction analysis, scanning electron microscopy and Vickers indentation technique were used to characterize the produced alloy samples. X-ray diffraction revealed that the dominant phases are Al<sub>3</sub>Nb and  $\alpha$ -Al solid solution in the whole composition range investigated in this study. The formation of primary dendritic structure is observed by scanning electron microscopy. Moreover, the Vickers micro hardness test, carried out under a load of 100g, shows a monotonically increasing up to 50% of Niobium and shows well the occurrence of the two types of hardening of solid solution and by intermetallic phase precipitation as Al<sub>3</sub>Nb phase.

**Keywords:** Aluminum alloys, Niobium, Al<sub>3</sub>Nb, induction fusion, microhardness





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**A computational approach to reveal the structural geometry and physical properties of AsGen (n = 1-14) Nanoclusters**

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**Abstract:** In this work we report the different properties of one Arsenic atom doped Germanium clusters AsGen (n=1-14) by using the first principles Density Functional Theory (DFT) within the generalized density functional approximation (GGA) implemented in SIESTA program. The lowest-energy isomers are determined by considering a large number of structures for each cluster size. The lowest-energy isomers reveal three-dimensional structures starting from n = 5. Their relative stability versus atomic size is examined based on the calculated binding energy where are increases as the cluster size increase which indicating that the clusters continue to gain energy during the growth process and always for AsGen, we observe that the binding energies are lower than those for Gen + 1. This means that doping with As atoms has no immediate effects on enhancing the stability of germanium cluster at small size. Besides, both were studied and discussed fragmentation energy, and second-order difference of energy, the calculated HOMO–LUMO energy gap, vertical ionization potential, vertical electron affinity and chemical hardness.

**Keywords:** DFT; As–Ge clusters; structural properties; electronic properties; HOMO-LUMO gap





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**Ab initio study of Phosphore-doped germanium clusters properties**

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**Abstract:** The aim of this work is to study the effect of a P doping atom on the structural, energy and electronic properties of different isomers of small PGen<sub>p</sub> (n=1-6; q= 0, ± 1) clusters using density functional theory (DFT). Relative stability, structural and electronic such as optimized geometries, binding energy of per atom, fragmentation energy, second-order differences and HOMO-LUMO gaps of the pure Gen+1 and PGen clusters are analyzed and discussed.

**Keywords:** Clusters, Density functional theory, P-Ge clusters, structural properties, electronic properties







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ID: MP013

**Galvanostatic deposition of zinc oxide nanostructures**

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**Abstract:** In this study, zinc oxide (ZnO) nanostructure was successfully deposited by electrochemical method on indium doped tin oxide (ITO). The electrochemical deposition was carried out at a constant current density in different deposition time. The potential-time response was recorded and discussed. The crystal structure was studied using X-ray diffraction (XRD). The results show that the grown ZnO nanostructures were of wurtzite structure with preferential orientation along the (002) axis. Furthermore, Photocatalytic activities of ZnO have been examined towards the photo degradation of methylene blue. A maximum efficiency of 72.2 % is reported which indicates the capability of ZnO photocatalytic activity.

**Keywords:** zinc oxide, photocatalytic, electrochemical, current density, time deposition



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ID: MP014

**Pomegranate peel extract as green corrosion inhibitor for steel in 0.5M HCl solution**

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**Abstract:** "The inhibitive action of Pomegranate Peel Extract on steel corrosion in 0.5 M HCl solution was studied using weight loss measurements, potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) techniques. The surface of the carbon steel samples was also analyzed by scanning electron microscopy (SEM) in the absence and presence of inhibitor. Polarization curves indicate that Pomegranate Peel Extract is a mixed-type inhibitor in 0.5M HCl solution and the inhibition efficiency (IE%) is temperature-dependent. Adsorption of Pomegranate Peel Extract on the steel surface follows the Langmuir isotherm model. The thermodynamic parameters of dissolution and adsorption processes are calculated from experimental polarization data and interpretation of the results are given. The results showed that the adsorption of the Pomegranate Peel Extract is related to the concentration and strongly influenced by the temperature. The thermodynamic study has shown that the adsorption process is spontaneous (negative free energy) and physical type.

**Keywords:** Corrosion , Pomegranate Peel Extract , Activation energy, Adsorption isotherms





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ID: MP016

**Application of intelligent algorithms for the calculation of interaction parameters in the equilibrium of ternary system Heptane (1), Toluene (2), Aniline (3) at 293 k and 313 k**

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**Abstract:** "The liquid-liquid equilibria are of paramount importance in chemical process engineering. The interaction parameters are a key element in the study of equilibrium liquid-liquid and liquid-vapour, optimization methods for these parameters play a significant part. In this study, we present the results of the simulation using evolutionary algorithms with and without function hybrid. The results are compared and show that the hybridization of the threshold acceptance algorithm can achieve better results. The ternary system Heptane (1), Toluène (2), Aniline (3) at 293 k and at 313 k the is considered in our calculations of interaction parameters and consequently the calculation of equilibrium. The thermodynamic models considered for the calculation of the interaction parameters are UNIQUAC model and NRTL model for which the interaction parameters are calculated."

**Keywords:** Liquid-Liquid Equilibrium, Optimization, Genetic Algorithm GA, Threshold Acceptance Algorithm TA, simulated annealing NMS.





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ID: MP017

**Analysis of Static Bending Behavior of Functionally Graded Plates with Porosities Subjected to Mechanical Loading Using of High Order Shear Theory**

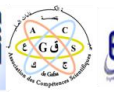
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**Abstract:** This work consists of the analysis of the bending responses of porous Ceramic-Metal functionally graded (FG) rectangular plates are investigated according to high order shear deformation theory. It does not require shear correction factors. Material properties of the plate are assumed to vary in the thickness direction according to a power law distribution interns of the volume fractions of the constituents. The proposed theory contains four unknowns unlike the other theories which contains five unknowns, but it checks the boundary conditions without constraints on the upper and lower plate surfaces. The governing equations of motion and boundary conditions are derived using the principle of virtual work. Solutions are obtained for FGPs in closed-form using Navier's technique. The results of deflections and stresses are presented for simply supported boundary conditions. The present numerical results are compared with the available solutions in the literature for non-porous plates deflections and stresses, from which it can be concluded that the proposed theory results are very close agreement to the published ones. Effects of the exponent graded and porosity factors are investigated.

**Keywords:** Static bending; Functionally graded; Power-Law ;Porosity; High order theory.





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**Effect of the narrow bandgap of n-type Layer on the Performance of a-Si:H Solar Cells**

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**Abstract:** In this work, a simulation study on the performance of solar cell based on a-Si:H by using hydrogenated amorphous silicon germanium (a-SiGe:H) film as n-doped layer have been carried out. We are simulated a series of n-doped a-SiGe:H layer with constant band gap and graded band gap for enhancing the performance of single junction a-Si:H solar cell, in particular fill factor (FF). The simulation result shows that a n-doped a-SiGe:H layer with decreasing band gap grading reduce the band gap offset and minimize the recombination of photo-generation carriers at i/n region. As result, the overall performance of solar cell has improved, particularly the fill factor FF and the open circuit voltage VOC.

**Keywords:** solar cell based a-Si:H ; n-type layer ; a-SiGe:H alloy ; band gap decreasing method.







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**Synthesis, crystal structures and characterizations of two new copper(ii) complexes including  
thiopheneacetic acid and imidazole ligands**

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**Abstract:** "Two new thiopheneacetic – based copper (II) complexes, namely bis(1H-imidazole)-(2-thiopheneacetato-O,Oi) (thiopheneacetato-O)-copper(II),  $[\text{Cu}(\text{HTAA})_2(\text{imd})_2]$  (1); bis(1H-benzimidazole-kN3)bis(2-thiopheneacetato-O,Oi)copper(II),  $[\text{Cu}(\text{HTAA})_2(\text{bimd})_2]$  (2), ( HTAA is thiopheneacetic acid ( $\text{C}_6\text{H}_5\text{O}_2\text{S}$ ), imd is imidazole ( $\text{C}_3\text{H}_4\text{N}_2$ ) and bimd is benzimidazole ( $\text{C}_7\text{H}_6\text{N}_2$ )), have been synthesized and characterized by FT –IR spectroscopy, and single crystal X-Ray diffraction. X-Ray diffraction analysis shows that complexes 1 and 2 have mononuclear units with the general formula  $[\text{Cu}(\text{HTAA})_2\text{L}_2]$  (L is imd or bimd), in 1  $\text{Cu}^{+2}$  ions is surrounded by tow HTAA and tow imd ligands with the distorted square bipyramidal coordination, Discrete monomeric units of 1 form a one-dimensional network via hydrogen bonds through nitrogen atoms and acetate oxygen atoms of the neighbouring molecules. Complex 2 consist of individual molecule in wish the  $\text{Cu}^{+2}$  lies on a center of symmetry; two thiopheneacetat and tow benzimidazole ligands surround the copper center forming an octahedral  $\text{CuN}_2\text{O}_4$  core. Both the HTAA and bimd ligands are arranged in trans positions. Each HTAA ligand is coordinated in a bidentate manner to the  $\text{Cu}^{2+}$  ion through the carboxylate O atoms (O1, O2,O3 and O4), creating a four-membered chelate ring, while the bimd ligands behave in a monodentate manner, coordinated through the N1 and N3 atoms. The coordination mode of carboxylate group in complex 2 were revealed by Fourier transform IR (FT–IR) spectroscopy.





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**Keywords:** Sulphur ligands, Coordination compound, Structural determination, X-ray diffraction

ID: MP020

**Numerical Modelling of Gravelly Clay**

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**Abstract:** The objective of this paper is to evaluate and compare analytical with numerical solutions of one-dimensional consolidation of Gravelly Clay. Plaxis 2D 8.6 professional version software was used to find numerical solution for saturated soil in oedometer test. The numerical pore pressure using different constitutive models has been estimated, discussed and compared with the existing analytical solution. A parametric study is undertaken to analyse the influence of the model's geotechnical parameters.

**Keywords:** Consolidation, numerical, constitutive models, oedometer test, PLAXIS.





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ID: MP021

**Contribution a l'analyse de l'évolution des charges déposées sur des matériaux isolants par la méthode de DPSZE**

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**Abstract:** Nous présentons dans cet article les résultats d'une étude expérimentale menée sur l'analyse de l'écoulement d'ions déposés en surface des matériaux isolants (polymères) par la méthode de DPS. L'influence du temps de dépôt, de l'épaisseur et de la densité de charge est analysée. Cette étude a permis d'une part de montrer les performances de la mesure électrostatique du potentiel de surface pour l'étude des propriétés diélectriques. Tous nos résultats ne font que confirmer l'intérêt d'une technique simple mais riche en informations et les possibilités encore à exploiter des mesures de potentiel de surface, d'autre part, nos résultats montrent que le DPS est fortement conditionné par la structure interne du polymère ainsi que la mise en évidence d'un processus d'injection de charges dans le volume du matériau. Enfin, nous avons noté que le vieillissement thermique est un facteur aussi déterminant dans l'évolution de la cinétique du déclin.

**Keywords:** Déclin de Potentiel en Surface, Décharge couronne, PET, Injection de charge, polymère, vieillissement.





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ID: MP022

**Activation energy of hydroxyapatite formation in kaolin - natural phosphate mixtures**

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**Abstract:** In this work, the activation energy of hydroxyapatite formation in different composites under non-isothermal conditions was determined using DTA. Seven compositions were prepared and studied, while varying the percentage of the kaolin from 20 to 80 wt. % at 10% increments. The DTA conducted at heating rates of 10, 20 and 30 K min<sup>-1</sup> showed an exothermic peak in all composites in the region 700-750°C associated with hydroxyapatite formation. The activation energies measured from non-isothermal treatments for seven compositions (20, 30, 40, 50, 60, 70 and 80 mass% of kaolin) were 194, 178, 178, 209, 162, 146 and 121 kJ mol<sup>-1</sup>, respectively.

**Keywords:** Activation energy, Hydroxyapatite, Composites, DTA.





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ID: MP023

**Caractérisation d'échantillons de sable de dunes de Sidi Slimane et Zaouïa El Abidia en utilisant la diffraction des rayons X (DRX) et la spectroscopie d'infrarouge à transformée de Fourier (FTIR)**

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**Abstract:** Dans le but de contribuer à la valorisation des ressources naturelles dans la vaste région de désert algérien, nous avons proposé une étude de certaines propriétés physiques et structurales de deux séries d'échantillons de sable prises de deux régions de Touggourt Elkobra dans le Sud-ouest Algérien. La première série comporte le sable des dunes pris de la commune de Sidi Slimane Sud-ouest de Touggourt. La deuxième série comporte le sable des dunes de la commune de Zaouïa El Abidia dans l'est de Touggourt. Après la préparation des échantillons de sable par séchage et broyage, on a réalisé des analyses par la diffraction des rayons X (DRX) ainsi que la spectroscopie infrarouge. Les spectres de DRX montrent que le sable de sidi Slimane est constitué principalement de quartz  $\text{SiO}_2$  avec une légère quantité de calcite  $\text{CaCO}_3$  et de gypse  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ . L'autre échantillon de Zaouïa El Abidia possède les mêmes constituants. Ces résultats ont été confirmés par les analyses de FTIR.

**Keywords:** Sable, Touggourt, DRX, FTIR, Dunes







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ID: MP024

**Effet de la structure poreuse sur les propriétés de transfert d'humidité des mortiers de ciment**

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**Abstract:** L'estimation des propriétés de transfert d'humidité en phase liquide présente une importance majeure pour évaluer la sensibilité des matériaux cimentaire aux attaques agressives. Dans cet article nous avons étudié l'influence de la structure poreuse caractérisée ici par la variation du rapport E/C et le mode de cure sur les propriétés du transfert d'humidité en phase liquide des mortiers de ciment. Ces paramètres sont déterminés par la technique gravimétrique dans des conditions amiantes seulement. Les résultats obtenus montrent que les propriétés hydriques en phase liquide pour les mortiers étudiés sont faibles, ceci permet de révéler que les mortiers sont des matériaux relativement hygroscopiques. De plus, la conservation dans l'eau a tendance d'augmenter les diffusivités et la diminution des sorptivités des mortiers étudiés.

**Keywords:** Mortier de ciment ; structure poreuse; Propriétés hydriques ; Sorptivité, Diffusivité hydriques.



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ID: MP026

**Preparation and characterization of new organic membranes for heavy metals separation**

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**Abstract:** "Polymer inclusion membranes (PIM) used for selective transport and separation of metallic ions have emerged in recent times. Their expansion depends on the method of preparation and their suitable structure and physico-chemical characteristics. In this paper, a novel category of membranes for ions separation is reported. The membranes were synthesized by solvent evaporation method using a mixture of polysulfone (PSL) and cellulose triacetate (CTA) or Poly(methyl methacrylate) (PMMA). PIM membrane exhibited a hydrophobic and thermally stable more than 120 °C with a more or less porous structure. The transport of Ni(II), Zn(II) and Pb(II) from aqueous solutions was studied by competitive transport across polymer inclusion membranes (PIM). Competitive transport of ions in solution across PIM shows that Ni(II) is selectively and efficiently transported by the three types of membranes, where we obtained a transport that exceeds well over 45% by using the PSL based membrane at an optimal concentration of 25 ppm

**Keywords:** Membrane; polymers; characterization; heavy metals; water treatment





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ID: MP027

**Lanthanum Substitution Effect on Structure and modulation in  $\text{Bi}_2\text{Sr}_{2-x}\text{La}_x\text{CaCu}_2\text{O}_{8+d}$  ( $0 \leq x \leq 0.3$ ) Superconducting Compound.**

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**Abstract:** The structural modulation are an important characteristic of the bismuth based superconductors and which change with doping. In this way, the effect of La substitution on the structural and modulation parameters of the  $\text{Bi}_2\text{Sr}_{2-x}\text{La}_x\text{CaCu}_2\text{O}_{8+d}$  ( $0 \leq x \leq 0.3$ ) superconducting phase was investigated. The X-ray powder diffraction (XRD) showed a good peaks profile of Bi-2212 phase, which is confirmed by dispersive energy X spectroscopy (EDX) measurements. Scanning electron microscopy (SEM) photography showed a decrease of both grain size and its connectivity when lanthanum concentration (x) increases. Jana2006 refinement using Gaussian function with a very good value of goodness of fitting factor (GOF) revealed that when  $x=0.3$  the orthorhombic cell transforms to the pseudo-tetragonal system and the modulation vector  $q$  increases when increasing La concentration.

**Keywords:** Bi based superconductors; modulated structure; doping; Jana2006





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ID: MP028

**Réduction de la charge polluante organique de la margine par adsorption sur le charbon actif  
préparé à base de noyaux de pêches**

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**Abstract:** "L'objectif de cette étude est la valorisation d'un résidu naturel lignocellulosique « les noyaux de pêches » et son application dans le traitement d'un effluent liquide issu de l'industrie oléicole « la margine » par le procédé d'adsorption. Les étapes chronologiques d'obtention du charbon ont été : le nettoyage, le séchage, le concassage et enfin le traitement thermique par pyrolyse à 900°C. La caractérisation de la matière carbonée et activée a montré des propriétés comparables à celles de nombreux charbons obtenus industriellement. Les essais de rétention en mode statique de la matière organique de la margine « la demande chimique en oxygène » sur le matériau obtenu, ont donné un taux d'élimination du polluant étudié de 85% (à 20°C et 45 minutes de temps de contact). L'étude de l'influence du pH et de la température du milieu, a montré qu'à pH acide et à température ambiante (T=20°C), l'optimal d'adsorption de la DCO est atteint et suit convenablement les modèles de Freundlich. La cinétique d'adsorption est rapide et elle est de type pseudo-second ordre.

**Keywords:** noyaux de pêches, charbon, activation thermique, adsorption, margine





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ID: MP030

**Experimental and simulation study of ZnO based transparent conductor oxide electrodeposited on n silicon substrate to improve the performance of heterojunction solar cells**

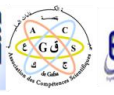
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**Abstract:** Transparent conductive oxide TCO (ZnO) films were prepared by electro-deposition anodization on n type (100) silicon wafer in the aim to achieve a high efficiency in photovoltaic energy conversion. The ZnO layer were analyzed to improve the heterojunction (HIT) solar cell performance as the FF, Jcc, VCO,  $\eta$ , and the optical properties as QE, X ray diffraction. Measurements show that the preferred orientation of ZnO films grown on Si substrate has (002). The simulations of a-Si/c-Si heterojunction solar cell were carried out to reveal the cell parameters. Our results show that the solar cell heterojunction is hypersensitive to the ZnO layer. The beneficial effect of implementing ZnO front contact for increasing electrical energy conversion properties of HIT solar cell was compared to the cell without the ZnO layer

**Keywords:** HIT solar cell, efficiency, ZnO-based TCO layer.







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ID: MP033

**Etude Thermo-mécanique Des Briques En Terre Renforcées Par Des Fibres Végétale Locale.**

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**Abstract:** L'Algérie se situe dans une zone à haute potentialité solaire, et présente près de 90 % des terres arides et semi-arides, de ce fait il est important de s'intéresser à la situation actuelle des villes sahariennes. L'objectif visé dans le cadre de ce travail est l'obtention d'un niveau de confort thermique avec une consommation énergétique réduite et une résistance mécanique acceptable avec un cout réduit. Pour cela, Nous avons essayé de confectionner des briques ayant de bonnes caractéristiques thermiques et mécaniques à base de trois matériaux locaux : à savoir l'argile de Baldet Âmer le sable de dune de Sidi Khouiled et les fibres de palmier dattier.

**Keywords:** Régions Sahariennes, Propriétés Thermiques, Propriétés Mécaniques, Sable de Dune, Argile, Brique



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ID: MP035

**Effect of number layers on the properties of indium oxide thin film deposited by spin coating technique**

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**Abstract:** Indium oxide are deposited on glass by sol gel (spin coating) at different number of thin films using nitrate indium as the precursor solution. Number of thin films effect on the crystalline structure, surface morphology and optical properties of these samples is then studied using several techniques such as X-ray diffraction, SEM and UV-Visible. The XRD analysis suggests that films deposited with different number of thin films are polycrystalline with a preferred grain orientation along the (222) plane. The crystallite size varies from 14.51 to 16.14 nm. SEM topographical images revealed that the grains are granular in shape but seen to be densely packed with the raise of the films number. The films show a high optical transparency of ~ 89% in the visible range and large optical band gap (3.82 to 3.9 eV) due to the quantum confinement effect.

**Keywords:** indium oxide, spin coating, structural, optical, morphological properties, sol gel.





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**Microstructure evolution of Mg-La alloy during annealing at 450 °C**

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**Abstract:** The microstructure and mechanical properties of Mg-1.33La (wt. %) alloy after hot rolling and annealing treatment at 450 °C up to twelve days have been investigated using optical microscopy and micro-hardness measurement. Results show a dendritic/granular transformation associated with a partial dissolution of La solute within Mg matrix. The micro-hardness of the alloy decreases with increasing annealing time from 45 to 38 Hv. The kinetic parameters of the dendritic/granular transformation and partial homogenization of inter-dendritic segregation were estimated using equations from Johnson–Mehl–Avrami equation and semi-empiric model based on Scheil equation. The n parameter is close to 1 and corresponds to a process of grain boundary nucleation after saturation. The total homogenization (i.e. dendritic/granular transformation) time associated with full dissolution of RE-rich phase time seems to lie between eight and twelve days upon annealing at 450 °C.

**Keywords:** Microstructure, Mg-La alloy, aging, dendritic, phase transformation



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ID: MP037

**Mechanical Behavior on damage of Filament Wound composite for hydraulic applications**

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**Abstract:** For any hydraulic system, it is necessary to have a pipe system resistant to its conditions of use, durable and able to carry fluids without interruption in all conditions from external forces and others. Usual materials, for which these conditions are harmful, require expensive maintenance and are dangerous to the environment in case of damage and leaks. The current contribution focuses experimental investigation the behavior of real laminates composites pipe manufactured with filament winding process. For this purpose, DCB specimen cut from two configuration stacking sequence  $[\pm 50]$  and  $[\pm 60]$  for characterisation of the magnitudes on initiation and propagation fracture toughness (GIC-init and GIC-prop). The obtained results highlighted that more deference energy was needs for the initiation of the cracks for  $[\pm 50]$  sequence laminates compared with  $[\pm 60]$  sequence laminates (224, 185 J/m<sup>2</sup> respectively) and also for the propagation crack. These experimental results are compared with the numerical analyses were performed in the ABAQUS® program based on the finite element. Finally, show the numerical results agreed well with experimental results.

**Keywords:** Filament wound composite, fracture toughness, DCB, Mode-I, Fiber bridging, Abaqus.





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ID: MP038

**Selection of an Encased Composite Beam in the Process of Rehabilitating a Pre-Stressed Voided  
Concrete Girder: SHA'AR bridge, Aleppo, Syria**

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**Abstract:** This paper is dealing with how to choose a structural solution that fits the field reality of a bridge composed of pre-stressed concrete girders with circular voids. When it is not possible to re-make a pre-stress girder with circular voids due to challenging conditions, it is necessary to consider an alternative girder, whose shape and structural behaviour simulate the original girder. This is what happened to the Sha'ar bridge, which has a 24m span, in Aleppo, which was damaged by the war on militants. Also the pre-stressed factory where the original pre-stressed girder was made, has been out of service. The creation of template (Kovraj) for original type of girder and its transfer from other provinces is a thorny and expensive process. So a local field solution has to be considered, an encased girder in this paper has been proposed. The proposed alternative composite girder consists of a rectangular hollow concrete section with a circular void, encased steel sections. Particularly in the composite sections of concrete and steel, there is no specific reinforcement ratio. But some researchers in this area recommend that the proportion of reinforcement ratio does not exceed 20%. Design formulas are derived and structural behaviour will be discussed for this composite section, proposed in this paper. And to reach proposals that benefit the scientific researcher and professional engineer







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**Keywords:** Rehabilitation, rectangle, composite, encased, voided

ID: MP040

**Study of the mechanical properties of stabilized earth bricks (BTS) based on dam sediment**

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**Abstract:** this work is part of studies carried out on the development of eco-materials, where respect for the environment is a requirement. The main objective of this work is to study the mechanical properties of stabilized earth bricks (BTS) made from dam sediments and different percentages of stabilizer (cement at 0, 6, 8, 10 and 15%). The sediment studied and that of the Koudiat Accerdoune dam in Lakhdaria. A series of tests were carried out. The mechanical results show remarkable properties and an improvement in mechanical strength of up to 15% of cement with 8.32MPa. All the results obtained indicate that the Koudiat Acerdoune dam sediment of lakhdaria can be successfully used for the production of stabilized earth bricks

**Keywords:** Sediment ; recycling ; stabilized bricks ; mechanical resistance.





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ID: MP041

**Etude de l'effet des Molybdate de Sodium sur la corrosion de l'acier doux (0,19% C) en milieu salin  
0,6M NaCl**

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**Abstract:** L'étude de l'inhibition de corrosion de l'acier doux en solution NaCl 0,6M par Molybdate de sodium a été étudiée par des méthodes électrochimiques: courbes de polarisation et spectroscopie d'impédance électrochimique. Les résultats obtenus révèlent le produit utilisé comme un bon inhibiteur contre la corrosion avec une efficacité de 92,43% à faible concentration. Les observations par le microscope électronique à balayage (MEB) ont également confirmé la présence d'une couche protectrice sur la surface de l'acier.

**Keywords:** Corrosion, Acier doux, Inhibition, Polarisation





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ID: MP043

**Use of Treated Domestic Wastewater in Concrete Production “A REVIEW”**

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**Abstract:** "Concrete is the most widely used construction material worldwide. It is basically a mixture of about 7 to 15% cement, 60 to 75% aggregate and 14 to 21% water. Concrete industry is considered as one of the largest consumer of fresh water. Today, fresh water is becoming scarce around the world due to expansion of world population, rapid urbanization and industrialization. So, it is necessary to find alternative water sources that offset the demand for freshwater, such as treated wastewater. In order to minimize the need for the use of fresh water in the concrete, the substitution of potable water by treated wastewater to produce concrete were evaluated in various researches. This paper presents an overview on the finding of most important of them.

**Keywords:** Treated wastewater, Mixing water, Concrete, Strength, Setting time



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ID: MP044

**On the high temperature magnetotransport properties of the double layered manganite  $\text{La}_{1.6}\text{Ca}_{1.4}\text{Mn}_2\text{O}_7$**

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**Abstract:** In the present work, the structural, electrical and magneto-transport properties of double layered manganite of  $\text{La}_{1.6}\text{Ca}_{1.4}\text{Mn}_2\text{O}_7$  compound are reported. Our compound was prepared by the solid state reaction method. X-ray diffraction pattern refinement using jana2006 confirms that the sample is crystallized in tetragonal structure with  $I4/mmm$  space group. Rhombohedral structure with  $R-3C$  space group was detected as a secondary phase. Electrical resistivity study of sample under zero and 1 T magnetic field exhibits insulator or semiconductor-like features at the whole temperature range above  $T_{MI} \approx 73.41\text{K}$ . In the insulating region, the electrical resistivity data fit well with two models; Mott's variable range hopping (3D-VRH) and adiabatic small polaron hopping (ASPH). Their conduction mechanism was discussed in the regions above and below the Debye temperature  $\theta_D/2$ . According the Mott's VRH mechanism, the density of states (EF) depends on Mott's characteristic temperature  $T_0$  and localization length of the electrons ( $\xi$ ), while the mean hopping distance electrons ( $R_h$ ) and mean hopping energy ( $E_h$ ) has been calculated from experimental curves.  $R_h$  ranges between 1.845 to 1.975 nm when  $\mu_0 H = 0\text{T}$  and 1.760 to 1.890 nm when  $\mu_0 H = 1\text{T}$ .  $E_h$  values range between 0.090 to 0.110 eV when  $\mu_0 H = 0\text{T}$  and 0.086 to 0.106 eV when  $\mu_0 H = 1\text{T}$

**Keywords:** Double layered manganite, electrical and magneto-transport properties, Electrical resistivity, 3D-VRH, ASPH.





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ID: MP045

**Élaboration des couches minces ZnS par déférant source de Zinc par Spin-coating**

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**Abstract:** Le dépôt des couches mince par spin-coating est parmi les méthodes Sol-gel très intéressante car il est simple, pratique, économique efficace et capable de produire des films uniformes et homogènes pouvant être produits à l'échelle industrielles fins. Plusieurs paramètres influencent sur le dépôt des couches ZnS sur un substrat de verre par la méthode spin cotinge. Dans ce travail, on fixe la source de soufre par la thiourée et on joue sur la source de zinc comme : acétate zinc, chlorure de zinc , sulfate de zinc . Et on utilise différant solvants: Ethanol, Méthanol, DMSO, MEA... La couche uniforme sur le substrat de verre , et le spectre UV-visible on confirme la déposition de la couche ZnS.

**Keywords:** spin-coating, semi-conducteur, ZnS, photovoltaïque, DMSO.







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ID: MP046

**Optical and electrical Properties, Photoluminescence mechanism of Ni-doped SnO<sub>2</sub> thin films**

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**Abstract:** Undoped SnO<sub>2</sub> and Nickel doped thin oxide (Ni:SnO<sub>2</sub>) thin films with various concentrations (2 at. % and 4 at. %) were deposited on glass substrates by sol gel spin coating technique. The influences of Ni doping on optical and electrical properties of the prepared films were studied by UV-Visible spectroscopy, photoluminescence spectroscopy and four-probe point measurements. XRD study confirmed that Undoped SnO<sub>2</sub> was polycrystalline with tetragonal rutile structure and preferential orientation along the (110) plane. All the films exhibit high transmittance varies between 80 and 90% in the visible region. The optical band gap was found in the range of 3.79 - 3.83 eV. Room temperature photoluminescence (PL) spectrum exhibited a strong UV emission peak at 404 nm for all the films which attributed to the oxygen vacancies. Furthermore, the Ni: SnO<sub>2</sub> thin films dysplasie low electrical resistivity varies between  $8.81 \cdot 10^{-3} \Omega \text{ cm}$  and  $1.01 \cdot 10^{-2} \Omega \text{ cm}$ . thereby, our experimental data may be promising for optoelectronic applications.

**Keywords:** SnO<sub>2</sub>, thin films, Ni doping, Sol-gel, Photoluminescence



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ID: MP048

**Effect of cobalt doping on the physical properties of nanostructured nickel oxide thin films**

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**Abstract:** In this paper we studied the structural, electrical and optical properties of the pure and Co-doped NiO thin films prepared at the molar concentration 0.1 mol/L of the nickel nitrate solution and cobalt (II) chloride hexahydrate. Thin layers of nickel oxide deposited on glass substrates under the temperature (480°C) by the SPT. The diffraction results of the X-rays showed that the films prepared had a fcc structure and (111) preferred orientation. The optical band gap energy and Urbach energy have been found ranging between 3.61 to 3.48 eV and 0.353 to 0.915 eV respectively. The maximum value of electrical conductivity was  $0.08961 \Omega^{-1} \cdot \text{cm}^{-1}$ , it is obtained at 12 at.%. All deposited samples having p-type conductivity.

**Keywords:** Co-doped NiO thin films, XRD and SEM characterization, Optical properties, Electrical conductivity.





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**Magnetoresistance and thermal coefficient of resistivity of the double layered manganite (La, Pr)<sub>1.6</sub>(Ca, Ba)<sub>1.4</sub>Mn<sub>2</sub>O<sub>7</sub>**

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**Abstract:** In this study, we have investigated the structural and magneto-electrical properties of double layered (La, Pr)<sub>1.6</sub>(Ca, Ba)<sub>1.4</sub>Mn<sub>2</sub>O<sub>7</sub> manganite compound. The sample was prepared by solid state reaction route. Refinement of X-ray diffraction pattern showed that the sample crystallizes in Sr<sub>3</sub>Ti<sub>2</sub>O<sub>7</sub>-type tetragonal (I4/mmm) structure with a rhombohedral simple perovskite detected as an impurity phase with space groupe. Temperature dependence of electrical resistivity in the range 20-300 K is carried out by four probe technique. It exhibits a metal-insulator transition at T<sub>MI</sub>=87K and 89K under 0T and 1 T respectively. The sample exhibit a maximum Magnetoresistance (MR%) ~33.44% at 64 K. The temperature coefficient of resistivity (TCR) is carried out and the maximum value reached 2.02% K<sup>-1</sup> at T<sub>K</sub>=58.84 and showed a similar behavior as T<sub>MI</sub>.

**Keywords:** Double layered manganites, Structure, Magnetic and electrical properties, Electrical resistivity, Magnetoresistance.





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ID: MP051

**Effet de la vitesse et de la nature du projectile sur le comportement mécaniques des structures  
aéronautiques**

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**Abstract:** Cette étude rentre a pour objectif l'analyse du comportement des structures des aéronefs aux chocs mécaniques rapides afin d'améliorer la résistance à l'impact d'un projectile. L'effet de la géométrie du projectile, de sa masse, de sa nature, sur le processus d'endommagement et de perforation a notamment été mis en évidence. Les résultats obtenus montrent clairement que ces paramètres déterminent la résistance mécanique à l'impact..

**Keywords:** zone plastique, impact, deformation, MEF, resistance, endommagement





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**The effect of the number of layers on the properties of titanium oxide (TiO<sub>2</sub>) thin films deposited  
by Sol-Gel (spin-coating) technique**

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**Abstract:** The effect of the number of layers on the structural, optical and electrical properties of Titanium dioxide (TiO<sub>2</sub>) thin films has been observed. thin films of TiO<sub>2</sub> are deposited on glass substrate by using sol-gel (spin-coating) method. The properties of these films are characterized by many technique. The X-ray diffraction (XRD) confirms that TiO<sub>2</sub> has anatase phase structure and the crystals grew along the preferred orientation (101). The grain size varied with different of the number of layers in the range 15.31 – 18.03 nm. The optical absorption spectra measured using UV–Vis. showed the average transmittance in the visible region of all films varies between 82 and 90%. The "optical band gap energies" of 3,5,7,9,11,13 and 15 layers of TiO<sub>2</sub> films were 3.80, 3.78, 3.75, 3.70, 3.57 and 3.56 eV, respectively. Four point probe measured the electrical properties showed the decreasing trend between the average resistivity and the number of layers.

**Keywords:** Titanium Oxide, Thin films, Sol-Gel, Optical properties, Electrical properties.







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ID: MP053

**Etude paramétrique du comportement mécanique des assemblages soudés par points par friction  
malaxage FSSW**

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**Abstract:** Ce travail sert à augmenter la surface de la soudure et en dépit maximiser la résistance statique de la soudure par point par friction malaxage FSSW des polymères thermoplastiques. L'effet de la géométrie de l'outil sur la résistance statique des soudures a été étudié via : l'angle de concavité allant de  $0^{\circ}$ - $16^{\circ}$  et la forme de rebord de l'outil à angle vif, chanfreinée et enfin arrondie. Des essais expérimentaux ont été réalisés sous différents paramètres opératoires tels que : la profondeur de plongée, la vitesse de rotation et le temps de maintien de l'outil pour mettre en évidence l'effet de la géométrie de l'outil et des paramètres opératoires de soudage sur la surface de la soudure et en vertu sur la résistance statique des soudures par points par friction malaxage des polymères thermoplastiques.

**Keywords:** soudage par FSSW, loi de comportement, polymère





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ID: MP054

**Effect of deposition time on structural and optical Properties of ZnO thin films deposited by spray pyrolysis**

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**Abstract:** In this work Zinc oxide thin films prepared by spray pyrolysis technique. A set of ZnO thin films were deposited with various deposition times, on glass substrate at 350 °C. The precursor solution is formed with zinc acetate in distilled methanol with 0.1 molarity. The deposition time was ranged from 2 to 8 min. The structural and optical properties of those films were examined by X-ray diffraction (XRD) and ultraviolet-visible spectrometer (UV). X-ray diffraction patterns of the ZnO thin films showed polycrystalline hexagonal wurtzite structure and the preferred orientation was along (002) plane when the grain size varied between 9.66 and 16.67nm. ZnO thin films were highly transparent in the visible with the maximum transmittance of 85% and the optical band gap was found between 3.25 and 3.28 eV.

**Keywords:** Thin films ; ZnO ; Spray pyrolysis ; Optical Properties ; XRD ; Deposition time



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ID: MP055

**Determination of the hole drift mobility in stabilized amorphous selenium**

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**Abstract:** Hole transport in stabilized amorphous selenium a-Se:As has been investigated by the simulation of the time of flight transient photocurrents as a function of temperature and electric field. It has been found that hole drift mobility decreases with decreasing temperature, with an activation energy  $E_a = 18.0 \text{ meV}$ . These results can be explained based on the density of states model that included types of traps forming Gaussian distributions within the mobility gap

**Keywords:** Stabilized amorphous selenium a-Se:AS, Density of localized states DOS, Transient photocurrents TOF, Inverse Laplace transform, the hole lifetime  $\tau_h$ , hole drift mobility  $\mu_h$





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ID: MP056

**Tamanrasset's clay characterization and use as low cost, ecofriendly and sustainable material for water treatment: Progress and challenge in copper Cu (II)**

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**Abstract:** In this study, the adsorption of copper Cu (II) from aqueous solution, on Tamanrasset's clay which is low cost adsorbent, was studied using batch experiments. The adsorption study includes both equilibrium adsorption isotherms and kinetics. For the characterization of the adsorbent several methods are used such as X-Ray Diffraction, Scanning Electron Microscopy coupled with Energy Dispersive X-ray, specific surface area by BET, Fourier transform infrared spectroscopy and thermogravimetric analysis. Indeed, various parameters were investigated such as contact time, initial metal ion concentration, mass of solid, pH of the solution and temperature. The adsorption process as batch study was investigated under the previous experimental parameters. The results revealed that the adsorption capacity of  $\text{Cu}^{2+}$  is maximized at pH natural of metal 5.5. Removal of copper by the clay of Tamanrasset (kaolinite) achieved equilibrium within 50 minutes; the results obtained were found to be fitted by the pseudo-second order kinetics model. The equilibrium process was well described by the Freundlich model and the maximum adsorption capacity was found to be 24.217 mg/g

**Keywords:** adsorption, clay, copper, kinetic, isotherms





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**Effect of Mn doped on the structural, optical and electrical properties of NiO thin films**

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**Abstract:** In this work, NiO pur and doped Mn thin films were prepared by the sol-gel technique combined with spin coating on glass substrates. With various concentration of Mn 0, 2, and 4 at%. The structural, optical and electrical properties of the prepared films were analyzed by X-ray diffraction, UV-visible spectroscopy and four-point. All films are polycrystalline with a cubic-type structure with a preferential orientation according to the direction  $\langle 111 \rangle$  at  $2\theta=37.33$ . It was shown that the crystalline size of the deposited thin films was calculated using Debye-Scherrer formula and found in the range between 19.76 and 9.81 nm. Thin films showed a high transmittance (80%) in the visible wavelength area of (300-800nm), where the band gap was found to be in the range of 3.76–3.78 eV. The resistivity measurements had revealed that the lowest resistivity value of about 3.609 ( $\Omega \cdot \text{cm}$ ) was obtained for Mn 2 at.% concentration.

**Keywords:** Nickel oxide, Thin films, Sol–gel, Spin coating, Mn doped NiO.







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**Etude électrochimique et caractérisation des produits de corrosion formés à la surface d'acier galvanisé en milieu naturel**

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**Abstract:** "La galvanisation à chaud des aciers est une opération de revêtement par trempée dans un bain de zinc ou d'alliage de zinc en fusion. Le revêtement obtenu protège la pièce en créant une barrière physique entre le milieu extérieur et le substrat, mais aussi par protection cathodique (consommation du revêtement de zinc à la place du substrat) représente un procédé industriel largement répandu qui trouve de nombreuses applications tout autour de nous. La tôle galvanisée, quand elle est stockée en bobine ou en paquet dans des endroits où une condensation est possible, est sujette au développement d'un oxycarbonate de zinc appelé rouille blanche. Pour prévenir cette corrosion superficielle, un traitement de passivation (ou Conversion chimique superficielle) est effectué soit au trempé soit par aspersion. C'est dans ce contexte que nous avons étudié le comportement électrochimique d'un acier galvanisé destiné aux canalisations de tout genre de transport de fluides (eau, gaz, air comprimé), dans l'eau souterraine. Pour y parvenir, nous avons utilisé des techniques électrochimiques stationnaires. Ces techniques nous ont permis de déterminer l'efficacité de conversion chimique, ainsi que certains paramètres propres à la corrosion. Les méthodes d'analyse chimique (DRX) et de topographie (MEB) de surface utilisées permettent à leur tour d'apporter des informations souvent complémentaires à l'interprétation des résultats issus des caractérisations électrochimiques."

**Keywords:** Corrosion, Acier galvanisé, Méthodes électrochimiques, Eau souterraine.





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ID: MP059

**Influence of SiO<sub>2</sub> concentration on surface properties and corrosion behavior of Ni-SiO<sub>2</sub> nanocomposite coatings**

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**Abstract:** "In the present work, Ni-SiO<sub>2</sub> nanocomposite coatings were produced on steel substrate by electrodeposition process from nickel sulfate bath containing differnts concentration of SiO<sub>2</sub> nano-particles. The influence of SiO<sub>2</sub> concentration on the structure, morphology and corrosion resistance of nanocomposite coatings were studied. The deposits were characterized by scanning electron microscopy (SEM) coupled with energy dispersive X-ray (EDX). Corrosion behavior of the coatings were evaluated in 3,5wt % NaCl medium using potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) techniques. The obtained results show that less agglomeration and more uniform distrubution of nanoparticles SiO<sub>2</sub> within the nickel metal matrix were formed from the deposite bath containing 20 g/L SiO<sub>2</sub>. The corrosion results indicate that the nanocomposite coatings Ni-20g/l SiO<sub>2</sub> exhibit higher corrosion resistance as compared to pure nickel and other coatings."

**Keywords:** Electrodeposition, nanomposite coatings, SiO<sub>2</sub> nano-particles, Nickel matrix, corrosion resistance.



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**The structural and optical properties of the  $\text{CH}_3\text{NH}_3\text{PbI}_3\text{-xCl}_x$  perovskite films deposited by spin coating**

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**Abstract:** In this work, we are interested in the deposition and the characterization of the  $\text{CH}_3\text{NH}_3\text{PbI}_3\text{-xCl}_x$  materials. These films were deposited on glass substrates by spin coating technique. The aim of study is to investigate the spinning speed effect on structural and optical properties. The structural characterization was carried out by X-ray diffraction, which showed that the films have tetragonal structure with tighten of crystallinity at low spinning. The UV-Visible measurement showed that these films have a high absorbance in the visible range with direct band gap energy in 1.53-1.56 eV range, which can be applied as good absorber for photovoltaic solar cells.

**Keywords:** perovskite, spin coating,  $\text{CH}_3\text{NH}_3\text{PbI}_3\text{-xCl}_x$ , photovoltaic.





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**Structural and optical properties of N and Mn co-doped ZnO thin films grown by ultrasonic spray  
pyrolysis method**

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**Abstract:** Nanocrystalline Nitrogen-Manganese co-doped ZnO thin films with different percentage of Mn content from 0 up to 11 at% and fixed N doping at 21at%; were elaborated by ultrasonic spray pyrolysis which is a simple, cheap, and versatile method, at atmospheric pressure and a substrate temperature of 350°C. We investigated the structural and optical properties of N-Mn co-doped ZnO thin films. The micro-structure of the as-prepared thin films was investigated by X-ray diffraction (XRD). The XRD patterns of all samples reveal the presence of a single hexagonal wurtzite phase structure. The grains sizes decreases from 52 to 23 nm. The Mn incorporation effect in ZnO matrix,. UV-Vis-NIR spectroscopy shows that the optical band gap energy increases (i.e. Blue-shift), with Mn-doping content which leads to the optical phonon confinement and/or to the Burstein-Moss effect. Finally, all our nanocrystalline thin films are very homogeneous in the chemical contents and Mn is uniformly incorporated into the hexagonal wurtzite structure by substituting Mn cations without any phase segregation.

**Keywords:** (N,Mn) co-doped ZnO; oxide semiconductors, p-type ZnO; multifunctional material; ultrasonic spray pyrolysis.





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**Optical and structural characterization of ZnS nanocrystals embedded in KBr single crystal matrix grown by Czochralski method**

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**Abstract:** ZnS nanocrystals were embedded in KBr single crystal matrix using Czochralski growth technique. The X-ray diffraction, FT-IR and optical spectroscopy revealed the incorporation of ZnS nanocrystals. A blue shift of the absorption edge of the obtained samples has been observed indicating the quantum confinement effect. The optical band-gap is estimated to be about of 4.67eV. Two excitonic peaks appeared at 300.4nm and 271nm. Annealing led to a shift in the absorption edge towards longer wavelengths and an increasing of the emissions intensity. This results shows that KBr is a good matrix-host of ZnS nanocrystals and that the elaborated samples can be used for important technological applications.

**Keywords:** ZnS nanocrystals, X-ray, optical properties, FT-IR, Czochralski method







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ID: MP063

**Effect of Dip-Coating Cycles on Structural & Optical Properties of Fe Doped ZnO Thin Films**

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**Abstract:** In this study Fe Doped ZnO thin films were deposited on glass substrates by sol-gel dip coating technique. The effect of the different dipping cycles (DCY); 4, 8, 12 and 16 times on the structural and optical properties of 5% Fe doped ZnO thin films were investigated. The structural and optical properties of the films were studied by X-ray diffraction (XRD) and Uv-visible spectroscopy respectively. The structural analysis by X-ray diffraction showed that the crystallite size of our deposited films decreased as the dipping cycles increased. The result of optical properties shows that the 08 dipping cycles was the best because of its high transmittance which is 86.30%. The optical band gap energy decreased as 3.3 eV, 3.26 eV, 3.25 eV and 3.23 eV respectively for 4, 8, 12 and 16 dipping cycles (DCY).

**Keywords:** Zno Thin Films, Optical Analysis, XRD Analysis, Fe doped ZnO, Dipping Cycles.



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**Thermodynamic assessment of the Bi-Y system Supported by first-principles calculations**

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**Abstract:** "The objective of this work is the thermodynamic modeling of the Bi-Y binary system by two methods: CALPHAD (Calculation of phase diagrams) and first principles calculations. The Calphad method is a very important method for modeling the thermodynamic properties of phase diagrams of multi-component systems. This method is based on a semi-empirical approach by modeling the Gibbs energy of the different phases existing in a system [1]. Therefore reliable experimental data are needed for the description of the thermodynamic properties of the phases. The basic principles of this method consist in harmonizing a whole of this experimental and theoretical information. The theoretical thermodynamic data are obtained by first principles calculation methods. The enthalpies of formations of the defined compounds which precede the calculation of phase diagram are obtained by a computation of first principle based on quantum simulations. The Bi-Y system phase diagram contains two defined compounds: BiY and Bi<sub>3</sub>Y<sub>5</sub>. Its enthalpy of formation is calculated using the Vasp code based on the Generalized Gradient Approximation "GGA" [2]. The CALPHAD evaluation of the Bi-Y system was then performed considering the calculated enthalpies of formation and the experimental phase equilibrium data. The liquid phase was modeled by the Redlich-Kister polynomial. The results obtained are in good agreement with the experimental results [3].





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**Keywords:** Bi-Y alloys, first-principles calculation, phase diagram CALPHAD, thermodynamics

ID: MP065

**Indium oxide (In<sub>2</sub>O<sub>3</sub>) thin films: The role of growth rate**

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**Abstract:** Indium oxide (In<sub>2</sub>O<sub>3</sub>) thin films have been grown prosperously on glass substrates by an ultrasonic spray CVD process. The structural, morphological, optical and electrical studies of the films with controlled growth rate induced during elaboration by changing the solution flow rate from 20 to 60 mL/h. The X-ray diffraction (XRD) exhibit that the films are polycrystalline with centered cubic structure, whereas the predominant plane in the films change from (222) to (400) plane. The crystallite size of the films slightly increases with the increase of growth rate where it is varied between 26 and 32 nm. UV-Visible spectroscopy show that the average transmittance is about 80% in the visible region. The optical band gap decreases with an increase of the growth rate from 3.93 to 3.62 eV. Where the high value of band gap can be correlated with the preferential orientation of the (222) plane. The electrical resistivity decreases with the increase of the growth rate in the range of 20 - 5.5 (10<sup>-2</sup>Ω Cm ). From these results we can say that the indium oxide thin films have a promising properties which make them applicable in the photovoltaic field.

**Keywords:** Thin films, Indium oxide, Ultrasonic Spray, Growth rate, Electrical properties.





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**Simulation by finite element method of wind turbine materials**

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**Abstract:** Wind turbines are an essential source of renewable energy so we did this study to determine the appropriate material for blade where we worked on GFRP as one of the materials used where we simulated by ansys as a professional program in the simulation process and choose the finite elements method FEM As a means of reaching the stress and strain, the blade was done in a state of immobility so that the only effective force is gravity. After the calculation, the distribution of fatigue-causing stresses, as well as the deformation and great values of each.

**Keywords:** Blade , strain , stress , wind turbine , FEM



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**Comportement D'un Alliage D'aluminium (Al-Mg) Deforme Et Recuit A La Corrosion Electrochimique**

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**Abstract:** "La déformation est destinée pour augmenter les propriétés mécaniques des alliages (Al-Mg). Ainsi ; les traitements thermiques ont été pour but d'améliorer cette propriété. Des études antérieures ont montré que la décomposition de la solution solide sursaturée de l'alliage Al-10% masse. Mg dans un stade intermédiaire est caractérisé par une bonne dureté, mais aussi une sensibilité remarquable à la corrosion. Le but de ce travail est d'étudier l'effet de la déformation par compression avant et après le traitement de vieillissement sur le comportement d'un alliage « Al-10% masse. Mg » à la corrosion dans une solution de chlorure de sodium (NaCl 3.5% en poids). L'étude a été réalisée en appliquant des différentes techniques expérimentales: la masse perdue, microdureté de Vickers, microscopie électronique à balayage (MEB) ainsi que la diffraction des rayons X (DRX).

Les résultats obtenus montrent que la déformation par compression avant ou après le traitement de vieillissement donne une microstructure qui réagit différemment en contact avec la solution de chlorure de sodium. Donc le comportement à la corrosion est pratiquement lié à la densité des dislocations.







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**Keywords:** Alliage Al-Mg, déformation, précipitation, corrosion.

ID: MP070

**Numerical modeling of cfrp and gfrp strengthened reinforced concrete beams using ansys**

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**Abstract:** This paper is an attempt to simulate the CFRP and GFRP strengthened RC beams using ANSYS for predict of rectangular concrete beams strengthened with CFRP and GFRP . The tested beams were under three point flexural loads . The ANSYS results were compared with the experimental data for two strengthened beams with different thickness of CFRP and GFRP on the curves of load-midspan deflection, yielding load and ultimate load. The load-deflection curves from the finite element analysis agree well with the experimental results. The average difference in ultimate load cases is 8 % and average difference in ultimate deflection cases is 26 %

**Keywords:** "Finite element method, CFRP , ANSYS, strengthened,GFRP.



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ID: MP071

**Thermal and optical properties of  $\text{Sb}_2\text{O}_3\text{--B}_2\text{O}_3\text{--Li}_2\text{O}$  a new glasses**

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**Abstract:** This work reports the synthesis of new  $\text{Sb}_2\text{O}_3$ -based heavy metal oxide glasses in the  $(90-x)\text{Sb}_2\text{O}_3\text{--}x\text{B}_2\text{O}_3\text{--}10\text{Li}_2\text{O}$  ( $x=0,10,20,30,40,50$ ) ternary system were prepared using the melt quenching method. Differential scanning calorimetry (DSC) measurements have shown that the temperature of glass transition  $T_g$  is in the range  $[256 - 307^\circ\text{C}]$  with a stability factor  $\Delta T = T_x - T_g$  generally greater than  $100^\circ\text{C}$  for  $(90x)\text{Sb}_2\text{O}_3\text{--}xB_2\text{O}_3\text{--}10\text{Li}_2\text{O}$  ( $x=10,20,30,40$ ) glasses. Density and Molar volume decreases from ( $d=5.029\text{ g/cm}^3$  to  $4.129\text{ g/cm}^3$ ,  $V_m=53.63\text{ cm}^3\cdot\text{mol}^{-1}$  to  $45\text{ cm}^3\cdot\text{mol}^{-1}$ ). The transmission spectra in the UV-vis region showed that the glasses transparent in the visible range. The Fourier transform infrared (FTIR) of glasses reveals the existence with O-Sb-O, B-O, and H-O-H vibrations in the present glasses. This study could open new avenues of research for ternary antimony-based glasses for applications in photonic and nonlinear.

**Keywords:**  $\text{Sb}_2\text{O}_3$ , DSC, FTIR, UV-vis.





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ID: MP072

**Magnetic and corrosion behavior of lean stainless steel 2101 in HCL solution**

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**Abstract:** "The present paper we investigate the influence of sigma phase formation in 2101 lean Duplex Stainless Steel (DSS) on microstructural, magnetic, and corrosion performance. It investigates the potential of using vibration samples magnetic (VSM) to detect microstructural changes and the corrosion behavior at 750°C aging treatment. The presence of corrosion phenomena is treated by potentiodynamic methods (PM), a good correlation exists between the fraction of sigma phases and PM parameters. The magnetic parameters are extracted in order to evaluated the microstructural features, we can confirm an inversely correlation exists between the magnetic parameters and the microstructural changes.

**Keywords:** "Corrosion, sigma phase, VSM, lean Duplex Stainless Steel"





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ID: MP073

**Caractérisation de la taille des grains dans un acier au carbone par courants de Foucault**

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**Abstract:** "Le présent travail concerne l'utilisation des courants de Foucault comme moyen non destructif pour l'évaluation et la caractérisation microstructurale des aciers au carbone. Des échantillons en acier au carbone C10 (XC10) sont traités thermiquement avec des températures d'austénitisation et des durées de maintiens variables avec un refroidissement lent, ce qui permet d'obtenir des microstructures ayant des tailles de grains bien distinctes. L'impédance normalisée d'un capteur à courants de Foucault (CF) est prélevée sur ces échantillons pour trouver une relation entre les différentes tailles de grains issues des traitements thermiques réalisés et l'impédance du capteur CF. Les résultats obtenus montrent que les signaux courants de Foucault sont sensibles aux changements microstructuraux produits par les différents traitements thermiques. Ainsi, nous pouvons dire que l'impédance mesurée est une grandeur liée directement à la microstructure de l'acier au carbone. Ainsi, nous pouvons prédire la taille moyenne des grains d'un acier au carbone d'une manière non destructive à travers l'analyse de réponse magnétique (CF) de l'acier.





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**Keywords:** Courants de Foucault, taille des grains, microstructure, caractérisation, impédance normalisée.

ID: MP074

**Structural, microstructural, and optical properties of  $\text{ZnO}, \text{Zn}_{0.90}\text{Co}_{0.05}\text{M}_{0.05}\text{O}$  (M= Na, Al, Cd, Cu) thin films by ultrasonic spray pyrolysis**

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**Abstract:** Nanocrystalline pure and Codoped  $\text{Zn}_{0.90}\text{Co}_{0.05}\text{M}_{0.05}\text{O}$  (M=Al, Cd, Na, Cu) single phase films have been successfully synthesized by ultrasonic spray pyrolysis technique. Structural analysis by X-ray diffraction show that all the films have hexagonal wurtzite structure with an average crystallite size in the range of 19–25 nm. SEM analysis revealed that Cd and Na preserve the shape of nanopetals observed with ZnO films, while the doping with Al or Cu promote the formation of dense films constituted of nanorods. By the application of Levenberg–Marquardt least square method, the experimental transmittance data were fitted perfectly with the transmittance data calculated via a combination of Wemple–DiDomenico model, absorption coefficient of an electronic transition and Tauc–Urbach model. The concentration of absorbing centres NCo and oscillator strength  $f$  of d–d transition of  $\text{Co}^{2+}$  ions are calculated from Smakula's formula







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**Keywords:** Thin films , Microstructure, Optical properties

ID: MP075

**Structural, Morphological and Optical Properties of Cadmium Carbonate  $\text{CdCO}_3$  Nanowires**

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**Abstract:** Cadmium carbonate ( $\text{CdCO}_3$ ) nanowires have been prepared by the chemical bath deposition (CBD) technique at room temperature. The X-ray diffraction (XRD) analysis confirmed that the films are polycrystalline in nature and possess rhombohedral crystal structure. Structural, morphological and optical characteristics of the films are analyzed and all obtained results are discussed. Our results are in good agreement with the existing literature.

**Keywords:**  $\text{CdCO}_3$  ; Nanowires ; CBD ; Thin films ; optical proprieties





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ID: MP076

**Effect of synthesis method on the structural behavior of  $\text{CaFeO}_{2.5}$  compound**

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**Abstract:**  $\text{CaFeO}_{2.5}$  samples are synthesized by solid solution, mirror furnace and sol-gel methods. The effect of synthesis method on the behaviour structure is investigated. The phase structures are comparatively characterized and studied by means of X-ray powder diffraction. Experimental results reveal that the synthesis method has a strong influence on the structure of the synthesized compounds. Samples obtained by three methods were crystallizes in the Pnma orthorhombic system. Synthesis temperature applied during preparation and quenching in liquid  $\text{N}_2$  has influenced on the lattice parameters values. The quenching in liquid  $\text{N}_2$  from very high temperature increase the lattice parameters which shows the great effect of dislocation density. On the contrary, in the case of sol gel which is a preparation method at intermediate temperature and does not contain a quenching in liquid  $\text{N}_2$ , the lattice parameters were decrease and the volume shrinks.





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**Keywords:** CaFeO<sub>2.5</sub>; Mirror furnace; Sol-gel; Solid solution; X-Ray Powder diffraction

ID: MP077

**Influence of waste of plastic on compressive and flexural strength of hollow concrete blocks**

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**Abstract:** "Nowadays, the reusability of plastics wastes represents the more interesting of the topicality subject. That's why it has created the new technique who is expressed by the recycling of plastic, to restrict the maximum pollution. The extensive use of different plastic waste will be donated to the great value in domain civil engineering and the many benefits in the environment. Used waste of plastic to the blend of a hollow concrete block of rate 5, and 10%, these effects are studied on the properties hardened (compressive strength and flexural strength). As a result of the reinforcement hollow concrete block matrix with plastic waste, who displayed the obvious amelioration in mechanical characteristics. This can reduce the total cost of construction by improving mechanical characteristics, phonic and thermal properties moreover, eliminate environments problems.





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**Keywords:** Hollow concrete block, environmental impact, industrial plastic waste, compressive strength, flexural strength

ID: MP078

**Simulation Numérique du Comportement de l'Insert Fémoral d'une Prothèse Totale de Genou**

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**Abstract:** "Ce travail a été consacré à l'étude du comportement de l'insert fémoral d'une prothèse totale de genou. On s'est habitué à ce que la prothèse totale du genou composée d'un insert tibial fabriqué de polymère et un autre fémoral fabriqué de l'acier inox, on s'est proposé de remplacer l'acier inox par la zircone pour un ensemble d'avantages et de conserver le polymère. En se servant du code Abaqus standard on a soumis la prothèse à une simulation numérique. L'analyse distribution des contraintes dans l'insert fémoral est le seul objectif dans ce travail. Comme résultats obtenus, les contraintes se montrent relativement plus basses ce qui encourage de prolonger l'étude en considérant d'autres cas"





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**Keywords:** "Prothèse, Simulation, Fémoral, Zircone, Tibial,"

ID: MP080

**Caractérisation des structures sandwiches à base du renfort naturel unidirectionnel**

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**Abstract:** "La conception d'une structure en matériaux composites prendra en compte plusieurs paramètres (propriétés mécaniques, légèreté et le coût), mais dans ces dernières années, un autre paramètre devient très important et nécessaire pour cette conception est d'être écologique. Ces nouveaux matériaux doivent répondre aux exigences et réglementaires environnementales. Ce travail est parmi les recherches et les études réalisées à l'unité de recherche Matériaux Procédés Environnement (URMPE, Université de Boumerdes), basées sur les matériaux composites à base des matériaux naturels. Cette étude présente une caractérisation mécanique d'un matériau composite sandwich, ce matériau se constitué de peaux en renfort naturel (fibres du jute) et âme en liège aggloméré blanc. La caractérisation est faite par des essais de flexion 3 et 4 points, afin de déterminer les propriétés mécaniques et les modes de rupture.







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**Keywords:** matériaux composites, structure sandwich, liège, fibres du jute, flexion.

ID: MP081

**Optimisation multi-objective de la rugosité de surface et du débit de copeau lors du tournage de  
l'acier fortement allié X210Cr12**

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**Abstract:** "L'industrie de la coupe des métaux doit aujourd'hui relever les défis de la productivité et de la qualité des pièces usinées de manière économique. Dans ce travail, une étude expérimentale est réalisée afin d'évaluer l'effet des paramètres de coupe (le rayon du bec de l'outil, la vitesse de coupe, l'avance par tour et la profondeur de passe) sur les paramètres de performances à savoir ; la rugosité de surface ( $R_a$  et  $R_z$ ) et le débit de copeau enlevé (MRR). L'usinage est réalisé sur des éprouvettes en acier fortement allié X210Cr12 en utilisant un outil de coupe en carbure à triple revêtement CVD (GC4215) ( $Al_2O_3+TiC+TiCN$ ). Dans cette étude nous avons appliqué la méthode de surface de réponse (RSM) et l'analyse de la variance (ANOVA) sur un plan d'expérience de Taguchi L16 ( $4^3 2^1$ ) pour quantifier les effets des paramètres de coupe sur les paramètres de sortie et de proposer des modèles mathématiques de





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la rugosité de surface ( $R_a$  et  $R_z$ ) et le volume de copeau enlevé (MRR). Les modèles trouvés ont été utilisés pour faire une optimisation en utilisant la fonction de désirabilité (DF), suivant trois objectifs souhaités (rugosité minimale ; débit de copeau enlevé maximal et rugosité de surface et volume de copeau enlevé ensemble).

**Keywords:** X210Cr12, tournage, carbure métallique, rugosité, Modélisation, optimisation.

ID: MP082

**Characterization of Concrete by using Bulk Longitudinal Ultrasonic Waves at Low Frequencies**

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**Abstract:** "Concrete is a complex porous material. This porosity comes from the air trapped during mixing and also from the free water that did not react with the cement. In this work, we varied the porosity rate in concrete specimens, in order to evaluate its effect on the acoustic and mechanical properties of the material during its maturation age. These test pieces were made according to EN 196-1: 2016 of different dimensions and with three mass ratios Water/Cement ( $W/C=0.45$ ,  $W/C=0.50$  and  $W/C=0.65$ ). The ultrasonic measurements were done in the direct transmission mode, using 54 kHz nominal frequency transducers, transmitting in the longitudinal mode. The results showed an increase in the propagation velocity with the age of maturation for all  $W/C$  ratios and an overall decrease in its value with this ratio. On the other hand, the attenuation coefficient increased slightly with the frequency in a quasi-linear manner, while its overall value decreased with the age of maturity of the concrete. For



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comparison, a destructive method was used. This consisted of crushing tests to determine the compressive strength. This latter increased with the age of maturation of the concrete for all W/C ratios, but decreased when these ratios increased. These results showed the same trend as those obtained for the group velocity and thus confirm the effectiveness of ultrasonic methods in evaluating the quality of concrete."

**Keywords:** Concrete, Compression Strength, Maturation age, Porosity, Ultrasonic Velocity, Ultrasonic Attenuation.

ID: MP083

**Study of New Antimony Phosphate Glasses**

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**Abstract:** "Crystallization kinetic studies of ternary antimonite glasses within the  $60 \text{ Sb}_2\text{O}_3\text{-(40-x) NaPO}_3\text{-xWO}_3$  system  $x = (5, 15)$  were prepared using the melt quenching technique were performed by non-isothermal methods using differential scanning calorimetry (DSC) its measurements showed glasses a very stable against devitrification with the addition of  $\text{WO}_3$ . The kinetic parameters  $E_a$  and  $n$  by applying Ozawa and Chen methods were found to be in good agreement with each other the values of crystallization activation energy were calculated in the range of 49, 30 Kcal.mol<sup>-1</sup> (Chen) and 52, 33Kcal.mol<sup>-1</sup> (Ozawa) and Avrami constant,  $\ln m_0(\text{SN5W})=2.05$ ,  $\ln m_0(15\text{W})= 2,01$  correspond decreasing nucleation rate. The FTIR results show the existence of Sb-O-P, W-O-W and P-O-W





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vibrations in the present glasses. the DRX results show the diffusion of peaks and broad characteristic of the vitreous state, which confirm the amorphous nature. This study could open new avenues of research for ternary antimony-based glasses for applications in nonlinear properties.

**Keywords:** Sb<sub>2</sub>O<sub>3</sub>, Crystallization, DSC, Tungsten, Fourier transform infrared spectroscopy

ID: MP084

**Preparation of Al-doped TiO<sub>2</sub> thin films deposited by sol-gel technique**

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**Abstract:** Aluminium doped TiO<sub>2</sub> thin films (Al:TiO<sub>2</sub>, Al: 0–3–10 at.%) have been prepared by sol-gel method onto glass substrate at room temperature. The obtained films have been annealed at 500°C for 2 hours. X-ray diffraction patterns showed that all Al:TiO<sub>2</sub> films are polycrystalline with a tetragonal anatase and orthorhombic brookite types structures. The surface morphologies of the TiO<sub>2</sub> doped with



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aluminium thin films were evaluated by atomic force microscopy (AFM). The calculated optical band gap decreases from 3.03 to 2.95 eV with increasing Al doping

**Keywords:** TiO<sub>2</sub> thin films, Sol-gel, Al-doping, morphology, Optical transmittance.

ID: MP085

**Experimental Investigation of Fibre Orientation Effect on Stress Concentrations in Composite Plates**

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**Abstract:** In the present work, an experimental study is performed to obtain the stress concentration factors (SCF) in E-glass/epoxy plates subjected to tensile load. The main objective of this work is to determine the effect of fibres orientation on the stress distribution in unidirectional E-Glass/Epoxy specimens subjected to tensile load. This is achieved by using Digital Image Correlation (DIC) technique. This technique is used to get the full-field surface strain measurements and understand accurately the effect of fibres orientation on failure modes. As a result of this investigation, the SCFs are considerably





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affected by increasing the fibre orientation angle and the increments in SCF values are estimated to be over 64%

**Keywords:** Stress concentration, hole, laminated plates, DIC technique, fibre orientation

ID: MP086

**Effect of Europium Doping On the Garnet (Gd<sub>1-x</sub>Lux) <sub>3</sub>Al<sub>5</sub>O<sub>12</sub> (x=0.2, 0.3) solid solutions**

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**Abstract:** Europium doped (Gd<sub>1-x</sub>Lux)<sub>3</sub>Al<sub>5</sub>O<sub>12</sub> Garnet compositions present an important interest in the structural and optical properties, the presence of Gd in these compounds gives advantages over the photoluminescence of the activators ions (rare earth elements) due to the low value of the electronegativity of Gd with compared to the yttrium ion. The inconvenient of Garnet containing Gd is not being formed by this ion only, because its large size prevents the formation of the pure phase, so it requires a compensation with an others ions in order to perform the substitution of Gd<sup>+3</sup>. In this work, we have tried to develop and elaborate the compositions of type (Gd<sub>1-x</sub> Lux)<sub>3</sub>Al<sub>5</sub>O<sub>12</sub> doped 5%at Eu<sub>2</sub>O<sub>3</sub> prepared by the solid state reaction method, in order to see the





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different effects like the percentage of Gd, which gives us its limit from which we will find a garnet pure phase, we have realized XRD analyses on these synthesized powders. Europium ion is also interesting from a structural symmetry point of view in host material by determination of  $5D_0 \rightarrow 7F_J$  transitions under excitation wavelength at 360 nm, therefore we confirmed the structure of these compounds. FTIR analyses have shown the active internal vibrations modes associated on the specific absorption bands of M – O (M: elements Gd and Lu or Al) with the different frequencies of these elaborated materials. The structural and vibrational investigations by XRD and FTIR were performed for a better understanding on the transitions and luminescent of  $\text{Eu}^{3+}$ , additional structural characteristics of  $(\text{Gd,Lu})\text{AG}:\text{Eu}^{3+}$  phosphors.

**Keywords:** Europium ; Garnet ; solid state reaction ; Luminescence of Garnets materials.

ID: MP087

**Claviceps purpurea fungus: a promising biosorbent for wastewater treatment**

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**Abstract:** In this study, *Claviceps purpurea* was successfully used, for the first time, to remove methylene blue dye from aqueous solutions and treat wastewater. This fungus was as efficient as commercially activated carbon in terms of the dye per cent removal, and it required low processing without a significant cost as it is a readily available biomaterial. The adsorption equilibrium was described by Langmuir isotherm and obeyed a pseudo-second order kinetic model. External mass transfer and intra-particle diffusion mass transfer are the main controllers of the adsorption process. The adsorption process is





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exothermic and spontaneous as well as proceeds with a positive entropy. SEM micrographs allowed for visualization of the particle morphology before and after adsorption. According to EDS spectra, the adsorbent consists of 64 per cent carbon and 32 per cent oxygen. Furthermore, the CP fungus was evaluated for its ability to treat wastewater samples. Based on the results, CP fungus enabled the adsorption of 94 -98 per cent of the contaminants. CP fungus could then be considered a highly efficient water treatment agent.

**Keywords:** adsorption; methylene blue; *Claviceps purpurea*; isotherms; kinetics; wastewater treatment

ID: MP088

**On the low temperature magnetoresistance properties of  $\text{La}_{0.7}\text{Ca}_{0.18}\text{Ba}_{0.12}\text{Mn}_{0.95}\text{Al}_{0.05}\text{O}_3$   
simple perovskite manganite**

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**Abstract:** We have successfully prepared the  $\text{La}_{0.7}\text{Ca}_{0.18}\text{Ba}_{0.12}\text{Mn}_{0.95}\text{Al}_{0.05}\text{O}_3$  manganite by solid-state reaction method. Structural, electrical and magneto-transport properties in the low temperature range have been experimentally characterized and discussed. Refinement of X-ray diffraction (XRD) patterns by use of FULLPROF program, shows the orthorhombic structure with Pnma space group of our sample. The resistivity curves show a single metal-to-insulator transition TM-Sc. The resistivity values decrease





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with applying external magnetic field. The magnetoresistance curve presents a linear decrease with increasing temperature. Its maximum value is 19% at 19K. Fitting resistivity curve shows that a combination of residual resistivity, weak localization and electron-electron interactions model govern the resistivity behavior in the low temperature range.

**Keywords:** Manganites, Structure, Electrical resistivity, Double exchange interactions, Magnetoresistance.

ID: MP089

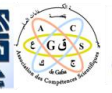
**Etude De Propriété Structurale, Electronique, Thermique Et Elastique De Composé PbTe**

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**Abstract:** Dans ce travail, nous avons étudié les propriétés structurales, électroniques et thermiques de composé PbTe qui a plusieurs applications dans le domaine photodétecteur à infrarouge en utilisant l'approximation du gradient généralisé (GGA) dans le cadre de la dft. Afin de calculer en détail les propriétés structurales, élastiques et électroniques de composé PbTe, nous avons également utilisé le programme GIBBS pour étudier les propriétés thermiques basées sur le modèle quasi-harmonique de Debye. L'approximation généralisée du calcul du gradient montre que le composé PbTe, dans lequel la structure d'équilibre des paramètres tels que la constante de réseau, le module de masse et sa dérivée de première pression sont établis et comparés aux données théoriques et expérimentales antérieures. L'étude





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élastique est considérée pour déterminer le module d'élasticité  $C_{11}$ ,  $C_{12}$  et  $C_{44}$  du cristal cubique. Grâce aux résultats obtenus à partir des modules élastiques, des modules mécaniques dérivés comprenant le module de Young, le cisaillement du module de Poisson, le coefficient de Poisson, la micro dureté  $H$  et le facteur d'anisotropie sont calculés afin de démontrer la stabilité mécanique du composite PbTe.

**Keywords:** GGA, propriétés physiques, DFT, PbTe, propriétés élastiques.

ID: MP090

**Modification of ion-exchange materials using a natural polyelectrolyte for the environmental aquatic protection**

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**Abstract:** This work highlights the continuous electro-permutation (EP) technique with modified materials, which is a hybrid technique coupling electrodialysis and ion exchange, for the selective removal of heavy metals from industrial wastewater. This work, it focuses on improving the selective separation of  $Cd^{2+}$  from a  $Cd^{2+}/Na^{+}$  mixture by using EP on an ion exchange resin modified with







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natural polyelectrolyte (Alginate (AG)). The modified resin was characterized by SEM and FTIR. The EP of the  $\text{Cd}^{2+}/\text{Na}^{+}$  mixture on modified resin made it possible to increase the difference between the removal rates of the two cations at 45% approximately. The increase in the density of the applied current favors the EP process of the modified resin and consequently the transfer of  $\text{Cd}^{2+}$  ions.

**Keywords:** Ion exchanges materials; Modification; Natural Polyelectrolyte; Environmental Aquatic.

ID: MP091

**Physical and thermal properties of antimony borate glasses**

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**Abstract:** Antimony oxide based glasses are ones of the Heavy Metal Oxide glasses. They are subject of many researches in the recent years for their low phonon energy, high refractive index and large optical transmission spectrum. By using classical routes (melting – casting), novel glasses synthesized in sodocalcics crucibles were obtained in the combination of  $\text{Sb}_2\text{O}_3$ ,  $\text{K}_2\text{CO}_3$  and  $\text{B}_2\text{O}_3$  precursors. The limits for glass formation have been investigated and the characteristic temperatures such as glass





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transition  $T_g$ , onset of the crystallization  $T_x$ , and maximum of crystallization  $T_p$  have been measured using differential scanning calorimeter (DSC). Several physical characterizations have been carried out on these new glasses. They concern the glass densities and the infrared range. All the results have been correlated to the glass composition and suggest that these glasses could have potential application in active and passive devices.

**Keywords:** Antimony borate glass, Glass transition, Density.

ID: MP093

**Fe and Li-doped SnO<sub>2</sub> thin films: doping influence on structural, optical and electrical properties**

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**Abstract:** In this study, we report structural, optical and electrical properties of Fe and Li-doped SnO<sub>2</sub> thin films during pyrolysis spray deposition from 0.5M SnCl<sub>2</sub> solution are presented. The change of parameters such as the grain size, lattice parameters and the intensity of X-ray diffraction peaks were controlled determined. For structural properties of the thin films, we used X-ray Diffraction. It was shown tetragonal crystal structure of non-doped SnO<sub>2</sub> and Fe and Li -doped SnO<sub>2</sub> thin layers. For optical





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properties, we used UV-VIS spectroscopy. The optical transmittance of the thin films shown high transparency reach to 90% in the visible region. The optical band gap decreases from 3.83eV to 3.82 eV. The preferential orientations of non-doped SnO<sub>2</sub> and 0.8wt.% of Fe-doped SnO<sub>2</sub> were along (211) and (200) planes respectively. The grain sizes decreases from 40 nm to 30 nm. Electrical resistivity of Fe and Li-doped SnO<sub>2</sub> thin films increases from  $1.05 \times 10^{-2} \Omega \cdot \text{cm}$  to  $1.92 \times 10^{-2} \Omega \cdot \text{cm}$ .

**Keywords:** Spray pyrolysis; Li-doped SnO<sub>2</sub> thin films; X-ray diffraction; UV-Visible Spectroscopy; 4-point probe method

ID: MP094

## Energie de formation des pérovskites de type ABO<sub>3</sub>

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**Abstract:** "Ce travail porte une étude sur la stabilité et la formation des structures pérovskites de type ABO<sub>3</sub>, nous avons calculé l'énergie de formation des oxydes pérovskites en se basant sur les fondements thermodynamique développés par Ping Wu et al, ensuite on a étudié la variation de cette énergie en fonction des paramètres ionique et l'état de valence des cations.





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**Keywords:** Pérovskites, ABO<sub>3</sub>, Energie de formation, Oxydes, facteur de tolérance.

ID: MP096

**Experimental and Numerical Investigation of Work-Hardening in AA2024-T3 Aluminum Alloy**

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**Abstract:** This work, investigate the AA2024-T3 aluminum alloy strain hardening behavior after tensile test using three strain levels (4%, 8%, 10%) along several directions relative to the rolling direction RD (0°/RD, 45°/RD, 90°/RD) by several hardening laws. However, the numerical result shows that, the work hardening behavior of AA2024-T3 is well described by the Ludwick law at low strain level. While, the Voce law was valid for middle and high strain one, which facilitate to predict the AA2024-T3 mechanical behavior for deformations higher than 20%.





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**Keywords:** AA2024-T3 aluminum alloy, Uniaxial tensile test, Strain hardening law, Ludwick law, Voce law.

ID: MP097

**Modeling Shrinkage Deformation of Hydraulic Materials**

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**Abstract:** Shrinkage is a complicated time-dependent process taking place in hydraulic materials. In normal and high-performance concretes, the most significant part of shrinkage is represented by drying shrinkage. Various prediction models have been developed to predict shrinkage in concrete; most of them use many number of factors that can affect shrinkage as like as strength of concrete, age of concrete at loading, type of curing conditions, ambient conditions, type of cement, type of aggregates, water-cement ratio, mix of concrete, size and shape of member, type of loading, and duration of loading. A such number of parameters increases the complexity of using these models and leads to some prediction imperfections; thence a new simplified model is needed. The main aim of this paper is to develop a new simplified model with a minimum of factors that affect drying shrinkage behavior as like as relative humidity and





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V/S ratio. To achieve this goal, we had developed a prediction model based on probability density function and a reduced number of parameters influencing shrinkage were set such as relative humidity and volume to surface ratio of the element. A very large database has been used in parameters calibration and very recent studies were used to validate the model.

**Keywords:** high-performance concretes, hydraulic materials, drying shrinkage, modeling, prediction.

ID: MP098

**Electronic Structure, Non-linear Optical Properties, Analysis of Frontier Molecular Orbital by  
Molecular Modelling of Indolin-2-one derivatives**

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**Abstract:** "— In this work, it was planned to illuminate theoretical determination of the optimized Molecular geometries, MEP, Mulliken charges of Indolin-2-one compound. In addition, we were calculated important quantities such as HOMO–LUMO energy gap, NLO, ionization potential (I), electron affinity (A), electrophilicity index (w), chemical potential (l), hardness (g), and softness





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(S) for Indolin-2-one systems. The geometries of Indolin-2-one and their derivatives were fully optimized by DFT/B3LYP with by Gaussian 09 program package.

**Keywords:** HOMO–LUMO orbitals, DFT, Indolin-2-one, NLO, MEP.

ID: MP101

**Simulation of P-I-N solar cell structure with 30period InGaP/InGaAsP Quantum Well layers**

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**Abstract:** "In our work, we want to increase the efficiency of the P-I-N solar cell and convert the largest number of photons to electrical energy, and this is what most researchers in this field seek, by using different techniques, and by using the latest simulation software before going to the experimental side, and this is what we have followed, by using ATLAS SILVACO device simulation software. And the any physical and optical models, to determine the response of solar cell with large number of Quantum wells, precisely a 30-period InGaP/InAsGaP characterized by a relatively high efficiency compared to the old





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solar cells, and compared with the results of the earlier experimental works, also the Simulation results has a good agreement with experimental results in the same conditions (AM1.5 spectrum at 300 K temperature) of 1.11mA and 50.48% J-V and EQE (External quantum efficiency) characteristic respectively."

**Keywords:** Quantum well, InGaAsP/InGaP, P-I-N solar cell.

ID: MP102

**Studying phonons-atomic vibrations- in Graphene by Molecular Dynamics Simulation**

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**Abstract:** "Important thermal, mechanical, optoelectronic and transport characteristics of materials are ruled by phonons or atomic vibrations. In order to understand advanced materials like Graphene



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nanostructures, we study atomic vibrations in Graphene using Molecular Dynamics Simulation (MDS). The MDS show that carbon atoms in Graphene move in the Longitudinal Optical (LO) vibration mode.

**Keywords:** Graphene, phonons, vibration, Simulation, Molecular Dynamic

ID: MP104

**L'étude de l'effet de la dureté mécanique sur les propriétés magnétiques d'un acier par le bruit magnétique**

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**Abstract:** Notre étude est purement expérimental pour but l'étude des propriétés magnétiques associées au traitement thermique, dans le but de rechercher une éventuelle corrélation entre les signaux bruit Barkhausen et la microstructure de l'acier X70. Cette étude a révélé que le champ coercitif décroît avec l'augmentation de la taille des grains selon une relation linéaire inversement proportionnelle entre la





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dureté magnétique (HC) et la dureté mécanique HV. Aussi, l'existence d'une relation de proportionnalité entre la perméabilité incrémentale et la dureté mécanique (HV) est mise en évidence.

**Keywords:** END, CND, bruit Barkhausen, matériaux ferromagnétiques, les aciers de pipeline, acier X70.

ID: MP105

**Waveguiding and C-axis Oriented ZnO Thin Films Prepared by Pulsed Laser Deposition**

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**Abstract:** Zinc oxide (ZnO) thin films fabricated from a series of high quality ceramic targets deposited at 450 ° C on glass and Si polycrystalline substrates by pulsed laser deposition (PLD) technique. The used source was a KrF excimer laser (248 nm, 25 ns, 5 Hz, 2 J/cm<sup>2</sup>). The effects of glass and silicon substrates on structural and optical properties of ZnO films have been investigated. X-ray diffraction patterns showed that ZnO thin films have been crystallized in hexagonal wurtzite-type structure with a preferred (002) orientation. Highly c-axis preferred orientation, which is critical for piezoelectric applications (ultrasonic oscillators and transducers devices), and the grain sizes calculated from XRD patterns varies





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from 37 to 22 nm. All the films have a good surface morphology. The optical waveguiding properties of the films were characterized by using prism-coupling method. The distinct M-lines of the guided transverse magnetic (TM) and transverse electric (TE) modes of the ZnO films waveguide have been observed. In the aim to study the optical properties of the ZnO films, an accurate refractive index and thickness measurement apparatus was set up, which is called M-lines device. An evaluation of experimental uncertainty and calculation of the precision of the refractive index and thickness were developed on ZnO films. Hall-effect electrical properties measurements in Van Der Pauw mode have been performed on ZnO films

**Keywords:** Thin films, ZnO, PLD, Piezoelectric, Waveguiding properties, Hall-effect.

ID: MP106

## Structural and optical properties of Co-doped SnO<sub>2</sub> films

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**Abstract:** "This work was Undoped and doped SnO<sub>2</sub> films (CTO) deposited by spray pyrolysis method onto glass substrate heated to a 480°C with different Concentrations of Cobalt [0;16]%. X-ray diffraction spectra (XRD) showed that the films deposited at different concentrations are polycrystalline with a rutile-type tetragonal, and take (200) as preferred orientation, Transparency in the visible range from 70% to 80%, however The optical band gap of the CTO films increased from 3.984eV to 4.133eV with







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increasing concentration, all SnO<sub>2</sub> thin films are type n and its mobility and electrical density of electrons agree together while they are inversely proportional with resistivity, The surface morphology in the SEM images was been grainy, orderly covering the full substrate surface."

**Keywords:** "SnO<sub>2</sub> ; Thin films spray pyrolysis ; thin films ; Cobalt ; XRD ; SEM.

ID: MP107

**Structural, Optical and Electrical Properties of NiO:Cu Thin Films**

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**Abstract:** Nickel oxide copper doped was deposited on highly cleaned glass substrates using spray pneumatic technique. The effect of copper doped on structural, optical and electrical properties has been studied. The XRD lines of the deposited NiO:Cu were enhanced with increasing precursor molarities due to the improvement of the films crystallinity. It was shown that the average of the crystalline size of the deposited thin films was calculated using Debye–Scherer formula and found in the range between 50 and 110 nm. The optical properties have been discussed in this work. The absorbance (A) and the transmittance (T) were measured and calculated. Band gap energy is considered one of the most important optical parameter, therefore measured and found ranging between 3.870 and 3.904 eV. The





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NiO:Cu thin film reduces the light reflection for visible range light. The increase of the electrical conductivity to maximum value of  $1.9102 (\Omega \text{ cm})^{-1}$  can be explained by the increase in carrier concentration of the films. A good electrical conductivity of the NiO:Cu thin film is obtained due to the electrically low sheet resistance. NiO:Cu can be applied in different electronic and optoelectronic applications due to its band gap, high transparency and good electrical conductivity.

**Keywords:** Nickel oxide, thin films, XRD, band gap energy, conductivity

ID: MP108

**Study of the structural and optical properties of nanostructured copper oxide thin films**

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**Abstract:** In this work, CuO thin films were prepared by the spray pyrolysis method using a different concentration of  $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ . X-ray diffraction (XRD) and UV-VIS transmission spectroscopy were employed to characterize the structure and optical properties of prepared films before and after annealing. XRD patterns show that the films are polycrystalline and monoclinic with (-111) and (111) crystalline orientations. Through the record of transmittance and absorbance, it has been found that the optical





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transmission showed a decrease with increasing concentration, the energy interval values decreases with increasing concentration, ranging from (1.54-2.47eV), the results showed that the annealing led to increase in film substance crystallization, and also it is found that the optical properties are changed.

**Keywords:** Thin films, copper oxide, chemical spray pyrolysis, structural properties, optical properties.

ID: MP109

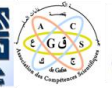
**Structural and microstructural parameters of crystalline phases in Sand Dunes of Ouargla (Algeria)**

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**Abstract:** In this communication, Rietveld refinements by using MAUD program have been performed for phase identification and determination of composition of crystalline phases in a natural sample of Ouargla (Algeria) dunes sand. In addition, both structural (lattice parameters) and microstructural parameters (crystallite size and microstrain) have been determined for each constituting phase. The





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refined XRD patterns show that quartz and gypsum are the two main components of this sand; with 72.11% and 23.77% respectively. In addition, some minor phases have been identified as well, such as 4.34% of bassanite.

**Keywords:** Dunes sand, X-ray diffraction, MAUD, Rietveld refinement.

ID: MP110

**Inverse Problems using Genetic Algorithm for Characterization in Materials**

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**Abstract:** "In this paper, we will be interested in The study of eddy current nondestructive testing systems for characterization of materials using finite element method requires a high cost in view of calculation time and memory space. Therefore, the optimization of the inversion technique associated to this method permits to reduce the time of defect characterization .In this work we will be interested in the identification and estimation of the physical and geometrical parameters of an aeronautical construction



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metal sheet made of Al, Ti and stainless steel 304L by using the inverse approach associated with the genetic algorithm. We identifying those parameters that have been changed, such as electrical conductivity, permeability and thickness.

**Keywords:** "Eddy Current; Inverse Problem; Aeronautic Materials; genetic algorithm."

ID: MP112

**Investigation of the structural, optical and electrical properties of Zinc Oxide Co-Doped with Fluorine and Cobalt**

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**Abstract:** Zinc oxide codoped with Fluorine and Cobalt thin films (FCZO) were successfully synthesized on heated glass substrate at 380 ° C by spray pyrolysis technique. The influence of doping and codoping on the structural, optical and electrical properties were investigated. X-ray diffraction results showed that the undoped and FCZO films exhibit the hexagonal wurtzite crystal structure with a preferential



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orientation along  $[0\ 0\ 2]$  direction. No secondary phase is observed in FCZO films. The optical transmittance of Co doped ZnO thin films reduces up to 80 % as compared to undoped ZnO thin film in the visible region. We have observed three absorption bands at 568, 608 and 659 nm which can be attributed to the d-d transitions of tetrahedrally coordinated  $\text{Co}^{2+}$  ion in the high spin state. The bandgap was found to be increasing in the range of 3.26-3.31 eV with Co doping whereas it decreases for higher doping of Co concentration.

**Keywords:** Spray Pyrolysis, Codoped ZnO, Thin Films, Characterization

ID: MP113

## Antioxidant Activity and Chemical Composition of the Essential oil of *Brocchia cinerea* growing wild in South East Algeria

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**Abstract:** The essential oil acquired through the hydrodistillation of aerial organs of *Brocchia cinerea*, was analyzed by (GC-MS), in order to define its chemical composition. Twenty-Five elements were identified in *B. cinerea* essential oil. The findings showed that the chief components of the essential oil were :  $\beta$ -Thujone (32.01%), Isobornyl acetate (16%), Cineole < 1,8> (15.31%), Santalina triene







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(9.35%), Camphor (3.92%), Terpinen-4-ol (2.91%), p-Cymene (2.27%). It is the first report on the chemical composition of the essential oil extracted from the *Brocchia cinerea* cultivated in Algeria, as well as an original study on the antioxidant activity of *Brocchia cinerea* essential oil. After investigating the antioxidant properties of *Brocchia cinerea* essential oil with 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging method, the findings displayed that this oil has low efficiency as an antioxidant; nevertheless, it can be considered as an important natural source of antioxidants in comparison with other medicinal plants.

**Keywords:** *Brocchia cinerea*,  $\beta$ -Thujone, hydrodistillation, Monoterpene, antioxidant

ID: MP114

**Optical Properties of ZnO by Sol Gel Method**

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**Abstract:** Undoped and aluminum-doped ZnO thin films are prepared by the sol-gel process. Zinc acetate dihydrate, aluminum nitrate nonahydrate, ethanol and mono ethanolamine were employed as precursor, dopant, solvent and stabilizer. In the present work 0.3M Zinc acetate dihydrate was taken as the precursor solution. The mono ethanolamine (MEA) was used as the stabilizer having molar ratio of MEA to Zinc acetate as 1.0. The resulting solution was stirred at 60°C for 2 hours to yield a clear and homogeneous sol-gel, which served as the coating solution after cooling to room temperature. The multi





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thin layers are prepared by spin-coating on ultrasonically cleaned glass substrates, respectively. X-ray diffraction, UV-VIS, photoluminescence techniques were investigated for the characterization of the prepared AZO thin films. X-ray diffraction study show that all the films prepared in this work have hexagonal wurtzite structure, with a relative preferential orientation along the c-axis and the lattice parameters  $a = b = 3.260 \text{ \AA}$ ,  $c = 5.214 \text{ \AA}$ . UV-VIS spectroscopy showed that the average value of the films transmittance in the visible region is found to be around 85 % and the gap ranges in the interval [3.15 eV–3.30 eV]. The photoluminescence spectrum only showed the UV peak while the broad band of the visible region was completely vanished.

**Keywords:** ZnO ; XRD ; Spin coating ; Photoluminescence

ID: MP115

## Preparation and study of ceramics based on kaolin DD3 with the addition of tri-calcium phosphate

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**Abstract:** In this work, samples based on local kaolin DD3 were prepared with additions of tricalcium phosphate in weight ratios as follows: 5, 10, and 15%. The samples were sintered at different temperatures (900-1300°C) for two hours. The results of the analysis and the study of the properties prove that tri-calcium phosphate improve the sintering process, it reacts with the cristobalite and alumina forming anorthite with the presence of mullite resulting from kaolin. Tri-calcium phosphate also reduces





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the percentage of porosity. Improving the sintering process directly affects the mechanical properties of the samples such as microhardness which improves. In the case of low additions of tricalcium phosphate, the sample exhibits a linear thermal expansion between room temperature and 1000°C.

**Keywords:** Kaolin, Tri-calcium phosphate, Anorthite, sintering, refractory ceramics.

ID: MP116

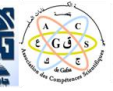
**Physicochemical properties of  $\text{Sr}^{2+}$ ,  $\text{Fe}^{3+}$  and  $\text{Al}^{3+}$  doped  $\text{TiO}_2$  monolith prepared by Sol-Gel approach**

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**Abstract:** Titanium isopropoxide was used as a precursor of titanium. The control of hydrolysis and polycondensation of the precursor was mediated by the esterification reaction between acetic acid and the solvent at room temperature. The doped monoliths were transparent at wavelengths ranging from 500 nm to 800 nm. The non-calcinated Al- $\text{TiO}_2$  and Fe- $\text{TiO}_2$  crystallized in the anatase form. Powder X-ray diffraction confirmed the amorphous-to-anatase and the anatase brookite/rutile phase transformations at





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different temperatures treatment. Based on the obtained results, only the anatase form was observed in all samples calcined at 450°C. According to the N<sub>2</sub> adsorption/desorption analysis, transparent gels had a larger surface area and high porosity.

**Keywords:** TiO<sub>2</sub>, Metal doping, Monolith, Transparent.

ID: MP117

**Rare earth doped TiO<sub>2</sub>: Understanding the effect of Dy<sup>3+</sup> doping on the stabilization of TiO<sub>2</sub> sol and the sol-gel TiO<sub>2</sub> growth**

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**Abstract:** In this work we provide a new investigation on the synthesis of Dy<sup>3+</sup> doped TiO<sub>2</sub> particles by hydrolysis-condensation at low H<sub>2</sub>O/Ti molar ratio ([H<sub>2</sub>O]/[Ti] = 1.5), with emphasis on the effect of the Dy<sup>3+</sup> doping on the stabilization of TiO<sub>2</sub> colloidal sol and the sol-gel growth of TiO<sub>2</sub> particles. Thermogravimetric, differential thermal analysis (TG/DTA) and nuclear magnetic spectroscopy (1H





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NMR) show that the presence  $Dy^{3+}$  ions slow down the particle growth in water and stabilize the  $TiO_2$  colloidal sol. The effect of  $Dy^{3+}$  doping was proved to disrupt the mechanism growth of  $TiO_2$  particles during the heat treatment, leading to amorphization of  $TiO_2$ . Scanning electron microscopy (SEM) of the undoped  $TiO_2$  showed non-sintered  $TiO_2$  microspheres. Doping of  $Dy^{3+}$  remarkably affects the size and morphology of  $TiO_2$  particles

**Keywords:**  $Dy^{3+}$  doped  $TiO_2$ , colloids, microspheres, nucleation, growth, NMR.

ID: MP118

**High efficiency and uniform distribution of pump-radiation absorption in Nd: YAG solar-laser system with end-side-end pumping configuration**

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**Abstract:** "Solar-pumped-laser (SPL) is an appropriate system which can transform the broad-band sunlight into the narrow-band laser directly, with the advantages of simple structure, high efficiency and long lifetime, in an environmentally friendly way, especially in places where the solar-energy is abundant and other energy sources are scarce such as the space. In order to produce the solar-laser light, we must excite the active medium by the solar- light. There are two major techniques for solar-pumping solid-state-lasers: side-pumping and end-side-pumping methods. The solar-laser efficiency advances were achieved by employing end-side-pumping configurations, since they can lead to much higher efficiencies





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compared to side-pumping configurations. Nevertheless, most of the advances in solar-laser brightness and stability were achieved by side-pumping configurations. The side-pumping method is an effective configuration for power scaling as it allows uniform absorption along the rod axis within the laser medium, hence decreasing the thermal load effects on solar-laser systems. Besides, the free access to both rod ends of side-pumped lasers permits the optimization of more laser resonator parameters, improving largely the laser beam quality and enabling the efficient extraction of solar laser at low modes, when compared to end-pumping configurations. By using the end-side-end pumping configuration, we aimed to benefit from the advantages of the two pumping methods cited above and that's what we effectively achieved and that we report here, a symmetrical and a uniform distribution of radiation along the laser rod axis, as well as a high radiation absorption, which increase the efficiency of the solar-laser system and improve the laser-beam quality.

**Keywords:** Solar-pumped-laser, end-side-end pumping configuration, solar-laser efficiency, solar-laser brightness, thermal load effects.

ID: MP119

## Suppression of Superconductivity in the $\text{Bi}_2(\text{Sr Ca})\text{CuOyFx}$ Compounds ( $x = 0, 0.2$ and $0.4$ ) of Fluorine-doped Bi-2201 Phase

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**Abstract:** We have synthesized, by the solid state reaction method, a series of  $\text{Bi}_2\text{SrCaCuOyFx}$  compounds ( $x = 0, 0.2, 0.4$ ) of the Bi-2201 phase of the BSCCO system. The objective is to study the effect of anionic doping by fluorine in oxygen sites on the superconductivity of  $\text{Bi}_2\text{SrCaCuOyFx}$  cuprates. The XRD analysis revealed that all the samples crystallized in a monoclinic system with a space group  $A2/a$  ( $a \neq b \neq c$ ,  $\alpha = \gamma = 90^\circ$ ,  $\beta \neq 90^\circ$ ) and the presence of several low intensity satellite peaks related to the structure modulation. The incorporation of fluorine in the structure leads to an increase in the intensity of the two main peaks (008) and (115) and the displacement of the peaks compared to those of the undoped compound, which explains the decrease in the volume







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of the cell elemental as a function of doping which can be attributed to the difference between the ionic radii of fluorine ( $R_{\text{F}} = 1.285 \text{ \AA}$ ) and that of oxygen ( $R_{\text{O}} = 1.35 \text{ \AA}$ ). The SEM images of BSF0.2 and BSF0.4 show a random distribution of grains and the formation of large grains of good lamellar connectivity which can be explained by the approximation of the melting temperature of the Bi-2201 phase. the last sintering. The electrical resistivity  $\rho$  (T) of the undoped sample (BSF0) exhibits a metallic behavior in the normal state and the superconducting transition takes place in two stages, the first appears  $T_{\text{C}} = T_{\text{HTC}} = 78.84 \text{ K}$  and the second one at  $T_{\text{C}} = T_{\text{C}, \text{On}} = 28.83 \text{ K}$ . The resistivity of BSF0.2 and BSF0.4 exhibits semiconducting behavior and superconductivity vanishes with a dramatic increase at low temperature. This can be reduced to the reduction of the oxygen content in the  $\text{Bi}_2\text{O}_2$  planes during doping with fluorine. It is probable that the substitution of O-2 by F- rapidly decreases the excess oxygen in the  $\text{Bi}_2\text{O}_2$  planes, and the whole oxygen content decreases, which decreases the concentration of the charge carriers in the  $\text{CuO}_2$  planes leading to the semiconductor state.

**Keywords:** Bi-2201 phase, Superconductor, Structure, Fluorine doping, Semiconductor behaviour.

ID: MP120

## Influence of Sn/Zn Molar Ratio on the Structures Photoluminescence and Electrical Properties of SZO Film Grown by Nitrogen Pneumatic Spray Pyrolysis

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**Abstract:** "The principal aim of this study is to reduce considerably the resistivity of the ZnO thin layers, in this order we try firstly to reduce the concentration of excessive oxygen atoms and secondary we have tested a doping by Tin (Sn) incorporation with different atomic percentages ( $\text{Sn}/\text{Zn} = 0, 1, 3, 5, \text{ wt. \%}$ ). All the Sn doped ZnO (SZO) films were grown by simple, flexible and cost-effective Nitrogen \_ Pneumatic Spray Pyrolysis method (NPSP) on glass substrates at a temperature of  $400^\circ\text{C}$ . The micro-structural, optical, morphological and electrical properties of the films were been studied. The XRD results





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demonstrate that the SZO films have polycrystalline nature, and exhibit the preferential orientation of (002) plane, on the other hand, when the concentration of Sn is increased, we notice the appearance of a new orientation (101), which leads to a bidirectional growth. The deposited SZO thin films showed an average optical transmittance in the order of 80 %, in the Uv-visible region (200–800 nm). The band gap values oscillated around 3,27 eV. Photoluminescence (PL) emissions of SZO samples had three main peaks: near band edge emission, and the violet emission and the blue–green emission. A minimum electrical resistivity value around of  $17 \cdot 10^{-3} \Omega \cdot \text{cm}$  was obtained for 3% SZO film. SZO films prepared by NPSP method are promising contender for their potential use as transparent window layer and electrodes in solar cells.

**Keywords:** ZnO, pneumatic spray, Sn doped, PL emission, transmission, and XRD

ID: MP121

**Development of structural and electrical properties of a Bi-doped lanthanum based double layered manganite prepared at two different sintering temperatures**

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**Abstract:** With the aim of probing the effect of the sintering temperature on structural and electrical properties, two samples of double layered manganite with formula  $\text{La}_{0.8}\text{Bi}_{0.6}\text{Ca}_{1.6}\text{Mn}_2\text{O}_7$  were synthesized, one at  $1150^\circ\text{C}$  and other at  $1350^\circ\text{C}$ , and experimentally investigated. Refinement of the X-ray diffractograms revealed that both sample crystalized predominately in a tetragonal structure with





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I4/mmm space group and partly in an orthorhombic structure with Pbnm space group. The tetragonal cell volume increases with increasing sintering temperature, whereas the orthorhombic one decreases. The crystallite size was estimated and found to be 27.02 nm and 26.52 nm for 1150 and 1350°C samples, respectively. SEM micrographs show granular and porous character of the samples. The four probe electric resistivity curves, in the range of 100K-300K, present metal-insulator transition (TMI) and show a decrease of the electrical resistivity with increasing sintering temperature. This can be attributed to the enhancement of the grain boundary electrical transport. TMI is found to be slightly decreased with sintering temperature. 3D-Mott's variable range hopping model was found to be the best to fit the resistivity curves in the insulator regime. The mean hopping energy ranged between 0.04 eV and 0.2 eV, whereas the mean hopping distance ranged between 1 nm and 1.2 nm. These results supported the 3D-Mott's variable range hopping mechanism for electrical transport in our samples.

**Keywords:** Double layered manganites, structure, microstructure, electrical transport, sintering temperature, variable range hopping model.

ID: MP122

## Evolution de la structure et de la conductivité électrique de la phase $\text{Sr}_{0.95}\text{Ce}_{0.05}\text{TiO}_3$ en fonction de la methode de préparation

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**Abstract:** l'importance visée dans ce travail est l'influence de la méthode de préparation de la pérovskite  $\text{SrTiO}_3$  dopé par le Cérium sur les propriétés structurale, morphologique et électrique. deux méthodes de préparation ont été utilisées : la voie solide et la voie sol gel. La caractérisation structurale est déterminée par DRX, la morphologie des grains par MEB et la conductivité électrique par la spectroscopie d'impédance, électrochimique à haute températures

**Keywords:**  $\text{SrTiO}_3$ , sol-gel, pérovskite, conductivité ionique, SOFC, spectroscopie d'impédances

ID: MP123

**Propriétés structurale et optique des poudres de manganite  $\text{La}_{0.7}\text{Ba}_{0.2}\text{Ca}_{0.1}\text{Mn}_{1-x}\text{Zn}_x\text{O}_3$  ( $x=0.0$  et  $0.1$ ) synthétisées par la méthode de réaction à l'état solide**

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**Abstract:** Dans ce travail, nous avons étudié l'effet du dopage du Mn par du Zn sur les propriétés structurales et optiques d'une série d'oxydes de manganèse  $\text{La}_{0.7}\text{Ba}_{0.2}\text{Ca}_{0.1}\text{Mn}_{1-x}\text{Zn}_x\text{O}_3$  ( $x=0.0$ . et  $0.1$ ) élaborée par la méthode de réaction à l'état solide. L'analyse structurale par DRX a montré que les





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paramètres structuraux et la taille des cristallites de ces manganites ont été affectés suite à la substitution du manganèse par du Zinc. Plusieurs paramètres physiques ont été calculés en se basant sur les résultats d'analyse DRX. Les analyses effectuées par spectroscopie FTIR ont montré la présence des bandes relatives à la liaison métallique Mn-O. Les propriétés optiques étudiées par la spectroscopie UV-Vis ont montré une transmittance de l'ordre de 50 à 65% pour l'ensemble des échantillons dans le domaine du spectre visible. La transition électronique dans nos systèmes est directe et les valeurs du gap  $E_g$  ont montré la nature semiconductrice du manganite  $\text{La}_{0.7}\text{Ba}_{0.2}\text{Ca}_{0.1}\text{Mn}_{1-x}\text{Zn}_x\text{O}_3$ .

**Keywords:** Manganites, réaction à l'état solide, propriétés structurales, propriétés optiques

ID: MP124

## L'effet de la méthode de synthèse sur la formation de la structure du composé $\text{Ca}_{0.7}\text{Sr}_{0.3}\text{FeO}_{2.5}$

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**Abstract:** "L'oxyde de type brownmillerite  $\text{Ca}_{0.7}\text{Sr}_{0.3}\text{FeO}_{2.5}$  a été synthétisé par deux méthodes, la première : sol-gel, où on fait la combustion des oxydes en utilisant les précurseurs :  $[\text{Sr}(\text{NO}_3)_2]$ ,







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[Fe(NO<sub>3</sub>)<sub>3</sub>+9H<sub>2</sub>O] et [CaN<sub>2</sub>O<sub>6</sub>+4H<sub>2</sub>O] et l'acide citrique comme réactifs. Le gel obtenu après séchage dans une étuve pendant une nuit sous une température de 100°C a été calciné dans un four sous différentes températures dans l'intervalle [800°C-1000°C] pendant autre une nuit. La deuxième méthode c'est la solution solide, où l'oxyde Ca<sub>0,7</sub> Sr<sub>0,3</sub>FeO<sub>2.5</sub> a été préparé à partir des quantités stœchiométriques de CaCO<sub>3</sub>, SrCO<sub>3</sub> et Fe<sub>2</sub>O<sub>3</sub>. Le mélange a été broyé dans un mortier puis calciné à l'air à 1000 °C pendant 12 heures dans le four. La poudre a été frittée à l'air dans un four à 1200 °C pendant une nuit. Les poudres obtenues sont caractérisé par DRX. Dans ce travail nous allons voir l'effet de la méthode de synthèse sur la formation de la structure cristalline de la phase SrFe<sub>0.7</sub>Mo<sub>0.3</sub>O<sub>3</sub>.

**Keywords:** brownmillerite, Ca<sub>0,7</sub> Sr<sub>0,3</sub>FeO<sub>2.5</sub>, sol-gel, solution solide, méthode de synthèse.

ID: MP125

## Etude expérimentale du retrait des bétons de sable renforcés par des fibres

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**Abstract:** Le sud algérien, et en particulier les oasis, pose un grave problème en raison de la présence de quantités considérables de sable; entraîné par le vent, formant des dunes. Ce phénomène de mouvement et d'accumulation de sable s'appelle généralement la désertification, un phénomène dangereux qui conduit à la fermeture des routes et à l'enfouissement des bâtiments ainsi qu'au remplissage de zones agricoles. Les







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oasis du sud de l'Algérie souffrent également du problème des vents, qui reste une période importante qui peut-être même la moitié de l'année. Tous ces facteurs rendent le coût de déplacement des sols très coûteux et continu. De plus, le problème de la rareté du sable naturel destiné à la construction, nous a poussés à exploiter le sable de dunes, au moins en partie dans la construction pour réduire ces phénomènes et problèmes. Dans ce contexte, plusieurs recherches et travaux ont tenté d'utiliser le sable de dunes comme composant du béton, dont la plus importante est le renforcement avec différentes fibres, afin de réduire le phénomène de retrait. Ce travail est une contribution à la correction granulaire du sable de dune et à l'amélioration des propriétés rhéologiques du béton de sable renforcé par des fibres métalliques.

**Keywords:** Mots clés: sable de dune, fibres métalliques, retrait, béton, additifs.

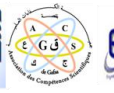
ID: MP126

## The effect of thiourea concentration on the properties of CdS thin films prepared by CBD

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**Abstract:** CdS thin films have been deposited on glass substrate employing chemical bath deposition technique by varying thiourea concentration, cadmium sulphate used as source of cadmium ions. The aim





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of this research is to investigate the effect of thiourea concentration on optical and structural properties of the deposited CdS thin films. XRD analysis reveals that the CdS thin films obtained have zinc blende cubic structure. UV-VIS studies demonstrate that as the thiourea concentration increases transmission spectra shift towards the shorter wavelength and the transmittance increases. The optical band gap of CdS thin films also increases from 1.80 – 1.96 eV. Both the grain size decreases when the thiourea concentration increases.

**Keywords:** Cds-Chemical bath deposition-Thin Film-Optical properties-Structural properties- FTIR

ID: MP127

**Effet du traitement thermique sur la corrosivité de l'acier dans un milieu H<sub>2</sub>SO<sub>4</sub>**

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**Abstract:** Les aciers X52 utilisés pour le transport de l'eau dans la région de Haoud Berkaoui se dégradent assez vite suite à de graves problèmes de corrosion. Plusieurs études ont été réalisées sur ces aciers pour tenter de comprendre ce phénomène et réduire le fléau. Différents inhibiteurs de corrosion ont été testés et ont montrés une efficacité relative. La présente étude, a permis de révéler d'abord l'état structural de l'acier X52 et de suivre l'évolution de la microdureté en fonction du traitement thermique de revenu. L'acier s'adoucit alors en fonction de la température de revenu croissante. Les mesures électrochimiques en milieu  $H_2SO_4$  ont permis de montrer que le comportement de l'acier est identiquement le même pour toutes les températures de revenu utilisées dans cet étude et que la vitesse de corrosion diminue de façon très significative.

**Keywords:** Traitement thermique ; acier ; dureté ; Corrosion ; ferrito-perlitique.

ID: MP128

**Effects of Al content and annealing duration on the structural, morphological and photocatalytic properties of  $TiO_2$  thin films.**

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**Abstract:** "Undoped TiO<sub>2</sub>, 3 and 5 at.% Al-TiO<sub>2</sub> thin films are prepared on glass substrate by sol-gel dip-coating technique, the obtained films were annealed at temperature of 500 °C for 1 and 2h . The structural, morphological and photocatalytic properties of the films have been investigated. XRD analyzes show that the crystalline phase of TiO<sub>2</sub> and the Al-TiO<sub>2</sub> thin films comprised only the anatase phases and the nanocrystallinity was enhanced by increasing the Al contents and annealing duration. The grain size calculated from XRD patterns increases as the Al content and duration of annealing increase. From, atomic force microscopy images, 3 at.% is the Al doping content that promotes the highest porous surface formation. The porous Al-TiO<sub>2</sub> films show improved photocatalytic activity under the UV light irradiation and the highest photodegradation is measured for the porous 3% Al doped TiO<sub>2</sub> thin films.

**Keywords:** TiO<sub>2</sub> thin film, Sol-gel, Annealing duration, Al content, Photocatalytic, Methylene bleu

ID: MP129

**Olive mill wastewater treatment by successive coagulation, flocculation, sedimentation and adsorption Muna**

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**Abstract:** Mediterranean region is known as the main olive oil production region worldwide. However, olive mill wastewater (OMW), a liquid by-product of the olive oil industry, creates a major environmental problem. The high polluting power of OMW is associated to its acidic pH, high amount of low biodegradable organic matter such as





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polyphenols. Only 2% of the total phenolic content of the olive fruit passes in the oil phase, while the remaining amount is lost in the OMW and thus lead to a serious ground water pollution problem and to great challenges in its remediation. A reliable olive mill wastewater treatment method that meets communal needs in the most cost-effective way is a vital need especially for Jordan, in which it faces serious problem pertaining water resources and environmental quality. A variety of technologies has been tested, and concluded that a single process cannot offer an efficient and viable solution for OMW treatment. In this study, OMW was pretreated with coagulation-flocculation and sedimentation processes to remove its suspended solids before it was subjected to sorbent material(s). Volcanic tuff (VT) and magnetite nanoparticles were utilized to remove chemical oxygen demand (COD) and total phenolic content (TPC) from pretreated OMW. VT was activated by calcination, acid impregnation followed by calcination and base impregnation followed by calcination. Magnetite nanoparticles were prepared by co-precipitation and coupled with VT either by mixing or by using VT/magnetite nanocomposites. COD and TPC removal efficiencies were then tested through batch and column approaches under laboratory conditions. The results obtained from this study revealed that the modified material with magnetite nanoparticles could be employed as an alternative technology for the removal of OMW pollutants. Furthermore, this study could provide valuable insight on the effect of magnetite nanoparticles toward the treatment and recyclability of olive mill wastewater, which is crucial for the local olive mill industry

**Keywords:** Olive mill wastewater; chemical oxygen demand; total phenolic content; adsorbents

ID: MP130

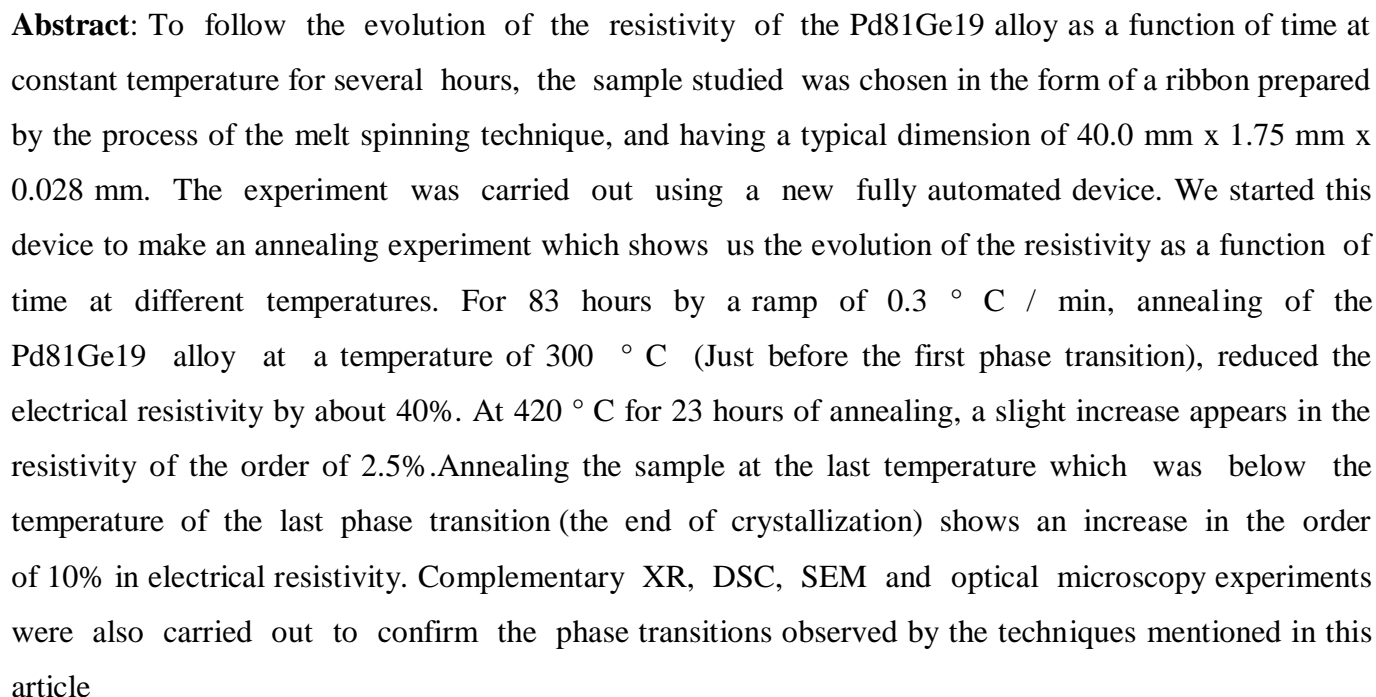
**Measurement Of the thermoelectric properties of Pd<sub>81</sub>Ge<sub>19</sub> alloy as a function of time**

ACHOURI Abderrahim, Benkrima Yamina, Benmabrouk Lazhar, Mohammedi Lazhar, Bergoug ,  
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**Keywords:** Electrical resistivity, Thermoelectric power, Annealing, Alloy, Phase transition

ID: MP131

## On the bending and vibration analysis of skew multilayered sandwich plate

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**Abstract:** In the present paper, the bending and vibration responses of skew multilayered sandwich plate is investigated using an efficient layerwise finite element model. Both, higher order and first order shear deformation theories are used in order to model the core and face-sheets respectively. This combined theory satisfies the interlaminar displacement continuity. The number of variables in this present model is fixed and does not increase when increasing the number of lamina layers. This is a very important feature compared to the conventional layerwise models. The governing equations of motion are derived using Hamilton's principle. The effects of skew angles and layup sequences on the dynamic response for various parameters are studied. The numerical results obtained by our model are compared favorably with those obtained via analytical solution and numerical results obtained by other models."

**Keywords:** Bending, Vibration, Skew multilayered sandwich, layerwise, finite element

ID: MP132

**Ab Initio study of structural, electronic and magnetic properties of RhFeSi ternary Heusler alloy**

BENADDI Fatiha, Mohammed AMERI, Fadila BELKHARROUBI





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**Abstract:** In this paper, the structural, electronic and magnetic properties of RhFeSi alloy have been investigated in the framework of the first principles calculation. The results of our calculations show that the magnetic (M) phase for the type I structure is more stable for this ternary heusler compound. The lattice parameter and the magnetic moment at the equilibrium state are in good agreement with the theoretical data available and the formation energy has been determined, the electronic structure of this compound has also been studied and revealed that half heusler alloy is half metallic ferromagnetic an indirect band gap . This property is shown that the RhFeSi is the candidate material for spintronic applications.

**Keywords :** First principles calculation, half metallic, spintronic applications

ID: MP133

**Development and characterization of PZT ceramics with ABO<sub>3</sub> perovskite structure, doping effect**





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**Abstract:** The main objective of our work is based on the synthesis, structural and physical characterization of a new ceramic material of the PZT type and perovskite  $ABO_3$  structure.. A substitution in sites A and B has been carried out in order to improve its physical properties. The samples selected for this study were prepared by the solid-state synthesis method. Our study aims to better understand the high piezoelectric properties . The main characteristics of these materials are a highly non-linear behaviour as well as the presence of a morphotropic phase boundary (PMF) where the properties reach a maximum.

**Keywords:** ceramics, doping, piezoelectrics, dielectric, DRX

ID: MP134

**Electrical investigation of a photo-sensible heterostructure presenting a resistive switching phenomenon:  $Au/TiO_2/ZnO:Al_4\%/p-Si$**

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**Abstract:** "We report an electrical investigation on the Au/TiO<sub>2</sub>/ITO/ZnO:Al/p-Si heterostructure, presenting a resistive switching (RS) behavior. This phenomenon manifests itself by a well defined hysteresis loop in the I-V characteristics, in dark and under illumination. The thermal activation of the I-V surface is about 160 and 100 meV in dark and under illumination, respectively. This illustrates that the RS phenomenon can be modulated via optical excitation. The temperature dependence of the conductance illustrates the presence of two temperature intervals: at low temperatures the Au/TiO<sub>2</sub> governs the electrical conductivity and for temperatures higher than 200 K, the control switches to the ZnO:Al4%/p-Si junction. By annealing the heterostructure in an oxygen atmosphere the RS behavior disappears, which confirms that oxygen vacancies in the top TiO<sub>2</sub> layer are responsible of the RS."

**Keywords:** Sol-gel; resistive switching; memory effect; nanoparticles

ID: MP135

**Multi-scale study and characterization of the structural and mechanical properties of copper wires deformed and annealing**

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**Abstract:** The scope of this work is to study the evolution of the (microstructure / texture) and properties (mechanical / electrical) of copper wire, the combined influence of the of deformation level and annealing temperature to 260 ° C on the recrystallization kinetics and the evolution of the crystallographic texture during recrystallization annealing of copper wire. For this we used several experimental techniques of measurement and characterization that allowed us to carry out this work. These are: scanning electron microscopy (SEM), backscattered electron diffraction (EBSD), X-ray diffraction, Vickers microhardness and chemical analysis (EDAX), tensile tests and measurements of electrical resistivity some of which allowed correlating the microstructure to the texture. Our study was carried out on a DUCAB type copper wire rod most used by the ENICAB Company in the manufacture of electrical energy transmission cables.

**Keywords:** Tréfilage, La Microdureté, EBSD, Recrystallisation, Traitement de recuit. Résistivité électrique.

ID: MP136

**Microstructure and Mechanical Behavior of High-Carbon Steel Wires**

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**Abstract:** In this research, the relationship between microstructure and mechanical properties of Steel strands containing a nearly fully pearlitic structure is investigated. strands Steel used for different engineering and industrial applications such as : hoisting loads, aerial cable-ways, the bridges decks, suspension cables, the retaining walls, the petroleum platforms, airports etc. because they offer a right combination of strength and ductility. They are composed of drawn steel wire twisted helically around an axial wire. These wires are obtained by the wire drawing process of a hard pearlitic steel wire of carbon concentration close to the eutectoid composition followed by a thermo-mechanical treatment of stabilization. The main goal of this work is to undertake a preliminary characteristic study of high-carbon steel wire rods intended for manufacture of strands. The two wires which are in a rough state of hot rolling are investigated by the following experimental techniques : Microstructure, Vickers microhardness, Tensile test and X-ray diffraction analysis.

**Keywords:** Strand, High-carbon steel, Wire rod, Microhardness , X-Ray diffraction

ID: MP137







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**Effet du traitement de vieillissement sur les propriétés structurales et mécaniques d'un fil en alliage  
AGS tréfilé industriellement**

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**Abstract:** Dans cette étude nous examinons l'effet du traitement de vieillissement naturel et artificiel sur l'évolution de la microstructure et le comportement des propriétés mécaniques d'un fil en alliage AGS tréfilé industriellement à froid à l'ENIBAB destiné pour le transport d'énergie électrique (moyen et haute tension) [1-4]. Pour cette raison on a utilisé plusieurs techniques expérimentales de mesure et de caractérisation qui nous ont permis de mener à bien ce travail. Il s'agit de: la microscopie optique et électronique à balayage (MO/MEB), la diffraction des RX, la microdureté Vickers et l'analyse chimique par (EDAX), dont certaines ont permis de corrélérer la microstructure aux propriétés mécaniques.

**Keywords:** Vieillissement naturel, microstructure, Alliage d'aluminium (AGS), déformation par tréfilage,

ID: MP138

**Enhanced properties of metal supported nanoparticles : A structural and optical study**

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**Abstract:** Metallic aggregates in colloidal phases or supported aggregates attract increasing attention of researchers because of the wide range of possible applications (catalysis, environment, non-linear optics, biology and medicine). The objective of this work is to study the structural, optical and vibrational properties of Ag/SiO<sub>2</sub>. The nanocomposites were synthesised by wet impregnation with ion exchange, followed by calcination. Various charges of Ag<sup>+</sup> (1, 2.5, 5, 7 and 10%) were fixed on the silica in a first step. The samples were then annealed in air at temperatures ranging from 300 to 500 °C in a second step. Several experimental techniques (SEM, DRX, FTIR and UV-Visible) were used to characterize the samples at various stages of development. Observation by Scanning Electron Microscopy (SEM) confirms that the morphology of Ag/SiO<sub>2</sub> samples after impregnation is different from that of silica alone. X-ray diffraction made it possible to identify the silver silicate Ag<sub>6</sub>Si<sub>2</sub>O<sub>7</sub> phase [1]. The optical properties of Ag/SiO<sub>2</sub> nanocomposites were studied by visible UV spectrophotometry. The absorption spectrum has, in addition to a broad band in the visible, three peaks in the UV range. This band was assigned to either the Ag<sub>2</sub>O oxide after impregnation and / or calcinations. The peaks were assigned to Ag<sub>2</sub>O oxide and Ag<sub>n</sub> clusters [2-4]. The increase of the initial charge in Ag<sup>+</sup> ions induces a slight shift of this band. The FTIR spectroscopy study of the Ag / SiO<sub>2</sub> samples revealed the vibrations of the Si-O-Si, Si-OH, Ag-O and Ag-SO<sub>4</sub> [5] bonds at the respective wave numbers 468, 810, 615 and 641 cm<sup>-1</sup>. The intensity of these vibrations varies according to the charge in Ag<sup>+</sup> ions and the temperature of the heat treatment. The studied samples are choice materials for photocatalysis.

**Keywords:** Nanomaterials, Nanocomposite, clusters, silver, support oxide, silica

ID : MP139

**Mineral Clays as Adsorbent Material: Case of Removal of BM in water Using Kaolinite**





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**Abstract** In this study, local mineral clay was used as an adsorbent to remove pollutants from the water, because the study demonstrated the effectiveness of the clay in removing methylene blue, which is one of the most common dyes. used, in particular in the industrial field We determined the optimal adsorption conditions by which we aim to increase the efficiency of removal of contaminants on the surface of the clay where the results were as follows The optimal initial concentration of the pigment was of 70 mg / l, and the absorption equilibrium was reached in less than 30 minutes of contact time, the adsorption rate increases with the increase in the mass of clay, the optimal adsorption temperature is normal temperature and adsorption is preferred in low base media. The thermodynamic results show that the adsorption process is endothermic and is accompanied by a change in the free energy of the surface. Isothermal modeling has shown that the Langmuir model is the best model to describe the isothermal adsorption temperature. , and the adsorption follows second order reaction kinetics. Acid activation has resulted in a decrease in the resistance to dye removal due to the emergence of new materials with properties different from those of natural clay.

**Keywords:** Mineral clay; Isothermal; Methylene blue; Adsorption





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ID : MP140

**Adsorption des margines par des argiles modifiées**

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**Résumé :** Cette étude concerne l'adsorption des margines par des argiles activées à l'acide. La quantité du margine adsorbée est fonction du temps d'attaque acide, le pH, la température et le temps de contact.

**Mots clés :** dépollution, margine, adsorption, argile activée à l'acide

ID : MP141





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## Adsorption du plomb par des argiles pontées Lanthane-Aluminium

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**Résumé :** L'objectif principal de la modification de la bentonite par pontage simple Al et mixte La-Al était l'étude de la possibilité de l'utilisation des argiles synthétisées pour le traitement des effluents contenant des polluants métalliques (plomb), dans le cadre d'une démarche relative à la recherche de procédés potentiellement applicables au traitement des eaux. Le modèle de sorption des ions, l'ordre de sa vitesse de sorption, les paramètres agissant sur cette sorption ainsi que le mécanisme réactionnel ont été déterminés expérimentalement.

**Mots clés :** lanthane, plomb, adsorption, argile pontée





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ID: TO01

**Energy decay for a nonsimple thermoelastic system with second sound thermoelasticity**

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**Abstract:** In this paper, we consider a one-dimensional nonsimple system with second sound thermoelasticity. The thermal disturbance is modeled by Cattaneo's law for heat propagation to remove the paradox of infinite speed. We use the semigroup approach and prove a well-posedness result. An exponential decay result was obtained by the use of Gearhart theorem and the method developed by Zhong and Liu.

**Keywords:** nonsimple material, second sound, thermoelasticity. Well-posedness, exponential decay

ID: TO02







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**Introduction et Application d'un Nouveau Type de Synchronisation IHFPS pour Sécuriser les Télécommunications**

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**Abstract:** Dans ce travail, un nouveau type de synchronisation du chaos appelé synchronisation projective à fonction hybride inverse (en anglais : Inverse Hybrid Function Projective Synchronization) noté IHFPS est étudié pour une classe de systèmes chaotiques en temps continu. Sur la base de la théorie de la stabilité de Lyapunov et de la méthode de contrôle non-linéaire, un nouveau contrôleur peut être conçu pour réaliser ce nouveau schéma de synchronisation pour des systèmes en n-D chaotiques en temps continu. Un exemple de simulation numérique est introduit afin de valider les résultats théoriques développés dans cette étude. Ainsi, ce nouveau type de synchronisation peut considérablement améliorer la sécurité des télécommunications et peut être aussi utilisé dans la physique et l'électronique.

**Keywords:** synchronisation hybride, contrôle non-linéaire, système dynamique, temps continu, télécommunications sécurisées.





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ID: TO03

**Exponential decay of the solution of a porous-elastic system with double porosity**

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**Abstract:** In the present work we consider a double porous elastic system with viscoelastic and porous dissipations. We use the semigroup approach and the Gearhart-Prüss a well-posedness result and an exponential rate of decay.

**Keywords:** semigroup, Exponential decay, double porosity semigroup, Well posedness

ID: TO04





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**Spectral diagnostics of argon plasma and determination of the electron temperature**

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**Abstract:** This work concerns a spectroscopic study of a window designed for an argon gas plasma discharge. The discharge channel have a diameter of 10mm and length 60mm. We are interested in electronic transitions from atoms and ions of argon and determination of electron temperature of the plasma. The characterization of plasma indicates that the plasma discharge is at conditions to satisfy the criterion of local thermal equilibrium (L.T.E).The results of our calculations are in good agreement with the experimental results of Pingpigret G, et al. (2017).

**Keywords:** spectroscopy, argon plasma, electron temperature





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ID: TO05

**An Efficient Algorithm for Solving Generalized Equal Width Wave Equation**

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**Abstract:** In this work an algorithm based on reproducing kernel theory is used to find numerical approach of the generalized equal width wave equation of integer and fractional orders. The numerical solutions converge uniformly. The results demonstrate the efficiency and the simplicity of the given method for the generalized equal width wave equation of integer and fractional orders.

**Keywords:** Generalized Equal Width Wave Equation, Reproducing Kernel Theory, Fractional Calculus, Convergence, Numerical Solution, Gram-Schmidt Process.





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ID: TO06

**Application Of Strict Coincidence And Common Strict Fixed Point To Dynamical System Via F-Contraction**

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**Abstract:** In this paper, we prove two strict coincidence and fixed point theorems for weakly compatible hybrid pairs of strongly tangential mappings satisfying F-contractions, in a metric space. An example and an application to functional equations arising in dynamic programming given to illustrate our results."

**Keywords:** common fixed point, strong tangential property, weakly compatible, hybrid pair."

ID: TO07





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**Performance and Analysis of an M/M/1 Retrial Queue with Orbital Search**

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**Abstract:** We consider a retrial queueing system with search of customers from the orbit, where the server stay idle after his active period .The model was proposed in the first time by Tuan Phung-Duc [1] for cloud computing systems where the processing unit (server) and the storage unit (orbit) are separated. Of our parts we propose to study the effects of performance measures on the system.By using embedded Markov chain technique and the supplementary variable method, we present the joint queue length distribution in steady state. The waiting process is also given. Finally, some numerical examples are presented.

**Keywords:** Retrial queueing systems, orbital search, performance measures, cloud systems, performance modeling.

ID: TO08







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**New Computer Experiment Designs Using Monte Carlo Markov Chain Method and Metropolis  
Hasting algorithm**

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**Abstract:** this article offers a method for building computer experiment designs. This method is based on the theory of marked point processes, otherwise known as object processes. Those designs rely on both the distribution of points in the experimental region and on some characteristics attached to those points, and are obtained using Monte Carlo Markov Chain Method (MCMC). A detailed study about the convergence of the Markov chain has been carried out. Moreover, a comparison between our approach and the one which is given by other existing computer designs has been drawn.

**Keywords:** Design of experiments, Computer experiment designs, Point process, marked point process, Markov Chain Monte-Carlo (MCMC).





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ID: TO09

**Exponential decay for a nonsimple thermoelastic system with thermoelasticity of type III**

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**Abstract:** In this work we consider a nonsimple thermoelastic solid subjected to thermal effects. We will prove that the coupling with thermal effects of type III bring the system to an exponential rate of decay.

**Keywords:** nonsimple material, thermoelasticity type III, exponential decay.

ID: TO10





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**A Dynamic Elasto-viscoplastique Piezoelectric Contact  
Problem with Adhesion and Damage"**

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**Abstract:** In this document, we study of a mathematical problem for dynamic contact between two electro-viscoelastic bodies with normal compliance, adhesion and damage. The damage of the material caused by elastic deformations. The evolution of the damage is described by an inclusion of parabolic type. The evolution of the bonding field is described by a first order differential equation. We derive variational formulation for the model and prove an existence and uniqueness result of the weak solution. The proof is based on arguments of time dependent variational inequalities, parabolic inequalities and Banach fixed point theorem.

**Keywords:** Dynamic process ; piezoelectric materials ; normal compliance ; damage field ; adhesion field.





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ID: TO11

**On Sylvester type equations for bounded and subnormal operators in Hilbert spaces**

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**Abstract:** The purpose of this study is to give the necessary and sufficient conditions of the existence of solution for an operator equation of Sylvester type with subnormality of bounded operators in finite dimension complex separable Hilbert space. Our results improve and generalize some results with operators in restricted cases.

**Keywords:** operators, finite dimension, complex, separable Hilbert, space.

ID: TO12





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**Non-Equilibrium Plasma Discharge Modelling for Ozone Production in Carbon Dioxide with  
Dioxygen Gas Mixture**

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**Abstract:** In this research, we study the production of O<sub>3</sub> in CO<sub>2</sub>/O<sub>2</sub> pulsed discharge. The developed model is based on the plasma chemistry of CO<sub>2</sub>/O<sub>2</sub>, the electrical circuit and the Boltzmann equations'. The fundamental chemistry of CO<sub>2</sub>/O<sub>2</sub> gas mixture used in this work is based on a full set of processes regrouped in 113 reactions involving 21 species of the discharge in the different states. The obtained numerical results show the temporal variation of ozone concentration under the different values of the discharge parameters such as: gas pressure, dielectric capacitance, applied voltage and discharge frequency. We have also studied the effect of these parameters on the ozone variation compared to total density of discharge plasma.

**Keywords:** Ozone, Pulsed Discharge, Kinetic Scheme, CO<sub>2</sub>/O<sub>2</sub> gas mixture, non-thermal plasma





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ID: TO13

**Modelling Biomaterials by Using Computational And Statistical Methods: Application to The Cardiac Cells**

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**Abstract:** recently, the principal goal in medicine is to use new and healthy materials to save human life, and our contribution in this paper is to replace, the use of animals by computational process to predict the effects of chemicals and drugs. We propose the study of the alterations of the main ionic membrane currents, which cause the modifications of the cardiac action potential in the cardiac hypertrophy and the heart failure by using a percolation theory, the Tarjan's depth-first-search algorithm and the finite difference methods.

**Keywords:** Percolation, modelling, finite difference methods, cardiac cells, ion channel

ID: TO14

**Studies of Ionization Rate for Lithium Using the Electrons Energy Distribution Functions (EEDF)**







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**Abstract:** For a radiative collisional model, population densities of atomic levels are determined by a system of equations containing the various atomic process rates. The electron impact ionization is an important atomic process in the collisional radiative model as well as for the study of ionization balance. In many types of plasmas it has been observed that some electrons (hot) are governed by a non-maxwellian energy distribution. The illustration of the effect of a non-Maxwellian distribution is provided for neutral helium emission lines and effective ionization rate coefficients. The ionization rates are generated from cross sections obtained by the Flexible Atomic Code (FAC), weighted by this distribution. We report in this paper calculation for cross section and rates coefficients for electron-impact ionization. We study the influence of electron energy distribution functions on the calculation of ionization using a non-Maxwellian energy distribution in the case of different values of hot electron fractions. The use of non-Maxwellian energy distribution showed the sensitivity of these rates to the forms of the electron energy distribution. Where possible, the calculated results will be compared with data those found in the literature.

**Keywords:** Cross sections, Code FAC, Distribution function, Electron impact ionization, Bi Maxwellian distribution of electrons.





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ID: TO15

**Extended Spectrum of Polynomial function operators and applications**

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**Abstract:** We say that a complex number  $\lambda$  is an extended eigenvalue of  $A$  if there exists a nonzero operator  $X$  satisfying the equation  $\lambda XA = AX$ . This work is devoted to the investigation of some properties of the extended spectrum polynomial operators, in this case, the extended spectrum satisfying the spectral mapping theorem for polynomial function. As application, we calculate the extended spectrum of polynomial operator  $A$  where  $A$  is Volterra operator.

**Keywords:** Extended spectrum, spectral mapping theorem, Volterra operator.





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ID: TP01

**Cross Sections for Electron Impact Excitations of Beryllium**

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**Abstract:** The atomic data of the various atomic processes are essential for the radiative collisional models describing plasmas. These processes are essential for the interpretation of laboratory and astrophysical spectroscopic data. We have contributed to study and the calculation of the cross sections and coefficients of the excitation rates, which are obtained by Semi-experimental methods. The objective is to evaluate the status of electron-impact excitation data for Beryllium and to generate the recommended datasets for use in analysis spectra.

**Keywords:** Atomic processes, Electron-impact excitation, Cross-sections, Simulation methods.



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ID: TP02

**Calcul de la composition du plasma à basse température de mélange CH<sub>4</sub>-H<sub>2</sub>**

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**Abstract:** L'objet de ce travail est le calcul de la composition chimique d'un mélange composé de méthane et d'hydrogène à l'équilibre thermodynamique et à la pression atmosphérique dans une gamme de température entre 300 et 3000K. La composition du plasma est calculée à partir de la loi d'action de masse. Les résultats obtenus montrent qu'à haute température la concentration de l'hydrogène atomique H est prépondérante. La concentration du méthane reste la majoritaire à basse température, la domination de la molécule d'hydrogène dans les températures intermédiaires. L'augmentation de la proportion de H<sub>2</sub> dans le mélange conduit à la domination de cette dernière jusqu'à des températures élevées.

**Keywords:** plasma thermique, méthane, hydrogène, composition du plasma

ID: TP03





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**Dispersion des particules fines dans un milieu ambiant confiné ventilé**

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**Abstract:** Plusieurs simulations numériques basées sur l'application du modèle du réseau neural artificiel (RNA) ont été réalisées pour étudier l'influence de la vitesse d'écoulement d'air sur la distribution spatiale de concentration des particules dans un milieu confiné ventilé. La base de données utilisée pour construire le modèle RNA a été déduite de la littérature bibliographique. Le modèle RNA de type perception multicouche (MLP-RNA) et à une seule couche cachée est développé pour l'objectif de donner une relation entre l'output et les inputs du modèle. Plusieurs algorithmes de formation du modèle ont été testés pour donner le choix à l'algorithme Traincgf. Les résultats obtenus pour un régime d'écoulement stationnaire montrent que la concentration des particules est croissante en fonction de l'augmentation de vitesse d'admission de l'air frais.

**Keywords:** Environnement, Dispersion, Particules, Simulation numérique, Réseau Neural Artificiel, Vitesse d'air, Approche CFD, Ecoulement air-particule, Concentration.





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ID: TP04

**Electronic Stark broadening of Be I, Mg I and Ca I using an analytical model based on limits of impact parameter**

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**Abstract:** In this work we are interested in studying the validation of the new estimated formula in Y. Ben Nana et al (2019) [1], for other spectral lines in other atoms. We applied the same method to the two atoms in the same column in periodic table Be I and Ca I, we study the variation of Be I, Mg I, Ca I as a function of electron temperature  $T_e$  and electron density  $N_e$ .

**Keywords:** Electronic collision operator, broadening by collision, Stark broadening, neutral plasmas, Beryllium, Calcium

ID: TP05







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**The effective potential energy of a two-component plasma**

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**Abstract:** The potential energy of charges plasma containing: electrons, positive and negative ions and impurities, is related to a system of nonlinear Bratu's equations (non-linear differential equations). In this work, we have focused our attention on some numerical solutions of this system. The coupled system of  $N$  nonlinear integral equations (NIES) and  $N$  nonlinear differential equations (NDES) governing the potentials energy of  $N$  species are solved numerically in a three-dimensional case with three different methods: fixed point method (FPM), Verlet method (VM) and finite difference method (FDM). These three methods generally give the same results and a good agreement with the molecular dynamics simulation (MD).

**Keywords:** Bratu's equations system, potential energy, non-linear integral and differential equations system (NIES, NDES).





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ID: TP06

**ADS/CFT correspondance**

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**Abstract:** Noncommutative geometry (and its matrix models) presents a distinct solution to the problem of quantum gravity whereas the AdS/CFT correspondence is currently the most successful proposal for quantum gravity. ncAdS2 is the quantization of AdS2 that preserves all the isometries. It is described in terms of the unitary irreducible representations, more specifically discrete series representations, of  $so(2, 1)$ . we study 2-dimensional fuzzy Anti de Sitter space and We write down symmetric differential representations for the discrete series, and we study AdS2 black holes.

**Keywords:** Noncommutative geometry, ADS/CFT





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ID: TP07

## Dense Astrophysical Plasma Expansion

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**Abstract:** In order to investigate the plasma expansion of an extreme high density matter, a hydrodynamical model is used. Quantum effects are included in electron and positron momentum equations through the degenerate pressure term and the exchange-correlations potentials. Our results reveal that important contribution comes from the electron exchange-correlations potential rises due to the overlap of electron wave function.

**Keywords:** Quantum effects, expansion, self-similar solutions





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ID: TP08

**Effet de la profondeur sur l'instabilité sous-harmonique des ondes interfaciales tridimensionnelles.**

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**Abstract:** Ce travail consiste à étudier l'instabilité sous-harmonique des ondes interfaciales de gravité, ce sont des ondes qui apparaissent à l'interface de deux fluides de densités différentes, pour ce, nous avons fait varier la profondeur du fluide inférieur en allant des petites aux grandes profondeurs. Les équations du mouvement sont ramenées à un problème aux valeurs propres généralisé. Le calcul de l'onde de base a été étendu analytiquement au 27ème ordre. La résolution a été effectuée par la méthode de Collocation. Nous avons étudié le cas des instabilités sous-harmoniques qui sont présentes lorsque la longueur d'onde de la perturbation est supérieure à celle de l'onde de base dans la même direction.

**Keywords:** Ondes à courtes crêtes\_ Ondes d'interface\_ instabilités sous harmoniques\_ Galerkin

ID: TP09

**Modeling study of dielectric barrier glow discharge in Ar/NH<sub>3</sub> mixture at atmospheric pressure**





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**Abstract:** In this work we study the mechanism of dielectric barrier discharge in Ar-NH<sub>3</sub> doped with NH<sub>3</sub> ammonia in argon Ar at atmospheric pressure, we calculated the electron transport parameters by numerically solving the Boltzmann equation. The momentum cross-section, which describes collisions such as ionization, attachment, and excitation between electrons and argon, comes from Hayashi's work. The NH<sub>3</sub> molecule has electronic, vibrational and vibrational energy levels. This complex energy structure is modeled by a set of five collision cross sections corresponding to three vibrational levels and two electronic levels. We have described the collisional processes in which plasma is the seat. Some essential elements of the kinetic theory are briefly given and relations between the Boltzmann equation and the transport parameters are also established. The transport parameters can be calculated by the method based on the resolution of the Boltzmann equation; in this method the transport parameters are determined once the distribution function is known."

**Keywords:** "DBD Discharge; atmospheric pressure; model 1D; Ar/NH<sub>3</sub> mixture"





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ID: TP10

**A mathematical formulation of the relationship between temperature and surface reaction probability of SiH<sub>3</sub> radicals during a-Si:H growth by PECVD process**

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**Abstract:** In this work, we present a mathematical formula that calculates surface reaction probability of SiH<sub>3</sub> radicals during a-Si:H growth by Plasma Enhanced Chemical Vapor Deposition process. This work is a continuation of our previous work “Analytical calculation of site and surface reaction probabilities of SiH<sub>x</sub> radicals in PECVD process”. Using Monte Carlo simulation, we found a rate of hydrogenated sites independent of temperature, it reaches 80%. Our results of SiH<sub>3</sub> surface reaction probability obtained by the mathematical formula are in excellent agreement with many previous works.

**Keywords:** mathematical formula, surface reaction probability, hydrogenated sites, Monte Carlo (MC)







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ID: TP11

**The Microstates of (2+1)-dimensional Black Hole and CFT**

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**Abstract:** "Gravity in (2+1)-dimensions is an interesting framework for addressing issues about black holes. I will present the (2+1)-dimensional black hole, known as BTZ black hole. Then I will report on its entropy and counting its microscopic states. Some notions of Conformal Field Theory (CFT) are introduced. These are used to derive Cardy formula which is the central formula for computing the number of microstates. The asymptotic symmetries and their Lie algebra are also given."

**Keywords:** BTZ black hole - Entropy - Microscopic states - Cardy Formula.

ID: TP12





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**Monte Carlo simulations for C/SiO<sub>2</sub> interface in a VP-SEM**

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**Abstract:** "This work deals with the electron-material interaction in the high pressure scanning electron microscope (HPSEM) and its effect on the backscattered electrons production from interface C/SiO<sub>2</sub> oxides. The relation between skirt radius and spatial resolution of backscattered electron BSE was studied. In addition, the effect of gas nature, the accelerating voltage, and pressure were analyzed. Together with SiO<sub>2</sub> dielectric, carbon is also considered as material model to find the minimum BSE imaging pressure for all materials with Monte Carlo simulation. The BSE resolution can be improved by either lowering the pressure or decreasing the atomic number of imaging gases. The analyses demonstrate that the minimum air (water vapour) pressure to image any materials at low voltage (5keV) must be below 100 Pa (400 Pa).

**Keywords:** Monte Carlo simulation, Scanning electron microscopy variable pressure(VPSEM) ; electron scattering ; water vapor ; skirt.





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ID: TP13

**Exact Solutions of Scalar Bosons in cosmic string and global monopole spacetime**

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**Abstract:** In this paper, we study the relativistic quantum motion of a charged scalar particles in the presence of an Aharonov-Bohm and Coulomb potentials in the space-times produced by an idealized cosmic string and global monopole. We have calculated and discussed the eigensolutions of DKP equation and their dependence on both the geometry of the space-times and coupling constants parameters.

**Keywords:** DKP equation, cosmic string, global monopole, AB potential.





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ID: TP14

**Effet des températures sur les vitesses de réactions chimiques de mélange gazeux CH<sub>4</sub>/H<sub>2</sub> dans les procédés HWCVD**

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**Abstract:** Cette étude s'intéresse à l'effet des changements de la température sur les vitesses de réactions d'un mélange gazeux CH<sub>4</sub>/H<sub>2</sub> lors de déposition dans les procédés HWCVD. Nous calculons les vitesses de réactions en fonction de température pour un mélange gazeux initial CH<sub>4</sub>/H<sub>2</sub> ; il peut y avoir plusieurs molécules et radicaux : CH<sub>4</sub>, H<sub>2</sub>, H, CH<sub>3</sub>, CH<sub>2</sub>, C<sub>2</sub>H<sub>5</sub>, C<sub>2</sub>H<sub>6</sub>, C<sub>2</sub>H<sub>2</sub>, C<sub>2</sub>H<sub>4</sub>. Nous avons utilisé l'équation d'Arrhenius ; les résultats montrent une augmentation des vitesses de réactions et une augmentera également du nombre de collisions entre les molécules par unité de temps, en fonction de la température. Quelques réactions peuvent présenter un comportement différent.

**Keywords:** couche mince, procédés HWCVD, les vitesses de réaction , énergie d'activation , réactions chimiques





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ID: TP15

**Thermodynamics properties of graphene via a one- dimensional Dirac oscillator fractional**

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**Abstract:** our main objective is the extension of the notion of the fractional quantum mechanics for the case of relativistic oscillators for the types of particles: in this direction we predict the influence of these derivatives on the thermodynamic properties for this type of problems. This model leads to the relativistic dispersion relation observed for graphene and explains the existence of a chiral phase transition. "

**Keywords:** Relativistic oscillators ,quantum groups ,fractional derivation, fractional quantum mechanics, Bosons, Fermion, partition, thermodynamic quantities function





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ID: TP16

**Study of Stokes dynamical system in a thin domain with Fourier condition and friction law**

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**Abstract:** Asymptotic behavior of an incompressible Stokes fluid in a dynamic regime in a three-dimensional thin domain  $\Omega_\varepsilon$  of  $\mathbb{R}^3$  during a time interval  $[0, T]$  with mixed boundary conditions and Tresca friction law is studied in this work. The problem statement and variational formulation of the problem are reformulated in a fixed domain. In which case, the estimates on velocity and pressure are proved. These estimates will be useful in order to give a specific Reynolds equation associated with variational inequalities. Two-dimensional constitutive equation of the Stokes fluid when one dimension of the fluid domain tends to zero are given

**Keywords:** Free boundary problems, Stokes Fluid, Reynolds equation, Asymptotic approach, Friction law.







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ID: TP18

**Numerical Analysis of the Electrostatic Potential in Ionosphere**

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**Abstract:** "In the present work, we consider the problem of mapping ionospheric electrostatic potential distribution using equipotential contours derived at the first moments of sunrise near auroral latitudes. So, a self-similar plasma expansion model is used for determining the variation of the electrostatic potential associated with different seasons. Our results show that the electrostatic potential is intense near the source for all the seasons and the later becomes negative far away from it. At the first moments of sunrise, expansion is governed by ionization processes. But when the plasma is far away from the source, expansion is mainly governed by recombination processes."

**Keywords:** ionosphere, electrostatic potential, sunrise, self -similar ,expansion.





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ID: TP19

**One Dimensions Modeling Of Dielectric Barrier Discharge in Pure Oxygen at Atmospheric Pressure Using Comsol Multiphysics**

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**Abstract:** This paper present a model of dielectric barrier discharge DBD describe and simulate the electrical breakdown at atmospheric pressure in pure oxygen using Comsol Multiphysics for the better understanding and explanation of physical behaviours of the existing species in gap. For this model, we prefer to simulate using the 1D geometry using physics-based kinetic methods. DBD have a several applications, such as ozone generation, surface treatment, light source and other environmental industries. This model include a numerical and chemical model. Courant and voltage characteristics presented in this paper. Density of existing and newly created species in gap also presented.

**Keywords:** Discharge; Fluid Model; Oxygen; Comsol Multiphysics; dielectric barrier





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ID: TP20

**Klein -Gordon equation in Rindler space time**

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**Abstract:** In this article, we study the equation of klein-gordon in rindler space-time way to understand acceleration influence on relativistic quantum mechanical particles is to solve the general relativistic form of wave equation, is how such a problem can be solved in defined the context by a of space-time the general theory of relativity .

**Keywords:** the general relativistic, klein-gordon, rindler, acceleration, space-time





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ID: TP21

**Blow Up of Semilinear Hyperbolic Equation with variable-exponent nonlinearities**

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**Abstract:** "In this paper we consider the nonlinearly damped semilinear hyperbolic equation associated with initial and Dirichlet boundary conditions. We prove that any strong solution, with negative initial energy, blows up in finite time if  $p > m$ . This result improves an earlier one in [1].

**Keywords:** Key words: Blow up, Variable Nonlinearly, Semilinear Wave Equation.





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ID: TP22

**On new extensions of F-contraction with application to integral inclusions**

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**Abstract:** "The purpose of this study is to present some fixed point theorems by combining the contractions of Geraghty and Hardy-Rogers with  $FS$ -contraction and  $\alpha$ -admissible concepts in the setting of set-valued mappings under weaker conditions. We give also an example and an application to support new theories."

**Keywords:** "F-contraction, Geraghty contraction,  $\alpha$ -admissible, semi lower continuous, integral inclusion."





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ID: TP23

**The Mathematical Analysis Of Physical Problem**

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**Abstract:** "we provide a maximum norm analysis of Schwarz alternating method for parabolic  $p(x)$ -Laplacien equation, where an optimal error analysis each subdomain between the discrete Schwarz sequence and the continuous solu-tion of the presented problem is established"

**Keywords:** "Maximum norm analysis; Nonmatching grids method; Schwarz sequence, Bilaplace differential equations."







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ID: TP24

**The Fractional Schrodinger Equation For a Linear Potential**

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**Abstract:** In this work, we solve the space fractional Schrodinger equation based on non singular Caputo-Fabrizio derivative definition for 1D linear potential. To reach this goal, we first work out the fractional differential equation defined in terms of Caputo-Fabrizio derivative. Hence, the wave functions of fractional Schrodinger equations are derived.

**Keywords:** fractional Schrodinger equation; Caputo-Fabrizio derivative; linear potential





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**Comparative électron broadening for différent interaction models in plasmas**

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**Abstract:** In the theory of plasma physics, there are many models that give the electric potential at all locality in the plasma. we shall consider among these models: The Coulomb potential, Deutsch potential, screened Deutsch potential and the "modified" Deutsch potential. Assuming the interaction energy of a free electron with the plasma to be one of the corresponding potential energy, we present for each interaction, an expression of the electron broadening factor in the framework of the impact approximation. All interactions (except the Coulomb interaction that is ideal). We applied them to the spectral line for Lyman-alpha of  $\text{Li}^{+2}$  showing that the line can be used to get an idea about the interactions governing between the charged particles in a plasma

**Keywords:** the electron broadening factor, Deutsch potential, screened Deutsch potential, electron broadening, spectral line.





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**Emergence of Ising Transition in Multitrace Matrix Model**

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**Abstract:** "in this work we present our study about the phase diagram, especially the ising transition in multitrace matrix model by using an exact metropolis algorithm applied to the first nontrivial multitrace correction of this theory on the fuzzy sphere, we present also the mesure of the critical exponents of this ising transition.

**Keywords:** matrix models, multitrace expansion, noncommutative geometry, fuzzy spaces, noncommutative scalar field theory, fuzzy sphere.

