ISCPE2022
The First International Seminar
on
Chemical Process and Environment
14-15 March 2023
University of Biskra, Algeria

CERTIFICATE

OF PARTICIPATION

ID : CSC040

This is to certify that

Yousf Islem Bourezg

Has participated and presented the paper entitled :

Microstructure, texture and corrosion behaviours of Al2024 alloy deformed by cold rolling processing

in The 1st INTERNATIONAL SEMINAR ON CHEMICAL PROCESS & ENVIRONMENT

14-15 March, 2023 University of Biskra, Biskra, Algeria

Co-author(s): Fateh Chouia, Abdelkader Hanna, Hiba Azzeddine

Presentation type: Oral

ISCPE2022 Chair

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14-15 MARCH 2023

THE FIRST INTERNATIONAL SEMINAR ON CHEMICAL PROCESS AND ENVIRONMENT

PROCEEDING BOOK

CHAIRMAN

Pr. Merzougui Abdelkarim

ISCPE2022

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The First International Seminar
On
Chemical Process and Environment

Faculty of Sciences & Technology
University Of Biskra
Biskra, Algeria,

14 - 15 March 2023

Proceeding Book

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Preface

Chemical processes have made use of a wide number of organic solvents due to their efficiency in countless unit operations. The increasing knowledge on the environmental, health, and safety hazards associated to their use has significantly contributed to the search for greener alternatives. In the last decades, several innovative studies have been interested in chemical process and environment. The Objective of the organization of this event by the theoretical, experimental, and all innovative trends fits perfectly with the following aspects: *Chemical engineering*, *Environment Sciences*, *Corrosion* and *surface chemistry*, and *Water treatment*.

The first edition of (**ISCPE2022**) focuses on the progress of techniques for synthesis, separations and the control of industrial processes in the field of process engineering. The seminar also deals with the problem of corrosion in industrial installations and the use of new strategies for the synthesis of organic and inorganic materials. Topics of interest include, but are not limited to:

- ***Phase Equilibria***
- ***Control and regulation of chemical processes***
- ***Modeling and Simulation of Chemical Processes***
- ***Separation Processes***
- ***Water Treatment***
- ***Corrosion and Surface Chemistry***

Pr. Merzougui Abdelkrim, Chairman of ISCPE2022, University of Biskra

I would like to thank all my colleagues for their efforts and contributions as members of the scientific and organizing committee to make a success of the first International ISCPE2022. The ISCPE2022 was largely successful according to the patience of the participants.

Chairman

Scientific Committee		Organizing Committee	
Name & Surname	**Affiliation**	**Name & Surname**	**Affiliation**
Pr. MERZOUGUI ABDELKRIM	Univ of Biskra	Dr. Guettaf-T. Elhachmi	Univ-Biskra
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Pr. Barkat Djamel	Univ-Biskra	Dr. Khaled Athmani	Univ-Biskra
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Dr. Tarek Djoudi	Univ-Biskra		
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Dr. Belhi Guerira	Univ-Biskra		
Dr. Labed Adnane	Univ-Biskra		
Dr. Ramzi Saadi	Univ-Biskra		
Dr. Kamel Aoues	Univ-Biskra		
Dr. Bacha oussama	Univ-Ourgla		

Scientific Program

Overview: Tuesday –Wednesday /14-15March, 2023

First Day	
Time	**Tuesday/March 14, 2023**
8h00 – 9h00	Welcome & Registration
9h00 – 9h30	Opening Ceremony
9h30 – 10h15	Keynote 1
10h15 – 11h15	Coffee Break/ Poster session 1
11h15 – 12h00	Keynote 2
12h00 – 14h00	Lunch
14h00 – 15h00	Oral session 1 / 03 Parallel Rooms
15h00 – 15h30	Coffee Break/ Poster session 2
15h30 – 16h30	Oral session 2 / 03 Parallel Rooms

Second Day	
Time	**Wednesday/March 15, 2023**
8h30 – 9h15	Keynote 3
9h15 – 10h00	Keynote 4
10h00 – 11h00	Coffee Break/ Poster session 3
11h00 – 12h00	Oral session 3 / 03 Parallel Rooms
12h00 – 14h00	Lunch
14h00 – 15h00	Oral session 4 / 03 Parallel Rooms
15h00 – 16h00	Coffee Break/ Poster session 4
16h00 – 16h30	Closing Ceremony/ Attestation Distribution

Tuesday/March 14, 2023 Auditorium

8h00 – 9h00	Welcome & Registration
9h00 – 9h30	Opening Ceremony

Plenary Session 1:

Chairs: Pr. Barkat Djamal & Pr. Ben Temam Hachemi

9h30 – 10h15	Keynote 1: Pr. Hassein Abdelmalek (univ-Biskra) Aperçu sur la modélisation numérique du problème des asphaltènes dans l'industrie pétrolière (Cholestérol du pétrole)

10h15 – 11h15	Coffee Break & Poster Session 1

Poster Session 1:

ID	Title	Authors	Affiliation
SP002	Experimental and Modeling Study of the Effect of Al and Al2O3 Nanoparticles on CO2 Separation from Natural Gas Using Gas Hydrate Process	Said Samer, Mohamed Belloum, and Jean-Michel Herri	Laboratory of Materials Chemistry and the Living (LCMVAR), University of Batna 1, 05000 Batna, Algeria
SP004	Chemical Composition ,Screening of Phytoconstituents and FT-IR-analysis of Helianthemum Lippi L .growing in southern Algeria	Fouhma Abir, Tamma Noureddine, Rebiai Abdelkrim	Laboratoire de Chimie Appliquée et Environnement
MSCP002	Application of the CFD approach for cleaning an oil well	Fedia Bekiri, Hanane Rahali, Khadidja Bouzid, Wahida Kherifi, Abdelkarim Mellah,	Scientific and Technical Center Research on Arid Regions, University of Biskra
MSCP003	Molecular docking, simulation against SARS-COV-2, theoretical study (DFT) and superoxide anion scavenging by cyclic voltammetry of 2-hydroxyphenyl iminonaphthalen-2-ol	Noudjoud HOUAS, Siham KITOUNI, Samira GHEDJATI, Meriem DJENANE, Assia TOUNSI	Laboratory of Electrochemistry of Molecular and Complex Materials (LEMMC), Department of Process Engineering, Faculty of Technology, Université Ferhat Abbas, 19000, Sétif 1,(Algeria).
MSCP004	Synthesis, structural and morphological of NBT ceramics for piezoelectric applications	RAHAL RAHIMA, ABBA MALIKA, and NECIRA ZELIKHA	
MSCP007	First-principles study of ferromagnetic Half-metallic Electronic structural and elastic properties Electronic, structural and elastic propertiesCs2CrGe	Mohammed KESSAS, Aissa GUESMIA, Samira CHERID, Saadiya BENATMANE, Rachida BENTATA, Zineb FARES, and BENTATA Samir	Laboratory of Technology and Solid's Properties, Faculty of Sciences and Technology, BP227, Abdelhamid Ibn Badis University, Mostaganem 27000, Algeria
MSCP008	Hole transport materials effect on perovskite based solar cells	Widad LAIADI, Afak MEFTAH, Chaker LAIADI	Laboratory of Metallic and Semiconducting Materials (LMSM), University de Biskra, Algeria.
MSCP009	Electron transport materials effect on perovskite solar cells	Widad LAIADI, Chaker LAIADI, Afak MEFTAH	Laboratory of Metallic and Semiconducting Materials (LMSM), University de Biskra, Algeria.
MSCP011	DFT and TD-DFT studies of chemical reactivity and physicochemical properties of some bioactive molecules	LAIB Souhila, and BOUSSEBBAT Wahiba	Département de Socle Commun, Faculté des Sciences de la Nature et de la Vie, Université de Batna-2, Batna, Algérie
MSCP012	Extraction of potato starch	Belahcene samira	university eloued
MSCP013	Molecular Modeling of Enzyme-Substrate Interactions: The Case of Monoamine Oxidase B Inhibitors	Kherachi rania, Daoud Ismail, Melkemi Nadjib, Fouzia Mesli	1-University Mohamed kheider, Faculty of Sciences, Department of Chemistry- Biskra, 07000-Algeria
MSCP015	Inhibition of monamino oxidase by benzofurane Derivatives	W.Soufi, F. BOUKLI Hacene and S.Ghalem	Mascara University-AlGERIA
MSCP016	In silico design of novel Enoyl ACP reductase inhibitors against Mycobacterium tuberculosis	LAOUD Aicha, FERKOUS Fouad	/
MSCP018	Effect of Hydrogen Bonding and Van der Waals Interactions on The Stability of CH4 -CO2 Hydrates: A Density Functional Theory Study	Abdelmalik Seddiki, Fouad Lebsir	Department of chemistry, Faculty of exact and applied sciences, University Oran1 Ahmed Ben Bella
MSCP019	The effect of co-doping with native defects points on electronic properties of ZnO	Kheira Said, Zahra Souadia, Rachid Baghdad	Synthesis and Catalysis Laboratory, Matter Sciences, Faculty of Ibn Khaldoun University, Tiaret, Algeria.
MSCP020	Theoretical study of structural , optical and elastic properties of AgAlTe2 alloys	HANENE BENDJEDDOU, H.MERADJI, GHEMID	Laboratoire LPS, Département de Physique, Faculté des Sciences, Université Badji Mokhtar, Annaba, BP12Annaba 23000, Algeria
MSCP021	In Silico Study of Alpha glucosidase Inhibitors by flavonoids	Faiza Boukli Hacene, Wassila Soufi , Said Ghalem	Laboratory of Naturals Products and Bio actives-LASNABIO, University of Tlemcen, AlGERIA
MSCP022	QSAR MODELING OF SOME OXINDOL DERIVATIVES AS ANTI-DIABETIC AGENTS	Abderahmane Belafriekh, Aicha Laoud	Chemistry Department, Faculty of Sciences, Saad Dahleb-Blida1 University, Route Soumaa, 09101 Blida, Algeria

MSCP023	Theoretical study of structural stability, elastic, electronic and thermodynamic properties of quaternary Heusler compounds by ab initio calculations	Saadiya BENATMANE, Samira CHERID, Mohammed KESSAS, Zineb FARES and Rachida BENTATA	Laboratoire de Modelisation et Simulation en Sciences des Matériaux, Djillali Liabes de Sidi Bel-Abbes University, Sidi Bel-Abbes 22000, Algeria
MSCP024	Modeling of Ga2O3/Cu2O heterojunction solar cell	Khadidja Naceur, Toufik Tibermacine, Rami Boumaraf	Laboratory of semiconducting and metallic materials (LMSM), University of Mohammed Khider BP 145, Biskra 07000, Algeria
MSCP025	Electronic and structural properties of Full-Heusler alloys N2BaSr	Zineb FARES, Samira CHERID, Saadiya BENATMANE, Mohammed KESSAS, Rachida BENTATA, And TERKHI Sabria	Laboratory of Technology and Solid's Properties, Faculty of Sciences and Technology, BP227, Abdelhamid Ibn Badis University, Mostaganem 27000, Algeria
MSCP026	Structural, electronic , elastic and magnetic properties of Full-Heusler alloys Pd2PrCl	Samira CHERID, Rachida BENTATA, Saadiya BENATMANE, Zineb FARES BENTATA Samir and Mohammed KESSAS	Laboratory of Technology and Solid's Properties, Faculty of Sciences and Technology, BP227, Abdelhamid Ibn Badis University, Mostaganem 27000, Algeria
MSCP027	New d0 half-Heusler compounds for spintronics and thermoelectricity	Rachida BENTATA, Samira CHERID, Saadiya BENATMANE, Zineb FARES BENTATA Samir and Mohammed KESSAS	Laboratory of Technology and Solid's Properties, Faculty of Sciences and Technology, BP227, Abdelhamid Ibn Badis University, Mostaganem 27000, Algeria
MSCP028	Magnetic and Optoelectronic Properties of Sr2CrXO6 (X= La and Y)	Slimane Haid, Samira CHERID, Rachida BENTATA, Zineb FARES, Mohammed KESSAS, and BENTATA Samir	Laboratory of Technology and Solid's Properties, Faculty of Sciences and Technology, BP227, Abdelhamid Ibn Badis University, Mostaganem 27000, Algeria
MSCP030	Structural, electronic, optical and thermodynamic investigations of NaXF3(X = Ca and Sr): First-principles calculations	Mohamed El Habib Benkabou, Mohammed KESSAS, M.Harmel A.Haddou, A.Yakoubi, N.Baki, R.Ahmed, Y.Al-Douri, S.V.Syrotyuk, H.Khachai, R.Khenata, C.H.Voon, Mohd RafieJohan	Laboratoire d'étude des Matériaux & Istrumentations Optiques, Physics Department, Djillali Liabès University of Sidi Bel-Abbès, Sidi Bel-Abbès 22000, Algeria
MSCP031	Investigation of Optoelectronic and Elastic properties of Halide perovskites RbGeX3 compounds	MESBAH Smain, HOUARI Mohammed, LANTRI Tayeb, MATOUGUI Mohamed and BENTATA Samir	Laboratory Physico-chemistry of Advanced Materials, University of Djillali Liabes, Sidi-Bel- Abbes, Algeria.
MSCP032	A new Semiconducting half-Heusler compounds MnScZ (Z = As, Sb): with half-metallicity behavior	HOUARI Mohammed, MESBAH Smain, LANTRI Tayeb, MATOUGUI Mohamed, BOUADJEMI Bouabdellah, and BENTATA Samir	Laboratory of Technology and of Solids Properties, University of Mostaganem.
MSCP033	Study of the structural and optical properties of Magnus-type complexes. Theoretical approach based on the DFT	Rabie Djouama, Hanane Djouama, Boumédiène Bounaceur	Macromolecular Physical Chemistry Laboratory, University of Oran1
MSCP034	Structural, UV/Vis, Excited State and Evaluation of tetrakis(isocyano)rhodium(I) complexes	Hanane Djouama, Rabie Djouama, Ahamed Boutarfaia	Applied Chemistry Laboratory, Faculty of Sciences, Chemistry Department, University of Mohamed Khider, Biskra, Algeria.
MSCP035	Using perceptron feed-forward Artificial Neural Network (ANN) for predicting the thermal conductivity of (Al2O3/Water) Nanofluid	GRINE Wassila, SAHRAOUI Abderrahmane, BENHAMZA M E Hocine	Laboratory of Industrial Analysis and Materials Engineering, University 8 May 1945, Guelma, 24000, Algeria,
MSCP037	Construction and computational of asphalt molecular model: Density Functional Theory study	Bouchra ELHADJ DAOUADJI	à coté de clinique Nekkache city Usto, Oran
MSCP038	Conception of new organophosphonates compound , DFT study and biological evaluation	BOUCHAMA Anis, HELLAL Abdelkader, MADANI Abdelghani	Laboratory of Electrochemistry of Molecular Materials and Complexes (LEMMC). Process Engineering Department, Faculty of Technology, University Ferhat Abbas Sétif-1 Algeria .
MSCP039	In silico drug discovery of PfDHFR enzyme inhibitors based on Quantitative Structure-Activity Relationship (QSAR) and drug-likeness evaluation	Nedjla Khelfa, Salah Belaidi, Fatima Soualmia, Samir Chtita	Group of Computational and pharmaceutical Chemistry, LMCE Laboratory, Department of chemistry, Faculty of sciences, University of Biskra, 07000, Biskra, Algeria.
MSCP040	DFT based chemical reactivity and QSAR studies of 1,2,4,5-tetrazine derivatives as potential lung cancer inhibitors	Halima Hazhazi, NadjibMelkemi	Group of computational and Pharmaceutical Chemistry, Laboratory of Molecular Chemistry and Environment (LMCE), University of Biskra, 07000, Biskra, Algeria
MSCP041	Numerical Simulation Of Date Palm Rachis Pyrolysis For Biofuels Production	Ikhlass Benamara, Sofiane Amara	Materials and Renewable Energy Research Unit (URMER), University of Tlemcen , BP 119 Tlemcen, ALGERIA
MSCP042	Theoretical investigations of the electronic, magnetic, mechanical and thermoelectric of a new half -metallic CO2ZrSn compound: A DFT study.	Ali Zitouni, Gherici Remil, Aissa Guesmia, Samira Cherid, Mohamed Matougui	Laboratory of Technology and of Solids Properties, Faculty of Sciences and Technology, BP227 Abdelhamid Ibn Badis University, 27000 Mostaganem, Algeria.
MSCP059	Parametric Study and Performance Analysis of a Shower Cooling Tower for the Biskra Region in Summer Season	Mohamed-Abdelbassit Kheireddine, Adel Benchabane, Amar Rouag	Université de Biskra, Laboratoire de Génie Energétique et Matériaux, LGEM, 145Biskra 0700, Algeria
CSC047	Density functional theory and molecular dynamic simulation studies on the corrosion inhibitor of plant extract from Nigella sativa on mild steel and aluminum metal	Kamel Berrezag, Kamilia Moussaoui, Badreddine Maalem , Sihem Abderrahmane	Laboratoire d'Ingénierie des Surfaces Université Badji-Mokhtar Annaba
CSC059	Nigella Sativa Cake inhibitor effect on stainless steel in 1M HCl by weight loss method	MAALEM Badreddine, ABDERRAHMANE Sihem, ATHMANI Sameh, YOUBI Asma, MOUSSAOUI Kamilia, MESSAST Sarah and DEHMCHI Farouk	Surface Engineering Laboratory (L.I.S); Chemistry department; Sciences faculty; BADJI Mokhtar -Annaba University.
CSC061	The devitrification behavior of antimonates glasses by the non-isothermal method	Baya Melik, Malika Nouadji ,Fayçal Goumeidane, Mostapha Iezid, Messaoud Legouera, Marcel Poulain	Laboratory Physics of Thin Films and Applications Laboratory, University of Biskra, BP 145 RP, 07000 Biskra, Algeria.
PE020	Study of the precipitation and the evolution of the structure and the mechanical properties in the aluminum (AGS) alloy drawn wires	M. Bayarassou, M. Zidani, A. Ourabi, M. Meyssoune	Laboratoire de Génie Energétique et Matériaux (LGEM), Université de Biskra
WT062	The effect of concentration of chromium nitrate on the structural, morphological and optical properties of Cr2O3 thin films elaborated by pneumatic spray	Saadi Boutheina, Saâd Rahmane	Laboratoire de Physique des couches minces et applications, Université de Biskra, BP 145 RP, 07000 Biskra, Algérie

Plenary Session 2:

Chairs: Pr. Barkat Djamal & Pr. Ben Temam Hachemi

11h15 – 12h00	**Keynote 2: Pr. Hakim Madani (Univ-Batna 2)** **Etude thermodynamique des systèmes Frigorifiques: Application sur les azéotropes**

12h00 – 14h00	**Lunch**

14h00 – 15h00	**Oral session 1 / 03 Parallel Rooms**

Room 1:

Chairs: Pr. Zidani Mosbah & Dr. Touba Mohammed Mostefa

Time	ID	Title	Authors	Affiliation
14h00 – 14h15	MSCP058	QMOM application to predict the asphaltene aggregation	Abdelmalek Hasseine, Khaled Athmani, Azeddine Kabouche, Djemoui Laiadhi, Loubna Amraoui	Laboratory LAR-GHYDE, University of Biskra, BP 145 RP, Biskra 07000, Algeria Department of Process Engineering, University of Larbi Ben M'Hidi, Oum El Bouaghi, Algeria.
14h15 – 14h30	MSCP001	Study of Catalytic Properties of Bimetallic Surfaces for Methane Activation"	Somia Benchikh, Mohamed Fahim Haroun	Laboratoire de Physique Quantique et Systèmes Dynamiques, Chemistry Department, Sciences Faculty, Ferhat ABBAS Setif-1 University, 19000 Setif, Algeria
14h30 – 14h45	MSCP005	Experimental study and simulation of stable phase β (mg2si) evolution during artificial aging of aluminum alloy AA6005.	Badi Ridha, Bensaada Said , Ramdhane Kouba and Reddah Takieddine	Research center in Industrial Technologies CRTI, P.O. BOX 64, 16014, Cheraga, Algiers, Algeria
14h45 – 15h00	MSCP006	Modeling of Fenton-like process on the removal of petroleum hydrocarbons soil using experimental design	Hadjer OURIACHE, Karima SEFFAH, Imane LAKEHAL, Imane MOUMED, Jazia ARRAR, Abdelkader NAMANE	Département de génie de l'Environnement, Ecole Nationale Polytechnique Laboratoire des Sciences et Techniques de l'Environnement (LSTE), Ecole Nationale Polytechnique, Avenue Hassen Badi, BP 182 El Harrach, 16110, Algiers, Algeria

Room 2:

Chairs: Pr. Barkat Djamal & Pr. Ben Temam Hachemi

Time	ID	Title	Authors	Affiliation
14h00 – 14h15	WT036	Nitric Acid – Metals Waste Waters From A Brass Pickling Used Bath: Separation, Purification and Recycling by an Hybrid Process Diffusion Dialysis – Selective Physico - Chemical Methods	Meddour Hanane, Afaf LALMI and Chahrazad AMRANE	Laboratory of Chemistry & Environmental Chemistry LCCE, Team: Water Chemistry, Environment & Desalination. Faculty of Sciences, University Hadj Lakhdar Batna 05000 Batna Algeria
14h15 – 14h30	WT037	Urban wastewater depollution trial in the city of Biskra using filters planted with Phragmites australis	Belhadj Khouloud, Mimech Leila, Hecini Lynda	University of Biskra, Bp 145 RP , 07000 Biskra, Algeria
14h30 – 14h45	WT038	PHYSICOCHEMICAL, MINERAL ANALYSES AND HEAVY METALS CONTENT OF TAFADEK ONSEN, TCHIROZERINE, AGADEZ, NIGER REPUBLIC	Salihu Abdullahi Kiyawa, Fatima Lawan Musa and Maryam Sani Gambo	Department of Chemistry, Yusuf Maitama Sule University, PMB 3021, Kano, Kano – Nigeria
14h45 – 15h00	WT044	Study of dye dynamic adsorption onto physico-chemical modified sludge of Adrar's refinery	Omar Khelifi, Hamza Laksaci, Abbas Benabdelkabir, Mouna Nacef, Mohamed Lyamine Chelaghmia, Abed Mohamed Affoune	Department of hydrocarbons and renewable energies, University of Ahmed Draia Adrar, Algeria.

Room 3:

Chairs: Pr. Faycal Djani & Pr. Merzougui ABDELKRIM

Time	ID	Title	Authors	Affiliation
14h00 – 14h15	SP001	Characterization of Bottom Ash as an Adsorbent of Sudan Black B Dye from Aqueous Solutions	Ouadjenia Fatima, Amer Nawel, Rached Sofine, Marouf reda	Department of Process Engineering, Faculty of Sciences and Technology, Mustapha Stambouli University of Mascara, Po Box 305 Mamounia road Mascara 29000, Algeria
14h15 – 14h30	SP006	The impact of agitation on the cyclohexane-based extraction of petroleum from storage tank sludges	Amraoui Loubna, Hasseine Abdelmalek , Laiadi Djemoui, Bouzid khadidja	Laboratory LARGHYDE, university of Biskra, Algeria.
14h30 – 14h45	PE005	Optimization of the S.A.W welding parameters of the weld seams of low alloy steel gas tanks with a low percentage of carbon	Mourad AOURAGH, Lakhemissi TOUAM, Belhi GUERIRA and Semcheddine DERFOUF	Department of Mechanical Engineering, Laboratory of Mechanical Engineering, University of Biskra, Algeria.
14h45 – 15h00	PE013	Synthesis, structural, caracterization of perovskite LaCr1-xNixO3 ($0 \leq x \leq 0,3$)	Madoui Nadia, Bezziou Nadjet, Cherroune Hayette, Mahmoud Omari	Laboratory of Molecular Chemistry and Environment, University of Biskra B.P 145

				07000

15h00 – 15h30	Coffee Break & Poster Session 2

Poster Session 2:

ID	Title	Authors	Affiliation
PE001	Selective Extraction of leached Metals (zinc, iron, copper) by Salicylideneaniline HSA	ELBAR D., BARKET D., REKISS A.	Center for Scientific and Technical Research for Arid Regions Omar El-Bernaoui Biskra (CRSTRA) Algeria.
PE002	Preparation and characterization of ceramic composite powders by sol-gel method	Ahcen Keziz, Meand Heraiz , Foduil Sahnoune	1Department of Physics, /Physics and Chemistry of Materials Laboratory University of M'sila, , Algeria
PE003	Simultaneous recovry of both nickel(II) and cobalt(II) from sulphate medium with capric acid	A.Slimani	Department of industrial chemistry, Faculty of Science and Thechnology, University of Biskra, Algeria.
PE004	First principales study of electronic and magneticproperties of halfHeusleralloysCrNiZ (Z = Al, Si and As)	Aissa GUESMIA, Mohammed KESSAS, Ali ZITOUNI	Laboratory of Technology and Solid'sProperties, Faculty of Sciences and Technology, BP227, Abdelhamid Ibn BadisUniversity, Mostaganem 27000, Algeria
PE006	Study of the liquid-vapor equilibrium using Of Aspen-Hysys	Mohamed islam Makhloufi, Abdelkrim Merzougui	Laboratoire Génie civil et Hydraulique, développement durable et environnement
PE007	Characterization studies of dissimilar friction stir welded aluminum /steel joints	Helal Yazid	Department of drilling and oil fields mechanical, University of Ouargla, Ouargla, Algeria.
PE008	Phase stability of SrAlGe compound with AlB2-like structure: first principle reinvestigation	Mokhtar Djelloul, Hichem Bouderba	Laboratoire de physique des matériaux, Amar Telidji University of Laghouat, BP 37G, Laghouat, 03000, Algeria
PE009	Crystallization kinetics of mullite formation from kaolin-natural phosphate mixture under non-isothermal conditions	Fateh CHOUIA, Yousf Islem BOUREZG, Hocine BELHOUCHET	Laboratory of Thin Film Physics and Applications, University of Biskra, BP 145 RP, 07000 Biskra, Algeria
PE010	Green synthesis of Zinc oxide nanoparticles (ZnO NPs) and their biological activity	Maroua Derki, Soukaina Tidjani	Faculty of Exact Sciences, Laboratory of Valorization and Technology of Resource Saharian (VTRS), Department of Chemistry University of Echahid Hamma Lakhdar, 39000, El Oued, Algeria.
PE011	Recalculating the characteristic points on the binary metal systems' liquid miscibility gap curve	Amel Naceur, Fouzia Adjadj	Faculty of Material Sciences, Batna University, Algeria
PE012	Performance Analysis of Br-Doped In2O3 Thin Films using ultrasonic spray	Bourhefir Ranida, Attaf Abdellah, Saidi Hanane Okba Ben khetta, and Nadjette Hamani	Physics of thin films and applications laboratory, Mohamed Kheider University, BP 145 RP, 07000 Biskra, Algeria
PE015	Study the effect of thickness on the structural and optical properties of tin oxide	Meddas Hanane, Lakel Abdelghani	Material Sciences Department Faculty of Science Universities Biskra, Algeria
PE016	Structural and Electrical Properties of NiO Thin Films Prepared by Spray Pyrolysis Technique	Saliha Bouaicha, Okba Belahssen	Department of Material sciences/ Faculty of Exact Sciences and Science of Nature and Life, University of Mohamed Khider , Biskra, Algeria.
PE018	Effects of sintering behavior on microstructure and piezoelectric properties of porous PZT ceramics	Abdelhek Meklide1,*, Ahlam Ksourri1	Chemistry Laboratory, Mohamed Kheider University of Biskra BP145 (07000), Algeria
PE019	Morphological characterization of porous hydroxyapatite synthesized then subjected to surface modification	Oum keltoum Kribaa, Guerfi Ziad, Nour El houda Ghamri, Souha Latif, Friale Saifi	Material science department, Applied Chemistry Laboratory, Mohamed Khider Biskra University
PE021	Structural, Morphological and Optical characterization of Different oxides Doped ZnO Nanopowders Synthesized via the Sol-Gel Method	Latif Aya, Arab Louiza, Amri Abdelhak	Department of Sciences Material, University of Mohamed Khider - Biskra
CRCP001	Effect of alkaline treatment on the mechanical proprieties of new building construction material	Houssam Eddine BENCHOUIA, Belhi GUERIRA, Mourad CHIKHI, Hamida BOUSSEHEL, Cristina TEDESCHI	Laboratoire de Génie Mécanique (LGM), Université de Biskra, BP 145, Biskra 07000, Algeria.
CRCP002	Preparation and characterization of composite materials: Low-density polyethylene (LDPE) /Redwood fibers	Lina Alloui, Achouak Achour, Hamida Boussehel, Belhi Guerira	Laboratory of Mechanical Engineering (LGM), UniversityMohamed Khiderof Biskra, BP145, 07000 Biskra,Algeria.
CRCP004	Chemical compositions and structures of hybrid perovskite based photodetectors	Nafissa ZERGUINE, Widad LAIADI, Afak MEFTAH, Chaker LAIADI	Laboratory of Metallic and Semiconducting Materials (LMSM), University de Biskra, Algeria.
CRCP006	Silicon carbide electrode for photo electrochemical conversion of carbon dioxide	S. Anas Boussaa, K. Benfadel, L. Talbi, A. Boukezzata, Y. Ouadah, D. Allam, A. Keffous, C. Torki, F. Boudeffar, S. Achacha, A. Manseri, N. Zaourar Boutarek, S. Kaci	Research Center On Semiconductor Technology for Energetic, CMSI-CRTSE, 2 BD Frantz Fanon, 7 merveilles, POB 140, Algiers, Algeria
CRCP007	Synthesis And Evaluation Of Biological Activity Of Substituted Imidazole-Thiadiazole Derivatives	Chaima Adaika	El Oued
CRCP008	Chemical Composition ,Screening of Phytoconstituents and FT-IR-analysis of Helianthemum Lippi L .growing in southern Algerie	Fouhma Abir, Tamma Noureddine, Rebiai Abdelkrim	Laboratoire de Chimie Appliquée et Environnement
CRCP009	PLASTICIZING EFFECTS OF ACETYLT TRIBUTYL CITRATE (ATBC) AS BIOBASED PLASTICIZER ON THE THERMAL PROPERTIES OF PVC/PMMA BLENDS	Aouachria Kamira	Laboratory of Multiphase Polymeric Materials (LMPMP), Faculty of Technologt, Ferhat ABBAS University of Setifl, Algeria
CRCP010	Study Properties of composite materials based on dates flour	F. Baira, M.Zidani	Deptartement De Sciences et techniques, Université de Batna 2, 53, Route de Constantine. Fésdis, Batna 05078, Algérie,
CRCP011	Synthesis of novel pyrrolo benzodiazepines derivatives	Rabia YOUMBAI, Ichrak BOUGUESSA, Nawal KHEIR, Mohamed DEHAMCHIA	Laboratoire de chimie appliquée et environnement, Département de Chimie, Université Hamma Lakhdar – Eloued 39000, Algérie.
CRCP013	Synthesis and TCP tricalcium phosphate characterisation	Ghamri Nourelhouda, Kribaa Oum Keltoum, Djouamaa Hanane,	LCA: Laboratory for Applied Chemistry
CRCP014	Study of the transesterification reaction of waste	B. dendouga, A.Sakri, C.bouremel, A.	Laboratory of Applied Chemistry (LCA), University of

	cooking oil in the presence of a heterogeneous catalyst	Boutarfaia	biskra (7000) -Algeria
CRCP017	Ni-doped NdFeO3 perovskites as electrocatalysts, for the oxygen evolution reaction in alkaline media	Yahia Kherief, Sofiane Makhloufi, Mahmoud Omari	Laboratory of molecular chemistry and environment, University of Biskra, Biskra, Algeria
MSCP043	A Computational investigation of the structure and reactivity of curcumin and its complex	Kaouther Baira, Nadia Ouddai	Laboratoire de Chimie des Matériaux et des Vivants : Activité & Réactivité (LCMVAR), Université Batna1, 5000 Batna, Algeria.
MSCP044	Structural, electronic and optical properties investigations of the cubic Ga1-xAlxAs1-yPy quaternary alloy; from ab-initio method	Moussa Rabah, Abdiche Ahmed, Khenata Rabah	Physico-chemistry of Materials and Environment Laboratory, Ziane Achour University of Djelfa, BP 3117, Algeria.
MSCP045	STUDY OF THE PHYSICO-CHEMICAL PROPERTIES OF THE COMPOUND INDOLIN-2-ONE AND ITS DERIVATIVES BY MEANS OF MOLECULAR MODELING	Nour Elhouda Derki, Aicha Kerassa, Maroua Derki	Faculty of Exact Sciences, Laboratory of Valorization and Technology of Resource Saharian (VTRS), Department of Chemistry University of Echahid Hamma Lakhdar, 39000, El Oued, Algeria.
MSCP046	Enhancement of the Plunger Speed Parameters into the Shot Sleeves of a High-Pressure Die Casting Machine	Kheireddine Arrif, Rodouane Laouaar	Mechanical Engineering Department, Badji Mokhtar University, PO Box 12, 23000, Annaba, Algeria
MSCP047	Molecular docking study of curcumin derivatives for rational design of novel c-Met inhibitors as anticancer agents	Narimene Chahbaoui, Saida Khamouli	Laboratory of Molecular Chemistry and Environment, University of Mohamed Khider, Biskra, Algeria
MSCP048	Semi-analytical solution of two-component aggregation population balance equation by A domian decomposition method	Khaled Athmani, Abdelmalek Hasseine	Laboratory LAR-GHYDE, University of Biskra, Algeria
MSCP050	Performances study of eco-friendly mixtures used as working fluid in two refrigeration cycle	Lahcen Mchounchi, Youcef Tamene, Hakim Madani	Laboratory of Studies of Industrial Energy Systems (LESEI), Department of Mechanical Engineering, Faculty of Technology, University of Batna 2, 05000 Batna, Algeria
MSCP051	A 3D numerical investigation of the effect of thermoconvective instability on mixed convection water flow in a rectangular channel.	Aymen Benbeghila, Riadh Ouzani, Ammar Benderradji	Laboratory of Studies of Industrial Energy Systems (LESEI), Department of Mechanical Engineering, Faculty of Technology, University of Batna 2, 05000 Batna, Algeria.
MSCP052	Physical-chemical Study of Hydroxyapatite with modeling Computational Chemistry Calculation	Ziad Guerfi, Oum keltoum Kribaa , Hanane Djouama	"LCA" Applied Chemistry Laboratory, Science of the matter, Mohamed Khider Biskra University
MSCP053	Device simulation of inverted perovskite solar cell with NiO as hole transport layer and SnO2/TiO2 as electron transport layer	Sara Barkat, Afak Meftah	Laboratory of Semiconducting and Metallic Materials (LMSM), University of Mohamed Khider Biskra, Algeria
MSCP054	Understanding electron density imbalance in energetic materials through molecular electrostatic potential	Nassima Bachir, Samir Kenouche	Group of Modeling of chemical systems using Quantum Calculations. Applied Chemistry Laboratory (LCA). University M. Khider of Biskra, 07000 Biskra, Algeria
MSCP055	Preparation of polyvinyl alcohol fiber by solution redox polymerization	Farouk Dehmchi, Abdallah Hamel, Abderrahmane Sihem, Badreddine Maalem and AsmaYoubi	Surface Engineering Laboratory (LIS), Faculty of Sciences, Badji Mokhtar-Annaba University , Annaba , Algeria
MSCP056	Describing the Flocculation of PCC Particles Using Population Balance Modelling: A fixed pivot technique	S. Seghir, A. Hasseine, M.G. Rasteiro	Laboratory of Civil Engineering, Hydraulic, Sustainable Development and Environmental, University of Biskra, Biskra, Algeria
WT061	A simple method for fabricating BMTT photocatalyst and its photocatalytic activity	L. Smaili, H. Menasra, C. Benbrika	Laboratory of Applied Chemistry, University of Biskra, Biskra, Algeria
CSC050	Elaboration and Characterization of composite anticorrosion deposits	Saida Leboukh, Mustapha Djama, Ahmed Haddad	Research Center in Industrial Technologies CRTI, Algeirs, Algeria. Division of Corrosion, protection and durability of des materials
CSC053	Effect of Cu doping on Co3O4 thin filmes prepared by pneumatic spray Technique	Sabah haffas, Belhamra nadjette	Laboratoire de Physique des Couches Minces et Applications, Université de Biskra, BP 145 RP, 07000 Biskra, Algérie.
CSC008	Evaluation of the effectiveness of an ecological corrosion inhibitor for steel pipelines in a sulfuric acid environment	Slimane Kherief, Mounir Djellab, Hamza Bentrah, Abdelouahad Chala, Bouzid Bouamra , Amir eddine Kabouia	Laboratory of Physics of Thin Films and Applications, University of Biskra, Biskra, Algeria.
CSC063	Effect of Indium Doping on Physical Properties of Co3O4 thin films prepared by pneumatic spray method	Zahia Bencharef, Abdelouahad Chala, Radhia Messemeche, Youcef Benkhetta, Nadjette Belhamra	Physic Laboratory of Thin Films and Applications (LPCMA), University of Biskra, 07000, Algeria

15h30 – 16h30	Oral session 2 / 03 Parallel Rooms

Room 1:

Chairs: Pr. Fadel Ammar & Dr. Menasra Hayet

Time	ID	Title	Authors	Affiliation
15h30 – 15h45	WT047	Fluorescence Properties of Fluorescein Dye Intercalated in Zr-Pillared Montmorillonite Clay	Belbel Abdeldjabbar,Kharroubi Mohamed, Dardour Maamar, Ahmed Souadiaa	Department of Chemistry, Ziane Achour University of Djelfa, BP 3117, Algeria
15h45 – 16h00	WT052	Preparation of MgAl-LDH@biochar composite for the effective recovery of phosphorus from water media	Kara Racha, Noureddine Rouahna, Dhirar Ben Salem, Hecini Lynda, Fouzia Touahra, Abdelkader Ouakouak	Research Laboratory in Subterranean and Surface Hydraulics, University of Biskra, PO Box 145, Biskra, 07000, Algeria.39000, Algeria.
16h00 – 16h15	WT055	Study of nickel (II) elimination onto modified Corallina Elongata alga	Bouchair Abdennour, Sayoud Nassim	Laboratoire de l'Interaction des Matériaux et de l'Environnement, Université de Jijel
16h15 – 16h30	WT058	Fenton oxidation efficacy for the elimination of a pharmaceutical (metronidazole) from aqueous solution.	Fadoua Nihad Chergui, Samira Ounoki, Samia Achour	Research Laboratory Underground and surface hydraulic –LARHYSS, Civil Engineering and Hydraulic Department, faculty of sciences and technology, M. K. University of Biskra, POB 145 RP, 07000, Algeria

Room 2:

Chairs: Pr. Zidani Mosbah & Pr. Touba Mohammed Mostefa

Time	ID	Title	Authors	Affiliation
15h30 – 15h45	CSC040	Microstructure, texture and corrosion behaviours of Al2024 alloy deformed by cold rolling processing	Yousf Islem Bourezg, Fateh Chouia, Abdelkader Hanna, Hiba Azzeddine	Faculty of Physics, USTHB, BP 32 El Alia, 16111, Algiers, Algeria
15h45 – 16h00	CSC049	Experimental study of a phosphate-zinc coating of carbon steel intended for industrial drawing	MERIEM Meyssoune, ZIDANI Mosbah, BOUTEFNOUCHET Hafida, ZEILLOUCHE Aicha, ABID Tahar, MECHACHTI Said	ENSMM, Laboratory Mines, Metallurgy and Materials (L3M), Annaba- Algeria.
16h00 – 16h15	CSC052	Substrate Temperature Effect on Properties of CuO Thin Films by Spray Pyrolysis	Ouarda Ben messaoud, Abdelouahab Ouahab, Sàad Rahmane	Physics of thin films and applications laboratory, Mohamed Kheider University, BP 145 RP, 07000 Biskra, Algeria
16h15 – 16h30	CSC058	Inhibitor effect of Plectranthus amboinicus leaves extract and biosynthesis NPs ZnO against A9M steel Corrosion in 1M HCl by gravimetric method	ABDERRAHMANE Sihem, MESSAST Sarah, and BOUASLA Nabila	Surface Engineering Laboratory (L.I.S); Chemistry department; Sciences faculty; BADJI Mokhtar -Annaba University Algeria

Room 3:

Chairs: Pr. Hassein Abdelmalek & Pr. Madani Hakim

Time	ID	Title	Authors	Affiliation
15h30 – 15h45	CRCP003	The impact of chemical treatment on the mechanical properties of construction materials based on date palm waste.	GHELANI Laala, Mohamed Aymen KETHIRI, Salah Elddine TAOUAI, Ayache TOUMI, Belhi GUERIRA, Noureddine BELGHAR.	Mechanical Engineering Department, University Abbes Laghrour Khenchela, Algeria.
15h45 – 16h00	CRCP005	Extraction and recovery of silver from waste mono crystalline silicon cells	Sabiha Anas Boussaa, Abdallah TradKhodja, MessaoudaAyachi, Fatima Boudeffar, RabiaRahmoune, Abderrahmane Naas, Bilal Merazka	Research Center On Semiconductor Technology for Energetic, CMSI-CRTSE, 2 BD Frantz Fanon, 7 merveilles, POB 140, Algiers, Algeria
16h00 – 16h15	CRCP012	Synthesis, NMR, XRD, and spectroscopic studies of poly (glycolide-co- ε-caprolactone) for improving the drug release effect	Asma Ziane, Guemra Kaddour	Physical and Organic Macromolecular Chemistry Laboratory (LCOPM), Faculty of Exact Sciences, University of Djillali Liabes, BP 089, Sidi Bel Abbes, Algeria
16h15 – 16h30	CRCP016	Chemical synthesis of high temperature superconductor YBCO	Daha Rania, Bouloudenine Manel, Khiat Abdelmadjid	École Nationale Supérieure des Mines et de la Métallurgie (ENSMM)-Amar Laskri, L3M, Ex CEFOC,Chainz,B.P: 233-RP,23000 Annaba, Algérie.

Plenary Session 3:

Chairs: Pr. Hassein Abdelmalek & Pr. Madani Hakim

08h30 – 09h15	**Keynote 3**

Plenary Session 4:

Chairs: Pr. Hassein Abdelmalek & Pr. Madani Hakim

09h15 – 10h00	**Keynote 4: Pr. ZIDANI Mosbah, (Laboratoire de Génie Énergétique et Matériaux (LGEM), U. Biskra, Faculté de Technologie, Université de Batna 2.** **Title: Correlation of morphological structure and crystallographic texture by EBSD: Expertise of industrial metals**

10h00 – 11h00	**Coffee Break & Poster Session 3**

Poster Session 3:

ID	Title	Authors	Affiliation
WT001	Kinetic, isothermal and thermodynamic studies of the adsorption of methylene blue dye on a natural product and industrial adsorbents	AIDI Amel, CHAIEB Hadjer	Laboratoire Génie civil et Hydraulique, développement durable et environnement, University of Biskra
WT003	Development and characterization of diatomite by ferrihydrite	BELMEHDI NADJIA, MOHAMMED HADJEL	Laboratory of Sciences Technology and Process Engineering LSTGP, Faculty of Chemistry, Department of Chemistry, University of Sciences and the Technology of Oran Mohamed Boudiaf USTO-MB, BP 1505 El M'naouer Bir El Djir 31016 Oran, Algeria
WT004	Preparation of an activated carbon based on natural waste: application to the adsorption of organic pollutants from wastewater	Boumessaidia Selman, Bensalem Fella, Houti Iman, Mohammedi Ouerida	Faculty of Science, Saad Dahleb University Blida, Algeria.
WT007	Adsorption of cuivre(II) and study of proprieties structural Ns.BioChar/ZnO	H.Rehali, H. Menasra, S.djebabra	Industrial chemistry Department, University of Biskra (07000), Algeria
WT008	Investigation on the possibility of removal of a cationic dye (Crystal Violet) from an aqueous solution by adsorption onto a biochar synthesized from Melia azedarach seed powder treated in two steps.	Asma Nouioua, Dhirar Ben Salem, Abdelkader Ouakouak,	Research Laboratory in Subterranean and Surface Hydraulics (LARHYSS), University of Biskra, PO Box 145 RP, Biskra, 07000, Algeria
WT009	Adsorption of crystal violet dye using dates stalks biochar: equilibrium, mechanism studies and modeling analysis	Sihem Djebabra, Hichem Fettah, Hanane Rehali	Department of Industrial Chemistry, Mohammed Khider University, Faculty of Science and Technology, Biskra, Algeria.
WT010	Model kinetics and adsorption isotherms of copper (II)	Fedia Bekiri, Hanane Rahali, Saliha Benaoune	Scientific and Technical Center Research on Arid Regions, University if Biskra
WT012	BM degradation for cobalt oxide thin-films under sun light with study of the surface morphology and the roughness at different withdrawn speeds	Mohammed Althamthami, Hachemi Ben Temam, Guettaf Temam EI Hachmi, Najran Malfi, Gamil Gamal Hasan	Physics Laboratory of Thin Layers and Applications, Biskra University, BP 145 RP, Biskra 07000, Algeria
WT013	Production of activated carbons from agriculture wastes for nitrates removal	Mazen Saleh Farhan Al-Hazeef1, Lynda Hecini, Amel Aidi	LARGHYDE Laboratory, Department of Civil Engineering and Hydraulics, Faculty of Sciences and Technology, Mohamed Khider University, BP 145 RP, 07000, Biskra, Algeria.
WT016	Separation of metals mixture (Fe, Cu, Zn and Co) using precipitation, cementation and IEX	Chahrazad AMRANE, Sabrina Tamersit and Afaf LALMI	Laboratory of Chemistry & Environmental Chemistry LCCE, ,Faculty of Sciences, University Hadj Lakhdar Batna 05000 Batna Algeria
WT017	Kinetic study of the fixation of an organic pollutant on a biosorbent	BRASSI Aicha, MIMANNE Goussem1, BENHABIB Karim3, ABDALLAH TOUATI Manel1, MOKDAD Hayat1, BOUSSAID Rihab1	Laboratory of materials and catalysis, Department of Chemistry, Faculty of Exact Sciences, Djillali Liabes University, Sidi Bel Abbes, Algeria
WT018	The capacity of an aquaponics system to treat of Tilapia cultuvation wastewater for reuse to growing Lettuce (Lactuca sativa L.)	Sarra Benaissa, Ayoub Hadjeb	Department of agronomic sciences, University of Biskra/ Diversity of Ecosystèms and Systèmes Dynamiques of Agricoles Production en Zones Arides Laboratory, Algeria
WT019	Design and development of a new sensitive part of a biosensor based on a composite biomaterial for the detection of heavy metals	Rabiaâ HELIM, Ali ZAZOUA, Hafsa KORRI YOUSOUFI	Université de JIJEL, Laboratoire d'Energétique appliqué et des Matériaux LEAM, 18000 Ouled Aissa, Algérie
WT020	Removal of copper by chemical and physical adsorption on activated carbon prepared from agricultural waste	Khadidja hamida, Hanane rehali, Menasra Hayet	Laboratory of LARGHYDE, University of Biskra, Algeria
WT021	Study of the physical and chemical properties of a biomaterial Total iron ions are absorbed in aqueous environment	Kaddouri Mebarka , Aidi Amel, Tarik Otmane	Département de Chimie Industrielle, Université de Biskra, Biskra 07000, Algérie,

WT022	Removal of methyl orange dye from aqueous solution using magnetic double walled carbon nanotube nanocomposite as adsorbent	Karima SEFFAH, Imane LAKEHAL, Hadjer OURIACHE,	Department of Material Sciences, Faculty of Sciences, University of Algiers 1, Ben youcef BENKHEDDA.
WT023	Conception d'un capteur électrochimique à base de la pectine des écorces des agrumes pour la détection du paracétamol dans les milieux aquatiques	Faiza Bouhebila	University of Jijel, 18000,Algeria
WT024	Synthesis and characterization of activated carbon from palme by chemical activation	Sabah DJABER, Reffas abdelbaki	Inorganic Materials Laboratory, Department of Chemistry, Faculty of Sciences, University Mohamed Boudiaf-M'sila, 28000, Algeria
WT025	Modelling of phosphate adsorption on activated coal from date stones	Rima Djezzar, Nora Seghairi	Laboratoire LARGHYDE, Civil and hydraulic engineering department, University of Biskra, Algeria
WT027	Synthesis and characterization of semiconductor material for degradation of organic dye via photocatalysis	Ahlem Ksouri, Fayssal Djani, Djamel eddine Mazouzi, Wissem Bouchel	Applied Chemistry Laboratory, Mohamed Kheider University of Biskra BP145 (07000), Algeria
WT028	adsorption and Removal of organic compounds from water through low-cost carbonaceous materials	Mohamed Khechai , Ammar Fadel, Abdelkader Ouakouak, Hecini Linda, Amir Djellouli	Laboratory of LARGHYDE, University of Biskra, PO Box 145, Biskra, 07000, Algeria.
WT029	Synthesis of highly sensitive molecular imprinted sensor for selective determination of heavy metals	Fafa Sarra, Zazoua ali	Applied Energy and Materials Laboratory, Process Engineering, University of Jijel, 98, Ouled Aissa 18000, Algeria
WT030	Valorisation d'un biomatériau «Spirogyra: Tahalib» pour dépollution des eaux contaminées par le cuivre par l'adsorption	Djezzar Zohra1, Aidi Amel, Rahali Hanane, Othmane Tarek	Laboratoire de chimie moléculaire et environnement, Département de Chimie Industrielle, Université de Biskra, BP 145, Biskra,
WT032	Removal of aqueous effluents by low-cost bio adsorbents	Djellouli Amir, Yamina berredjem, Hattab Zhour, khechai mohamed	Mohamed-Cherif Messaadia University - Souk Ahras
WT039	Effects of iron doping on optical properties of BIT Aurivillius	ChaimaBenbrika, Hayet Menasra, Amira Sbaihi, Aya Latif, Randa Slatnia	Material Sciences, Laboratory of Applied Chemistry, University of Biskra, Algeria
WT040	Prediction of the water quality index of the station of the dam guenitra of Oued Gabli using the ANN model	FARTAS Fadhila, SEKIOU Fateh, REMINI Boualam	Département d'Hydraulique, Faculté de Technologie, Université de Bejaia, 06000 Bejaia, Algerie (Algeria)
WT041	Contribution to the purification of drinking water by activated carbon from date pits	Belmimoun Asmaa, Chikhaoui Fatima, Hantour Razika, and Bouheda Youcef	Laboratory Of Bioconversion Microbilogical Engineering And Health Safety ,University of Mascara,Algeria
WT042	Assessment of Drinking Water Quality From Demineralization Station in Djamaa City, Algeria	Ammari Abdessattar, Kateb Samir	Laboratoire d'exploitation et de mise en valeur des ressources naturelles en zones arides, université de Kasdi Merbah-Ouargla, BP147 RP, 30000 Ouargla, Algérie
WT043	New material "Ag2MnO2" for wastewater treatment by photocatalytic process	A. Bahloul, H. Zouaoui, A. Meribai, A. Diafat, C. Hammouche, M. R. Ketfi, A. Sayah, N. Boumaaza, F. Habelhames, A. Rokbane	University of Mohamed El Bachir El Ibrahimi, Faculty of sciences and technology, Department of process engineering, Bordj Bou Arréridj, Algeria.
WT045	Electrochemical treatment of phenol on a SS/MnO2 thin film	Nabila Cherchour, Yasmine Ait Jaoud, Chadia Dehouche	Laboratoire d'Electrochimie, Corrosion et de Valorisation Energétique (LECVE), Faculty of Technology, University of Bejaia, 06000 Bejaia, Algeria.
WT046	Investigation of nickel adsorption from aqueous solutions by sewage sludge activated carbon	Abbas Benabdelkabir, Hamza Laksaci, Omar Khelifi	Laboratory of Energy, Environment and Information's Systems, University of Ahmed Draia Adrar, Algeria
WT048	Adsorptive Removal of Imidazolium Ionic Liquids from Aqueous Solutions Using Modified Clay	Belbel Abdeldjabbar, Kharroubi Mohamed, Dardour Maamar, Ahmed Souadiaa	Department of Chemistry, Ziane Achour University of Djelfa, BP 3117, Algeria
WT049	Water resources and environment of the Sanhadja wetlands complex (North-east Algeria)	Benamara Abdelwaheb, Hedjal Sihem	Associate Professor, Faculty of Science and Technology, Department of hydraulic. ZianeAchourDjelfa University, Algeria
WT050	Effect of the annealing temperature on the degradation of rohdamine B by the MnO2/SiNWs system	DERKAOUI Khaled, HADJERSI Toufik, KECHOUANE Mohamed	Semiconductor Technology Research Center for Energetic (CRTSE), 2, Frantz Fanon, Algiers-7 Merveilles, PO Box 140, Algiers, Algeria
WT051	Seawater desalination: improvement of pretreatment for the prevention of biofouling of membranes	Azzouzi Kawther, Seghir Abdelfetah	Laboratory Antibiotics Antifungals: physico chemical: synthesis and biological activity - University Tlemcen.
WT053	Enhanced photocatalytic performance of CCU nanocomposites for degrading Rhodamine B	Wissam BOUCHAL, Faiçal DJANI ,Arturo MARTÍNEZ-ARIAS, Djamel Eddine MAZOUZI	Molecular Chemistry and Environment Laboratory, Mohammed KHIDER University Biskra, BP:145 RP, Biskra, 07000, Algeria.
WT054	Synthesis, structural evolution and wettability characterization of Sr-ZnO thin films prepared by Silar method	MOKRANI Nourelhouda, GHETTAF TEMAM Elhachemi, BEN TEMAM Hachemi, BARKAT Hadjer	Physics Laboratory of Thin Layers and Applications, Biskra University, BP 145 RP, Biskra 07000, Algeria
WT056	Study of complex formation of Co (II) with D2EHPA	T. LOUICHAOUI, F. GHEBGHOUB et D. BARKAT	Laboratory of Chemical Molecular and Environment, Department of Industrial Chemistry,Faculty of Science and Technology, Biskra University, Biskra, Algeria
WT057	Optimizing adsorption of dye on high-surface-area activated carbon using experimental design methodology	Naima BOUCHEMAL, Fatima ADDOUN	High School of Food Sciences and Agri-Food industries, ESSAIA, avenue Ahmed Hamidouche, Beaulieu OuedSmar, Algers, Algeria.
WT059	Spectral Characterization, Scanning Electron Microscope (SEM) of Hexamethylenetetramine (HMTA) - Metal(II) Complexes.	Aya Alem, Dalila Fedaoui, Yasser Bouchebcheb	Université Badji Mokhtar Annaba - Algérie.BP 12 - 23200 Sidi-Ammar
WT060	Effect of Barium concentration on the microstructure and wettability of Ba-ZnO thin films synthesized by SILAR technique	Barkat Hadjer, Guettaf Temam Elhachemi, Ben Temam Hachemi, Althamthami Mohammed, Mokrani Nour Elhouda	Physics Laboratory of Thin Layers and Applications, College of Science and Technology, Biskra University, BP 145 RP, Biskra, 07000,
CSC057	Flowers of Borago officinalis inhibitor effect on mild steel A9M in 1M H2SO4 by weight loss method	YOUBI Asma, ABDERRAHMANE Sihem, MAALEM Badreddine, MOUSSAOUI Kamilia, MESSAST Sarah and DEHMCHI Farouk	Surface Engineering Laboratory (L.I.S); Chemistry department; Sciences faculty; BADJI Mokhtar -Annaba University.
CSC060	Black Cumin Cake extract as a cost-effective and green corrosion inhibitor for mild steel in acidic media: computational, gravimetric and electrochemical studies	MOUSSAOUI Kamilia; ABDERRAHMANE Sihem; MESSAST Sarah; YOUBI Asma; MAALEM Badreddineand DEHMCHI Farouk	Surface Engineering Laboratory (L.I.S), department of chemistry; Faculty of Sciences; BADJI MOKHTAR -ANNABA University-Algeria

CSC056	Gravimetric study of the extract of Plectranthus amboinicus leaves against the corrosion of X60 steel in 1M HCl	MESSAST Sarah; ABDERRAHMANE Sihem; BOUASLA Nabila, MOUSSAOUI KAMILLIA, YOUBI Asma; ZENNIR Houssam ;MOUSSAOUI KAMILLIA, MAALEM Badreddine,DEHMCHI Farouk	Surface Engineering Laboratory (L.I.S), Department of chemistry, Faculty of Sciences, University BADJI Mokhtar -Annaba Algeria
CSC023	Study of the effect of fiber size and fiber mass ratio on the mechanical behavior of bio-composite materials.	Oussama Smaal, Tarek Djoudi, Toufik Ameur	Laboratory of Exploitation and Valorization of Natural Resources in Arid Zones (EVRNZA) Kasdi_Merbah_ University, Ouargla, ALGERIA
PE023	Nanostructured stable phase elaborated by Ni & S compounds: XRD & SEM confirmation	Randa Slatnia, Lakel Abdelghani	Material Science Department, Laboratory of Metallic and Semiconducting Materials, Mohamed Khider University, Biskra, Algeria.

11^h00 – 12^h00 | Oral session 3 / 03 Parallel Rooms

Room 1:

Chairs: Pr. Hassein Abdelmalek & Pr. Madani Hakim

Time	ID	Title	Authors	Affiliation
11^h00 – 11^h15	**MSCP010**	In silico and in vitro study by quantum and empirical methods in heterocycles with medicinal interest	Fattouche Maroua, Belaidi Salah, Soualmia Fatima	Group of Computational and Pharmaceutical Chemistry, LMCE Laboratory, department of Chemistry, Faculty of sciences, University of Biskra, 07000, Biskra, Algeria.
11^h15 – 11^h30	**MSCP014**	Comparison of discretization methods to solve a population balance model of wet granulation including nucleation, aggregation and breakage."	Ibtissem.Terghini , Diego Caccavo ,Abdelmalek Hasseine	University Mohamed khider Biskra, Faculty of Science and Technology, Department of Process Engineering, BP 145 RP, 07000 Biskra, Algeria.
11^h30 – 11^h45	**MSCP029**	In silico evaluation of the inhibition activity of some phosphonate derivatives against SARS-CoV-2 main protease	Nadjib Chafai, Khalissa Benbouguerra, Lilia Adjissi	Laboratory of Electrochemistry of Molecular Materials and Complex (LEMMC). Department of Process Engineering, Faculty of Technology, University of Ferhat ABBAS Setif-1, El-Mabouda campus, 19000 Sétif, Algeria
11^h45 – 12^h00	**MSCP036**	Investigation of the radical scavenging potency of hydroxylated stilbenes: DFT insight	HAMADOUCHE Salima, OUDDAI Nadia, MEROUANI Hafida	Laboratoire de Chimie des Materiaux et des Vivants:Activite&Reactivite(LCMVAR), Université Batna1, Batna, Algeria

Room 2:

Chairs: Pr. Faycal Djani & Pr. Merzougui ABDELKRIM

Time	ID	Title	Authors	Affiliation
11^h00 – 11^h15	**MSCP049**	In silico Investigation of several series of heterocyclic molecules for drug discovery	Chennai Yassmine, Belaidi Salah	Group of Computational and Pharmaceutical Chemistry, LMCE Laboratory, University of Biskra, BP 145 Biskra 07000, Algeria
11^h15 – 11^h30	**WT002**	Study of Various Parameters Measured for Industrial Liquid Waste in a Treatment Plant at the two Skikda Refineries (RA1/K, RA2/K)	Benkharrat Hichem	Boumaiza Ben azouz Skikda
11^h30 – 11^h45	**WT005**	Heterogeneous phase adsorption of carmine, phenolphthalein and eosin dyes on activated carbon and natural clay, experiments, characterization and physical interpretations	Abderezak Guemache, Ahmed Bouchelaghem, Mahmoud Drif, Fares Kakoul, Louanes Hamzioui	Université de M'Sila, Département D'hydraulique, Faculté de Technologie, M'Sila 28000 Algérie
11^h45 – 12^h00	**WT006**	Design of an industrial electrochemical reactor for wastewater treatment	Abdelkader SAILA	Laboratory of Physico-Chemistry of Materials and Environment, University of Djelfa, 17000 Djelfa, Algeria.

Room 3:

Chairs: Pr. Fadel Ammar & Dr. Menasra Hayet

Time	ID	Title	Authors	Affiliation
11^h00 – 11^h15	**WT011**	Characterization of diatomite Silica Doped Fe Composite and their Enhanced Photocatalytic Activity by UV Light in Water Treatment	Walid Rezig	Laboratoire des Sciences, Technologie et Génie des Procédés LSTGP , Faculté de Génie chimique ; Département de Génie chimique ; Université des Sciences, Technologie et Génie des Procédés USTO-MB ; BP 1505 El M'naoueur Bir El Djir 31000 Oran, Algeria.
11^h15 – 11^h30	**WT014**	Preparation of a Magnetic Hybrid Adsorbent from Low-cost Biochar for the Effective Removal of Cu (II) from Water	Dhirar Ben Salem1, Abdelkader Ouakouak 1,2, Fouzia Touahra 3 and Noureddine Hamdi 4,5	Research Laboratory in Subterranean and Surface Hydraulics, University of Biskra, PO Box 145, Biskra, 07000, Algeria.
11^h30 – 11^h45	**WT015**	Study of the efficiency of activated carbon for the removal of a pharmaceutical product (metronidazole) from aqueous solutions.	Chebbi Meriem, Ounoki Samira , Youcef Leila, Achour Samia	Research Laboratory Underground and surface hydraulic –LARHYSS, Faculty of Science and Technology Hydraulic and Civil Engineering Department, M. K. University of Biskra, POB 145 RP, 07000, Algeria "
11^h45 – 12^h00	**WT026**	Thermodynamic study of ibuprofen removal using biochar pepper stem oxidize	Azri Naima, Fadel Ammar, Ouakouak Abdelkader, Chebbi Rachid	Laboratory of LAR GHYDE, University Mohamed Kheider- Biskra,07000, Algeria

12h00 – 14h00	Lunch

14h00 – 15h00	Oral session 4 / 03 Parallel Rooms

Room 1:

Chairs: Pr. Fadel Ammar & Dr. Menasra Hayet

Time	ID	Title	Authors	Affiliation
14h00 – 14h15	WT031	Mixture of shells non activated for removal of lead from water: Adsorption, factorial design analysis, Kinetics and isotherm studies.	Imane LAKEHAL, Karima SEFFAH, Hadjer OURIECHE	University Algiers1-Ben Youcef Benkhadda,science of matter department,faculty of sciences, Algiers, Algeria.
14h15 – 14h30	WT033	Enhancing the ZnO Photocatalytic Efficiency by Ag Doping in the Dye Removal from Wastewater	LAKSACI Hamza, KHELIFI Omar, BENABDELKABIR Abbas	Laboratoire des Matériaux Catalytiques et Procédés Industriels (LMCPI), Faculté des Sciences et Technologies, Université Ahmed Draïa, Adrar, Algérie
14h30 – 14h45	WT034	Treatment of the industrial wastewater from food Aromsa and ingredients production by electrocoagulation (EC) process assisted by the mucilage of opuntia ficus indica	Naima Djerroud, Nawel Adjeroud, Zahra Azzouz, Merzouk Belkacem , Khodir Madani	Laboratoire de Biomathématique, Biophysique, Biochimie, et Scientométrie (L3BS), Faculté des Sciences de la Nature et de la Vie, Université de Béjaia, 06000 Bejaia, Algérie.
14h45 – 15h00	WT035	Contribution to the improvement of the resistance of cementitious materials	Abdelaziz LOGBI, Toufik CHOUNGARA, Mohammed MANI, Tarek	Département d'Hydraulique et de Génie Civil , Université Chahid Hamma Lakhdar –El-Oued

Room 2:

Chairs: Pr. Faycal Djani & Pr. Merzougui ABDELKRIM

Time	ID	Title	Authors	Affiliation
14h00 – 14h15	PE014	Synthesis and structural characterization of the substitution compound La1-xSrxNiO3-δ for Lithium Batteries	Hesna Messalaoui, Nedjemeddine Bounar	LIME Laboratory,University of Jijel,Algeria
14h15 – 14h30	PE017	Simulation Investigation on Heat Transfer and Two-Phase Flow in a Shell and Tube Heat Exchanger in Petroleum Refinery	Sayoud Nassim, Bouchair Abdenour, Touati Houcine	Process Engineering Department, Faculty of Science and Technology, University of Jijel, P. O. Box 98, 18000, Jijel, Algeria
14h30 – 14h45	PE022	The effect of annealing on the evolution of the microstructure of an industrially drawn medium carbon steel wire	Amina Ourabi, Mosbah Zidani, Salim Messaoudi, Mohamed Chaouki Nebbar, Tahar Abid	Laboratoire de Génie Energétique et Matériaux-LGEM, Université de Biskra, Biskra 07000, Algérie.
14h45 – 15h00	MSCP057	New application of DuQMoGeM to the modeling of the asphaltene aggregation	Khaled Athmani, Abdelmalek Hasseine, Paulo Laranjeira da Cunha Lage , Djemoui Laiadhi	Laboratory LAR-GHYDE, University of Biskra, BP 145 RP, Biskra 07000, Algeria

Room 3:

Chairs: Pr. Zidani Mosbah & Pr. Touba Mohammed Mostapha

Time	ID	Title	Authors	Affiliation
14h00 – 14h15	CRCP018	Enlargement of WC grains in WC-Co alloys.	Hassiba Rabouhi, Youcef Khelfaoui, Abdelkrim Khireddine	Department of Physics, Faculty of Exact Sciences, University of Bejaia, Algeria.
14h15 – 14h30	CSC062	Effet thermique sur un joint soudé d'Al 1050A: Étude microstructural	CHÉRIFI - BENNADJI Nedjema, ABDERRAHMANI Safa	Laboratory LAR-GHYDE, University of Biskra, Algeria
14h30 – 14h45	SP005	Oil recovery from crude oil sludge by solvent extraction	Amraoui Loubna, Hasseine Abdelmalek, Laiadi Djemoui, Bouzid khadidja	Laboratory LARGHYDE, university of Biskra, Algeria.
14h45 – 15h00	CSC038	Study of optical properties of undoped NiO thin films deposed at 723K	Mohamed Zakaria Merad, Lahcene Fellah, Helal Yazid	Laboratoire de recherche : Exploitation et valorisation des ressources naturelles en zones arides, UKM Ouargla.

15h00 – 16h00	Coffee Break & Poster Session 4

Poster Session 4:

ID	Title	Authors	Affiliation
CSC001	Corrosion of Nickel-based composite coatings	LEKMINE Farid, ZIDANI Ibtissem, GANA Abderahmane, BEN TAMAM Elhachemi, CHALA Abdalouahad1	University Abbes Laghrour, Khenchela, 40000, Algeria.
CSC002	Study of the anti-corrosion effecacite of the ferrocenic derivative on XC48 steel by electrochemical impedance spectrometry (SIE)	KARCE Houssam Eddine	Département de Génie de l'environnement, faculté de Technologie, Université Mohamed Elbachir ElIbrahimi Bordj Bou Arreridj , Algerie
CSC003	COBALT-RICH ALLOYS: ELECTROCHEMICAL DEPOSITION, STRUCTURE AND CORROSION RESISTANCE	Louiza Tahraoui, Malika Diafi	Department of Chemical Industry, University of Biskra, 07000, Algeria
CSC004	DIFFUSION BARRIER PROPERTIES OF ELECTROCHEMICALLY DEPOSITED Zn-Co-Cr ALLOYS	Louiza Tahraoui, Malika Diafi	Department of Chemical Industry, University of Biskra, 07000, Algeria
CSC005	CORROSION PROTECTION OF STEEL USING Zn-Cr COATINGS	Louiza Tahraoui, Malika Diafi	Department of Chemical Industry, University of Biskra, 07000, Algeria
CSC006	Pitting Corrosion of 2209 Duplex Stainless Steel weldments in NaCl Aqueous Solution	Rabah AZZOUG, Hania Hachemi, Mohamed Elamine Djeghlal, Ali Mezouar	Ecole Nationale Polytechnique, Département de Métallurgie, LSGM, Alger, 16200, Algérie
CSC007	Effect of Current Density on Corrosion Properties of Ni-P-TiO2 Composite Coating Prepared by Electrodeposition	LEKMINE Farid1,2*, BEN TAMAM Elhachemi, GANA Abderahmane, CHALA Abdalouahad, ZIDANI Ibtissem	University Abbes Laghrour, Khenchela, 40000, Algeria.
CSC009	The ecological impact of PMMA:ZnO used as an optical photovoltaic coating	Bachir Eddine Messaid, Mahdia Toubane, Younes Lamri, Razika Talaighil, Boujamaa Bouaouina, Faycal Bensouici	Research unit of materials processes and environment (URMPE), M'hamed Bougara University of Boumerdes,Algeria
CSC010	Morphological, Structural Properties of LaFeO3 Perovskite doped Prepared by classical Method and Its photocatalytic Activity	Achour Achouak, Abba Malika, Necira Zelikha	Laboratoire de chimie moléculaire et environnement(LCME)
CSC011	The effects of sodium dodecyl sulfate on hardness and corrosion of Ni–MoS2 composite coatings	GANA Abderrahmane, LEKMINE Farid, ZIDANI Ibtissem, HERZALLAH Ouahiba, BEN TEMAM Hachemi	Physic Laboratory of Thin Films and Applications (LPCMA), University of Biskra, 07000
CSC012	MICROSTRUCTURE AND CORROSION BEHAVIOUR OF Zn-Co ELECTROGALVANIZED STEEL	Louiza Tahraoui, Malika Diafi	Department of Chemical Industry, University of Biskra, 07000, Algeria
CSC013	INVESTIGATION OF CORROSION INHIBITION EFFECT AND ADSORPTION ACTIVITIES OF GREEN INHIBITOR FOR MILD STEEL IN 1M HCL	Bouzid BOUAMRA, Mounir DJELLAB, Hamza BENTRAH, Slimane KHERIEF, Abdelouahad CHALA, Amir eddine KABOUIA	Laboratory of Physics of Thin Films and Applications, University of Biskra, Biskra, Algeria.
CSC014	Effect of doping with of Niobium on the properties structural of Titanium Dioxide thin films prepared by sol gel (spin-coating) process	Djehiche Nour el houda, Saidi Hanane, Attaf Abdallah, and Okba Ben khetta	Physics of thin films and applications (LPCMA) university of Biskra Algeria
CSC015	Effect of Annealing Temperature on Properties of Thin films of Zinc-Oxide (ZnO) elaborated by Sol-gel (Dip-coating) method	Ferial Belhamra, Sâad Rahmane, Elhachmi Guettaf Temam, Nadjette Belhamra	Physics Laboratory of Thin Layers and Applications, Biskra University, BP 145 RP, Biskra 07000,Algeria
CSC016	Characterization of the Electrochemical Behavior of a Chrome Steel Intended For the Manufacture of Oil Drilling Tunings	FETTAH Hichem	Laboratory of Applied Energetics and Materials (LEAM), University MSBY –Jijel,
CSC017	Structural characterization of NiO thin films by the Williamson-Hall method	Zakaria Merad, Lahcene Fellah, Helal Yazid	Laboratoire de recherche : Exploitation et valorisation des ressources naturelles en zones arides, UKM Ouargla.
CSC018	Effect of Vanadium addition on microstructure and mechanical properties of TiSiN/CrVxN multilayers system.	M. Athmani, A. Chala, F. Fernandes, A. Cavaleiro	Laboratory of Physics of Thin Films and Applications, University of Mohamed Khider, BP 145 RP, 07000 Biskra, Algeria
CSC019	Effect of date palm leaf fiber on the mechanical and morphological properties of polyvinyl chloride composites	Abir Berkouk, Ahmed Meghezzi	Department of Material Sciences, Laboratory of applied chemistry LCA, University of Biskra, Biskra 07000, Algeria
CSC020	Preparation and characterization of Co3O4:Ag thin films prepared by pneumatic spray method	Nadjette Belhamra, Lamia Dressi, Noura Djahra, Ferial Belhamra, Zahia Bencharef	Physic Laboratory of Thin Films and Applications (LPCMA), University of Biskra, 07000, Algeria
CSC021	X-ray diffraction line profile analysis of dislocation density of X70 welded pipeline steel	Kelthoum Digheche, Farid lekmine, Farida khamouli, Abdelouahed Chala	Physic Laboratory of Thin Films and Applications (LPCMA), University of Biskra, 07000, Algeria.
CSC022	propriétés physico-chimique et caractérisation d'huile essentielle de lavande	ABDERRAHMANI Safa, REHALI Hanane, CHÉRIFI - BENNADJI Nedjema	Laboratory of LAR GHYDE, University Mohamed Kheider- Biskra, Algeria
CSC024	Effect of chemicals treatments on the mechanical, morphological, and thermal properties of palm fiber reinforced polyethylene composites	Nour Elhouda Nouioua1,*, Hamida Boussehel, Lina Aloui, Nadjla Debabeche, Houssam Eddine Benchouia, Belhi Guerira	Laboratory of Mechanical Engineering LGM, University of Biskra, Algeria
CSC025	Sodium Molybdate as a Corrosion Inhibitor for Mild Steel in (0.6MNaCl+ 0.01MNa2SO4) Solution	Hayat MARMI, Chahinez SIAD, Saida MARMI, Abdelouahad CHALA	Laboratory of Thin Film Physics and Applications, University of Biskra
CSC026	Welding Effects on microstructural and mechanical properties of material	Hind Mnsour, Kelthoum Digheche , Kelthom Adaika	Physic Laboratory of Thin Films and Application LPCMA ,University Mohamed Khider of Biskra , 07000.Algeria
CSC027	Microstructure and Mechanical Properties of FeCrNiSiB-WC-TiC twin wire arc sprayed coatings.	Rachid Lakhdari, Yazid Fizi , Islam Nacer Eddine El Ghoul, Messaoud Legouera	Centre de Recherche Scientifique et Technique sur les Régions Arides (CRSTRA) Biskra-Algérie
CSC028	Reducing Industrial Accident by Corrosion Risk Assessment	Mouloud Bourareche, Zakarya	LRPI Laboratory, Institute of Health and Industrial

	and Risk Based Inspection	Chiremsel	Safety, University of Batna 2, Constantine Street, 53. Fesdis, Batna 05078, Algeria
CSC029	Mint Leaves Extract as a Green Corrosion Inhibitor for Copper in Hydrochloric Acid Solution.	Saida MARMI, Abdelouahad CHALA, NOUDJI MALIKA, Hayat MARMI, Chahinez SIAD, SouhilaMARMI	Laboratory of Thin Film Physics and Applications, University of Biskra
CSC030	CORROSION INHIBITION OF A STAINLESS STEEL IN AN AGGRESSIVE MEDIUM IN THE PRESENCE OF TUNGSTATES	LAROUI Ghania; AISSAOUI Regadia, LARIBI Ahmed, AMZERT Sid-Ahmed, Mahi Mohamed, Rebhi Abdelghani Elmahdaou, and Hakem AHCENE	Department of Chemistry Faculty of Exact Science and Computer Science University Ziane Achour of Djelfa BP 3117 Djelfa - Algeria.
CSC031	Extraction of essential oil from pine leaves and its use as an inhibitor of the corrosion process of metals and alloys in an acid medium	GACEM Saliha; AISSAOUI Regadia, Tahri Bouhafas, Karma Ahmed, Mahi Mohamed, Rebhi Abdelghani Elmahdaou and Hakem AHCENE	Department of Chemistry Faculty of Exact Science and Computer Science University Ziane Achour of Djelfa BP 3117 Djelfa - Algeria.
CSC032	Evaluation of the inhibitory efficiency of a synthesized compound against copper in 1M hydrochloric acid	Moumeni Ouahiba	Laboratory of Electrochemistry of Molecular and Complex Materials (LEMMC), Department of Process Engineering, Faculty of Technology, El-Maabouda University Ferhat Abbas Sétif-1, 19000 Sétif, Algeria
CSC033	High efficiency of New Triazole-Based Schiff Base Ligand as an Effective Corrosion Inhibitor for XC40 Carbon Steel In 1.0 M Hydrochloric Acid Solution: Experimental and Theoretical Study	Yaakoub Saadallah, Achouak Sator, Fatima Setifi, Abderrezak Addala, Zouaoui Setifi	Laboratory of Chemistry, Engineering of Materials and Nanostructures (LCIMN) University Ferhat Abbas-Setif 1
CSC034	Elaboration and Characterization of composite anticorrosion deposits	Saida Leboukh, Mustapha Djama , Ahmed Haddad	Research Center in Industrial Technologies CRTI, Algeirs, Algeria. Division of Corrosion, protection and durability of des materials
CSC035	Simulation of the effect of the length of palm fiber reinforced on two different composite materials (Epoxy resin / Palm fibers and Polyester / Palm fibers)	Abderrahmane Sahraoui, Mabrouk Hecini , Tarek Djoudi, Wassila Grine	Laboratoire de Génie Mécanique (LGM), Université de Mohamed KHIDER-BP 145, 07000 Biskra, Algérie,
CSC036	Electrodeposition and Corrosion Resistance of NiP Composite Coatings	Tawous KACEL, Mourad MEBARKI, Messaoud HEMMOUS, Mustapha DJAMA	Research Center in Industrial Technologies CRTI, BP64 route de Dely Ibrahim Cheraga, Algeria.
CSC037	STUDY OF ELECTRICAL AND MECHANICAL BEHAVIOR AND THE EVOLUTION OF THE TEXTURE OF THE THREADS IN COPPER AND RECRUITE COPPER WIRES	F. Baira, M. Zidani	Université de Batna 02, Département ST, BP 53, 05078 Fésdis, U. Batna- Algérie,
CSC039	Elaboration and characterization of transition metal oxide by electrolysis	Noureddine BOUMAZA; Abdelfatteh SAYAH1 ; Abdelkrim MERZOUGUI; Assia TOUNSI; Amine KHERFI, Leila LAMIRI; Farid HABELHAMES; Ahmed BAHLOUL; Naima MAOUCHE	Laboratory of Electrochemistry and Materials, Department of Process Engineering, Faculty of Technology, University of Sétif 1, ALGERIA
CSC041	Structural, and corrosion evaluations of multilayered 7000-Series Aluminum fabricated by ARB Process.	Ismail Bencherifa, Djamel Bradai	Laboratory of Metallic and Semiconducting Materials (LMSM), Department of Mechanical Engineering, University of Biskra, B.P.145, 07000, Biskra, Algeria.
CSC042	The effect of the deposition layers on the optical property of tin dioxide (SnO2) thin films prepared by the sol-gel (Spin coater) process.	Youcef Amina, Attaf Abdallah, Okba Ben khetta and Saidi Hanane,	Science of matter, Physics Laboratory of Thin Films and Applications, University of Biskra, Algeria.
CSC043	Hierarchical 3D micro flower-like TiO2 thin film grown by spray pyrolysis	Okba Ben khetta, Abdallah Attaf, Hanane Saidi, Youcef Benkhetta, Adel Bouhdjer, Radhia Messemeche, Nour Elhouda Djehiche, Ammar Derbali	Physics Laboratory of Thin Films and Applications LPCMA, University of Biskra, Algeria.
CSC044	Comparative Study on the Corrosion Resistance of an austenitic stainless steel and a duplex stainless steel	Rabah AZZOUG, Hania Hachemi, Mohamed Elamine Djeghlal, Ali Mezouar	Ecole Nationale Polytechnique, Département de Métallurgie, LSGM, Alger, 16200, Algérie
CSC045	Rosemary extract as a Green Corrosion Inhibitor for Copper in Hydrochloric Acid Solution	Malika Nouadji, Saida Marmi, Baya Melik	Laboratory of Thin Film Physics and Applications, University of Biskra
CSC046	Study of Green Corrosion Inhibition on mild Steel X70 in hydrochloric Acid Using Syzygium aromaticum as Eco-Friendly Inhibitor	Fatima adjal, kholoud chagra, Imane Ait bouabdallah, sana almi	Department of industrial chemistry, University of Biskra/Biskra, Algeria
CSC048	Synthesis and characterization of a new ceramic material	Ahlem Ksouri, Abdelhek Meklid, Necira Zelikha	Applied Chemistry Laboratory, Mohamed Kheider University of Biskra BP145 (07000), Algeria
CSC051	Improved corrosion resistance of electrodeposited NiCo-Al2O3 composite coatings with different Al2O3 contents	Herzallah Ouahiba, Ben Temam Hachemi, Abdelrahman Gana	Physic Laboratory of Thin Films and Applications (LPCMA), University of Biskra, Algeria
CSC054	Morphological characterization photocatalytic of BIT ceramic material	Ounis Amina, Menasra hayet	Applied chiemistry laboratory,Mohamed kheider university,Algeria
CSC055	STUDY OF Zn-Co ALLOY COATINGS MODIFIED BY NANO-Cr2O3 PARTICLES INCORPORATION	Louiza Tahraoui, Malika Diafi	Physic Laboratory of Thin Films and Applications (LPCMA), University of Biskra, Algeria
MSCP017	Numerical simulation of schottky barrier diode based on β-Ga_2O_3	Rima cherroun, Afak Meftah	Mohamed Khider University, Biskra –Algeria, Laboratory of semiconducting and metallic materials (LMSM)
SP003	STUDY OF XANTHATE (KAX) ADSORPTION ON GALENA : SEPARATION BY FLOTATION	NEDJAR ZOHIR, IBTISSEM KORICHE, DJAMEL BARKAT	Laboratoire de Chimie Moléculaire et de L'environnement, Université de Biskra 07000, Algérie.

16h00 – 16h30 **Closing Ceremony/Attestation Distribution**

Phase Equilibria

ID: PE001 *Poster Presentation*

Selective Extraction of leached Metals (zinc, iron, copper) by Salicylideneaniline HSA

ELBAR D.[1,*], BARKET D[2]., REKISS A.[1]

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Abstract.

The leaching solution is rich in metals (zinc, copper, iron) in the form of sulphide, which is retained by direct chemical leaching in the midst of sulphuric acid from the Chaabet El Hamra mine deposit in Setif, which is part of the Hodna metallogenic zone.

To extract the metals from the leached solution, we chose the optimum conditions: temperature 85°C, sulphuric acid concentration of 2 ml/l, particle size 63 µm and leaching time of 120 minutes.

This leached synthetic solution at the following metal concentrations: zinc (II) at 2360.4 mg/l, iron (II) at 770.5 mg/l and copper (II) at 420.02 mg/l.

Selective extraction of leached metals (zinc, iron, copper) by Schiff's base Salicylidene aniline HSA, due to the fact that this extractor forms stable complexes with metals that play an important role in biological systems.

The solvent extraction of leached metals, zinc (II), iron (II) and copper (II) by a Schiff base-type salicylidèneaniline mid sulfate, was studied as a function of pH and HSA concentration. Stoichiometry organometallic complexes extracts for each metal was determined by the log-log slope method.

The selectivity extraction of metals from the leached solution by HSA shows that the extraction selectivity of iron to zinc is very high as copper with a 75% yield; and excellent selectivity in copper and zinc extraction with an output of 65% and 70% respectively.

Keywords: Zinc, Copper, Iron, Selective Extraction, HSA.

ID: PE002 *Poster Presentation*

Preparation and characterization of ceramic composite powders by sol-gel method

Ahcen Keziz*, Meand Heraiz , Foduil Sahnoune [3]

[1]*Department of Physics, /Physics and Chemistry of Materials Laboratory University of M'sila, , Algeria*

Corresponding_author: *Ahcen Keziz*, ahcen.keziz@univ-msila.dz

Abstract.

In the present work, cordierite–mullite composites were produced using a sol-gel technique. Different amounts of cordieite (0 and 25 wt.%) were added to the mullite, and the calcined gels were sintered at 1500° AND 1550 for 1 h. The phase composition were evaluated via X-ray diffraction (XRD). The sintering parameters in terms of bulk and apparent density were determined .the thermal expansion coefficient (TEC) and mechanical properties were also evaluated. The sintering parameters in terms of apparent and bulk densty were calculated.

Keywords: mullite-cordeirite composites , sol-gel , differential thermal analysis , XRD , Scanning electron microscopy

ID: PE003 *Poster Presentation*

Simultaneous recovry of both nickel(II) and cobalt(II) from sulphate medium with capric acid

A. Slimani

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Abstract.

In mines, minerals are found in a combined state. Two or more exist in the same sample. Given their critical role in industry, obtaining these deposits in a separate state is vital. For this purpose, many techniques are common practice, one of the most important of which is solvent extraction lauded for its simplicity and high yield. However, in the course of metal extraction and under certain conditions, they can be combined into a compound of two or more metals. This makes it an extremely difficult recovery process. In this work, we tried to understand the behavior of nickel and cobalt in the same sulphated medium using capricic acid, as extraction, dissolved in chloroform. We used a range of combination techniques such as calculation methods, visible and infrared spectrum. It turns out that under experimental conditions, nickel and cobalt were extracted in a selective manner. The capric acid extracted nickel and then cobalt. These lab findings lead us to use the capric acid itself dissolved in chloroform to extract both nickel and cobalt separately, regardless of the mixed complex phenomenon.

Keywords: capric acid, mixed complex, nickel, cobalt, solvent extraction.

ID: PE004 *Poster Presentation*

First principales study of electronic and magneticproperties of halfHeusleralloysCrNiZ (Z = Al, Si and As)

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Corresponding_author: *Aissa GUESMIA,* aissaguesmia33@gmail.com

Abstract.

The presentworkperforms self-consistent ab initio full potential-linearizedaugmented plane wave (FP- LAPW) methodwithin the frame work of the spin-polarizeddensityfunctionaltheory (DFT) to study the structural, electronic and magneticproperties of the halfHeuslerallоysCrNiZ (Z = Al, Si and As) in all three phases (a, b and g phases) usinggeneralized gradient approximation (GGA) by Perdew–Burke–Ernzerhof (PBE). We have calculated the latticeparameters, bulkmodulus and the first pressure derivatives of the bulkmodulus, spinpolarized band structures, and total and partial densities of states. The obtainedresults of the spin-polarized band structure and the density of states show that the minority-spin electrons have metallic but the majority-spin bands are metallic. Total magnetic moments are an integer, whichprovesthatthese compounds are half-metals. Finally, wecalculated the opticalpropertiessuch as complexdielectricfunctions, refractive index and absorption coefficient.

Keywords: Half Heuslerallоys; Electronic structure; Magnetic moments

ID: PE005 *Oral Presentation*

Optimization of the S.A.W welding parameters of the weld seams of low alloy steel gas tanks with a low percentage of carbon

Mourad AOURAGH[1,*], Lakhemissi TOUAM[3], Belhi GUERIRA[2] and Semcheddine DERFOUF[4]

[1] *Department of Mechanical Engineering, Laboratory of Mechanical Engineering, University of Biskra, Algeria.*

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Abstract.

Our work is a study, which is carried out on weld beads, of a gas tank element made of steel, whose trade name is P265Nb of chemical composition [C%: 0.20, Si%: 0.0079 , Mn%: 0.77, P%: 0.015, S%: 0.058, Cr%: 0.020, Al%, 0.03] and with a thickness of 3.3 mm, this tank is intended for vehicles, its manufacturing process is finalized by a normalizing annealing heat treatment at a temperature of 920°C ± 10°C. The purpose of this work is the optimization of the two welding parameters, which are the current voltage (U), and the filler metal unwinding speed (V), this welding is submerged arc welding under solid flux. The principle of the characterization considered consists in varying both the current voltage U that is between [31÷36] Volts and the unwinding speed, which is between [28.01÷32.16] mm.s-1. It is concluded that these physical parameters have a direct influence on the mechanical properties of the steel in question. The tests used are tensile tests and the micro-hardness test. Optical images of the different structures of the different zones on either side of the welded cords of the ZAT are the subject of more details.

Keywords: SAW welding, Low alloy steel, Welding parameters, Speed of metal feed.

ID: PE006 *Poster Presentation*

Study of the liquid-vapor equilibrium using Of Aspen-Hysys

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Abstract.

The critical temperature (Tc) and critical pressure (Pc) are two important parameters to characterize a particular fluid. In this work, we have studied the critical points of three binary mixtures containing hydrocarbon derivative and carbon dioxide. Computations were performed using "ASPEN-HYSYS" simulator with the following equations of state (Eos): Group Contribution Equation of State (GCEOS), Peng-Robinson (PR), Soave-Redlich-Kwong (SRK), Zudkevitch Joffee and Kabadi Danner. The comparison between predicted and available reference data are given to evaluate the accuracy of the thermodynamic model employed. The average absolute relative error (AARE) of the calculated data was less than 4% for critical temperature and 0.7% for critical pressure. A good agreement has been found between model prediction and reference data.

Keywords: temperature, critical, carbon dioxide, thermodynamic model.

ID: PE007 *Poster Presentation*

Characterization studies of dissimilar friction stir welded aluminum /steel joints

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Abstract.

One of the advantages of friction stir welding (FSW) is enables joining of dissimilar materials normally not compatible for welding by other joining methods. This advantage on the joining dissimilar of steel and aluminum by friction stir welding has qualitatively established. However, analysis of the intermetallic reaction layers in the interfacial aluminum / steel during the friction stir welding is minimal and unclear. The present investigation aims at exploring characteristic in detail the interface 6061 aluminum alloy and steel were joined by friction stir welding (FSW) at different welding conditions. Welded joints were characterized in optical and scanning electron microscopes. X-ray elemental mapping, with ultra-high resolution SEM. The joint strength was evaluated on a tensile testing machine.

Keywords: Friction stir welding, Interfacial, Intermetallic , Dissimilar, Aluminum , Steel.

ID: PE008 ***Poster Presentation***

Phase stability of SrAlGe compound with AlB2-like structure: first principle reinvestigation

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Abstract.

In the present research, based on the density functional theory computational approach, we investigate the ground state structure of the SrAlGe superconductor compound through energetic, mechanic and dynamic stability. According to the findings, although the EOS curves present that the SrPtSb phase is the most stable under conditions of zero pressure reflected by the SrAlGe minimum total energy. The calculated elastic constants indicate SrAlGe is mechanically stable. Moreover, elastic properties including bulk modulus, shear modulus, Young modulus and Poisson's ratio are derived from the obtained single-crystal elastic constants. In an overview of dynamic properties, the detailed analysis of the phonon spectrum deduce a stable configuration with a doubled unit cell and buckled AlGe layers. It allows to show how the experimentally accepted AlB2-like structure of the SrAlGe compound is suggested to be dynamically unstable at 0 K.

Keywords: SrAlGe, Phase stability, Prediction, ab initio calculation.

ID: PE009 ***Poster Presentation***

Crystallization kinetics of mullite formation from kaolin-natural phosphate mixture under non-isothermal conditions

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Abstract.

In this work, the kinetics of mullite formation in different kaolin-natural phosphate composites was studied under non-isothermal conditions, using DTA analysis. Three samples were prepared by reaction sintering of kaolin (DD2) and natural phosphate (NP). The XRD patterns revealed the presence of mullite and hydroxyapatite phases in the mixtures, while a partial disappearance of hydroxyapatite phase in the 70K sample at 1673K. The DTA curves showed an exothermic peak in all samples in the range of 1173-1323K, which associated with mullite crystallization. The activation energy of the crystallization was calculated using the Kissinger method, and the obtained values were 332.59, 340.49 and 408.54 kJ.mol-1, for the samples 30, 50 and 70K, respectively.

Keywords: mullite, kinetics, kaolin.

ID: PE010 ***Poster Presentation***

Green synthesis of Zinc oxide nanoparticles (ZnO NPs) and their biological activity

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Abstract.

Green synthesis is an ecofriendly novel technology and attractive research area for the production of metal oxide nanoparticles in bio-medical and chemical applications. The green perspective includes sol- vents, reductants or stabilizing agents obtained from a natural resource as they are non-toxic and eco- friendly. In this study, a sustainable green synthetic strategy to synthesize zinc oxide nanoparticles by employing medicinal plants. mation of zinc oxide nanoparticles was confirmed by comprehensive characterization techniques. The presence of biomolecules and metal oxides were confirmed by UV-Vis and Fourier transform Infrared (FT-IR) spectral data analysis. The X-ray diffraction (XRD) revealed the formation of pure wurtzite ZnO crystalline nanoparticles. the antibacterial activity was tested using the disk diffusion method.

Keywords: zinc oxide nanoparticles, medicinal plants, green synthetic, Antibacterial activity.

ID: PE011 *Poster Presentation*

Recalculating the characteristic points on the binary metal systems' liquid miscibility gap curve

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Abstract.

The characteristic points of the liquid miscibility gap curve for the binary metallic systems have been computed in this article. We are interested in recalculating the free energy related to the binary alloys over a different range of temperatures based on the thermodynamic theory and gathering information from the bibliography. We may use this computation to construct the phase separation curve from a program after extracting the mole fractions that correspond to the common tangent to the curve of the free energy with two minima at different temperatures. This simulation was carried out using the Matlab 7.1 programming language and the Redlich-Kister polynomial model. The proposed code is applied to a wide range of binary systems, each of which has the special property of being immiscible in the liquid state. We may then assess how well our results agree with those that have previously been published and reach very satisfying results as a conclusion.

Keywords: Thermodynamic Calculation, Phase Equilibria, Demixing Curve, Newton – Raphson Method, Free Energy, Redlich-Kister Polynomial.

ID: PE012 ***Poster Presentation***

Performance Analysis of Br-Doped In_2O_3 Thin Films using ultrasonic spray

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Abstract.

In this work we investigated the variation in the structural and optical properties of InO:Br thin films before and after annealing, examining two values of annealing (500 °C and 550 °C). Prepared on a glass substrate at a temperature of 400°C by ultrasonic spraying technique. The crystal structure and optical properties of these layers were investigated by X-ray diffraction and UV-Vis-NIR spectrophotometer. The XRD patterns indicated that all the films are polycrystalline and crystallize into a cubic structure with preferential orientation along the (400) plane, and the crystallites range in size from 33.64, 53.83 nm, and 33.64 without annealing, T1 = 500 °C and T2 = 550 °C. respectively . While the UV-Vis-NIR spectrophotometer shows that the transmission spectra were examined for the atomized films in the spectral range 300–1000 nm, for the films examined we notice a discrepancy in the transmittance values. Optical band gap and disorder of In2O3:Br thin films as a function before annealing and at differential annealing. , and it is noted that the values of the optical band gap, Eg, ranged between 3,63and 3.68 eV. The Urbach tail modulus E0 was calculated for the deposited films before annealing and at different annealing.

Keywords: In2O3; thin films; ultrasonic spray; annealing; doping.

ID: PE013 ***Oral Presentation***

Synthesis, structural, caracterization of perovskite LaCr1-xNixO_3 ($0 \leq x \leq 0, 3$)

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Abstract.

In this work we have prepared oxide powders perovskite, LaCr1-xNixO3 ($0 \leq x \leq 0, 3$) by the method of sol-gel using metal nitrate salts and citric acid as the complexing agent for determining the effect of the substitution of chromium by le Nickel in the properties of the oxide in the sub network B and studies the effect of degree of substitution on structural. Different characterization techniques have been used for this study as x ray diffraction for structural characterization and infrared spectrometry for determined functional groups as well as their modes of vibration. The study by X-ray diffraction, has allowed to confirm the existence of a phase pure perovskite of orthorhombique structure for solids, LaCr1-xNixO3 was obtained at temperature equal 800 °C during 6h in the range ($0.0 \leq x \leq 0.3$).The analysis by infrared spectroscopy (IR) shows has a higher frequency band of 618 cm-1 and a lower frequency band of 424 cm^{-1} are related to the environment surrounding the octahedron MO6 in the perovskite ABO3.

Keywords: Pérovskite, LaCr1-xNiO_3, Sol-gel, X-ray diffraction (XRD),infrared spectra (IR).

ID: PE014 ***Oral Presentation***

Synthesis and structural characterization of the substitution compound La1-xSrxNiO3-δ for Lithium Batteries

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Abstract.

Due to its excellent thermochemical stability, chemical stability, shock tolerance, conductivity, and electrocatalytic activity, perovskite-type oxides (PTOs) have been used in lithium batteries. The purpose of this work is to synthesize and characterize the perovskite compound with the structure La1-xSrxNiO3-δ in order to investigate the effects of the substitution of La by Sr on this compound's characteristics and to attempt to introduce gaps into this structure to facilitate ionic conduction. By ball milling nickel oxide (Ni2O), lanthanum oxide (La2O3), and strontium carbonate (SrCO3), we created the (La1-x SrxNiO3-) phase using the traditional solid state reaction approach from pure starting materials. By using XRD, the obtained samples were evaluated, and R space group crystallization was (rhombohedral).

Keywords: Synthesis, characterization, X-ray diffraction, Structural, perovskite oxide and batteries.

ID: PE015 ***Poster Presentation***

Study the effect of thickness on the structural and optical properties of tin oxide

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Abstract.

Tin dioxide is an n-type semiconductor, with wide band gap 3.6 eV and special properties such as high optical transmission in the visible range, the infrared reflection and chemical stability. The objective of our work is to study the effect of thickness on the properties of SnO2 thin films, which were deposited on glass substrate by sol-gel spin coating technique and characterized by X-ray diffraction, UV–visible spectroscopy.The XRD patterns showed that all of the films are polycrystalline with tetragonal rutile structure and had a preferential orientation [110]. The results of characterization of optical properties showed that the thin films of Indium doped SnO2 experienced an increase in transmittance from 96.6 - 78% at wavelengths 300 - 350 nm . The results of this study indicate that SnO2 thin films is high-quality because it has high transmittance .

Keywords: Thin film, SnO2, spin coating, structural and optical properties.

ID: PE016 ***Poster Presentation***

Structural and Electrical Properties of NiO Thin Films Prepared by Spray Pyrolysis Technique

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Abstract.

In this paper, the Cu-Co:NiO thin films were deposited on glass substrates under the temperature of (400°C) by spray pyrolysis technique (SPT), and their structural and electrical properties were studied. The films prepared with a molar concentration of 0.1 mol/l from solutions of nickel nitrate, cobalt chloride hexahydrate and copper chloride hexahydrate. The X-ray diffraction results indicated that the prepared films had a cubic crystal structure and multicrystalline with a predominant direction (111) for all the prepared samples. For the surface resistance, its value decreased by increasing the concentration of copper, which means an improvement in electrical conductivity.

Keywords: thin films, copper-cobalt alloyed nickel oxide, pyrolysis spray technology, (XRD), electrical conductivity.

ID: PE017 ***Oral Presentation***

Simulation Investigation on Heat Transfer and Two-Phase Flow in a Shell and Tube Heat Exchanger in Petroleum Refinery

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Abstract.

Petroleum refineries obtain their energy needs through direct fuel fire for process heat and steam generation (for process use). Energy conservation is receiving a lot of attention as a result of the rising cost of energy. Heat exchangers can be used to recover otherwise lost thermal energy. It has the potential to lower the total amount of thermal energy consumed in industrial operations. Here a study of a heat exchanger problem of a catalytic naphtha reforming unit of an SKIKDA refinery (RA1K) is carried out. At the inlet of the first reactor of the reaction section at the catalytic reforming unit, the design temperature of 471°C was never reached after the start-up of the unit with a mass flow of 60% of the naphtha, where 43687 kg/h). The essential device for heating the charge before entering the reactor is shell-and-tube heat exchanger. we present here a study for a heat exchanger at the catalytic naphtha reforming unit (Magnaforming unit) of the SKIKDA refinery (RA1K). In this study, the thermal characteristics of the shell and tube heat exchanger in two-phase flow (liquid-gas) were investigated. In addition, the model has been utilized for investigating the effect of different walking parameters (mass flow rate, inlet temperature, gas/liquid ratio) on the thermal performance of heat exchanger using Aspen HYSYS software. The thermal performance indicators such as the heat transfer coefficient (hi), overall heat transfer coefficient (U), overall thermal conductance (UA), logarithmic temperature difference (LMTD), and mass flow rates for fluids circulating inside the heat exchanger were determined.The simulation results show the important role of the studied parameters in the thermal performance enhancement of heat exchanger. The results reveal that the ratio two fluids are supplied to the heat exchanger significantly matters in this issue: the flow maldistribution has a important impact on the thermal performances of shell and tube heat exchangers if two fluids are supplied from the same side.

Keywords: heat exchanger, mass flow rate effect, petroleum refinery, simulation, two-phase flow.

ID: PE018 *Poster Presentation*

Effects of sintering behavior on microstructure and piezoelectric properties of porous PZT ceramics

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Abstract.

This work has for objective, the syntheses and development, the survey of the dielectric, piezoelectric and mechanical properties of a new material made by ceramics PZT type of structure perovskite in the ternary system (0.80-x)Pb(Cr1/5,Ni1/5,Sb3/5)O3-xPbTiO3-0.20PbZrO3 avec 0,30 ≤ x ≤ 0,42.A substitution in site B was carried out in order to ameliorate its physical properties. The samples chosen for this survey have been prepared by a synthesis method in strong way. The samples have undergoes a sintering : 1100, 1150,1180 °C successively, in order to optimize the temperature of sintering where the density of the sample is maximal (near to the theoretical density) and therefore the product of better physical quality.

Different techniques of characterization have been used for this survey as, the diffraction of the X-rays, the scan electronic microscopy (SEM) and the electric measures. the diagrams of diffraction of the X-rays indicated that the compositions near to the MPB, are located in the range 39% ≤ x ≤ 42% and the morphological survey of the different samples showed that the ceramics PZT-CNS (20/42/38) sintered 1180 °C near to the MPB favored the growth of the grains. The survey of the dielectric properties of all samples showed a lower constant for the samples 20/42/38 (εr = 4262,48), and lower loss constant 0,1162 supposed to be near the morphotropic phase boundary where coexists the two phases tetragonal (T) and rhombohedral (R).The survey of the piezoelectric properties of the sample (20/42/38) also showed a maximal value of the planar electromechanical coupling factor (0,8827).

Keywords: Pervskite, Piezoelectric, dielectric, X-rays diffraction.

ID: PE019 *Poster Presentation*

Morphological characterization of porous hydroxyapatite synthesized then subjected to surface modification

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Abstract.

Due to their large surface area, increased pore volume, increased porosity, and variable pore size, porous materials, such as silica and mesoporous carbon, have attracted considerable attention in the fields of physical sciences and biomedical sciences. Due to their compositional and biological similarities with natural tissues, synthetic nanoscale porous hydroxyapatite (HAP) nanoparticles possess good biocompatibility, bioactivity and osteoconductivity and have recently expanded their applicability in a wide range of fields such as as tissue replacement, drug/gene carriers, and biocompatible coatings. In this study, we defined a new way to synthesize mesoporous hydroxyapatite nanoparticles by wet neutralization method. The HAP particles as prepared were subjected to structural, functional and morphological characterization. Mesopores in HAP have been observed for samples synthesized at pH 12. Hydroxyapatite is a widely used bioactive biomaterial for the repair and reconstruction of bone defects. This work focuses on the development and characterization of hydroxyapatite powders and hydroxyapatite / polyethylene composite materials intended for use in the field of bone substitution. For this we proceeded to the development of hydroxyapatite, the HAp powders obtained are grafted to different rates of polyethylene. The structural characterization of the compositions obtained was carried out by different analysis techniques: (infrared; XRD; SEM, etc.).

Keywords: materials , hydroxyapatite, structural, polyethylene, characterization, porosity.

ID: PE020 ***Poster Presentation***

Study of the precipitation and the evolution of the structure and the mechanical properties in the aluminum (AGS) alloy drawn wires

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Abstract.

The scope of this work is to study the evolution of the microstructure and properties mechanical of aluminum alloy drawn wires (AGS), during natural and artificial aging treatments, the combined influence of plastic strain rate and aging temperature. The reduction of the section of the wires shows a modification of the microstructure and the texture, the presence of β (Mg2Si) precipitates which increases the hardness of the aluminum wire with the level of deformation by cold drawing. For this we used several experimental techniques of measurement and characterization that allowed us to carry out this work. These are: Optical microscopy (OM), scanning electron microscopy (SEM), X-ray diffraction, Vickers microhardness and chemical analysis (EDAX), Our study was carried out on an Aluminum alloy 6101 series (Al-Mg-Si) of MIDAL provider (BAHRAIN) in the form of wire rod of 9.5 mm diameter, are used by the ENICAB Company in the manufacture of electrical energy transmission cables.

Keywords: the ageing treatments, cold drawn, plastic deformation, aluminum alloy (AGS).

ID: PE021 *Poster Presentation*

Structural, Morphological and Optical characterization of Different oxides Doped ZnO Nanopowders Synthesized via the Sol-Gel Method

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Abstract.

Zinc oxide (ZnO), a wide-band gap semiconductor with a direct energy gap about 3.37 eV, has emerged as one of the most promising metal oxide nanomaterials for practical applications in the above mentioned fields, due to its optical and electrical properties, high chemical and mechanical stability. Influence of Bi and Ga doping on structural, morphological and optical properties of ZnO nanopowders has been studied. Undoped, doped and co-doped ZnO nanopowders with different concentration (ZnO: Bi 3%; ZnO: Ga 3%; ZnO: Bi 5%+ Ga 3%) were synthesized via chemical sol-gel method. The prepared samples were characterized through X-ray diffraction (XRD), scanning electronic microscope, UV-Vis spectroscopy. Wurtzite phase of all the synthesized samples was confirmed through characteristic XRD pattrens, with an average grain size varying from 24 nm to 17 nm. SEM images reveal the change of ZnO grains size the Ga-Bi concentration (%) increases. The results of UV analysis showed a decrease in the values of the band gap energy (Eg) and the Urbach energy with the increase of the Bi and Ga doping concentration. The simple synthesis method proposed represents an interesting approach to produce Ga and Bi co-doped Zinc oxide (ZnO) nanopowders, with promising potential for different applications.

Keywords: Zinc oxid; Co-doped; Nanopowder; Sol-Gel; XRD; UV–Vis.

ID: PE022 ***Oral Presentation***

The effect of annealing on the evolution of the microstructure of an industrially drawn medium carbon steel wire

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Abstract.

The main interest of this work is focused on the study of the influence of cold deformation on the microstructural evolution and the mechanical properties of drawn wires in medium carbon steel of C68D2 grade intended for the manufacture of spring mattresses. Also, on the effect of heat treatment at 950°C for 5 minutes on the evolution of the microstructure, more particularly the pearlitic phase, as well as on the properties of drawn wires in order to improve the mechanical behavior during shaping by drawing at TREFISOUD company.

In order to carry out this work, appropriate tests and experimental techniques were used, namely, the tensile and torsion test to monitor the mechanical properties of the wires studied, and examination under an Optical Microscope (OM) and Scanning Electron Microscope (SEM) to follow the evolution of the microstructure. The study concluded that the resistance properties increase with the reduction rate during the drawing process due to the strain hardening effect generated by the plastic deformation and the grain refinement following the evolution of the microstructure deformed. On the other hand, after heat treatment of the drawn wires at 950°C for 5 minutes, it is possible to observe a specific reduction in these properties following the attenuation of the stresses and internal defects due to industrial drawing.

Keywords: Medium carbon steel, Microstructure. Annealing , Vickers microhardness. parlitic phase, heat treatment.

ID: PE023 *Poster Presentation*

Nanostructured stable phase elaborated by Ni & S compounds: XRD & SEM confirmation

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Abstract.

In this study, the nanostructured stable phase identification elaborated by Ni and S compounds. After the preparation of the solution (Stirred mixture of CH4N2S, NiSO4 with ethanol as solvent), a deposition of eight layers of this solution on a glass substrate and annealed at 300 °C for energy applications. The annealed sample was analyzed by X-ray Grazing incidence diffraction (GID) with a Bruker D8 Advance diffractometer using Cu Kα1 radiation at 40 kV and 40 mA (1600 W) and Scanning electron microscopy (Thermo Fisher environmental SEM).
The results of XRD-GID analysis for the prepared sample showed the formation of an identified stable phase NiS2 and the XRD-GID pattern of the elaborated sample with eight layers prepared solution and annealed show wide and characteristic peaks of the NiS2 with cubic structure (ICDD card no. PDF 01-078-4702). The morphology of the NiS2 thin films confirmed by XRD-GID analysis was investigated by ESEM showed a surface with a uniform and homogeneous distribution nanostructure.

Keywords: Nickel Sulfide, thin films, Nanostructure, XRD, ESEM.

ID: PE024 ***Poster Presentation***

Solid-liquid equilibria of binary mixture :Biphenyl +n-tetracosane

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Abstract.

Solid−liquid equilibria for binary mixtures formed by biphenyl and n-tetracosane were determined using differential scanning calorimetry (DSC). The liquidus lines were established from the onset temperatures of the melting peaks observed in the thermograms. The experimental data were compared to predictions made by a thermodynamic model considering ideal solution. Non-idealities were also computed by means of the group contribution method, Mod UNIFAC (Lyngby), and Mod UNIFAC (Dortmund) were assessed. The best description is obtained with Mod UNIFAC (Lyngby) method, which leads to the lowest deviations in melting temperature and activity coefficients.

Keywords: Solid-liquid equilibria, DSC, UNIFAC model, n-alkane.

Control and regulation of chemical processes

***ID:* CRCP001** **Poster Presentation**

Effect of alkaline treatment on the mechanical proprieties of new building construction material

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Abstract.

Worldwide, enormous amounts of date palm waste are produced and squandered each year. An experimental study on the mechanical properties of a polystyrene composite material made from date palm fibers was conducted in the aim of valuing these wastes and protecting the environment. Various untreated (U) and alkali treated (A) date palm fibers (DPF) loads were prepared, namely (0%, 10%, 20%, and 30% by wt.%). Composite formulations of polystyrene/date palm fiber (PS/DPF) were melt-blended together by extrusion method. It has been found that adding 10% UDPF to the polystyrene matrix improves the material's tensile strength and strain at break. These two features are reduced for UDPF dosage of 20% and 30%, respectively. While the tensile modulus gradually increased with the loading of fillers. The tensile strength and elongation at break of PS-DPF are increased by the alkali treatment, whereas the tensile modulus is slightly reduced. Additionally, the integration of treated and untreated fibers has no discernible impact on the shore D hardness.

Keywords: date palm fibers, polystyrene, alkalization; composite material; mechanical proprieties.

***ID:* CRCP002** **Poster Presentation**

Preparation and characterization of compositematerials: Low-density polyethylene (LDPE) /Redwood fibers

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Abstract.

The handling of trash created by the growing usage of composite materials causes issues. Consequently, one directs more and more of their efforts toward the creation of biodegradable products, either by using biodegradable polymers or by adding biodegradable fibers to polymeric materials. In order to optimize adhesion between the matrix and the load, the latter typically calls for a stage of accounting through chemical treatment of the components. The purpose of this work is to create and describe a wheat-based PE-matrix composite material. The latter is made by pulverizing sawdust and sifting it to a 180µm particle size. The samples are created using a variety of tools and methods before being compressed and molded. Making the composite with up to 15% by weight of wood It was done to optimize the operational parameters, including water absorption, the tensile tests, and the FTIR analysis. According to the results, a 15% elaborated fiber composite has superior mechanical characteristics. Finally, it can be concluded that the presence of wood significantly enhances these composites' mechanical properties.

Keywords: Composite materials, Wood flour, Low-density polyethylene, Chemical modification, Chemical modification, mechanical properties.

ID: CRCP003 *Oral Presentation*

The impact of chemical treatment on the mechanical properties of construction materials based on date palm waste.

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Abstract.

The use of natural materials in industry, clothing, filters, or buildings requires a thorough knowledge of their physical and chemical properties. The objective of this work is to exploit the residue of the date palm waste of the Biskra region which is found in large quantities for the purpose of recovering it and using it as reinforcement in building materials and/or re-construction of a house in the area. In this work, we examine the impact and effect of chemical treatment on the mechanical behavior of composite materials. Our case study is a composite material Gypsum/date palm waste, we treated the date palm waste with NaOH and CH3COOH with different concentrations and we did a series of mechanical tests on the composite materials. Compression and bending tests in order to achieve our goal. The results showed good mechanical properties, these results opening up the prospects of contributing to this field and to the development of the exploitation of this kind of resource available in the region.

Keywords: Characterization, Chemical, Mechanical, Composite material, Date palm, Gypsum, NaOH, CH3COOH, Building material.

ID: CRCP004 ***Poster Presentation***

Chemical compositions and structures of hybrid perovskite based photodetectors

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Abstract.

Photodetectors occupy a critical place in optoelectronic integrated circuits and they convert light into electricity.For halogenated perovskites (ABX3, X=I, Br, Cl), when small organic molecules (CH3NH3+, CH(NH2)2+) are used as monovalent A cations, the materials possess an organic-inorganic hybrid structure. The types CH3NH3PbI3, CH3NH3PbBr3, CH3NH3PbCl3, have been widely studied in the field of photodetectors. Notably, mixed halide perovskites have improved stability in air, compared to single halide perovskites. In this review, we provide a comprehensive overview of recent advances in perovskite-based photodetectors focusing on versatile chemical compositions and structures towards superior performance metrics. Perovskites are expected to replace commercial silicon for future photodetection applications.

Keywords: Perovskite, Photodetectors, Chemical compositions, Structures.

***ID:* CRCP005** ***Oral* Presentation**

Extraction and recovery of silver from waste mono crystalline silicon cells

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Abstract.

Protect the environment and realize a recycling-oriented society without waste is the responsibility of all human being. Photovoltaic end of life photovoltaic panels and broken silicon cells waste are continuously increasing which impose to adopt an appropriate recycling method to face to this problem and recover a huge amount of useful materials. The aim of this work was to establish a recycling process for recovering silver metal from broken monocrystalline silicon solar cells. Before and after the experimental procedure the broken solar cells were characterize with several characterization technics, such as: optical and Sem microscopy, XPS spectroscopy and FTIR spectroscopy. The experiments consisted of a chemical separation, leaching of silver from silicon wafer was conducted by alkaline solution. Finally, silver was successfully extracted and recovered from monocrystalline silicon waste cells.

Keywords: waste, silicon cells, silver, recovery.

ID: CRCP006 ***Poster Presentation***

Silicon carbide electrode for photo electrochemical conversion of carbon dioxide

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Abstract.

Excessive consumption of fossil fuels generates a huge amount of CO2which is the major contributor to the climate changes and global warming

In the present work, we have been interested in both the development and the physico-chemical, structural and optical characterizations of silicon carbide (SiC) electrode. This semiconductor has a very interesting characteristics, namely its prohibited bandwidth which allows a better coverage of the solar spectrum. Therefore, it is a very good candidate for designing a photoelectrode for CO2 conversion.

The SiC thin layers were developed using the magnetron cathodic pulverization technique. The latter being simple and efficacy and favorable for the elaboration of SiC thin films.

The silicon carbide thin-film characterization was conducted using various characterization methods, including:XPS, SEM, FTIR, UV Visible spectroscopy and Photoelectrochemical characterizations. Catalytic activity of silicon carbide layers was investigated by linear sweap voltampetry (LSV) in darkness and under white light irradiation using the potentiostat station. A Cyclic voltammetry in the presence and without CO2 purge was also performed. Based on the results found, we confirmed that the silicon carbide electrode could be used an electrode for CO2 conversion.

Keywords: electrode, siliconcarbide, carbondioxide, conversion.

ID: CRCP007 ***Poster Presentation***

Synthesis And Evaluation Of Biological Activity Of Substituted Imidazole-Thiadiazole Derivatives

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Abstract.

Heterocyclic Nitrogen compounds are important biological molecules in medicinal chemistry and drug discovery, in the present study, we have synthesized 4,5-diphenyl-5-hydro-1Himidazole-2-one, 4,5-diphenyl-5-hydro-1H-imidazole-2-thione and 4,5-diphenyl-5-hydro-1H2,1,3-thiadiazole-1,1-dione condensation from Benzoin , with different Nucleophiles such as Urée, Thiourée and Sulfamide . the structures of the synthesized products were confirmed by the usual spectroscopic methods Infrared, NMR-H1 and mass spectrometry and their antibacterial activity was tested against a range of selected bacterial strains.

Keywords: Nucleophiles, Imidazole, Thiadiazol, Nitrogen.

ID: ***CRCP008*** ***Poster Presentation***

Chemical Composition ,Screening of Phytoconstituents and FT-IR-analysis of Helianthemum Lippi L .growing in southern Algerie

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Abstract.

This work aims at a chemical study of the organic extracts of the desert plant Helianthemum Lippi L obtained by extraction with different polar organic solvents, and a comparative study of a group of previous studies that en rich the importance and effectiveness of the extracts of this plant in eliminating industrial antioxidants .To achieve this we as an initial stage ,conducted a phytochemical survey of the active substances of this plant, which resulted in its efficacy as containing many families of secondary metabolites represented in (phenols - flavonoids - alkaloids - stérols and triple terpénes). then as a second stage we carried out a chemical inventory of these products by colorimetric methods and by spectroscopic Ultraviolet and visible rays, and through this study, we concluded that the plant Helianthemum Lippi L is rich in metabolites represented in (polyphenols and flavonoids).it has been confirmed by FTIR spectrum with the presence of a hydroxyl group at 3201.07 cm-1 Then, after relying on some previous references, the antioxidant activity of an organic chemical system (methanol) for flowers was determined by two chemical methods: DPPH and hydroxyl (H2O2). Through this, it was found that the methanolic extract was more effective in combating antioxidants in both tests, which estimated IC50 , respectively as 61.49 ug/ml and 464.48ug/ml.

Keywords: Helianthemum Lippi L, phytochemical survey, DPPH, H_2O_2.

ID: CRCP009 *Poster Presentation*

PLASTICIZING EFFECTS OF ACETYLT TRIBUTYL CITRATE (ATBC) AS BIOBASED PLASTICIZER ON THE THERMAL PROPERTIES OF PVC/PMMA BLENDS

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Abstract.

Plasticizers have long been known for their effectiveness in producing flexible plastics for applications ranging from the automotive industry to medical and consumer products. Human exposure to certain plasticizers has been debated recently because di (2-ethylhexyl) phthalate DEHP, used in medical plastics, has been found at detectable levels in the blood supply and potential health risks may arise from its chronic exposure. This study was undertaken to reevaluate the industrial potential of Acetyl tributyl citrate (ATBC) and to provide a comparison of ATBC as a PVC plasticizer with DEHP. For that purpose, The PVC and PMMA blends of variable composition from 0 to 100 wtolo were prepared in the presence (15, 30, and 50 wt %) and in the absence of (ATBC) as plasticizer. Their miscibility was investigated by using diffbrential scanning calorimetry (DSC). The thermal degradation of the blends was investigated by thermogravimetric analysis (TGA) under inert atmosphere in the temperature range of 50-550°C. The results showed that the thermal degradation of rigid and plasticized PVC/PMMA in this broad range of temperature is a two-steps process and that PMMA exerted a stabilizing effect on the thermal degradation of PVC during the first step by reducing the rate of dehydrochlorination.

Keywords: PVC/PMMA blends, ATBC, biobased plasticizer, ATG, DSC.

ID: CRCP010 ***Poster Presentation***

Study Properties of composite materials based on dates flour

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Abstract.

We have been witnessing for a decade for an increasing interest in the use of natural fibers of as a reinforcement element of composite materials with polymer matrices. The interest of this craze lies in the fact that this type of composite is recyclable. In our work we used dates nut flour with different grains and different percentage in several matrixs like PVC PP. The mechanical parameters studied such as lengthening, resistance to rupture, characterization of composite materials its fact using a Mo, Meb, Drx and IR. The analyzes of the results allowed that the composite materials obtained are improved on the one hand mechanical side, the study of the biodegradability which was followed by IR and by permitted weight of concluding that there is a greater degradation chemical and improved biodegradation compared to the matrix.

Keywords: Photo-induced polymerization, degradability, modified cellulose, composite.

***ID:* CRCP011** **Poster Presentation**

Synthesis of novel pyrrolo benzodiazepines derivatives

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Abstract.

Nitrogen-containing heterocycles are important synthetic targets for both academic laboratories and the pharmaceutical industry because of their presence in a wide range of natural products, synthetic materials, and bioactive molecules. In this work, a new fused pyrrolo-benzodiazepine and bis-pyrrolobenzodiazepine derivatives were synthesized by condensation of 2, 2'-dipyrromethane with oxalic acid and o-phenylenediamine. The chemical structures of the newly compounds were confirmed infrared spectroscopy (FT-IR), mass spectral analysis, proton (1H) and carbon (13C) nuclear magnetic resonance (NMR) and elemental analysis.

Keywords: Pyrrole, benzodiazepine, pyrrolo-benzodiazepine, Nitrogen heterocycles, Synthesis.

ID: CRCP012 ***Oral Presentation***

Synthesis, NMR, XRD, and spectroscopic studies of poly (glycolide-co- ε-caprolactone) for improving the drug release effect

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Abstract.

The control of chemical process is important in all area of chemistry. In this work, the synthesis of copolymers with different composition is reported. 1H, 13C NMR spectroscopy was invested to confirm the structure of our copolymers. Vibrational spectroscopy FTIR were recorded to confirm the resultant copolymers. New formulations obtained by microencapsulation process and composed from this copolymer as matrix have been developed in order to control the drug-release of 5-Fluorouracil an anti-cancer drug.

In fact, Statistical experiment design methodologies are systemic tool to understand and describe the optimum relationship between the process variables and responses related to the formulation properties and have been applied in various fields such as pharmaceutical.

So, in this part of our research, the effect of some variables namely the matrix concentration and the blend effect on the microparticles' characteristics i.e size, drug content and drug release has been exposed.

Keywords: synthesis, copolymers, microencapsulation, 5-Fluorouracil, drug release.

***ID:* CRCP013** ***Poster* Presentation**

Synthesis and TCP tricalcium phosphate characterisation

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Abstract.

The research has a significant challenge in order to meet the current need for osseous substitutes that exhibit bioactivity, biocompatibility, and mechanical properties without inducing immune rejection.
This work is focused on the development and classification of tricalcium phosphate (TCP) powder for use in the field of bone replacement.
According to many factors, including temperature, the phosphate tricalcium can manifest itself in a variety of ways. To get there, we used a variety of precursors, such as the ambient temperature double decomposition method, followed by calcination and frittage at various temperatures. Different methodologies have been used to characterize the developed materials: (infrared; X-ray diffraction; electronic balance microscope) and physical characteristics (density measurement; mass loss; durability).

Keywords: Biomaterials, TCP, X-ray diffraction, infrared, meb.

ID: CRCP014 ***Poster Presentation***

Study of the transesterificationreaction of waste cooking oil in the presence of a heterogeneouscatalyst

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Abstract.

Biodiesel is a biofuel, thatcanbeobtained by transesterification of vegetableoil or fromwasteoil in the presence of a catalyst.Thisworkaims to study the catalyticactivity of a heterogeneouscatalyst (CaO/ZnO 2 %) wasprepared by the classicmethod (by solid-state reaction) for the transesterificationreaction of usedwaste cooking oil (WCO) en presence of methanol to produce biodiesel. The differentproductswerethencharacterizedusingvarious techniques such as X-ray diffraction (XRD), scanning electronmicroscopy (SEM) image, UV-Visible and FTIR spectrometer. Weused BET analysis to determine the surface area and averageparticle size of the preparedcatalyst. The resultsobtainedallow us to affirmthat the catalystpreparedis active with a good yield of biodiesel producedfromused cooking oil by transesterificationreaction.

Keywords: biodiesel, waste cooking oil, catalyst heterogeneous, transesterification.

ID: CRCP016 ***Oral Presentation***

Chemical synthesis of high temperature superconductor YBCO

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Abstract.

Yttrium barium copper oxide (YBCO) is a family of high temperature superconductors (HTS) that has become an important agent for many applications due to their unique physical and chemical properties; it has the first material lever found to change to superconductivity above the liquid nitrogen boiling point (77K) at roughly 92K. The aim of this work is the synthesis of the high temperature superconductor YBCO by the sol-gel method. Structural and elementary properties of the obtained samples are checked by X-ray diffraction and scanning electron microscopy (SEM).Good magnetic properties are recorded on the obtained sample via the vibrating sample magnetometer (VSM). The thermal gravimetric and differential analyzer (TG/DSC) was used to examine the thermal analysis of the sample.

Keywords: YBCO, Sol-Gel Method, Superconductor, VSM.

ID: CRCP017 *Poster Presentation*

Ni-doped NdFeO3 perovskites as electrocatalysts, for the oxygen evolution reaction in alkaline media

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Abstract.

Developing an efficient and durable electrocatalyst for catalyzing oxygen evolution reaction in electrochemical water splitting application is greatly desired and challenging.
Herein, a simple and facile strategy was followed to prepare Ni-substituted NdFeO3 nanocomposite as an electrocatalyst for oxygen evolution reaction (OER). X-ray diffraction (XRD), thermogravimetric and differential thermal analysis (TG/DTA), Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM) and electrochemical measurements, were used to characterize the structure, morphology and electrocatalytic activity of the prepared catalysts. The X-ray diffraction indicated that samples calcined at 800 °C, exhibit a pure perovskite structure in the all range of substitution. The FTIR spectra confirm the presence of metal oxygen bond of Fe-O in the FeO6 octahedra. Scanning electron microscopy show the agglomeration of the particles with different shapes. Nickel substitution disclose a remarkable change in the catalytic activity of the same towards OER. Among all the electrocatalysts, NdFeO3 substituted with 0.2 mole Ni exhibits low overpotential for attaining the current density of 10 mA/cm2 and low onset potential with a low Tafel slope.

Keywords: Oxygen evolution reaction, Electrocatalytic activity, sol-gel process

ID: CRCP018 ***Oral Presentation***

Enlargement of WC grains in WC-Co alloys.

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Abstract.

Liquid phase sintering is a process for producing materials, a good example of which is WC-Co cemented carbide, which combines the hardness of carbide with the toughness provided by the cobalt binder. The microstructures obtained consist of faceted grains of WC in a solid phase of cobalt which may contain graphite and residual porosity in more or less negligible quantities. The dissolution kinetics of WC in solid Co at 1200°C or liquid Co at 1450°C, controlled by diffusion, are rapid. Growth in WC/Co cemented carbides is not limited by diffusion of supersaturated W and C atoms in the liquid.

The studies relatively carried out on particle sizes greater than 1 - 2 µm and do not mention the phenomena of abnormal magnification.Such phenomena are encountered in materials made from fine grain sizes (<1µm). The recrystallization of the structure due to the coarsening of grains, the presence of graphite and porosity can be at the origin of an alteration of the properties of WC-Co alloys.

In this work we used the CIC process to develop WC-Co composites containing 11 and 20% by mass of Co with improved properties with a fine and perfectly homogeneous structure. A comparative study of the properties of these alloys was carried out using the two processes.

We will try to gather experimental observations likely to identify the physicochemical phenomena of the microstructural evolution during the sintering of cemented carbides and to propose the mechanisms that can control these phenomena.

Keywords: Sintering, Hot isostatic pressing, Cemented carbide, Microstructure.

Modeling and Simulation of Chemical Processes

ID: MSCP001 ***Oral Presentation***

Study of Catalytic Properties of Bimetallic Surfaces for Methane Activation

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Abstract.

First principal density functional theory calculations (DFT GGA-PW91) have been employed to simulate the dissociative adsorption of CH4 on the Ni cluster supported on CuNi (100) surface. We studied methane site preference for CH4, CH3, CH2, CH, C and H species at a coverage of a 0.25 monolayer. From the calculated adsorption energies, we found that the most stable site for CH4 adsorption is the top Ni cluster with two hydrogens oriented toward this atom. The fragments of methyl, methylene, methyne, hydrogen, and carbon have a strong preference to bond on top Ni-surface. We investigated the most stable co-adsorption of CHn+ H (n = 0-3) and found that CHn (n= 0–3) stabilizes on the top Ni-surface whereas hydrogen prefers the top Cu site. In addition, the complete methane dehydrogenation is thermodynamically favorable. The results revealed that the addition of Ni cluster above on the CuNi (100) surface improves significantly the adsorption energies of different species and the thermodynamics properties of complete dissociation of methane. In the light of these first results, the Ni cluster supporetd on CuNi (100) would be an efficient catalyst for methane complete dissociation.

Keywords: CH4 dissociation, Ni doped Cu(100) surface, DFT, catalysis, Ni, adsorption.

ID: MSCP002 ***poster Presentation***

Application of the CFD approach for cleaning an oil well

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Abstract.

The main objective of this study was to to determine the different variables that act on the transfer of cuttings. A numerical study with a CFD approach is carried out to study the cuttings transport by the drilling mud as well as to describe the effect of different variables on the transfer of cuttings.

To describe the cuttings transport, we will use a two-phase model. Therefore, a bibliographic study is carried out for the Eulerian formulation of the basic equations of the two-phase model.

Based on the study of the effect of the geometric parameters of the drilling, the rheological parameters and the characteristic parameters of the debris, we found that the transport efficiency is proportional to the diameter of the pipe, the shear limit stress and the plastic viscosity of the drilling mud. On the other hand, it is inversely proportional to the diameter of the borehole, the density of the sludge, the density and the diameter of the cuttings.

Keywords: Drilling mud,CFD simulation, viscosity, rheology.

ID: MSCP003 ***poster Presentation***

Molecular docking, simulation against SARS-COV-2, theoretical study (DFT) and superoxide anion scavenging by cyclic voltammetry of 2-hydroxyphenyl imino naphthalen-2-ol

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Abstract.

Simulation in terms of enzymatic activity and estimation the process of transfer of electronic active sites of the compound 2-hydroxyphenyl imino naphthalen-2-ol (Schiff basis) synthesized have called upon valuable computational programs such as the docking in which we used the Arguslab program and the Gaussian endowed to the calculation of the functional density theory consists the investigated molecule. And as the experimental study designed under difficult, expensive or sometimes impossible conditions, docking program simulates the molecular binding of protein targets with ligand, which itself can reveal the arrangement of hydrogen and hydrophobic bonds that link the active sites and the ligand, It is an economical step in terms of time and money that can lead to the selectivity of the product interest in drug manufacturing. In this context, we have currently focused on the study of the inhibitory effect of this molecule with the enzyme (6lu7) fighting against covid-19, and have them compare it to the drug chloroquine. The results obtained show that the calculated Gibbs free energy of protease is -7.29986 Kcal/mol which is almost more inhibiting than chloroquine (-7.26517 Kcal/mol). The DFT method estimates the molecular electrostatic potential that the potentially positive sites consists an easily yielding electron when they are brought into contact with oxidizing species during the reduction reaction. The study of the superoxide anion scavenging activity via this product is performed practically by electrochemical way, the standard Gibbs energy is noted less remarkable than that of the standard BHT (-21.652 Kcal/mol). At a value of (-16.9022 Kcal/mol) the compound can spontaneously form very stable inactive species with the oxidant ion.

Keywords: Molecular docking, Antioxidant activities, DFT calculations.

ID: MSCP004 *poster Presentation*

Synthesis, structural and morphological of NBT ceramics for piezoelectric applications

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Abstract.

Lead based materials are widely used in microelectronic industry due to their ferroelectric and piezoelectric properties. However, due to lead toxicity, it has recently desired to develop lead free piezoelectric materials for environmental protection.

The objective of this work is the synthesis and characterization of a promising material: NBT. A method solid route prepares these ceramics. A heat treatment was applied to our sample at 900C° and sintered at 1150C°.The powders of the studied compound were made by solid state reaction with the precursors :Na_2CO_3, Bi_2O_3, TiO_2

We will detail the different analysis techniques applied to this material, Structural characterization was carried out using X-ray diffraction (XRD) and IR spectroscopy techniques. These studies help us to accumulate as much information as possible on these materials

Keywords: BNT, ceramic method, FTIR Lead-free, X-ray diffraction.

ID: MSCP005 *Oral Presentation*

Experimental study and simulation of stable phase β (mg2si) evolution during artificial aging of aluminum alloy AA6005.

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Abstract.

An AA6005 alloy that has been machined or cast can be strengthened using various aging and solution heat treatment techniques. This is called structural precipitation hardening which goes through three steps ،a homogenization at lower temperature of melting temperature, which ensures alloy solution and then rapid cooling, and finally an aging treatment at a temperature between 180 and 220 for our alloys. In order to optimize the time and number of heat treatments, we perform simulations of various heat treatment ranges using MatCalc software to initiate precipitation reactions → G zone. P.→ β″→ β′→β (Mg2Si). Artificial aging is used to induce the formation of the hardening phases (Mg2Si). The MatCalc software uses the mc Al.ddb thermodynamic database for aluminum alloys. The numerical results are in good agreement with the microhardness results, which demonstrate the existence of the stable β phase.

Keywords: Artificial aging, simulations, Artificial aging, AA6005.

ID: MSCP006 *Oral Presentation*

Modeling of Fenton-like process on the removal of petroleum hydrocarbons soil using experimental design

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Abstract.

This work deals with the soil removal of petroleum hydrocarbons in the case of an old pollution by FL oxidation in solid phase reactors on a microcosm scale without pH modification and the determination of the optimal conditions. The effects of hydrogen peroxide (H2O2), endogenous and zero valent iron (Fe), and ethylene diamine tetracetic acid (EDTA) are studied. The application of an experimental design was used to assess and optimize the potentially influential parameters on the removal of petroleum hydrocarbons soil and the modeling of FL process in the case of the studied soil. The statistical analysis of data by factorial design, has allowed the modeling of Fenton like process performances in the operating domain. It showed that hydrogen peroxide amount, interaction effects of oxidant-catalyst, catalystchelating agent, and oxidant-catalyst-chelating agent, were the influential parameters. Moreover, these results suggest that endogenous iron could be used as a source of iron in the presence of the chelating agent to activate FL oxidation. A better accuracy (80.0%) was obtained for H2O2/endogenous Fe/EDTA molar ratio of 20/1/1 after 48 hours of treatment

Keywords: Experimental design, soil, petroleum hydrocarbons, remediation.

ID: MSCP007 *poster Presentation*

First-principles study of ferromagnetic Half-metallic Electronic structural and elastic properties Electronic, structural and elastic propertiesCs2CrGe

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Abstract.

In our study we took an interest material as Full-Heusler alloys based on the wien2k code which works on a UNIX platform, it is written in Fortran and composed of several programs linked by c-shell scripts plus an interface graphic called Wien2web for easy handling. The wien2k allows to calculate different properties: structural, elastic, electronic, magnetic, optics and etc…. Our Cs2CrGe material is stable in the FM type 2 phase, and behaves as semimetallic significantly with temperature. For the electronic properties, the band structure of Cs2CrGe, shows the presence of an indirect gap for the low spin where the minimum of the conduction band is located at the gamma point and the maximum of the valence band is located at the point X with a gap value equal to 0.4631 ev for the GGA, and 1.4339 ev for the mBJGGA. However, for the high spin a band overlap at the Fermi level is observed. Consequently, the low spin has a semiconductor character and the high spin has a metallic character.

Keywords: Heusler alloy, DFT, magnetic moment, GGA approximation.

ID: MSCP008 ***poster Presentation***

Hole transport materials effect on perovskite based solar cells

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Abstract.

The different area of solar cell developments led to a new generation of PV technology characterized by low manufacturing cost. Organic-inorganic hybrid perovskites (OIHPs) are emerging materials that have been progressively enabling new thin-film optoelectronics, including solar cells. The most commonly used perovskite photoabsorbers are CH3NH3PbI3 which has various exciting photoelectric characteristics and most importantly its exciton diffusion length. In this present work, numerical modeling of CH3NH3PbI3-based solar cell using SILVACO simulator is investigated, several materials were studied for possible hole transport layers (HTL), for the HTL materials, the proposed materials are: P3HT, Spiro-OMeTAD, Copper (I) thiocyanate, Copper (I) iodide and Nickel (II) Oxide. Among the proposed materials, Copper (I) thiocyanate is the most suitable HTM. Hence, employing Copper (I) thiocyanate as HTM in perovskite solar cell, the power conversion efficiency is significantly enhanced. Therefore, the obtained results make Copper (I) thiocyanate an excellent candidate for improving the performance of CH3NH3PbI3 perovskite solar cells.

Keywords: CH3NH3PbI3 Perovskite, Numerical simulation, HTL, Copper (I) thiocyanate.

ID: MSCP009 ***poster Presentation***

Electron transport materials effect on perovskite solar cells

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Abstract.

Organic–inorganic hybrid perovskite solar cells (PSCs) are promising owing to their superior semiconducting properties, such as long carrier lifetime, high charge carrier mobility, low voltage loss. In typical perovskite solar cell design, a perovskite absorber material is sandwiched between an electron transport material and a hole transport material. In this work perovskite solar cell was studied using SILVACO simulator. Several materials were studied for possible electron transport layers (ETL). Indium gallium zinc oxide, tin dioxide, titanium dioxide and zinc oxide are tested as an ETL. In order to enhance perovskite solar cell performance, several materials were suggested as electron transport layers (ETL). Among the proposed ETL materials it was found that Zinc oxide is the most adequate material.

Keywords: Perovskite, SILVACO simulator, ETL, Zinc oxide.

ID: MSCP010 ***Oral Presentation***

In silico and in vitro study by quantum and empirical methods in heterocycles with medicinal interest

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Abstract.

Drug discovery takes several years and large research and development resources. QSAR in addition to drug likeness studies contribute strongly to predict and discover new active molecules. In this study, a fundamental and original research on the isothiazole compound is carried out with the aim of predicting the reactivity and the biological activity of the studied compound and its derivatives [1]. The structure of isothiazole is incorporated in several compounds having a biological activity (antibacterial, antifungal, ...), our study aims at derivatives having good activity against the disease of hepatitis C (HCV) [2]. In this work, The qualitative studies of structure-activity relationship were affected on twenty-eight derivatives of isothiazole, using amphiphilic parameters. The molecular electrostatic surface potential and Lipinski rule, Veber rule, the ligand efficiency (LE) and lipophilic efficiency of ligand (LLE), and we perform a QSAR modeling of Isothiazole derivatives by artificial neural networks and Gaussian process seldom used in this approach. Their predictability coefficient was good with a value that exceeds 0.9. Drug likeness studies based on Lipinski and Veber rules, besides the lipophilicity indices permitted to define the drug like molecules [3].

Keywords: Drug Likeness, QSAR, ANN, Isothiazole Derivatives.

ID: MSCP011 ***poster Presentation***

DFT and TD-DFT studies of chemical reactivity and physicochemical properties of some bioactive molecules

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Abstract.

Theoretical studies of some bioactive molecules (Chrysophanol 1 and Physcion 2) were carried out using density functional theory (DFT) and Time Dependent Density Functional Theory (TD-DFT) in Gaussian 09 package at B3LYP/6-311G(d,p) and in water. Our aim is to predict and to compare the molecular structure, chemical reactivity, thermodynamic parameters and spectroscopic properties of these compounds. The diagram of the orbitals molecular predicts that the two molecules are energetically stables (Egap = 4.78 eV and 4.56 eV, for 1 and 2, respectively). The calculated of the quantum chemical descriptors predict that 2 have strong Lewis acid. The thermodynamic stability is given by thermodynamic parameters (Gibbs free energy G, Enthalpy H and Entropy S). These parameters are obtained at constant temperature 298 K. The values of these parameters predict that these molecules are thermodynamically stables. The spectroscopic properties have been evaluated using time-dependent density functional theory (TD-DFT). The absorption wavelength in 2 has the highest absorption wavelength (λ abs max=352.67 nm, this result can be interpreted by (–OCH3) group in 2. The intensity of wavelength in 1 is stronger than in 2. The strong absorption band observed at 450-600 nm.

Keywords: Theoretical studies, DFT, molecular structure, Enthalpy, chemical reactivity.

ID: ***MSCP012*** ***poster*** ***Presentation***

Extraction of potato starch

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Abstract.

The potato in the world's fourth most cultivated plant, owing to its numerous applications in the food and industrial sectors. In our work, we attempted to extract its starch through three methods of soaking neuter (distilled water), basic (NaOH), and acid (Hcl), and after 90 minutes at 25°C degrees Celsius, we mixed the mixture at high speed for 15 minutes, The juice is then filtered and dried in the open air, and the comparison of our results with what other experience has discovered reveals that the yield of starch extraction by the basic medium was higher 20% of each 100g of potato, then 18% in acid medium, and 14% in neutral medium. Our future research will focus on determining the physicochemical properties of the amidon in order to quantitatively and qualitatively define millier extraction methods.

Keywords: starch, bioplastic, potato.

ID: MSCP013 ***poster Presentation***

Molecular Modeling of Enzyme-Substrate Interactions: The Case of Monoamine Oxidase B Inhibitors

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Abstract.

After Alzheimer's disease, Parkinson's disease is the most common neurodegenerative disease. Several studies have been conducted in order to find effective drugs for this rapidly spreading disease. Although no drugs have been discovered to date to treat this disease, several attempts have been made to reduce its severity. Molecular modeling is a modern technique in chemistry, biology, and pharmaceuticals that allows different methods to be used to discover new drugs. To investigate the inhibition of the enzymes involved in this disease and to discover new inhibitors, Our work has focused on the use of molecular modeling methods based on molecular docking and molecular dynamics using a MOE program, as well as the estimation of ADME properties. Our discussion is based on two important parameters: the energy score and the interaction distances between MAO-B residues and a series of 4-(benzyloxy) phenyl and biphenyl-4-yl derivatives. Following simulations and a comparison of the results of the two previous methods, the L30 and L38 compounds were chosen as the best MAO-B inhibitors and above, both compounds comply with Lipinski rules, Veber and Egan, they are able to cross the BBB, and they could be used in the development of new pharmacological agents for the treatment of Parkinson's disease patients.

Keywords: Parkinson's disease, Molecular Docking, Molecular Dynamic, ADME, Interaction.

ID: MSCP014 *Oral Presentation*

Comparison of discretization methods to solve a population balance model of wet granulation including nucleation, aggregation and breakage.

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Abstract.

Wet granulation finds application in a wide range of industries including mineral processing, agricultural products, detergents, pharmaceuticals, foodstuffs, nutraceuticals, cosmetics, zootechnical and specialty chemicals. HPMC is the most employed excipient in the formulation of hydrogel-based matrices in form of tablets or granules in order to provide the drug release in a controlled manner.The preparation of granules, hydroxypropyl methylcellulose HPMC 20, supplied by Pentachem Srl (San Clemente, RN-Italy) were produced spraying distilled water as liquid binder on powders in a low-shear granulator. PSDs of HPMC granules at different granulation times were obtained by an ad hoc dynamic image analysis device based on the free falling particle. For this reason find the development and use of mathematical models in this field have received special attention, mainly because they allow describing, predicting and in general better understanding the process. Population balances will be applied to model wet granulation processes taking into account agglomeration, nucleation and rupture. The discretization of PBEs is the most often used method for describing the evolution of the complete PSD, which includes all events that produce distribution variance.As the analytic solution of the Population Balance Equations (PBEs) is not trivial. Several numerical approaches have been devised, the fixed pivot approach (Kumar and Ramkrishna.1996) and the discretized PBE Litster et al (1995) were used to explain the experimental results of a wet granulation process with the goal of optimizing and incorporating the phenomena of breakage, agglomeration, and nucleation. The findings of comparisons between experimental and numerical data are equivalent.

Keywords: Population balance, Wet granulation, Hounslow-Litster's method, Fixed Pivot.

ID: MSCP015 ***poster Presentation***

Inhibition of monamino oxidase by benzofurane Derivatives

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Abstract.

Parkinson's disease is a condition where a part of your brain deteriorates, causing more severe symptoms over time. While this condition is best known for how it affects muscle control, balance and movement, it can also cause a wide range of other effects on your senses, thinking ability, mental health and more [1]. Monoamine oxidase-B (MAO-B) is an enzyme in the body that breaks down several chemicals in the brain, including dopamine. An MAO-B inhibitor makes more dopamine available to the brain. This can modestly improve many PD movement symptoms. [2]. A series of benzofuran derivatives were synthesised and evaluated as inhibitors of MAO-B, In general, the derivatives were found to be selective MAO-B inhibitors with IC50 values [3]. In our work, the interaction between bioactive structures will be studied by molecular modeling methods (MM, Docking). We conclude that these benzofuran derivatives are promising reversible MAO-B inhibitors with a possible role in the treatment of neurodegenerative diseases such as Parkinson's disease (PD).

Keywords: Parkinson's disease (PD), Monoamine oxidase (MAO), benzofurane derivatives, molecular modeling.

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ID: MSCP016 ***poster Presentation***

In silico design of novel Enoyl ACP reductase inhibitors against Mycobacterium tuberculosis

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Abstract.

A virtual screening protocol combining a 3D-QSAR model with molecular docking procedures and physicochemical properties was used to find novel inhibitors of enoyl-acyl carrier protein (ACP) reductase against Mycobacterium tuberculosis. Initially, 32 isoniazid analogues were collected from literature and investigated against the tuberculosis target (PDB Id: 2IE0) using molecular docking. The docking studies were used to position the inhibitors into the active site of enoyl-ACP reductase to derive a receptor-based 3D-QSAR model. The 3D-QSAR model was built and shown to be statistically significant, with a high predictive ability for the training (R2 = 0.97) and test (Q2 = 0.73) sets. The analysis of the contour cubes derived from the 3D-QSAR model revealed the chemical features necessary for the inhibition of the enoylACP reductase enzyme. The model was then used for virtual screening with the aim of identifying new inhibitors of enoyl-ACP reductase and predicting their potential activity. Based on the results of the above studies, 05 new molecules were proposed as enoyl-ACP reductase inhibitors with high binding affinity, activity prediction, and favorable ADME properties.

Keywords: 3D QSAR model, docking, Enoyl ACP reductase inhibitors, ADME study.

ID: MSCP017 ***poster Presentation***

Numerical simulation of schottky barrier diode based on $\beta - Ga2O3$

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Abstract.

This work is a numerical simulation of schottky barrier diode (SBD) (photo detectors) based on metal/$\beta - Ga2O3$ by Silvaco Atlas TCAD software, we specifically devoted this study to understanding the impact: Firstly, The effect of light density on schottky barrier diode (SBD) (photo detectors) at different wavelengths. Second, effect of temperature on the performance SBD. It means studying the effect of these variables on the current-voltage characteristics in reverse bias.

Keywords: Numerical simulation, Silvaco Atlas TCAD, $\beta - Ga2O3$ SBD, photo detectors, I-V characteristic.

ID: MSCP018 ***poster Presentation***

Effect of Hydrogen Bonding and Van der Waals Interactions on The Stability of CH4 -CO2 Hydrates: A Density Functional Theory Study

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Abstract.

Capture and storage of the CO2 and CH4 greenhouse gases is of outstanding importance and a major challenge for gas-control technologies. Scientist are called to identify the right materials and processes for this purpose, with clathrates hydrates presenting an excellent source for the formation of inclusion compounds and, thus of great potential for gas storage. In this work we aim to describe the intermolecular interactions between guest molecules (CO2, CH4) and host water cages (H2O)20 through density functional theory (DFT) calculations by using different methods B3LYP, M06-2X and B3LYP with D3(BJ) empirical dispersion. Our results indicate that The dispersion corrections D3(BJ) is a reliable description for the guest-host interactions, M06-2X is good for the H-bonding interaction between water molecules, also B3LYP give reasonable description for H-bonding and not suitable for the guest-host interactions. These assessments provide useful guidance for choosing appropriate methods of DFT simulation for clathrates and related systems.

Keywords: greenhouse gases, clathrates, intermolecular interactions, density functional theory (DFT).

ID: MSCP019 ***poster Presentation***

The effect of co-doping with native defects points on electronic properties of ZnO

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Abstract.

The present study is a theoretical work of the effect of co-doping with defects points on the electronic properties of ZnO, by generalized gradient approximation (GGA) using the Perdew Burke Ernzerhof functional correlations (PBE) exchange and adjusting the energy-volume results using the Birch-Murnaghan equation state; we found that the lattice parameters and volume of OV and ZnV decrease than Oi,tet and Zni,tet , which are expanded. But their energies increase, and Zn+,O-. Depending on the band gap energy and state density, the electronic properties of a semiconductor can be explained, we can say that the introducing of O and Zn vacancy (OV,ZnV) make C:Si:ZnO smaller and help the quick transition of the charges (e-,h+) from valence band to conduction band. It has lowest energy defects, but largely up-shifts when oxygen atoms become rich (Oi,tet), and are thought to act as acceptors on C: Si doped ZnO with a new states of energy valence of the bands inwards for the C:Si doped ZnO, mainly come from the bond between interstitial oxygen and its first neighbor oxygen and zinc. Meanwhile, point defects induce occupied states in band gaps. These results indicate that in this case, there are strong interactions between the C, Si and native defects in ZnO. These findings agreed with a several calculations.

ID: MSCP020 ***poster Presentation***

Theoretical study of structural , optical and elastic properties of AgAlTe2 alloys

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Abstract.

The first principles calculations are performed by the linearized augmented plane wave (LAPW) [1].]. Based on density functional theory DFT [2]. method as implemented in the Wien2k code within the density functional theory to obtain the structural, electronic and optical properties for AgAlTe2 chalcopyrite semiconductors in the body centered tetragonal (BCT) phase. Ground-state properties are computed using WuCohen Generalized gradient approximation (WC-GGA) and they are in good agreement with those obtained by other theoretical and experiental data Optical features, such as dielectric functions, refractive indices, extinction coefficient and optical reflectivity are calculated for photon energies up to 14 eV. The independent elastic parameters (C11, C12, C13, C33, C44 and C66) are evaluated. The quasiharmonic approximation is used to describe the pressure–temperature dependence of the thermalexpansion cœfficient, bulk modulus, specific heat, Debye temperature and entropy and Grüneisen parameters.

Keywords: DFT , WC-GGA, optical properties , electronic properties , structural properties.

ID: MSCP021 ***poster Presentation***

In Silico Study of Alpha glucosidase Inhibitors by flavonoids

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Abstract.

The oral antidiabetics drugs such as alpha glucosidase inhibitors present undesirable effects like acarbose. Flavonoids are class of molecules widely distributed in plants, for this reason we are interested in our work to study the inhibition in silico of alpha glucosidase by natural ligands (flavonoids analogues) using molecular modeling methods using MOE (Molecular Operating Environment) software to predict their interaction with this enzyme with score energy, ADME /T tests and druglikeness properties experiments. Two flavonoids Beicalein and Apigenin have high binding affinity with alpha glucosidase with lower IC50 supposed potent inhibitors.

Keywords: Alpha glucosidase, flavonoides analogues, Drug research, Molecular modeling.

ID: MSCP022 *poster Presentation*

QSAR MODELING OF SOME OXINDOL DERIVATIVES AS ANTI-DIABETIC AGENTS

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Abstract.

Quantitative structure-activity relationship (QSAR) studies are a powerful method for the design of bioactive compounds and the prediction of activity according to the physical and chemical properties. In the present study, a 3D-QSAR model was developed for 25 derivatives of 6-chloro-3-oxindole inhibiting the alpha-glucosidase. 3D-QSAR investigations were applied to find the correlation between the different physicochemical parameters of the compounds studied and their biological activity. A multiple linear regression was carried out (MLR), the results of MLR showed good correlation (R2=0.83, S = 0.178 and N=18) between the descriptors and alpha-glucosidase inhibitory activity. To test the performance of this model, we have used the cross validation method (R= 0.63, Pearson(r) = 0.68 and N=7).

Keywords: QSAR, Alpha-glucosidase, MLR, Oxindole.

ID: MSCP023 *poster Presentation*

Theoretical study of structural stability, elastic, electronic and thermodynamic properties of quaternary Heusler compounds by ab initio calculations

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Abstract.

First-principles theory was applied to investigate the electronic, elastic, magnetic, and half-metallic behaviors of the newly designed quaternary Heusler compounds BaNYO (Y=K, Rb and Cs) without 3d transition metal elements. However, elastic properties show that our compounds are ductile and anisotropic. The calculated results show that our compounds are half-metallic with an integer magnetic moment of 2.00μB at the equilibrium lattice parameter, with 100% spin polarization around the Fermi level, which follows the famous Slater–Pauling rule, Mtot =16−Zt, Mtot is the total magnetic moment and Zt is the total number of valence electrons. Based on its equilibrium and strained lattice constants, the magnetic and half-metallic behaviors of this compound have been discussed in detail. Large half-metallic gaps of BaNYO (Y=K, Rb and Cs) compounds of 0.95, 0.90 and 0.85eV, respectively have been found in our work, which is nearly larger than any previous study. Furthermore, the calculated negative formation energy and cohesive energy indicate that these two alloys have good chemical stability. This theoretical investigation provides further insight into the application of BaNYO compounds as spintronic materials.

Keywords: Ferromagnetic, Heusler materials , FP-LPW method.

ID: MSCP024 *poster Presentation*

Modeling of Ga_2O_3/Cu_2O heterojunction solar cell

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Abstract.

Cuprous oxide (Cu2O) is a direct-bandgap semiconductor with a bandgap (Eg) of around 2.1, and it is a cheap, plentiful, non-toxic, and sustainable photovoltaic material, this material's optical absorption coefficients are above 〖10〗^4 〖cm〗^(-1) close to the band edge. Due to these properties, the usage of Cu2O as an absorber in solar cells has greatly increased in recent years and the power conversion theoretical efficiency of Cu2O solar cells has been around 20%. Although all this, it is still challenging to attain greater efficiencies since the maximum efficiency reached experimentally is 8.23 %. Silvaco TCAD-Atlas- has been used in this work to model and simulate a reference structure of an AZO/Ga2O3/Cu2O/Au heterojunction solar cell based on the experimental data, where we found the output parameters of the simulated structure perfectly match the published experimental data where the conversion efficiency of our device simulation is 5.38 %. Also, we focused to investigate the effects of the buffer layer (Ga2O3) doping concentration as well as the impact of the defects of the absorber layer (Cu2O) on the performance of the solar cell. As we found a slight effect when changing the doping concentration of the buffer layer in contrast to changing the density of the defects absorber layer, it has a significant effect on the performance of the solar cell, where the best performance of the solar cell was at the value N_d (〖Ga〗_2 O_3)=7×〖10〗^18 〖cm〗^(-3) and the value N_def (〖Cu〗_2 O)=1×〖10〗^13 〖cm〗^(-3).

Keywords: Solar cell, Cu2O, Ga2O3, Simulation, Silvaco-Atlas.

ID: MSCP025 ***poster Presentation***

Electronic and structural properties of Full-Heusler alloys N2BaSr

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Abstract.

Half-metallic ferromagnetic (HMF) materials have attracted considerable attention both theoretically and experimentally because of their potential applications in magneto-electronics or spintronics. These materials are characterized by the metallic band structure for one spin state, while the band structure of other spin state is semiconductor or insulator with a clear energy gap. The present investigation focuses on searching and studying the variations in electronic and magnetic properties of Cubic Full-Heusler alloys N2BaSr. We have studied the cubic structure using DFT method. Our choice of this material in this study is based on the insufficiency of theoretical works on this element.

Keywords: Ferromagnetic, Heusler materials , FP-LPW method, approximation (PBE-GGA).

ID: MSCP026 ***poster Presentation***

Structural, electronic , elastic and magnetic properties of Full-Heusler alloys Pd2PrCl

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Abstract.

A large number of researches who is interested on the class of half-metallic ferromagnetic HMF like transition metal oxides, Heusler alloys and manganites. The existence of HMF is marked from its band structure. In full-Heusler compounds X2YZ, where X and Y represent two different transition metals (or a transition (T) metal with a rare earth (RE) metal), and Z represents a p element of the 3rd, 4th, or 5th main group.
In this work We have performed ab-initio calculations with spin polarization using the full-potential linearized augmented plane wave method (FP-LAPW) based on the density-functional theory (DFT), the exchange-correlation potential was treated with the generalized gradient approximation (PBE-GGA), whereas for the treatment of strong on-site 4f electron–electron interactions on Pr the PBE-GGA+U approximation (where U is the Hubbard Coulomb energy term) are applied for the calculation of the structural, elastic, electronic and magnetic properties of Pd2PrCl.

Keywords: Ferromagnetic, Heusler materials , FP-LPW method, approximation (PBE-GGA)Ferromagnetic, Heusler materials , FP-LPW method, approximation (PBE-GGA).

ID: MSCP027 ***poster Presentation***

New d0 half-Heusler compounds for spintronics and thermoelectricity

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Abstract.

Structural, electronic, magnetic and thermoelectric properties of the sp-based half-Heusler LiBaX (X = Si and Ge) compounds have been investigated using the full-potential linearized augmented plane wave method based on density functional theory. To approximate the correlation-exchange potential, we have employed two approaches: the generalized-gradient approximation and the modified Becke–Johnson. Both compounds free of transition metals are ferromagnetic, half metallic with a large spin-flip gaps which are appropriate for Spintronic applications. The transport properties reveal high figure of merit values making these compounds great thermoelectric candidates. Moreover, the studied half-Heuslers exhibit negative formation energy and cohesion which indicate the possibility of synthesizing and stabilizing these cheap and available materials. So far and to our knowledge no experimental or theoretical studies have been reported regarding LiBaSi, while for LiBaGe, thermoelectric properties have not been investigated yet.

Keywords: Ferromagnetic, Heusler materials , FP-LPW method, approximation (PBE-GGA).

ID: MSCP028 ***poster Presentation***

Magnetic and Optoelectronic Properties of Sr2CrXO6 (X= La and Y)

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Abstract.

The effects of spin polarization on the structure, magnetic, and optoelectronic properties of Cr-based series of double perovskites Sr2CrXO6 (X = La and Y) have been studied by using the full-potential linearized augmented plane-wave method (FP-LAPW), based on the density functional theory (DFT) as implemented in the Wien2k code, within the generalized gradient approximation (GGA), GGA + U, and GGA plus Trans-Blaha-modified Becke–Johnson (TB-mBJ) as the exchange correlation. Our results show a similar half-metallic ferromagnetic ground state for both materials. From the electronic properties, it is found that Sr2CrYO6 has a direct band gap at (-) direction and Sr2CrLaO6 has an indirect band gap at (-W) direction. Furthermore, we have computed the optic and thermodynamic properties which are investigated for the first time. Consequently, the magnetic, optoelectronic, and thermodynamic properties show these compounds are promising for high technological applications, namely spintronic materials.

Keywords: Double perovskite, FP-LAPW, Ferromagnetic, Optoelectronic properties, Spintronic.

ID: MSCP029 ***Oral Presentation***

In silico evaluation of the inhibition activity of some phosphonate derivatives against SARS-CoV-2 main protease

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Abstract.

In this work the inhibition activity of a series of phosphonate derivatives against SARS-CoV-2 main protease (Mpro) has been evaluated using in silico molecular docking study. In this context, the crystal structure of SARS-CoV-2 main protease achieved from the Protein Data Bank database (PDB ID: 6LU7) has been selected and used as a receptor for docking calculations. Also, the molecular structures of phosphonate derivatives have been fully optimized using DFT/B3LYP/6-31G (d,p) method before their use in docking study. The obtained results indicate that the investigated compounds can be interacting with the catalytic sites of Mpro through H-bonds, van der Waals forces and electrostatic bonds. According to the obtained values of binding energy we can said that these compounds have an interesting inhibition activity. Finally, the in silico docking study of the inhibition activity of SARS-CoV-2 main protease showed that the studied phosphonate derivatives could be consider as potent inhibitors and candidate therapeutic agents for COVID-19.

Keywords: Phosphonates, Inhibition, In silico docking, DFT, SARS-CoV-2 main protease.

ID: MSCP030 *poster Presentation*

Structural, electronic, optical and thermodynamic investigations of NaXF3(X = Ca and Sr): First-principles calculations

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Abstract.

The structural, electronic and optical properties for fluoro-perovskite NaXF3(X = Ca and Sr) compounds have calculated by WIEN2k code based on full potential linearized augmented plane wave (FP-LAPW) approach within density functional theory (DFT). To perform the total energy calculations, exchange-correlation energy/potential functional has been utilized into generalized gradient approximation (GGA) and local density approximation (LDA). Our evaluated results like equilibrium lattice constants, bulk moduli, and their pressure derivatives are in agreement with the available data. The electronic band structure calculation has revealed an indirect band-gap nature of NaCaF3, while NaSrF3 has direct band gap. Total and partial densities of states confirm the degree of localized electrons in different bands. The optical transitions in NaCaF3 and NaSrF3 compounds were identified by assigning corresponding peaks obtained from the dispersion relation for the imaginary part of the dielectric function. The thermodynamic properties were calculated using quasi-harmonic Debye model to account lattice vibrations. In addition, the influence of temperature and pressure effects was analyzed on bulk modulus, lattice constant, heat capacities and Debye temperature.

Keywords: Fluoride-Perovskites, first-principle calculations, structural properties, electronic and optical properties.

ID: MSCP031 ***poster Presentation***

Investigation of Optoelectronic and Elastic properties of Halide perovskites RbGeX3 compounds

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Abstract.

We have investigated the structural, electronic, elastic and optical properties of the halide perovskites RbGeX3(X=Cl, Br), using the full potential linearized augmented plane wave (FP-LAPW) method of density functional theory (DFT). Two approaches are employed to approximate the correlation-exchange potential, namely the generalized-gradient approximation (GGA-PBE) and the modified Becke-Johnson (mBJ-GGA). Both of compounds are semiconductor, with band gap values of 0.873 eV and 1.344eV for RbGeBr3 and RbGeCl3 respectively, lattice parameter are found to be in the range of 5.2-5.6 A. the studied compounds are mechanically stable and both of them exhibit negative formation energy and cohesion which indicates the possibility of synthesizing and stabilizing these cheap and available materials. Optical properties, such as real and imaginary parts of the dielectric functions, refractive index, reflectivity, loss energy (EEL) and absorption coefficient are investigated. According to optical results, these compounds are competent candidates for optical and optoelectronic devices. Moreover, Up to date no experimental or theoretical studies have been carried out regarding these compounds.

Keywords: Halide perovskites; Wien2k; Optical properties; mBJ-GGA.

ID: MSCP032 *poster Presentation*

A new Semiconducting half-Heusler compounds MnScZ (Z = As, Sb): with half-metallicity behavior

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Abstract.

The present article reports a comprehensive study on structural, elastic, electronic and thermoelectric properties of MnScZ (Z= As and Sb). This study has been carried out using Wien2k computational code based on density functional theory. In our calculations the electronic exchange correlation energy is determined by two approaches, generalized gradient approximation (GGA-PBE) and the modified Becke-Johnson potential (mBJ). Equilibrium lattice constants are found to be 6.107A and 6.502A, the band gap value calculated with mbj-GGA are 0.705eVand 0.732eV for MnScAs and Mn ScSb respectively. It is revealed by the analysis of elastic properties that both compounds, MnScSb and MnScAs, are ductile in nature in the GGA approach. The results of both calculations are shown for comparison. Half-metallicity of these compounds is verified, using both methods, by showing that the spin-up states are semiconducting while the spin-down states are conducting. These compounds are characterized by a high figure of merit (ZT) (close to unity) and a high Seebeck (S) coefficient, making them promising candidates for thermoelectric applications.

Keywords: Half-Heusler, Wien2k, Seebeck coefficient, half-metallicity.

ID: MSCP033 ***poster Presentation***

Study of the structural and optical properties of Magnus-type complexes. Theoretical approach based on the DFT

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Abstract.

Theoretical investigations of the structural, dynamics and photo-physical properties of the Magnus' green salt complex and its derivatives obtained with different substituent were carried out at different levels of theory with a particular focus on the structure and the dynamics of the complex in the ground state and the excited state. The present work illustrates the results of both the quantum mechanics formulation of the time dependent density functional theory (TDDFT) (LR-TDDFT-QM) and TDDFT based Born-Oppenheimer molecular dynamics (LR-TDDFT-BOMD) within the linear response theory. The appropriate choice of the functional within the LR-TDDFT-QM approach appears to be of major importance to get relatively satisfactory results for the photo-physical properties and the absorption spectra of such type of complexes. These effects were characterized through the polarization of the basis set function. Regarding our current knowledge of the properties of the Magnus' salts, LR-TDDFT-QM and LR-TDDFT-BOMD were performed on a series of complexes of the type [Pt(NH2R)4]-[PtX4], with R denoting an alkyl group and X is a halogen. The effects of the low and medium range Pt-Pt distance upon the absorption wavelength were explored. Available data in the literature of the electronic structure of such material correlated to our results indicate that, the substituent has a double effect both on the shapes and position of the absorption bands. A perceptive shift of the absorption wavelengths is observed, a consequence of the structure and dynamics of the complex in the ground state. The distortion observed in the Pt-Pt distance is found to be a direct consequence of the rotational motion of groups of atoms. By associating the different theoretical approaches, several interesting properties in the ground state and the excited state were determined.The structural, dynamic and spectroscopic properties are presented in order to gain a better understanding of the behavior of this system. Based on these results, the chemistry of MGS derivatives of general formula [Pt (NH2R)4] [PtX4], R = alkyl group and X = halogen), and the optical properties of these complexes were modified by the introduction of other organic or inorganic ligands. Next, we were interested in studying the electron absorption and emission spectra of MGS complexes with CN ligands. It is therefore interesting to construct dimensional complexes with an electron-rich center, and to study their luminescent properties. We have discovered that these complexes exhibit very high luminescence and rich spectroscopic properties.

Keywords: DFT, TD-DFT, Magnus, platinum, supramolecular, spectroscopic.

ID: MSCP034 *poster Presentation*

Structural, UV/Vis, Excited State and Evaluation of tetrakis(isocyano)rhodium(I) complexes

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Abstract.

A series of tetrakis(isocyano)rhodium(I) complexes with different chain lengths of alkyl substituents has been found to exhibit a strong tendency toward solution state aggregation upon altering the concentration, temperature and solvent composition1. The geometry optimizations of both the ground state of the considered monomer and different possible dimer and trimers have been performed in solution using several density functional theory (DFT) functionals. The UV−visible absorption spectra of the complexes are well rationalized using a vertical time-dependent DFT (TD-DFT) protocol relying on a global hybrid exchange−correlation functional. The remarkable change in UV-vis absorption characteristics induced by changes in solvent composition can be considered as a special type of solvatochromism. Benzo-15-crown-5 moieties have been incorporated for selective metal cationion to induce dimer formation and drastic color changes, rendering the system as potential colorimetric and luminescent cation sensors.

Keywords: DFT, TD-DFT, Rhodium, crown, absorption spectra, luminescent.

ID: MSCP035 *poster Presentation*

Using perceptron feed-forward Artificial Neural Network (ANN) for predicting the thermal conductivity of (Al2O3/Water) Nanofluid

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Abstract.

Nanofluids are nowadays the most widely used working heat transfer fluids. Therefore, a more accurate assessment of their thermophysical properties, as well as their performance, is required. Thermal conductivity is the most influential thermophysical property in the application of nanofluids. The increase in nanofluids' thermal conductivity cannot be accredited only to a better and excellent thermal conductivity of nanoparticles in suspension. Still, it also comes simultaneously from several physical factors of varying importance. Additionally, nanoscale thermal behavior does not follow models applied to larger structures, thus further research is needed to design appropriate models.

In this paper, an Artificial Neural Network (ANN) model for predicting the thermal conductivity of (Al2O3/Water) nanofluid was developed. The model accounts for the effect of temperature, nanoparticle volume fraction, nanoparticle diameter and nanoparticle shapes. Feed forward ANN has been used to predict the effective thermal conductivity of nanofluid. The network was trained, tested, and validated using a total of 105 experimental data points. The results show that the best architecture obtained in hidden layers for the Thermal Conductivity Ratio (TCR) is 15 neurons. TCR model provides an excellent correlation between predicted and experimental values, with coefficient of determination (R2) values superior to 0.99 for both learning and validation and insignificant Mean Square Error (MSE) values (equal to 0.000018). Moreover, the selected ANN approach provides learning with an Absolute Average Relative Deviation (AARD) of 0.013 %, confirming the validity of the adopted method. The comparison with numerous empirical correlations also confirms that the model proposed in this study predicts the TCR of Alumina/Water nanofluids with better performance and therefore can be considered a practical tool for the considered tasks.

Keywords: Nanofluids, Nanoparticle, Metal Oxides, Thermal Conductivity, ANN.

ID: MSCP036 *Oral Presentation*

Investigation of the radical scavenging potency of hydroxylated stilbenes: DFT insight

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Abstract.

Using DFT calculation in BDE (E0), ETS-NOCV calculations at PW91/TZP. And the hydrogen atom transfer (HAT), sequential proton loss electron transfer (SPLET), and single electron transfer followed by proton transfer (SET-PT) mechanisms at B3LYP/6-311++G(2d,2p) level of theory. All are explored as possible oxidation paths of cis and trans 2,4,3′,5′-tetrahydroxystilbene, and for cis and trans 2,3′,4-trihydroxystilbene. HAT was found to be thermodynamically dominant mechanism, indicating that the investigated compounds can be classified according to their antiradical activity in the following sequence order T-OXY>T-RES>C-OXY>C-RES. The evaluation of ΔHBDE reaction enthalpies, ΔHIP, and ΔHPA linked to the three mechanisms with certain radicals (HO·, HOO·, CH3O· and CH3OO·, NO·, and NO2·) are determined. The results indicate the HAT and SPLET mechanisms are competitive in inhibiting those species. The study of solubility by the COSMO-RS model demonstrates that the compounds are very soluble in DMSO. QTAIM calculations reveal the existence of critical points in the two conformers. The Diels-Alder intramolecular cyclization leads to two new tautomers: trans-cycle-OXY and cis-cycle-OXY with a significant improvement in the antioxidant activity. In conclusion, T-OXY and T-CYCLE-OXY are identified as the best antioxidant candidates among those tested.

Keywords: Antioxidant activity, Hydroxystilbene, BDE(E0), ETS-NOCV, QTAIM, Antioxidant mechanism.

ID: MSCP037 ***poster Presentation***

Construction and computational of asphalt molecular model: Density Functional Theory study

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Abstract.

Asphaltenes are one of the most complex petroleum byproducts. The deposition of this molecules are complex phenomena that reduce the efficiency in oil production operations. Theoretical methods such as molecular modeling now make it possible to give a prediction and a good description of the properties of an entity given these properties are related to the nature and the shape of the molecule. The present work is interested in the elucidation of structures of complex molecules of asphaltene. the use of quantum calculation methods based on the Density Functional Theory (DFT) method in order to optimize molecules with 6-31G (d, p) and functional deferent bases (B3LYP, WB97XD, B3PW91, PBEPBE) allows us to develop geometric structures while consolidating the results obtained with those found by experiments. These results carried out by a laboratory team.

Keywords: Asphalt, Theoretical, Modeling, Simulation, DFT.

ID: MSCP038 ***poster Presentation***

Conception of new organophosphonates compound , DFT study and biological evaluation

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Abstract.

A novel category of phosphonate compounds is synthesized by a sequence one pot three component reactions strategy of Kabachnik-Fields using Microwave irradiation. All the designed products are obtained with good chemical yields in short reaction times, and confirmed by spectroscopy analyses. The synthesized phosphonates were screened to in vitro antioxidant using DPPH techniques. Some of the obtained compounds are found to be potent with antioxidant activities. These in vitro studies have been further supported by ADMET (absorption, distribution, metabolism, excretion, and toxicity), quantitative structure−activity relationship, molecular docking. Eventually, title compounds are identified as good antibacterial agents against some types of bacteria shows. Then, these molecules were studied from a theoretical point of view in order to know their structural and electronic properties with the calculations by the (DFT) method, using the Gaussian09 software. Molecular structures were optimized using the B3LYP / 6-31G hybrid method, and different properties of these products were analyzed by means of the HOMOLUMO properties, such as structural parameters, Mulliken atomic charges, MESP, global reactivity descriptors (Hardness, softness, electronic affinity, ionization potential, electronegativity, electrophilicity) and thermomolecular proprieties of these molecules.

Keywords: DFT, Phosphonate, Antioxidant activity, Docking Molecular, ADMET.

ID: MSCP039 ***poster Presentation***

In silico drug discovery of PfDHFR enzyme inhibitors based on Quantitative Structure-Activity Relationship (QSAR) and drug-likeness evaluation

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Abstract.

The investigation and prediction of the potential antimalarial activity of a number of 1,3,5-triazine derivatives as PfDHFR inhibitors make this study significant and novel. In the present investigation, we focused our interest on the Quantitative Structure-Activity Relationships studies were carried out for a bioactive series of 1,3,5-triazine derivatives complexed with the P. falciparum dihydrofolate reductase (Pfdhfr). For that purpose, artificial neural networks (ANNs) are used. The accuracy of such model is mainly evaluated by the correlation coefficient of R_ANN^2 value 0.99, respectively, with risk lower than 0.01 % of model. These model can also be used to predict the activities of new chemical entities for their design and with low toxicity. Then, a qualitative study of the drug-likeness was also performed for a bioactive series of 1,3,5-triazine derivatives using different MPO methods. The fundamental idea of QSAR is the possibility of establishing relationship between a set of structural properties and a particular type of biological activity. The fundamental idea of QSAR is the possibility of establishing relationship between a set of structural properties and a particular type of biological activity.

Keywords: 1,3,5-triazine derivatives, PfDHFR, QSAR, ANN, MPO.

ID: MSCP040 *poster Presentation*

DFT based chemical reactivity and QSAR studies of 1,2,4,5-tetrazine derivatives as potential lung cancer inhibitors

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Abstract.

A theoretical study based on the reactivity of 1,2,4,5-tetrazine have been studied using density functional theory (DFT) at the B3LYP/6-311++G(d,p) level of theory in order to predict local reactivity in both gas and solvent conditions. Whereas, the influence of the solvent was taken into account employing the PCM model. DFT- based descriptors such as electronic chemical potential, molecular hardness, electrophilicity, dipole moment, condensed Fukui function and total energies have been determined to predict the reactivity of 1,2,4,5-tetrazine. Quantitative structure–activity relationships (QSAR) have been applied for development relationships between physicochemical properties and their biological activities. Therefore, Many studies focused on 1,2,4,5-tetrazine derivatives to explore their antitumor activity against lung cancer. A series of 18 molecules derived from 1,2,4,5-tetrazine is investigated by QSAR using electronic descriptors: HOMO–LUMO energy gap, electrophilic and nucleophilic frontier electron density (f^E, f^N) and net atomic charges (qi) and dipole moment (DM) based for the DFT in gas and aqueous phases. Whereas, multiple linear regression (MLR) procedure was used to obtain the best QSAR models and the leave-one-out (LOO) method to estimate the predictivity of our models. The results indicated f_(N2)^N the more positive values in the both cases which have ability of the 2-position azote atom to accept electron and can be utilized successfully to predict the antitumor activity of the 1,2,4,5-tetrazine molecules.

Keywords: 1,2,4,5-tetrazines, Antitumor activity, DFT, QSAR, Solvent effect.

ID: MSCP041 ***poster Presentation***

Numerical Simulation Of Date Palm Rachis Pyrolysis For Biofuels Production

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Abstract.

Renewable energy sources are one of the best strategies to mitigate environmental problems and the consumption of fossil fuels. The most promising renewable energies to limit the increase of the greenhouse effect is biomass, which can be converted into valuable products (biofuels) through thermo-chemical conversion. An interesting chain of recycling can be created by the production of bioenergy and the conversion of agro-industrial waste into energy. Among the advanced biomass conversion technologies, thermochemical processes offer considerable potential and must be optimized . pyrolysis is a very promising solution for the production of high-quality bio-oils and chemicals with high energy . Residence time, process temperature, flow rate, and biomass type strongly affect bio-fuels yield . In this research, the effect of temperature and residence time on bio-fuels (bio-oil,biochar,Syngas) yield during date palm rachis pyrolysis was studied using SPD simulator . The results of this study were obtained by performing a different simulation tests . The simulation findings show that the optimal bio-oil yield (44.53 %) was reached at a pyrolysis temperature of 550° with 0.5 s as a residence time. However, a temperature of 650°C and a residence time of 12 s are the optimal conditions to maximize the yield of syngas with a production of 23 % . The maximal Biochar production (32.47 %) was achieved at a temperature of 400 °C and a residence time of 0.5 s. These investigations have highlighted the fact that the energy content of date palm rachis can be processed by pyrolysis or gasification to yield substantial end products that can be exploited as fuel.

Keywords: Biomass, pyrolysis, Date palm rachis, Bio fuels, SPD simulator.

ID: MSCP042 *poster Presentation*

Theoretical investigations of the electronic, magnetic, mechanical and thermoelectric of a new half - metallic CO2ZrSn compound: A DFT study.

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Abstract.

The electronic, magnetic, mechanical, and thermoelectric properties of CO2ZrSn compound were investigated by using the density functional theory and Boltzmann transport theory. Generalized gradient approximation were employed for the exchange–correlation potential. The results of the electronic band structure analysis indicate that the majority spin band is of metallic behavior, while the minority spin band shows a half-metallic character. The alloy possess total magnetic moment 2.00 μB following Slater-Pauling rule MT = ZT − 24. The mechanical stability along with ductile nature of alloys is determined through elastic constants. Finally, the thermoelectric properties of these materials are discussed on the basis of the Seebeck coefficients, electrical and thermal conductivity relative to relaxation time as a function of temperature, at the Fermi level were studied between the temperature range of 100-1200 K. The large Seebeck coefficient exhibited by CO2ZrSn make it an attractive candidate for thermoelectric materials.

Keywords: Spin-polarization, Thermoelectric properties, Electronic materials, Mechanical stability.

ID: MSCP043 ***poster Presentation***

A Computational investigation of the structure and reactivity of curcumin and its complex

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Abstract.

Purpose curcumin has shown a variety of biological activity for various human diseases including cancer in preclinical setting. Currently, curcumin has been shown to exhibit anti-cancer, anti-Alzheimer, anti-cystic fibrosis, and other medicinal effects. Curcumin (cur) [(1E, 6E) -1,7-bis (4-hydroxy-3-methoxyphenyl) -1,6-diene-3,5-dione], represents the majority of the natural yellow pigments present in the Turmeric, used primarily as a spice. The objective of this study is to perform a quantum calculation based on Density Functional Theory (DFT), TDDFT, and QTAIM. DFT calculations using the B3lyp method and the 6-311 G (2d, 2p) base have shown that the enolic form (cur-enol) is more stable than the anti diketone (cur-anti diketone). The complexation of curcumin with metal fragments (Ni, Mg and Cu) has been established with the Cur-Anti diketone, but does not improve its biological activity. Calculations of the solubility for curcumin and its complexes were carried out in different solvents (octanol, water ethanol, DMSO and others) and showed that DMSO is the only tested solvent which solubilized all molecules. All compounds are insoluble in water except cur-Mg which has a very low solubility (in order of 14g / l). Cur-Anti diketone is much more soluble than Cur-Enol in all used solvents.

Keywords: Curcumin, Metal Complex, DFT, TDDFT, QTAIM.

ID: MSCP044 *poster Presentation*

Structural, electronic and optical properties investigations of the cubic Ga1-xAlxAs1-yPy quaternary alloy; from ab-initio method

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Abstract.

In the present work, we have investigated the structural, electronic and optical properties of the quaternary alloy Ga1-xAlxAs1-yPy solid solutions. The lattice parameter, bulk modulus and its pressure derivative of the quaternary alloys with their binary compounds GaAs, GaP, AlAs and AlP are determined from the fit on the total energy at the equilibrium volume. The lattice parameter as a function of the composition of the quaternary alloy shows a small deviation from the linearity and decreases with the increase of the composition. The band gap energies of the quaternary alloys are also predicted and indicate that the studied materials are direct band gap semiconductors. The optical properties such as the dielectric function and refractive index are calculated, the obtained results are in good agreement with other theoretical and experimental works found in literature.

Keywords: DFT, wien2k, Ga1-xAlxAs1-yPy, alloys, semiconductors.

ID: MSCP045 *poster Presentation*

STUDY OF THE PHYSICO-CHEMICAL PROPERTIES OF THE COMPOUND INDOLIN-2-ONE AND ITS DERIVATIVES BY MEANS OF MOLECULAR MODELING

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Abstract.

Quantum chemistry methods play an important role in obtaining molecular geometries and predicting various properties. To obtain highly accurate geometries and physical properties for molecules that are built from electronegative elements, expensive ab initio/HF electron correlation methods are required. Density functional theory methods offer an alternative use of inexpensive computational methods which could handle relatively large molecules. In this work, it was planned to illuminate theoretical determination of the optimized Molecular geometries, Mulliken charges of Indolin-2-one compound. In addition, we were calculated important quantities such as HOMO–LUMO energy gap, bipolar torque (μ) for Indolin-2-one and its derivatives. The geometries of Indolin-2-one and their methyl, Mercapto derivatives were fully optimized by PM3, Ab initio/ MP2 / 6-31G*and DFT/B3LYP /6-31G* ,Gaussian 09 program package. Finally, we studied Quantitative structure activity relationship (QSAR) using a program HyperChem.

Keywords: DFT, Indolin-2-one, HOMO–LUMO, QSAR.

ID: MSCP046 *poster Presentation*

Enhancement of the Plunger Speed Parameters into the Shot Sleeves of a High-Pressure Die Casting Machine

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Abstract.

In the metalworking industry, High-pressure die casting (HPDC) within cold room is nowadays a very important place, where the cold room for this process mainly comprises an injection cylinder for injecting the molten metal into the mold using a piston. This technique makes it possible to obtain very high quality parts with a very good surface finish, but unfortunately, the air that is in the injection cylinder can be locked in the metal during the injection phase. So the main flaws of this technique are porosity and air entrapment. The purpose of this study is to find a law of piston acceleration to minimize air entrapment during the slow injection phase and porosity in the final product, where the work was highlighted in the analysis of the effects of each of the piston accelerations, fill rate, surface tension and viscosity on the free surface wave motion. The flow of the molten metal in the casting chamber and the thermal study of the process were studied by introducing certain boundary conditions to allow an improvement and avoid the occlusion of the air. To simulate this numerical model we use the code of calculation FLUENT which is based on the equations of mass conservation, momentum and energy. The liquid volume method (VOF) was used to follow the immiscible interface (free surface). Due to piston displacement, the geometry of the domain is variable and the numerical resolution uses a dynamic mesh. The results obtained with the numerical solution show that the quantity of air trapped during filling and injection processes can be reduced or eliminated by choosing the appropriate conditions related to the piston speed and acceleration and the initial temperature of the chamber and molten metal to ensure the smooth process.

Keywords: HPDC, Air Entrapment, VOF, Free Surface, Dynamic Mesh.

ID: ***MSCP047*** ***poster Presentation***

Molecular docking study of curcumin derivatives for rational design of novel c-Met inhibitors as anticancer agents

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Abstract.

c-Met is a receptor tyrosine kinase belonging to the MET family. It is one of the most extensively targeted kinases for drug development due to its involvement in a crucial phase of cell proliferation and differentiation in digestive system tumors. Using natural compounds as therapeutic agents to treat pancreatic cancer has recently focused on natural drug research. Curcumin, the active ingredient of the Curcuma longa plant, has received significant attention over the past two decades as an antioxidant, anti-inflammatory, and anticancer agent.

This study aims to design more active curcumin derivatives as anticancer drugs by targeting c-met through a molecular modeling approach. In brief, the process consists of receptor and ligands preparation, docking validation and simulation using Schrodinger 2020-3 software, and ADMET filtration.

Based on the obtained results, the top compounds which showed higher docking scores (ranging from -10.447 to -9.399) than the reference ligand were selected. The crucial interactions were hydrogen bond and Pi-Pi stacking interactions. Furthermore, most of the derivatives successfully passed five different drug-likeness criteria and were predicted to have good ADMET characteristics.

The obtained results could be a fruitful guideline for the rational design of novel c-Met inhibitors as anticancer agents.

Keywords: virtual screening, curcumin derivatives, molecular docking, c-Met, ADME/Tox.

ID: MSCP048 *poster Presentation*

Semi-analytical solution of two-component aggregation population balance equation by Adomian decomposition method

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Abstract.

Particulate processes are governed by a mathematical model known as the population balance equation. Because of the limited availability of analytical solutions, several numerical methods were proposed to solve this complex equation. In this work, we provide semi-analytical solutions of a two-component aggregation population balance equation by using the Adomian Decomposition Method. The results of the present method show good agreement with the available analytical solutions. Adomian Decomposition Method is a suitable technique to solve the multi-components population balance equation.

Keywords: Population balance equations, Aggregation, Adomian decomposition method, Semi-analytical solutions.

ID: MSCP049 ***Oral Presentation***

ANN,MLR and ADMET Properties of a Serie of Coumarin

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Abstract.

Drug discovery and design are inextricably linked to various branches of chemistry, particularly organic chemistry. Many aspects of chemistry must be involved in order to translate knowledge of the molecular, genetic, and cellular bases of cancer into effective therapies. Thus, the goal of this research is to identify promising active compounds for coumarin as CK2 protein kinase inhibitors using a QSAR model and drug similarity analysis.CK2 is a ubiquitous Ser/Thr-specific protein kinase that is required for cell cycle viability and progression. CK2 levels are particularly high in proliferating, normal, or transformed tissues, and transgenic mice expressing its catalytic subunit are responsible for lymphomas.

The work began with the optimization of the equilibrium structures of the basic coumarin in order to select the most reliable forecasting approach compared to experimentation and at the lowest computational cost. Following our research, we conduct a multiple linear regression (MLR) analysis to generate QSAR models.

An external validation research was done because the results show that the QSAR model of CK2 inhibitory activity is robust and has extremely strong prediction capacity, as indicated by R2 values of 0.951 and 0.927, respectively, following linear regression analysis. The investigation using QSAR models is successful in screening 34 candidate chemicals. Following that , the compounds under consideration were evaluated for drug-likeness and reactivity (ADME, golden triangle, lipophylicity indices).

The results reveal that when supplied orally, the majority of the substances have no bioavailability issues.

The data also aid in determining which chemicals do not have clearance issues, as well as which are the most stable and reactive among those examined.

The anticipated findings of this study may aid in the development of novel coumarins with significant CK2 inhibitor activity.

Keywords: coumarine, CK2, QSAR, MLR.

ID: MSCP050 *poster Presentation*

Performances study of eco-friendly mixtures used as working fluid in two refrigeration cycle

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Abstract.

According to the European (F-gas) regulation, all refrigerants with GWP upper than 1500 would be out by 2025. Searching for alternative refrigerants which are friendly to the environment has become an urgent challenge for the refrigeration and air-conditioning sector. Based on their environmental advantages and their good thermo-physical properties, azeotropic mixtures have recently gained special interest as substitute to conventional refrigerants. This work aims to compare the performance of three azeotropic mixtures with the usually refrigerant R134a in two refrigeration cycle: basic cycle (BC) and Ejector refrigeration cycle (ERC). To reach this objective a numerical program was developed using MATLAB software to evaluate the coefficient of performance (COP) and the cooling capacity of the studied mixtures and were compared with those of R134a refrigerant. The simulation was realised for condensing temperatures (Tc) selected between 30 and 55°C and evaporation temperatures (Te) ranging between -10 and 10°C. Results showed that the mixture R134 a+R290 (GWP= 538.5531) has the better cooling capacity than the other studied refrigerants, on the other hand, the blend R1234ze+R600a (GWP=5.668) gives a better COP in the "BC" cycle than other blends, while the R134a+R1234yf (GWP=466.4518) has the better COP in the "ERC" cycle comparatively to both other mixtures.

Keywords: GWP, mixtures, refrigeration cycle, Performance.

ID: MSCP051 *poster Presentation*

A 3D numerical investigation of the effect of thermoconvective instability on mixed convection water flow in a rectangular channel.

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Abstract.

Heat transfer by mixed convection occurs in nature and has many technical applications (geothermal energy systems, microelectronic cooling, heat sinks in solar collectors, and nuclear and chemical reactors...). Understanding this phenomenon improves the design and optimization of energy devices by reducing heat loss and improving efficiency. In this work, a numerical study of a Rayleigh-Bénard-Poiseuille water flow in a rectangular channel of aspect ratio B = 10 that is heated from the bottom a constant flow (0 <Re <100 and 104 <Ra <106) was carried using the commercial code CFD Fluent 17.0 (ANSYS). This study aims, to demonstrate the formation and development of thermo-convective instability, Where the latter appears as longitudinal rolls (R//). The effects of Re and Ra on the instability and evolution of R//, and the heat transfer behavior were studied. Compared to the experimental observations of the authors studying this phenomenon, our results were in good agreement with theirs. According to the simulation results, R// formation starts first under the effect of the side wall, then develops downstream until it completely invades the cross-section (fully developed). and it was also noted that the length where the rolls are fully developed (Le) is affected by Re and Ra. Due to the buoyancy force, the results showed that mixed convection improves heat transfer (maximum to Le) compared to pure forced convection.

Keywords: Rayleigh-Bénard-Poiseuille, Thermo-convective instability, Numerical simulations, Mixed convection.

ID: MSCP052 ***poster Presentation***

Physical-chemical Study of Hydroxyapatite with modeling Computational Chemistry Calculation

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Abstract.

Computational chemistry has proven to be an effective method for researching materials. It also assists chemists in making predictions before running the actual experiments allowing them to be better equipped to make observations. This computer technology has ability to visualize and modify objects on an atomic scale. The most popular and successful quantum mechanical approaches to matter calculations is density functional theory (DFT). Since the 1970s, it has been widely used for calculations in theoretical modeling. Biomaterials based on HAP have been gradually accepted and used widely and successfully to repair bone and tooth defects. Hydroxyapatite (Ca10(PO4)6(OH)2) (HAP) is an important biomedical material that is used for bone and dental defects due to its excellent bioactivity, biocompatibility and similarity to bone and tooth composition. In this study, Hydroxyapatite (HAP) was produced from synthetic sources using the double decomposition method. Then tests were characterized by X-ray diffraction (XRD), and (FTIR) spectroscopy with diverse conditions made in heating process such as temperature and length of heating. Density functional theory was used to perform the quantum mechanical calculations of the HAP molecule. Calculations were carried out via the Gaussian09 package program using the CAM-B3LYP functional method, 6-31G(d,p) basis set and GaussView 5.0.9. All results obtained and were compared with experimental results. This investigation revealed that HAP was synthesized via precipitation, particularly with suitable temperatures. The results of the quantum chemistry calculations are very close to the experimental results where it found a well agreement between theory and experiment was obtained by the CAM-B3LYP/6-311G method for spectroscopic characterizations.

Keywords: Computational chemistry, Density functional theory (DFT), Biomaterials, Hydroxyapatite, Gaussian09, X-ray diffraction.

ID: MSCP053 *poster Presentation*

Device simulation of inverted perovskite solar cell with NiO as hole transport layer and SnO2/TiO2 as electron transport layer

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Abstract.

Perovskite solar cells (PSCs) are one of the areas of photovoltaics (PV) research that is growing the fastest. To make PSCs more efficient, a perovskite absorber layer is put between two layers like electron and hole transport layers. This paper shows a planar (p-i-n) perovskite solar cell with a bilayer electron transport layer (Bi-ETL). In this case, the Bi-ETL is made up of the inorganic tin oxide (SnO2) and titanium dioxide (TiO2) buffer layer, which works together to align the interfacial energy level and make the surface very resistant to moisture. This study looks at the effect of nickel oxide (NiO), SnO2, TiO2, perovskite doping concentration and temperature. The power conversion efficiency (PCE) of the optimized device stack is 25.56% when VOC = 1.04 V, JSC= 40.34mAcm2, and FF = 61.14%.

Keywords: perovskite solar cells Numerical simulation., Bi-ETL,SnO2,TiO2.

ID: MSCP054 ***poster Presentation***

Understanding electron density imbalance in energetic materials through molecular electrostatic potential

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Abstract.

The main objective of this contribution is to clarify the electron density imbalance in the molecular surface of four known energetic compounds: TNB, TNA, DATB and TATB by using the molecular electrostatic potential (MEP) which is an efficient tool reflecting rigorously the electronic and nuclear charge distribution. It is known that positive values of MEP in the central areas of the molecular surface typical of energetic compounds directly affect their sensitivity to detonation. The addition of electron-donor functional groups is one of the strategies used to avoid a large positive electrostatic potential in the central regions. This donor effect also strengthens the C-NO2 and N-NO2 trigger bonds. Amino groups are very effective in this respect, the more amino groups are added, the weaker the positive electrostatic potential in the central region, thereby decreasing the sensitivity. The decrease of the sensitivity by adding amino groups can be attributed to one or more factors commonly affecting this property, such as the ability of the compound to form intra and intermolecular hydrogen bonds. In this work, a qualitative and quantitative analysis of the MEP was conducted to highlight the anomalies resulting from the strong depletion of the negative charge distribution in the central regions of such compounds and to quantify the role of amino groups in compensating this imbalance. Moreover, some statistical molecular descriptors defined by Politzer et al have been investigated to quantitatively analyze the distribution of positive and negative charges on the whole molecular surface. In addition, a correlation between the number of amino groups present in each compound and the central MEP value was established.

Keywords: energetic materials, molecular electrostatic potential, amino/nitro groups, sensitivity, electron density imbalance.

ID: MSCP055 *poster Presentation*

Preparation of polyvinyl alcohol fiber by solution redox polymerization

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Abstract.

In this work , redox polymerization was implemented by its solution mode using a combination of acyl peroxide R1COOCOOR2 and hydroxy aromatic amine R3OHNArHOR4 .Vinyl acetate VAc monomer was polymerized at low temperature in order to give access to High Molecular Weight HMW polyvinyl acetate PVAc .Second step of the process was the saponification of PVAc that was converted to HMW polyvinyl alcohol .Third step was the preparation of a fiber of polyvinyl alcohol by dry wet gel spinning in (DMSO,H2O). PVAc and PVA were characterized by ATR-FTIR spectroscopy ,GPC.Mechanical parameters of PVA fiber were evaluated by Zwick machine drived by TestXPert software.

Keywords: PVAc, PVA, Redox polymerization, Dry wet gel spinning.

ID: MSCP056 ***poster Presentation***

Describing the Flocculation of PCC Particles Using Population Balance Modelling: A fixed pivot technique

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Abstract.

A fixed pivot approach for a two dimensional population balance modeling strategy is used in this work to describe the flocculation of PCC particles induced by polyelectrolytes. The model describes the dynamics of processes where aggregation and breakage occur simultaneously, as is the case in papermaking. The median size diameter of the flocs, obtained by LDS (Laser Diffraction Spectroscopy), is compared with the simulated results obtained by the application of the presented model. The model efficiency, when compared to the experimental data, is confirmed through a Goodness of Fit (GoF) above 98 % in all cases, providing a good approximation to the temporal evolution of the volume median size of the flocs, as can be seen in Figures 1 and 2. Optimized fitting parameters are obtained for the collision efficiency factor, the fragmentation rate and the flocs restructuring parameter. The flocculation kinetics and scattering exponent data (related to the flocs structure) evolution with time, obtained from modelling, are discussed in relation with the polyelectrolytes properties, and the different conditions considered. The model parameters will be correlated with the characteristics of the polymers used in the flocculation process (molecular weight, branching and concentration) in order to obtain a model that can predict the aggregates characteristics (size and structure) required for a predefined task, and considering the operating conditions used, which constitutes a progress beyond the present state of the art.

ID: MSCP057 *Oral Presentation*

New application of DuQMoGeM to the modeling of the asphaltene aggregation

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Abstract.

In the petroleum industry, the population balance equation is often used to simulate dispersed phase systems. The aggregation of asphaltene is the focus of this study. It is modled using the population balance equation for a Brownian aggregation kernel. To obtain an approximation to this model, we used e dual quadrature method of generalized moment (DuQMoGeM). The predicted total number of asphaltene is compared with the available experimental data. The DuQMoGeM solution shows a high degree of agreement with the experimental results. The aggregation population balance problem can be effectively solved using DuQMoGeM.

Keywords: Dispersed phase systems, Population balance equations, Asphaltene, Aggregation, DuQMoGeM.

ID: MSCP058 ***Oral Presentation***

QMOM application to predict the asphaltene aggregation

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Abstract.

For modeling dispersed phase systems, the petroleum sector frequently uses the population balance equation. We modeled asphaltene aggregation in a batch reactor in this work by applying the population balance equation. Therefore, we employ QMOM to get approximated solutions to this model. It then compares the total number of asphaltene to the available experimental data. QMOM solution is in good accord with the experimental data. QMOM is an efficient method for resolving the aggregation population balance equation.

Keywords: Dispersed phase systems, Population balance equations, Asphaltene, Aggregation, Quadrature method of moments.

ID: MSCP059 *poster Presentation*

Parametric Study and Performance Analysis of a Shower Cooling Tower for the Biskra Region in Summer Season

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Abstract.

The aim of this study is to investigate the performance of a shower cooling tower adapted to the Biskra region during the summer season. A parametric study was conducted to analyze the effects of various parameters on the cooling tower's performance. The parameters considered in this study include the tower's size, water flow rate, air flow rate, ambient temperature, and relative humidity. The numerical results were used to evaluate the cooling efficiency, water consumption, and energy consumption of the cooling tower. The results showed that the cooling tower's performance is highly dependent on the ambient conditions. The tower's cooling efficiency increases with an increase in water flow rate and air flow rate. However, an increase in tower size results in a decrease in cooling efficiency due to a reduction in the air velocity.

Keywords: Heat and mass transfer, performance, shower cooling tower.

ID: MSCP060 ***poster Presentation***

Quantitative Structure-Activity Relationship Modeling of Benzothiazoles Dérivatives

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Abstract.

QSAR studies have been performed on twenty molécules of benzothiazole dérivatives.
The compound are antitumor. Qualitative approximations of the structure activity Relationship were applied to This séries of twenty compounds to détermine the rôle of several physico chemical properties which are used in QSAR modeling as independent variables. A multiple linear regression (MLR) procedure was used to envisage the relationships between molecular descriptors and the activity of benzothiazole derivatives. The predictivity of models was estimated by cross-validation with the leave-one-out method. Our results suggest QSAR models based of the following descriptors: SAG, V, HE, log P and MW for the antitumor activities of benzothiazole derivatives. Results show high correlation between experimental and predicted activity values, indicating the validation and the good quality of the derived QSAR models.

Keywords: Antitumor, benzothiazole Derivatives, QSAR, MLR.

Separation Processes

ID: SP001 *Oral Presentation*

Characterization of Bottom Ash as an Adsorbent of Sudan Black B Dye from Aqueous Solutions

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Abstract.

This study investigated the potential of using bottom ash (BA) as a low cost adsorbent for the removal of Sudan Black B (SBB) dye from aqueous solutions. The adsorbent was obtained from incinerated hospital waste (Mascara, Algeria). X-Fluorescence, FTIR, MEB, BET and pH(PZC) analysis were used to characterize the adsorbent material. The results indicated that this material consisted of silica, carbonates and sodium chloride. Batch adsorption studies were performed for the removal of SBB from aqueous solutions by varying the parameters like initial solution pH, initial SBB concentration and contact time. The adsorption data were then fitted by model equations such as Langmuir, Freundlich and Dubinin-Radushkevich isotherms and it was found that the Langmuir isotherm model best fitted the adsorption data. Adsorption rate constants were determined using pseudo first-order and pseudo second-order rate equations. The results clearly showed that the adsorption of SBB onto BA followed pseudo second-order model. The maximum sorption capacity and energy of adsorption of bottom ash were 143.97 mg/g and 0.316 KJ/mol, respectively. It can be concluded that natural bottom ash can be an alternative economic material to more costly adsorbents used for dye removal in wastewater treatment processes.

Keywords: Adsorption, Bottom Ash, Sudan Black B dye, Isotherms study, kinetic.

ID: SP002 *Poster Presentation*

Experimental and Modeling Study of the Effect of Al and Al2O3 Nanoparticles on CO2 Separation from Natural Gas Using Gas Hydrate Process

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Abstract.

The general technologies applied to separate the CO2 from natural gas are mainly the absorption, adsorption and membrane processes. Besides these classical methods, there are new separation techniques currently under investigation which are based on the use of: low temperature, ionic liquids, as well as gas hydrate crystallization. This latter has recently risen as a novel technology for reducing this effect. However, the low hydrate formation rate, low gas selectivity and low gas storage capacity have been proved as the major bottlenecks for its successful application. Using nanoparticles as promotor is a novel technique for the enhancement of gas hydrate formation process. In this article, a batch reactor was used to investigate the effects of Al and Al2O3 nanoparticles on the enhancement separation of CO2 from natural gas by means of gas hydrates. The natural gas stream was represented by a mixture of CO2-CH4. In the experimental setup, nanofluids of Al and Al2O3 with particle weight percentages ranging from 0.1 to 0.3 wt % were respectively prepared and characterized, CO2-CH4 gas mixture was injected in the reactor containing pure water and different prepared nanofluids. The pressure and temperature were maintained at 4.0 MPa and 274.15 K, while the magnetic stirrer speed was set at 350 rpm. The obtained results showed that the nanoparticles of Al, at the beginning of the process and beyond a certain minimum concentration, can slightly enhanced the gas dissolution (<5%), improve the gas consumption by crystallization up to 10%, improve the gas capture selectivity up to 20% but these effect becomes negative at the end of process. The nanoparticles of Al2O3 up to a certain maximum concentration, can enhanced the gas dissolution (up to 15%), improve the gas consumption by crystallization up to 65% and no positive effect was observed on the capture selectivity.

Keywords: Natural gas; separation; gas hydrates; nanoparticles; Al; Al_2O_3; CO_2.

ID: SP003 *Poster Presentation*

STUDY OF XANTHATE (KAX) ADSORPTION ON GALENA : SEPARATION BY FLOTATION

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Abstract.

The adsorption of anionic collectors (xanthate) on the surface of galena was studied using diffuse reflectance FTIR (DRIFT) and scanning electron micrograph (SEM) techniques.
The effect of sulphite interaction with galena on the mechanism of potassium amyl xanthate (KAX) adsorption onto galena surfaces has been studied in situ using electrochemical potential, FTIR spectra and SEM have been used to identify the mechanism of interaction between sulphite and galena surfaces.
Activated galena with copper sulfate (10-4M) has been investigated at pH 9.5 and potassium amyl xanthate (3.10-2M) concentration.
Potential (Eopt (PbS) = +55mV); Adsorbed colloidal (Pb-AX, 1109-1384Cm-1) is found even at high xanthate concentration, colloidal lead oxide/hydroxide particles have been imaged after 10-4M lead sulfate addition at pH 9.5.
The behaviour of this system is consistent with ion exchange between xanthate and hydroxide followed by oxidation to dixanthogen (X2, 1276Cm-1) and diffusion of this species across the surface.

Keywords: Galena, Xanthate (KAX), Adsorption, SEM, FTIR.

ID: SP004 *Poster Presentation*

Chemical Composition ,Screening of Phytoconstituents and FT-IR-analysis of Helianthemum Lippi L .growing in southern Algerie

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Abstract.

This work aims at a chemical study of the organic extracts of the desert plant Helianthemum Lippi L obtained by extraction with different polar organic solvents, and a comparative study of a group of previous studies that en rich the importance and effectiveness of the extracts of this plant in eliminating industrial antioxidants .To achieve this we as an initial stage ,conducted a phytochemical survey of the active substances of this plant, which resulted in its efficacy as containing many families of secondary metabolites represented in (phenols - flavonoids - alkaloids - stérols and triple terpénes). then as a second stage we carried out a chemical inventory of these products by colorimetric methods and by spectroscopic Ultraviolet and visible rays, and through this study, we concluded that the plant Helianthemum Lippi L is rich in metabolites represented in (polyphenols and flavonoids).it has been confirmed by FTIR spectrum with the presence of a hydroxyl group at 3201.07 cm-1 Then, after relying on some previous references, the antioxidant activity of an organic chemical system (methanol) for flowers was determined by two chemical methods: DPPH and hydroxyl (H2O2). Through this, it was found that the methanolic extract was more effective in combating antioxidants in both tests, which estimated IC50 , respectively as 61.49 ug/ml and 464.48ug/ml.

Keywords: Helianthemum Lippi L, phytochemical survey, DPPH, H_2O_2.

ID: SP005 ***Oral Presentation***

Oil recovery from crude oil sludge by solvent extraction

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Abstract.

Recent years have seen a lot of interest in the creation and deposition of crude oil sludge during petroleum production and refining operations. Reduced storage tank capacity, clogged tank drain pipes, harmful effects on workers, and increased corrosion are all consequences of this sludge accumulation. On the other side, improper sludge disposal also poses a significant environmental risk. In order to benefit from the oils collected and use them economically, as well as to decrease the volume of solid waste to safeguard the environment, we applied an extraction process by xylene to recover the oil present in the sludge from the storage tanks. We have had success extracting hydrocarbon oil from sludge using xylene and we also succeeded in recycling xylene.

Keywords: Petroleum sludge; Solvent extraction; Phase balance; xylene.

ID: SP006 *Oral Presentation*

The impact of agitation on the cyclohexane-based extraction of petroleum from storage tank sludges

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Abstract.

Solvent extraction was used to remove oil from sludges from crude oil storage tanks in order to address the industry's environmental and financial issues by minimizing solid waste generation and recovering petroleum oils for profit. In our work, the hydrocarbon oil was extracted from the sludge using cyclohexane as a solvent. We investigated the impact of agitation time on the extraction process and discovered that when the extraction rate is high, the agitation duration should be increased. We have had successful oil extraction with cyclohexane.

Keywords: Petroleum sludge; Solvent extraction; Agitation; Phase balance; Cyclohexane.

Water Treatment

ID: WT001 ***Poster Presentation***

Kinetic, isothermal and thermodynamic studies of the adsorption of methylene blue dye on a natural product and industrial adsorbents

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Abstract.

In the dyeing process in industry, a large proportion of dyes, often used in excess to improve the dyeing, are discharged into waterways. Being difficult to degrade, they risk accumulating in the environment where they constitute a significant toxicity vis-à-vis living organisms, hence the need to develop specific depollution processes in order to protect our water resources. . The objective of this study was to investigate the possibilities of using the specific adsorption properties of different adsorbents (activated carbon (AC), silica gel (GS) and algae). The efficiencies of the MB adsorption treatment vary depending on the nature of the adsorbent materials tested. The effects of adsorbent dose, contact time, stirring speed, pH and temperature on BM were studied. The adsorption of BM on adsorbents increases with the mass of the adsorbent. The equilibrium time decreases with increasing adsorbent mass. The optimum pH for the elimination of BM by adsorbents is 12. The adsorption of BM is better in a basic medium (99.29% for CA, 73.57% for GS, 79.96% for algae). The results showed that powdered CA proved to be a better adsorbent than algae and GS. The maximum adsorption efficiency (99.91%) of CA was obtained for a contact time of 60 min, a mass of carbon = 10 mg, a stirring speed of 200 rpm when working at room temperature. The adsorption of BM on adsorbents is better described by the Freundlich model which gives R2 coefficients close to 1. The PSO model better describes the adsorption of BM on adsorbents. $\Delta G° < 0$ which proves that the process of elimination of BM by these materials is spontaneous. $\Delta H° > 0$ which shows that this process is endothermic. $\Delta S° > 0$ reflects that a fundamental change has occurred in the internal structure of materials during BM adsorption.

Keywords: Adsorption, methylene blue dye, Kinetic, isothermal and thermodynamic.

ID: WT002 *Oral Presentation*

Study of Various Parameters Measured for Industrial Liquid Waste in a Treatment Plant at the two Skikda Refineries (RA1/K, RA2/K)

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Abstract.

The objective of this study is to assess the treatment efficiency of the industrial effluent treatment plant of the Skikda refinery complex according to an experimental comparison study between the two plants of the two refineries (RA1/K and RA2/K), the study of purification performance of the station based on the different parameters of the effluent from the two stations, namely: pH, flow rates, and temperature. And at the level of the biological reactor to evaluate the ratios of BOD5 (biological oxygen demand) and COD (chemical oxygen demand), suspended solids-suspended solids and phosphorus, used for the development of microorganisms. The results obtained show an efficiency of treatment of SS with a yield of up to 99%.

Keywords: Industrial waste water, RA1K Skikda refining unit, physico-chemical processes, biological processes, hydrocarbons, filtration

ID: WT003 ***Poster Presentation***

Development and characterization of diatomite by ferrihydrite

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Abstract.

The present work deals with the purification and chemical modification of diatomite in order to improve its structural and textural properties. The diatomite in the form of white powder also called natural kieselguhrs of Algerian origin deposit of Sig presenting the advantage of being locally available and less expensive.
The diatomite (DB) which will be modified by Iron "the deposition of Ferrihydrite on raw diatomite" by $FeCl_2$ and NaOH to increase the specific surface of this material [2].
The textural and surface characterization of the diatomite was carried out by several analytical techniques, X-ray Diffraction, Scanning Electron Microscope SEM, Infrared IR and BET. The results show that the raw diatomite is formed of several constituents and in particular silica, allumine and calcium carbonates, which occupy by moment the surface of the pores of the material.
The iron-modified diatomite was analyzed by the SAA method, and it was found that the diatomite surface was loaded with 0.24 g Fe/g.

Keywords: Diatomite, Ferrihydrite, textural characterization.

ID: WT004 ***Poster Presentation***

Preparation of an activated carbon based on natural waste: application to the adsorption of organic pollutants from wastewater

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Abstract.

The objective of our work is the preparation of activated carbon based on natural waste and test their adsorption power with the two dyes purple crystal and orange methyl. ctivated carbon has been prepared from waste which is natural residue by pyrolysis and activation of activated carbon with phosphoric acid (H3PO4). After determining the zero PZC charge point, the latter showed us that the PZC of activated carbon is 5. The study of the kinetics showed us that the pseudo first order model (PPO) better describes the adsorption process of the two dyes CV and MO. The values of the yield of these two are: 96.37% for CV and 97.86% for MO. The isothermal study shows us that both Langmuir and Freundlich models are favored.

Keywords: activated carbon, dyes, adsorption, natural waste, depollution.

ID: WT005 ***Oral Presentation***

Heterogeneous phase adsorption of carmine, phenolphthalein and eosin dyes on activated carbon and natural clay, experiments, characterization and physical interpretations

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Abstract.

No microscopic analysis is possible without dyes, stains or indicators. Indeed, dyes and stains are extraordinarily critical in biology, biochemistry, molecular biology and microbiological research, because they are frequently used to dye or dye certain cellular components, proteins or DNA/RNA to visualize them. In biochemistry and molecular biology, dyes and stains are used to highlight biological tissues and to quantify or qualify the presence of certain chemicals when attached to substrates. In microbiology, dyes and stains are used to make microorganisms visible or differentiate them due to distinct colorings properties. On the other hand, indicators are often used to measure the pH of the samples. They are added to microbiological culture media to detect the metabolic properties of microorganisms. Despite what has just been said, half a dozen of these dyes (E102, E104, and E129), combined with various preservatives, and are thought to be responsible for hyperactivity in some children. Synthetic dyes are also suspected of causing respiratory problems and allergies. Adsorption remains the most recommended classic technique because of its simplicity, efficiency, ease of implementation and low cost. In this context, our study focused on the removal of three dyes: carmine, phenolphthalein, and eosin b on the surface of two adsorbents: activated carbon, natural clay. We used various physico-chemical techniques to determine the crystalline structure of the DRX device, for this to make a clear idea of the chemical binding by the FTIR analysis and finally to know the maximum absorbance λmax of the dyes it is by the UV-Visible analysis method. In addition, we describe a simplified explanation of adsorption kinetics. The results obtained help us to compare the efficiency of active carbon and natural clay for color removal, in addition to the possibility of describing adsorption by the two models of adsorption isotherms Freundlich and Langmuir.

Keywords: Adsorption, carmine, Phenolphthalein, Eosin B, Natural clay, Activated carbon, Kinetic model.

ID: WT006 ***Oral Presentation***

Design of an industrial electrochemical reactor for wastewater treatment

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Abstract.

The pollution load (organic, mineral and biological) of water from urban networks (wastewater) is very remarkable, especially in large towns and industrial sites. In this context, the search for good solutions for this problem is of great importance in current researches. Many chemical, physical and biological treatment methods have been developed. However, each of these methods has its specific advantages. So the search for other solutions remains an area that can always be exploited. Among these new techniques to be developed; there are the electrochemical methods. They present significant techniques in the elimination of organic, and minerals pollutants; also, biological contaminants (bacteria, viruses, etc.). In the present work, we have contribute by the design of an industrial reactor for the electrochemical treatment of different pollutants; based on previous studies carried out on electrochemical methods used in wastewater treatment. To answer this problem, we first carried out an exhaustive study on the electrochemical processes used in the elimination of different pollutants and contaminants. We have grouped and classified the necessary information on electrode materials each with its specifics and uses. In addition, we have carried out a study and compilation of useful information on the types of electrochemical reactors used for pollution treatment. All this information, allowed us to construct an efficient database to design an industrial scale electrochemical processing reactor, from which we used economical and efficient materials in the processing.

Keywords: wastewater treatment, electrochemical methods, reactors design.

ID: WT007 ***Poster Presentation***

Adsorption of cuivre(II) and study of proprieties structural Ns.BioChar/ZnO

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Abstract.

In this work, a single -step of synthesis of a new Biochars/ ZnO composite from agricultural waste based on nut shells. The production of a biochar/ZnO composite by ZnCl2 a low concentration and neutral pH(pH=7.7). The results obtained in this study show and improve the adsorption capacity of copper (II). In most cases, accelerates the rate of adsorption of pollutants. The resulting biochars /ZnO composite were characterized in detail describing their morphological and structural properties by FTIR, DRX, SEM before and after the copper (II) adsorption. The adsorption kinetics can be described as more appropriate by the pseudo-second order kinetic model. Copper adsorption follows the laws of Langmuir, Freundlich and Intraparticle-diffusion. The removal rate of copper is 78% and adsorption capacity is t he adsorbed quantity is improved with the increase of the various initial copper content (2, 5and 8g / l) using in this study at temperature 25°C .

Keywords: biochars , kinetics, adsorption, composite, nut shells, ZnO.

ID: WT008 ***Poster Presentation***

Investigation on the possibility of removal of a cationic dye (Crystal Violet) from an aqueous solution by adsorption onto a biochar synthesized from Melia azedarach seed powder treated in two steps.

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Abstract.

Dyes are used in many industrial sectors such as textile, paper, leather dyes, in the food and cosmetics industries. They have a reputation for being toxic and persistent substances in the environment; they require physico-chemical techniques to degrade them. Several physical, chemical, and biological methods exist to treat and decolorize polluted water. The adsorption technique is the most favorable method for the elimination of pollutants and has become an analytical method of choice, very efficient and simple to use. In this work, we studied the elimination of Crystal Violet from an aqueous solution by biochar prepared from Melia azedarach seed powder treated in two steps. The effects of contact time, initial dye concentration, solution pH, the temperature of the reaction, and adsorbent amount, were investigated on the removal efficiency of adsorbent for the Crystal Violet. The experimental results showed that eliminating the Crystal Violet dye in an aqueous solution depends on all these physico-chemical parameters. Using 0.025 g of adsorbent, in the pH range of (7-10), at room temperature (15°C), removed Crystal Violet from 25 ml of a 20 mg/l concentrated solution. The required time for obtaining equilibrium at different concentrations of dye is about 240 min. The kinetic study of the elimination of Crystal Violet agrees better with the pseudo-second-order model and the results of the modeling obtained during the study of the isotherms are in good adequacy of the model of Freundlich.

Keywords: Adsorption, Biochar, Melia azedarach, Crystal Violet, Cationic dye, wastewater treatment.

ID: WT009 ***Poster Presentation***

Adsorption of crystal violet dye using dates stalks biochar: equilibrium, mechanism studies and modeling analysis

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Abstract.

The dye is the first pollutant to be detected in wastewater [1]. The presence of a very low concentration of dyes, in water, is very noticeable and undesirable. Several treatment methods were used for treating effluents containing dyes [2, 3]. Adsorption is rapidly gaining prominence among the treatment technologies and [4] has noted that adsorption can produce high-quality water while also being a process that is economically feasible [5]. It is a useful and simple technique and allows kinetic and equilibrium measurements without any highly sophisticated instruments [6]. The present work describes the use of dates stalks biochar (DSB) as effective adsorbent for the removal of a hazardous dye, crystal violet (CV), from its aqueous solutions. The prepared adsorbent was characterized using FTIR, SEM. Experiments were carried out as a function of contact time, concentration of CV, pH and adsorbent dose. A high adsorbent removal efficiency (92%) was obtained after the first 60 minutes. The adsorption data of CV onto DSB followed the Freundlich isotherm. The kinetic data were evaluated using pseudo-first-order and pseudo-second-order model equations and the data were fitted well with the pseudo-second-order kinetic model. Concluding, DSB can be introduced and used as an efficient adsorbent in removing CV dye from aqueous environments and industrial wastewaters.

Keywords: Adsorption, dates stalk biochar, aqueous solutions, Crystal violet, isothermal models.

ID: WT010 ***Poster Presentation***

Model kinetics and adsorption isotherms of copper (II)

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Abstract.

Adsorption is one of the most widely adopted techniques for the removal of pollutants, because of its great ability to purify contaminated water. The present study is part of this perspective by trying to test materials from agri-food waste, particularly cypress waste for copper elimination.

Adsorption tests have shown that the fixation of copper on the bio carbon is rapid and improved with the increase in activated carbon doses. Langmuir, Freundlich isotherms were applied to determine the effectiveness of biomaterials as an adsorbent. The results showed that the isotherms are linear and that the reaction follows the second-order kinetics. This concludes that natural bio carbon can be used effectively as an adsorbent for the removal of copper Cu (II) in an aqueous solution.

Keywords: Bio carbon, Copper(II), Adsorption, Elimination, Cypress.

ID: WT011 *Oral Presentation*

Characterization of diatomite Silica Doped Fe Composite and their Enhanced Photocatalytic Activity by UV Light in Water Treatment

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Abstract.

Diatomite silica supported iron oxide nanoparticle thermally calcined composite as catalyst was developed for heterogeneous photocatalysis of vat green 03 indanthrene and characterized in this study.Diatomite modified by ferric oxide thermally calcined (DMF3X6) was synthesized by mixing raw diatomite with ferrous chloride tetrahydrate including the addition of NaOH is evidenced by x-ray fluorescence (XRF), x-ray diifraction (XRD), attenuated total reflection- Fourier transform infrared (ATR-FTIR) spectroscopy , scanning electron microscopy (SEM), energy dispersive x-ray (EDX), thermogravimetric analysis (TGA), differential scanning calorimetry (DSC) and UV-visible diffuse reflectance spectroscopy (DRS).The surface area of DMF3X6 is 218.2 m2/g and their bad gap was Eg = 1.60 eV by UV-visible DRS technique .The surface modification also increased the point of zero charge (pHPZC) values to 6 for Diatomite modified by ferric oxide thermally calcined at 600 °C " DMF3X6 " .The vat green 03 indanthrene textile dye degradation has pH dependency, the better result is at pH =10 with colour remove about 92 %.The photodiscolouration rate follows pseudo-first order kinetic with to respect to the dye concentration..

Keywords: Diatomite, silica, iron, photocatalysis, dye.

ID: WT012 ***Poster Presentation***

BM degradation for cobalt oxide thin-films under sun light with study of the surface morphology and the roughness at different withdrawn speeds

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Abstract.

In this paper, Co3O4 thin films with different withdrawn speeds were prepared on glass substrates via a sol-gel process with a low cost. Surface morphology and roughness have been analyzed and debated. The blue methylene (BM) was used to test the degradation efficacy under sunlight irradiation of cobalt oxide thin films. The withdrawn speed of 5 mm/s resulted in a high photocatalytic efficiency of 78%, which relates to 55 nm surface roughness. Each one of the thin films had a consistent structure and morphology surface. The AFM image at withdrawn speed of 3 mm/s revealed considerable roughness at 71.1 nm, followed by (54.7–51.4) nm at 5, and 9 mm/s withdrawn speeds, respectively. The degradation of BM was (44.99, 73.34, 77.88, 61.81, and 62.57) % at (1, 3, 5, 7, and 9) mm/s. stressed the potential for applicability to numerous types of organic pollutants from diverse wastewater sources under sunlight irradiation.

Keywords: Photocatalysis, Dip-coating, Co_3O_4 thin films, Sunlight.

ID: WT013 ***Poster Presentation***

Production of activated carbons from agriculture wastes for nitrates removal

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Abstract.

In the recent years, the activated carbon (AC) has been widely used in wastewater treatment. However, the high cost of commercial activated carbon makes the agriculture waste materials as a sustainable alternative for producing biochar. Due to the fact that, these residual biomasses are abundant, renewable, and available at low cost. This work aims to synthesize and characterize an activated carbon from vicia faba waste, then study of nitrates removal from water by adsorption. The following steps were carried out to synthesize the activated carbon: pretreatment of biomass, carbonization, and chemical activation. Spectral and physicochemical analysis such as IFTR, SEM, iodine number have been performed to characterize the produced activated carbon. The effect of time on nitrates ions removing from wastewater was investigated. Pseudo-first-order and pseudo-second-order kinetics models have been used to fit the adsorption data. All the results have been extensively discussed.

Keywords: Agriculture wastes, Activated carbon, Nitrates and Adsorption.

ID: WT014 ***Oral Presentation***

Preparation of a Magnetic Hybrid Adsorbent from Low-cost Biochar for the Effective Removal of Cu (II) from Water

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Abstract.

Considerable quantities of industrial waste effluents today contain large amounts of heavy metals which can cause potential risk for human beings and environment. In this study, peanut shells (PS) waste was used to produce biochar and then prepare separable magnetic biochar beads (MBB) for removal of copper ions from liquids. The prepared beads were characterized and applied as adsorbent of Cu (II) ions via batch experiments. The isotherm study was conducted at pH 5.0 and initial concentration ranging from 5 to 200 mg/L.

Results show that pHPZC value was 6.5 and 6.2 for the MBB and PS-biochar samples, respectively. MBB beads exhibited an excellent removal rate toward the Cu (II) ions compared to started biochar. The Langmuir model gives a much better fit than Freundlich for the isotherm data. The monolayer adsorption capacity of Langmuir reached 234.1 mg/g at 30°C (for MBB adsorbent). It was also found that the adsorption process was affected by the pH of solution.

The prepared beads can float on the solution surface and can be easily collected or separate using external magnetic field. They are also recyclable and very promising for elimination of metals from industrial wastewater.

Keywords: Peanut shells, biochar, magnetic beads, separable, Cu (II), isotherm.

ID: WT015 *Oral Presentation*

Study of the efficiency of activated carbon for the removal of a pharmaceutical product (metronidazole) from aqueous solutions.

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Abstract.

The problem of the drug residues' occurrence in aquatic compartments is very worrying because of their recalcitrant character, in addition to their increasing continuous discharge. Antibiotics are among the most consumed drugs worldwide. Their adverse effects on the aquatic ecosystem and on humans, such as drug resistance, alteration of the structure of algae in aquatic systems, and effect on non-target pathogens, have been proven by various researchers. Metronidazole (MNZ) is an antibiotic used to treat infections caused by parasites (amoebas) and anaerobic bacteria, it can also be administered to treat diarrhea. It is characterized by a low biodegradability, which implies the need for its treatment. The objective of this study is to investigate the adsorption of metronidazole on powdered activated carbon in an aqueous medium. For this purpose, experimental tests were carried out in batch on synthetic solutions of distilled water. In order to optimize the abatement process of the tested antibiotic, various reaction parameters were varied, namely the stirring speed, the adsorption kinetics, as well as the activated carbon content. The results of the adsorption kinetics showed that powdered activated carbon has a high affinity towards MNZ with a maximum yield of 98% during an equilibrium time of 30 min. It appears that a high stirring speed contributes to the increase of MNZ removal. Increasing the activated carbon content leads to increased removal efficiencies with an optimum carbon content of 1 g/l. The removal of the drug product is very appreciable regardless of the drug content. From the acquired output, it can be deduced that powdered activated carbon is an ideal adsorbent for the treatment of water containing metronidazole.

Keywords: Metronidazole, adsorption, activated carbon, kenitics, stirring speed.

ID: WT016 ***Poster Presentation***

Separation of metals mixture (Fe, Cu, Zn and Co) using precipitation, cementation and IEX

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Abstract.

The plating and surface finishing industry produces significant quantities of metal hydroxides sludge issued from IEX regeneration and precipitation. This sludge poses a double problem: environmental and economic. In this work, we use certain hydrometallurgy processes (precipitation, cementation by zinc and exchange ions resins) as well as the complexation of the zinc ions in chloride medium; to separate the mixture of metals :cobalt, copper, zinc and iron. After leaching by the sulphuric acid, we filter to eliminate Co (OH) 3 which is insoluble in sulfuric acid. Then we apply dialysis diffusionnelle to recover the excess of acid. We increase the pH until approximately 4 for precipitate iron in the form of hydroxide. Then we eliminate copper by cementation by zinc. The separation of zinc and cobalt is made in chloride medium. For the complexation by chlorides, we used software (HYDRA - MEDUSA) to find the optimum conditions of separation. A preliminary theoretical study of equilibrium (diagrams of distribution…) and the use of the Hydra-medusa software allowed lying down the optimum conditions for separation. They allow also significant economies in useless laboratory tests. The example of complexation by chlorides is clearly visualized: the complexes of zinc are negative and those of cobalt are positive thus making it possible to choose the ionic exchange for the separation of the two metals.This procedure gives an excellent efficiency of separation: 65 % of leaching acid, 70.66 % of iron, 89.5 % of copper, 70 % of cobalt (II), 64 % of cobalt (III) and 60 of zinc.

Keywords: heavy metals, cementation, ionic resin, sludge.

ID: WT017 ***Poster Presentation***

Kinetic study of the fixation of an organic pollutant on a biosorbent

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Abstract.

This present research is devoted to the study of the valorization, according to the circular economy model, of agri-food waste, namely potato peelings for the manufacture of an adsorbent materials, which will be used for the depollution of waste water contaminated with dyes and, in this case, yellow bemacide (YB) generated by the various textile industries. The results show that we were able to remove more than 74% of the yellow bemacide (YB) dye on the microwave activated potato peelings. The adsorption kinetics is very fast. The kinetic data were modeled by five equations, which revealed that the adsorption of yellow bemacide (YB) on microwave-activated potato peelings follows the pseudo-second-order model. During our study, experiments confirmed that microwave activated potato peelings are a cheap bio-adsorbent, which has a high capacity to remove yellow bemacide (YB) from aqueous solutions.

Keywords: Valorization, agri-food waste, microwaves, adsorption, yellow bemacide.

ID: WT018 ***Poster Presentation***

The capacity of an aquaponics system to treat of Tilapia cultuvation wastewater for reuse to growing Lettuce (Lactuca sativa L.)

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Abstract.

In the recirculation aquaponic system (RAS), fish farming waste was utilized as a nutrient for plants, minimizing the water need, and producing the fish and plants as well. However, this wastewater contains a high concentration of ammonia which is toxic to aquatic animals. The objective of the study was to examine the capacity of an aquaponic system to treat Tilapia wastewater for reuse to grow Lettuce (Lactuca sativa L.) without chemical inputs. During the experiment, the plant growth parameters were measured. Various physicochemical parameters were evaluated as water quality indicators. lettuce harvests showed a good performance in terms of growth and production, with a final weight of 180.226 ± 5.59g. There was a positive relationship between the time and the levels of NH4 and therefore NO3− in the water. the ammonia content decreased from 1.90 mg/l at the beginning of the trial to 0,768 mg/l at the end. While the concentration of nitrate- ranged from 17.260 mg/l to 14.650 mg/l. It was discovered that the aquaponic system with the bioball used as the biofilter media could remove the ammonia in the tilapia wastewater, specifically decreasing it to 0.768 mg/L, which contributed to the reuse of water for a closed recirculation tilapia culture system and growing vegetables at the same time.

Keywords: Aquaponics, Water-Reuse, Ammonia-Removal, Biological-filters, Lettuce, Tilapia.

ID: WT019 ***Poster Presentation***

Design and development of a new sensitive part of a biosensor based on a composite biomaterial for the detection of heavy metals

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Abstract.

Hemicellulose, a biomass-derived material, has recently become more popular in the creation of value-added products such as hydrogel-based sensors. In actuality, the incorporation of hemicellulose for heavy metal detection applications is a novel strategy that has caught the interest of researchers recently. In this study, voltammetri and impedence techniques were employed to produce an electrochemical sensor of trace heavy metal ions using the hemicellulose cactus extract as a sensitive matrix. By simple adsorption, the Hemicellulose/ Agarose hydrogel composite recognition layer (AG/HEM) was placed on a gold electrode. Under optimal chemical and instrumental conditions, the variation in current intensity increased linearly with the increase in ion concentration, with a detection limit (LOD) that was both very interesting and significantly below many polymer-based heavy metal sensors as well as the WHO threshold limits. We also assessed the AG/HEM membrane's stability, reusability, and capacity for long-term storage. Finally, we investigated how well this matrix could determine metal contamination in environmental water samples.

Keywords: hemicellulose, agarose, heavy metal, detection limit.

ID: WT020 ***Poster Presentation***

Removal of copper by adsorption on chemical and physical activated carbon prepared from agricultural waste

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Abstract.

In this study, we performed the removal of copper Cu (II) ions in aqueous solution of copper sulfate (CuSO4) by adsorption on activated carbon prepared from plants. Comparative study of the adsorbent capacity of an activated carbon by two ways: physical activation and chemical activation. The chemical activation of the plants is carried out by zinc chloride (ZnCl2) 0.1 M at room temperature. Several parameters were studied, such as the effect of the dose of activated carbon (0.02-0.1 g), stirring time (20-120 min), pH of solution and initial copper concentration (100-400 mg/l). Our results showed that adsorption isotherms and kinetic studies show that these supports are good adsorbents for copper in solution.

Keywords: Adsorption, activated carbon, kinetic, Cu (II).

ID: WT021 ***Poster Presentation***

Study of the Physical and Chemical Properties of a Biomaterial as an Adsorbant on Removal of Total iron ions in Aqueous Environment

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Abstract.

In this work, we went to the preparation on a pillar that we obtain from a natural product, namely palm leaves from the Biskra region. The purpose of our work being to find a low -cost and high efficiency biomaterial in water treatment (Elimination of Iron ions), it is crushed and sifted to obtain a fine grain powder with a granulometry ≤90 microns. This material was tested by absorption of total iron ions in aqueous environment, in this research, it has been found that the adsorption process depends largely on a set of chemical variables, namely pH, quantity of adsorbent, initial concentration in metal ions and physical characterization: electron microscope in scanning (SEM), Infrared (FTIR) and XRD spectroscopy, these studies help us collect as much information as possible on these materials.

The experimental results have shown remarkable value for the effectiveness of palm leaves, since more than 90% of iron ions were eliminated in the mass of the adsorbant 20 mg/l, pH 12, and the first concentration 6 g /L.

Keywords: Water treatment, Iron, Biomaterials, Physical and chemical characterizations, Adsorption.

ID: WT022 ***Poster Presentation***

Removal of methyl orange dye from aqueous solution using magnetic double walled carbon nanotube nanocomposite as adsorbent

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Abstract.

Environmental protection requires special attention to industrial activities that use chemicals in their manufacturing process. Indeed, many industrial processes, as textiles, paper, pharmaceuticals, leather tanning, cosmetics, use a wide variety of synthetic chemicals such as dyes.

Various techniques have been developed for decontamination purposes. However, adsorption process seems to be among the most effective methods yielding therefore to remove dyes from aqueous environments, while several studies have already been done in this field using several materials as adsorbents. Indeed, the performance and the efficiency of this adsorption technique depend generally and preponderantly on the nature of the support used as adsorbent.

Synthetic goethite (α-FeOOH) is one of the most important phases of iron oxides because of its application as an adsorbent for various toxic cations and anions due to chemical reaction occurring at specific surface sites. In another side of view, double walled carbon nanotubes shows good mechanical, electrical properties and especially a large surface area . Prior to this, carbon nanotubes are nanomaterials which have undergone considerable development in recent years due to their remarkable potential for nanoscale applications, with a fibrous form, large external surface accessible, and a well-developed mesopore As a starting point as an hypothesis, the combination of magnetic properties and adsorbent properties within the same material is an interesting challenge that could overcome the problems of recovery of adsorbents loaded with pollutants.

This work aims the synthesis of (DWNTCs/α-FeOOH) by refluxing process. The results indicated that the maximum adsorption rate is 9.6 mg.g -1 with 100 mg of (DWNTCs/ α-FeOOH), and an initial orange methyl concentration of 10 mg.l-1. In addition, the adsorption process describes a second-order kinetic model, where the modeling of adsorption isotherms showed that the Freundlich one seem to be the adequat model describing the adsorption process with R2 = 0.97.

Keywords: Carbon nanotubes, α-FeOOH, methyl orange.

ID: WT023 ***Poster Presentation***

Conception d'un capteur électrochimique à base de la pectine des écorces des agrumes pour la détection du paracétamol dans les milieux aquatiques

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Abstract.

In this work, we present a new electrochemical sensor based on a polyelectrolyte complex (pectin-chitosan), intended for the detection and quantification of paracetamol in aquatic environments.
Pectin is a non-toxic, biodegradable, biocompatible and abundantly found anionic polysaccharide found in the cell wall of trees and terrestrial plants. Based on these advantageous properties, we have chosen to isolate pectin from citrus bark and use it to develop a sensitive, fast and inexpensive electrochemical biosensor for the detection of paracetamol in aquatic environments.
A polyelectrolyte chitosan–pectin complex was prepared as a sensitive part. The electrochemical behaviour of paracetamol on a gold electrode modified by this prepared biocomposite was studied as well as the effects of detection conditions. The new biosensor has a satisfactory sensitivity with a detection limit of the nanomolar order. In the light of these results, it appears that the extract used could offer a new catalyst less costly and abundant.

Keywords: electrochemical sensor, polyelectrolyte complex, paracetamol, biocompatible, detection limit.

ID: WT024 ***Poster Presentation***

Synthesis and characterization of activated carbon from palme by chemical activation

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Abstract.

For the manufacture of activated carbon, agricultural leftovers have been used as a precursor material. Researchers looked at how phosphoric acid affected the porosity, adsorption, and surface properties of carbon. Using phosphoric acid in the range of 60 to 100%, three samples of carbon were created, each measuring 80 m in size. Activated carbon made from palm trash was characterized using FTIR, phpzc, and ATG. Additionally investigated were the iodine index and the methylene blue index.It was investigated how different variables, including starting dye concentrations of 50–300 ppm and pH (2–10), adsorbent dose (0.0025–1.5 g/L), contact period (20–240 min), and other variables, affected the results. Compounds were evaluated in solution before and after adsorption using FTIR spectroscopy. Application of and experimental results supporting isothermal models of Langmuir and Freundlich. The findings demonstrated that the adsorption phenomenon closely matches the Langmuir isotherms a pseudo-second-order model best captures the sequential adsorption kinetics of Congo red and methylene blue dyes on palm residue. The outcomes demonstrated that phosphoric acid significantly enhanced the aforementioned properties.

Keywords: bleu de méthylène, rouge Congo, adsorption, charbon actif.

ID: WT025 ***Poster Presentation***

Modelling of phosphate adsorption on activated coal from date stones

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Abstract.

Recently, the presence of phosphorus in domestic wastewaters has received increased attention due to the realization of negative impacts it can have on receiving waters in the environment. Excessive presence of phosphorus is a major cause of eutrophication of fresh water bodies.
Of these techniques, adsorption appears to be the simplest, most efficient and inexpensive Activated carbon is one of the most widely used adsorbent materials for the treatment of natural water. Research is focused on the use of locally available low-cost adsorbents made from natural sources. Agricultural residues have been widely used as adsorbents to treat effluents such as date stones. The date stones (DS) were prepared in pieces of 0.2 to 0.5 cm then washed to remove impurities then dried at 110 °C for 24 h. FTIR spectra of prepared activated charcoal show that there are C-O C=O and CH3 bands in the structure of activated coal. These bands confirm the existence of carbonyl, lactone, aldehyde and carboxyl groups on the surface of the activated char-coal. In single systems, the kinetics of adsorption of phosphate follows the pseudo-second-order model and equilibrium was reached after stirring for 40 min resulting in an equilibrium efficiency of 96.55 %. The maximum removal, (qt = 18.414 mg/g and 19.311 mg/g), corresponds to the maximum of phosphate ions fixed on the surface respectived for DSNA (unactived) and DSAC (actived with phosphoric acid) and the minimum of residual phosphate content. We followed the elimination of phosphate according to the initial concentration of phosphate.
The results obtained showed that the dephosphatation is effective for low levels of phosphates ((in our study C0< 20mg /l). Models of Langmuir and Freundlich can be used to describe the adsorption equilibrium. In this study, date stones (DSAC) has proved to be an efficient adsorbent for the reduction of phosphate on synthetic solutions.

Keywords: Active carbon, Date stones, Adsorption, Phosphate.

ID: WT026 ***Oral Presentation***

Thermodynamic study of ibuprofen removal using biochar pepper stem oxidize

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Abstract.

In this work, we study the effect of oxidized biochar-PSO700 with sodium hydroxide for pepper stem on the removal of ibuprofen. results of the isotherm study indicate that the adsorption of Ibuprofen by PSO-biochar chas great potential, which provides a good theoretical basis for the application of PSO-biochar in environmental protection in Algeria: The initial ibuprofen concentration 60 mg L−1, equilibrium time 120 min and temperature 20 °C for more than 79% adsorptive removal of ibuprofen. The equilibrium adsorption estimated maximum removal capacity is 330.96 mg/g. As the initial IBU concentration increased the adsorption amount also increased and the adsorption was favorable.

The signal of thermodynamic parameters was negative ΔG° and ΔH° values, but positive ΔS° value. The thermodynamic analysis showed that Ibuprofen adsorption onto biochar-PSO700 was spontaneous and Exothermic. Thus, biochar-PSO700 can be used as an effective absorbent to remove dyes from wastewater. The adsorption mechanism consisted of pore-filling, hydrogen bonding formations, n-π and π-π interactions, and van der Waals force.

Keywords: Ibuprofen, PSO700, adsorption, mechanism, Thermodynamic.

ID: WT027 ***Poster Presentation***

Synthesis and characterization of semiconductor material for degradation of organic dye via photocatalysis

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Abstract.

The main objective of this work relates to the synthesis, the characterization of a semiconductor material of perovskite structure ABO3by different techniques and to study the photocatalytic properties for the degradation of organic pollutants and the treatment of water. The material selected for this study was prepared by the sol gel method, and calcined at T= 800°C for 5 hours, to form the perovskite oxide phase. Different characterization techniques were used such as scanning electron microscopy (SEM), X-ray diffraction analysis (XRD) and IR.

Keywords: Perovskite, degradation, organic pollutants, Photocatalysis.

ID: WT028 ***Poster Presentation***

adsorption and Removal of organic compounds from water through low-cost carbonaceous materials

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Abstract.

Nowadays, humanity is increasingly confronted with a serious problem; Indeed, for years, the degradation of ground and surface water by organic pollutants has been a public health problem. Human activity in the pharmaceutical, agricultural, industrial fields, etc. generates various pollutants that permanently alter the quality of water and jeopardize the very future of human beings. Phenolic compounds, especially the chlorinated ones, are considered very harmful to plants, animals, and human, even at low concentrations.The aim of this work is to study the possibility of purifying water loaded with organic compounds such as phenol by adsorption technique. We used biochar prepared through one-step pyrolysis at 600 °C from palm waste. It was used as a low-cost sorbent to absorb 2-nitrophenol. Various tests, such as stirring time (0 to 360 min), pH (3 to 11), and initial concentration (2 to 200 mg/L) of the adsorbent were studied and examined. The adsorption studies performed showed that a pseudo-second-order model can be used effectively to evaluate adsorption kinetics. The Langmuir model provides the best fit for isothermal absorption. pHpzc was found to be 6.7. The sorbent used in this study showed great success in removing 2-nitrophenol even at high concentrations. Bio char can be used as a sustainable solution in actual environmental conditions and on an industrial scale.

Keywords: Biochar, palm fibres, adsorption, 2-Nitrophenl, kinetics, equilibrium.

ID: WT029 ***Poster Presentation***

Synthesis of highly sensitive molecular imprinted sensor for selective determination of heavy metals

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Abstract.

Heavy metal pollution can be toxic to humans and wildlife, so it is very important to develop rapid and sensitive methods to detect them. The present work deals with the development of electrochemical sensors based on ion imprinting polymer for the detection of trace metal ions, especially cadmium ions, in the aquatic environment. A platinum electrode was modified with poly (3,4ethylenedioxythiophene), (II/PEDOT), by an in situ electropolymerization method with cadmium ions as the fingerprint ion. solvent extraction of cadmium ions created cavities in the polymer matrix corresponding to the properties of the target ion (size, shape, and function). All these phenomena are monitored and characterized by electrochemical methods CV and SWV under the conditions of optimized experience. The modified electrode shows excellent electrochemical performance towards Cd^{2+} in a linear range from 0.5to75 µg. l^{-1}, with a very good detection limit (LOD), quantification limit and an estimated pressure factor of 0.05 µg. l^{-1}, 0.17 µg. l^{-1} and 2.78, respectively.

Keywords: heavy metals, electrochemical sensors, ion-imprinted polymer.

ID: WT030 ***Poster Presentation***

Valorisation d'un biomatériau «Spirogyra: Tahalib» pour dépollution des eaux contaminées par le cuivre par l'adsorption

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Abstract.

La pollution des eaux et sols, accidentellement ou volontairement par certains produits chimiques d'origine industrielle ou agricole constitue une source de dégradation de l'environnement et suscite à l'heure actuelle un intérêt particulier à l'échelle internationale. Ce travail s'inscrit dans le cadre de la dépollution des eaux usées contaminées par les métaux lourds (le cuivre). Pour atteindre cet objectif, nous avons effectué des essais d'adsorption pour évaluer la capacité d'élimination du cuivre Cu2+ par un charbon actif préparé à partir de biomatériau (les algue vertes Spirogyra) de la région de M'Chouneche wilaya de Biskra et activé par un acid à différentes puretés (20%, 40%, 60%, 80%, 100%). D'autres part, la caractérisation physique (porosité et surface) des algues vertes brutes et le meilleur charbon qui a été déterminée par l'analyse DRX, MEB, IR et BET et la caractérisation chimique (fonction de surface), qui a été effectuée par le pH au point de charge nulle (pHPZC). Aussi, on a étudié l'influence des différents paramètres physico-chimique tels que le temps de contact, la masse, le volume, la concentration, le pH et la température. Quelque résultats ont montrées que la rétention du cuivre est rapide, où l'équilibre à 30 minute, et concernant la masse, le volume et la concentration de la solution optimales sont de m=0.1g, V=50ml et C=200mg/l et avec une température ambiante 25 °C et pH= 5 avec un rendement maximal R=89, 61%.

Keywords: Spirogyra, Acid, Charbon actif, Paramètre physic-chimique, Caractérisation.

ID: WT031 *Oral Presentation*

Mixture of shells non activated for removal of lead from water : Adsorption, factorial design analysis, Kinetics and isotherm studies.

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Abstract.

Water pollution by heavy metals is a major environmental concern because of their non-biodegradability because of their non-biodegradability and their strong toxicity, among these metals, we are interested in Lead. Pb salts enter the environment through car exhaust fumes. The larger particles fall to the ground immediately and pollute the soil and surface water, the smaller particles of Pb travel long distances in the air and remain in the atmosphere. Our study will focus on the combination of adsorption and inductively coupled plasma mass spectrometry mass spectrometry (ICP-MS) which has demonstrated in recent years that it offers efficient analytical performances of trace elements.We will study the adsorption using a bioadsorbent made of a mixture of nuts, pecan and peanut shells, to study their capacity of adsorption of heavy metal in water, based on the heavy (Lead) metals in water, based on the results obtained by(ICP-MS).

The contact time, the dose of the pH and initial concentration are parameters that influence the adsorption process, therefore they were process, therefore they were studied following a complete factorial design in order to better understand the behavior of our raw adsorbent. After determination of the desirability of our factorial study, the study of the adsorption isotherm of Lead on our support is carried out under the fixed optimal conditions. In order to examine the transfer kinetics of lead to the surface of our shell mixture, two kinetic models were used to test the experimental results in pseudo-first and pseudo-second order kinetics.

Keywords: Adsorption ,Lead , Isotherms, Kinetics , Full factorial design , ICP-MS.

ID: WT032 ***Poster Presentation***

Removal of aqueous effluents by low-cost bio adsorbents pumpkin seed hulls

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Abstract.

The objective of this study was focused on the synthesis and preparation of cationic and anionic biomaterials. These materials were used as adsorbents in waters polluted by different adsorbates likely to be present in the environment. The different materials will be characterized by different techniques (FTIR, XRD, SEM, BET and ATG/DTA). The adsorption studies with these materials will be carried out by controlling the different parameters such as: pH, mass, concentration and temperature.
Removing effluents from aqueous media, in particular the adsorption technique which seems to be well suited to remove pollutants due to its proven efficiency and also for economic reasons, using low-cost adsorbents such as agricultural and industrial waste.

Keywords: Characterization, Different materials, Water treatment, bio adsorbents.

ID: WT033 ***Oral Presentation***

Enhancing the ZnO Photocatalytic Efficiency by Ag Doping in the Dye Removal from Wastewater

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Abstract.

This paper discusses the synthesis of pure Ag co-doped ZnO was successfully accomplished using a biosynthesis process. Materials with defined structures as have been prepared via henna extract. These solids are then dried and then calcinated at a temperature of 400°C for four hours. The synthesized samples were characterized by Fourier Transformer Infrared Spectroscopy (FTIR) and X-ray diffraction (XRD). The photocatalytic ability of the samples is estimated through degradation of tartrazine in aqueous solution under photocatalytic conditions. The effect of operating parameters such as catalyst dose, initial concentration of tartrazine has been optimized for tartrazine degradation as a function of time. Results showed that the removal rate of tartrazine dyes increased with the increased dosage of catalyst and decreased with initial dyes concentration. Also the acidic condition is favorable for degradation efficiency. The mechanism of photocatalytic activity was also proposed.

Keywords: Photocatalysis, Tartrazine, Henna.

ID: WT034 *Oral Presentation*

Treatment of the industrial wastewater from food Aromsa and ingredients production by electrocoagulation (EC) process assisted by the mucilage of opuntia ficus indica

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Abstract.

In this study, the electrocoagulation-electroflotation (EC-EF) process was assisted with the mucilage of Opuntia ficus indica (OFI) cladode in order to enhance the COD removal efficiency of the industrial wastewater of food Aromsa company and ingredients production at Gebze, Kocaeli, Turkey. Investigated parameters included initial pH, Current density (j) , types of electrodes (iron (Fe) and aluminum (Al) anodes), mucilage concentration and charge loading . The EC-EF using the Al electrodes and at optimum concentration of 200 mg/L OFI mucilage, pH 3 and j= 60 A/m2 improved the COD removal efficiency with 69.77 % in shorter time of t = 40 min (3048 C). The operating costs, energy and electrode consumption were equal to 3.809 $/m3, 0.81 kWh/Kg COD removal and 0.7898 Kg/m3 respectively. Compared to Fe anodesm any improvement was noted with or without adding mucilage at pH 6, j = 50A/m2 the COD % removal efficiency was 41.5 % at t = 120 min (7632 C) The operating costs, energy and electrode consumption were equal to 4.2201 $/m3, 2.8 kWh/Kg COD removal and 3.0964 Kg/m3, respectively. The addition of 200 mg/L of OFI mucilage to EC-EF using Al electrodes allowed 69.77% of COD efficiency at 40 min.

Keywords: Electrocoagulation-electroflotation, Aromsa wastewater, COD, Opuntia ficus indica, cladode mucilage.

ID: WT035 ***Oral Presentation***

Contribution to the improvement of the resistance of cementitious materials against the aggression of the groundwater by the addition of dune sand

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Abstract.

The rise of the water table in the region of Oued-Souf (south-east of Algeria) presents a major ecological and environmental problem. The groundwater saturated with aggressive substances and minerals poses a great danger to agriculture and building infrastructure. In the field of construction and building we always try to develop a concrete that resists this aggression through the use of local resources.
In this context our paper is inscribed; it is a contribution to the use of a local material for the development of a mortar (concrete), which resists well to this chemical aggression. We used crushed dune sand as an addition with different percentages (10, 15, 20%) in order to find an optimal composition that gives good chemical and mechanical performance. We found that this addition presents a good alternative to other additions commonly used in the cementitious sector.

Keywords: groundwater, chemical attack, cement, dune sand, mechanical resistance, ecology.

ID: WT036 ***Oral Presentation***

Nitric Acid – Metals Waste Waters From A Brass Pickling Used Bath: Separation, Purification and Recycling by an Hybrid Process Diffusion Dialysis – Selective Physico - Chemical Methods

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Abstract.

This research work applies a clean technology to treat the concentrated waste waters of a brass pickling bath. This last contains high concentration mixture of nitric acid and dissolved metals (Cu++, Zn++ and Pb++).
Now the studied industrial plant neutralizes HNO3 and precipitates the metals with these 3 major drawbacks:

- Loss of an expensive acid (50 % of the initial quantity);
- Pollution of the treated and rejected effluents by nitrates;
- Production of a problematic (filtration, storage, fate …) metal hydroxides sludge;

To solve these problems, we apply a clean hybrid technology:

- The diffusion dialysis with anion exchange membranes AMX; the result is excellent. We separate and purify HNO3 with a high efficiency.

The remaining metals mixture contains Cu++, Zn++ and Pb++ which are processed by chemical (selective precipitation) and physico – chemical (cementation, …) methods.
The experimental study gives the following results:

- Proton leakage Diffusion dialysis gives a good efficiency (≈50%) of nitric acid recovery in only a first batch step.
- Selective precipitation of metal phosphates leads to excellent yields: 100 % of Pb ++, 91.275 % of Cu ++ and 86.61% of Zn ++.
- The test of copper cementation by powder of the zinc excess showed that the reaction gives an excellent output (74.32%) of copper recovery.

The results obtained, seem that selective precipitation by phosphate, cementation and dialysis are effective and economic techniques for recovery and recycling metals and acid of brass pickling bath It is a clean technology which can be applied to stagnant bath.

Keywords: Nitric Acid, brass pickling bath, Diffusion Dialysis, Selective Physico - Chemical Methods.

ID: WT037 *Oral Presentation*

Urban wastewater depollution trial in the city of Biskra using filters planted with Phragmites australis

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Abstract.

The purification of wastewater through the use of the plants (phytoepuration) was used in dif¬ferent areas; it was tested successfully for the reduction of organic pollution, for the elimination of phosphorus pollution, nitrogen pollution, metals, and for the destruction of the pathogenic germs. This study reports the monitoring of purifying performances of the different types of materials of the filters planted with macrophytes, which show a good acclimatization in arid climate. Using a substrate composed of alluvial sand, alluvial gravel, clay and macrophyte plants (Phragmites australis). The experimental pilot set_up consists of six plastic tubs capacity of 20 L. Three tubs were planted with young stems of the studied species with the coverage of 15 stems/m2, and the other three tubs remained unplanted to serve as reference object. The flow occurred by percolation through the substrate. The residence time of water is 5 days. Treated water is recovered by a tap placed in bottom of the tub. The results show, very satis¬factory outputs were obtained for particulate and organic pollution, where the decrease rates of reached 91% for suspended matter (SM), 88% for the Chemical Oxygen Demand (COD), and 87% for the Bio¬logical Oxygen Demand (BOD5). The elimination of nitrogen and phosphorous pollution resulted in decreasing rates of 94% for nitrates and 95% for orthophosphates. The plant sand combination gives the best yields for the elimination of organic and nitrogen pollution. This performance refers to the nitrification and denitrification interactions ensured by the bacteria, which colonize the roots of the plant. The combined action of plants and microorganisms in a filter bed has allowed the degradation of the polluting load, by oxidation, reduction, denitrification and nitrification, with well-defined genera of bacteria, such as Clostridium and Pseudomonas. The phyto-purification process has highlighted the importance of filters and plants in the purification of wastewater, especially sand and Phragmites australis.

Keywords: wastewater treatment, phytopurification, arid climate, substrate, Phragmite australis.

ID: WT038 *Oral Presentation*

PHYSICOCHEMICAL, MINERAL ANALYSES AND HEAVY METALS CONTENT OF TAFADEK ONSEN, TCHIROZERINE, AGADEZ, NIGER REPUBLIC

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Abstract.

Tafadek spring is postulated to have therapeutic indications with rich fluoride, silica and balneotherapy for the treatment of orthopaedic, rheumatological, neurological, urinary tract infections, and osteoporosis. If the Tafadek spring is developed into a modern health resort promoting balneotherapy, health tourism it could give way for tourism development of the nation. The aim of the study is to analyze the physicochemicals, minerals and to determine some heavy metals. Tafadek valley is located in the district of Tchirozerine, Agadez, Niger Republic, with the Latitude of 17°29'33.0"N and Longitude 7°50'02.0"E The hot spring water with temperature of 83 0C was analyzed for its physicochemical parameters and the heavy metals content. Turbidity was found to be 27.3, total alkalinity 311.5 mg/dm3, nitrate 27.2 mg/dm3, phosphate 14.6 mg/dm3, conductivity 145.3 µs/cm3, TDS 297.8 mg/dm3, COD 185.4 mg/dm3, DO 5.9 mg/dm3, TOC 1.3 mg/dm3, PH 7.2, TSS 276.5 mg/dm3, bicarbonates 173.2 and chlorides content was found to be 87.5 mg/dm3, fluorides 7.2 mg/dm3, nitrates 2.9 mg/dm3 and the sulphates content was found to be 167.8 mg/dm3. The results showed that values for turbidity, total alkalinity, nitrates, COD and temperature are higher than the WHO limits while electrical conductivity, TOC and TSS were lower. The PH and DO were found to be within WHO set values. The heavy metals detected include zinc with 0.37 g/dm3, chromium 0.05 mg/dm3. Pb, Cu and Ni were below detection limit (BDL). Zinc was higher than the WHO limit while Cr was lower. The results of the physicochemical, mineral analyses of the water sample showed that the levels of trace elements, Ni, Pb, Zn and Cu were all below the WHO threshold limits were found to be below the guidelines for drinking water given by WHO and SON. Conclusively, the water sample from Tafadek stream is safe for human consumption.

Keywords: physicochemicals, Tafadek, Hot spring, Onsen, Tchirozerine, Agadez, Niger Republic

ID: WT039 ***Poster Presentation***

Effects of iron doping on optical properties of BIT Aurivillius

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Abstract.

Bismuth titanate (Bi4Ti3O12) ceramics, so-called BiT,has many recent applications in electronics, ionic, thermal, optical and catalytic purification of polluted waters.We investigated the effect of 8% of Fe3+ doping on the structural and optical properties of BiT Aurivilius, which was synthesized by the molten salt method, and its properties were investigated using XRD and UV-visual techniques. X-ray diffraction patterns of our sample indicated that the crystal phase of BiT-8% Fe was orthorhombic with (Fmmm/69) space group. The optical properties of BiT-8% Fe using UV-Vis absorption spectra revealed that the optical band gap of BIT- 8% Fe is 3.55 (eV) higher than that of undoped BIT, making it effective as a catalyst for the degradation of organic pollutants such as Rh-B and MB.

Keywords: BiTAurivillius, Fe^{3+}, gap energy, X-ray.

ID: WT040 ***Poster Presentation***

Prediction of the water quality index of the station of the dam guenitra of Oued Gabli using the ANN model

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Abstract.

Water quality management in rivers is one of the most important environmental challenges. Classically, WQI is commonly computed using the traditional methods, which involved lengthy calculations, are time consuming, and are sometimes associated with inadvertent errors when calculating sub-indices. Therefore, it is essential to provide an accurate prediction model for the WQI. Recently, Artificial Neural Networks (ANN) among the most used intelligence methods for estimation and prediction of complex environmental variables.

The objective of this research focuses on the prediction of WQI using the ANN model and the determination of the most important input variables. The focus is on finding the best assessment of surface water quality in the Guenitra dam, Oued Guabli by using the three classical indices WQINSF (National Sanitation Foundation Water Quality Index), WQICCME (Canadian Council of Ministers of the Environment Water Quality Index) and WQIAP (weighted arithmetical Water Quality Index). For the selection of input parameters, a PCA was performed to reduce the loads of 23 physical and chemical parameters. The Central Laboratory of the National Agency of Water Resources, Eastern Region (Algeria), collected him. The results bring back 10 variables (DO, BOD5, COD, NH3, NO2, PO4, TSS, Cond, T and pH) used in the calculation of the classical indices and as input parameter for the prediction model. In addition, it attributes the pollution sources to essential anthropogenic activities.

The prediction of water quality index by ANN was performed by multi-layer artificial neural network models, the effectiveness of these models was revealed using the dispersion (x - y) and fitness criteria which showed that the ANN models predicted the quality indices well.

These results justify the use of the environmental modeling technique to reveal the water quality model for decision making by the government and stakeholders.

Keywords: Artifical neural networks, WQI, Water Quality Evaluation, Principal component analysis, Sensitivity analysis, Ageria.

ID: WT041 ***Poster Presentation***

Contribution to the purification of drinking water by activated carbon from date pits

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Abstract.

Recently several research works are devoted to the valorization of date pits in different forms and in the present study we are interested in the valorization of date pits in several fields (agri-food, therapeutic) having several uses: Manufacturing of activated carbon, used for water dechloration and heavy metal removal process,The water used is a drilling water coming from the region "Zellagua" in Mascara(Algeria) which is a water generally hyperchlorinated because the use is anarchic of the bleach by the owners of the drilling water. However, it is mentioned that the normal level of chlorine in drinking water is 0.5 mg/l.

Previously, we studied the physico-chemical characteristics of date pits. From the results obtained, it appears that the physico-chemical characteristics of the pits are (in %): Moisture 5.83, pH 6.43, titratable acidity 1.18, ash 0.92, whose most dominant mineral elements are (in % MS): k = 54.3, P = 19.3, a richness in organic matter and dry matter 99.04, 94.16 respectively Thus, they contain a content of 2.89% protein, 4.14% total sugars, 6.05% fat, cellulose rate is 9.13% and lignin 9.9%.

Then, this work proposes to produce an activated carbon from date pits capable of adsorbing pollutants present in the drilling water. Moreover, the latter was likely to adsorb chlorine under the effect of contact time from 3.5 mg/ml to 0.2 mg/ml after 1h and 30min of contact, also we have seen a marked elimination of heavy metals present (cobalt, nickel, zinc, copper),this results makes the project is interesting, valuable, and worth investigating further.

Keywords: water purification,activated carbon,date pits,valorization.

ID: WT042 ***Poster Presentation***

Assessment of Drinking Water Quality From Demineralization Station in Djamaa City, Algeria

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Abstract.

Groundwater is the major source for drinking purposes in northern Sahara of Algeria. Due to its high salinity, minerals are removed from them by desalination plants. The present study was carried out to assess the quality of drinking water produced by demineralization station designed to lower the groundwater salinity in Djamaa city, Algeria. The assessment was done by investigating the physico-chemical water characteristics and heavy metals concentrations. Representing water samples were collected from the drinking water treatment station . Water quality characteristics include: pH, Turbidity, The total dissolved solids (TDS), EC (electrical conductivity), Ca2+(calcium), Mg2+ (magnesium), K+ (potassium), HCO3-(bicarbonate), Cl- (chloride), and SO42- (sulfate), Na+ (sodium) and NO3-(nitrate), NO2-. Water quality parameters were compared to the World Health Organization (WHO) standards for drinking water. The obtained results revealed that of the studied parameters fall within the World Health Organization standards. Accordingly, all of treated water samples fall in excellent and good categories for drinking purpose. water treatment stations reduce groundwater salinity in order to make the water suitable for drinking. Accordingly, there is an urgent need for the continuous monitoring of water desalination plants and implementation of all the environmental health regulations and conditions. there is a great necessity for a continuous monitoring and assessment of the quality of drinking water produced via water treatment stations in order to protect the human health in the region.

Keywords: Djamaa, Groundwater, drinking water, Physico-chemical characteristics, demineralization station.

ID: WT043 ***Poster Presentation***

New material "Ag_2MnO_2" for wastewater treatment by photocatalytic process

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Abstract.

New technologies have therefore appeared in recent years, including advanced oxidation processes (AOP). These are technologies based on the production of highly reactive oxidizing species such as the hydroxyl radical, to degrade recalcitrant organic pollutants [1].
Heterogeneous photocatalysis is one of these AOPs which has already demonstrated its ability to treat a large number of pollutants. Propelled by the advancement of so-called photonic technologies, this technique has gained ground in recent years and has proven to be very effective in eliminating toxic compounds in water in an economical and clean way, because it uses a renewable energy source. and semiconductor materials at limited cost [2, 3].
The objective of this study is to synthesis of a new material Ag2MnO2 which will be used in photocatalysis process and to verify the effectiveness of this material in the treatment of wastewater obtained from Ain Taghrout WWTP. The results showed that the synthetized Ag2MnO2 possesses very encouraging photocatalytic properties which given the significant decrease in COD from 600 mg/l to 60 mg/l. The BOD5 was decreased from 300 mg/l up to 26 mg/l which represents a depollution efficiency of 91%

Keywords: Photocatalytic treatment, Ag_2MnO_2, COD, BOD5.

ID: WT044 ***Oral Presentation***

Study of dye dynamic adsorption onto physico-chemical modified sludge of Adrar's refinery

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Abstract.

Dynamic adsorption experiments were carried out to explore the feasibility of using the activated carbon prepared from Adrar's refinery sewage sludge (ACSS) for the removal of dye (methylene blue). The preparation of activated carbon was applied by chemical activation with 2:1 ratio of phosphoric acid (H3PO4). Identification of the functional groups present in the adsorbent was carried out by using FTIR analysis. The adsorption of the dye was influenced with different bed high of ACSS (5 and 7 cm). The result indicated that the dynamic adsorption removal efficiency of MB increase with increasing the bed high of adsorbent. The prediction of breakthrough curves was obtained by using Bohart-Adams, Wolborska, Thomas and Yoon-Nelson models. However, the entire breakthrough curve was best predicted by Thomas and Yoon-Nelson models (R2>0.97). The study concludes that removal of MB in fixed-bed system using the prepared ACSS is an effective and feasible method.

Keywords: Dynamic Adsorption, Sewage sludge, Activated Carbon, Methylene Blue, Adrar's refinery.

ID: WT045 ***Poster Presentation***

Electrochemical treatment of phenol on a SS/MnO2 thin film

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Abstract.

Water treatment is at the heart of the environmental concerns of industrialists. Conventional processes such as physical-chemical and biological processes have been used to treat wastewater containing organic compounds. However, they are inefficient for recalcitrant aromatic compounds. Electrochemistry presents an interesting alternative for the treatment of industrial wastewater because it is mainly based on electron transfer and can be applied to a large number of non-biodegradable organic pollutants. The efficiency of electrochemical processes is related to the choice of the electrode material. Anode materials such as Pt, PbO2, SnO2, or boron-coated diamond film (BDD) are very effective, but the high cost of BDD, the possible toxicity of lead leaching from PbO2 and the short life span of SnO2 limit the actual application of these electrodes. MnO2 has been one of the most studied oxides for decades due to its remarkable properties, its wide availability at a good price and its relative harmlessness towards the environment and, consequently, the wide range of applications for which this material can be used. It is in this context that this study is situated, whose objective is to make a contribution in the treatment of water. The treatment of phenol is carried out by an electrochemical process based on chronoamperometry using an electrode based on a thin film of MnO2 electrodeposited on a stainless steel substrate (SS/MnO2). The results showed that the use of this electrode in the proposed electrochemical process allowed to obtain a phenol degradation rate of 80.31% after 4h of treatment under the optimal conditions of initial phenol concentration of 10 mg.L-1, an applied potential of 0.8 V/ESS and a pH of 3 with a kinetic of order 1.

Keywords: Water treatment, Phenol, Electrochemical process, SS/MnO_2 thin film.

ID: WT046 ***Poster Presentation***

Investigation of nickel adsorption from aqueous solutions by sewage sludge activated carbon

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Abstract.

The present study was undertaken to evaluate the adsorption of nickel(II) ions on activated carbon derived from sewage sludge. Batch adsorption experiments were performed as a function of initial Ni(II) ions concentration and contact time. The experimental data were analyzed by different models and Freundlich model showed better representation of equilibrium data (R2>0.99), the maximum adsorption capacity was found to be 11.52 mg.g-1 and the mean adsorption energy (E= 3.98 kJ mol-1) indicated that the adsorption process controlled by physically process. The value of adsorption energy indicates that nickel(II) adsorption would be attributed to a physico-chemical adsorption process rather than a pure physical or chemical adsorption process. Based on the results of the present study, activated carbon prepared from sewage sludge can be used as cost effective and potential adsorbent for the treatment of waterscontaining nickel(II) ions

Keywords: Carbon material; activated carbon; adsorption; nickel; sewage sludge.

ID: WT047 *Oral Presentation*

Fluorescence Properties of Fluorescein Dye Intercalated in Zr-Pillared Montmorillonite Clay

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Abstract.

In the present study, the adsorption capacities of two intercalated smectites, Na+-PMt and Ca2+-PMt with the Zr pillar were investigated on fluorescent dye adsorption.The adsorption isotherms fit well with the non-linear Langmuir isotherm model and the maximum adsorption capacities of all the materials are determined. The X-ray diffraction (XRD) was done to determine the location of the dye molecule. The pillar improves the adoption capacity towards fluorescein due to its location inside interlayer space. Interestingly, the time resolved fluorescence show that the dye is not released in solution as it is the case for the pristine clay.

Keywords: Montmorillonite, Pillared clays, Adsorption.

ID: WT048 ***Poster Presentation***

Adsorptive Removal of Imidazolium Ionic Liquids from Aqueous Solutions Using Modified Clay

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Abstract.

Industries are the main source of water pollution due to release of toxic pollutants including surfactant. It becomes urgent to propose low cost and environmentally friendly solutions involving the use of local resources. Here, the properties of the Zr- pillared smectite, with the Zr to adsorb the 1-Butyl-3-methylimidazolium chloride are investigated.The adsorption isotherms as well as the kinetic are measured. The modified clay sample were characterized in detail using X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), thermogravimetric analysis (TGA).The XRD analysis showed the increase of basal spacing of pillared clay prepared from 12.22 to 16.05 Å. For the butylmethylimidazolium the adsoption capacities are not enhanced by the presence of pillar as it is the case for the pristine clay. Adsorption isotherms, displayed that the maximum adsorption capacity of Mt-Na and PMt-Na according to the Langmuir model were 54.77 mg/g and 22.70 mg/g, respectively.

Keywords: Montmorillonite, Pillared clays, Adsorption.

ID: WT049 ***Poster Presentation***

Water resources and environment of the Sanhadja wetlands complex (North-east Algeria)

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Abstract.

The complex wetland Sanhadja consists of a mosaic of ecosystems hosting a rich and original biodiversity representing a great interest in the services and the roles they play in the context of natural resources and the local socio-economic development.

Unfortunately, these resources are subject to serious threats from natural disturbances (climate change) combined with an important human pressure: encroachment for the purpose of farming, fires, the sands, wind dynamics and silting jeopardize the future of the complex, its ecosystems and sustainability

Conservation of the natural heritage of wetlands is a popular concept in Algeria (Act 83-03 of 5 February 1983 on the protection of the environment, and the law of 17 February 2011 concerning the areas protected as part of sustainable development). However, even if the developed laws state coercive clauses and set up specialized structures in the defense and promotion of biodiversity, the field reality contrasts strangely with the policy initiated by the government since the environmental situation remains worrying and natural resources continue to deteriorate.

In short, our aim in this work is to see the state of affairs, human action on an even natural environment, home to wetlands (Ramsar Convention) where we try to take stock of the various threats to the natural heritage (water and biodiversity).

The other aspect we try to move towards sustainable management of test that will satisfy both the needs of the local population while preserving the complex components that support the very life of these populations. This new management approach, based on cooperation, communication and participation of all stakeholders is necessary.

Keywords: Wetlands Complex; Sanhadja; natural heritage; threats; Northeast Algeria.

ID: WT050 ***Poster Presentation***

Effect of the annealing temperature on the degradation of rohdamine B by the MnO2/SiNWs system

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Abstract.

Environmental catalysis represents a fascinating and promising field of research to address new environmental challenges. It is widely used for the degradation and mineralization of hazardous organic compounds into CO2 and H2O, the reduction of toxic metal ions to non-toxic states, the deactivation and destruction of waterborne microorganisms and the decomposition of air pollutants such as volatile organic compounds. In recent years, the photocatallysers based on silicon nanowires (SiNWs) has been the subject of many studies due to the interesting physicochemical properties of this material. In the present work, we coated silicon nanowires, obtained by metal-assisted chemical etching, by the manganese dioxide MnO2 films by chemical bath deposition (CBD) method to realize a photocatallyser. Firstly, we have studied the influence of the deposition time on the different properties. Indeed, the morphology, the chemical composition, the crystalline phases as well as the electrochemical performances were analyzed by scanning electron microscopy (SEM) coupled to the analysis by Energy Dispersive X-ray Spectroscopy (EDX), X-ray diffraction (XRD), cyclic voltammetry (CV), Galvanostatic Charge-Discharge (GCD) and electrochemical impedance spectroscopy (EIS), UV-Visibel spectroscopy on reflectance defuse mode (UV-Visible). This study allowed us to find that the MnO2 film deposited for 15 min followed by annealing at 200°C presents the best photocatallytical activity with a degradation random of 100% on 75min for Rodamin B. We also showed that the formation time of the silicon nanowires has a significant effect on the morphological and photocatalitical properties. This allowed us to conclude that MnO2-coated SiNWs is a promising way to fabricate high-performance thin films photocatallysers.

Keywords: photocatalyst, envirenement, nanocomposites, silicon nanowires.

ID: WT051 ***Poster Presentation***

Seawater desalination: improvement of pretreatment for the prevention of biofouling of membranes

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Abstract.

The water crisis is a pandemic concern due to the ever increasing demand for drinking water. Reverse osmosis (RO) has become an essential technology in the purification of non-traditional water sources such as brackish, sea and wastewater and is the most efficient technique for seawater desalination purposes. Therefore, it is important to ensure high performance of RO plants, which is possible by adjusting parameters such as feed pressure, permeability, feed salinity and control of biofouling problems. Biofouling reduces the actual performance of the membrane through microbial generation in a biofilm that forms on the membrane surface. Biofouling in a seawater reverse osmosis (SWRO) plant is controlled by the surrounding environment as well as the feed water pretreatment. For the prevention of biofouling, the improvement of pretreatment is one of the solutions provided in the study of Yee et al. Silver-zeolite (AgZ) nanocomposite material is proposed as a promising anti-microfouling agent. They evaluated the effectiveness of AgZ in inhibiting biofilm, involving H. pacifica which is a marine bacterium used as a model organism responsible for biofilm. They found that biofilm formation of H. pacifica was reduced by up to 81% by AgZ nanocomposites loaded with up to 10% Ag by weight, demonstrating its property against a common fouling microorganism in the early stages of biofouling.

Keywords: Desalination, seawater pretreatment, biofouling, AgZ nanocomposite, anti-microfouling.

ID: WT052 ***Oral Presentation***

Preparation of MgAl-LDH@biochar composite for the effective recovery of phosphorus from water media

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Abstract.

Elimination of phosphorus (P) from contaminated water is a great challenge for its recycling as a fertilizer and limiting pollution of water bodies. This work proposes the preparation of composite material adsorbent based biochar and layered double hydroxide. MgAl-LDH (2:1) were chemically co-precipitated within the biochar porosity; then calcined to form MgAl-Biochar composite. The synthetized material was characterized and used as adsorbent for the removal of high content of P from synthetic solution and surface water in the batch system.
Results confirmed that the LDH phase was successfully co-precipitated onto the biochar surface. Batch experiments show that the prepared composite is very efficient in adsorbing P and strongly outperformed the started biochar.
This study reports new insights on the adsorption of P and proposes a novel effective material for enhancing P recovery and wastewater treatment.

Keywords: layered double hydroxide, biochar, composite, phosphorus, adsorption.

ID: WT053 ***Poster Presentation***

Enhanced photocatalytic performance of CCU nanocomposites for degrading Rhodamine B

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Abstract.

A novel binary composite CeO_2-CuO has been synthesized via self-combustion method was investigated as photocatalyst for the photodegradation of Rhodamine B under visible light. The nanocomposite has been characterized by X-ray diffraction (XRD) structural and morphologic analysis, scanning electronic microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDS) which enables the chemical characterization/elemental analysis of materials, UV-Vis Diffuse reflectance spectroscopy (UV-Vis DRS).The XRD diffractogram shows that the composite is majorly composed of 65.2% CeO_2 and 34.8 % CuO. The band gap of the as prepared material was 2.05 eV. The results of the photocatalytic tests show 28% conversion in the photodegradation of RhB organic pollutant during 180 min under visible light. The CeO_2- CuO material could be reused for treatment of wastewater during several cycles which demonstrates its stability for the process.

Keywords: CeO2/CuO, Photocatalytic activity, Recyclability, Rhodamine B, Self-combustion, visible light.

ID: WT054 ***Poster Presentation***

Synthesis, structural evolution and wettability characterization of Sr-ZnO thin films prepared by Silar method

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Abstract.

In this work, pure ZnO and Sr-doped ZnO thin films with different concentrations prepared by successive ionic layer adsorption and reaction method (SILAR). X-ray diffraction patterns confirmed the nature of the grown composites that is polycrystalline with hexagonal wurtzite structure and preferred plane (100), and the crystallite size increases as the concentration of Sr doping increases. AFM results showed that the average roughness and root mean square (Rq) of ZnO increase as the Sr doping increases. Nevertheless, water droplet contact angle (WDCA) measurements show that Sr-doping has a significant impact on the physical and chemical properties of SILAR-deposited ZnO films.

Keywords: Sr-ZnO, thin films, Silar, microstructure, hydrophilicity.

ID: WT055 ***Oral Presentation***

Study of nickel (II) elimination onto modified Corallina Elongata alga

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Abstract.

Bio sorbents can be an alternative to activated carbon. They are derived from agricultural by-products or aquatic biomass. They are inexpensive and they may have comparable performances to those of activated carbon.
The present study focuses on the removing of Nickel from water by using two new low-cost materials; natural algae Carolina Elongata (CE), and the Carolina Elongata treated at 900 °C (CE900). The materials were characterized using various characterization techniques such as FTIR, SEM and XRD, which showed that the material consisted essentially of calcite containing magnesium. The kinetics results of nickel removing showed that the quantity of nickel eliminated is increased from 23 to 945mg / g, when we did the treatment onto the algae, and the pseudo second order model fitted perfectly well with the experimental results. Finally, the results have shown a strong affinity between the Ni2+ and our materials.

Keywords: CE900, isotherm, coralline Elongata, Nickel.

ID: WT056 ***Poster Presentation***

Study of complex formation of Co (II) with D2EHPA

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Abstract.

A study has been made of the extraction equilibrium of cobalt (II) from sulfate medium using di (2-thylhexyl) phosphoric acid (D2EHPA, HL) at 25.0C° with the following parameters: pH, concentration of the extractant, and the nature of solvent.

Influence of diluent using several polar solvents as diluents in addition to non-polar solvents in the extraction of cobalt (II) is discussed, the complexes extracted in the organic phase had the stoechiometry CoL22HL and CoL2 in chloroform and 1-octanol, respectively. Equilibrium formulations were determined for various diluents and the extractant form complexes of tetrahedral symmetry. Only in the case of D2EHPA/ 1octanol transform to an octahedral complex.

Keywords: Solvent extraction, cobalt (II), acide di(2-éthylhexyl) phosphorique, diluent.

ID: WT057 ***Poster Presentation***

Optimizing adsorption of dye on high-surface-area activated carbon using experimental design methodology

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Abstract.

The present study attempts to utilize date pits to prepare effective and low cost adsorbent using physicochemical activation method consisted of zinc chloride (ZnCl2) treatment and carbon dioxide (CO2) gasification. The activated carbon produced was characterized by carbon yield (%), the determination of the amount of methylene blue (A-MB), BET surface area, porosity development (total pore volume and micropore fraction). Adsorption of Orange G dye (OG) from water was studied using the prepared activated carbon. A three-factor central composite design (CCD) combined with response surface modeling (RSM) was employed for maximizing OG removal from aqueous solution by the activated carbon based on 20 different experimental data obtained in a batch study, the effects of various parameters such us agitation time, initial dye concentration and adsorbent dosage were studied. The significant factors on experimental designs response were identified from the analysis of variance (ANOVA). The optimum conditions for the maximum adsorption of Orange G dye (83.56%) were found as follows: agitation time of 4.99 h, initial dye concentration of 24.19 mg/L and adsorbent dosage of 0.26 g.

Keywords: Activated carbon; Adsorption; Orange G; response surface modeling; Central composite design.

ID: WT058 *Oral Presentation*

Fenton oxidation efficacy for the elimination of a pharmaceutical (metronidazole) from aqueous solution.

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Abstract.

Antibiotics are among the emerging contaminants, which have received an increasing attention in recent years because of their wide use over the world. They are introduced into surface water and groundwater sources due to urban and industrial effluents. Considering their high stability, they do not only disrupt the common processes of sewage treatment, but also have toxic effects on humans and other living organisms, and their removal have therefore been considered. Among such Antibiotics, metronidazole is occurred in the environment due to its resistance to biological breakdown. This study aimed to investigate the effectiveness of Fenton oxidation for the elimination of metronidazole from aqueous solutions. In order to enhance the process of Fenton oxidation process, several operational parameters were varied, such as reaction time, catalyst concentration and the concentration of hydrogen peroxide. The obtained results showed that Fenton oxidation is very effective in removing metronidazole with a yield of 88 % for an equilibrium time of one hour. It also appeared that the highest percentage of removal of metronidazole in FeSO4 catalyst concentration of 8 mg/l, hydrogen peroxide concentration of 400 mg/L. Based on the results obtained from this study, it can be concluded that Fenton oxidation process is an effective process for the removal of metronidazole from aqueous solutions.

Keywords: Antibiotics, metronidazole, Fenton oxidation, removal, catalyst, hydrogen peroxide.

ID: WT059 ***Poster Presentation***

Spectral Characterization, Scanning Electron Microscope (SEM) of Hexamethylenetetramine (HMTA) - Metal(II) Complexes.

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Abstract.

Among the multi-dentate nitrogen donor ligands, the synthesis of some of the metal hexamethylenetetramine complexes and their antimicrobial activity have been reported [1]. Hexamethylenetetramine (HMTA, C6H12N4), is an heterocyclic tetradentate donor ligand, which has been used medicinally as an antiseptic agent for the treatment of urinary tract infections [2].
Studies of HMTA coordination compounds with different metal salts have therefore attracted much attention.
Complexes of Co(II), Ni(II), and Cu(II) have been synthesized in ethanol. While the cobalt(II) and copper(II) complexes have one molecule of hexamethylenetetramine, the nickel complex has two molecules. These complexes have been characterised by infrared and UV-Visible spectroscopy, conductivity and scanning electron microscope (SEM). The results suggest octahedral coordination in which the central metal ion is bonded to HMTA and aqua ligands. Complexes with hexamethylenetetramine and thiocyanate ion as coligands have been synthesized too and characterised by infrared spectroscopy and ultraviolet-visible spectroscopic techniques [3].

Keywords: Hexamethylenetetramine, Complexes, SEM.

ID: WT060 *Poster Presentation*

Effect of Barium concentration on the microstructure and wettability of Ba-ZnO thin films synthesized by SILAR technique

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Abstract.

In the current study, barium doped and undoped zinc oxide thin films have been prepared by successive ionic layer adsorption and reaction technique at various doping concentrations (0 wt. %, 1 wt. %, and 7 wt. %). Analysis and discussion were done on how Ba-doping concentrations affected on the physical characteristics of ZnO thin film. The structural, morphological and surface roughness properties were exhibited using X-ray diffractometry (XRD) and atomic force microscope (AFM), respectively. The X-ray diffraction reveals the polycrystalline of ZnO films with hexagonal wurtzite structure, whereas, the preferred orientation changed from (102) to (002) plane with the increase of Ba concentration. AFM results showed that the thickness of the film increases with the increase of Ba-doping from 116.97 nm to 319.05 nm corresponding to a decrease in surface roughness up to 0.124 um. Furthermore, the study of water droplet contact angle (WDCA) on the surface of the films using homemade technique showed that the increase in Ba doping concentration enhanced the hydrophilicity of the films. The wettability of the films is major at 3% Ba with an average WDCA of 39.43 °.

Keywords: Ba-ZnO, SILAR technique, XRD, AFM, physical properties, wettability.

ID: WT061 ***Poster Presentation***

A simple method for fabricating BMTT photocatalyst and its photocatalytic activity

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Abstract.

In order to increase the photocatalytic activity of Bi4Ti3O12 (BTO) crystals in this study in order to degrade organic pollutants, (Mg /Ta) have been added to the crystals. The as-prepared (Mg/Ta) doped-BTO photocatalysts were thoroughly investigated utilizing a variety of techniques, including X-ray powder diffraction and ultraviolet visible diffuse spectroscopy. The doped ceramics' pure orthorhombic structure was revealed by heating the reaction mixture for 4 hours at 850 °C (2°C/min steps). As a model organic pollutant, Rhodamine B (RhB) dye solution was used to study the impact of Mg/Ta doping on photocatalytic activity under sun irradiation. The Mg/Ta-BTO catalyst was found to have a 93% photodegradation efficiency of RhB in a shorter amount of time (90 min), with an estimated velocity constant of k approx. = 0.0247 min-1.

Keywords: Aurivillius BTO, Solar light, Rhodamine B, Photocatalyst.

ID: WT062 ***Poster Presentation***

The effect of concentration of chromium nitrate on the structural, morphological and optical properties of Cr_2O_3 thin films elaborated by pneumatic spray

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Abstract.

In this study, chromium oxide (Cr_2O_3) thin films were produced on glass substrates utilizing a homemade spray pyrolysis technique. Investigations are conducted into how the concentrations affect structural, morphological, and optical characteristics.The films are characterized by several techniques such as DRX, UV-Visible transmission and the results suggest that the prepared films are uniform and well adherent to the substrates. Films thicknesses estimated by gravimetric method were between 270 –632nm. X-ray diffraction (XRD) patterns showed that Cr_2O_3 films were polycrystalline with rhombohedral crystal structure, with crystallite size around 37,18 nm. The optical study confirms that the transmittance of Cr_2O_3 films decreases with the increase of precursor concentration. The optical gap of Cr_2O_3 thin films are found to be in a range of 3.48 –3.38 eV.

Keywords: thin film, Cr_2O_3 , spray pyrolysis, precursor concentrations, properties.

ID: WT063 ***Poster Presentation***

Elimination Pb of aqueous effluents with inexpensive bioadsorbents

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Abstract.

The objective of this study was focused on the synthesis and preparation of biomaterials of cationic and anionic type. These materials were used as adsorbents in waters polluted by different adsorbates likely to be present in the environment. The different materials will be characterized by different techniques (IRTF, DRX, MEB, BET and ATG/DTA). The studies of adsorption by these materials, will be carried out by controlling the various parameters such as: pH, mass, concentration and temperature.

Removal of effluents in aqueous media, especially the adsorption technique which seems to be well adapted to remove pollutants because of its proven efficiency and also for economic reasons, using low-cost adsorbents such as agricultural and industrial wastes.

Keywords: Characterization; Different materials; Water treatment; Bio adsorbents; adsorption.

ID: WT064 ***Poster Presentation***

Chelant extraction of Nickel(II) metal from wastwater

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Abstract.

In solvent extraction, the self-assembly of molecules into an organized structure is the phenomenon responsible for the transfer of the metal ion from the aqueous phase to the organic solvent. The extraction of divalent metals from sulfate medium with di(2-ethylhexyl)phosphoric acid (D2EHPA, HL) at 25_C is studied with the following parameters: pH, concentration of the extractant, and the nature of diluent. The effect of the diluent using polar and nonpolar solvents in the extraction of nickel(II) is discussed. The extracted species were NiL2 in 1-octanol and methyl isobutyl ketone and NiL2 2HL in toluene, carbon tetrachloride, and cyclohexane.
The extraction constants are evaluated for different diluents.

Keywords: solvent extraction; Ni(II); di(2-ethylhexyl)phosphoric acid; diluent effect.

ID: WT065 ***Poster Presentation***

High catalytic H2 generation performance with a sol gel synthesized bismuth iron oxide

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Abstract.

The urgent need for a clean energy and the environmental pollution issue caused by classical fuel orientate scientific research to be opened on more H2 generation investigations. The present work denotes the hydrogen gas production efficiency of the BiFeO3 mixed oxide prepared by a citrate sol gel method. The catalyst was obtained at 800 °C, then it underwent such characterizations as: XRD for structure investigation, FTIR for detecting the compound's vibrational bonds and the UV-Vis reflectance for optic properties. A single phase of BiFeO3 has been detected with XRD pattern analysis. Two bonds situated at 420 and 546 cm-1 responsible on Bi-O and Fe-O bonds respectively confirmed the formation of the desired material in infra-red spectroscopy. The band gap of the as prepared oxide was estimated at 2.71 eV using Kubelka-Munk method. Sodium Borohydride methanolysis way has been used for the catalytic hydrogen production purpose, it gives (262.8 ml, 11.15 mmol) in just 8 minutes. Turnover frequency calculated value revealed 10.89 min-1.

ID: WT066 ***Poster Presentation***

Photocatalytic Phenol degradation behavior of BiFeO3 under both artificial and sunlight

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Abstract.

The accelerated and huge development of industry has a harmful impact on environment and especially on water, for that, researches trends to deal with water treatment. Photocatalysis is one of best suggested solutions for that issue. The perovskite bismuth iron oxide is well known material as photocatalyst due to its high performance, for the issue of testing its capability of phenol degradation, this mixed oxide were synthesized by sol gel method calcined at 550 °C. XRD, UV-Vis absorbance and FTIR spectroscopy were used for the characterization. The phenol degradation has been followed by the concentration measurement for every 30 minutes.

ID: WT067 ***Oral Presentation***

Elimination Of "Abamictin "Inscticid On GAC Waste: Kinetic Models Approach

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Abstract.

The objective of this study is to contribute to the knowledge of the adsorbent power of commercial activated charcoal granual in the adsorption removal of a plant protection product commonly applied in the field of irrigation, recognized under the name of Abamectin and to test the efficiency of this process. The tests showed that, the monitoring of the evolution of abamectin removal yields recorded that, the optimum yield is 95.9% obtained during 120 minutes. The process is more efficient at pH less than 7. For the variation of the initial content of the compound, the elimination is maximum up to 30 mg/l of abamectin then a decrease appeared. However, the change in the mass of powdered charcoal showed an increase in the elimination of abamectin with an increase in adsorbent. The application of kinetic models, the results obtained showed that the two models pseudo first order and pseudo second order are favorable. Similarly, the models of the Langmuir and Freundlich isotherms have proved that the retention of abamectin on powdered activated charcoal obeys the adsorption phenomenon.

Keywords: Abamectin, Commercial activated charcoal, Adsorption, Parameters effects.

ID: WT068 ***Poster Presentation***

Efficient removal of glyphosate from aqueous solutions by adsorption

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Abstract.

Activated carbon (AC), a carbon-rich solid product derived from biomass, There is therefore for advanced techniques to remove glyphosate from the environment. Glyphosate, the most commonly used non-selective herbicide, has attracted global attention due to its adverse effects at high concentrations in aquatic environments. Glyphosate removal from waste effluent by adsorption process using natural of low cost biosorbent, activated carbons. The AC showed >89% herbicide removal efficiency at original pH of herbicide. The effect contact time, pH and initial concentration, were analyzed. The adsorption data were consistent with the models; Langmuir and Freundlich.

Keywords: Adsorption, Herbicide, Glyphosate, Environment.

Corrosion and Surface Chemistry

ID: CSC001 ***Poster Presentation***

Corrosion of Nickel-based composite coatings

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Abstract.

Ni-P-TiO2 composite coatings are important in engineering, due to their properties such as, good resistance to wear and corrosion. In this paper, Ni-P-TiO2 composite coatings were deposited with applied current densities on copper substrates. The corrosion performance of the coatings was evaluated using Tafel polarization and electrochemical impedance spectroscopy (EIS). The results indicate that the TiO2 nanoparticles included in the coatings. In addition, microhardness of the coatings noticeably increased with current densities. The Ni-P-TiO2 composite coating electrodeposited at 3 A.dm -2 exhibits the best microhardness and corrosion resistance.

Keywords: Current density, Ni-P-TiO2 composite coatings, Corrosion resistance, Microhardness.

ID: CSC002 ***Poster Presentation***

Study of the anti-corrosion effecacite of the ferrocenic derivative on XC48 steel by electrochemical impedance spectrometry (SIE)

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Abstract.

Corrosion of steel reinforcement in reinforced concrete is the greatest problem. This phenomenon often encountered in coastal areas and aggressive environments is regarded as the most common degradation of reinforced concrete structures. This pathology results from the aggressiveness of the environment but also from design and implementation defects. Corrosive substances such as chloride, sulfate and carbon dioxides are the most harmful, which can lead to a reduction in strength, bursting, expansion or loss of mass in concrete. As a result, huge economic losses and many ecological problems are noted. Many researchers have studied in depth the problem of corrosion in reinforced concrete and formulate the most costeffective solution of adding inhibitors that can be used in a preventive or restorative way. objective of this work is to evaluate the effectiveness of inhibiting the corrosion of steel in a solution of sulphuric acid by the use of an organic inhibitor (ferrocenic derivative), using electrochemical methods such as electrochemical impedance spectroscopy which we show that at low frequency inhibition is due to the formation of a deposition and stable that limits corrosion

Keywords: Corrosion, ferrocenic derivative, inhibitors, SIE.

ID: CSC003 ***Poster Presentation***

COBALT-RICH ALLOYS: ELECTROCHEMICAL DEPOSITION, STRUCTURE AND CORROSION RESISTANCE

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Abstract.

The effects of the concentration of cobalt on zinc-cobalt alloys obtained from chloride baths, on steel substrates, under continuous current deposition are described. The deposit morphology was analyzed using Scanning Electron Microscopy (SEM) and an X-Ray Diffraction (XRD) was used to determine the preferred crystallographic orientations of the deposits. Protection against corrosion properties studied in a solution of 3 % wt NaCl in the potentiodynamic polarization measurements (Tafel), electrochemical impedance spectroscopy (EIS) to the potential of corrosion free. It has been observed that the zinc-cobalt alloy is characterized by enhanced the resistance of corrosion compared to the zinc alloys and the addition of cobalt in the zinc-cobalt increases the micro-hardness, XRD and SEM results an identify any coatings zinc-cobalt alloy composition reveals that zinc-rich (η-phase) and cubic γ-Co5Zn21 phases.

Keywords: Cobalt-rich alloys, chloride bath, electrochemical deposition, corrosion resistance.

ID: CSC004 *Poster Presentation*

DIFFUSION BARRIER PROPERTIES OF ELECTROCHEMICALLY DEPOSITED Zn-Co-Cr ALLOYS

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Abstract.

In order to develop the electrogalvanized steel with high corrosion resistance, conventional electrogalvanizing bath was modified with an addition of Co and Cr compounds. The increase in chromium-content in the Zn-Co-Cr coating can be interesting for the anticorrosive performance of these coating. Diffusion barrier properties of electrochemically deposited Zn-Co-Cr alloys were examined. The deposit morphology was analyzed using Scanning Electron Microscopy (SEM) and an X-Ray Diffraction (XRD) was used to determine the preferred crystallographic orientations of the deposits. Protection against corrosion properties studied in a solution of 3.5 % wt NaCl in the potentiodynamic polarization measurements (Tafel), electrochemical impedance spectroscopy (EIS) to the potential of corrosion free. The parameters that characterize the corrosion behavior can be determined from the plots and Nyquist plots. XRD and SEM results of the Zn-Co-1.94 wt. % Cr electrogalvanized steel showed that the alloy coating consist of a zinc-rich (η-phase), cubic γ-Co5Zn21 and chromium-rich (Cr matrix) phases, with nanocrystalline structure and uniform surface. Potentiodynamic polarization scans and EIS measurements showed that the nanocrystalline chromium-cobalt alloyed zinc coating resisted red rusting in more than twice as long as conventional electrogalvanized coating of the same thickness. Zn-Co-1.94 wt. % Cr alloy can be considered as good diffusion barrier for steel diffusion. Electrodeposited thin film of these metals (Zn, Co, Cr), either do not possess diffusion barrier properties, e.g. Cr, or have inferior diffusion barrier properties. The improved corrosion resistance of this deposit coating was attributed to its surface chemistry, phase content, texture, and surface morphology.

Keywords: Electrogalvanizing, ternary Zn-Co-Cr coatings, chromium-rich, nanocrystalline structure, corrosion resistance.

ID: ***CSC005*** ***Poster Presentation***

CORROSION PROTECTION OF STEEL USING Zn-Cr COATINGS

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Abstract.

Highly corrosion resistant of steel coated Zn-18 wt. % Cr was applied in corrosive of marine environment. In this work, we have done an experimental study of Zn-Cr coatings, for this the influence of Cr concentration was the principal object to improve the corrosion resistance of the coatings, which has been made by two step; technique of Zn-Cr electrodeposition and Cr pack cementation, have been studied by several characterization methods as the X-ray diffraction (XRD) and scanning electron microscopy (SEM). Protection against corrosion properties studied in a solution of 5 wt. % NaCl for two days and week in the potentiodynamic polarization measurements (Tafel) and electrochemical impedance spectroscopy (EIS) to the potential of corrosion free. XRD and SEM results of the Zn-18 wt. % Cr electrogalvanized steel showed that the alloy coating consist of a zinc-rich (η-phase), cubic γ-Cr5Zn21 and chromium-rich (Cr matrix) phases, with nanocrystalline structure and uniform surface. Potentiodynamic polarization scans and EIS measurements revealed up to five times higher corrosion resistance of Cr-rich alloy as compared to that of the conventionally used Zn-1Cr alloy. The results showed the microstructure of two days corroded samples has duplex layer composed of inner □-(Zn, Cr) and outer Cr2O3, while a quite thin and continues protective oxide of Cr2O3 was observed in outer layer of week corroded samples. The formation of oxide scale rich in Cr2O3 has contributed for the better corrosion resistance of Zn-Cr alloy. Electrodeposited thin films of these metals, at the thickness of 1000 Å, either do not possess diffusion barrier properties, e.g. Cr, or have inferior diffusion barrier properties. Zn-18 wt. % Cr alloy can be considered as good diffusion barriers for steel diffusion.

Keywords: Cr-rich alloy, corrosion resistance, diffusion barrier, oxide scale rich in Cr2O3.

ID: CSC006 *Poster Presentation*

Pitting Corrosion of 2209 Duplex Stainless Steel weldments in NaCl Aqueous Solution

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Abstract.

In oil and gas industry, stainless steels are widely used to protect equipments against corrosion. The assessment of the degradation of these steels before use is essential and has such importance. The aim of this study is to characterize the pitting corrosion of 2209 duplex stainless steel weldments, used in the manufacture of the welded pipelines. The experimental study is based on the metallographic observations, the mechanical hardness measurements and the electrochemical polarization tests. The evolution of the morphology of the pits of the duplex steel was done by immersion in a solution of 3,5% NaCl. The results show that the time of immersion influence the pits morphology, and that the mechanical behavior of the steel can be correlated to its microstructure after welding.

Keywords: corrosion, hardness, stainless steel, welding, microstructure, correlation.

ID: CSC007 *Poster Presentation*

Effect of Current Density on Corrosion Properties of Ni-P-TiO2 Composite Coating Prepared by Electrodeposition

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Abstract.

Ni-P-TiO2 composite coatings are important in engineering, due to their properties such as, good resistance to wear and corrosion. In this paper, Ni-P-TiO2 composite coatings were deposited with applied current densities on copper substrates. The corrosion performance of the coatings was evaluated using Tafel polarization and electrochemical impedance spectroscopy (EIS). The results indicate that the TiO2 nanoparticles included in the coatings. In addition, microhardness of the coatings noticeably increased with current densities. The Ni-P-TiO2 composite coating electrodeposited at 3 A.dm -2 exhibits the best microhardness and corrosion resistance.

Keywords: Current density, Ni-P-TiO2 composite coatings, Corrosion resistance, Microhardness.

ID: CSC008 ***Poster Presentation***

Evaluation of the effectiveness of an ecological corrosion inhibitor for steel pipelines in a sulfuric acid environment

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Abstract.

The inhibition effect of bark resin of Schinus molle (BRSM) on the corrosion of API 5L X70 pipeline steel in hydrochloric acid 5% has been studied by potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) measurements; also, surface morphology has been analyzed by SEM-EDX. The results show that BRSM is a good inhibitor in hydrochloric acid solution. The maximum percentage inhibition efficiency is equal to 82% at 3 g/L. The adsorption of BRSM on API 5L X70 pipeline steel surface obeys Langmuir adsorption isotherm, and involves physical adsorption. Polarization curves reveal that BRSM acts as a mixed-type inhibitor.

Keywords: pipeline steel, bark resin of Schinus molle, hydrochloric acid 5%, corrosion inhibitor.

***ID:* CSC009** ***Poster* Presentation**

The ecological impact of PMMA:ZnO used as an optical photovoltaic coating

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Abstract.

Currently, the surface treatment of coatings is attracting more and more attention from specialists and even governments. In the energy sector, in particular with the orientation towards clean energies; the integration of the photocatalytic application within the photovoltaic energy becomes an ecological indispensability infinitely desirable by the researchers; the idea of this study is to investigate a replacement of the glass which represents the famous photovoltaic protection facades by a material mechanically resistant with encouraging photocatalytic properties. In this work, we sought to study the thermal, optical and photocatalytic properties of a poly(methyl methacrylate) PMMA polymer doped with zinc oxide ZnO, the latter which was introduced into the polymer matrix using a protocol of very specific preparation, four nanocomposites are obtained: PMMA: (0% ZnO, 5% ZnO, 10% ZnO, 15% ZnO). The ATD–TG analyzes show a significant improvement in the thermal resistance of the filled polymer; however a qualitative improvement is obtained by doping the ZnO in the polymer. 65% photocatalytic degradation was observed. It can be said that these results give a positive impression of the use of this PMMA/ZnO nanocomposite with its ecological aspect.

Keywords: ecological nanocomopsite ; photovoltaic cover ; photocatalytic properties.

ID: CSC010 *Poster Presentation*

Morphological Structural Properties of LaFeO3 Peroveskite Doped Prepared by Classical Method and Its Photocatalytic Activity

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Abstract.

Nowadays perovskite materials have been mostly preferred due to their outstanding optic, magnetic, and catalytic properties. Lanthanum- based perovskite materials have been specifically used in solar cells, magnetic materials, solid oxide fuel cell electrodes, catalysts, chemical sensors, oxygen permeation membranes, hydrogen storage and optoelectronic devices thanks to good stability.

Lanthanum orthoferrite (LaFeO3) has a direct and narrow energy band gap. It is also chemically stable and nontoxic with high electron mobility. The efficiency of these materials relies on the synthesis techniques including solid-state reaction, hydrothermal synthesis, combustion synthesis, wet sonochemical synthesis, EDTA glycine process, and reverse microemulsion process and sol–gel.

The purpose of our study is the synthesis of LaFeO3 doped by solid method (classic method) followed thermal treatment .and the the substitution effect on the different proprieties.

The effect of doping on the lanthanum ferrite prepared was investigated. Thermal decomposition of the of LaFeO3 was characterized by TG/DTA thermal analysis. The synthesized powders were characterized by means of X-ray diffraction (XRD), infrared spectra (IR), and ultraviolet (UV-Vis) were used to study the photocatalytic activity.

Keywords: Substitution - Perovskite - Lanthanum orthoferrite - Photocatalytic.

***ID:* CSC011** **Poster Presentation**

The effects of sodium dodecyl sulfate on hardness and corrosion of Ni–MoS2 composite coatings

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Abstract.

Ni–MoS2 composite coatings were electrodeposited from a nickel chloride bath containing particles in suspension, which were dispersed with the aid of an organic agent such as SDS. The Ni–MoS2 composite coatings were prepared on steel substrates (BS2). The effects of the organic agent on co- deposition, morphology, corrosion and mechanical properties of composite coatings were investigated. Several characterization methods have been used to study these coatings, namely X-ray diffraction, adhesion quality, measurement of micro-hardness and layer morphology by scanning electron microscopy, polarization, lost mass. These coatings were subsequently subjected to an aggressive medium composed of a 0.6M NaCl solution to study their resistance to corrosion. Experimental results showed that the addition of SDS could improve the microhardness of the composite coatings, reduce the agglomeration of big size-grained (particles), and achieve a more uniform distribution of MoS2 particles in the nickel matrix. From the Potentiodynamic polarization curve of electrodeposited Ni–MoS2 it is confirmed that the corrosion resistance increases with low concentrations of SDS, which gives the best protection coating against corrosion and high hardness.

Keywords: Ni–MoS2, coatings, polarization, corrosion, hardness.

ID: CSC012 ***Poster Presentation***

MICROSTRUCTURE AND CORROSION BEHAVIOUR OF Zn-Co ELECTROGALVANIZED STEEL

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Abstract.

Coating on steel is one of the techniques to improve corrosion resistance in extreme environments. Selection of coating materials based on characteristic as protective material for oxidation. Cobalt can improve oxidation resistance. In present work, Zn-Co was diffusion-coated onto steel by electrodeposition. The objective of this research is to study the structure of Zn-Co phases on steel and to understand the relationship between the Co content and oxidation resistance. The deposit morphology was analyzed using Scanning Electron Microscopy (SEM) and an X-Ray Diffraction (XRD) was used to determine the preferred crystallographic orientations of the deposits. Protection against corrosion properties studied in a solution of 3,5 % wt NaCl in the potentiodynamic polarization measurements (Tafel), electrochemical impedance spectroscopy (EIS) to the potential of corrosion free. The parameters that characterize the corrosion behavior can be determined from the plots and Nyquist plots. XRD and SEM results of the Co-rich Zn-18 wt.% Co electrogalvanized steel showed that the alloy coating consist of a zinc-rich (η-phase) and cubic γ-Co5Zn21 phases, with nanocrystalline structure and uniform surface. Potentiodynamic polarization scans and EIS measurements showed that the increase in the Co codeposition in a Zn-Co alloy changes the coating protection process from a sacrificial coating to a protective one because Co have inferior diffusion barrier properties. It revealed up to five times higher corrosion resistance of Co-rich alloy, at the thickness of 1000 Å, as compared to that of the conventionally used Zn-1Co alloy of the same thickness. Zn-18 wt. % Co alloy can be considered as good diffusion barriers for steel diffusion. The improved corrosion resistance of this deposit coating was attributed to its surface chemistry, phase content, texture, and surface morphology.

Keywords: Cobalt-rich alloys, nanocrystalline structure, phase content, corrosion resistance, diffusion barrier.

ID: CSC013 *Poster Presentation*

INVESTIGATION OF CORROSION INHIBITION EFFECT AND ADSORPTION ACTIVITIES OF GREEN INHIBITOR FOR MILD STEEL IN 1M HCL

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Abstract.

Corrosion inhibition of carbon steel in normal hydrochloric acid solution at 20°C by Gum Arabic (GA) has been studied by electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization curves. The experimental results have showed that this inhibitor revealed a good corrosion inhibition and that the inhibition efficiency is increased with the inhibitor concentration. The maximum percentage inhibition efficiency was found to be 91% at 2 g/L. The adsorption of GA on pipeline carbon steel surface obeys Langmuir adsorption isotherm, and involves physical adsorption. Polarization curves reveal that GA acts as a mixed-type inhibitor in hydrochloride acid

Keywords: carbon steel, eco-friendly inhibitor, hydrochloric acid, corrosion inhibitor.

ID: CSC014 *Poster Presentation*

Effect of doping with of Niobium on the properties structural of Titanium Dioxide thin films prepared by sol gel (spin-coating) process

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Abstract.

In this study we deposited undoped and Niobium doped Titanium Dioxide thin films with doping prcent varied between (0% -10%) onto glass substrates by Sol-Gel spin-coating method. The prepared films were obtained by dissolving Titanium (IV) Isopropoxide in a mixture of ethanol, acetylacetone, and Niobium (IV) chloride as doped source.

The films were analysed by the X-Rays diffraction (XRD).

The results obtained by the XRD showed that the prepared films are polycrystalline Titanium Dioxide with a tetragonale structure of anatase. The preferential orientation is (101) . The grain size and deformation of the various TiO2 films were calculated from the highest peak.

Keywords: Thin fims, Titanium Dioxide, Sol-Gel(sping-coating), Niobium, Doping , structural.

ID: CSC015 *Poster Presentation*

Effect of Annealing Temperature on Properties of Thin films of Zinc-Oxide (ZnO) elaborated by Sol-gel (Dip-coating) method

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Abstract.

This work describes the preparation of zinc oxide thin films using the sol-gel dip-coating technique. The structural, electrical, and optical properties of zinc oxide thin films were studied as a function of annealting temperature in the range of 300–550 °C. All the films prepared were uniform and well adherent to the substrates. XRD analysis showed that the films grow with (002) preferred orientation. The transmittance spectra indicated that the transmittance of the films showed a decreased trend with annealing temperature. the estimated band gap energy from optical absorption data was 3.2–3.3 eV. The measured electrical conductivity at room temperature was found in the order of 1.37 × 10-1(Ω. cm)-1 for ZnO.

Keywords: ZnO, thin film, dip coating, crystalline structure, optical properties, electrical conductivity.

ID: CSC016 *Poster Presentation*

Characterization of the Electrochemical Behavior of a Chrome Steel Intended For the Manufacture of Oil Drilling Tunings

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Abstract.

The problem of degradation by corrosion appears especially in the casings and steel tubings which represent the framework of the well. Its last are in permanent contact with very aggressive brine used to overcome the hydrostatic pressure of the reserve's hydrocarbons. The corrosion of its tubing causes their perforation which leads to the infiltration of crude through the walls of the well.

To combat this problem have resorted to the use of corrosion inhibitors as a protection technique, this technique is from an efficiency and simplicity, quite profitable, however, the inhibiting agents used are often expensive mineral compounds and quite toxic.

This abstract resides on the study of corrosion inhibitors used at oil and gas wells and their effect on types of steel in neutral meduim and at different concentrations of sodium chloride. This experimental work is also dedicated to the possibility of replacing these inhibitors and designing a green corrosion inhibitor formulation with better efficiency, economic and respect for the environment.

Keywords: Drilling, tubing, steel, corrosion, inhibitors.

ID: ***CSC017*** ***Poster Presentation***

Structural characterization of NiO thin films by the Williamson-Hall method

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Abstract.

Thin films of Nickel oxide (NiO) were prepared on glass substrates by the spray pyrolysis method using a spray and heater assembly manufactured in our laboratory. The thin layers were deposited on substrates heated to 450°C. The precursor solutions were prepared on the basis of nickel oxide diluted in a solvent formed from three quarters of demineralized water and one quarter of absolute methanol. The concentrations used are (0.05; 0.10; 0.15; 0.20; 0.25; 0.30; 0.40 mol. /L). The structural properties of the different samples were analyzed by X-ray diffraction (XRD). The diffractograms obtained show that the nickel oxide deposited in thin layers has a cubic structure belonging to the space group Fm-3m. The film structure is that of a single phase created with preferential orientation along the (111) axis in films. The size of the crystallites varies from 524 nm for the 0.10 mol. /L concentration up to 147 nm for the 0.40 mol. /L concentration. The displacement of the diffraction peaks revealed the appearance of stresses in the films formed. The stresses measured vary from 1% (0.40 mol. /L) to 0.03% (0.10 mol. /L). Finally, we noticed that the solution concentration of the most suitable precursor to obtain thin layers of nickel oxide is 0.15 mol/L.

Keywords: nickel oxide, thin films, spray-pyrolysis, XRD, Williamson-Hall.

ID: CSC018 ***Poster Presentation***

Effect of Vanadium addition on microstructure and mechanical properties of TiSiN/CrVxN multilayers system.

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Abstract.

In this investigation, the influence of vanadium alloying to TiSiN/CrN system deposited by D.C reactive magnetron sputtering on microstructure and mechanical properties was studied. As expected, all coatings displayed several peaks belonging to the (111), (200), (220) and (222) diffraction plans of an fcc crystalline structure. The cross-sectional images of the deposited coatings clearly revealed that all multilayered films have very well-defined columnar microstructures. No important changes on the cross-section morphology of the coatings could be detected with V addition. Also, adding of vanadium to the coating has no effect on the residual stresses level and adhesion. It was found that the critical loads Lc1 and Lc2 characteristics of the coatings adhesion to the substrate were similar for all the coatings. However hardness of the coatings increased with increasing vanadium concentration in films, reaching the maximum value of 30 GPa for the highest vanadium content. The improvement of the hardness and Young's modulus of the multilayer coatings is tentatively explained by the incorporation of V in solid solution in the CrN lattice.

Keywords: TiSiN/CrVN, Multilayer coatings, Magnetron sputtering, Structure, hardness, scratch test.

***ID:* CSC019** **Poster Presentation**

Effect of date palm leaf fiber on the mechanical and morphological properties of polyvinyl chloride composites

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Abstract.

The objective of this research is to improve the properties of polyvinyl chloride (PVC) polymer. This research was conducted with the aim of valorizing a natural waste, the date palm leaf fiber (DPLF). From there, some properties of polyvinyl chloride (PVC) based composites containing a natural waste, the date palm leaf fiber (DPLF) in different proportions have been studied. In the present work, we made composite sheets containing DPLF fibers at 10, 15 and 30 wt%. In addition, we performed a mechanical study; the shore A hardness test. We also carried out a morphological study. The results of this research show that the Shore A hardness of the PVC / DPLF compositions increases progressively with the increase of the DPLF fiber incorporated in the polymer. In addition, SEM morphology detected cohesion between the polymer and the fiber

Keywords: Composite, Date palm leaf fiber, Mechanical proprieties, Morphology, Polyvinyl chloride.

ID: CSC020 *Poster Presentation*

Preparation and characterization of Co3O4:Ag thin films prepared by pneumatic spray method

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Abstract.

This work focuses to prepared and characterized Co3O4 thin films doped with different concentrations of silver. The films where deposited on glass substrates at a 400°C by spray pneumatic method. The aim of this work is to investigate the effect of silver doping on the structural, optical and electrical properties of Co3O4 thin films. The characterization of samples was carried out by X-Ray diffraction, UV-VIS spectroscopy and electrical conductivity method. Results showed that all the films were polycrystalline spinel type cubic structure, with a preferential orientation according to the (111) plane. The exploitation of these spectra allowed us to obtain the values of the sizes of the crystallites. We noticed a decrease in crystallite size with increasing silver concentration from 29.7388 nm to 10.9575 nm. The optical measurements showed that the transmittance comprised between 10.94% and 29.18% in the visible domain, and the band gap value Eg1 and Eg2 comprised between (1.37 to 1.47ev) and (1.88 to 2.04ev) respectively. The maximum conductivity measured is 19.849 (Ω .Cm)-1 for the 2% mass concentration of silver.

Keywords: TMO, Co3O4 thin films, Ag doping, spray pneumatic method.

ID: CSC021 *poster Presentation*

X-ray diffraction line profile analysis of dislocation density of X70 welded pipeline steel

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Abstract.

XRD is powerful tool to characterize the microstructure of the polycrystalline samples. It gives the microstructures of the sample in statistical manner. X-ray diffraction line profile analysis (XRDLPA) is one of the potential indirect Methods of characterizing the state defect. Basically, XRDLPA provides quantitative as well as qualitative information on several microstructral parameters, small crystallite size, size distribution, microstrain, and density of dislocation stacking faults, energy... from broadening XRD peaks.

Dislocations are known for their peculiar effects on the diffraction profiles. Each given dislocation type, produces specific anisotropic line broadening basically determined by the so-called contrast factor (CF). Whole powder pattern modeling (WPPM) procedure allows a one-step refinement of microstructure parameters by a direct modeling of the experimental pattern. Lattice parameter and defect content, expressed as dislocation density, outer cut-off radius, contrast factor, can be refined to gather with the parameters (mean and variance) of a grain-size distribution All data were analyzed by the software PM2K in this paper. After applyingof heat treatments we obtained these results: Before heat treatment the density of dislocation in the heat affected zone (HAZ) was(ρ= 6.501594) but after the isothermal annealing at 400°C and 600°C for 10 min, we found a decrease in the density of dislocation(ρ=5.166125.1014 m-2 and 5.676957.1014 m-2 respectively). The values of the Wilkens parameter (M), the dimensionless parameter M is the factor for characterizing the dislocation arrangement are 0,667272 and 1.230876 corresponding to 400 °C and 600°C heat treatments for 10 min respectively). After the isothermal annealing at 400°C we have obtained total screw dislocations, contrary at 600°C we attained edge dislocations.

Keywords: Dislocation density, WPPM, PM2K software, line broadening, contrast factor.

ID: CSC022 *Poster Presentation*

Title of the Paper propriétés physico-chimique et caractérisation d'huile essentielle de lavande

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Abstract.

For a long time man has recognized and used plants for food, healing, and sometimes using them in religious rites, and to treat various diseases. Even today, science confirms the different virtues of aromatic plants and their essential oils and their raw extracts whose fields of application are very varied and which are widely used in the food industry as additives and in cosmetics, perfumeries, soap and detergent industries in impressive volume.

In this study, we extracted lavender essential oil by aqueous distillation and studied its different properties. Such as physical and chemical properties : pH, conductivity, relative density of refractive index, acidity index, saponification index, ester index, impurity rate, oleic acid and diode index. We also conducted phytochemical tests: saponosides, flavonoids and glucosides. We have performed ultraviolet optical spectroscopy, infrared spectroscopy of chemical analysis. We also investigated the effect of lavender essential oil on inhibiting the corrosion rate of X70 steel by absorbing the essential oil into a solution of hydrochloric acid.

After the studies we have done we get good results as the effectiveness of lavender essential oil extracted on inhibiting the corrosion of steel X70, was wonderful and its properties that we studied are good, and this essential oil is considered high quality.

Keywords: extract, lavender, X70 steel, inhibiting, corrosion.

***ID:* CSC023** ***Poster* Presentation**

Study of the effect of fiber size and fiber mass ratio on the mechanical behavior of bio-composite materials.

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Abstract.

In recent years, bio-composites have attracted great interest from researchers, especially in the field of industrial research on new alternative materials to corrosive materials. Hence these biomaterials have proven their effectiveness in the industrial field due to their good mechanical and thermal properties in addition to their low density and their respect for the environment. Where these bio-materials are commensurate with the principle of sustainable development and the current destination of the world as being degradable, recyclable, and anti-corrosion. In this context, this experimental study was carried out which focused on the preparation of a bio-composite (short fiber of date palm tree/epoxy), with the study of the effect of the size of the fibers and the mass ratio of the fibers on the mechanical properties of these bio-composites. The mechanical test results obtained are used to valorize these fibers for possible industrial applications; Generally speaking, these results show a significant improvement in the modulus of elasticity and the surface hardness of materials reinforced with these fibers, The results showed the highest modulus of elasticity 1.286 GPa when in the fiber composite with a size of (0.8 - 1 mm) and a mass ratio of 16%, but with a decrease in the value of the surface hardness. The fiber-based composite with a size of (0.315 - 0.5 mm) was improved at a mass ratio of 10%, a significant improvement in the modulus of elasticity 1.255 GPa, and with an increased surface hardness of 20% higher than that of virgin epoxy, making it the best.

Keywords: Fibers, Bio-Composite, Mechanical properties, Mass ratio, Anti-corrosion.

ID: CSC024 *Poster Presentation*

Effect of chemicals treatments on the mechanical, morphological, and thermal properties of palm fiber reinforced polyethylene composites

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Abstract.

In recent years, the mechanical properties of synthetic polymeric materials have been enhanced by combining them with various reinforcing fillers, such as lignocellulosic materials, which are among the most environmentally friendly agrowaste and will play a significant role in resolving the most pressing environmental issues of the future. Because they degrade with time, these materials are simple to gather from agrowaste and have no environmental impact. This study aims to determine the effects of palm fiber alkali treatments and silane coupling agents on the mechanical, thermal, and water absorption properties of polyethylene PE composites. Examine the effects of fiber treatments using infrared spectroscopy. The use of treated fibers in composite materials enhances mechanical properties compared to untreated composites. In addition, SEM images showed a strong interfacial adhesion between the treated fibers and polyethylene composite surfaces, resulting in enhanced water absorption and thermal stability.

Keywords: Polyethylene, Palm fiber, Alkali treatment, Coupling agent, Adhesion.

ID: CSC025 *Poster Presentation*

Sodium Molybdate as a Corrosion Inhibitor for Mild Steel in (0.6MNaCl+ 0.01MNa2SO4) Solution

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Abstract.

The inhibitive action of Sodium Molybdate on Mild Steel corrosion in 0.6MNaCl+ 0.01MNa2SO4 solution was studied using weight loss measurements, potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) techniques. The surface of the Mild Steel samples was also analyzed by scanning electron microscopy (SEM) in the absence and presence of inhibitor. Polarization curves indicate that Sodium Molybdate is a anodic –type inhibitor in 0.6MNaCl+ 0.01MNa2SO4 solution and the inhibition efficiency (IE%) is temperature-dependent. Adsorption of Sodium Molybdate on the Mild 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 Sodium Molybdate 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: Mild steel, Corrosion, inhibition, Activation energy, Adsorption isotherms.

ID: CSC026 *Poster Presentation*

The Effect of Welding Processes on Mecanical and Microstructural Proprieties of Material

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Abstract.

The welding operation causes, through its energy input and sometimes through the metal input, metallurgical modifications at the level of the welded joint.

These modifications will affect the microstructures of the melted zone and the heat-affected zones. In fact, the welded joint is subject to various problems resulting from these modifications: Hydrogen embrittlement, cold cracking phenomenon, appearance of hot cracking (liquation) during solidification, shrink marks, intergranular cracking.These issues concern both the molten zone (which has changed to a liquid state during the welding operation) and the heat-affected zone. The heat-affected zone called HAZ is the seat of metallurgical modifications of the base metal which can induce brittleness, reductions in mechanical resistance, lack of ductility.

These modifications depend on the welded material, the process used, the operating mode followed. To improve the properties and to minimize the problems due after welding, heat treatments will be applied to the level of the welded joint.

Keywords: Welding, Steel, molten zone, heat affected zones, base metal, microstructure.

ID: ***CSC027*** ***Poster Presentation***

Microstructure and Mechanical Properties of FeCrNiSiB-WC-TiC twin wire arc sprayed coatings

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Abstract.

Twin wire arc spray (TWAS) has been the most popular process to produce metallic coatings to protect steel structures against corrosion thanks to its low effective cost and high deposition. However, in highly aggressive conditions of combined erosion corrosion attack, metallic coatings suffer from an acceleration of material degradation. In such applications, Cermet material coatings combining a tough and corrosion-resistant metallic matrix reinforced with hard ceramic particles are strongly recommended. In this work, a cored wire feedstock was used to prepare FeCrNiSiB-WC-TiC cermet coatings on carbon steel substrates by TWAS process. The coatings were examined by X-Ray Diffraction analysis (XRD) and Scanning Electron Microscopy (SEM) to investigate the phases and microstructure of the coatings. The mechanical properties of the coatings: microhardness and fracture toughness were assessed by the Vickers indentation method. The coatings displayed a heterogonous and layered microstructure. Considerable decomposition of W-C and TiC carbides and phase dissolution of W and Ti in the metallic matrix were detected. Consequently, new phases of complex carbides and oxides were formed, leading to alterations in the mechanical properties of the coatings. The microhardness of the coatings showed a relatively high value exceeding (890 HV03) thanks to the embedded carbides as well as the newly formed phases. While the fracture toughness was low only in the areas rich in oxides and brittle phases. Generally, the coating is considered sufficiently hard and tough to be a good candidate for erosion protection application.

Keywords: FeCrNiSiB-WC-TiC coating, microstructure, fracture toughness, twin wire arc spray (TWAS).

ID: CSC028 *Poster Presentation*

Reducing Industrial Accident by Corrosion Risk Assessment and Risk Based Inspection

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Abstract.

Corrosion is a major aggressive environmental factor in oil and process industries affecting the life of equipment, valves and relief valves resulting in leakage, fires and explosions. In fact, in Algerian chemical industry, this phenomenon which takes different forms with multiple causes if it is not inspected and prevented at the real time, it can generate major accident and impacts to the plant, human and environment assets. For that reason, the need to refer to strategies of corrosion management is indispensible in order to predicate damages and degradation of process to avoid catastrophic disasters. The results obtained from corrosion risk management constituted the starting point for a perform risk based inspection (RBI) procedure. This last is methodology used for optimizing inspection plans based on the risk factors assessment of equipment failures mainly corrosion. It is applied to optimize the lifecycle of equipments and mitigate safety and environmental risks. The paper deals with case study on oil and gas tank of crude, the objective to optimize the maintenance plan using RBI approach and corrosion risk assessment.

Keywords: corrosion risk assessment, RBI approach, maintenance.

ID: CSC029 *Poster Presentation*

Mint Leaves Extract as a Green Corrosion Inhibitor for Copper in Hydrochloric Acid Solution

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Abstract.

The inhibitive action of mint leaves Extract on copper corrosion in 1 M HCl solution was studied using weight loss measurements, potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) techniques. Polarization curves indicate that mint leaves Extract is a mixed-type inhibitor in 1M HCl solution . The temperature effect on the corrosion, behavior of copper without and with inhibitor, and the associated activation energy have been determined and proved that the inhibitor interacts on the copper surface by electrostatic effect. The inhibitor was adsorbed on the copper surface according to the modified Freundlich adsorption isotherm model. The thermodynamic parameters of dissolution and adsorption processes are calculated from experimental polarization data . To inspect the surface of the samples, we used analytical techniques for both the light microscope and the X-ray diffraction (XRD) from which we observed the appearance and disappearance of corrosion results Fe2O3 Fe_3O_4 after adding an inhibitor to the medium.

Keywords: mint leaves Extract, Freundlich, corrosion, polarizationn, inhibitor.

ID: CSC030 *Poster Presentation*

CORROSION INHIBITION OF A STAINLESS STEEL IN AN AGGRESSIVE MEDIUM IN THE PRESENCE OF TUNGSTATES

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Abstract.

The interest of this work is to study the efficiency of the corrosion resistance of an AISI 321 stainless steel in an aggressive medium in the presence of chloride ions and a non-toxic corrosion inhibitor, in particular tungstates as well as in the presence iodates as an oxidant through the application of electrochemical techniques, where we have deduced the corrosion potentials and the electrochemical parameters from the Tafel curves, followed by the electrochemical impedances. The study of the influence of conductivity and pH as a function of the different concentrations of the solutions used made it possible to understand the mechanism of action of this inhibitor on the corrosion of stainless steel.

Keywords: corrosion, stainless steel, inhibitor, chlorides, tungstates, iodates.

ID: CSC031 *Poster Presentation*

Extraction of essential oil from pine leaves and its use as an inhibitor of the corrosion process of metals and alloys in an acid medium

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Abstract.

The importance of our study lies in the need to meet the economic needs of maintenance of industrial plants by studying the inhibitory action to reduce the speed of corrosion processes. Much scientific research has been devoted to this effect. This work aims to extract essential oil from pine leaves and test the effectiveness of its inhibition of corrosion of a piece of A333 carbon steel in an acid medium (HCl - M 1) by the weight loss method at a temperature of 25C, The results obtained showed that the speed of solid dissolution depends on the concentration of the base oil and the immersion time, the corrosion inhibiting activity increases with the increase in the concentration of the inhibitor and also with the immersion time and reaches a maximum value of 58.9% for the time = 24 h for a concentration of 1 g/litre of oil, the electrostatic reaction is evidenced (physical adsorption) between the oil-laden particles and the surface of the steel, which allows the formation of a protective and insoluble layer. We also concluded that increasing the temperature reduces the effectiveness of corrosion inhibition.

Keywords: Corrosion - A333 - (HCl - M 1) - essential oil - pine leaves – extraction.

***ID:* CSC032** ***Poster* Presentation**

Evaluation of the inhibitory efficiency of a synthesized compound against copper in 1M hydrochloric acid

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Abstract.

Phosphonates are characterized by their good chemical stability and high water solubility, which allows their use in corrosion inhibition. Therefore, it seemed interesting to us and to study the inhibitory power of an organic compound of the organophosphnate family againt copper corrosion in hydrochloric acid medium 1M. In this work, we have study:

- The electrochemical properties of a compound synthesized in the laboratory and that demonstrate its electrochemical efficiency.

- The inhibitive action of the synthesized compounds on copper corrosion in 1M HCl solution was studied by polarization curves and electrochemical impedance spectroscopy (EIS) methods. The results indicated that the studied compound is an efficient mixed-type inhibitor and its inhibition efficiency increased with increasing inhibitor concentration. The adsorption of the inhibitor on copper surface obeys Langmuir isotherm and their thermodynamic parameters are obtained. The surfaces of copper after exposing to test solutions were examined by atomic force microscopy (AFM).

-The film formed on the surface of the metal was studied using infrared spectroscopy.

Keywords: Synthesis, Ligand, complexes, phosphonates, inhibitors, corrosion, EIS.

ID: CSC033 *Poster Presentation*

High efficiency of New Triazole-Based Schiff Base Ligand as an Effective Corrosion Inhibitor for XC40 Carbon Steel In 1.0 M Hydrochloric Acid Solution: Experimental and Theoretical Study

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Abstract.

carbon steel is one of the most widely used engineering materials owing to its outstanding mechanical properties, low cost, and ready availability. Its high vulnerability to corrosion attack, however, limits some of its applications. The objective of this work is to review briefly the general results of experimental and theoretical study of new Schiff base ligand, namely 1-p-tolyl-N-(4H-1,2,4-triazol-4-yl)methanimine, as an effective corrosion inhibitor for XC40 carbon steel in 1.0 M hydrochloric acid solution. Electrochemical experiments were performed in a conventional three-electrode cell. The cast iron sample was used as the working electrode (WE); a saturated Ag/AgCl electrode and a platinum foil (surface area of 1.0 cm2) were used as reference and counter electrode, respectively. Results from electrochemical measurements showed that the triazole-based compound were effective in inhibiting corrosion in acidic medium. The polarization curves show that this compound act as a mixed-type inhibitor with predominantly anodic characteristics. In addition, it was established the Langmuir adsorption isotherm fits well with the experimental data. The results of scanning electron microscopy (SEM) reveal that the triazole-based compound confirmed the presence of a protective layer on the surface of a mild steel sample. The density-functional theory as a quantum modeling technique that is used to study the electronic structure reveals that the obtained findings were found to be consistent with the experimental results. In this work, the study was conducted using several electrochemical measurements coupled with SEM observations and EDX analysis. The results obtained showed that, the maximum value was achieved at 10-3 M at 25°C, which was approximately 93.6%, 94.6% and 90.55%, according to the potentiodynamic polarization curves, EIS results and weight loss measurement, respectively.

Keywords: corrosion inhibitors, Potentiodynamic polarization, XC40 carbon steel, Adsorption, DFT.

ID: CSC034 *Poster Presentation*

Elaboration and Characterization of composite anticorrosion deposits

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Division of Corrosion, protection and durability of des materials

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Abstract.

The need for improved coatings for better corrosion resistance, allowed the development of composite electrolytic deposits, by incorporating solid particles into the structure of Zinc, Based on this, ZnO is chosen as recess particles to improve corrosion behaviors. The object of our work is the elaboration and the electrochemical, morphological and structural characterization of zinc-ZnO composite deposits, on a mild steel E 24 substrate. These deposits are obtained from a sulfated electrodeposition bath. In a first step, we studied the electrochemical behavior of the bare substrate in a 3.5% NaCl medium, then the zinc coatings were deposited potentiostatically by applying a corrosion potential (-0.6) constant for 900 s. The second part focuses on the study of the morphological and electrochemical characterizations of the coatings obtained on steel by corrosion tests in a sodium chloride solution. The surface morphology of the coatings was examined using scanning electron microscopy (SEM) and those of electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization measurements (Tafel). Our results obtained are considerably encouraging for the protection of mild steel against corrosion by Zn. The deposited alloy coatings were compact.

Keywords: Corrosion, Zinc-ZnO, electroplating, soft steel, coatings.

ID: CSC035 *Poster Presentation*

Simulation of the effect of the length of palm fiber reinforced on two different composite materials (Epoxy resin / Palm fibers and Polyester / Palm fibers)

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Abstract.

Nowadays, the whole world is using composite materials because of their practical benefit and perform the intended function, so we find that they are used in several areas, including (Insulation panels, Aircraft hulls, Racing cars.....) so we conducted this study, which is a simulation by ANSYS program to find the mechanical properties (Young's model, Strain,...) for two composite materials, the first consisting of epoxy resin and palm fibers, and the second of polyester and palm fibers, where in each composite material we used two different types of Palm fibers With a change in the percentages of palm fibers in relation to the total volume of the composite material, we took the following percentages (5%,10%,15%,20%,25%,30%), and with changing the length of the palm fibers, we took the following values : 5 mm,10 mm,15 mm,.20 mm,25 mm ,30 mm And in the end the results were good and can be serve us in the future.

Keywords: Mechanical properties, Epoxy resin, Polyester, Palm fibers, Length of fibers.

ID: CSC036 ***Poster Presentation***

Electrodeposition and Corrosion Resistance of NiP Composite Coatings

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Abstract.

In this present work, cycle numbers' impact on the corrosion, structural, microstructural and morphological properties of NiP films electrodeposited on Cu substrates was studied. X-ray diffraction (XRD) was carried out to obtain the structural parameters such as the preferential orientation, the out-in-plane strain 〖ε〗^hkl (%), and the mean grain size <D (nm)>. Atomic force microscopy (AFM) and SEM microscopy were used to study the morphology of the NiP films. Note that, the NiP films' thickness grows as the cycle numbers increases. The XRD results show that the NiP films are polycrystalline and grow with the <200> texture. As the cycle numbers increase, the lattice parameters gradually decrease. The out-in-plane strain, 〖ε〗^hkl (%), is positive for all samples. With increasing cycle numbers, the strain value decreases, indicating that stress is relieved as NiP thickness increases. With increasing cycle numbers (increasing NiP thickness), the mean grain size, D(nm), varies between 47 and 78 nm. The variation of D (nm) with the cycle numbers shows a maximum equal to 78 Å corresponds to a cycle numbers equal to 2. The impact of cycle number and thickness on grain morphology, size, and dispersion was investigated. Open circuit potential (OCP) measurements, potentiodynamic polarization measurements (Tafel), and electrochemical impedance spectroscopy (EIS) were used to study the corrosion prevention properties. All these results will be discussed and correlated.

Keywords: DC current, NiP composite, Corrosion, XRD, SEM, AFM.

ID: CSC037 *Poster Presentation*

STUDY OF ELECTRICAL AND MECHANICAL BEHAVIOR AND THE EVOLUTION OF THE TEXTURE OF THE THREADS IN COPPER AND RECRUITE COPPER WIRES

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Abstract.

This work and carried out on scientific collaboration with the company manufacturing cables for the ENICAB ENICAB electrical energy. Our study was conducted on a Ducab type copper wire most used by the company. The purpose of this work and to highlight the relationship between the evolution of the microstructure, texture and the mea and electric properties of the copper wires distorted by the Trefilage process as well as, the combined influence of the rate of Deformation and the receipt temperature at 270 ° C on the recrystallization cinema and the evolution of the crystallographic texture during the receipt of re-cristalization.

For this study, several experimental techniques of measurement and characterization allowed us to carry out this work. These are: Balayage electron microscopy (MEB), the diffraction of retraded electrons (EBSD), the diffraction of RX, Vickers microduretity, tensile tests and electrical resistivity measurements, some of which have allowed -Renge the microstructure with texture with mechanical and electrical properties.

Keywords: Trefilage process, microdureté, tensile tests, EBSD, recrystallization, receipt treatment.

ID: CSC038 ***Oral Presentation***

Study of optical properties of undoped NiO thin films deposed at 723K

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Abstract.

The spray pneumatic method has been successfully employed for the preparation of polycrystalline NiO thin films. This work aims to study the effect of the molar concentration of NiO on the optical properties of its thin films. Thin layers of nickel oxide were fabricated from precursor solutions of concentrations 0.10, 0.20, 0.30, and 0.40 mole/L. The thin films were deposited onto glass substrates at 723K using a homemade heater. The X-ray diffractograms obtained show that the thin layers of NiO are polycrystalline and exhibit the first five peaks [(111), (200), (220), (311), (222), and (400)] of this phase. The optical transmission of the NiO thin films was measured for different concentrations. As shown, the films have good optical transparency in the visible range, but the film with the concentration of 0.10 mol/L has a high transmission for lower frequencies (ν <750THz) around 76% and exhibits a sharp cut-off ultraviolet at about 923 THz. The optical energy gap decreases from 3.78 eV for the thin layers of NiO with a concentration of 0.10 mole/L down to 3.46 eV for the concentration of 0.40 mole/L. However, the Urbach disorder energy had clearly increased from 273.6 meV for the thin layers of NiO with a concentration of 0.10 mole/L to 328.1 meV for the concentration 0.40 mole/L.

Keywords: nickel oxide, thin films, spray-pyrolysis, optical properties, energy gap, Urbach energy.

ID:* CSC039** **Poster *Presentation

Elaboration and characterization of transition metal oxide by electrolysis

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Abstract.

Semiconductors are materials with an electrical resistivity (ρ) intermediate between that of insulators and that of metals. These materials are characterized by a full valence band (VB) and an empty conduction band (CB) separated by a forbidden band (which tends to 1V).

Processes for the production of metal oxides are very useful in industry, in particular that of transition metals. Wherein, in an electrolysis device equipped with a cathode and an anode. Either the metal ions, which are dissolved in an organic electrolyte, are electrochemically reduced in the presence of an oxidizing agent at the cathode, or metals whose oxide is to be produced on the surface by anodic oxidation.

Transition metal oxides are among the materials used as electrode materials. Among them, the oxides of tetravalent and divalent metals (example: TiO2, Co (II) and Cu) have received particular attention due to their high specific capacity, their low cost, their natural abundance and their low impact on the environment. In order to maximize their capacities and their electrochemical performances, one was interested in the modification of the structure of this material to lead to very powerful electrical and electrochemical properties. Indeed, this study aims to improve the electrochemical performance of metal oxides by formulating new electrode materials. As well as the study of the effect of the tension imposed on the nature and the quality of the metal oxide obtained. Morphological analysis gave the possibility of obtaining such uniform metal oxide deposits.

Keywords: Transition metal oxide, Electrolysis, SEM, IR.

ID: CSC040 *Oral Presentation*

Microstructure, texture and corrosion behaviours of Al2O24 alloy deformed by cold rolling processing

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Abstract.

The aim of the study is to investigate the influence of rolling processing at room temperature for up to 85% in thickness reduction, on the microstructure, mechanical properties and corrosion behaviour of the Al2024 alloy. As important observations, a fast strengthening with fine-grain structure was developed after rolling processing. The α–Al matrix and intermetallic compound S-Al2CuMg were identified in the as-received alloy, while the θ-Al2Cu phase precipitated after 85 % of cold rolling. The microhardness increases from the as-received state (133 Hv) to reach a value of 193 Hv after rolling to 85% of thickness reduction. The electrochemical test results demonstrated that cold rolling improves considerably the corrosion behaviour of the Al2024 alloy comparing with the as-received alloy.

Keywords: Aluminium alloy; microstructure; mechanical properties; corrosion.

ID: CSC041 *Poster Presentation*

Structural, and corrosion evaluations of multilayered 7000-Series Aluminum fabricated by ARB Process.

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Abstract.

High-strength aluminum alloys are promising materials for automotive structural parts since they offer a great potential to reduce vehicle weight and greenhouse gas emissions. For this reason, 7000-series aluminum alloys recently became the object of various investigations. However, one major drawback of these alloys is their poor corrosion behavior, which is a crucial aspect and currently limits their application in the automotive industry. In this work, Accumulative Roll Bonding (ARB), a severe plastic deformation process for the industrial production of ultra-fine grained (UFG) was used to fabricate a laminated composite Al1050/Al7075/Al1050 at 300 °C up to 2 cycles. The aim is to produce a sheet that has good mechanical properties from the Al7075 sheet, and good corrosion resistance from the Al1050 sheet. Optical Microscope (OM) results showed that good bonding was acquired between Al1050 and Al7075 sheets, and no cracks were observed. X-ray Line Profile Analysis (XRDLPA) on the (RD-TD) plan showed that the dislocation density increased and the crystallite size decreased gradually after 2 ARB cycles due to grains refinement. This was confirmed by the microhardness results (Hv). The electrochemical corrosion tests (potentiodynamic polarization) have been carried out in an aggressive environment (3.5% NaCl) with a pH=5.6. The polarisation potentiodynamic (PDP) results showed that the corrosion resistance of Al1050/Al7075/Al1050 up to 2 cycle ARB is better than Al7075. Indeed, Raman spectroscopy was used to investigate the corrosion product of Al1050/Al7075/Al1050 after electrochemical tests.

Keywords: Accumulative roll bonding (ARB), Microstructure, Al7075, Corrosion, Raman spectroscopy.

ID: CSC042 *Poster Presentation*

The effect of the deposition layers on the optical property of tin dioxide (SnO2) thin films prepared by the sol-gel (Spin coater) process.

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Abstract.

In this study is based on the deposition of thin layers of tin dioxide (SnO) on soda lime glass substrates using the Holmare-sol-gel spin coater process using 0.4M of stannous chloride dehydrate as precursor. The optical properties of tin dioxide films have been investigated by ultraviolet visible spectroscopy. Optical spectra show that these layers are transparent in the visible range, with average transmission from 67% to 86%. As well as, the values measured of the optical band gap energy have increased with the increase in the number of deposit layers from 3.68eV at 4 layers to 3.76 eV at 12 layers.

Keywords: tin dioxide, thin films, sol gel, spins coater, UV-Vis. Optical.

***ID:* CSC043** ***Poster* Presentation**

Hierarchical 3D micro flower-like TiO2 thin film grown by spray pyrolysis

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Abstract.

In the present work, hierarchical 3D growth TiO2 film have been synthesized on heated corning glass substrate, by spray pyrolysis method, using Tetraisopropyl orthotitanate as Ti source. Morphological, chemical bonds and composition, properties are analyzed by environmental scanning electron microscopy (ESEM), attenuated total reflectance fourier transform infrared spectroscopy (ATR-FT-IR), and energy dispersive x-ray spectroscopy (EDS), respectively. Scanning electron microscopy image revealed that the sprayed TiO2 films has dense surface with hierarchical 3D micro flower-like TiO2 growth . FTIR analysis showed the existence of a Ti–O–Ti band at 800-400cm -1 on the coated glass surfaces. EDS spectrum confirms the presence of all elements forming Titanium di-oxide film.

Keywords: Hierarchical 3D TiO2, ESEM, Thin films, Titanium dioxide micro-flower, FTIR spectroscopy.

ID: CSC044 *Poster Presentation*

Comparative Study on the Corrosion Resistance of an austenitic stainless steel and a duplex stainless steel

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Abstract.

This comparative study aims to evaluate the electrochemical behavior of two types of stainless steels AISI 316L and 2209 and their welded joints in NaCl solutions at different concentrations (0.001%, 0.1% by weight) by means of the potentiostatic polarization tests and electrochemical impedance spectroscopy. The experimental results have shown a good consistency between the corrosion kinetic parameters and characteristics of the passive layer formed in each medium and the microstructure of each type.

Keywords: corrosion, stainless steel, welding, microstructure, pitting.

***ID:* CSC045** ***Poster* Presentation**

Rosemary extract as a Green Corrosion Inhibitor for Copper in Hydrochloric Acid Solution

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Abstract.

The objective of this work is to study the corrosion inhibition of C45 steel by a green inhibitor. The inhibitor used in this work is rosemary extract with 0.5M HCl as a corrosive medium. This study was carried out by the weight loss method also the surface analyses of C45 steel by XRD and optical microscopy. In the weight loss method, we studied the effect of concentration, immersion time, and temperature on the corrosion process of C45 steel in a 0.5M HCl acid medium in the absence and presence of an inhibitor. The results obtained reflect the inhibition efficiency is increased by increasing the concentration of the inhibitor in the electrolyte solution until it reaches 74.2350% at 0.7692 g/L, and it increased by increasing the immersion time, while the inhibition efficiency decreases with increasing temperature. The values of the thermodynamic coefficients for the adsorption of the rosemary extract inhibitor on the metal surface proved that this adsorption is physical adsorption and it pursues the Langmuir model.Observation by X-ray diffraction (XRD) and optical microscopy (OM) confirms the presence of a protective layer formed on the surface of C45 steel for the inhibitor in a 0.5M HCl medium.

Keywords: corrosion, inhibitors, rosemary extract, adsorption.

ID: ***CSC046*** ***Poster Presentation***

Study of Green Corrosion Inhibition on mild Steel X70 in hydrochloric Acid Using Syzygium aromaticum as Eco-Friendly Inhibitor

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Abstract.

In this work, we were interested in the study of the physicochemical properties, the antibacterial activity as well as to study the inhibitory effect of the clove essential oil against the corrosion of steel X70 in an acidic medium of 1M HCl, by the mass loss method.

The extraction method by hydrodistillation and continuous extraction using a Soxhlet apparatus were used to compare the effect of the extraction method on the quality of the essential oil.

The results obtained show that the extraction yields using both methods are respectively 11.25% and 25.11%. The physical and chemical analyses were carried out in agreement with the French standardization association AFNOR. Moreover, the study of the corrosion inhibiting effect of clove oil revealed that the inhibition efficiency reaches a maximum value of 99.33% at a concentration of 1 g/l of clove oil and two hours immersion time.

Keywords: essential oil, clove buds, corrosion, inhibitor.

ID: ***CSC047*** ***Poster Presentation***

Density functional theory and molecular dynamic simulation studies on the corrosion inhibitor of plant extract from Nigella sativa on mild steel and aluminum metal

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Abstract.

Plant extract of Nigella stevia was evaluated as inhibitor for mild steel or aluminum in hydrochloride solution (1M), using weight measurements at room temperature, and was found to be effective. Corrosion rate decrease linearly with the film of plant extract coating on the surface metal. The thicker the film of plant extract coating on the metal, the more protection it gave to it, giving rise to the increase in inhibition efficiency. DFT and Molecular Dynamic were used for further an in depth explanation into the mode and mechanism of the majors' components of plant extract under the study: Thymoquinone, Thymohydroquinone, Carvacrol and p-Cymene, on surfaces Fe (110) and Al (111). Quantum chemical parameters associated with the electronic structures of the optimized geometries, at level theory B3LYP 6-311G(d, p) ,of inhibitor molecules confirmed their inhibiting potential through HOMO, LUMO, ΔN, ESP, while Fukui indices indicates that the molecules may interact with Al or Fe metal surface through the hydroxyl (-OH) and carbonyl (-CO). The study by MD reveals adsorption energies in the order: Thymoquinone < Thymohydroquinone < Carvacrol < p-Cymene and a planar configuration parallel to the studied surfaces of all the compounds.

Keywords: Density Functional Theory, Molecular Dynamic, Corrosion, Adsorption, Surface, Plant extract.

ID: CSC048 ***Poster Presentation***

Synthesis and characterization of a new ceramic material

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Abstract.

The main objective of this work is about synthesis, structural and physical characterization of a new ceramics material PZT of perovskite structure ABO3 with substitution in the site A and B which was carried out in order to ameliorate its physical properties. The samples selected for this study were prepared by the method of synthesis in a solid way. A thermal treatment was applied to these compositions at different temperatures : 1100 ° C, 1150 ° C 1180 ° C and 1190 °C successively in order to optimize the sintering temperature where the density of ceramics is at maximum (near theoretical density) and therefore the product is better physical quality. Different techniques of characterization were used such as scanning electron microscopy (SEM), X-ray diffraction (XRD) analysis and IR.

Keywords: Perovskite / ceramic / DRX / MEB / Sintering.

ID: CSC049 *Oral Presentation*

Experimental study of a phosphate-zinc coating of carbon steel intended for industrial drawing

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Abstract.

The Phosphate-Zinc coating is used in industrial application especially in carbon steel coating intended for cold deformation (wire drawing) to enhance both of drawability and corrosion resistance.

In this study the formation of phosphate-zinc coating by conversion method, its morphology and adhesion behavior has been investigated, The process of crystalline zinc phosphating by immersion was carried out in a bath containing mainly of H3PO4,Zn(PO4),acid and oxidizing gaz pedal of NO3-,NO2-,The temperature of the bath is 65ºC for 15min of immersion time, the final coating surface has been characterized by scratch testing,3D surface state , MEB observation .

Keywords: Phosphating, coating, surface, steel, roughness, industrial drawing.

ID: CSC050 *Poster Presentation*

Elaboration and Characterization of composite anticorrosion deposits

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Division of Corrosion, protection and durability of des materials

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Abstract.

The need for improved coatings for better corrosion resistance, allowed the development of composite electrolytic deposits, by incorporating solid particles into the structure of Zinc, Based on this, ZnO is chosen as recess particles to improve corrosion behaviors. The object of our work is the elaboration and the electrochemical, morphological and structural characterization of zinc-ZnO composite deposits, on a mild steel E 24 substrate. These deposits are obtained from a sulfated electrodeposition bath. In a first step, we studied the electrochemical behavior of the bare substrate in a 3.5% NaCl medium, then the zinc coatings were deposited potentiostatically by applying a corrosion potential (-0.6) constant for 900 s. The second part focuses on the study of the morphological and electrochemical characterizations of the coatings obtained on steel by corrosion tests in a sodium chloride solution. The surface morphology of the coatings was examined using scanning electron microscopy (SEM) and those of electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization measurements (Tafel). Our results obtained are considerably encouraging for the protection of mild steel against corrosion by Zn. The deposited alloy coatings were compact.

Keywords: Corrosion, Zinc-ZnO, electroplating, soft steel, coatings.

***ID:* CSC051** ***Poster* Presentation**

Improved corrosion resistance of electrodeposited NiCo-Al2O3 composite coatings with different Al2O3 contents

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Abstract.

Corrosion resistance of Ni–Co alloy and NiCo- Al2O3 nanocomposite coatings electrodeposited in a modified Watts bath using by electrolytic deposition technique was evaluated by potentiodynamic polarization measurements in the 3.5% NaCl solution and studied as a function of concentration particles in the bath. The structure, surface morphology, composition and corrosion resistance properties of the nanocomposite deposits have been characterised by using various techniques. X-ray diffraction analysis (XRD) of the electrodeposited NiCo–Al2O3 nanocomposite shows that it is fcc crystalline. Scanning electron micrography (SEM) reveals smaller grains and uniform distribution of the alumina oxide in the alloy matrix. The corrosion resistance of the electrodeposited nanocomposite evaluated by electrochemical Tafel polarization studie showed that the NiCo–Al2O3 nanocomposite is more corrosion resistant than the Ni–Co alloy deposit. The finer grain and uniform distribution of the alumina oxide in alloy matrix favour the enhanced corrosion resistance of the nanocomposite. Among thestudied coatings, NiCo–Al2O3 nanocomposite coatings containing 21.42 wt% nano-particles exhibited the best corrosion resistance.

Keywords: Electrodeposition, Nanocomposite, NiCo–Al2O3, Corrosion resistance, Morphology.

ID: CSC052 *Oral Presentation*

Substrate Temperature Effect on Properties of CuO Thin Films by Spray Pyrolysis

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Abstract.

The need for energy is constantly growing as a result of technological advancements. Solar energy is the most abundant and widely available source. Several materials are used as absorber layers in solar cells. CuO films seem to be a very promising new and cutting-edge functional material based on recent discoveries in many important fields. Our contribution by the present work aim to obtain CuO films with the appropriate structural, optical, and electrical characteristics used for solar cell applications. This study investigated the effect of substrate temperature on Copper oxide (CuO) film properties prepared by a spray pyrolysis deposition. Copper chloride (CuCl2,2H2O) as a precursor dissolved in distilled water. The films were deposited on a glass substrate at 350 C° and 450C° temperature of substrate. The molarity, time deposition, the distance nozzle-substrate were kept constants all depositions. Structural, optical, Morphological and electrical properties were performed by X- ray diffraction (XRD), UV-VIS-NIR spectroscopy, scanning electron microscopy (SEM) and four probe point measurements respectively. The results showed that the samples were polycrystalline consisting (CuO) monoclinic phase with orientation (110), (-111), (111), (020) and (113). The crystallite size and strain values are 48.75, 35.52 nm, and 7.33*10-4, 9.76*10-4 at 350 °C and 450 °C respectively. The film prepared at 350 °C was absorbent in Visible range and by with the increase of substrate temperature to 450C°, the transparence of film increases to 60%. SEM image shows homogeneity and smooth surface at low temperature. The electrical measurements of resistivity at room temperature were varied between (6.37*10-4 and 2.11*10-4) (Ω.cm). the film's synthesized at 350 °C has good electrical and optical properties which could be used as an absorber layer for solar cell applications.

Keywords: copper oxide, spray pyrolysis, substrate temperature, structural properties, thin films.

ID: ***CSC053*** ***Poster Presentation***

Effect of Cu doping on Co3O4 thin filmes prepared by pneumatic spray Technique

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Abstract.

Cobalt oxide (Co3O4) thin films were deposited on amorphous glass substrates by spray pneumatic method, the cobalt oxide samples has been prepard and employed to be vaccinated with som degrees of the copper (0% ,1%,3%,5%,7%,9%).

To select the properties of this samples have been used many techniques such as the x- rays and the natural analysis of the visible ultraviolet rays.

Results showed that all the films were polycrystalline spinel type cubic structure. The preferred orientation of the crystallites changed from (111) .In addition to that, the results of the spectral analysis shows that the pernability is between 9.18% and 44.25% in the visible and the infrored ranoge.

Keywords: Cobalt oxide, Cu, thin films, pnuematic spray.

ID: CSC054 *Poster Presentation*

Morphological characterization photocatalytic of BIT ceramic material

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Abstract.

In this study, we are going to synthesis our material based on bismuth, he was carried out by the molten salt method. The mixture was prepared and then calcined under a temperature of 800 degrees for 4 hours. The synthesized powders were analyzed to determine their crystalline structure, through the X-ray diffraction technique using X-ray diffractometer with Cu Kα radiation, λ = 1.250 Å, and the system operated at 40 kV and 15 mA. the diffraction peaks revealed the good crystalline nature of the nanocatalyst. All peaks were indexed to orthorhombic BIT structure . The SEM results confirmed that the sample has a relatively dense pure structure with a nanometric size. We observed that the morphology of the powder was uniform where the particle size is approximately 46 nm. The BET surface area and Barrett–Joyner–Halenda (BJH) pore volume of the photocatalyst were determined by adsorption–desorption .We used our catalyst to degrade a cationic polltuant (méthylène Blue) by the photocatalytic effet under the influence of ultraviolet radiation UV (364 nm, 6W) and solar radiation. Photo-catalysis of this cationic pollutant follows first-order reaction kinetics. The rate of degradation approximately 88% under influence of ultraviolet and 93% under solar radiation.

Keywords: catalyst,photocatalytic,BIT,nanocatalyst.

ID: ***CSC055*** ***Poster Presentation***

STUDY OF Zn-Co ALLOY COATINGS MODIFIED BY NANO-Cr2O3 PARTICLES INCORPORATION

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Abstract.

Many metals and alloys suffer from pitting corrosion in different atmospheric condition. The use of protective coatings for improved mechanical and physical-chemical properties of metals and alloys is now an urgent task of industry. Electroplated binary Zn-Co coatings, exhibit improved properties, higher corrosion resistance and better surface morphology, compared to pure Zn coatings. The purpose of this paper is to investigate the effect of Cr2O3 nanoparticles contents on structural properties, microhardness and corrosion resistance of Zn-Co alloy coating and Zn-Co-Cr2O3 composite coatings is electrodeposited on steel substrate in the acid sulfate bath, The smaller grain size of the composite coatings is observed in the presence of Cr2O3 and it is confirmed by the images of scanning electron microscopy (SEM) and X-ray diffraction (XRD) techniques. The corrosion performance of coating in the 3.5% NaCl as a corrosive solution is investigated by potentiodynamic polarization and electrochemical impedance spectroscopy EIS methods. It is found that the incorporation of nanoparticules in Zn-Co alloy coating have better corrosion resistance and the values of Rct and Zw increase, while the values of Cdl decrease with the increasing of nanoparticules. Potentiodynamic polarization scans and EIS measurements showed that the increase in the Cr2O3 deposition in a Zn-Co alloy changes the coating protection process from a sacrificial coating to a protective one because Cr2O3 have inferior diffusion barrier properties. It revealed up to five times higher corrosion resistance of Cr2O3-rich alloy, at the thickness of 1000 Å, as compared to that of the conventionally used Zn-Co alloy of the same thickness. Zn-Co-Cr2O3 alloy can be considered as good diffusion barriers for steel diffusion.

Keywords: Zn-Co-Cr2O3, oxide Cr2O3, corrosion resistance, diffusion barrier.

***ID:* CSC056** **Poster Presentation**

Gravimetric study of the extract of Plectranthus amboinicus leaves against the corrosion of X60 steel in 1M HCl

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Abstract.

60 steel is used in many industries, including domestic applications, automotive industry, equipment assembly, and chemical manufacturing, due to their outstanding characteristics and low cost . Nevertheless, in acidic environments, corrosion of steel is a major problem . This is a particular problem in the oil industry, where X60 steel alloys are used in pipelines . The aim of this work is to study the inhibition performance of Plectranthus amboinicus leaf extract (EFPA), X60 steel in acidic medium (1 M HCl).EFPAis obtained by extraction using soxhlet and methanol as solvent. The study was conducted by the weight loss (ML) method. Characterization of the inhibitor was done by Fourier Transform Infrared Spectroscopy (FTIR), UV-visible and phytochemical screening. The maximum inhibitory efficiency was 99.87% at 0.02 ppm EFPA, obtained after 24 hours of immersion. The influence of temperature on the inhibitory efficiency of EFPA at 0.02 ppm was studied by the weight loss method at temperatures 25, 35, 45 and 55°C. We can therefore conclude that EFPA is a good ecological corrosion inhibitor of X60 in 1M HCl.

Keywords: Corrosion; Inhibition; X60; Plectranthus amboinicus; La perte masse.

ID: CSC057 *Poster Presentation*

Flowers of Borago officinalis inhibitor effect on mild steel A9M in 1M H2SO4 by weight loss method

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Abstract.

The mild steel A9M is used in construction and industry, because of its mechanical properties. Most mild steels are susceptible to corrosion in different aggressive environments. In this work we investigated the inhibitory effect of Borage Officinalis Flower Extract (BOE) on the corrosion of A9M mild steel in 1M H2SO4, using the gravimetric (weight loss) method at concentrations 2.10-1, 4.10-1, 6.10-1 and 8.10-1 v/v. This plant is cultivated for medicinal and culinary purposes because of its richness in Gamma-linolenic acid (GLA) [1-2] . The flowers of borage officinale come from the eastern Algerian coast (EL TARF). EFBO was obtained by decoction and then extraction by Soxhlet in the presence of ethanol as solvent. The characterization of EFBO was done by FTIR and UV-visible spectroscopic analysis as well as by phytochemical screening. The effect of temperature was studied at 15, 25, 35, 45 and 55°C. The surface condition of A9M steel before and after inhibition was characterised by SEM-EDX and AFM. Increasing the concentration of EFBO increases the inhibition efficiency to 90% at 8.10-1 v/v EFBO after 24 h of immersion at 55°C. SEM and AFM micrographs confirm the presence of the inhibitor film on the surface of the test steel In conclusion, borago officinalis flower extract is a good corrosion inhibitor of A9M in 1M H2SO4.

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Keywords: corrosion; inhibitor; Borago officinalis; A9M steel; H2SO4.

ID: CSC058 *Oral Presentation*

Inhibitor effect of Plectranthus amboinicus leaves extract and biosynthesis NPs ZnO against A9M steel Corrosion in 1M HCl by gravimetric method

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Abstract.

In this work, we investigated the inhibitory power of Plectranthus amboinicus (P.a) leaf extract and P.a biosynthesised ZnO nanoparticles (P.a-NPs ZnO) against the corrosion of A9M steel in 1M HCl. The study was carried out by the Weight Loss (WL) method. The characterizations of both inhibitors were done by Fourier transform infrared (FTIR), UV-visible and X-ray diffraction (XRD) spectroscopy. The main constituents of P.a were identified by phytochemical screening. Microscopic analyses of the surface condition of the test steel were obtained by scanning electron microscopy-energy dispersive spectrometry (SEM-EDS). The maximum inhibitory efficiencies obtained by P.a and P.a-NPs ZnO are respectively 99% at 0.04 ppm and 50% at 0.15 ppm, after 24h of immersion time at 25°C. SEM micrographs confirm the presence of an inhibitor film. In conclusion, we can conclude that the extract of Plectranthus amboinicus leaves is an eco-friendly inhibitor of A9M in 1M HCl.

Keywords: Corrosion, Green inhibitor, A9M, Plectranthus amboinicus; WL.

ID: CSC059 ***Poster Presentation***

Nigella Sativa Cake inhibitor effect on stainless steel in 1M HCl by weight loss method

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Abstract.

Corrosion is a major problem faced by industrials. Many studies have been conducted to find a sustainable solution to mitigate the problem of corrosion [1]. Iron-chromium-nickel alloys are specifically designed for components that require increased mechanical strength and corrosion resistance [2, 3]. Among the various stainless steel series available, the 300 series is used in the petroleum, petrochemical, biomedical and other industries. [4]. The aim of this work is to study the inhibitory effect of Nigella Sativa Cake Extract (NSCE) on the corrosion of 316L stainless steel in 1M HCl, using the mass loss method, at concentrations 2.10-2, 4.10-2, 6.10-2, 8.10-2 and 2.10-1 v/v. Nigella Sativa Cake, obtained after cold extraction of its oil, purchased from Istanbul (Turkey). NSCE was obtained by maceration in 1M HCl. The characterization of NSCE was done by FTIR and UV-visible spectroscopic analysis and phytochemical screening. The effect of temperature was studied at 15, 25, 35, 45 and 55°C. The surface state of 316L steel before and after inhibition was characterised by SEM-EDX and AFM. Then, both density functional theory (DFT) and molecular dynamics (MD) were further adopted to investigate the interaction between BCCE molecules and ss-316L surface. Increasing the concentration of NSCE increases the inhibition efficiency to 86% at 4.10-2 v/v NSCE after 24 h immersion at 35°C. SEM and AFM micrographs confirm the presence of the inhibitor film on the surface of the 316L steel. Computational approaches based on DFT and MD were performed to confirm the experimental results and verify the reactivity of the inhibitor molecules in terms of the charge-transfer ability and adsorption energy of Thymoquinone as principal constituent. In conclusion, the extract of Nigella Sativa Cake is a good corrosion inhibitor of 316L in 1M HCl.

ID: CSC060 *Poster Presentation*

Black Cumin Cake extract as a cost-effective and green corrosion inhibitor for mild steel in acidic media: computational, gravimetric and electrochemical studies

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Abstract.

Corrosion is a natural phenomenon, resulting from a chemical or electrochemical reaction. It occurs through the physical-chemical interaction of the metal and its environment, resulting in the degradation of the material and its properties. In the literature, several other works have been carried out on the use of different plant parts with their extracts as green inhibitors against corrosion. These include the following: Opuntia ficus-indica [1, 2]; American Agave [3, 4]; Solanum xanthocarpum [5]; Garlic Extract [6]. On the other hand, the valorisation of plant waste has been the subject of several studies such as: residual tea extract [7]; potato peels [8, 9]; Prunus dulcis peel extracts [10]; pectin isolated from tomato peel waste [11]; Chinese gooseberry shell extract [12]. In this work, the use of Black Cumin Cake (BCC), obtained after the cold extraction of its oil, as a corrosion inhibitor for A9M steel in acidic medium. The Black Cumin Cake Extract (BCCE) was obtained by maceration of the BCC for 24 h in 1N HCl. Several analytical methods were used, such as Weight Loss (WL), Potentiodynamic Polarisation (PPD), and Electrochemical Impedance Spectroscopy (EIS). Characterisation of the inhibitor was carried out by Fourier Transform Infrared (FTIR) and UV-visible. To identify the main phytochemicals of the extract, phytochemical screening was performed. Surface characterisations were carried out by scanning electron microscopy (SEM) and atomic force microscopy (AFM). The WL results show that increasing the concentration increases the inhibitory efficiency up to 90% at 4.10-2 v/v BCCE, after 24 hours of immersion. The maximum inhibitory efficiencies obtained by PPD, SIE and RPL, are 94.63%, 82.26% and 87.52% respectively at 4.10-2 v/v BCCE. The latter acts as a mixed inhibitor. Microscopic observations by SEM and AFM confirm the results obtained.

Keywords: Corrosion; Inhibitor; Black Cumin Cake; A9M steel; HCl.

ID: CSC061 *Poster Presentation*

The devitrification behavior of antimonates glasses by the non-isothermal method

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Abstract.

The study of devitrification was performed on the ternary glass composition 65 Sb2O3 -20PbCl2-15AgCl by the Mehl-Johnson-Avrami-Kolmogorov model. The two major factors of the kinetics of devitrification are determined. The index of Avrami “n” shows the mechanism of the crystallization (nucleation and growth) and the activation energies “Ea” indicates the strength of the glass to the crystallization which is nearly 129.116kj/mol. Therefore, the glass takes place in the constant thermally glasses. The morphology of the crystals and the interfaces has been studied by the SEM.

Keywords: devitrification, antimony oxide, activation energy, Avrami index.

ID: CSC062 *Oral Presentation*

Effet thermique sur un joint soudé d'Al 1050A: Étude microstructural

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Abstract.

This work aims to study the effect of heat treatment on the micrographic and mechanical properties of a joint welded by TIG aluminum 1050A.

For the characterization of the samples, we used different experimental techniques such as optical microscope, XRD, Vickers microhardness and EBSD.

This study allowed us to follow the evolution of the crystallographic microstructure of the welded joint on these three zones: MB; ZAT and ZF. The analyzes showed that a coarsening of the grains and new orientations in the crystallographic planes (hkl) are observed while keeping the same component and the same CFC structure.

The microhardness measurements showed an improvement in the mechanical properties of the areas of the welded joint essentially the heat affected zone and the z one fondu.

Keywords: Aluminum 1050, TIG, Microstructure, Heat treatment, EBSD.

ID: CSC063 *Poster Presentation*

Effect of Indium Doping on Physical Properties of Co3O4 thin films prepared by pneumatic spray method

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Abstract.

Cobalt- Indium oxide was deposited on highly cleaned glass substrates using spray pneumatic technique. The effect of Indium percentage on structural, optical and electrical properties has been studied. The crystalline size of the deposited thin films was calculated using Debye-Scherer formula and found in the range between 24,938 and 53,296 nm. The optical properties have been discussed in this work. Band gap energy is considered one of the most important optical parameter, therefore measured and f6ound ranging between (Eg1) 1,066-1,352 eV and (Eg2) 1,743-1,900 eV. The Co3O4:In thin film reduces the light transmittance for visible range light. The increase of the electrical conductivity to maximum value of 2,249.10-5(Ω cm)-1 for 3% In can be explained by the increase in carrier concentration of the films. A good electrical conductivity of the Co3O4:In thin film is obtained due to the electrically low sheet resistance. Co3O4:In can be applied in different electronic and optoelectronic applications due to its high band gap, high transparency and good electrical conductivity.

Keywords: TMO, Co3O4 thin films, In doping, spray pneumatic method.

ID: CSC064 ***Poster Presentation***

Aging temperature effect on precipitation kinetics in Al-Cu-Fe alloy

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Abstract.

The effect of ageing at 300 °C before and after quenched at two temperatures of 180 and 280 °C on the Al 2017 alloy was studied. The structural properties were investigated using X-ray diffraction; the microstructural evolution was investigated using scanning electron microscopy and microhardness measurement for the mechanical properties. After various states of ageing, the Al–Cu–Fe alloy shows significant changes in the microstructure and mechanical behavior. After ageing, the microstructure of the matrix consisted of a three solid solution of α– Al–Cu–Fe, β– AlFe and θ –Al2Cu phases precipitations. After two-step heat treatment (quenching and ageing), the alloy reveals the formation of β and θ phases precipitates. After ageing at 300 °C of original sample, the alloy reveals higher β precipitates, corresponding to the minimum value of microhardness, the volume fraction of this precipitates becomes higher. On the other hand, the TTT curves for the dicontinuous and continuous precipitation reaction in this alloy have been suggested.

Keywords: Al–Cu–Fe alloy; Heat treatment; ageing; Microstructure; Precipitation.

ID: CSC065 *Poster Presentation*

Study of the effect of heat treatment on the hardness of Steel X70

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Abstract.

Steel is a metal alloy consisting mainly of iron and carbon. It differs from cast iron and ferroalloys by its carbon content between 0.02% and 2% by mass. It is this carbon content that gives steel its properties.

This work examines the differences between the hardness of the X70 steel taken from the transmission pipes before and after the heat treatment of samples measured by the Vickers hardness (HV) test method , where we obtained satisfactory results in this study.

After studying the results , we found that steel X70 is more homogeneous and less hardened after the heat treatment process.

Keywords: X70 steel, Vickers hardness (HV), heat treatment.