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جامعة الملك عبدالله للعلوم والتقنية
King Abdullah University of Science and Technology

جامعة محمد الأول بوجدة
UNIVERSITE MOHAMMED PREMIER D'OUJDA

INTERNATIONAL
Conference On Materials
& Environmental Science
& Exhibition for Science

"Health, Sustainability, & Resiliency Through Research & Innovation"

6Th ICMES 2023

PROCEEDINGS

ICMES

JUNE 07 -11 2023

SAÏDIA MOROCCO

Hôtel Oasis Atlantico
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Welcome Message from General Chairs

Dear Colleagues and Friends,

In lieu of the organizing committee, it is with great pleasure that I cordially invite you to the Sixth International Conference on Materials and Environmental Science **ICMES2023** & Exhibition for Science Under the Theme: « Health, Sustainability, & Resiliency Through Research & Innovation ». For more than 7 years, ICMES has served as an international stage for dissemination of current and emerging materials, environmental science and Health. This year **ICMES2023** will be held as an onsite event from June 7 to June 11, 2023, *Hôtel Oasis Atlantico Saidia Palace & Blue Pearl, Saïdia, Morocco*.

ICMES 2023 keeps its scientific edges from traditional subjects like materials, nanoscience, Smart Technologies for Sustainable Water Management, energy, Technologies and Industry, Sustainability indicators for asset management, Smart Homes, Cities and Communities, New advances in health management, organic, inorganic and nanomaterials, natural products to their biotechnological application, quality, water, environment, health and safety at work, electrical engineering and physics simulations, materials and devices... A dozen of renowned plenary speakers across the world will provide outstanding insights on materials and devices research at this event, along with a couple of comprehensive tutorial lectures and more than a hundred of brilliant invited talks. In addition, we will host several workshops and bilateral symposia organized by leading research groups. If you are interested in current and future research and development of materials and devices Health, please do not miss this event.

With a Great Pleasure to see You in this Beautiful City Saidia the Blue Pearle of the Mediterranean Sea.

Finally, we wish all the participants in **ICMES'23** a very successful and fruitful conference and a wonderful and enjoyable stay in Saïdia, Morocco.

Pr. Belkheir HAMMOUTI Mohammed First University, Oujda, Morocco	**Pr. Faouaz JEFFALI** Mohammed First University, Oujda, Morocco
Pr. Mohammed EDDAOUDI Ampmrc, Kaust, Saudi Arabia	**Pr. Mohammed SIAJ** Quebec University Canada

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Introduction

On behalf of the Organizing Committee of the **6th International Conference on Materials and Environmental Science ICMES2023 & Exhibition for Science Under the Theme: « Health, Sustainability, & Resiliency Through Research & Innovation »**, we are pleased to welcome you **in Saidia, Morocco, on June 07-11, 2023.**

The **ICMES2023** is organized by Mohammed First University, Faculty of Sciences Oujda, Morocco, Faculty of Medicine and Pharmacy Oujda, Morocco, KAUST, King Abdullah University of Science and Technology, SAUDI ARABIA, Higher School of Technology, Oujda, Morocco and the Association: Moroccan Center for Sciences Development -MoCeDeS. This scientific meeting is the continuation of other organized sessions as fellow:

ICMES2016: The 1st International Conference on Materials and Environmental Science **was held in** Campus University of Transfer of Technologies and Expertise – Knowledge Campus, Technopole Oujda, Morocco from 1-3 December 2016. This first session was the start point of gathering leading academic scientists, researchers and industrials to exchange and share their experiences and research results on all topics of Material and Environmental Science. The **ICMES2016** provided also a premier interdisciplinary platform for selected researchers and industrials to discuss the most recent innovations as well as possible collaboration. (http://www.mocedes.org/icmes2016/index.htm).

ICMES2018: The 2nd International Conference on Materials and Environmental Science, which was held on 26-28 April 2018 in Melia Saidia Beach All Inclusive Resort, Saidia, Morocco. The ICMES2018 was an interdisciplinary platform for researchers and industrials for promoting a multi-sectoral and collaborative approach in the field of development of new and innovative approaches in materials and their applications in energy and renewable energy, environmental science and sustainable development, biotechnology and electrical engineering. (http://www.mocedes.org/icmes2018/index.html).

ICMES2019: The 3rd International Conference on Materials and Environmental Science has been held in 18-20 December 2019, Sofitel Agadir Royal Bay, Agadir, Morocco. It was organized by IBN Zohr University, National School of Applied Sciences, Agadir Morocco and the Association: Moroccan Center for Sciences Development -MoCeDeS. The **ICMES2019** was an international platform for participants to consulate and to collaborate in many innovative applications touching the energy, environmental science and sustainable development. (http://www.ensa-agadir.ac.ma/icmes/).

ICMES2020: The 4th International Conference on Materials and Environmental Science has been held virtually during the COVID pandemic period in November 18-28, 2020. The primary objective is to bring together online leading academic scientists, researchers and industrials from more than 20 countries to exchange and share their experiences and research results on all topics of Material and Environmental Science. The second objective is to provide a premier interdisciplinary platform for selected researchers and industrials with complementary, strong and diverse expertise to discuss the most recent innovations as well as initiate possible complementary cooperation and collaboration

for international programs in these fields. The other objective of the conference is to constitute a formation school for the education of young scientists in this important field by creation of direct contacts between international experts in this environmental matter and master or PhD students post docs in order to help them for their future professional careers and to the profit of our society. To initiate interactions between the 24 speakers and participants, keynotes, 120 oral presentations and 30 posters (http://www.mocedes.org/icmes2020/index.html).

ICMES2022: The 5th International Conference on Materials and Environmental Science was held from June 9 to June 12, 2022, in Saïdia, Blue Pearl of the Mediterranean Sea, Morocco. The ICMES2022 was an interdisciplinary platform for researchers and industrials to promote a multi-sectoral and collaborative approach in materials science, energy development, environmental science, health, sustainable development, biotechnology, and electrical engineering. (http://www.mocedes.org/icmes2022/index.html).

The main objective for the ICMES@2023 is: to bring together leading academic scientists, researchers and industrials from Africa, North and South America, Europe, Asia, Australia and Middle East to exchange and share their experiences and results related to Material, Environmental Science and Health. ICMES is providing an interdisciplinary platform for researchers and industrials all over the world with complementary, strong and diverse expertise. The participants will have the opportunity to discuss the most recent innovations as well as to initiate possible complementary cooperation and collaboration through international programs by creating a direct contact between international experts. The goal here is also to promote exchange of Master, PhD students and Post docs between the different academic partners.

The main themes selected for the ICMES@2023 are:

- Health and Nutrition Sciences.
- Water, Soil, Air, Agriculture and Environmental Issues.
- The Power of Different Energy Sources to Effectively Meet Energy Needs.
- Artificial Intelligence, Machine Learning, Engineering and Simulations.
- Advanced Materials from Organic and Inorganic Devices.
- Natural Products and their Valorisations.

The scientific program includes:

The Organizing Committee would like to thank all participants, partners and sponsors for their financial supports and participations.

Further information is available on our conference web site then visit:

http://www.mocedes.org/icmes2023/index.html

Organizing Committee of ICMES2023

THE FIFTH INTERNATIONAL CONFERENCE ON MATERIALS & ENVIRONMENTAL SCIENCE, ICMES-2023

UNDER THE THEME: " HEALTH, SUSTAINABILITY, & RESILIENCY THROUGH RESEARCH & INNOVATION"

JUNE 07-11, 2023, HÔTEL OASIS ATLANTICO SAIDIA PALACE & BLUE PEARL

SAÏDIA, MOROCCO

ORAL COMMUNICATIONS LIST

Authors	Title	ID
HEALTH AND NUTRITION SCIENCES		
M. Ramdani, S. Bekaoui, Fz. Berkchi, H. Boujakhrout, Y. Bentata, N. Abda	Epidemiological status of diabetic ESRD patients on chronic hemodialysis and their preferences on renal replacement therapy	**101**
S. Karim, A. Aouniti, C. Belbachir, I. Rahhou	Human health impact assessment of contamination of fishery products and prevention of food risks	**I103**
N. El Kouartey, K. Edou, H. Koubri, O. Chemao, A. Sulaymani	Epidemiological profile of migrants admitted to Rabat University Hospital	**105**
A. Bouhoudan, J. Bakkach, N. Mourabit, M. Khaddor	Can the mycotoxins become the future treatment for cancer?	**09**
H. Koubri, N. El Kouartey, A. Soulaymani, H. Hami	Place of the "person-centred health services" approach in the improvement of primary health care in Morocco	**112**
H. Guider, M.A. Lafraxo, Y. El Madhi, A. Soulaymani, H. Hami	Prevalence of stress among science teachers: results of a cross-sectional study	**122**

Idrissi Yahyaoui M., Bentouhami N. E., Moumnassi S., Bellaouchi R., Eddabbeh F.-E., El Guerrouj B., Saalaoui E., Jaouadi B., Abousalham A., Capanoglu E., Asehraou A.	BIODEGRADATION OF XYLO-OLIGOSACCHARIDES BY LACTIC ACID BACTERIA: A short review	**165**
Hasnaa Sadik, Chadia Ouazzani, Samira El Ghammarti, Abdellah Moustaghfir, Issam Essebahi, Abdellah Dami, Lhussein Ballouch	Study of the nutritional proprieties of commercial strawberries, red and black raspberry consumed in Morocco	**178**
Dihmane Asmaa**, Aniba Rafik, Raqraq Habiba, Ressmi Amina, Nayme Kaotar, Timinouni Mohammed, Barguigua Abouddihaj**	Antimicrobial Susceptibility and risk factors of Extended-Spectrum β-Lactamases producing Gram-Negative bacilli recovered from patients admitted to Beni Mellal Regional Hospital	**231**
Fz. Smaili, K. Zerrouki, Fz. Aouni, A. Ghanam, A. Babakhouya, M. Tajir	Contribution of Sanger sequencing in the detection of the recurrent Maghrebian c.525delT mutation at the *SGCG* gene in limb-girdle muscular dystrophy with gamma-sarcoglycan deficiency	**232**
N. El Kouartey, H. Koubri, H. Hami, A. Soulaymani	NGOs' rules in the improvement of the migrants' financial access to healthcare in the Rabat Salé Kénitra region	**265**
Saida Rahmani, Abdelilah Berhili, Mohammed Bensalah, Mehdi Najar, Rachid Seddik, Makram Merimi	Impact of T-Lymphocytes Number and Quality in B Acute Lymphoblastic Leukemia's Prognosis	**273**
M. Zraidi	The basics of eliminating the precancerous lesions and cervical cancer in Morocco	**349**
Abdelhamid Bitari, Abdelkhaleq Legssyer	Presentation and Study of the Manuscript Book Entitled "Mark of Happiness in Usual Foods" علامة السعادة في الاغذية المعتادة by doctor Abou Alī Al-Hasan Ibn Ali Al-Marrakushi	**372**
N, Abda, M Fourtassi, Y, Bentata	What profile of type 2 diabetic patients followed at a secondary care referral center: data from a Moroccan cohort study.	**394**
WATER, SOIL, AIR, AGRICULTURE AND ENVIRONMENTAL ISSUES		
F. Zulkifli, Jiyaul Haque, M.S.M. Ghazali, S.M. Zulaikha, Walid Daoudi, **W.B. Wan Nik**	Alocasia Odora Extract as Environmentally Benign Corrosion Inhibitor for Aluminium in HCl: Electrochemical and Surface Study	**24**

JABRI Abdelkarim	Does FDI hurt environment quality in Morocco: Nonlinear cointegration and nonlinear causality	**28**
F. Baragh, K. Draoui, B. El Bali, A. Kherbeche, M. Agunaou, H. Gallard	Removal of organic pollutants from wastewater by catalytic wet peroxide oxidation	**55**
C. Merimi, B. Hammouti, R. Touzani, M. A. Mehdi, M. Neffa, R. Quesada-Cabrera, J. M. Doña-Rodriguez	Study of the degradation of an organic pollutant using a raw clay extracted from the magma of Cumbre Vieja volcano	**56**
El Assaoui Naïma, Sadok Abdelaziz, Merini Imane	Assessment of future climate change effects on groundwater resources in dry area: case of Berrechid aquifer (Morocco)	**57**
Abdelali El Mekkaoui, Rachid Moussadek, Rachid Mrabet, Ahmed Douaik, Rachid El Haddadi, Saïd Chakiri And Abdelmjid Zouahri	The impact of no-till and conventional tillage systems on soil physical properties in a semi-arid region of Morocco	**64**
Abdelhak Saidi, Lhoussaine Jait, Abdelkader Chahlaoui, Youssef Ouballouk, Moulay Lafdil Belghiti, Mohcine Sadki, Chadia Sekkat	Assessment of the parasitic load of the surface waters of Khoumane wadi (city of moulay idriss zerhoun-morocco)	**84**
Youssef Bounakhla, Abdelfettah Benchrif, Mounia Tahri, Fatiha Zahry , Moussa Bounakhla,, El Hassan El Kafssaoui	Levels and patterns of Black carbon at an Urban Site in Kenitra, Morocco	**100**
Fatima Tayi, Adil Akil, Younes Essamlali, Mohamed Zahouily	Exploring the Potential of Fish Protein Hydrolysates from Sardine for Agricultural Applications	**129**
Wafaa Zriouel, Aziz Bentis, Sanaa Majid, Belkheir Hammouti, Said Gmouh	The Blue Tansy essential oil: Electrochemical measurement, computational study and prediction of its corrosion inhibition efficiency based on chemical composition	**131**
Assia Jebli , Abdelhay El Amri, Basma Zarrik, Lamiae Alami, Hicham ElAouani, Ali Oumirdine, El Housseine Rifi , Ahmed Lebkiri	Elimination of a cationic dye from aqueous solution: adsorption on a hybrid biosorbent based on chitosan	**134**
A. Bagayou, A. Hamdache, Y. Diane And M. Ezziyyani	Risk assessment of pesticides in groundwater in the Loukkos area	**140**
Intissar Abounki, Ahmed Fekri, Aziz Ait Sliman	Flood risk assessment and mapping in a semi-arid watershed of the High Atlas mountains, Morocco	**155**
Z. Bediouri, H. Hami, A. Soulaymani, M. Boughriba	Liquid sanitation system of Talsint center: a case study in Figuig province	**160**

Chaouki, K. El Maalam, K. Aouadi, S. Naamane, M. Ben Ali	The effect of zinc bath formulation on the corrosion resistance of galvanized steel: a short review	**186**
Dounia Azzouni, Rajae Salim, Elhachmia Ech-Chihbi, Soukaina Alaoui Mrani, Zakia Rais, Mustapha Taleb	Electrochemical investigation by novel ecological corrosion inhibitors applied to mild steel in a molar hydrochloric acid medium	**197**
KHALID Krami, AHMED Benamara, MOHAMMAD Ettayeb, TARIK Lhoussaine	Study of Asphalt Pavement Cracking Under Climatic Variations in Different Regions of Morocco Using Electrical Tomography Method	**243**
Badr Bouhcain, Yassine Ez Zoubi, Antonio Morán, Mohammed Hassani Zerrouk	Application of Response Surface Methodology to optimize the removal of caffeine and diclofenac from water using biochar produced from argan nutshells	**333**
Y. El Idrissi, M. Benabbou, Z. Rais, M. El Haji	Brackish and seawater pretreatment processes: A systematic literature review	**104**
Imane Merimi, Belkheir Hammouti, Mohamed Ebn Touhami, Charafeddine Jama, Tadeusz Szumiata	Corrosion-Inhibiting Powder Protects Bridge Cables During Construction	**408**
A. El Amri, N. El-Aouni, R. Sayed, S. Sadaoui, N. Dkhireche, M. Ebn Touhami	Experimental and theoretical study of new epoxy resin synthesized as corrosion inhibitor of mild steel 1 M HCl	**151**
A. Belkheiri, M.Khattbi, K. Dahmani, M. Galai, N.Dkhireche, R.a.Belakhmima, M. Rbaa, M. Ebn Touhami, B. Lakhrissi	Comparative Study of MeSQX and BrSQX as Corrosion Inhibitors for Mild Steel in HCl Solution: Experimental and Theoretical Insights	**403**
THE POWER OF DIFFERENT ENERGY SOURCES TO EFFECTIVELY MEET ENERGY NEEDS		
M. Morsli, R. Addou. M. Tahiri	Eco-Friendly Sustainable Materials Based On Construction Waste	**07**
Loubna AZIZI And Nouredine Kouddane	Green City: towards a new urban sustainability in Morocco	**29**
M. Amou, B. Larhrib, N. Sabi, I. Saadoune	Novel Nasicon-typed porous Ni1.5V2(PO4)3/C and Mn1.5V2(PO4)3/C as anode materials for lithium-ion batteries: Crystal structure and electrochemical lithiation/delithiation reaction mechanism	**72**
Grari Meryem, Guetbach Yassmina, Zoheir Cifallah	Characterization of ionic flux and ionic energy in several plasma discharge reactors	**127**
A. Ait Ali, H. Hihi	Cooling of photovoltaic panels by using groundwater with	**133**

	quality analysis	
Oumayema El Ghali, Abdelwahed Chari, Marwa Tayoury, Zakaria Chchiyai,Youssef Tamraoui, Bouchaib Manoun, Mouad Dahbi	Structural and Electrochemical properties of new spinel oxides MgFe2-xMnxO4 as anode materials for Li-Ion Batteries	**153**
Rita Azerhouni, Youssef Benmoussa, Ahmed Khallaayoun	Feasibility Study on the Production of Green Hydrogen using Floating PV in the Moroccan Framework	**157**
Youness Bouhaj, Meriem Saadouni, Mohamed Tahiri, Abdeslam El Bouari	Thermal and mechanical proprieties of PES fabric-CMC composite panel for thermal insulation in building	**163**
Ahmed Bazzi, Hamza El Hafdaoui, Ahmed Khallaayoun	Energy and Environmental Assessment of Alternative Fuel Rails in Morocco	**193**
Ghizlane Elomari, Loubna HDIDOU, Hicham LARHLIMI, Mohamed MAKHA, Jones ALAMI And Mouad DAHBI	Safe and fast charging and anode material for lithium-ion batteries	**205**
H. Chadli, K. Salmi, S. Chadli, R. Malek, O. Deblecker, K. Kassmi, N. Bachiri	Autonomous solar cooker (Heating plate) using both PV panels and batteries	**257**
Abdellatif BOUAICHI	Understanding PV module durability in desert climate conditions for a new durable module	**277**
A. Garni, A. El Barkany, F. Jeffali	Supply chain & Building industry	**299**
M. El Mesellek, K. Hirech, A. Bouaichi, A. Azouzoute, M. Abraim, A. Ghennioui	In-situ performance and degradation of three different photovoltaic module technologies installed in semi-arid climate of Morocco.	**300**
Hiba ELFALLAH, Mohamed AQIL, Anass AIT BENHAMOU, Amina AMARRAY, Mounir ELACHABY, Fouad GHAMOUS, Mouad DAHBI, Houssine SEHAQUI	Battery Separators Based on Phosphate-Functionalized Cellulose	**409**
Hamza Afaryate, Yassin.Zoizou, Mehdi Karbak, Mohamed Aqil, Youssef Tamraoui, Fouad Ghamouss	A Facile Preparation of spinel-type λ-MnO2 as Cathode Material for High-Performance Zinc-Ion Battery	**418**
Yassine SEFFAR, Jones ALAMI, Mouad DAHBI	Graphite surface modification for Improving VO^{2+}/VO^{2+}Redox Kinetics in Zinc-Vanadium Redox Flow Batteries	**420**
Mohamed Kerroumi, Fatima El Bachraoui, Mariam Baazizi, Said Mansouri, Bouchaib Manoun, Youssef Tamraoui, Fouad Ghamouss	Valorization of low-grade pyrolusite and the preparation of LiMn2O4 materials for lithium-ion batteries	**417**
Khadija KOUCHI, Mohamed AQIL, Abdelwahed ChARI, Ayoub EL BENDALI, Jones Alami, and Mouad Dahbi	PVP additive-assisted synthesis and Ti doping: a dual-modification strategy for improving the electrochemical performance of NMC cathode materials for rechargeable lithium-ion batteries	**159**
Elhoucine Elmaataouy, Abdelwahed Chari, Ayoub El Bendali, Marwa Tayoury, Rachid Amine, Mohamed Aqil, Gui-Liang Xu, Tongchao Liu, Jones Alami, and Mouad Dahbi	LiNi0.8Fe0.1Al0.1O2 as Cobalt-free Cathode material with High-Capacity for Lithium-Ion Batteries	**422**

A. Azouzoute, A. Bouaichi, M. El Ydrissi, M. El Mesellek, M. Benhaddou, C. Hajjaj, F. Jeffali	Techno-econo-environmental study of the integration of renewable energy in a desalination plant: case study of Laayoune, Morocco	**301**
Khaoula Benaomar, Abdelkader Outzourhit, Hicham Mastouri, Mohamed El Mankibi, Karim Limam	Climate Change and Building Materials: Implications for Durability and Performance- A case study of Morocco	**346**
Ait Khouya Oumaima, Jammoukh Mustapha, Zamma Abdellah, El Farissi Latifa	Recycling red brick waste into aerogel for thermal insulation applications	**347**
H. Jebbouri, A. Chafi	Additive manufacruring, Litterature review	**367**
Kaoutare Amini Alaoui, Hassan Radoine	A new rural establishment planning towards the sustainability of integration: The development potential for rural communes in the Rehamna province of Morocco	**390**
A. Malah, A. Sabri, H. Bahi	Remote sensing of urban thermal environment's quality assessment	**119**
Mustapha Salihi, Maryam El Fiti, Kenza Charafeddine, Younes Chhiti, Ahmed Chebak, Charafeddine Jama	Effect of tilt angles on the PCM melting behaviour in a rectangular cavity: A numerical study	**397**

ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, ENGINEERING AND SIMULATIONS

H. Foulah, A. Hamdaoui, N. Damil, E. El Alami, A. Boukamel, M. El Bouchti, M. Oumam	Comparison between experimental testing and numerical simulation of polyester matrix composites reinforced with silica glass fibers	**38**
Sabri Anas, Malah Anass, Bahi Hicham	Spatio-temporal analysis of land use land cover changes (LULCC) for detecting urban sprawl using support vector machine (SVM): A Case Study of Casablanca	**59**
I. Srii, L. Elfarissi, M. Jammoukh, A. Zamma	Prediction of the mechanical behaviour of HDPE pipes: Using the Finite Element Method (FEM) and Artificial Neural Network technique (ANN)	**88**
Mohamed El Ghafiani, Mohammed Elaouni, Soufyane Khattou, Yamina Rezzouk, **Madiha Amrani**, El Houssaine El Boudouti	Inverse design of topological properties of photonic systems using deep learning	**99**
Siham Malki, El Farh Larbi, Darhi Zakaria, Guesmi Ibtissam, Challioui Allal	Modeling structural, electronic and optical properties of Vanadium silicide compound based on Density Functional Theory	**123**
Fz. Zahraoui, M. Et-Taoussi, He Chakir, B. Elbhiri, H. Ouadi	A Hybrid Genetic Algorithmic Approach for Energy Management in a Multi-Source Smart Grid: A Case Study in LAMHIRIZ, Morocco	**172**
Ssadik Charadi, Abdelbari Redouane, Abdennebi El Hasnaoui	An energy management system of hybrid microgrid using metaheuristic strategy	**173**
S. Haida, S. El Mrissani, J-L. Probst, L. Misane, A. Benmohammadi, H. Sibari	Long-term and high frequency hydrochemical monitoring in the Sebou catchment: Hydrosystem dynamic and modeling	**200**

Y. Rezzouk, S. Khattou, M. Amrani, M. El Ghafiani, E. H. El Boudouti, A. Talbi, B. Djafari-Rouhani	Observation of FW-BIC in a stub with two lateral branches	**217**
I. Antraoui, S. Machichi, Y. Errouas, M. Gharbi, R. Bousseta, M. Serrhini, D. Bahia And D. Bria	Study of the oscillatory motion of a coupled pendulum and the flapping phenomenon using the MicroLab ExAO interface with an electronic sensor	**249**
S. Machichi, M.R. Qasem, T. Touiss, F. Z. Elamri, F. Falyouni, D. Bria	Electron transport analysis through a GaAs and AlGaAs based cylindrical nanowire cell using the transfer matrix method	**250**
M. El Malki , A. Bria**,** A. Baidri, J. Yousfi, M. Serrhini, S. Amraqui , R. El Houssaine, D. Bria	Hall effect sensors Based Experiment to Study the viscosity of a fluid in Real-time	**251**
A. Baidri, F. Z. Elamri, M. Hbibi, A. Ouariach, F. Falyouni, J. Youssfi, M. Himmi, A. Anakkar And D. Bria	Innovative Teaching Method for Thermodynamics: Real-Time Verification with Pressure and Temperature Sensors	**262**
Y. Errouas, I. Antraoui, A. Bria, D. Bahia, S. Amraqui, M. Gharbi, S. Rihab And D. Bria	Analysis of the movement of a spring with a piezoelectric sensor connected to a Microlab interface	**275**
N. El Biyari, M. Zekriti	Surface Plasmon Resonance in Bilayer Structures: Modeling and Applications	**278**
Kamal ANOUNE, Anas El Maliki, Abdessamad Benlafkih And Abdelkader Hadjoudja	Assessing Lithium-ion Battery State of Charge Estimation for Drones Operation using an Extended Kalman Filter Algorithm	**287**
Moulay Said Khatab, Tarik Touiss, Ilyass El Kadmiri, Driss Bria	Optimization of propagation acoustic waves in one-dimensional via a waveguide tube with a local copper patch resonator	**292**
Wafae El Hamdani, Imane Halkhams	Terahertz applications and integrated circuits for communication systems	**294**
M Khala, N Elyanboiy, I Elabbassi, M Halimi, O Eloutassi, Y Elhassouani, C Messaoudi	Moroccan Sub-Saharan areas hourly air temperature prediction model using Deep Learning methods	**304**
S. Machichi, F. Z. El Amri, M. El Malki, F. Falyouni, A. Ouariach, M. Himmi, R. El Houssaine, D. Bria	Experimental study of an oscillatory motion of a simple and heavy pendulum using a distance sensor with the MicroLabExAO interface	**327**
Hamza El Hafdaoui, Ahmed Khallaayoun	Machine learning for embodied carbon life cycle assessment of buildings	**330**
Ilham El-Atmani, Ilyass El Kadmiri, Aissam Khaled, Driss Bria, Mounsif Ech Cherif El Kettani, Pierre Marechal	Acoustic Splitter Waves Based on Ramified System Made Of Waveguides and Resonators	**371**
Hamza Ennadafy, Mustapha Jammoukh, Naoual Belouaggadia	Numerical simulation of the thermal behavior of a new bio-composite with a durable charge	**373**
Badr-Eddine BENAHMED, Faouaz JEFFALI, Abdallah BARKANY	"IoT-enabled Maintenance 4.0: Optimizing Maintenance Processes and Equipment Performance"	**381**
Zahaf Toufik, Sabar Hichame, Boushaba Farid, Mimoun Chourak	Numerical simulation of the risk of flooding of the national road N°2 at the crossing of the Sefrou wadi south of the city of Bni Drar	**402**
W. Mrabti**, M. Emharraf**	Artificial Intelligence in medical diagnostic: Advancements and challenges	**02**

ADVANCED MATERIALS FROM ORGANIC AND INORGANIC DEVICES

H. Messaoudi, A. Koukouch, I. Bakhattar, M. Asbik	Combustion of sewage sludge in a counter-current fixed bed: an experimental study	**39**
Kamal Essifi, Mohamed Brahmi, Abdelghani Boussetta, Hassan Charii, Abderrahim Ed-Daoui, Anass	Elaboration of calcium alginate-based hybrid bio-capsules:	**423**

Ait Benhamou, M'hammed Benelmostafa, Mohammed Dahmani, Samira Salhi, Amine Moubarik, Ali El Bachiri, Abdesselam Tahani	Insight into the effect of clay content on the mechanical performance	
Meriem Saadouni, Ayoub Nadi, Yosra RAJI, Omar Cherkaoui And Mohamed Tahiri	A new chelating support based on PAN fibre waste; synthesis, experimental design and characterization	**40**
EL Hassan Boutriouia, Taha El Assimi, Mustapha Raihane, Redouane Beniazza, Hicham Ben Youcef, Mehdi Khouloud, Mohamed Hassen V Baouab, Abdelkrim El Kadib, Mohammed Lahcini	Polymethyl methacrylate-g-carboxy-methylcellulose material: from synthesis to slow release fertilizer application	**43**
Ettayeb Mohammad, Chaouni Abdel-Ali, Khalid Krami	Reuse Correlation between P-wave velocity and Schmidt rebound hardness with unconfined compressive strength of Taza marl-limestone in Morocco	**47**
Aziz El-Yahyaoui, Imad Manssouri, Taj Eddine Manssouri, Hassane Sahbi, Houssame Limami	Effect of Aluminum Sawdust Waste on the Technological Properties of Unfired Clay Bricks as a Construction Material	**67**
N. Alanssari, L. Elfarissi, L. Goudali**, N. Akkouri, Y. Haddaji**	Accelerated and ultra-accelerated photoaging of polyethylene films used as greenhouse cover	**96**
Ahlam Oulous, Nour Elhouda Daoudi, Mounir Cherfi, Tarik Harit, Mohamed Bnouham, Fouad Malek	New pyrazole-tetrazole compounds: synthesis, characterization and in-vitro α-amylase inhibition	**109**
Yasmina ED DARIY	Reinforcement of concrete by using the composites materials: A review	**145**
Y. Ouhassan, S. Bri, M. Habibi	Microwave absorption properties of WC / Al2O3 ceramic composite at X-band frequencies	**152**
K. Lamayny, O. El Abouti, M. Amrani And E. H. El Boudouti	Surface states in one-dimensional Graphene-Dielectric photonic crystal	**183**
K. Lamayny, O. El Abouti, T. Mrabti, M. Amrani, S. Khattou, Z. Labdouti, A. Mouadili, E.H. El Boudouti	Fabry-Perot bound states in the continuum in a mesoscopic loop connected to two resonators	**184**
R. Chattahy, M. Bakkas, K. El Maalam, M. Ben Ali, S. Boukheir, A. Chbihi, A. Eljersifi, S. Naamane	Investigation of coal fly ash and electric furnace slag as potential local materials for sensitive thermal storage of industrial waste heat	**188**
Mohamed El Ghafiani, **Adnane Noual**, Mohammed Moutaouekkil And El Houssaine El Boudouti	Surface acoustic waves interaction with confined phonons in a single layered ridge set on top of a multilayer design	**189**
Loubna Bazzi, Samir El Hankari	Green and sustainable synthesis of metal-organic frameworks for the adsorption of phosphate	**191**
Manar Derhy, Yassine Taha, Asmae El Bahi, Yassine Ait Khouia, Mostafa Benzaazoua, Rachid Hakkou	Green froth flotation for a selective separation of calcium-bearing minerals: exploring the potential of bio-based alternatives to conventional collectors	**206**
Moussa Ouakki, Zakaria Benzekri, Mouhsine Galai, Elhachmia Ech-Chihbi, Khadija Dahmani, Said Boukhris, Mohamed Ebn Touhami, Mohammed Cherkaoui	Insights into corrosion inhibition mechanism of mild steel in 1M HCl solution by quinoxaline derivatives: electrochemical, SEM/EDAX, UV-visible	**221**
Issam Saber, Khadija Dahmani, Moussa Ouakki, Mouhsine Galai, Mustapha Belfaquir, Mohammed Cherkaoui, Salaheddin El Youbi	Elaboration and characterization of new bismuth-borate glasses for corrosion inhibition of copper in 1M H2SO4 0.5M medium	**234**
Chaymae Bahloul, Adil Eddiai, Mounir El Achaby	Flexible Piezoelectric Nanocomposite films based on PVDF doped with CoLa0.2Fe1.8O4 For Energy Harvesting Applications	**263**
Soukaina Bouhmaidi, Redi Kristian Pingak, Larbi Setti	First-principles investigation of electronic, elastic, optical and thermoelectric properties of strontium-based anti-perovskite Sr3MN (M= P and As) for potential applications in optoelectronic and thermoelectric devices	**272**

M.R. Qasem, S. Machichi, T.Touis, Y. Ben-Ali And D. Bria	Electronic states in GaAs/AlGaAs/GaAs Core/shell Cylindrical Quantum Wires	**281**
Guetbach Yassmina, Grari Meryem, Zoheir Cifallah	Influence of secondary electron emission on the plasma characteristics in an argon inductively coupled discharge	**284**
M. Koudad, S. Dadou, K. Chourti, M. El Farkhani, O. El Amari And M. Abou-Salama	Encapsulation of therapeutic molecules by starch-cellulose nanocomposites for controlled release	**289**
Zaidi K., Aouiniti A., Merimi C., Daoudi W., Dagdag O., Berisha A., Oussaid A., Touzani R., Hammouti B.	Experimental and theoretical correlation of inhibitory efficacy of L-Serine and L-Tyrosine on carbon steel in 1M HCl	**295**
M. Galai, K. Dahmani, O. Kharbouch, M. Rbaa, M. Khattabi, I. Saber, A. Belkheiri, M. Ebn Touhami, B. Lakhrissi	Surface Analysis and Interface Properties of a Newly Synthesized Quinoline-Derivative Corrosion Inhibitor for Mild Steel in Acid Pickling Bath: Mechanistic Exploration through Electrochemical, XPS, AFM, Contact Angle, SEM/EDS, and Computational Studies	**311**
Sarah Baayyad, Youssef Esshouba, Tarik Mahfoud, Mounir El Achaby, Hassan El Moussaoui	Structural, morphological, optical and magnetical properties of NiFe2O4 micro particles and nanoparticles and their effect on thermoplastic matrix	**314**
F.E. Morchid, L. Elfarissi, A. Zamma, M. Idiri, M. Jammoukh	Enhancing Thermal Properties of Wood flour/High-Density Polyethylene Composites through Incorporation of Phase Change Materials	**329**
F-Z. El Bouchtaoui, E-H. Ablouh, M. Mhada, I. Kassem, Z. Hanani, M. El Achaby	A novel green lignin modification for designing slow-release fertilizers using coating technology	**342**
Yousra Bahjou, Smaail Radi, Mohamed El Massaoudi, Youssef Draoui, Marilena Ferbinteanu, Haralampos N. Miras,Yann Garcia	Toxic trace metals extracted from aqueous solutions using a new ecologic hybrid material created by grafting tetrazole and bi-pyrazole CN junction entities onto the surface of silica	**343**
Youssef Esshouba, Sarah Baayyad, Tarik Mahfoud, Mounir El Achaby, Hassan El Moussaoui	Magnetic Polymeric Composites based on Magnetic Nano and microparticles for Industrial Applications	**351**
Xiaochun Li, Yann Garcia	Schiff base ligand MIII(M = Fe, Mn) mononuclear complexes with *psca* as an anion	**368**
Hamza Outar, Mustapha Jammoukh, Mohamed El Khaili	Comparative study of the mechanical properties of innovative materials for wind turbines	**374**
A. El Aatiaoui, W. Daoudi, E. Hanan, M. El Mahamdi, S. Lamghafri , N. Benchat And M. Abou-Salama	Inhibition of Corrosion of Mild Steel by Oxazole and Isoxazole Derivatives in 1M HCl Medium	**389**
Mohamed El Miz, Abdelilah Elhaddar, Marie-Laure Fauconnier, M. Abou-Salama	Characterization and Adsorption Study of cationic dye on purified and hydrophobic modified diatomaceous earth	**391**
Abdelillah Shaim, Omar Doughmi, Reda El-Bardai 1, Driss Rair, Touria Jermoumi, Abdelkrim Chahine, Abdelghani Hsini	The development of a new polyaniline@oak acorn biocomposite for the efficient removal of Orange G dye from aqueous solutions	**398**
Hasna Nait M'Barek, Soukaina Arif , Benaziz Mohamed4, Patrick Perré	Mycelium-based materials: tuning properties through knowledge and engineering	**395**
Soukaina Arif1, Hasna Nait M'barek, Geert Haesaert, Hassan Hajjaj	Mining biocatalysts for local biorefineries: lignocellulolytic enzymes production by four filamentous fungi under different fermentation systems for olive stones valorization	**396**

NATURAL PRODUCTS AND THEIR VALORISATIONS

T. Alfredy, **M. Dahbi, J. Elisadiki, Y. Jande**	Electrosorption of paraquat pesticide on activated carbon modified by aluminium oxide (Al_2O_3) in capacitive deionization	**15**
Beraich Abdessamad, El Farissi Hammadi, Makaoui Abderrahman, Bouakline Hamza, Neffa Mounsef, El Bachiri Ali, and Talhaoui Abdelmoneam	Comparative study of antioxidant and antibacterial activity from the essential oil obtained from Pistacia Lentiscus stems and leaves via different extraction methods: Hydrodistillation, Microwave, Ultrasounds, and Supercritical fluid extraction	**18**
Yousra Lehleh, Imad Manssouri, Houssame Limami, Taj Eddine Manssouri, Hassane Sahbi, Abdessitir Deraoui, Asmae Khaldoun.	Thermal study of unfired clay bricks with pretreated wheat straw.	**23**
Insaf Nori, Salah Touil, Kaoutar Khallaki	Study of the conversion of the waste of Opuntia Ficus-Indica (L.) Miller into reducing sugars using dilute acid hydrolysis and autohydrolysis	**26**
Nouhaila AJBLI, Fouzia KZAIBER, Abdelkhalek OUSSAMA, Khalid BOUTOIAL, Mohammed BENBATI And Kaoutar ELFAZAZI	Antioxidant proprieties and polyphenols content of quinoa cultivated in Morocco in the region of Béni Mellal Khénifra	**120**
Rachid EL HADDADI, Amina OUAZZANI TOUHAMI, Abdelali EL MEKKAOUI And Allal DOUIRA	Effect of initial morphological traits on field performance of Tetraclinis articulata seedlings in a semi-arid Mediterranean area	**171**
H. Zejli , Fz. Bousseraf, A. Fitat, M. Taleb, A. Abdellaoui	Comparative assessment of total phenolics content and in vitro antioxidant capacity variations of leaf extracts of *Origanum grossii* and *Thymus pallidus*	**182**
O. Boussetta, E. Loukili, A. El Youssfi, S. Ouahabi, M. Ramdani	The effect of drying mode on the chemical composition of Cannabis L Sativa seeds harvested from Morocco	**309**
O. Belhadj, A.Idrissi, A.El Amri, M.Ouakki, S.Bouzakraoui, A.Lebkiri, M.Cherkaoui	Brassicaceae methanolic extract for mild steel protection in HCl 1M	**210**
A. Chergui, E. Ajal, I. Zakariya, R. Nejjari	A Comparative Study of the Biometric, Germinative, and Physicochemical Characteristics of Fruits and Oils of Three Cannabis Strains (Cannabis sativa L.var indica) Cultivated in the Rif Region of Morocco	**214**
J. Chaouay, F. Bentiss, M. Zbair, Z. Belattmania, B. Sabour, C. Jama	Biochar from brown seaweed *Sargassum muticum* as a potential biosorbent for wastewater treatment	**226**
Naji Majoudi, El-Houssaine Ablouh, Fatima Zahra Semlali, Houssine Sehaqu, Abou El Kacem Qaiss, Rachid Bouhfid, Mounir El Achaby	Phosphorylated cellulose nanofibers-based films: tailored thermal, optical, structural and mechanical properties	**233**
Yahia El Habib, Jarosław Serafin, Mohamed Saidi, Mohammed Ouzzine	Promising porous carbons derived from argan waste and their application in CO2 storage	**235**
A. Krid, A. Ennoury, N. Nhhala, K. Aberkani, B. Bouhcain, M. Nhiri, M.H. Zerrouk	Utilization of seaweeds extracts as an eco-friendly alternative of agrochemicals for sustainable agriculture	**241**
Oumayma Sayah, Hamza Bouakline, Imane Ziani, Abdesselam Tahani, Abdelmonaem Talhaoui, Ali El Bachiri	The effect of extraction processes of biomolecules from Prunus dulcis fruit kernels in the eastern region of Morocco and characterization of physico-chemical and bioactive properties of almonds oil	**246**
H. Mesbahi, I. Saibari, M. Ezziyyani, A. Hamim	The role of gamma irradiation to induce genetic variability and improve the yield of groundnut (*Arachis hypogaea* L)	**253**

Ayoub Abarkan, Nafea Achalhi, Ridouan El Yousfi, Abdessamade Benahmed, Abderrahmane El Idrissi	Green Chemistry Approach to Cellulose Modification: Homogeneous esterification using anhydride and acyl chloride reagents	**285**
M. Belfaquir, M. Loutfi, A Hmimou, M. S. Elyoubi	Equilibrium and kinetic studies on the adsorption of Zn^{2+} from an aqueous solution using natural Moroccan clay	**286**
Jazi Omaima, Bahije Loubna, Moustaghfir Abdellah, Zaoui Fatima	New Chitosan based biomaterials and their application in dentistry	**302**
Safae Ouahabi, El Hassania Loukili, Mohamed Ramdani, Marie-Laure Fauconnier	Chemical Composition and Antioxidant Activity of *Gracilaria bursa-pastoris* red seaweed extracts	**308**
Sara Moussaoui, Ahmad Dermaj, Najat Hajjaji, Hamid Erramli	Study of the steel corrosion inhibition in an acid medium by the Centaurium erythraea plant extracts	**325**
Moumnassi S., Lmimouni M., Bentouhami N. E., Idrissi Yahyaoui M., Brahmi M., Bellaouchi R., Eddabbeh F.-E., Hasnaoui I., Abousalham A., Jaouadi B., Saalaoui E., Asehraou A.,	A novel biotechnological valorization approach of shrimp shells based on fermentation by *Lactiplantibacillus plantarum* S61 and ultrasound treatment	**338**
Leila Azaryouh, Mohamed Jaouahar, Zineb Kassab, Mounir El Achaby, Adil Aboulkas	Extraction and characterization of Cellulose and Lignin from Two-phase olive mill waste	**345**
Bensalem EL JEDDAOUI, Imane FIKRI, Abdelmajid El Bakkali, Saadia Ait Lyazidi, Ali Amechrouq, Mustapha Haddad, Stefano LEGNAIOLI And Marina BICCHIERI	Rubia tinctorum Madder: Towards an ecofriendly dyeing of the traditional Moroccan carpet	**362**
D. Mhanni, A.Habsaoui, O. Boussalem, G. Doumane, M. Ebn Touhami	Characterization, phytochemical study and evaluation of the antioxidant power of certain polar and apolar extracts of Chamaerops humilis L fruit (pericarp, seed and mixture) from western Morocco	**378**
I. Mariouch, R. Mariouch, M. Belfaquir, M. S. Elyouibi	Study on the removal of cobalt and chromium heavy metals by adsorption using a natural clay from Morocco: modeling and optimization using response surface methodology (RSM)	**401**
A. Azghar, M. Dalli, S. Azizi, E. Benaissa, Y. Lahlou, M. Elouennass, A. Maleb	Chemical composition and antibacterial activity of Salvia officinalis essential oil against multidrug-resistant bacteria	**399**

POSTERS LIST

Authors	Title	ID
HEALTH AND NUTRITION SCIENCES		
M. Legmouz, A. El Elouahabi, S. Boulbaroud, F. Azzaoui	Epydemiology of pituitary adenomas in the region of rabat-sale-kenitra, Morocco.	**106**
H. Koubri, N. El Kouartey, A. Soulaymani, H. Hami	Health care security in primary healthcare context	**113**
I. Rhzali, H. Khalki, S. Boulbaroud And F-Z. Azzaoui	Perceived stress and coping strategies in Beni Mellal nursing students	**227**
WATER, SOIL, AIR, AGRICULTURE AND ENVIRONMENTAL ISSUES		
M. Zarri, S. Ait Benichou, A. Fahde, F. Amraoui, M. Tahiri	Comparative study of the quality of treated water and sludge from wastewater treatment plants in the peri-urban area of Casablanca	**34**

O. Taoussi, **H. Ba-Haddou, S. Foudeil, A. El Bakkali, S. Ait Lyazidi, M. Haddad, H. Cabana, M. Christelle**	Long-term impact of treated wastewater irrigation on organic matter in agricultural soils: Case of the locality of Ain Taoujdate in the region of Fez-Meknes	**361**
THE POWER OF DIFFERENT ENERGY SOURCES TO EFFECTIVELY MEET ENERGY NEEDS		
Ghizlane El Hajoui, Imad Manssouri, Tajeddine Manssouri, Hassane Sahbi, Asmae Kaldoun, Houssame Limami	Thermal inertia performance of recycled wastewater treatment plant sludge with lightweight earth bricks	**17**
ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, ENGINEERING AND SIMULATIONS		
H. El Baraka, A. Fadlallah	The Energy Efficiency Measures and Economic Performance: Empirical Evidence from Morocco Using a Computable General Equilibrium Model	**20**
R. EL-BOUAYADY, H. Radoine, S. Tayi	Sustainability assessment framework for green infrastructure	**258**
S. Tayi, H. Radoine, R. El-Bouayady	Radar remote sensing indices for extracting impervious surfaces: a comprehensive review and analysis	**179**
M. Ouachekradi, M. Elkabous, Y. Karzazi	Theoretical study on the efficiency of new organic dyes based on (E)-2-(2-(thiophen-3-yl)vinyl)-1,1'-bipyrrole as DSSC sensitizers	**229**
N. Ettaloui, S. Arezki, T. Gadi	An analysis of blockchain-based electronic health record and compliance with GDPR and HIPAA	**267**
H. Boubcheur, A. Bouhaba, Y. El Madhi, H. Sfouli	Education in the era of artificial intelligence, a literature review	**276**
H. Boudine, M. Bentaleb, M. Tayebi	Digital education in Morocco: The impact of the digital classrooms project on science subject teachers	**317**
A. Elammari, J. Arif	The impact of implementation of an AGV in supply chain management: a systematic literature review	**348**
B.-E. Benahmed, F. Jeffali, A. Barkany	The use of infrared thermography in Industry 4.0 maintenance	**382**
AMESLEK Oumaima, ZAHIR Hafida, El BACHAOUI Mostafa	Smart Cities: Mapping an Urban Environement by Decision Tree Method	**411**
ADVANCED MATERIALS FROM ORGANIC AND INORGANIC DEVICES		
Kamal Essifi, Mohamed Brahmi, Abdelghani Boussetta, Hassan Charii, Abderrahim Ed-Daoui, Anass Ait Benhamou, M'hammed Benelmostafa, Mohammed Dahmani, Samira Salhi, Amine Moubarik, Ali El Bachiri**,** Abdesselam Tahani	Characteristics of alginate@clay-based hybrid capsules reinforced with different loading and clay types	**424**

B. Bouabdellaoui, Z. Abbaoui, M. El Kodadi, S. Chetioui, A. Atlamsani, R. Touzani	Six Diaza Benzene Ligands Complexed with Cu(II), Co(II), Mn(II) and Ni(II) Metals: An Excellent in-situ phenoxazinone synthase Catalysts	**21**
Ataria S., Mourabit F.	Optimization of the adhesion of polyurethane paint on a thermoplastic elastomer	**33**
K. Blyid, O. Sadiki, R.A. Belakhmima, M. Ebn Touhami	Electrodeposition of Zn-Ni alloy coating to enhance the corrosion resistance in automotive industry	**74**
Y. Tajmout, S. Merzouk, B. Elbhiri, O. Jamal Eddine, A. Moumen	A bibliometric review of research on construction materials durability, 1990-2023	**170**
M. Ouakki, M. Galai, Z. Aribou, Zakaria Benzekri, E. Ech-Chihbi, K. Dahmani, B. Srhir, S. Boukhris, M. Cherkaoui	Detailed experimental and computational explorations of pyran derivatives as corrosion inhibitors for mild steel in 1 M HCl: Electrochemical/surface studies	**222**
S. Benhaiba, O. Salhi, A. El Attar, A. Ezzahi, M. El Rhazi	Simple and fast electrochemical detection of nitrate ions using a poly 1,8 diaminonaphthalene and copper oxide film on carbon paste electrode	**247**
Amal El Mahdaoui, Smaail Radi, Abderrahmane El Idriss, M.G.P.M. Silva Neve, M. Amparo F. Faustin, Nuno Mour, Mohamed El-Massaoudi	Using materials derived from cellulose to remove heavy metals from wastewater through adsorption	**414**
H. Meziane, I. Oualdi, M. El Kodadi, S. El Kadiri, I. Ozdemir And R. Touzani	Synthesis of selenium-N-heterocyclic carbene compounds: Investigation of antimicrobial and anticancer potential	**115**
Z. Abboui, H. Meziane, M. El Kodadi, E.B. Yousfi, T. Salima, A. Djedouani, R. Touzani	Symmetrical azine ligand-based evaluation of their phenoxazinone activities	**42**
Abdessamad Benabbou, Mohamed El Boutaybi, Youssef Draoui, Mohamed El Kodadi, Rachid Touzani, Zahra Bahari	New materials based on pyrazole and metals: synthesis, characterization, application and the kinetic study	**48**
NATURAL PRODUCTS AND THEIR VALORISATIONS		
A. Laksir, H. Bouammali, R. Touzani	*Solanum elaeagnifolium Cav* fruits: Studies and Applications	**30**
A. M'harzi, I. Oualdi, E.B. Yousfi, M. El Kodadi, R. Touzani	Ecofriendly materials for catecholase reaction: naturel products and metals	**41**
Hamza Bouakline, Soumia Taibi Imane Ziani, Oumayma Sayah, Abderrahman Makaoui, Neffa Mounsef, Hammadi El Farissi, Abdesselam Tahani, Abdelmonaem Talhaoui, Ali EL Bachiri	Comparison of various Pistacia lentiscus leaves essential oil extraction methods: yield, chemical composition and antioxidant activity	**124**

I. Oualdi, R. Benabbes, S. Ouahhoud, B. Adedoyin, K. Elfazazi, H. Azzouzi, R. Touzani	Chemical Composition and Biological Activities of Cedar Essential Oil	**125**
H. Bouammali, L. Zraibi, M. Merzouki, L. Bourassi, I. Oualdi, E. Fraj, H. Meziane, C. Bourhou, B. Bouammali, A. Challioui, R. Touzani	Exploring the medicinal properties of rosemary: potential for the development of antioxidant and anti-cancer drugs through docking analysis	**177**
A. Sellam, Y. Zerrouki, N. Hamdaoui, I. Khalid, M. Meziane	In Vitro Characterization of Lactic Acid Bacteria from Moroccan fermented milk product "Lben" as Probiotics with Cholesterol-Lowering Effect	**379**
Cherriet S., Merzouki M., Soulaymani A., Hammouti B., Ibriz M., Elbekkaye K., Ouasghir A	Phytochemical Screening and Antioxidant Activity of Aristolochia longa: molecular docking, DFT studies and POM analysis	**405**
A. Bekkouch, H. El Mostafi, M. Merzouki. E. Aboubaker, A. Mesfioui	Potential inhibition of ALDH by argan oil compounds, computational approach by docking, ADMET and molecular dynamics	**305**

Invited Speakers

Rare Earth Doped Nanoparticles: Towards Theranostics with Light

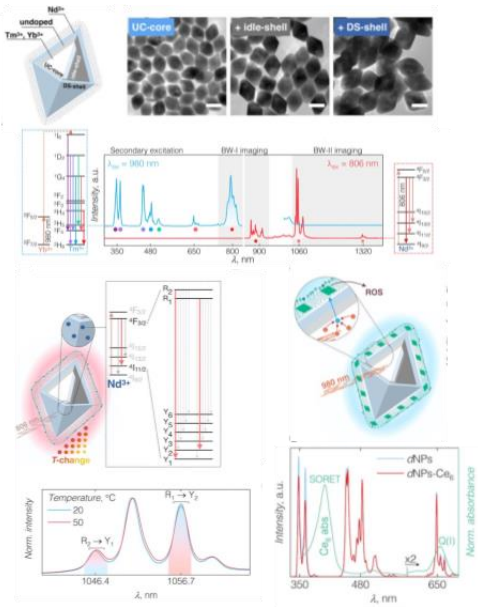
Fiorenzo Vetrone

Institut National de la Recherche Scientifique (INRS), Centre Énergie, Matériaux et Télécommunications, Université du Québec, Varennes (Montréal), QC, J3X 1P7, Canada

Abstract

Luminescent nanomaterials that can be excited, as well as emit, in the near-infrared (NIR) have been investigated for use in a plethora of applications including nanomedicine, nanoelectronics, biosensing, bioimaging, photovoltaics, photocatalysis, etc. The use of NIR light for excitation mitigates some of the drawbacks associated with high-energy (UV or blue) excitation, for example, little to no background autofluorescence from the specimen under investigation as well as no incurred photodamage. Moreover, one of the biggest limitations is of course, that of penetration. As such, NIR light can penetrate tissues much better than high-energy light especially when these wavelengths lie within the three biological windows (BW-I: 700-950, BW-II: 1000-1350, BW-III: 1550-1870 nm) where tissues are optically transparent[1]. At the forefront of NIR excited nanomaterials are rare earth doped nanoparticles, which due to their 4*f* electronic energy states can undergo conventional (Stokes) luminescence and emit in the three NIR biological windows[2]. However, unlike other classes of nanoparticles, they can also undergo a multiphoton process (known as upconversion) where the NIR excitation light is converted to higher energies resulting in anti-Stokes luminescence spanning the UV-visible-NIR regions[3]. Perhaps the biggest impact of such materials would be in the field of disease diagnostics and therapeutics, now commonly referred to as theranostics[4]. Due to the versatility of their optical properties, it now becomes possible to generate high-energy light (UV or blue) *in situ* to trigger other light activated therapeutic modalities (*i.e.*, drug release) while using the NIR emission for diagnostics (*i.e.*, bioimaging, nanothermometry)[5]. Here, we present the synthesis of various NIR excited (and emitting) rare earth doped core/shell (and multishell) nanoparticles and demonstrate how their luminescence properties can be exploited for potential use in diverse biomedical applications.

Figure:



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1. Hemmer, E. Benayas, A., Légaré, F., Vetrone, F., Nanoscale Horiz., 1 (2016) 168-184.
2. Matulionyte, M., Skripka, A., Ramos-Guerra, A., Benayas, A., Vetrone, F., Chem. Rev, 123 (2023) 515-554.
3. Cheng, T., Marin, R., Skripka, A., Vetrone, F., J. Am. Chem. Soc., 140 (2018) 12890-12899.
4. Liu, X., Skripka, A., Lai, Y., Jiang, C., Liu, J., Vetrone, F., Liang, J., Nature Commun., 12 (2021) 6401.
5. Skripka, A., Karabanovas, V., Jarockyte, G., Marin, R., Tam, V., Cerruti, M., Rotomskis, R., Vetrone, F., Adv. Funct. Mater., 29 (2019) 1807105.

Biography

Fiorenzo Vetrone is currently Full Professor at INRS, Centre Énergie, Matériaux et Télécommunications, Université du Québec. Dr. Vetrone is a pioneer in the field of rare earth doped upconverting nanoparticles, publishing the first paper in the field. He has published papers in prestigious, journals such as Science, Nature Communications, Chemical Reviews, etc. that have been collectively cited more than ~18,700 times (H-index = 64). He has given more than 150 invited, keynote, and plenary lectures at prestigious conferences and seminars around the world. Moreover, he has won prestigious awards such as the Keith Laidler Award from the Canadian Society for Chemistry, the W. Lash Miller Award from the Electrochemical Society as well as the Rutherford Memorial Medal in Chemistry from the Royal Society of Canada (RSC). He was an elected member of the Global Young Academy and the College of New Scholars, Artists and Scientists of the RSC. In 2022, he was named Fellow of the Canadian Academy of Engineering.

Defluorination and Adsorption of Tetrafluoroethylene (TFE) on TiO_2(110) and Cr_3O_3(0001)

Jessiel Siaron GUERIBA[1,2,3], Nur Ellina Annisa SALEHUDDIN[1,4], **Wilson Agerico DIÑO[1,5]**, Kiminori WASHIKA[6], Hiroshi NAKAMURA[7], Tatsumi KAWAFUCHI[6]

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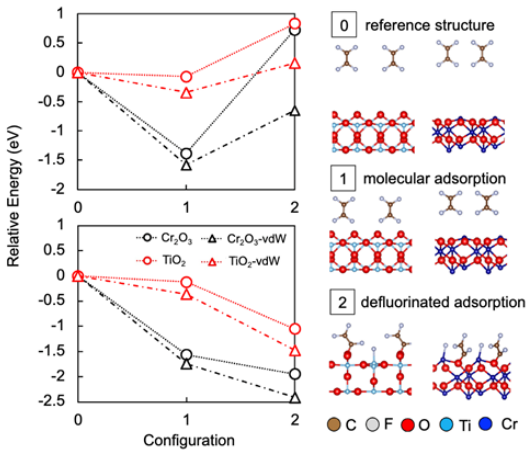
Abstract

Being able to join dissimilar materials allows design engineers to create new structures or parts with tailor-engineered properties, e.g., exhibiting high temperature resistance in one area and good corrosion resistance in another. Notable examples include polymer-metal composites used in various specialized applications. All these applications fundamentally start with polymer adhesion on metal surfaces. We showed that metal oxide surfaces catalyze the formation of intermediate defuorinated tetrafuoroethylene (TFE) radicals, resulting in enhanced binding on the corresponding metal oxide surfaces (cf., Fig. 1). As expected, reactivity of the corresponding metal oxide surfaces depends on the oxygen coordination of metal surface atoms. Thus, introducing oxygen vacancies and non-ionizing radiations to form intermediate radicals could promote binding of polymers to metals and metal-oxide surfaces, allowing for better materials design. This could find significant applications not only in joining dissimilar materials, but also allow for flexibilities in realizing materials with the desired (pre-determined) characteristic properties. Further details will be presented at the meeting.

Figure: . (Right panel) A depiction of TFE interaction with TiO2(110) and Cr2O3(0001) in 3 different configurations, viz., reference structure (0), molecular adsorption (1), and defluorinated adsorption (2) on the corresponding surfaces. Upper left panel shows the corresponding relative energies for optimized adsorbates on frozen surfaces. Lower left panel shows the corresponding relative energies upon surface relaxation. (Note stronger TFE adsorption on Cr2O3(0001) than on TiO2(110). Energy trends remain even after implementing van der Waals (vdW) correction). (Taken from [1]).



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1. S. Yasuda et al., ACS Nano 16 (2022) 14362.
2. Y. Tsuda et al., JACS Au 2 (2022) 1839.
3. T. Kasai et al., J. Chin. Chem. Soc. 69 (2022) 630.
4. J.S. Gueriba et al., Sci. Rep. 11 (2021) 21551-1-7.
5. Y. Tsuda et al., Sci. Rep. 11 (2021) 3906-1-8.).

Biography

Wilson Agerico Diño (wilson@dyn.ap.eng.osaka-u.ac.jp)
1999: Doctor of Engineering, Osaka University.
1999-2001: Japan Society for the Promotion of Science (JSPS) Special Invited Foreign Researcher Fellow.
2001-2002: The University of Tokyo, Institute Industrial Science Researcher.
2002-2002: Academia-Industry Collaborative Researcher.
2002-2004: Advanced Computational Science and Technology-Japan Science and Technology Agency (ACT-JST) Researcher.
2004-present: Adjunct Professor, De La Salle University, Philippines.
2004-2005: Specially Appointed Research Asst., Osaka University Nano Center.
2005-2007: Specially Appointed Assoc. Prof., Osaka University Nano Center.
2007-2010: Assoc. Professor, Osaka University, Graduate School of Science.
2010-present: Assoc. Professor, Osaka University, Graduate School of Engineering.
2010-present: Assoc. Professor, Osaka University, Center for Atomic and Molecular Technologies (concurrent).

Chemistries of Lithium-ion Batteries : A state of the art

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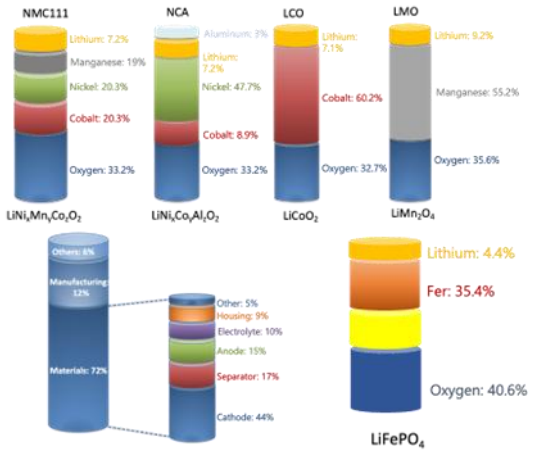
Abstract

Tremendous efforts have been devoted to replace typical fossil energy sources causing environmental deterioration and global warming by efficient alternatives such as renewable clean energy power sources ensuring the growth in demand for energy. Such efforts have led to the development of competitive energy storage systems. Particularly, lithium-ion batteries (LIBs) have attracted extensive interest thanks to their high energy density, long cycle life, high efficiency, and distinguished cycle performance, and stand as the best candidate used for a wide variety of applications from portable electronics to electric vehicle and large-scale energy systems.

Even though there has been a very remarkable progress steps toward the improvement of LIBs since their first commercialization in 1990, . more sustainable developments enhancements of the battery properties in term of safety, performance (energy density, lifetime, rate capability) and production costs are still needed in order to satisfy the industrial and social demands. These properties of the battery are related directly to the properties of its components: , namely the anode, the cathode, and the electrolyte. This presentation will give an overview of the commercialized chemistries used in the cathode, the anode and the electrolyte.

Figure: Cathode materials chemistries.



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1. H. Aziam, …. I. Saadoune, J. Energy Storage, 62 (2023) 106838
2. El Kacemi, .. I. Saadoune, Solid State Ionics, 392, (2023) 116167
3. C Hakim, …, I Saadoune, Electrochim. Acta 438, (2023) 141540
4. H Aziam, .,I Saadoune, Renew. Sustainable Energy Rev. 167, (2022) 112694
5. M. Amou,.. I. Saadoune, J. Power Sources, 532 (2022) 231310).

Biography

Prof. Ismael SAADOUNE was graduated from the University of Bordeaux, France (French PhD, 1992) and the University Cadi Ayyad UCA-Marrakech, Morocco (Moroccan PhD, 1996). 30 PhD Students have been under his supervision, all of them have successfully pursued jobs in industry or in research laboratories. He is the Principal Investigator of 19 national and 20 international research funded projects on energy storage. He was involved in two European Masters ERASMUS MUNDUS. In 2020, he was nominated as the Director of IMED-Lab. where 28 professors and 53 PhD students conduct their R&D on sustainable materials and Energy. Prof SAADOUNE was invited in many prestigious universities/research centers (Uppsala University Sweden; KIT, Germany, Jilin University, China). He is currently a member of editorial boards for three journals and reviewer of more than 200 research papers. His publications have received more than 4700 citations and his current Hirsch Index is h = 29 (Scopus).

Computational-aided development of MOF Mixed Matrix Membranes

Guillaume Maurin

ICGM, Univ. Montpellier, CNRS, ENSCM, Montpellier, France

Abstract

Mixed matrix membranes (MMMs) incorporating Metal-organic frameworks (MOF) into polymeric matrices show promising properties for several industrial applications, such as gas separation, water desalination and pervaporation among others. Especially in the field of gas separation, MMMs have attracted a great attention owing to their potential for merging the processability of polymers and the excellent selectivity of MOF materials. Therefore, understanding the MOF/polymer interface and gas transport through the MMMs is of significant importance. Here, we selected a series of MOFs, as fillers and use our previously developed computational methods to construct MOF/Polymer interfaces with the selection of both rigid and more flexible polymers. Subsequently, we performed Grand Canonical Monte Carlo and concentration gradient-driven molecular dynamics (CGD-MD) simulations to assess the thermodynamic and dynamic adsorption properties of these MMMs. Our simulations revealed that the distinct characteristic of polymer backbones result in different interfacial void regions. We evidenced that not only the size but also the shape of the interfacial voids region have eminent effects on the gas transport properties of the MMMs with respect to a selected range of molecules, e.g. CO_2, N_2 and CH_4. Our results constitute an important step toward the rational design of MMMs with the optimal interfacial void size/shape to achieve the highest performance for the separation of industrially relevant gas separations.

Recent Publications

1. Rational design of mixed-matrix metal-organic framework membranes for molecular separations, S.J. Datta, A. Mayoral, N. Murthy Srivatsa Bettahalli, P.M. Bhatt, M. Karunakaran, I. D. Carja, D. Fan, P. Graziane M. Mileo, R. Semino, G. Maurin, O. Terasaki, M. Eddaoudi, Science, 2022, 376, 6597, 1080.
2. Engineering MOF surface defects in mixed matrix membranes: An effective strategy to enhance MOF/polymer adhesion and control interfacial gas transport, D Fan, A Ozcan, O Shekhah, R Semino, M Eddaoudi, G Maurin, **Journal of Membrane Science Letters** 2022, 2 (2), 100029
3. Asymmetric pore windows in MOF membranes for natural gas valorization, Sheng Zhou, Osama Shekhah, Adrian Ramírez, Pengbo Lyu, Edy Abou-Hamad, Jiangtao Jia, Jiantang Li, Prashant M Bhatt, Zhiyuan Huang, Hao Jiang, Tian Jin, Guillaume Maurin, Jorge Gascon, Mohamed Eddaoudi**,** **Nature** 2022, 606, 7915, 706.

Biography

Guillaume Maurin, received his PhD in Physical Chemistry from Universite Montpellier 2 (France) in 2001. After a Post-Doctoral Marie Curie Fellowship at the Royal Institution of Great Britain in London (UK) in the group of Pr. C. R. A. Catlow, he became Lecturer in 2002 at the Université Provence-Marseille (France). He is currently Full Professor at the Université Montpellier and member of the Institut Universitaire de France. His research interests include the development and applications of advanced molecular simulation techniques to design advanced nanoporous materials and related membranes for energy and environmental applications.

Plasma synthesis of oxide materials for photonics, energy and water treatment applications

Mohamed Chaker[1] and Joëlle Margot[2]

[1]*Institut National de la Recherche Scientifique – Energie Matériaux Télécommunications*
[2]*Département de physique, Université de Montréal*

Abstract

Innovation in materials science and engineering resides in our ability to design new materials with tailored properties (electrical, optical, magnetic, etc.) by controlling their microstructure. One of the most powerful means to uniquely arrange matter at such scale is to use plasmas due to their unique ability to provide simultaneously a variety of particles such as ions, neutral atoms and radicals. In this presentation, we will focus on the growth of various oxide materials in the form of thin films, including undoped and doped vanadium dioxide and titanium oxide using either pulsed laser deposition or dielectric-barrier discharges. There are exploited for various applications including photonics, energy and water treatment.

Biography

Mohamed Chaker has been a professor at the Institut National de la Recherche Scientifique (INRS) in Varennes, Quebec, Canada since 1989. Holding a Tier 1 Canada Research Chair in Plasmas applied to micro and nanomanufacturing technologies since 2003, he has published over 330 articles in peer-review journals (16000 citations, H-index=68 according to Google Scholar) in various domains, including advanced plasma sources characterization (high-density plasmas and laser-induced plasmas) for applications to thin film and nanomaterials synthesis, nanometer pattern transfer and device fabrication. From 1999 to 2002, he has been the director of the Center Energie et Matériaux of INRS, then from 2002 to 2005, the director of the Center Énergie Matériaux Télécommunications. He played a leadership role in the development of Quebec consortia (Prompt-Québec, NanoQuébec). From 2005, he is the director of the Laboratory of Micro and Nanofabrication (LMN) of INRS.

FTIR microspectroscopy imaging promising tool to study biomacromolecular distribution in biological samples

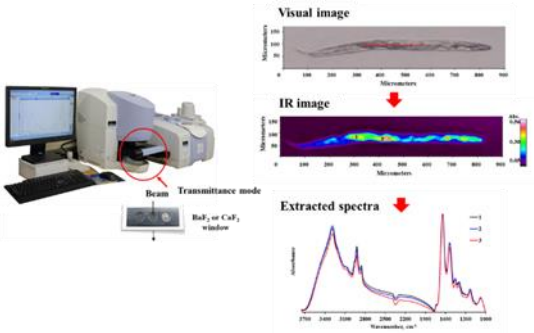
Sumedha Liyanage, Amal Bouyanfif, & **Noureddine Abidi**

Fiber and Biopolymer Research Institute, Department of Plant and Soil Science, Texas Tech University, Lubbock, Texas, USA 79409

Abstract

Fourier Transform Infrared (FTIR) microspectroscopy is a non-destructive technique for the study of various materials including biological samples. It provides information on the presence of chemical species as well as their distribution within a sample. The IR spectrum of a material is made of absorption peaks, which represent frequencies of vibrations between bonds of the molecules making up the material. Because different materials have a unique combination of molecules, they exhibit different IR signatures. Thus, the IR spectra provide a unique chemical fingerprint of the samples. In this study, we used FTIR imaging to study the biochemical profile in white adipose (WAT), brown adipose (BAT), liver tissues, and intact *C. elegans* worms. First, we developed a detailed protocol for cryo-sectioning tissues with a high-fat content, which are considered the most difficult-to-cryosection tissues. We found that adjusting the temperature of the cutting blade and the sample is the key to cryosection tissues rich in fat. In the second study, we used FTIR imaging to investigate biochemical changes in WAT and BAT that are associated with the development of obesity. We identified several infrared bands, infrared peak ratios, and data analysis techniques to monitor vital changes in BAT and WAT. In the third study, we used FTIR imaging to investigate biochemical changes associated with developing non-alcoholic fatty liver disease. We identified fatty liver-associated changes in fat distribution in mouse liver tissues and structural changes in fatty acid molecules. In the fourth study, we used FTIR imaging to study diet, genotype, and age-dependent biochemical changes in wild-type (N2) and mutant (Tub-1 and Fat-3) *C. elegans* strains. These studies paved the way for understanding the biochemical changes in intact nematodes in response to induced changes (e.g., drug, diet, and pathogenesis of diseases).

Figure:



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6. Liyanage, S., & Abidi, N. (2019). Fourier transform infrared applications to investigate induced biochemical changes in liver. *Applied Spectroscopy Reviews*, 0(0), 1–33.
7. Bouyanfif, A., Liyanage, S., Hequet, E., Moustaid-Moussa, N., & Abidi, N. (2019). FTIR microspectroscopy reveals fatty acid-induced biochemical changes in C. elegans. *Vibrational Spectroscopy*, 102, 8–15.
8. Liyanage, S., Bouyanfif, A., Ramalingam, L., Moustaid-Moussa, N., & Abidi, N. (2018). Application of FTIR imaging to detect dietary-induced biochemical changes in brown and white adipocytes. *Vibrational Spectroscopy*, 97(May), 91–101.
9. Bouyanfif, A., Liyanage, S., Hewitt, J., Vanapalli, S. A., Moustaid-Moussa, N., Hequet, E., & Abidi, N. (2017). FTIR imaging detects diet and genotype-dependent chemical composition changes in wild-type and mutant C. elegans strains. *Analyst*, 142, 4727–4736.
10. Liyanage, S., Dassanayake, R. S., Bouyanfif, A., Rajakaruna, E., Ramalingam, L., Moustaid-Moussa, N., & Abidi, N. (2017). Optimization and validation of cryostat temperature conditions for trans-reflectance mode FTIR microspectroscopic imaging of biological tissues. *MethodsX*., 4, 118–127.

Biography

Dr. Noureddine Abidi is Professor of Biopolymers and Bioproducts and Director of the Fiber and Biopolymer Research Institute at Texas Tech University. His focus is on the chemistry of biopolymers, particularly cellulose, and their transformation to advanced materials. He holds a "Habilitation à Diriger les Recherches" from the University of Haute Alsace in France and a Ph.D. from the University of Montpellier II in France. Dr. Abidi has generated 147 refereed journal publications and book chapters, 3 books, more than 182 presentations, 9 patents/provisional patents. Abidi has served as PI or co-PI on funded research grants totaling more than $17M. He received several awards such as Texas Tech University Chancellor's Council Distinguished Research Award, Texas Tech University Outstanding Research Award, Texas Tech University President's Mid-Career Award, Fulbright US Scholar Award, Texas Tech University Integrated Scholar Award, American Chemical Society Cellulose and Renewable Materials Division Fellow.

Hydrazine High-Performance Oxidation and Sensing Using a Copper Oxide Nanosheet Electrocatalyst Prepared via a Foam-Surfactant Dual Template

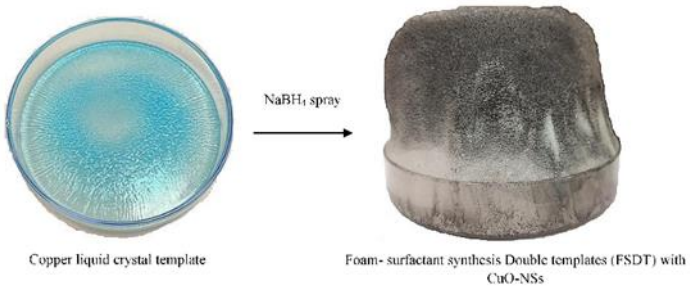
Abdulrahman Alwarthan

Chemistry Department, College of Science, King Saud University, Riyadh 11451, Saudi Arabia

Abstract

This work demonstrates hydrazine electro-oxidation and sensing using an ultrathin copper oxide nanosheet (CuO-NS) architecture prepared via a versatile foam-surfactant dual template (FSDT) approach. CuO-NS was synthesised by chemical deposition of the hexagonal surfactant Brij®58 liquid crystal template containing dissolved copper ions using hydrogen foam that was concurrently generated by a sodium borohydride reducing agent. The physical characterisations of the CuO-NS showed the formation of a two-dimensional (2D) ultrathin nanosheet architecture of crystalline CuO with a specific surface area of ~39 m2/g. The electrochemical CuO-NS oxidation and sensing performance for hydrazine oxidation revealed that the CuO nanosheets had a superior oxidation performance compared with bare-CuO, and the reported state-of-the-art catalysts had a high hydrazine sensitivity of 1.47 mA/cm2 mM, a low detection limit of 15 µM (S/N = 3), and a linear concentration range of up to 45 mM. Moreover, CuO-NS shows considerable potential for the practical use of hydrazine detection in tap and bottled water samples with a good recovery achieved. Furthermore, the foam-surfactant dual template (FSDT) one-pot synthesis approach could be used to produce a wide range of nanomaterials with various compositions and nanoarchitectures at ambient conditions for boosting the electrochemical catalytic reactions.

Figure: Graphical Abstract.



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2. Ajlouni, Abdul-Wali, et al. "Green Synthesis of Silver Nanoparticles Using Aerial Part Extract of the Anthemis pseudocotula Boiss. Plant and Their Biological Activity." Molecules 28.1 (2022): 246.
3. Adil, Syed Farooq, et al. "Advances in graphene/inorganic nanoparticle composites for catalytic applications." The Chemical Record 22.7 (2022): e202100274.

Biography

- *Prof. Abdulrahman Abdullah Alwarthan*
- *Prof. of Analytical Chemistry in Chemistry department, College of Science, King Saud University, Saudi Arabia*
- *His Ph.D. from the School of Chemistry of Hull, University of Hull in the United Kingdom obtained in 1988.*
- *He is a member of Saudi Chemical Society Council*
- *He is the Editor-in-Chief for the Arabian Journal of Chemistry*
- *Member of the International Advisory Board of Jordan Journal of Chemistry (http://jjc.yu.edu.jo)*
- *Associate Editor for Arab Journal of Forensic Sciences and Forensic Medicine (http://ajfsfm.nauss.edu.sa)*
- *He has supervised and examined more than 50 Ph.D. students*
- *He has supervised and examined more than 300 M.Sc. students.*
- *He has published with his research group more than 300 papers in journals of international repute with good impact factor.*

New strategy for designing new materials based on conducting polymers and metal oxide: from sensing to energy application

.

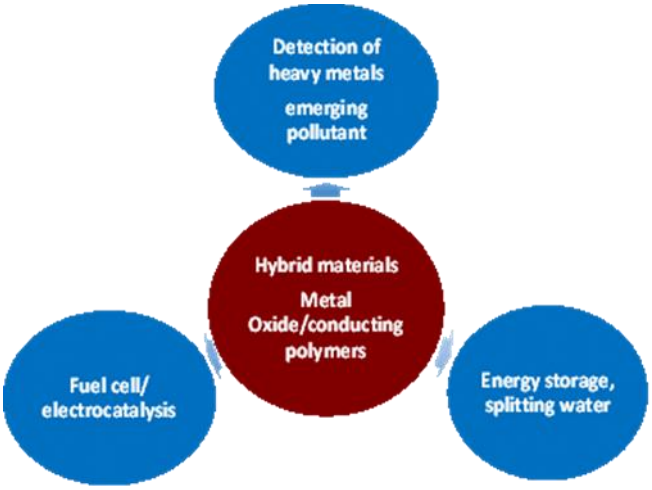
Mama El Rhazi*, Anas El Attar, Salhi Ouissal , Badr Bouhjouil, Benhiba Saad

Faculty of Sciences and technologies- University Hassan II of Casablanca - Laboratory of Materials, Membranes and Environment – Mohammedia – Morocco.

Abstract

The presence of aromatic compounds rich in carbon and azote in the backbone of conducting polymers such as polypyrrole, polyaniline, and poly-phenylenediamine improve their capacity to quench metallic particles via amine group to include them into their frameworks. Herein, a new and simple strategy based on electrochemical cascade reactions was used to prepare metal oxide / conducting polymers. [1-5]. Metal oxides such as Nickel, Ruthenium or Copper oxide are widely used for Direct alcohol fuel cell (DAFC) applications due to their interesting optical, catalytic and electrical properties. In the first part of this work, we will explore the most commonly used methods for preparing metal-conducting polymer based nanocomposites including the key factors influencing their morphology. The catalytical performances of mono and bimetal catalysts deposited on poly-phenylenediamine for electrooxidation of ethanol reaction and oxygen reduction will be examined. The developed nanocomposites offer a great potential for application as sensors or electrocatalysts. We look for future collaborations to apply our catalyst for electrochemical reduction of CO_2.

Figure:



Recent Publications

1. S Chemchoub, A El Attar, L Oularbi, SA Younssi, F Bentiss, C Jama, **Mama El Rhazi**, International Journal of Hydrogen Energy, 47, 2022, 39081
2. O Salhi, T Ez-zine, L Oularbi, M El Rhazi, Arabian Journal of Chemistry 15 (6), 2022, 103820
3. EM Halim, S Chemchoub, A El Attar, FE Salih, L Oularbi, M **El Rhazi,** Frontiers in Energy Research, 292, 2022, 1
4. EM Halim, **M El Rhazi**, H Perrot, O Sel, .ACS Applied Materials & Interfaces 14 (6),2022, 8508-8520
5. O Salhi, T Ez-Zine, L Oularbi, **M El Rhazi**, Frontiers in Chemistry 10, 2022; 90.

Biography

Mama El Rhazi obtained her PhD thesis in electrochemistry in 1992 investigating the modified electrodes by impedance techniques. She started her career by teaching chemistry in the university of Versailles saint –Quentin (France). She then moved to the University of Hassan II - Casablanca (Morocco). She was also invited as associate professor at university of Cergy-Pontoise – France, during 1994 and 1996. She is currently professor in department of chemistry at Faculty of Sciences and Technologies of Mohammedia. She is President of Moroccan Society of Analytical Chemistry for sustainable development. She was president of Federation of African Societies of Chemistry (2017-2022), member of Pan African Chemistry Network. . Chair and Co-chair of several international conferences (ASCD 2010, ACSD2013, ACD2016, abchem 2022.). Her research interests include electroanalysis, modified electrode by conducting polymers / and nanoparticles or by metallic film as bismuth for detection of heavy metals or organic compounds.

Sustainable Nanomaterials as Drivers for Application Development in Sensing and Clean Energy Applications

Rafik Naccache [1,2]

[1]*Department of Chemistry and Biochemistry and The Centre for NanoScience Research, Concordia University, Montreal, Quebec, Canada*
[2]*Quebec Centre for Advanced Materials, Concordia University, Montreal, Quebec, Canada*

Abstract

In recent years, carbon dots, a relatively new class of nanomaterials, have come to light.[1] Carbon dots are carbon, oxygen, nitrogen and hydrogen containing materials with the first two elements typically accounting for ~80% of their elemental composition. Moreover, they are typically water dispersible and can be prepared from an abundant number of inexpensive sources including small molecules such as citric acid, amino acids and sugars. While they are small in size (typically 1-10 nm), they can offer a high quantum yield of emission, a process that is controlled through passivation of the surface with an organic reagent. Of particular interest are their optical properties, which can be tailored via careful selection of the starting precursors and the desired synthesis route resulting in the ability to generate fluorescence from the blue to the near infrared regions of the spectrum (Fig. 1).

Their versatile optical properties and the development of dual fluorescent systems allow us to develop ratiometric optical based sensing probes that can be used in biological systems focusing on temperature and pH sensing of physiological events in live biological model systems.[2,3] We also exploit the optical properties for environmental sensing applications focusing on heavy metals and emerging contaminants.

These carbon dots bare numerous chemical functionalities that we also exploit for the development of novel heterogeneous catalysts in green energy applications focusing on the transformation of refined and waste oils to biofuels such as biodiesel.[4] We report biodiesel conversions of >97% at 150 °C and 1 wt% catalyst loading for our first-generation catalyst. Moreover, we demonstrate the stability and reusability of the nanocatalyst with sustained catalytic efficiency for at least five reaction cycles. Our second-generation catalysts allows for a significant reduction of the reaction temperature to 90 °C, operate at ambient pressure without a significant increase to the catalyst loading.

Figure: The fluorescence of the carbon dots can be tuned from the blue to the far red/near-infrared regions of the spectrum.

Recent Publications

1. de Medeiros, T. V.; Manioudakis, J.; Noun, F.; Macairan, J.-R.; Victoria, F.; Naccache, R. *J. Mater. Chem. C.* 7 (2019) 7175-7195.
2. Macairan J. R., Jaunky D. B., Piekny A. and Naccache R. *Nanoscale Adv.* 1 (2019) 105-113.
3. Macairan J. R., Zhang I., Clermont-Paquette A., Naccache R. and Maysinger D. *Part Part Syst Charact.* 7 (2019) 1900430.
4. de Medeiros T., Macina A. and Naccache R. *Nano Energy* 78 (2020) 105306

Biography

Rafik Naccache obtained his PhD (2012) in Chemistry at Concordia University in Quebec, Canada working on lanthanide-doped upconverting nanoparticles for imaging applications. There, he was the recipient of the Distinguished Doctoral Dissertation Prize and the Governor General Gold Medal in the area of Technology, Industry, and the Environment. He subsequently carried out his NSERC postdoctoral training in nanobiophotonics at l'Institut National de la Recherche Scientifique developing Terahertz sensing applications in nanobiophotonics. In December 2015, he accepted a tenure track faculty position as a strategic hire in the Department of Chemistry and Biochemistry at Concordia University. He is currently an Associate Professor, the Director of the Centre for NanoScience Research and a University Research Chair. His group's research focuses on the study of the fundamental properties of fluorescent carbon nanomaterials and hybrid nanosystems for the development of sensing, imaging and catalysis applications. He has published over 60 manuscripts and has an *h*-index of 33 with nearly 6000 citations (Scopus).

New iron sensors for the detection of toxic industrial chemicals

Yann Garcia [1]

Institute of Condensed Matter and Nanosciences (IMCN/MOST), UCLouvain, Place Louis Pasteur 1, 1348 Louvain-la-Neuve, Belgium

Abstract

In recent years, more attention has been focused on the efficient detection of chemical pollutants, especially small volatile organic compounds (VOCs) and hazardous gases (HGs), using various electronic sensors. This area is really growing given the current challenges in highly toxic molecules detection in our daily life, including viruses. In particular, the detection of relatively volatile molecules at room temperature, is challenging at low concentration levels, and there is therefore a need to develop new sensitive sensors.

From many years, we have been constructing iron coordination polymers with azole based ligands,[1] for which intriguing spin crossover properties were disclosed.[2] We have recently identified a new colorimetric chemosensor of formula $[Fe(H_2btm)_2(H_2O)_2]Cl$ (**1**) (H_2btm = di(1H-tetrazol-5-yl)methane), able to detect at real time, and with a high selectivity and ultra-sensitivity, 14 different VOCs and HGs.[3] In particular amines, which are detected rather quickly (< 10 min) and with a very high sensitivity. The detection is accompanied by significant and fast colour changes detectable by the naked-eye at ambient conditions. But not only, since the detection can be achieved using simple and intuitive standard chemometric means with a handful smartphone-based analytical method. The crystal lattice of **1** reconstructs after adsorbing VOCs vapours, reconstruction which is accompanied by a spin state and a colour change. In addition to its high thermal stability (up to 170 °C), the colorimetric sensor showed excellent reusability by consecutive 7 cycles of adsorption–desorption. This sensor is low-cost, environmentally friendly, easy to use, and shows excellent and fast detection performances. Such features offer attractive prospects for **1** which could be used for in-field detection and food safety control in environmental conditions. We recently extended this material to new materials showing improved performances,[4-6] which I will review in this talk.

Figure:

Recent Publications

1. Y. Garcia, *Adv. Inorg. Chem*. 76 (2020) 121.
2. W. Li, C. Liu, J. Kfoury, J. Oláh, K. Robeyns, M. L. Singleton,
3. S. Demeshko, F. Meyer, Y. Garcia, *Chem. Commun*. 58 (2022) 11653.
4. L. Sun, A. Rotaru, K. Robeyns, Y. Garcia, *Ind. Eng. Chem. Res*. 60 (2021) 8799.
5. W. Li, L. L. Sun, C. Liu, A. Rotaru, K. Robeyns, M. L. Singleton, Y. Garcia, *J. Mater. Chem. C* 10 (2022) 9216. **Hot paper. Front cover**.
6. L. Sun, A. Rotaru, Y. Garcia, *J. Hazardous Mater*. (437) 2022 129364. **IMCN news**.
7. L. Sun, W. Li, Y. Garcia, *'Mössbauer Spectroscopy: Applications in Chemistry and Materials Science'*. Wiley VCH 2023.

Biography

Prof. Yann Garcia develops new sensors for various applications in material science using coordination compounds. He was awarded his doctorate in Jan. 1999 with the highest distinction at ICMCB-CNRS. He has published more than 280 papers with several cover pages of top chemistry journals, 13 book chapters in Inorganic Chemistry, a Wiley-VCH book on Mössbauer spectroscopy and two patents. h-index = 57 (14317 citations, GScholar, April 2023). He is associate editor of the *Mössb. Eff. Ref. Data J.* (CAS) and *Chem. Synth*. (OAE Pub, China). Since 2007, he chairs the Mössbauer French Speaking Society (www.gfsm.fr), and is IBAME vice chair (IBAME.org) of the International Mössbauer community since 2021. He promotes the development of chemistry at the highest level, among the next generation of Morrocan chemists. He co-chaired the International Conference on Advanced Materials, Nanosciences and Applications (ICAMANA 2019 Oujda and 2022 LLN) and two training schools on Nanochemistry.

Imaging and modelling the Spatio-temporal Dynamics of First-OrderSpin Transitions in Spin-Crossover Single Crystals.

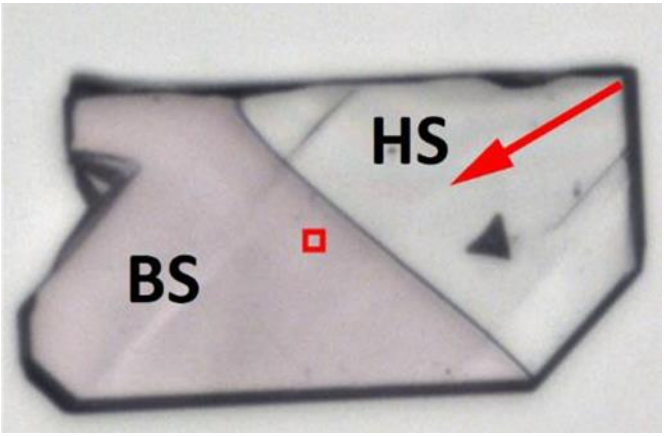
K. Boukheddaden[1], N.E.I Belmouri[1], H. Fourati[1], S.Triki[2], Y. Singh[1], M. Ndiaye[1], N. di Scala[1].

[1]Université Paris-Saclay, GEMAC, UMR CNRS 8635, 45 Avenue des Etats Unis, 78035, Versailles, France.
[2]Université de Brest, CNRS, CEMCA, 6 Avenue Victor Le Gorgeu, C.S. 93837, 29238 Brest, Cedex 3, France

Abstract

Imaging the spatiotemporal dynamics[1] of spin transition (ST) materials by optical microscopy (OM) at the scale of one single crystal has recently emerged as a highly efficient method allowing a deep understanding of their cooperative macroscopic transformation between the low-spin (LS) and high-spin (HS) states. In this communication, we will show some typical examples[2] (see Fig. 1) of real time transformation of ST single crystals exhibiting first-order transitions with well-defined front interfaces. The velocities, shapes and orientation of the HS/LS interfaces will be discussed in relation with the macroscopic shape of the crystals and the structural transformations of the unit cells. Under light, the ST solids display photo-induced phenomena through LIESST (Light-Induced Excited Spin-State Trapping) effect. When this process competes with thermalrelaxation, Light-Induced Thermal Hysteresis (LITH) effect is obtained. Both of these phenomena and their spatiotemporal properties will be characterized by OM[3]. Finally, we will demonstrate that light irradiation[4] can be used as a relevant stimulus leading to control the front interface as well as to selectthe nucleation point[5] at which the spin transition can be triggered, while the latter effect is usually a stochastic process in thermal transitions. Overall, the spatiotemporal properties of the nucleation, growth and propagation of the spin domains will be discussed and their modelling will be presented.

Figure: OM imaging of the interface propagation along the HS to LS transition in a single crystal of the compound $\{Fe(2pytrz)_2[Pd(CN)_4]\}.3H_2O$ exhibiting a hysteretic incomplete spin transition.



Recent Publications

1. A. Slimani, F. Varret, K. Boukheddaden, et al., *Phys. Rev. B.*, 84 (2011) 094442.
2. A. Slimani, F. Varret, K. Boukheddaden et al. *Phys. Rev. Lett.* 110 (2013) 087208.
3. H. Fourati et al., *Phys. Rev. B.*, 105 (2022) 174436.
4. H. Fourati and K. Boukheddaden al. *Phys. Rev. B.*, 101 (2020) 224101.
5. N. E.-I. Belmouri, J.A. Real, K. Boukheddaden, to be submitted.

Biography

The author is a full Professor of Physics since 2005 in Versailles's University. He is a solid state physicist, expert of equilibrium and nonequilibrium aspects of phase transitions in molecular solids, including spin-crossover systems, Prussian Blue analogs, charge transfer solids (mixed valence) and photo-luminescent hybrid organic-inorganic for which he studied the correlation between their optical and structural properties. The author has also an expertise in real time optical microscopy imaging of phase transitions, and in theory of spatiotemporal dynamics of thermally- or optically-induced first-order phase transitions, using elastic models, Monte Carlo simulations, Molecular Dynamics and reaction- diffusion approaches. He was awarded his PhD in Solid State Physics in 1993 from the University of Pierre et Marie Curie (Paris VI), France. He published more than 260 papers. His H-index is ~ 40 on WOS.

Guar-based composites as alternatives for petroleum-based materials

Sumedha Liyanage & **Noureddine Abidi**

Fiber and Biopolymer Research Institute, Department of Plant and Soil Science, Texas Tech University, Lubbock, Texas, USA 79409

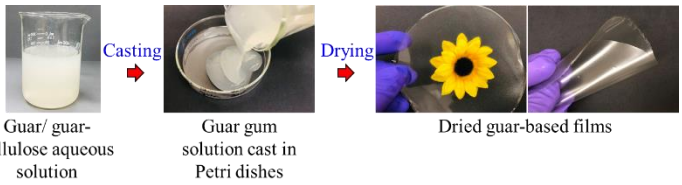
Abstract

Given the convenience and broad spectrum of applications, plastics have become an essential part of our lives. However, the unintended environmental and health consequences associated with the excessive use of synthetic plastics in our daily lives have become a global problem. Bioplastics made from non-food agroforestry materials are considered most promising and sustainable substitutes for non-renewable petrochemical materials. However, the conversion of agroforestry biomass into bioplastics requires purification and fractionation of the feedstock, followed by dissolution using harsh chemicals. Guar gum (GG) is a galactomannan extracted from guar or cluster bean (*Cyamopsis tetragonolobus L.*). It is emerging as one of the most versatile and low-cost water-soluble biopolymers with unique and fascinating properties. It is a naturally derived thickener, binder, and stabilizer that has uses as an additive to pharmaceuticals, food, cosmetics, and several consumer products. It is also used in huge quantities for hydraulic fracking.

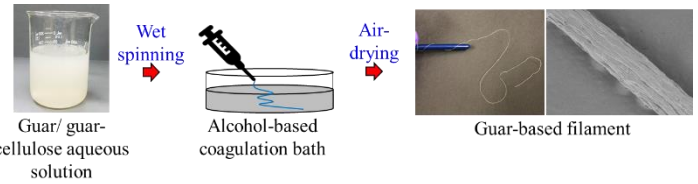
In this study, films, filaments, and aerogels are prepared from guar and guar-cellulose aqueous solutions by cast-drying, wet spinning into an alcohol-based coagulation bath, and freezing followed by freeze-drying, respectively. Glycerol is used to impart plasticity, and borax is used as a crosslinker to improve water stability. Produced flexible and transparent guar-based films exhibited a smooth surface texture, an elongation of about 80% depending on the plasticizer content, and a tensile strength of about 70 MPa depending on the type and quantity of cellulose. Guar-cellulose filaments show a uniform diameter of approximately 0.12 mm, excellent flexibility, elongation up to 140%, and tensile strength up to 17 MPa. The resulting guar-based porous materials show highly porous structures (porosity of ~ 99%) and resemble to starch-based and polystyrene-based "packaging peanuts." After use, these bioproducts can be dissolved in water and reshaped or decomposed as needed.

Figures:

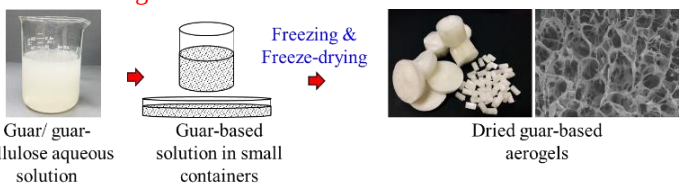
Guar-based films



Guar-based filaments



Guar-based aerogels



Biography

Dr. Noureddine Abidi is Professor of Biopolymers and Bioproducts and Director of the Fiber and Biopolymer Research Institute at Texas Tech University. His focus is on the chemistry of biopolymers, particularly cellulose, and their transformation to advanced materials. He holds a "Habilitation à Diriger les Recherches" from the University of Haute Alsace in France and a Ph.D. from the University of Montpellier II in France. Dr. Abidi has generated 147 refereed journal publications and book chapters, 3 books, more than 182 presentations, 9 patents/provisional patents. Abidi has served as PI or co-PI on funded research grants totaling more than $17M. He received several awards such as Texas Tech University Chancellor's Council Distinguished Research Award, Texas Tech University Outstanding Research Award, Texas Tech University President's Mid-Career Award, Fulbright US Scholar Award, Texas Tech University Integrated Scholar Award, American Chemical Society Cellulose and Renewable Materials Division Fellow.

Synthetic of Organic and Inorganic Materials for Environmental Applications

Solhe F. Alshahateet

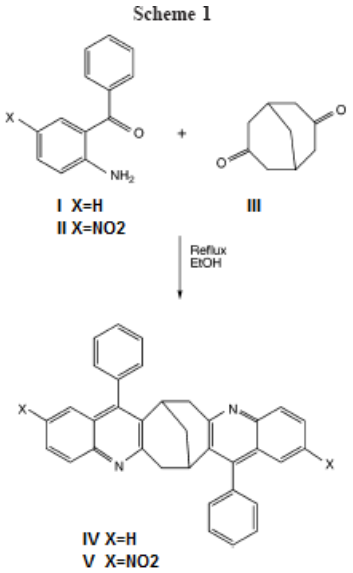
Department of Chemistry, Mutah University, Mutah 61710, Jordan

Abstract

The large environmental challenge that the world faces today is the scarcity of water. Definitely, water is the significant feature in the population/resources equation where water resources in the world are limited and the world's population has continued to rise. The increasing interest in suitable wastewater treatment technologies has generated the urgent need for alternative non-organic adsorbents due to their innate merits in terms of raw abundance, removal efficiency, and operational safety. Organic materials, one of the most important adsorbent systems, have been widely used for removal of toxic substances. However, the large-scale application of organic adsorbents is hampered by the concerns of limited removal efficiency, high production cost, and safety issues. In this regard, the development of new materials is urgently needed for the next generation adsorbent technologies.

Non-organic (TiO_2, CuO, etc.) nano-adsorbents for the removal of heavy metals and organic pollutants have attracted great attention as emerging low-cost and high removal efficiency technologies for large-scale applications. However, the development of these approaches is hindered by the limited choice of high-performance adsorbent materials.

Figure:



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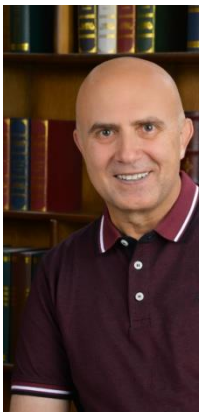
1. *Suresh Sagadevan*, et.al. Inorganic Chemistry Communications, 2023, 148, 110288.
2. Suresh Sagadevan, et.al. Topics in Catalysis, 2023, 66(1-4), 126.
3. Sagadevan Suresh, Selvaraj Vennila, J. Anita Lett, Is Fatimah, Faruq Mohammad, Hamad A. Al-Lohedan, Solhe F. Alshahateet, M. A. Motalib Hossain & Mohd Rafie Johan. Inorganic and Nano-Metal Chemistry, 2022. 52(2), 173.
4. Mohammed M. Al-Mahadeen, Anwar G. Jiries, Salah A. Al-Trawneh, Solhe F. Alshahateet, Ahmad S. Eldouhaibi and Suresh Sagadevan. Chemical Physics Letters, 2021. 783. 139053.
5. *Salah A. Al-Trawneh, Anwar G. Jiries, Solhe F.Alshahateet, Suresh Sagadevan*. Chemical Physics Letters, 2021, 781, 138959.

Biography



Prof. Solhe F. Alshahateet received his PhD from University of New South Wales (UNSW), Australia in 2003. He holds a full professor position in the Department of Chemistry, Mutah University, Jordan. He served in various positions such as President of Aqaba University of Technology in Jordan. He has been a Visiting Scientist, in the ICES & A*STAR, Singapore, and in the Department of Chemistry, the University of South Florida, USA. He was as a Visiting Fellow at the University of New South Wales, Australia.

He has 25 years of teaching and 30 years of research experience. He has published more than 100 papers in internationally reputed journals with sound knowledge of research in his field. His field of the research area is focused on crystal engineering and supramolecular chemistry involving industrial applications.

He is an expert group leader as well as an associate member of various scientific societies, reorganizations, and professional bodies. He has been involved as the editor/ editorial board member/ reviewer for various high-impact factor journals. He has delivered many lectures as the chairperson and also contributed Plenary, Keynote, and Invited lectures worldwide. At present, his google scholar citation is 1,295 h-index is 21, and i10 index is 46. As well as Scopus citations is 873 and h-index is 18 and also, his Research score (RG) is 542.3 which strongly endorses his high research productivity.

Electrolytes and organic dyes used in in dye-sensitized solar cells: Local structure, Dynamics and photophysics

Abdenacer Idrissi and François Alexandre Miannay,

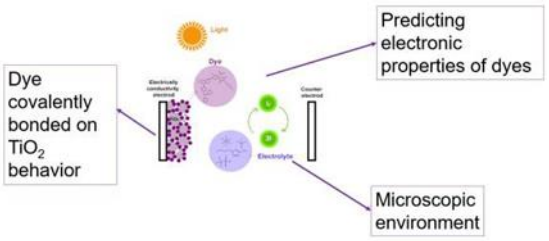
University of Lille, CNRS UMR 8516 -LASIRe - Laboratoire Avancé de Spectroscopie pour les Interactions la Réactivité etl'environnement, 59000 Lille, France

Abstract

The presentation will cover two main components of the dye-sensitized solar cell (DSSC): the electrolytes structure and dynamicsand the photophysics of dyes used in DSSCs. Indeed, the electrolyte locale structure composition of the electrolyte can influence the mobility and diffusivity of the ions in the electrolyte, which, in turn, affects the charge transport properties of the device.For instance, a high viscosity electrolyte may limit ion mobility and reduce the device's efficiency. While, the photophysics of the dyes used in dye-sensitized solar cells (DSSCs) (see Figure 1) cansignificantly impact the efficiency of the device. In the first part ofmy talk I will present our recent results on the study of the structureand dynamics of the mixture of ionic liquid/solvent mixtures that are used as electrolytes. These results were obtained using an array of experimental (vibration spectroscopy, NMR, Kerr effect

..) and theoretical approaches. In the second part, I will present our analysis of the mixture composition of these ionic liquids on thephotophysics of organic dyes used in the solar cells.

Figure: dye-sensitized solar cells (DSSCs.



Recent Publications

1. D. S. Stepaniuk, M. M. Blazhynska, V. Koverga, A. Kyrychenko, F. A. Miannay, A. Idrissi, Mol. Simulation 48 (2022) 97-103
2. K. Polok, M. Beisert, A. Świątek, N. Maity, P. Piatkowski, W. Gadomski, F. A. Miannay and A. Idrissi, Phys. Chem. Chem. Phys., 2020, 22, 24544-24554
3. F. A. Miannay, J. Dubois, O. Kalugin, V. Koverga, Y. Smortsova, A. Idrissi, J. Mol. Liq, 282 (2019) 39-50
4. M. M. Blazhynska, D . S. Stepaniuk, V. Koverga, A. Kyrychenko, A. Idrissi, O. N. Kalugin, J. Mol. Liq. 332(2021) 115811

Biography

Author has Abdenacer Idrissi received his M.Sc. in Physics from the University of Mohammed I (Oujda, Morocco), and his PhD in Physical Chemistry from the University of Lille (France), where he is a Professor of Chemistry and Physics at the present time. His research interest isfocused on the understanding of the structure and dynamics of fluids including ionic liquids and supercritical fluids. The main problematics are the understanding of the cellulose dissolution, the control of the polymorphic forms of the bioactive molecules and thecharacterization of the short time dynamics of the dyes used in solar cells. These research are carried out using a combination of an array of spectroscopic technics (IR, Raman, neutronscattering, time resolved spectroscopy) with molecular dynamics simulation.

Cold Plasma processes for Surface Modification of Materials

Charafeddine JAMA

Univ. Lille, CNRS, INRAE, Centrale Lille, UMR 8207 – UMET Unité Matériaux et Transformations, F-59000 Lille, France

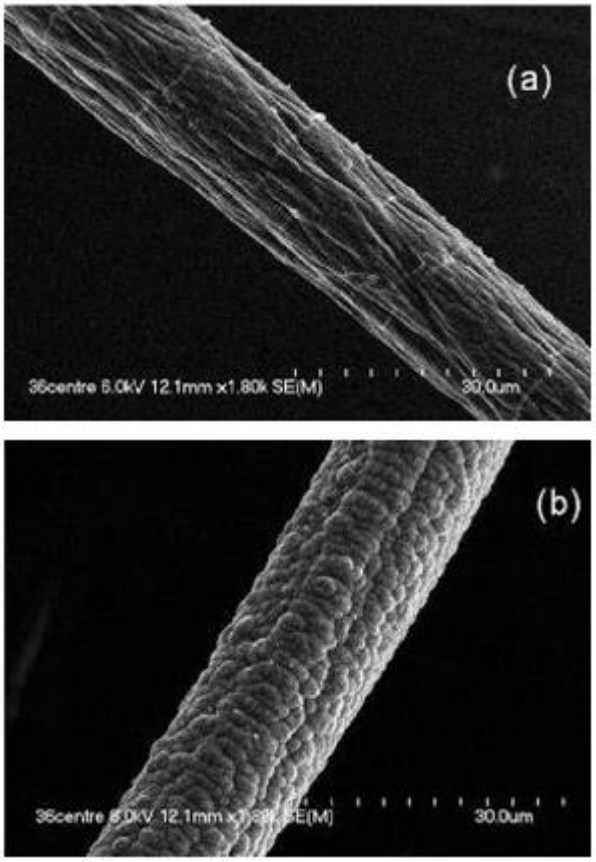
Abstract

Multifunctional effects are essential for producing higher value added materials, important not only for new technical applications but also for more traditional uses. The growing environmental and energy-saving concerns will also leadto the gradual replacement of many traditional wet chemistry- based processing, using large amounts of water, energy and effluents, by various forms of low-liquor and dry-finishing processes. The dominant role of plasma-treated surfaces in key industrial sectors, such as microelectronics is well known, and plasmas are being used to modify a huge range of material surfaces, including plastics, polymers, papers, food packaging and biomaterials. In previous works, it was evidenced that cold plasma technologies can induce several surface modifications such as change in surface polarity, grafting of chemicals or deposition of functional coatings (Figs. 1&2). Such modificationsare effective to confer new and durable properties to synthetic or natural polymers, without altering their bulk properties.

Figure 1: Nitrogen Plasma Process.

The presentation will give a comprehensive description and review of the science and technology related to plasmas, with particular emphasis on their potential use in the industry. Examples of surface functionalization of materials achieved by means of cold plasma grafting and/or deposition of hydrophilic or hydrophobic coatings, antibacterial, anticorrosion and fire-retardant materials will be presented.

Figure 2: Plasma deposition of organosilicon coatings: SEM images of (a) Uncoated ; (b) Coated fibers.



Biography

Prof. Charafeddine JAMA started his research career since (1990) at the University of Science and technology of Lille and developed several industrial processes. He is author of more than 162 research papers in international journals. In 1999, he joined the UMET UMR CNRS 8207laboratory as Professor and he is developing research on new surface modification processes for multifunctional materials, anticorrosion, antioxidant and antibacterial applications. His H-index is 39 on Scopus.

Application of Rheology in the Enhancement of Mechanical and Thermal Properties of red Clay Bricks.

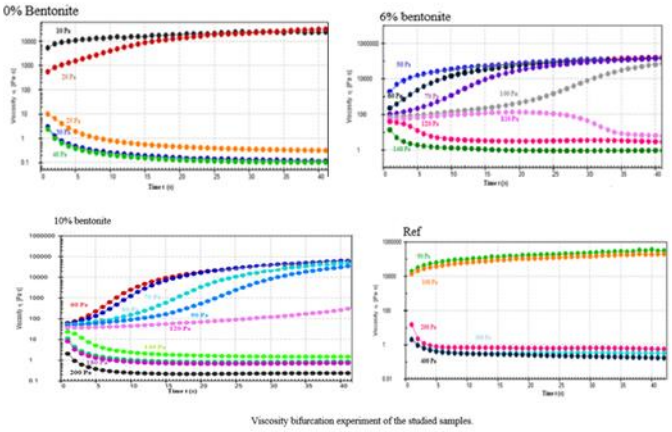
Khaldoun Asmae[1], Rhita El Boukili [2].

[1]*Laboratory of Sustainable Energy Materials, Al Akhawayn University, Ifrane, Morocco.*
[2]*Team of Modeling and Simulation of Mechanical and Energetic, Physical Department, Faculty of Sciences, Mohammed V University, Rabat, Morocco.*

Abstract

The exploitation of locally available materials can be a viable alternative for sustainable development. To minimize the economic and environmental impact of transporting clay materials, clayey materials from nearby deposits should be used in the building-related ceramic industry. This study aims to develop an innovative scientific methodology for adjusting the physicochemical composition of any clay soil to make it appropriate for construction applications. This research was carried out on unexploited clayey soil extracted from Bensmim village (Morocco). The "Extrabrick" brick manufactory clay sample was used as. Grain size analysis and Atterbergs limits showed that Extrabrick sample is characterized by high plasticity related to the presence of smectite clay. Based on the conducted tests, Bensmim clay was confirmed to be an unsuitable raw material for clay bricks production. Therefore, improving the plasticity of Bensmim clay was taken as a critical factor to enhance the properties of this clay. Different percentages of bentonite, ranging from 0-10%, were added to study the effect of this addition on the rheological and mechanical tests. The addition of 10% bentonite showed an increase in the yield stress, viscosity, and the mixture exhibited a rheological behavior like the reference sample. And a value of compressive strength of 8.2 MPa very close very close to the value found for the reference sample value of 8.8 MPa.

Figure:



Viscosity bifurcation experiment of the studied samples.

Recent Publications

1. El Boukili G., Khaldoune A. Journal of Building Engineering Volume 63, Part B, 1 (2023), 105525
2. Boukili, G. Lechheb M., M. Ouakarrouch, Dekayir, F. Kifani-Sahban, and A. Khaldoun, Constr. Build. Mater., vol. 280, p. 122300, Apr. 2021, doi: 10.1016/j.conbuildmat.2021.122300.
3. Khaldoun A. Wegdam G., Bonn D., Phys. Rev. Lett., vol. 103, no. 18, p. 188301, 2009.
4. Khaldoun A. Wegdam G., Bonn D., Nature (2005) 437(7059):635

Biography

Prof. Dr. ASMAE KHALDOUN
Associate Professor at Al Akhawayn University in Ifrane
Asmae Khaldoun has a Physics BSc and M. Sc. degree in Renewable Energy from the University Mohamed V in Rabat. She earned her Ph.D. in physical chemistry at the University of Abdel Malek Essaadi in Morocco in 2002. She got a second Ph.D. in Physics "Soft condensed Matter" on January 10th, 2013 at the University of Amsterdam. From 2004 to 2007 she worked, as Post Doc at the University of Amsterdam, under the direction of Profs. Daniel Bonn. This group – and particularly its work on complex fluids – is acknowledged to be among the premier experimental chemical engineering research programs worldwide. In September 2009, she started working at Al Akhawayn University as Assistant Professor and got promoted to Associate Professor in 2016. She published more than 80 papers. Her H-index is 16 on Scopus.

Smart system for predicting climate degradation for monitoring the adaptation of agriculture to climate change

Pr. Mostafa EZZIYYANI

Abdelmalek Essaadi University, Faculty of Sciences and Techniques of Tangier, Computer Sciences Department

Abstract

Agriculture is undoubtedly one of the most climate-dependent human activities. However, the latter has tried to overcome this dependence and therefore often seeks to modify the environment, for example by rinsing, by standardizing the topography, by increasing the size of the plot, by reducing the landscape heterogeneity by ensuring that the varieties high-yielding varieties bred for a familiar environment are always in optimum growing conditions. In this approach, which assumes that it is still possible to control crop growth conditions, climate change appears as a new factor. In these modern landscapes characterized by agricultural intensification, innovative systems are needed to satisfy the overall long-term increase in global demand for food and wood while addressing environmental concerns. Current forecasts suggest that the Mediterranean region is likely to be strongly impacted by climate change. Projections indicate that these changes are likely to negatively affect ecosystems and agricultural production throughout the Mediterranean basin.

North Africa is expected to face significant challenges in terms of climate change. Smart agriculture based on adaptation to climate change is a practice that will be very useful for Mediterranean countries such as Morocco, Spain and Tunisia, especially in desert and hilly areas where agricultural land and water are rare. Our aim to study the effect of climate change on olive cultivation in the Mediterranean regions based on new techniques of data mining and data analysis to predict in advance the damage caused by the climate change on the quality of crop yields will allow a better decision.

Biography

Prof. Dr. Mostafa Ezziyyani, Received the Bachelor's degree in computer science in 1994, the "Graduate Diploma in Computer Science" degree in 1996 and the first PhD degree in "Information System Engineering from Mahmmeed V University in Rabat, Morocco. He received the second PhD degree in 2006, From Abdelmalek Essaadi University" in Distributed Systems and Data Technologies. In 2008 he received a Researcher Professor Ability Degree and since 2017 he holds the position of full professor at Computer Science Department. He is member Mathematics and Applications laboratory (MAL) and responsible of the research direction Data Science and Digital Transformation, he formed a research team that works around this theme and more particularly in the area of integration of heterogeneous systems, Data Science, Artificial Intelligence and decision support systems and new technology for communication. His research activities focus on the modeling databases and integration of heterogeneous and distributed systems (with the various developments to the big data, data sciences, data analytics, system decision support, knowledge management, object DB, active DB, multi-system agents, distributed systems and mediation). This research is at the crossroads of databases, artificial intelligence, software engineering and programming.

He is president of International Scientific Council of Logistics and Transport (CELT) and of College of Engineering (CoE) and president of Arabic African Foundation on Science and Technology Transfer (A2S2T Foundation). He received the first WSIS prize 2018 for the Category C7: ICT applications: AQ1 E-environment, First prize: MtG—ICC in the regional contest IEEE - London UK Project: "World Talk", The qualification to the final (Teachers-Researchers Category): Business Plan Challenger 2015, EVARECH UAE Morocco. Project: «Integrated Sink with Smart Circuit Faucet for water conservation», First prize: Intel Business, Challenge Middle East and North Africa—IBC-MENA. Project: «Intelligent Preventive System for the Control and Monitoring in Real Time of Medicinal Plants in the Process of Growth (PCS: Plants Control System)», Best Paper: International Conference on Software Engineering and New Technologies. Paper: «Disaster Emergency System Application Case Study: Flood Disaster».

He has authored three patents: (1) device and learning process of orchestra conducting (e-Orchestra), (2) built-in washbasin with intelligent circuit tap for water preservation. (LIRCI) (3) Device and method for assisting the driving of vehicles for individuals with hearing loss. He is the editor and coordinator of several projects with Ministry of Higher Education and Scientific Research and others as international project; he has been involved in several collaborative research projects in the context of ERANETMED3/PRIMA/H2020/FP7 framework program including project management activities in the topic modelling of distributed information systems reseed to environment, Health, energy and agriculture. The first project aims to propose an adaptive system for flood evacuation. This system gives the best decisions to be taken in this emergency situation to minimize damages. The second project aims to develop a research dynamic process of the itinerary in an events graph for blind and partially signet users. Moreover, he has been the principal investigator and the project manager for several research projects dealing with several topics concerned with his research interests mentioned above.

He was an invited professor for several countries in the world (USA, UK, France, Spain Belgium, Holland, Romania, China, Algeria, Sudan, Djibouti, Egypt, and Tunisia). He is member of USA-J1 program for TCI Morocco Delegation in 2007. He creates strong collaborations with research centers in databases and telecommunications for students' exchange: LIP6, Valencia, Poitier, Boston, Houston, China.

He is the author of more than 150 papers which appeared in refereed specialized journals and symposia. He was also the editor of the book "New Trends in Biomedical Engineering", AEU Publications, 2004. He was a member of the Organizing and the Scientific Committees of several symposia and conferences dealing with topics related to computer sciences, distributed databases and web technology. He has been actively involved in the research community by serving as reviewer for technical, and as an organizer/co-organizer of numerous international and national conferences and workshops. In addition, he served as a program committee member for international conferences and workshops.

He is also the founder and the current chair of the blinds and partially signets people association. His activity interests focus mainly on the software to help the blinds and partially signet people to use the ICT, specifically in Arabic countries. He is the founder of the private centre of training and education in advanced technologies AC-ETAT, in Tangier since 2000..

Porphyrin@nanomagnetic particles in advanced oxidation process and their impact on wheat exposure

Carlos J.P. Monteiro, Gonçalo Gamito, M. Graça P.M.S. Neves, Sónia M.P.N. Silva, **M. Amparo F. Faustino**

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Abstract

Global water demand is expected to increase by 20-30% by 2050 [1]. One of the Sustainable Development goals for 2030 (SDG6) is "Ensure availability and sustainable management of water and sanitation for all" [1]. Reusing treated water from Waste Water Treatment Plants (WWTP) is a potential resource to provide safe and clean water for agricultural irrigation or urban purposes [2]. However, water reuse can pose risks to health primarily due to pathogenic microorganism (MO) present and to the presence of either disinfected agents or new nanodelivery approaches [3]. So, considering the efficiency of Photodynamic Inactivation (PDI) to eradicate MO [3] and the possibility of using immobilized photosensitizers (PS) indicate that photodynamic approach can be very attractive to eradicate MO from WW with sunlight. In this communication, the preparation and functionalization with porphyrin derivatives of nanostructured magnetic supports will be presented and their ability to inactivate MO [4-8] will be reported, as well as the effect of exposure of wheat plants to porphyrin@nanomagnetic particles to estimate the environmental impact of plants treated with water containing these nanomaterials.

Funding: This work received financial support from PT national funds (FCT/MCTES) through projects UIDB/50006/2020 and UIDP/50006/2020 and also through the project PREVINE – (FCT-PTDC/ASP-PES/29576/2017).

Acknowledgments: Thanks are due to the University of Aveiro and FCT/MCTES for the financial support to LAQV-REQUIMTE (UIDB/50006/2020 and UIDP/50006/2020) and to the FCT Project PREVINE – (FCT-PTDC/ASP-PES/29576/2017), through national funds (OE) and where applicable co-financed by the FEDER-Operational Thematic Program for Competitiveness and Internationalization-COMPETE 2020, within the PT2020 Partnership Agreement. Thank are also due to the Portuguese NMR and Mass Networks.

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Biography

M. Amparo F. Faustino research interests are related with synthesis, reactivity, and characterization of tetrapyrrolic macrocycles and their functionalization with adequate structural features to be considered in medical and environmental applications namely in photodynamic therapy (PDT) of neoplastic tissues and photoinactivation of microorganisms. Additionally, the development of photochemical techniques for environmentally friendly approaches in the field of water treatment is presently one of her main goals. She received her doctoral degree in Chemistry in July 1999. She published more than 215 papers, 19 book chapters and 2 patents, h-index = 44 (6730 citations from Scopus). Since 2021 is President of the European Society for Photobiology (www.photobiology.eu) and since 2010 keep strong collaboration with Moroccan research groups in the field of organic synthesis and material chemistry.

Green Graphene Inks Printed by Aerosol-Jet for Sensing Applications

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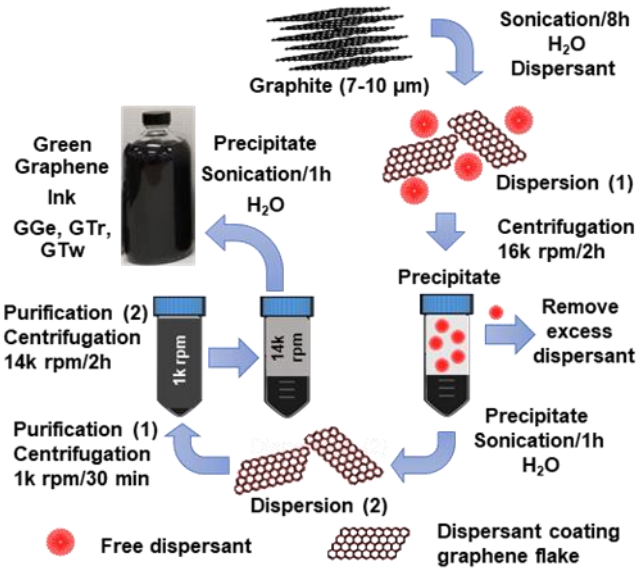
Abstract

This study presents green graphene inks produced through liquid-phase exfoliation of graphene flakes in water using optimized concentrations of dispersants. The study compares the effectiveness of three different dispersants (gelatin, triton X-100, and tween-20) in creating stable and conductive inks that can be printed onto polyethylene terephthalate (PET) substrates using an aerosol-jet printer. The study analyzes and discusses the chemical, printability, mechanical, and electrochemical properties of the developed inks based on the dispersant used. Our findings indicate that triton X-100 is the most effective dispersant for formulating graphene ink (GTr), which demonstrated superior electrical conductivity (4.5 S.cm-1), a high nanofiller concentration of graphene flakes (12.2%) with a size smaller than 200 nm (< 200 nm), a low dispersant-to-graphene ratio (5%), good quality as measured by Raman spectroscopy (ID/IG ≈ 0.27), and good wettability (θ ≈ 42°) over PET. The GTr's ecological benefits, combined with its excellent printability and good conductivity, make it an ideal candidate for manufacturing chemiresistive sensors that can be used for Internet of Things (IoT) healthcare and environmental applications.

Figure:



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3. Al Shboul, A.; Shih, A.; Izquierdo, R. A Flexible Indium Oxide Sensor with Anti-Humidity Property for Room Temperature Detection of Hydrogen Sulfide. IEEE Sens. J. 2021, 21 (8), 9667–9674.

Biography

R. Izquierdo: After an eight-year career in the industry as a researcher then R&D director at Technologies Novimage-OLA Display he joined as a professor the Microelectronics engineering program at the Université du Québec à Montréal (UQAM) in 2005. At UQAM he contributed to the emergence of two institutional research centers one in the field on nanomaterials (NanoQAM) were he served as adjunct director from 2007 to 2010 and a second in the field of microsystems (CoFaMic) which he directed from 2010 to 2016. Since 2016 is a Full professor in the electrical engineering department at the École de Technologie Superieure from the Université du Québec (ETS). At ETS he is also the director of the LACIME research center. He is a highly recognized expert in sensors and printed electronics with more than 2300 citations and 30 invited talks.
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Controllable Synthesis of One-dimensional Nanoarrays Photoanodes based CdS or BiVO4 and MoS2 towards solar hydrogen evolution

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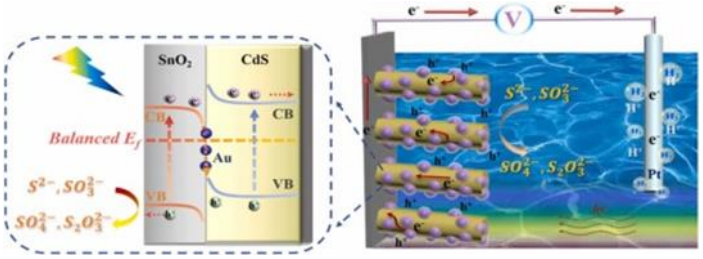
Abstract

Photoelectrochemical (PEC) water splitting for hydrogen evolution is a highly efficient and eco-friendly technology in solar energy conversion that needs to develop photoconversion efficiency. Photoactive materials as the basic component for PEC systems have been extensively studied due to their distinct structure features. Among them, one-dimension (1D) oriented cadmium sulfide (CdS) and bismuth vanadate ($BiVO_4$) nanoarray has attracted considerable attention and is regarded as a promising candidate for PEC hydrogen production due to its suitable narrow bandgap around 2.4 eV, excellent electrical/optical properties, larger aspect ratio and confined charge transfer path for lower carrier loss. Here, the rational design of CdS or $BiVO_4$ nanojunctions, like Plasmon-enhanced, Z-scheme, and p-n scheme heterostructure, was employed to enhance their solar light utilization and superior photoconversion efficiency. Specifically, a series of novels and highly-efficiently CdS-based composite photoanodes based (i) Au NPs on carbon-wrapped oriented CdS nanoarray; (ii) Novel Z-scheme core-shell CdS/SnO_2 with Au NPs and (iii) 1D CdS nanorod/MoS_2 heterostructure (Figure 1); (iv) Nanopyramid-shaped E-$BiVO_4$ modified MoS_2 as a heterojunction will be discussed.

Figure:



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2. Peng, Z., Su, Y., Siaj, M. Encapsulation of tin oxide layers on gold nanoparticles decorated one-dimensional CdS nanoarrays for pure Z-scheme photoanodes towards solar hydrogen evolution. Applied Catalysis B: Environmental, 330 (2023) 122614

Biography

Mohamed Siaj received his Ph.D. in Chemistry at Laval University, Quebec, Canada. Following postdoctoral training at Columbia University, New York, USA. Siaj is holding the rank of full professor since 2018 at université de Quebec à Montréal, Chemistry Department. He is the holder of the Canada Research Chair Tier-2 in 2D-Materials for Bio and Chemical Sensing (2016-2026). Since 2017, he is the director of the institutional nanomaterials and energy research center (NanoQAM). He is the director of the Quebec Centre for Advanced Materials (QCAM), since 2023. QCAM is an FRQNT (Fonds de recherche du Québec – Nature et Technologies) funded strategic cluster. Siaj's group activities focus on the growth, synthesis, processing and characterization of advanced nanostructured electroactive materials and their integration into the chemical and biosensors. Siaj's research activities generated a total of +100 peer-reviewed articles in prestigious international journals. He has given over +78 talks worldwide, including 42 as invited talks and 16 as keynotes.

Oral Presentations

HEALTH AND NUTRITION SCIENCES

Epidemiological profile of migrants admitted to Rabat University Hospital

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Abstract

Cross-border population movements have never been as intense as in the last decade. Knowing the health needs of migrants established in the national territory is a matter of capital importance nowadays, especially in order to better respond to them through the national health strategies and to adapt the provision of care consequently. This study aims to describe the epidemiological characteristics of migrants admitted to the Ibn Sina University Hospital in Rabat between 2014 and 2017.

Mixed descriptive cross-sectional study, quantitative and qualitative, at three levels of analysis. Conducted from April to May 2018 at three sites of the Rabat University Hospital: Children's Hospital, Specialty Hospital and Ibn Sina Hospital. Data were collected from hospital registries, patient records, questionnaires and semi-structured interviews.

Analysis of the epidemiological data of three hundred and eighty-one (381) patient-migrants finds that they are mainly married adults, male (68.5%), aged 31 to 60 years (51.7%), mainly of sub-Saharan origin (84.8%) and unemployed (66.7%). Of the 170 identified reasons for admission, tumor pathologies are the leading causes (25.5%) followed by the digestive system diseases (15%). Full hospitalization (77%) predominated over day hospitalization. The average length of hospital stay is 17 days with a cure rate of 99.5%. More than half of migrant patients (53.8%) have no medical coverage.

Contrary to the literature data, which places infectious diseases as migrants' primary admissions reason, our study reveals a predominance of chronic diseases. Is this an epidemiological transition in the migrant population or a new reason for immigration? Further research is needed to answer these questions.

Table: Migrants' admission reasons, in ascending order, according to ICD 10 (n = 381)

Reasons for admission by homogeneous group of pathologies	N (%)
Congenital malformations	1 (0,3)
Pregnancy, childbirth and the puerperium	1 (0,3)
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	1 (0,3)
ENT pathologies	2 (0,5)
Endocrine diseases	5 (1,3)
Hematological pathologies	7 (1,8)
Diseases of the nervous system	10 (2,6)
Traumatic injuries	24 (6,3)
Dermatological pathologies	26 (6,8)
Diseases of the respiratory system	29 (7,6)
Diseases of the genitourinary system	37 (9,7)
Infectious diseases	40 (10,5)
Diseases of the circulatory system	44 (11,6)
Diseases of the digestive system	57 (14,9)
Tumors	97 (25,5)

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Biography

The author is Medical Doctor, Master in Public Health, Public Health specialist, actually Head of Administrative Normalization Division at the Health Insurance National Agency – Rabat, Morocco. He also has a university diploma in social protection and health insurance fundamentals. Over his 26 years of experience in public health field, at different levels of responsibilities in the Moroccan health system, he is finalizing a PhD research on Migrants' Health Coverage in Morocco. He has participated to the publication of 4 articles on primary health care, migrant health and youth health.

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Place of the "person-centred health services" approach in the improvement of primary health care in Morocco

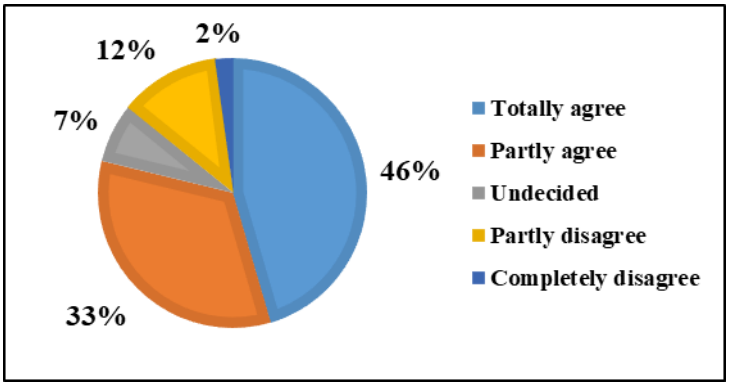
H. KOUBRI[1], N. EL KOUARTEY[2], A. SOULAYMANI[3], H. HAMI[3].

[1]Directorate of Population, Ministry of Health and Social Protection, Rabat, Morocco
[2]National Health Insurance Agency, Rabat, Morocco
[3]Laboratory of Biology and Health, Faculty of Science, Ibn Tofail University, Kenitra, Morocco

Abstract

Primary health care (PHC), as the health system gateway, is of widely recognized capital importance. Many health systems have developed by making well-organized and well-integrated primary health care networks their cornerstone. The model of primary health care services currently adopted in Morocco has remarkable shortcomings related to the many aspects raised in several reports. Thus, the choice of the reorganization of primary health care in Morocco with the implementation of a model of health services centered on the person, well defined in terms of governance and organization, constitutes a real strategic intervention justified by the search for the best quality of these services focused on the needs of the person, effective, efficient, secure, coordinated, without fragmentation, without duplication and without gaps in the continuum of care and at a lower cost, which could have significant advantages for the health for everyone and greater satisfaction among users of primary health care services. This study, conducted in 2021, is descriptive exploratory based on documentary analysis, questionnaires and interviews with 272 healthcare professionals identified by proportional stratified sampling. More than 50% of participants said that current health service practice is not person-centred. 56% said that coordination between staff is weak through informal and occasional exchanges or, rarely, meetings to discuss specific patient cases. More than 70% of service providers attach importance to the integrated care of people. As a result, 78% agree on the reorientation of primary health care establishments towards the person-centered approach by implementing family health as a new paradigm for the organization of health services.

Figure: Perception of the of primary health care facilities reorientation towards a family health and person centered health services model



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Biography

The author is Doctor, Public Health specialist, technical focal point for coordinating UNFPA projects with the Ministry of Health and Social Protection. She also has a Master's degree in Nursing Education and a Master's degree in Law. She worked for 7 years as a teacher and manager of continuing education at the Human Resources Directorate before joining the Population Directorate as manager of health programs. As a researcher, she works, among others, on the management of health organizations, primary healthcare, health policies, migrant health, sexual and reproductive health, digitalization in the health field... She has scientific publications on primary health care, migrant health and youth health. She has published 4 articles. Her H index is 1 on Scopus.

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Prevalence of stress among science teachers: results of a cross-sectional study

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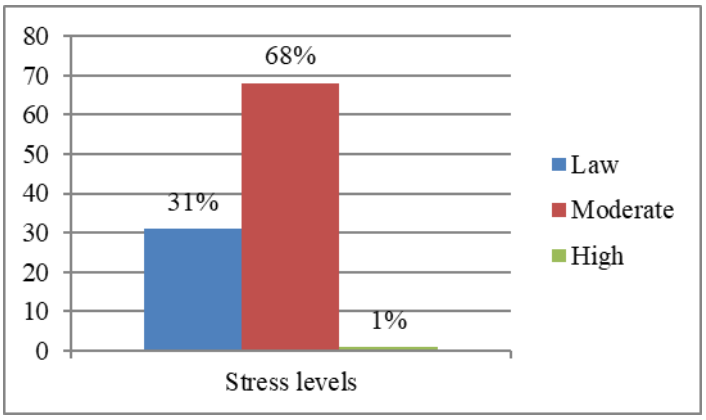
Abstract

It is widely acknowledged that the work environment can significantly affect the mental health of teachers and impact the quality of their teaching practices. The objective of this study was to assess the prevalence of stress among high school science teachers in the city of Tetouan who teach experimental sciences. A cross-sectional study was conducted in public high schools, and 258 experimental science teachers were invited to participate by completing a questionnaire. Of the respondents, 51.7% were female and aged between 24 and 61 years. The response rate to the survey was 57%. The questionnaire included psychometric scales, such as the COHEN scale of perceived stress and the KARASEK questionnaire, which aimed to assess the health status of teachers in relation to their work and measure work-related psychosocial factors. The results revealed that only 31% of teachers demonstrated effective stress management skills, adaptability, and problem-solving abilities. While 68% of teachers reported being generally able to cope with stress, they struggled with specific situations. One percent of teachers reported constantly feeling that their lives were at risk, leaving them with no choice but to confront these situations. While this study validated certain hypotheses related to stress management and coping among teachers, it also highlighted the need for further research to identify effective strategies and healthy habits that educators can adopt to reduce the risk of developing work-related stress.

Figure: Perceived stress rates among high school teachers.



Biography

The author is a PhD student in the Department of Biology at Ibn Tofail University in Kenitra, Morocco, and also holds a position as a teacher at the Ministry of Education in Morocco. His research interests primarily focus on mental health in the workplace, and he has been actively involved in conducting studies on the impact of psychosocial factors in the workplace on mental health as a member of the Biology and Health Laboratory team.

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Can the mycotoxins become the future treatment for cancer?

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Abstract

The discovery of anti-cancer chemicals is a potential research topic, as cancer is a very important global health problem. Interest in targeted therapies using anti-cancer compounds, which act directly against abnormal cells, is growing and is still a topical issue. Until now, there have been few studies on the use of biologics with antitumor activity, fewer side effects, and possibly specificity for cancer cells. Fungal metabolisms have shown promise in the prevention and treatment of cancer. These substances are increasingly attracting attention for their anti-inflammatory and antioxidant properties (based on their biological effects). Mycotoxins (mold secondary metabolisms) have long been considered a global threat to human health and well-being due to their toxicity and their presence in food and feed. However, a wide variety of these mycotoxins include antibiotic, antiviral and antifungal substances, others contain many substances that can be specific targets for certain diseases. A significant part of these mycotoxins has proven its effect on tumor cells and has been the subject of pharmaco-clinical studies. *Penicillium aurantiogriseum* is a species of *Penicillium*, usually isolated from food and feed. *P. aurantiogriseum* contains a variety of mycotoxins which have recently demonstrated potent anti-cancer effects. These effects were mediated by a number of mechanisms, including inhibition of crucial enzymes (Pseurotin), stimulation of death pathways (Auranthine, Aurantiamides A, Aurantiomides A-C, Penicillic Acid, Penitrem, Verrucisidinol and Acetate of verrucosidinol, Chaetoglobosin A); or promoting growth arrest (Anicequol, Aurantiamine, taxol). Some of these mycotoxins have already been commercialized (taxol, Anacine, Compactin), while others have not received much attention. The contribution of these natural chemicals goes beyond the simple direct application of unmodified structures and includes their derivatives, such as semi-synthetic analogs of lead structures and synthetic structural mimics. The use of mycotoxins has not received enough attention in the pharmaceutical field, and the identification of its anticancer effect could lead to new therapeutic targets.

Figure: Anticancer pathways of some mycotoxins of *P. aurantiogriseum*

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Biography

BOUHOUDAN Assia has expertise in Food Biotechnology and a passion for improving the plant, seeds, and fungi used in Food biotechnology. Her focus is based on the use of natural products to have applications in the health, agrifood, and pharmaceutical field. She was awarded her Ph.D. in 2018 from Abdelmalek Essaadi University, Morocco. She published more than 5 papers. Her H-index is 2 on Scopus.

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BIODEGRADATION OF XYLO-OLIGOSACCHARIDES BY LACTIC ACID BACTERIA: A short review

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4: Laboratory of Microbial Biotechnology and Enzyme Engineering (LMBEE), Centre of Biotechnology of Sfax (CBS), University of Sfax, Road of Sidi Mansour Km 6, P.O. Box 1177, Sfax 3018, Tunisia
5: Université Lyon 1, Institut de Chimie et de Biochimie Moléculaires et Supramoléculaires (ICBMS), UMR 5246 CNRS, Génie Enzymatique, Membranes Biomimétiques et Assemblages Supramoléculaires (GEMBAS), Bât Raulin, 43 Bd du 11 Novembre 1918, F-69622 Villeurbanne cedex, France
6: Department of Food Engineering, Faculty of Chemical and Metallurgical Engineering, Istanbul Technical University, 34469 Istanbul, Turkey

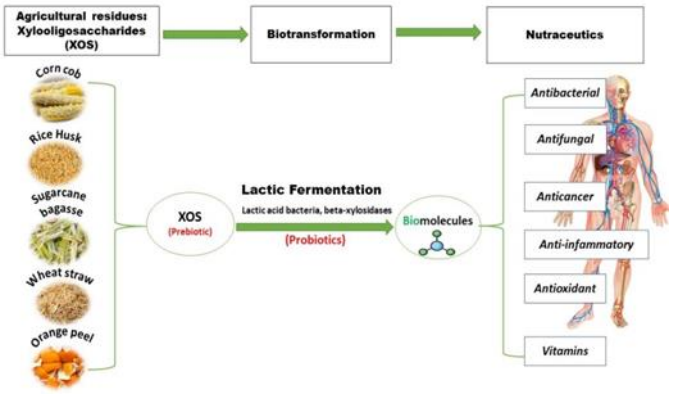
Abstract

Xylo-oligosaccharides (XOS) are oligosaccharides composed mainly of multiple D-xylose (pentose) monomers linked by β-(1,4) xylosidic bonds, with a degree of polymerization mostly ranging from 2 to 10 units. XOS are recently emerging as important prebiotics used as food additives. They can be obtained from agricultural residues naturally rich in xylans (fruits, sugar cane bagasse, chestnut shells, wheat straw, peanut shells, honey, etc.).

Lactic acid bacteria (LAB) are commonly used in the food and non-food industries, due to their GRAS status (Generally Recognized As Safe), and their ability to produce a variety of important glycosides hydrolases (i.e. beta-xylosidases), releasing mono- and oligosaccharides (xylose, xylobiose, xylotriose, etc.) from XOS. The xylose (pentose), obtained as the major monomer end product, can be fermented by some LAB into various biomolecules (organic acids, ethanol, short-chain fatty acids, hydrogen peroxide, bacteriocins, vitamins, exopolysaccharides, etc.). These biomolecules are known for their important biological properties (e.g. antioxidant, antibacterial, antifungal, antidiabetic, tackling vitamin B deficiency, etc.). They can be used as nutraceuticals and bio-preservatives in the food industry.

In this review, we summarize the current state of the literature on the biotransformation of xylooligosaccharides by lactic acid bacteria, as well as the biological properties of their fermentation products.

Figure: Graphical abstract.



Recent Publications

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2. Liao, H., Xu, Y., & Zhang, J. (2021). Efficient production of xylooligosaccharides and fermentable sugars from corncob by propionic acid and enzymatic hydrolysis. *Bioresource Technology*, *342*, 125680.
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Biography

Doctoral student in 2nd year, at the Faculty of Sciences of Oujda, Biotechnology/Microbiology team at Laboratory of Bioresources, Biotechnology, Ethnopharmacology and Health Laboratory.
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Study of the nutritional proprieties of commercial strawberries, red and black raspberry consumed in Morocco

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Abstract

Berries are small, fleshy fruits grown for commercial purposes and typically consumed fresh or processed. This category of fruits includes black raspberries (Rubus occidentalis), red raspberries (Rubus idaeus), strawberries (Fragaria x Ananasa), and other varieties of red berries. Their increasing popularity in Moroccan diets is due to their freshness, nutritional value, and health benefits for humans.

The aim of the present study is to investigate the organoleptic, physicochemical, and antioxidant characteristics of three types of red fruits, namely strawberry, red raspberry, and black raspberry, widely consumed in Morocco. The levels of magnesium, calcium, chloride, glucose, polyphenols Flavonoid , were measured by spectrophotometry, while the sucrose content was evaluated using a digital refractometer.The levels of Mg, Ca and Cl are variable and range from 26.4 to 35.5 mg/100g, 48.10 to 88.7 mg/100g and 19 to 1609 mg/100g, respectively. The levels of Glucose, Sucrose are respectively between 1.27 to 2.49 g/100g, 0.8 to 1.3 g/100g, 0.8 to 2.7 g/100g. The levels of total polyphenols are between 155 to 307.1 mg/100g.

The results of the nutritional and antioxidant study of strawberries and different varieties of raspberries highlight significant differences in nutrient composition. Specifically, this study found that black raspberries have higher levels of magnesium, calcium, glucose, and polyphenols compared to the strawberries and red raspberries that were studied.

These results make it possible to classify the different varieties of raspberries based on their nutritional qualities and dietary interest, which can help consumers make informed choices when purchasing fruits. It is therefore recommended to prioritize black raspberries in order to fully benefit from their health benefits.

Table: Results of nutritional analyses of strawberry, red and black raspberry studied

	Strawberry	Red raspberry	Black raspberry
Humidity	67	68	87
pH	3 .06	4.07	3.50
Titratable acidity %	0.67	0.81	1.02
Conductivity ms/cm	0.86	0.72	0.65
Magnesium content in mg /100g	34	26	35.5
Calcium content in mg /100g	48.1	75.9	88.7
Chloride content in mg /100g	1609.28	28.2	19
Glucose content in g /100g	2.45	1.27	2.49
sucrose content g/100g	1.2	0.8	1
Total Polyphenol mg /100g	151	286.2	307.1
Total Flavonoid mg /100g	55	153.39	261.8

Recent Publications

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5. Rodas C.L., Pereira S.I., Toledo-Coelho V.A., Guima-ries-Ferreira D.M., De Souza R.J., Ciuedes de Carvalho J. (2013). MESTA (Chile). 31: 53-58.

Biography

Hasnaa Sadik is a third-year student researcher at the Faculty of Medicine and Pharmacy, University Mohamed 5 in Rabat, who is currently studying the antioxidant activity of red fruits. She has presented two posters related to her research, the first one at the 1st International Conference on Sustainable Agriculture: Tools and Innovations in Beni Mellal, and the second one at the Fifth International Conference on Materials & Environmental Science - (ICMES 2022)

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Antimicrobial Susceptibility and risk factors of Extended-Spectrum β-Lactamases producing Gram-Negative bacilli recovered from patients admitted to Beni Mellal Regional Hospital

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Abstract

The aim of this study was to determine the burden of extended-spectrum β-lactamases (ESBLs) in Gram-negative bacilli (GNB) recovered from patients admitted to Beni Mellal regional hospital and risk factors associated with ESBL GNB infection

A total of 75 Gram-negative bacilli were recovered from Oct-2021 to Oct-2022, among which Escherichia coli were the predominant isolates followed by Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aerogenosa, Serratia marcescens and Pantoea agglomerans. The highest percentage of antibiotic resistance was noted against ampicillin (84%) followed by nalidixic acid (66.7%) and ciprofloxacin (62.7%). Moreover, the isolates showed better sensitivity towards chloramphenicol and carbapenem drugs. Out of 75 isolates, 61.3% were multi drug resistant. Nearly 34.7% were producers of ESBL. Previously hospitalization, previous antibiotherapy, patient admitted to surgical ward, patients with malignancy and patients with anemia, urinary tract infection and urinary tract catheter were found as significant risk factors. The emergence of multidrug resistance bacteria in our hospital specifically isolates producing ESBL is highly alarming.

Figure

Recent Publications

1. Aniba, Rafik, Barguigua, Dihmane Asmaa, Nayme Kawtar, et Timinouni Mohammed. « Insite into Herbal Medicinal Practices among the Students of Sultan Moulay Slimane University, Morroco: A Retrospective Cross-Sectional Study ». Agricultural Sciences 13 (1 janvier 2022): 675-83.
2. Aniba, Rafik, Barguigua Abouddihaj, Asmaa Dihmane, Nayme Kawtar, et Mohammed Timinouni. « Self-Medication Practice and Risk Factors for Self-Medication among university students in Beni Mellal » 2 (1 juillet 2021): 74-81..
3. Rafik, Aniba, Barguigua Abouddihaj, Dihmane Asmaa, Nayme Kaotar, et Timinouni Mohammed. « Antibiotic Resistance Profiling of Uropathogenic Enterobacteriaceae, Casablanca, Morocco ». E3S Web of Conferences 319 (2021): 01002.

Biography

Asmaa DIHMANE is a PhD student at the polydisciplinary faculty of the University of Sultan Moulay Sliman. She is currently working on projects related to the phenotypic and genotypic characterization of gram-negative bacilli isolated from patients, surfaces and cockroaches at the regional hospital of Beni Mellal.

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NGOs' rules in the improvement of the migrants' financial access to healthcare in the Rabat Salé Kénitra region

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Abstract

Migration is a cross-cutting issue that exposes migrants to real vulnerability to health risks for which the health and social systems of host countries are poorly prepared to respond to new needs. The cost of health services represents a real financial accessibility barrier for migrants. In this regard, the health coverage of the migrant population is now capturing the full attention of the international community, national authorities and civil society. The latter plays an important role in facilitating the migrant population's access to health services. Nevertheless, migrants' access to secondary and tertiary services remains difficult due to a lack of resources to purchase health goods and services for migrants on the one hand, and the complexity of administrative procedures on the other.

Our study aims to analyze the barriers, especially financial, that hinder migrants' access to health care in Morocco, and the role played in this area by NGOs and associations working for the benefit of migrants.

Descriptive exploratory study, based on documentary analysis, questionnaires, interviews and focus groups with migrants, conducted in 2018 with 25 associations active in the field of health and migration in the Rabat-Salé-Kénitra Region, selected by reasoned sampling.

All the associations surveyed have difficulty in meeting migrants' demands for medicines, hospitalization, biological or radiological examinations. For this, the internal financing of associations, composed of the contributions of their members and the aids of individuals, is the most used means (46%), followed by the financial support of foreign partners (31%), then donations (19%). 72% of the associations surveyed ask for more financial support and social protection to better meet the health needs of migrants.

Table 2: Nature of migrants' health needs funded by NGOs and associations.

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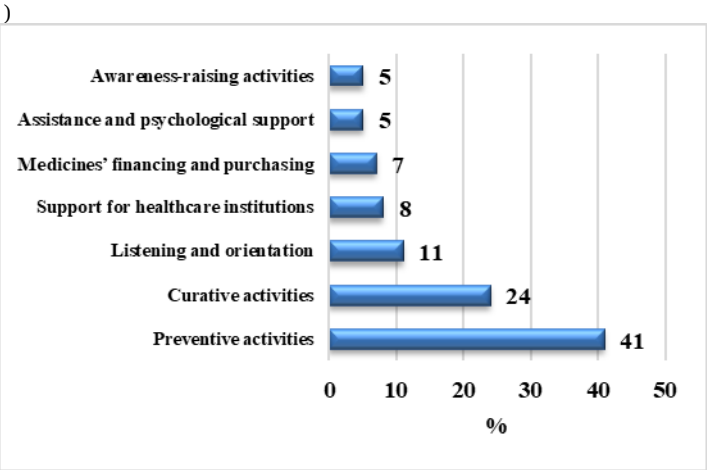

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2. [2] Organisation Internationale pour les Migrations. World Migration Report 2018 Chapitre2.
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4. [4] Alioua M. Le Maroc, un carrefour migratoire pour les circulations euro-africaines. Hommes et migrations, n° 1303. 2013.
5. [8] ORMES. Guide des associations œuvrant dans le domaine de la migration au Maroc. 2016.
6. [9] Ait Ben Lmadani. F « La politique d'immigration » Un jalon de la politique africaine du Maroc. Cas de la régularisation des migrants subsahariens.2016.

Biography

The author is Medical Doctor, Master in Public Health, Public Health specialist, actually Head of Administrative Normalization Division at the Health Insurance National Agency – Rabat, Morocco. He also has a university diploma in social protection and health insurance fundamentals. Over his 26 years of experience in public health field, at different levels of responsibilities in the Moroccan health system, he is finalizing a PhD research on Migrants' Health Coverage in Morocco. He has participated to the publication of 4 articles on primary health care, migrant health and youth health.

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The basics of eliminating the precancerous lesions and cervical cancer in Morocco

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Abstract

Cervical cancer (CC) is a major cause of female morbidity and mortality worldwide. Thus, nearly 604,000 new cases and 342,000 deaths. Thus it is ranked the fourth cancer in women in the world. However, the severity of this disease depends on many parameters, the most important of which is the timing of its prevention since early prevention reduces the frequency of this cancer. It should be noted that the prevention methods and techniques used vary from one country to another and more specifically between developed countries and low-income countries. Thus, in this work we are interested in the evolutions during the last two decades of the means employed by the health system in Morocco for the prevention, the screening of the cervical cancer in this case the precancerous lesions. The results showed that from 2012 a new primary, secondary and tertiary prevention strategy is applied in Morocco: anti HPV vaccination, screening by visual inspection with acetic acid, instead of pap test cervico-vaginal smear, and treatment precancerous lesions by thermo-coagulation instead of resection with a diathermic loop.

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2. 2. Nabah, K., Mezzoug, N., Aarab, A., Oufdou, H., & Rharrabe, K. (2021). Epidemiological profile of the imported Malaria in the north region of Morocco from 2014 to 2018. In E3S Web of Conf Vol. 319, p. 0105). EDP Sci
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4. 4. Haisoufi, D., Kasouati, J., El Kafssaoui, S., Bouaiti, E., Bouqual, R., & Mhayi, A. (2020). Utilisation et apports du système d'information géographique en épidémiologie. Rev d'Épid et de S Publ, 68, 138
5. 5. Ferreira, M. D. C., Vale, D. B., & Barros, M. B. D. A. (2021). Incidence and mortality from breast and cervical cancer in a Brazilian town. Revista de Saúde

Biography

Mohamed Zraidi : Physician,Gynecologist, obstetrician , coloposcopist, oncologist and surgeon in the Regional Maternity kenitra, currently working in the Reference center for screening and early diagnosis of breast and cervical cancer, provincial hospital, kenitra, Morocco.

PhD student at the Ibn Tofail University, Sciences high school, having a numerous publications about obstetrics, gynecology, oncology,and having participated at national and international events and association works.

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Human health impact assessment of contamination of fishery products and prevention of food risks

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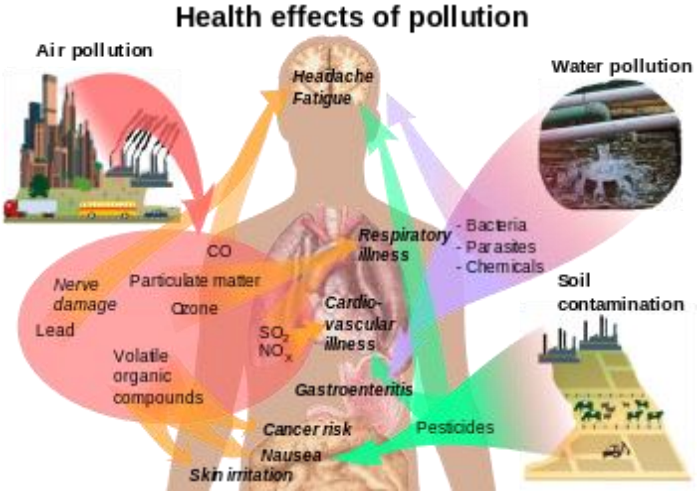
Abstract

According to several medicinal studies, the presence of trace metals, mainly cadmium, and lead, causes various adverse effects on human health. Cadmium, lead, chromium, nickel, zinc, copper and iron are, to varying degrees, cumulative toxins whose effects are most often insidious. They are observed after a latency time of several months for lead, zinc, chromium, copper and nickel or of several years for cadmium. The study of the different exposure factors shows that dietary intakes account for more than 90% of the total intakes of trace metals for the general population. Our objective is to determine to what extent and for what quantities the consumption of fish entails a risk for the Moroccan consumer. To do this, we have characterized the risk factor associated with the consumption of seafood containing trace metals, especially cadmium, and lead. Secondly, we deduced from these, on the basis of the levels of ETM and the quantity of fish consumed, a daily dose (EDI) or weekly exposure dose (EHD) of the ETMs. At the same time, we estimated a hazard quotient (HQ) of the MTEs. The resulting Weekly Exposure Doses (WEDs) are below WHO recommended standards, therefore, no consumer risk is posed by all fish species studied. This assumption is true if the estimated doses do not include the contribution of other foods that may be other sources of contamination to which the population is also exposed.



Recent Publications

1. S.Karim , A.Aouniti , C. Belbachir , Ilyesse Rahhou . World Journal of Advanced Research and Reviews, 2022, 15(01), 719–729.
2. S. Karim, A. Aouniti, M. Taleb, F. El hajjaji, C. Belbachir, I. Rahhou, M. Achmit, B. Hammouti. Journal of Environment and Biotechnology Research, Vol. 8, No.1, Pages 1-13, 2019.
3. M Achmit , M Machkor , M Nawdali, G Sbai, S Karim, A Aouniti1 and M Loukili. Journal of Chemical and Pharmaceutical Research, 2018, 10(4): 122-127.

Biography

Author has her expertise in environmental pollution, environmental chemistry and environmental toxicology, her focus is based on the study of metal pollution in fishery products and seawater in order to preserve the environment and human health. She was warded her PhD in 2018 from the University of Mohamed first. Oujda.

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Presentation and Study of the Manuscript Book Entitled "Mark of Happiness in Usual Foods" علامة السعادة في الاغذية المعتادة by doctor Abou Alī Al-Hasan Ibn Ali Al-Marrakushi

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Abstract

Morocco is rich on manuscripts books found mainly in the Royal Library of Morocco, the National Library and the Al Quaraouiyine Library. These manuscripts represent the cultural and scientific heritage of Moroccan, Arab and Islamic civilizations. This requires identification and study. Our work comes in this context to study the manuscript book tagged "Alāmat al-sa'ādah fī al-aghdhiyah al-mu'tādah. The study needed a comparison of the information included in the manuscript on the laws of nutrition and medicinal plants, with the data of modern science, received from bibliographic research in the databases Scopus, Elsevier, PubMed, Google scholar...

For the presentation of the manuscript book, we used two copies. One is from the Royal Library of Rabat, the other is from the Islamic Library of Saudi Arabia at the Imam Mohammed Ben Saud Islamic University. The two copies are undated; therefore, we used the clearer version as the main version and compared it to the second version in order to determine the original version of the manuscript book. The presentation of the book in word form is completed. This manuscript book is about medicinal plants and nutrition. Two hundred two food names have been prescribed in the book.

Nutrition is a major, modifiable, and powerful factor in promoting health, preventing and treating disease, several important laws in nutrition are mentioned in this manuscript for example:

- The contribution of nutrition to the prevention of disease
  فالحفظ للصحة بالغذاء أولى من الحاجة للدواء
- Balanced nutrition is a major determinant of health.
  مقدارَ ما يكفي على اعتدالٍ من غير إكثار ولا إقلالِ
- Benefits of eating earlier in the day
  وقد أتى خيرُ الغذاءِ بَوَاكِرُهْ وفي العَشاء خيروا سوافرهْ

Keywords: manuscripts books; laws of nutrition and medicinal plants

Figure

Recent Publications

1. A. Bitari, I. Oualdi, R. Touzani, M. Elachouri, A. Legssyer, Alpinia officinarum Hance: A mini review, Mater. Today Proc. (2022). https://doi.org/10.1016/J.MATPR.2022.10.080ElHajjaji F., Greche H., Taleb M., ChetouaniA.,,Aouniti A., Hammouti B., J. Mater. Environ. Sci. 7 (2) (2016) 566-578.
2. A. Bitari, I. Oualdi, R. Touzani, M. Elachouri, A. Legssyer, Zingiber officinale Roscoe: A comprehensive review of clinical properties, Mater.Today Proc(2022). https://doi.org/10.1016/J.MATPR.2022.09.316.
3. I. Merimi, A. Bitari, Y. Kaddouri, N. Rezki, M. Mohamed, R. Touzani, B. Hammouti, Metal corrosion inhibition by triazoles: A review, Int. J. Corros. Scale Inhib. 11 (2022) 524–540. https://doi.org/10.17675/2305-6894-2022-11-2-4.
4. SERBOUT, A. Bitari, R. Touzani, M. Bouklah, B. HAMMOUTI, An insight on the corrosion inhibition of mild steel in aggressive medium by Solanum Tuberosum extract, Arab. J. Med. Aromat. Plants. 8 (2022) 151–165

Biography

I am a pharmacist with a graduate degree in advanced study in medicinal plants and a master's degree in vegetal biology, and I am presently a nutrition researcher at the faculty of sciences in Oujda.

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Contribution of Sanger sequencing in the detection of the recurrent Maghrebian c.525delT mutation at the SGCG gene in limb-girdle muscular dystrophy with gamma-sarcoglycan deficiency

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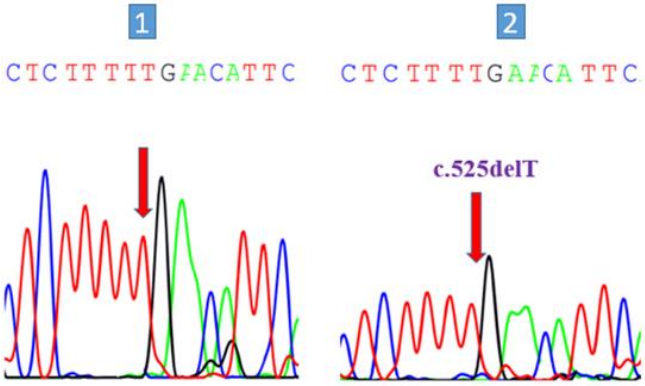
[3]*Pediatrics Department, Mother and Child Hospital, Mohammed VI University Hospital, Oujda, Morocco*

Abstract

Introduction: Limb-girdle muscular dystrophies (LGMD) represent a heterogeneous group of myopathies and include autosomal recessive gamma-sarcoglycanopathy, due to mutations in the *SGCG* gene. The c.525delT (p.Phe175Leufs) mutation of this gene is a recurrent mutation found in 65% of autosomal recessive LGMD. The objective of our work is to show the importance of the Sanger Sequencing method in the determination of this mutation and its contribution to health strategies. Material and methods: We report a patient referred to the Medical Genetics Laboratory of the Mohammed VI University Hospital of Oujda for a myopathy. The patient's DNA was extracted from peripheral venous blood. DNA quality and quantity were controlled by spectrophotometry. We performed a PCR amplifying exon 6 of the *SGCG* gene. The amplified fragments were purified and sequenced by the Sanger method on ABI SeqStudio from Applied Biosystems. Result: Sequencing showed the presence of the c.525delT mutation in the patient in the homozygous state. Discussion: Autosomal recessive LGMDs represent a frequent reason for mutation search in medical genetics. We proceed by searching for the Maghrebian c.525delT mutation of the *SGCG* gene because of its frequency. The *SGCG* gene codes for gamma-sarcoglycan, it is located on the long arm of chromosome 13 and consists of eight exons. On the complementary DNA, the c.525delT mutation is a deletion of a thymine at position 525 of exon 6 of the *SGCG* gene. At the protein level, the mutation results in the substitution of a phenylalanine by a leucine at codon 175. Sanger sequencing allows rapid, targeted and low-cost detection of this mutation. Conclusion: We highlight the importance of molecular analysis by Sanger sequencing in the targeted detection of genetic mutations.

Figure : Electropherogram showing the normal sequence of the *SGCG* gene (1) and homozygous mutation in exon 6 of the *SGCG* gene of a mutated patient (2).



Recent Publications

1. El Kerch F., Ratbi I., Sbiti A., Laarabi FZ., Barkat A., Sefiani A. Carrier Frequency of the c.525delT Mutation in the SGCG Gene and Estimated Prevalence of Limb Girdle Muscular Dystrophy Type 2C Among the Moroccan Population. J. Genetic testing and molecular biomarkers. 18(4)2014
2. Vainzof M., Souza LS., Giannetti JG., Zatz M. Sarcoglycanopathies : an update.J. Neuromuscular Disorders.
3. 31 (2021) 1021–1027
4. Schiava M., Marchesoni C., García de Rosa M.L., Estrada N., CejasL.L., Pardal A., Pirra L., Repetto L., Torres A., Dubrovsky A., Reisin R. Genetic characterization of Limb Girdle Muscular Dystrophies and Pompe Disease in a large Argentine cohort J.Neurology Perspectives. 2 (2022) 123–133.

Biography

Author has her expertise in environmental pollution, environmental chemistry and environmental toxicology, her focus is based on the study of metal I am a first year doctoral student enrolled in the Laboratory of Epidemiology, Clinical Research and Public Health at the Faculty of Medicine and Pharmacy of Oujda, University Mohammed Premier. I also work as a medical assistant at the University Hospital Center Mohammed VI Oujda in the Laboratory of Medical Genetics. I have developed my knowledge in the laboratory work for the manipulation of different techniques of molecular biology, I have participated in several conferences by scientific publications.

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Impact of T-Lymphocytes Number and Quality in B Acute Lymphoblastic Leukemia's Prognosis

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[2] *Central Laboratory of Hematology, university hospital center Mohammed VI Oujda, Morocco.*
[3] *Faculty of Medicine and Pharmacy, university Mohammed the first Oujda, Morocco.*

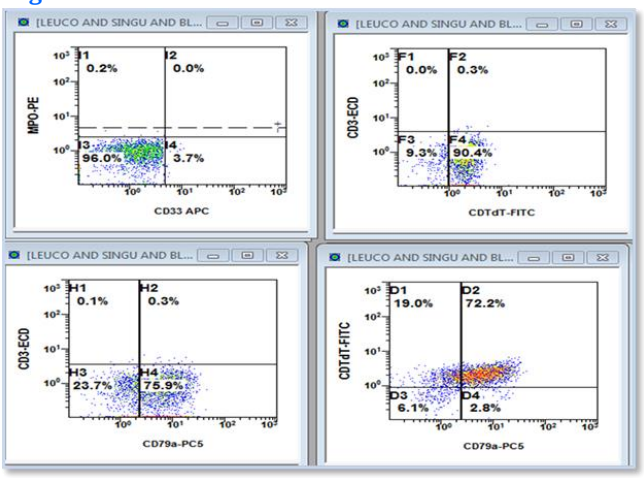
Abstract

B-acute lymphoblastic leukemia (B-ALL) is a neoplasm of immature B-cell precursors. It is distinguished by recurring cytogenetic and molecular abnormalities. It primarily affects children and is relatively rare in adults. Over the last three decades, significant progress has been achieved in treating B-acute lymphoblastic leukemia. This study aimed to investigate the predictive value of T-lymphocyte percentage at diagnosis regarding response to first-induction chemotherapy. The clinical data of 22 B-ALL patients enrolled between May 2019 and January 2022 at Morocco's university hospital in Oujda were reviewed retrospectively. Flow cytometry was employed at diagnosis to determine the T-lymphocyte percentage in the bone marrow aspirate. And statistical analyses were performed using SPSS and GraphPad. There was no significant difference between T-lymphocyte percentage at diagnosis in the group that achieved first complete remission compared to the primary refractory group (P value =0,9785).

These results demonstrate that the percentage of T lymphocytes at diagnosis cannot be used as an independent predictor of treatment response after the first induction in B-ALL. However, the analysis of their molecular profile seems to be a good indicator of the prognosis and suggests an altered function of T lymphocytes in B-ALL.

Keywords: T-Lymphocytes, Acute lymphoblastic leukemia, B-ALL, first complete Remission, Prognosis.

Figure



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Biography

Saida Rahmani is a second-year Ph.D. student supervised by Pr. Makram Merimi at the University Mohammed the First Oujda, Morocco. She received a bachelor's degree in Physiology and health and a master's degree in the same major from the same University. Her current field placement is with the cellular therapy unit. She is interested in exploring the tumoral microenvironment of acute leukemia, studying the immunosuppressive mechanisms of AL, and finding bioactive molecules that can fight these diseases. This work reached daylight owing to her supervisor Pr. Makram Merimi's caring supervision, advice, and directives.
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What profile of type 2 diabetic patients followed at a secondary care referral center: data from a Moroccan cohort study

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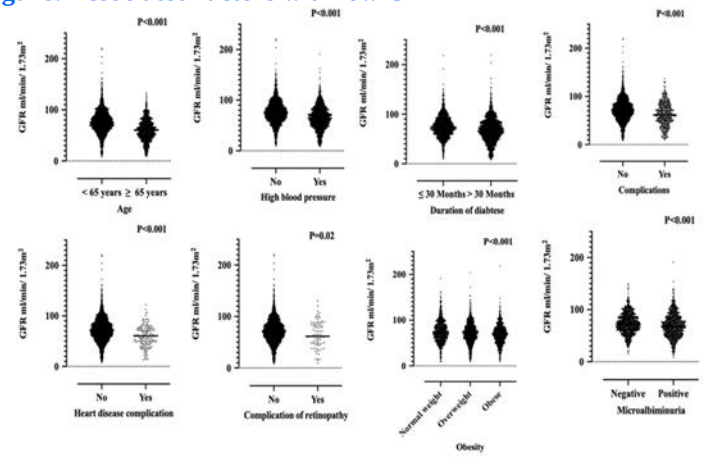
Abstract

Background: Chronic kidney disease is a major public health problem and one of the most important long-term complications of diabetes mellitus, hence the interest in its screening in all diabetic patients. The main objective of this study was to describe the epidemiological profile of type 2 diabetic patients who are admitted to a reference center for chronic diseases and to explore the factors that are associated with a low glomerular filtration rate (GFR). Methods: This retrospective cohort study aims to examine the epidemiological characteristics of patients with type 2 diabetes who had at least one consultation between 2005 and December 2020. Results: The study included 19,953 patients, of whom 66.8% were women, with an average age of 58.2 ±12.2 years. The majority (64.7%) had a diabetes duration of less than 5 years. On admission, 37.6% of patients had high blood pressure, 41.8% were overweight, while 31.5% were obese. Nearly 9% of patients had at least one complication on admission: 2.6% had heart disease, 2% had nephropathy, 1.8% had retinopathy, 0.7% had neuropathy and 0.5% had a diabetic foot. The study found that 76.8% of patients had poorly controlled diabetes, and 30.1% had a GFR < 60 ml/min/1.73 m². Women, patients over 65 years, those with a diabetes duration > 30 months, hypertensive patients, those with at least one complication on admission, patients with overweight or obesity, and those with positive albuminuria had significantly lower GFR (p<0.001). Conclusion: Primary care health centers may not have sufficient human and material resources to effectively screen for and monitor diabetes-related complications. Therefore, it is crucial to strengthen secondary care referral centers to ensure comprehensive and optimal management of diabetes patients, including diabetic control and early detection and management of its complications.

Figure: Associated factors with low GFR



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Biography

Author has her expertise in epidemiology and public health. She is interested in the epidemiology of non-communicable diseases like diabetes and chronic kidney disease. She was warded her specialty degree in community medicine in 2012 at Sidi Mohammed Ben Abdallah University of FES, Morocco. And since then, she has been a community medicine professor at University Mohammed Premier, Oujda, Morocco. She has published over 45 articles. Her H-index is 5 on Scopus.
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WATER, SOIL, AIR, AGRICULTURE AND ENVIRONMENTAL ISSUES

Does FDI hurt environment quality in Morocco: Nonlinear cointegration and nonlinear causality

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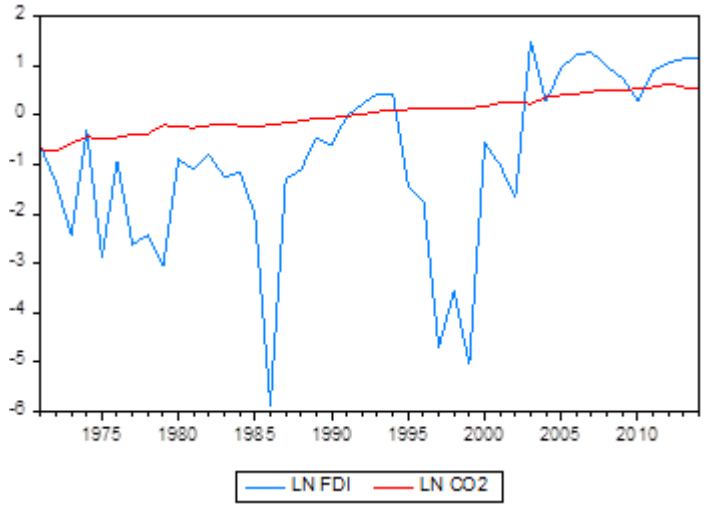
Abstract

The goal of this study attempts to examine the relationship between CO2 emissions (CO2), energy consumption and foreign direct investment (FDI) in Morocco during the period 1971-2014. It contributes to the existing literature by using nonlinear ARDL (NARDL) cointegration and the nonlinear causality test. Therefore, this empirical exercise also tries to see the direction of causality between FDI and the emission of carbon dioxide in Morocco compared to previous empirical work.

Figure: Evolution of CO^2 Emissions and Foreign Direct Investment



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Biography

Abdelkarim Jabri, Ph.D, Dr. Abdelkarim Jabri, Ph.D. in Economics, he is professor at National School of Business and Management (ENCGO), Mohammed Premier University, Oujda- Morocco. His research focuses on nonlinear Panel and Time Series Econometrics applied to Finance, Macroeconomics, and International Trade. He was awarded his PhD in 2012 from the University of Paris Ouest Nanterre La Defense, France.
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Removal of organic pollutants from wastewater by catalytic wet peroxide oxidation

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[2]*Laboratory of Catalysis, Materials and Environment (LCME), Higher school of technology (EST), Sidi Mohamed Ben Abdellah University, Fez, Morocco.*
[3]*Materials and interfacial systems laboratory (MSI), Faculty of Sciences, Abdel Malek Essaadi University, Tetouan, Morocco.*
[4] *Independent Scientist, Oujda, Morocco, ORCID: 0000-0001-6926-6286; Email: b_elbali@yahoo.com.*
[5]*Institut de Chimie des Milieux et des Matériaux de Poitiers (IC2MP), UMR 7285 CNRS Université de Poitiers, Poitiers, France.*

Abstract

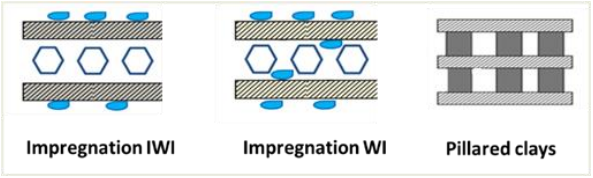
Water scarcity is currently a major issue that is attracting high attention worldwide, especially in developing countries where huge volumes of hazardous wastewaters are evacuated into the ecosystem with minimal or no treatment. Thus, water pollution by discharges of toxic organic compounds is a major problem, especially in the North Africa region. In this millennium, Morocco is one of the 33 countries facing real water stress and threatened by extreme water shortage by 2040. Therefore, serious efforts must be made to reduce pollution and preserve water resources.

In this context, studies were conducted in order to synthesize natural-based heterogeneous catalysts, using local low-cost clays [1-4]. These aimed the removal of the most persistent organic pollutants from contaminated water through the process of catalytic wet hydrogen peroxide oxidation. The latter has been reported as a clean alternative treatment, among other advanced and classical processes, operating under very moderate conditions, used effectively in the remediation of these toxic non-biodegradable pollutants.

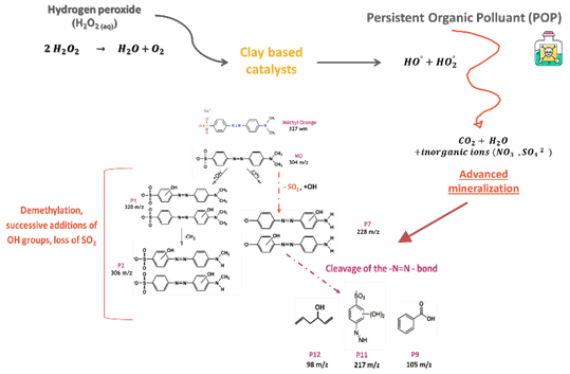
The synthesized catalysts showed good catalytic affinity towards the degradation and mineralization of three model contaminants of emerging concern (4-Nitrophenol (4-NP), Methyl Orange (MO) and Amoxicillin (AMO)). In fact, in the best conditions and after 2h of oxidation, complete removal was reached with total organic carbon (TOC) reduction reaching 42%, 47% and 56% for 4-NP, MO and AMO respectively. Furthermore, the oxidation reaction pathways of these pollutants were proposed based on the presence of intermediates/by-products detected by LC-MS analysis. Besides, the stability of these prepared materials was monitored by X-ray Photoelectron Spectroscopy.

Keywords: Organic pollutants; Clays; Catalysts; wastewater treatment.

Figures : Clay based catalysts preparation



Figures : Catalytic wet peroxide oxidation using clay based catalysts



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Biography

The author is a process, energy and environmental engineer. She is a Ph.D. in Catalysis, Physico-chemistry of materials and Environment. Her research interest is mainly focused on the wastewater treatment by advanced oxidation processes using natural clay-based catalysts as a clean alternative treatment. Her thesis project is under financial support by CNRST-Maroc (Projets dans les domaines Prioritaires de la Recherche scientifique et du développement technologique PPR2). Her research work was awarded the prize of the best presentation in ECGP'14 held on December 5th-7th, 2017 in IMT Douai (France) and in RNE'10 held on April 18th-19th, 2019 in Ifrane (Morocco) and resulted so far in the publications of 4 articles.
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Assessment of future climate change effects on groundwater resources in dry area: case of Berrechid aquifer (Morocco)

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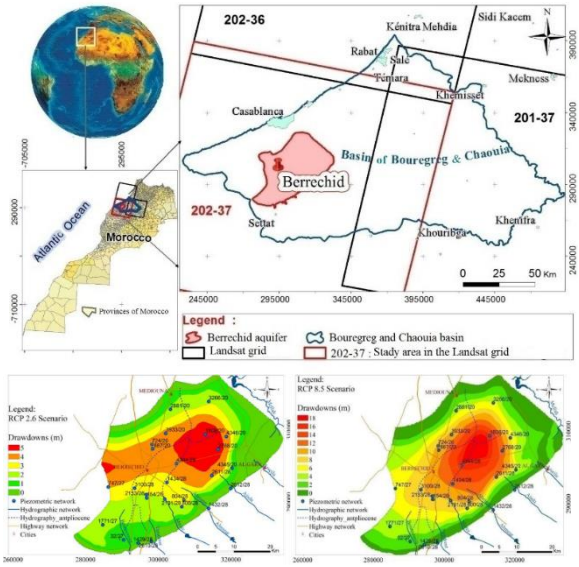
Abstract

Climate change affects several strategic sectors in a dry area like Morocco: water, agriculture, forests, coastline, etc. According to different forecasts in Morocco using optimistic or pessimistic scenarios, indicate a downward trend in annual cumulative rainfall varying between 10 and 30% by 2100. The average annual temperatures, would increase of 0.5°C to 1°C by 2020, and between 1°C and 1.5°C by 2050 and 2080 respectively. This climate disruption affects the hydrological cycle and directly impacts both surface and groundwater water resources. This paper evaluates the current situation from outcoming of different studies related to climate change impact on groundwater resources in Morocco. The main objectives are discussed through a case study related to Berrechid situation representing one of the major Moroccan's aquifers. The lack of data and tools motivated a development of a global methodology to study the impact of climate change on groundwater resources. The approach is based on a top-down methodology and take into consideration the three main aspects: climatic, hydrological and hydrogeological, to evaluate the actual and future situation of Berrechid's aquifer. It's based on coupling KNMI simulator for climate forecasts, MODFLOW for hydrodynamic modeling, and ESPER for recharge evaluation The forecasts of the variability of climate parameters (rainfall-temperature, evapotranspiration (PTE), etc.) have been made considering the RCP scenarios (2.6 and 8.5) of the IPCC for short (H1: 2016-2035), and long term (H3: 2081-2100) periods. The results outcomes show a trend of decrease in the water table level varying from 1 to 25 m at the piezometers managed by the Bouregreg-Chaouia hydraulic Basin Agency (ABHBC). The general trend, which emerges from the evolution of the differences in piezometric levels of the boreholes in relation to the different IPCC scenarios considered, shows that the effect of the decrease in recharge, implies a continuous decrease in piezometric levels, which shows that the renewable freshwater resources are considerably reduced.

Figure



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Biography

Author EL ASSAOUI Naïma, Professor in the geosciences department, Water and Environment Geosciences Laboratory (GEE) of the Faculty of Sciences, Mohammed V Rabat University. She is a State Engineer in Hydrogeology from the Moscow Academy of Geological Prospecting. She is graduated of a Master in GIS and Land Management and Doctorate in Geosciences at the Faculty of Sciences Ain chock of Casablanca. Her thesis was awarded Best Thesis 2017, in Geosciences from Hassan II University. She has carried out several researches in the field of geosciences and in particularly: the management and planning of groundwater, computational modeling of groundwater flows, water erosion, remote sensing applied to water systems, as well as the impact study of climate change on surface and groundwater resources (Berrechid aquifer as case study). she's the author of several scientific publications (scientific journals, journals, technical documents. She's member of: the International Association of Hydrogeologists (IAH); International Water Resources Association (IWRA), Moroccan Association for the Development of Research and Scientific Information (AMIS); Tunisian Association for Digital Geographical Information (TADGI); Euro-Arab Geomatics Union (UEAG); International association Francophone for Bibliothecarial and Documentation (AIFBD); scientific and organization committees for several scientific congresses and events.

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The impact of no-till and conventional tillage systems on soil physical properties in a semi-arid region of Morocco

Abdelali El Mekkaoui [1,2,*], Rachid Moussadek [1,3], Rachid Mrabet [1], Ahmed Douaik [1], Rachid El Haddadi [2]

Saïd Chakiri [2] and Abdelmjid Zouahri [1].

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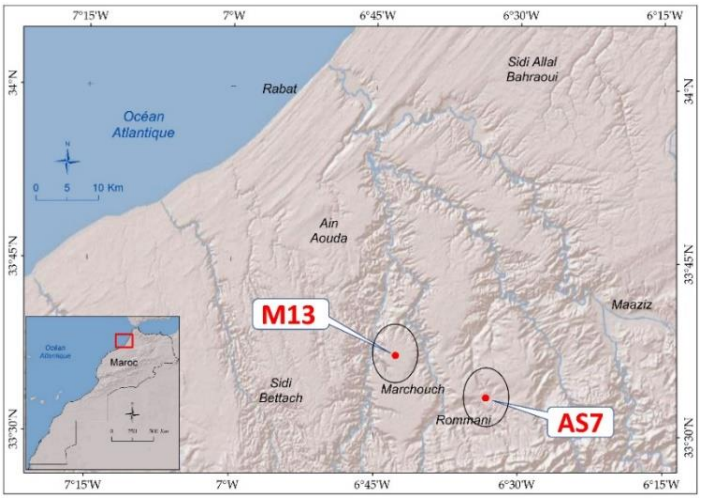
[2] *Laboratory of Geosciences, Faculty of Sciences, University Ibn Tofaïl, BP 133, Kenitra 14000, Morocco*
[3] *International Center for Agricultural Research in the Dry Areas (ICARDA), Av. Mohamed Belarbi Alaoui P.O. Box 6299-Rabat Institutes, Rabat 10112, Morocco*

Abstract

The most critical sustainable development issue is addressing significant environmental risks worldwide, including climate change, drought, erosion, contamination of water resources, desertification, and loss of soil quality [1]. Conventional tillage practices (CT) appear to leave soils in semi-arid regions vulnerable to degradation. These regions have delicate soils that can be further damaged by overexploitation of the environment. Conservation agriculture (CA) has the potential to reduce the degradation of natural resources, especially soils, through its various benefits. The adoption and implementation of the no-till (NT) system with mulch could open up new possibilities for the advancement of agriculture in semi-arid regions [2]. This study aims to evaluate the effects of conservation agriculture, specifically the no-till system, on soil physical properties such as soil organic matter (SOM), gravimetric water content (θg), bulk density (BD), and structural stability (SS) compared to conventional tillage (CT). The transition from a CT system to an NT system was assessed for the major modifications it brought about at two experimental sites: Merchouch (M13) with vertisol soil and Ain Sbit (AS7) with isohumic soil. A no-till system resulted in significant improvement in most soil physical properties at both sites, although the changes were more pronounced at Site M13. Structural stability under NT showed a significant increase in both sites (fast wetting (FW), slow wetting (SW), and wet stirring (WS) improved by 88, 43, and 83% at the M13 site, respectively, against, 16, 23, and 7%, respectively, at the AS7 site). On the other hand, the SOM increased from 2.0 to 2.6% (an improvement of 28%) at AS7 and from 1.2% to 1.9% (an improvement of 52%) at M13 [3]. the study findings indicate that conservation agriculture, specifically NT, can enhance soil physical quality over both medium and long-term periods.

Figure 1. Location of the two study sites in the Zaer region, Morocco.



Recent Publications

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2. E. M. Abdelali, M. Rachid, D. Ahmed, M. Rachid, et C. Said, « Soil fertility improvement under conservation agriculture. effect of fertilization on soil physicochemical properties and wheat yield under both conventional and no-till systems ». Sept. 2021 https://ecaf.org/wp-content/uploads/2021/09/ST2_P6.pdf
3. A. El Mekkaoui et al., « Effects of Tillage Systems on the Physical Properties of Soils in a Semi-Arid Region of Morocco », Agriculture, vol. 13, no 3, Art. no 3, mars 2023, doi:10.3390/agriculture13030683.

Biography

Abdelali El Mekkaoui is specialized in conservation agriculture and soil science. He is a member of the Moroccan Association of Conservation Agriculture (AMAC). He is also a fifth-year Ph.D. student at IBN TOFAIL University, Kenitra, in the main fields related to soil science: land suitability, soil fertility management, carbon sequestration in the agricultural system about climate change modeling, etc. He has published a respectable number of papers and has participated in several national and international conferences. He has participated in various national (OCP soil fertility map, ANDZOA...) and international projects (IDRC, ICARDA...).
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Assessment of the parasitic load of the surface waters of Khoumane wadi (city of moulay idriss zerhoun-morocco)

ABDELHAK SAIDI[1]*, LHOUSSAINE JAIT[1], ABDELKADER CHAHLAOUI[1], YOUSSEF OUBALLOUK[1], MOULAY LAFDIL BELGHITI[1], MOHCINE SADKI[1], CHADIA SEKKAT[1].

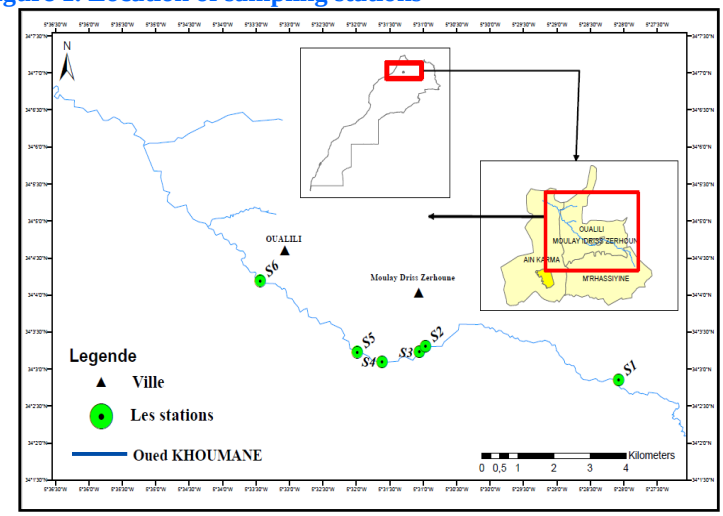
[1]Natural Resources Management and Development Team, Environment and Health Laboratory. Department of Biology, Faculty of Sciences, Moulay Ismaïl University, BP 11201 Zitoune, Meknes, Morocco.

Abstract:

The waters of the Khoumane wadi continually receive the wastewater discharges from the city of Moulay Idriss Zerhoun. These waters are used for various domestic activities of the surrounding population and for agricultural irrigation. This study was undertaken to evaluate the parasitic diversity as well as the total parasitic load present in the surface waters of the Khoumane wadi. Water samples were collected monthly from January to December 2022 in six stations distributed along the Khoumane wadi from upstream to downstream

The 72 samples analyzed were positive with a constant predominance of protozoan cysts over helminth eggs (25.41 10^5 cysts/L against 4571 eggs/L). Eleven parasite genera were detected: Giardia spp, Entamoeba histolytica, Entamoeba coli, Blastocystis hominis, Ascaris lumbricoides, Trichuris trichiura, Ancylostoma diudinal, Enterobius vermicularis, Taenia saginata, Hymenolepis spp and Strongyloides sp. The results obtained indicate significant parasitic contamination in the watercourse, which could have detrimental consequences on the quality of the environment in general as well as on the health of humans and animals in particular. It is therefore important to regularly monitor water quality as well as water management measures to reduce parasitic contamination and improve water quality.

Figure 1. Location of sampling stations



Biography

The author has experience in hydrobiological study. Its objective is based on the evaluation of water quality. He enrolled in a doctorate in 2021/2022 at Moulay Ismaïl University in Meknes, Morocco.
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Exploring the Potential of Fish Protein Hydrolysates from Sardine for Agricultural Applications

Fatima tayi[1,2], Adil Akil[2], Younes Essamlali[2], Mohamed zahouily[1,2]

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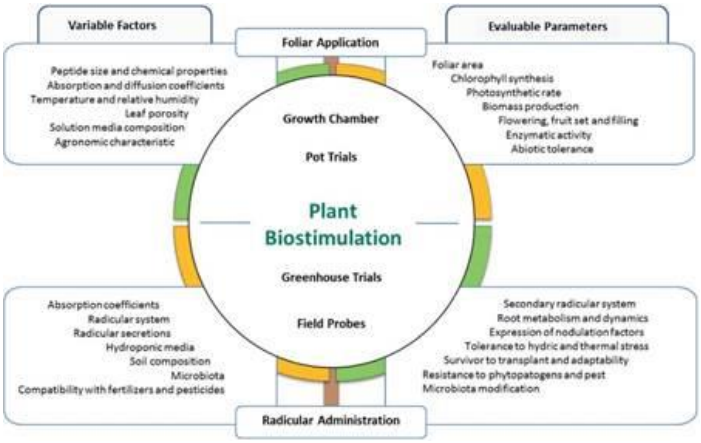
[2]*MAScIR – Moroccan Foundation for Advanced Science, innovation, and research.*

Abstract

Fish byproducts are typically viewed as waste or unwanted byproducts during processing. However, these substances may contain valuable nutrients and substances that can be used for various purposes, such as animal feed, plant fertilizer, and even human food products like fish oil and fishmeal. Fish protein hydrolysates (FPH) have gained significant interest in many fields, particularly in agriculture, due to their wide range of biological activities. In this study, FPH prepared from sardine through chemical hydrolysis using formic acid was investigated. The hydrolysate was analyzed for its proximal composition in N, P, K, and its effect on the germination and vegetative phase of tomato and sorghum crops. The results showed that while the hydrolysate had a germination inhibitory activity at higher doses, it had a stimulating effect on the vegetative phase of crops when applied in the appropriate dose (1.5ml of hydrolysate after 15 days of transplanting). The study suggests that FPH produced using endogenous enzymes could be a promising product for agricultural applications.



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2. H. Civelek Yoruklu, B. Ozkaya, et A. Demir, « Optimization of liquid fertilizer production from waste seaweed: A design of experiment based statistical approach », Chemosphere, vol. 286, p. 131885, janv. 2022, doi: 10.1016/j.chemosphere.2021.131885.

Biography

Fatima TAYI completed her undergraduate studies in Applied Plant Biology at the Biology Department of the Faculty of Science and Technology at Moulay Ismail University Errachidia-Morocco. She then pursued her academic career and obtained a master's degree in Improvement and Valorization of Plant Resources from the Department of Biology at the Faculty of Sciences Ibn Tofail-Morocco in 2020. Currently, Fatima TAYI is a PhD student at the laboratory of materials, catalysis, and valorization of plant resources, under the supervision of Prof. Mohamed Zahouily, at the University HASSAN II of Casablanca, Morocco. She is affiliated with the MAScIR Foundation, and her research topic focuses on the formulation of new biostimulants and their evaluation for application in agriculture.

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The Blue Tansy essential oil: Electrochemical measurement, computational study and prediction of its corrosion inhibition efficiency based on chemical composition

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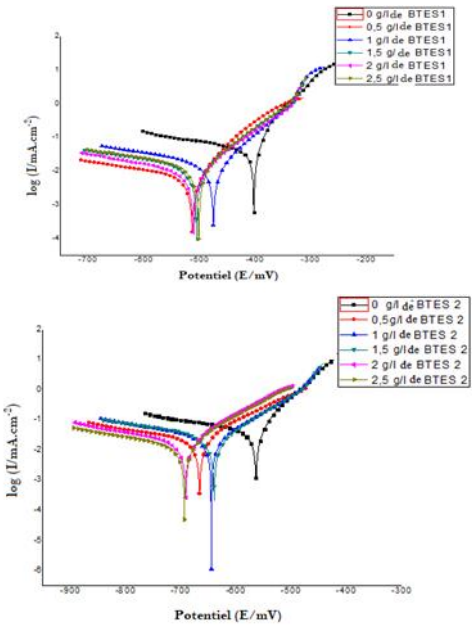
Abstract

The Blue Tansy essential oil (BTES) has several properties applied in high-end skincare products. In addition to its anti-inflammatory, hypoallergenic and antalgic effects, extracts from this plant are used extensively in modern medicine and in cosmetics. The objective of our research is to study the inhibition efficiency of two Blue Tansy essential oils (BTES 1 and BTES 2) which have two different chemical compositions. The corrosion-resistance ability of the mild steel in hydrochloric acid solution using the BTES was tested by means of weight loss measurements and Potentiodynamic polarization study. The inhibition efficiency of the BTES increased with the inhibitor concentration and its inhibitory behavior follow a damped oscillation. To explain the anti-corrosion mechanism of the BTES and to predict its corrosion inhibition efficiency based on chemical composition, the theory of the functional density of tight (DFT) computation was applied, to calculate quantum chemical parameters, Mulliken atomic charges and the Fukui index. The inhibition efficiency reached the maximum 80% at 0.5 g/l of the BTES 1 and 70% at 2.5 g/l of the BTES 2. The polarization curves indicate that the BTES is a mixed-type inhibitor. The results obtained from weight loss measurements were in good agreement with those obtained from electrochemical measurements for different inhibitor concentrations.

Figure: Potentiodynamic curves for mild steel in 1.0 M HCl in the presence of the BTES 1 and the BTES 2 at different concentrations.



Biography

Ms. ZRIOUEL WAFAA obtained her State Engineer diploma in Industrial Processes from the Mohammadia School of Engineers in 2010. She then joined the Technical Support Units for Scientific and Technical Research (UATRS) at the National Center for Scientific and Technical Research (CNRST) in Rabat where she was responsible of Infrared-Raman spectroscopy and Gas chromatography coupled with mass spectrometry (GC-MS). In 2014, she joined the faculty of sciences Ben M'sick in Casablanca where she holds currently the position of head of the development and digitalization department and she is registered as a PhD student.
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Risk assessment of pesticides in groundwater in the Loukkos area

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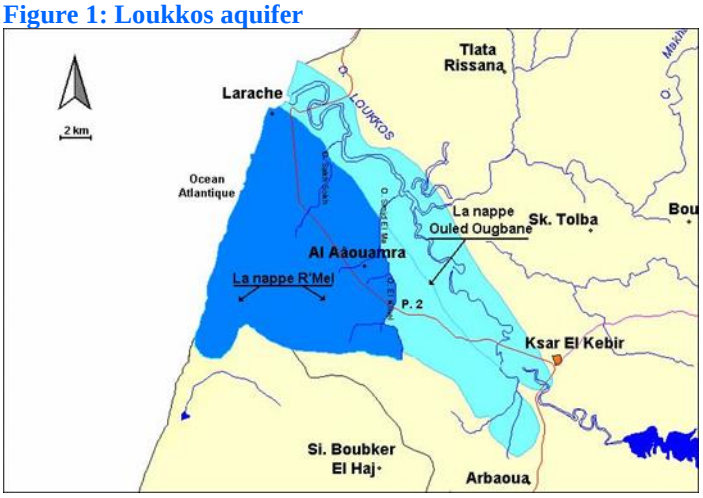
[2]*Laboratory of the Independent Export Control and Coordination Establishment (EACCE) Larache-Morocco.*

Abstract

The province of Larache is an agricultural region known for its high volume and quantity of agricultural production, which requires a lot of pesticides. The aim of our study is to determine the state of pesticide contamination of groundwater in the Loukkos area, to identify the remaining pesticide residues and their concentrations, and to analyse the potential risks to human health and the environment. Human health risks from pesticides detected in groundwater used as drinking water were assessed using a previously described model (US EPA, 2015). The ecological risks of pesticides were assessed by calculating the risk quotient (RQ) using the ratio of the measured environmental concentration and predicted no-effect concentration (PNEC). Processing of the GC results revealed the presence of 19 active substances in the groundwater samples with concentrations above the applicable maximum value (0.1 µg/L) for water quality standards. The human health risk analysis showed that some of the detected pesticides pose carcinogenic and non-carcinogenic health risks to the population consuming and using the groundwater as drinking water. The QRs identified very sensitive and unacceptable risk levels for some pesticides that pose a risk to groundwater organisms, particularly shellfish. Our result showed that the use of pesticides in the region threatens human health and poses potential ecological risks to shellfish and disrupts their functions within the Loukkos agroecosystems.

Figure 1: Loukkos aquifer



Recent Publications

1. Bagayou A., Hamdache A., Diane Y., Ezziyyani M., *AI2SD Springer, Cham.* (2022) 47.
2. Krikech I., Jafarabadi A. R., Leermakers M., Le Pennec G., Cappello T., Ezziyyani M., *Mar. Pollut. Bull.* 180, (2022), 113770.
3. Krikech I., Le Pennec G., Ezziyyani M., *Bioflux AACL.* (2022) 313.

Biography

Ahmed BAGAYOU is a PhD student in the second year of his thesis. I am passionate about research in the field of environment, health and ecotoxicological risk assessment posed by environmental contaminants. I have participated in various international Scopus indexed congresses such as AI2SD 2022 at ENSAM Rabat.

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Flood risk assessment and mapping in a semi-arid watershed of the High Atlas mountains, Morocco.

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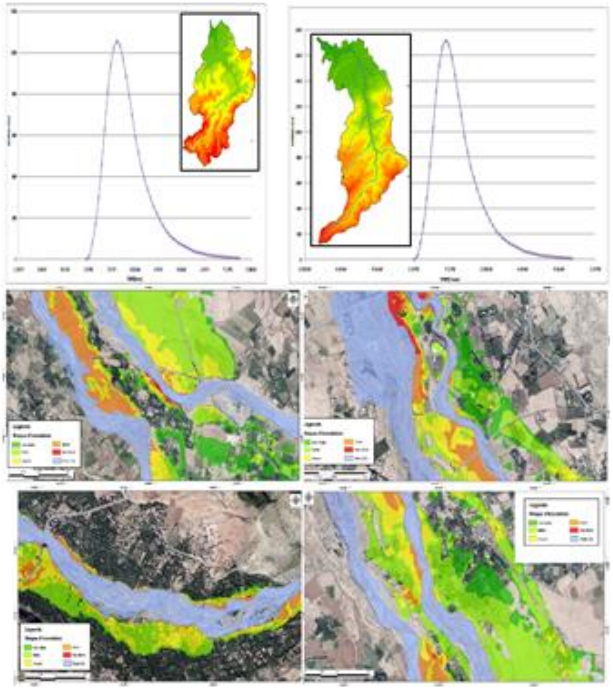
Abstract

In a context of climate change, flush flood management happens to be one of the greatest security challenges, particularly in semi-arid areas where this problem has a significant impact on hydrological risks as a result of rainfall extreme event.In the study area, the wadis originate in the heights of the High Atlas Mountains, cause frequently damage in the less steep part of the foothills. The watershed chosen for this study concerns a rather complex basin that consists of the confluence and diffluence of several rivers. The most important ones are Zat and Ghmat Wadis, both have watersheds with areas exceeding 570 Km². The methodology adopted consists of 3 steps. The first one is a hydrological study, carried out to analyze and determine the flood flows in the wadis basins with different return periods, using flow and rain data from two main hydrological stations: Taferiat and Aghbalou stations with series of over 50 years long. The approach was based on the application of statistical adjust-ments to the maximum annual instantaneous flows of the observed series and the application of the Gradex method.The second step is a hydraulic study which allows realizing 2D hydraulic simulation of the different floods in order to determine the areas likely to be flooded. It uses HEC RAS software as hydraulic model based on a high-resolution digital model (Lidar). Then flood inundation maps for different return period are elaborated. For the 100-year flood, the delimitation of these zones is completed by maps of water heights and speeds. The confrontation between those maps and the land use map allows drawing vulnerability maps to inundation. Such documents are a decision-making tool for risk prevention and a key for strategy conception for mitigation and actions that should be done on the field both before and after inundation.

Figure



(1) Ayari K. & al. (2016),

(2) cutter, s.l., boruff, b.j., shirley, w.l., 2003.

(3) D.Herve KOUMASSI, A. Eric Tchibozo, (2014)

(4) G. BERZ, (2000).

(5) Laabidi A. El Hmaidi H. (2016).

(6) Morin, M., 2008.

Biography

Water resource management is my domain of expertise and passion, my focus is based on hydrology with all its aspects, especially regarding hydrological and hydraulic modelling in order to anticipate the damages caused by floods, either through hydrological modeling using conventional methods, or by applying artificial intelligence to remedy the uncertainties related to the forecast;
As a hydraulic engineer, it was a must to integrate the reseach domain to complete the practical aspect of the job and of course keep updated with the news of the scientific advances.
Thus, my current PhD, in the Hassan 2 University, Morocco, is interested in all the aspects in relationship with hydrology and hydraulic modelling, that will be applied in a rather interesting area, which is the high Atlas mountains region.
I had the chance to attend several events, to present some communications and to benefit from a good number of trainings since this journey has began.
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Liquid sanitation system of Talsint center: a case study in Figuig province

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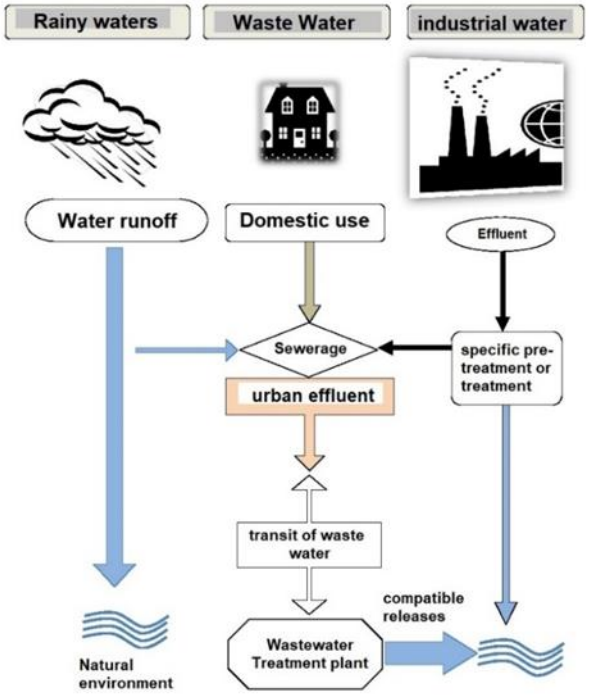
Abstract

Although most Moroccan cities have a sanitation network, the lack of proper sanitation infrastructure particularly affects the peripheral districts of large urban agglomerations, contributing to poor living conditions and unsanitary environments. Liquid sanitation plays a critical role in the water cycle as it enables the hydraulic evacuation of rainwater and wastewater, connecting the urban and receiving environments. In this context, this study aims to integrate unsanitized districts in the Talsint locality into the existing sewerage network by recognizing the pre-existing system and applying criteria and rules to evaluate wastewater and rainwater flows (using Caquot's superficial model). This evaluation will serve as the basis for designing and sizing the pipes needed for the installation of the sewerage network in the Talsint locality.

The study covers several aspects, including population growth, urban spatial planning and estimation of drinking water consumption, followed by the use of a standard model to analyze the sewerage network in the locality and determine the most suitable technical and economic solution.

Keywords: Liquid sanitation, Caquot Formula, Urbanized basin.

Figure



Biography

The author is a water science and technology expert with a Master's degree in Water Engineering since 2019, and a focus on wastewater treatment. Currently, he is a PhD student at Ibn Tofail University, Faculty of sciences, Kenitra. His research thesis aims to contribute to the study of the Ahfir wastewater treatment plant's purifying performance, as well as the degree of pollution of the receiving environment and its ecotoxicological impact assessment.

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The effect of zinc bath formulation on the corrosion resistance of galvanized steel : a short review

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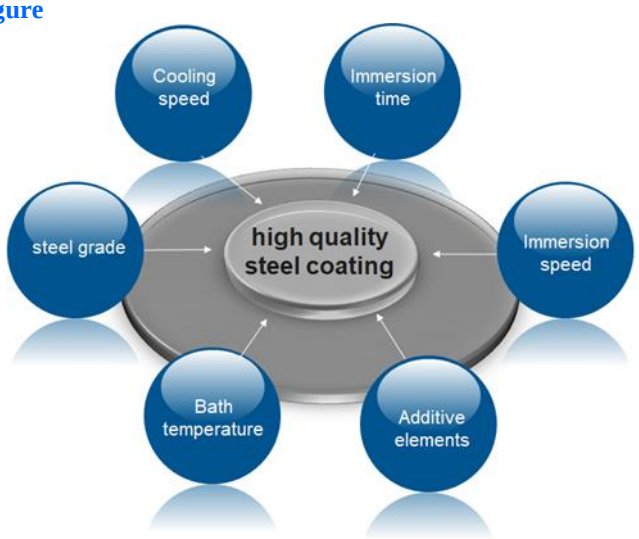
[2] *Moroccan Foundation for Advanced Science, Innovation and Research (MASCIR), Engineering and durability of materials center, B.P., Rabat, 10100, Morocco*

Abstract

The corrosion resistance of hot-dip galvanized coatings is closely related to the effect of the elements contained in the alloy and indirectly to the control parameters. this review article gives a summary on the effect of corrosion resistance, mechanical properties and coating appearance of the galvanized steel. in fact, several parameters are involved in achieving a good quality coating, mainly the parameters associated with the process such as bath temperature, immersion time or bath formulation.

In this work, a comparative study between alloyed coatings and standard zinc coatings is carried out based on the condition of the coating after exposure to natural sites or accelerated corrosion tests or electrochemical tests, for mechanical tests the comparison is made by bending tests or hardness tests.

Figure



Biography

The author is a materials engineer and a PhD student in metallurgy. His objective is to develop a new quality of hot-dip galvanization that is more protective against corrosion. He obtained his master's degree in engineering and physics of advanced materials in 2022 at the Hassan II University - FST of Mohammedia and he is preparing his PhD in collaboration between the Mascir Foundation and the Polytechnic University Mohammed IV.
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Electrochemical investigation by novel ecological corrosion inhibitors applied to mild steel in a molar hydrochloric acid medium

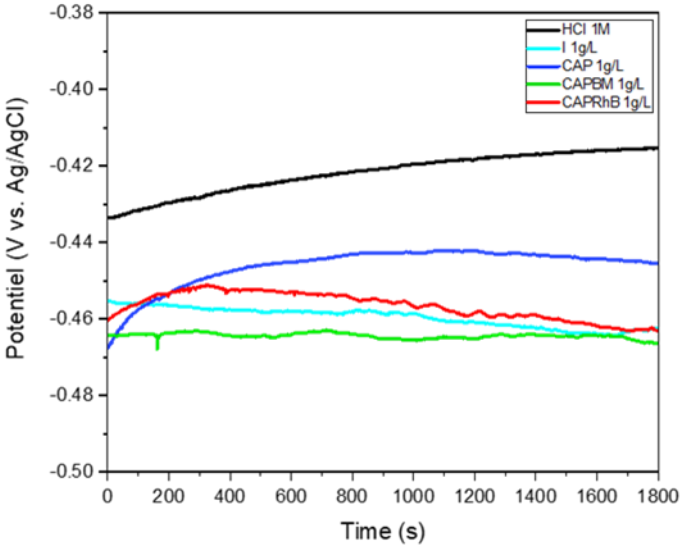
Dounia Azzouni[1*], Rajae Salim[1], Elhachmia Ech-chihbi[1], Soukaina Alaoui Mrani[1], Zakia Rais[1], Mustapha Taleb[1]

[1]*Laboratory of Engineering Electrochemistry, Modeling and Environment, Department of Chemistry, Faculty of Sciences Dhar El Mahraz, Sidi Mohamed Ben Abdellah University, Fez, Morocco*

Abstract

An experimental investigation of the corrosion inhibition properties using spent coffee grounds (I), activated carbon (CAP), and two additional residues from the adsorption process of dyed water (CAPBM) and (CAPRhB) was conducted in a 1M HCl acidic medium regarding mild steel (MS). Based on the experimental results, the inhibition efficiency reached excellent values of 90 %, 89 %, 88 %, and 78 % for CAPBM, CAPRhB, I, and CAP respectively under an optimum concentration of 1 g/L. Furthermore, the polarization curves showed that the studied compounds had a mixed character, controlling both anodic and cathodic corrosion reactions. Additionally, electrochemical impedance spectroscopy (EIS) reported a significant increase in the polarization resistance of mild steel upon the addition of increasing amounts of the tested compounds to HCl solutions, with a simultaneous decrease in the double-layer capacity. Besides, morphological study of the metal surface by scanning electron microscope (SEM) and energy dispersive X-ray (EDX) analysis confirmed the effectiveness of the inhibitors in protecting mild steel from corrosion due to the formation of a protective film on its surface.

Figure



Recent Publications

1. Azzouni, D., Saoudi Hassani, E. M., Rais, Z., & Taleb, M. (2022). An Excellent Alternative to Industrial Activated Carbons for the Purification of Textile Water Elaborated from Waste Coffee Grounds. International Journal of Environmental Research, 16(5), 89.
2. D. Azzouni, N. Eloutassi, B. Louasté, A. Lahkimi, M. Chaouch, Production of the Bioenergy from Industrial waste. Materials Today Proceedings, volume 13, Part 3, 2019, Pages 607-614
3. D. Azzouni, M. Chaouch, B. Louasté, A. Lahkimi, N. Eloutassi, Performance of Aspergillus niger and Kluyveromyces marxianus for optimized bioethanol production from dairy waste. Springer Nature Switzerland AG 2019, AI2SD 2018, AISC 913, pp. 162–175, 2019.

Biography

The author is an expert in the treatment of wastewater from textile industries by adsorbent biomaterials such as activated carbon, also in the inhibition of corrosion of mild steel in molar hydrochloric acid medium, as well as in the integral management of waste and recovery by composting process. She obtained her Ph.D. in Applied Physical Chemistry in 2023 from Sidi Mohammed Ben Abdellah University, Faculty of Science Dhar El Mahraz Fez - Morocco. She has published more than 3 papers and 3 others are under review.

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Study of Asphalt Pavement Cracking Under Climatic Variations in Different Regions of Morocco Using Electrical Tomography Method

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(1) Research and Development in MPA Sciences & Engineering, Ecole nationale supérieure d'art et métier, Moulay Ismail University, Meknes, Morocco.
(2) Intelligent Systems, Georesources And Renewable Energies Laboratory, Faculty of Sciences and Technics, Sidi Mohamed Ben Abdellah University, Fez, Morocco.

Abstract

Road pavements are subject to a variety of environmental factors such as temperature changes, freeze-thaw cycles, precipitation, and traffic exposure. These factors can cause cracks in asphalt pavements, which can compromise road user safety and require costly repairs.

To better understand the mechanisms of cracking in asphalt pavements, this study proposes using electrical tomography to measure the electrical resistivity of the soil supporting road pavements.

We conducted electrical resistivity measurements of the soil supporting road pavements at different times on four different road sections. Two of these sections were located on Regional Road N°707 in the Ifrane region, while the other two were located on National Road N°13 in the Azrou and Timhdit region.

The results of the geophysical campaign will be valuable in helping us to better analyze the impact of climate variations on soil resistance and the formation of cracks in asphalt pavements. To do this, electrical tomography will be used to create 2D images of the electrical resistivity of the soil. These images will then be compared to the asphalt cracking data collected in the field through visual surveys and/or asphalt cores.

The 2D analysis of the electrical resistivity images of the road pavements we studied reveals a decrease in electrical resistivity values after the winter season. The circulation of water and/or the geological nature of the soil supporting road pavements can explain this decrease. These results can contribute to the design of more resilient and sustainable roads by taking into account the effects of climate change on soil properties.

Keywords: Road pavements, Environmental factors, Asphalt Pavement Cracking, Electrical tomography, Soil supporting road pavements..

Figure: measurement of electrical resistivity

Biography

Graduated from Mohammedia School of Engineering, engineer in charge of study in the company LPEE division road and major works.
Enrolled in the second year of doctoral cycle since 2021 in the Laboratory of Research and Development in MPA Sciences & Engineering, Ecole nationale supérieure d'art et métier, Moulay Ismail University, Meknes. Currently, responsible for the establishment of geotechnical road studies and monitoring and control of road works in the region of Meknes and Draa Tafilalt.

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Study of the degradation of an organic pollutant using a raw clay extracted from the magma of Cumbre Vieja volcano

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1 Laboratory of Applied Analytical Chemistry, Materials and Environment (LC2AME), Faculty of Sciences, University Mohammed First, Oujda, Morocco
2 Mohammadia School of Engineers Civil Engineering and Construction Laboratory Rabat, Morocco
3 Bioresources, Biotechnology, Ethnopharmacology and Health Laboratory University Mohammed First, Oujda, Morocco.
4 Grupo de Fotocatálisis y Espectroscopía para Aplicaciones Medioambientales (FEAM), Instituto de Estudios Ambientales y Recursos Naturales (i-UNAT), Universidad de Las Palmas de Gran Canaria, Campus Universitario de Tafira, 35017 Las Palmas, Spain.

Abstract

The use of clays in water treatment has been studied for many years because of their ability to adsorb a wide variety of contaminants. This method of water treatment is becoming increasingly popular due to its effectiveness, low cost and environmental friendliness.

The clays used is raw from a volcano located in the Canary Islands of La Palma, have a layered structure that allows them to capture and adsorb the pollutants present in the water. The structural and optical properties of the particles were characterized by Fourier Transform Infrared Spectroscopy (FTIR), High Performance Liquid Chromatography (HPLC), Energy Dispersive X-ray Analysis (EDX) and High-Performance Liquid Chromatography (SEM).

Figure

Recent Publications

1. José M. Doña-Rodríguez and Elisenda Pulido Melián , J Nanomaterials 2021, 11, 688.
2. E. Pulido Melian , M. Nereida Suarez ,T. Jardiel , D.G. Calatayud , A. del Campo , J.M. Dona-Rodrı´guez , J. Arana, O.M. Gonzalez Dı´az, International Journal of Hydrogen Energy, Volume 44, Issue 45, 20 September 2019, Pages 24653-24666
3. R Quesada-Cabrera, A Mills, C O'Rourke, Applied Catalysis B: Environmental 150, 338-344

Biography

The author has expertise in the field of materials engineering, characterization processing, quality control and surface treatment.
She is currently a PhD student in her fourth year at the Faculty of Sciences of Oujda at the Mohamed Premier University. His expertise in evaluation and his passion for the use of advanced oxidation methods, photocatalysis for the degradation of organic and inorganic pollutants and have applications in industries.
And had an Erasmus+ 2021-2022 mobility to the research laboratory of Las Palmas Grand Canaria Spain

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Elimination of a cationic dye from aqueous solution: adsorption on a hybrid biosorbent based on chitosan

Assia Jebli [1], Abdelhay El Amri [1], Basma Zarrik [1], Lamiae Alami [1], Ahlam Rahrouj [1], Ali Oumirdine [1], El Housseine Rifi [1], Ahmed Lebkiri [1]

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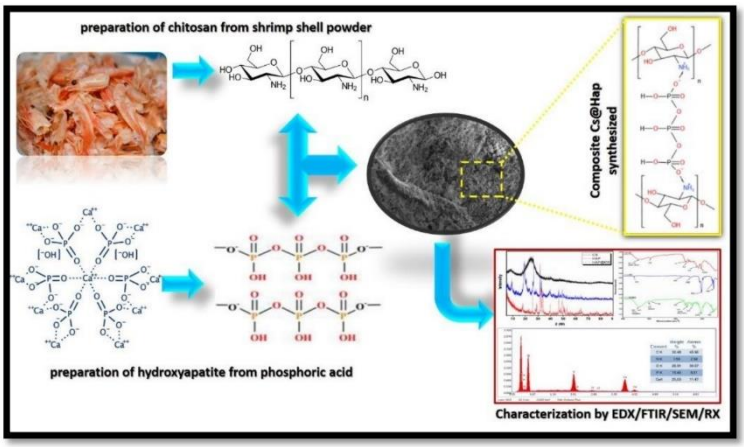
Abstract

The present research is based on the preparation of a chitosan and hydroxyapatite (Cs@Hap) adsorbent prepared from shrimp shell powder and phosphoric acid, respectively and its use for the adsorption of a cationic dye, crystal violet.

The study shows an adsorption efficiency of more than 90%, optimized thanks to the study of many effects including the mass of the adsorbent, the pH, the initial concentration of the dye, the effect of agitation and the effect of temperature.

The support used was characterized using Fourier transform infrared spectroscopy, X-ray diffraction and scanning microscopy techniques. The modelled results showed that the adsorption of crystal violet on Cs@Hap follows the pseudo-second order kinetic model and the Freundlich isotherm.

Figure



Recent Publications

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2. H. J. Kumari, P. Krishnamoorthy, T. K. Arumugam, S. Radhakrishnan, et D. Vasudevan, « An efficient removal of crystal violet dye from waste water by adsorption onto TLAC/Chitosan composite: a novel low cost adsorbent », International journal of biological macromolecules, vol. 96, p. 324- 333, 2017.

Biography

Graduate of the National School of Applied Sciences of Al Hoceima and holder of an engineering degree in water and environmental engineering. Currently, a third year phD student at the Faculty of Sciences of the University Ibn Tofail within the laboratory of advanced materials and process engineering.

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assia.jebli@uit.ac.ma

Levels and patterns of Black carbon at an Urban Site in Kenitra, Morocco

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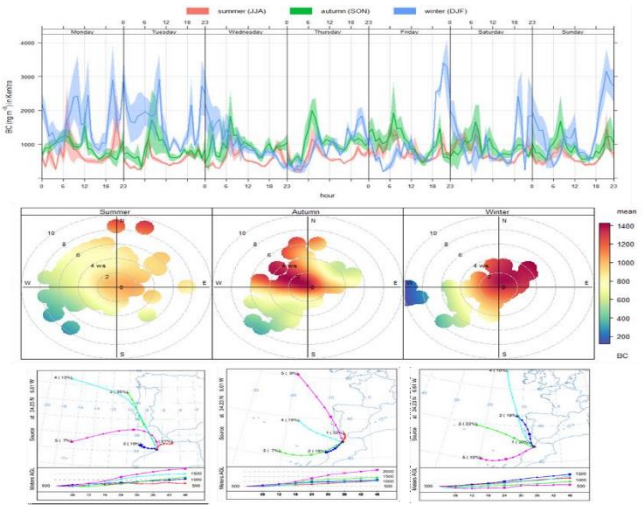
[1]*Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco*
[2] *National Centre for Nuclear Energy, Science and Technology (CNESTEN), Morocco*

Abstract

In this study, data collected from a seven-wavelength aethalometer was used to investigate the levels and patterns of black carbon mass concentrations in Kenitra, Morocco, between mid-July 2020 and mid-February 2021. The average concentration of black carbon (BC) was found to be 0.90 ± 0.80 µg/m3, which is lower than the levels typically seen in African and European cities. This lower value may be due to the influence of COVID-19 restrictions. The BC concentrations showed a bimodal pattern throughout the year, with the magnitude of the peaks varying by season. This seasonal variation was linked to changing meteorological conditions and the height and pathways of air masses. During the weekdays, BC concentrations were higher during the day than at night, while slight increases in BC were observed at night on the weekends. Local sources, such as road traffic, were found to be significant contributors to BC concentrations. However, backward trajectories also showed that long-range aerosols from polluted air masses from populated areas to the west could also contribute to BC concentrations. Lower levels of BC concentrations typically did not exceed 0.5 µg/m3, which is considered an "urban background level.

Figure: Graphical Abstract



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1. Benchrif, A., Guinot, B., Bounakhla, M., Cachier, H., Damnati, B., Baghdad, B., 2018. Environ. 174 (November 2017), 140–147. https://doi.org/10.1016/j.atmosenv.2017.11.047.
2. .Bounakhla, Y., Benchrif, A., Tahri, M., Costabile, F., Zahry, F., Bounakhla, M., El Hassan, E.K., Atmospheric Pollution Research (2022),https://doi.org/10.1016/j.apr.2022.101489
3. Adon, A.J., Liousse, C., Doumbia, E.H., Baeza-Squiban, A., Cachier, H., Léon, J.F., Yoboué, V., Akpo,A.B., Galy- Lacaux, C., Guinot, B., Zouiten, C., Xu, H., Gardrat, E., & Keita, S. (2020). Atmospheric Chemistry and Physics, 20, 5327-5354. DOI:10.5194/ACP-20-5327-2020.
4. Bibi, S., Alam, K., Chishtie, F.A., Bibi, H., & Rahman, S. (2017). Journal Atmospheric and Solar-Terrestrial Physics, 157, 67-77. DOI:10.1016/J.JASTP.2017.03.017.

Biography

I am Youssef BOUNAKHLA, and currently i am a Moroccan Ph.D. student at Ibn Tofail University, Faculty of Sciences, Kenitra,Morocco; entitled "Application of chemical transport models for the study of air pollution in urban areas: case of the city of Kenitra" under the supervision of Pr.EL KAFSSAOUI El Hassan (ibn tofail university) and Dr. BENCHRIF Abdelfettah(cnsten)

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Brackish and seawater pretreatment processes: A systematic literature review.

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1: Advanced Research Laboratory in Industrial Engineering and Logistics (LARILE), Optimization of Industrial and Logistics Systems Team (OSIL), National School of Electrical and Mechanical Engineering, Hassan II University, Casablanca
2: Natural Resources and Environment Laboratory, Sidi Mohammed Ben Abdellah University, Faculty Polydisciplinary of Taza, Morocco
3: Laboratory of Electrochemistry Engineering, Modeling and Environment (LIEME), Faculty of Sciences Dhar El Mahraz, Sidi Mohamed Ben Abdellah University, Fez, Morocco.

Abstract

Climate change induces strong disturbances in the water cycle. This leads to rainfall repercussions, particularly long periods of severe drought, which subsequently impacts the economic and social aspects of communities. The desalination of sea and brackish water appears to be a promising solution to limit these effects. However, the performance of this solution depends on the efficiency of the pre-treatment processes for better results in terms of water quality and energy consumption. The objective of this study is to identify the good practices concerning the pretreatment processes of marine and brackish waters in order to build a reference for the design studies of pretreatment processes and subsequently desalination units. In order to achieve the objectives of this study, the steps for the elaboration of a systematic literature review were followed. A list of scientific articles collected on this topic was used as input to the review process. The obtained results led to an examination of the different techniques used for the pretreatment and their performances, which allowed us to have a clear idea on the techniques to be integrated on the hybrid desalination pretreatment process that we will choose depending on their performances and the characteristics of the water to be pretreated.

Recent Publications

1. Wen Zhang, Xuan Zhang. Effective inhibition of gypsum using an ion–ion selective nanofiltration membrane pretreatment process for seawater desalination (2021). DOI: https://doi.org/10.1016/j.memsci.2021.119358S.
2. Jennifer Runhong Du, Xiang Zhang, Xianshe Feng, Yun Wu, Fang Cheng, Mohamed E.A. Ali. Desalination of high salinity brackish water by an NF-RO hybrid system. (2020). DOI : https://doi.org/10.1016/j.desal.2020.114445
3. Cüneyt Kaya, Yakubu Abdullahi Jarma, Ali Mohammed Muhidin, Enver Güler, Nalan Kabay, Müşerref Arda, Mithat Yüksel. Seawater Desalination by Using Nanofiltration (NF) and Brackish Water Reverse Osmosis (BWRO) Membranes in Sequential Mode of Operation (2020). DOI : 10.22079/JMSR.2019.107844.1264
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DOI : http://dx.doi.org/10.1016/j.desal.2015.12.018.

Biography

Youssouf EL IDRISSI: a PhD student at the National School of Electricity and Mechanics in Casablanca, he has an engineering degree in industrial engineering and logistics, his thesis is about " Hybrid processes for the desalination of marine waters "
.
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Application of Response Surface Methodology to optimize the removal of caffeine and diclofenac from water using biochar produced from argan nutshells

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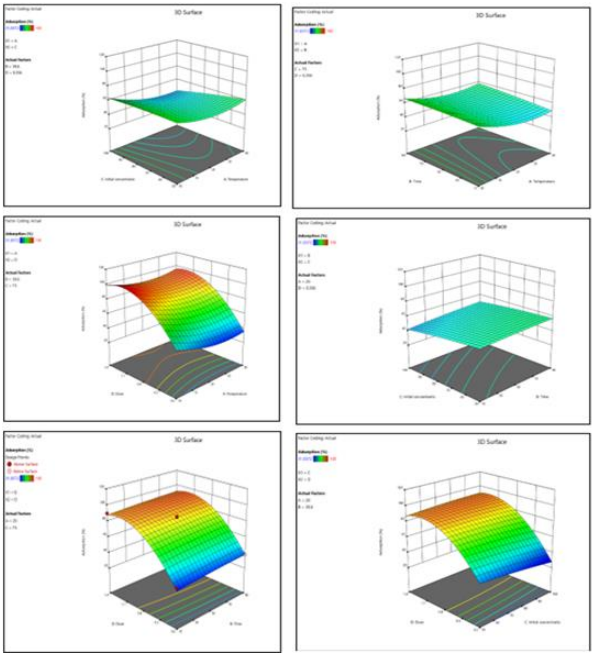
Abstract

Caffeine and diclofenac, two representative anthropogenic indicators for wastewater pollution of surface waterways, have been adsorbed using agricultural activated carbon derived from argan nutshells. Researchers have also focused on how changing factors including starting concentration, pH, temperature, adsorbent mass, and contact time affect the solid's adsorption behavior. To reduce costs and increase efficiency, models were developed using the data mining technique of response surface methodology (RSM), which considers a number of different operational factors. In this study, a variety of characterization techniques (FTIR, BET, and SEM) were utilized to analyze the adsorbent's properties with precision, allowing for a deeper insight into the material's structure and functionality. Adsorption was typically accomplished after a contact period of 90 minutes when 1 g of adsorbent material was added for both caffeine and diclofenac. As a further note, it has been shown that the adsorption of caffeine and diclofenac molecules to the sites of powdered biochar is significantly influenced by the initial concentration of pollutants, temperature, and pH variation. The highest removal percentages in the optimized step were obtained for RSM (Cf: Temperature 10 °C, adsorbent mass 0.8 g, contact time of 50 min, and caffeine concentrations of 100 mg/L), (Dcf: Temperature 20 °C, adsorbent mass 0.8 g, contact time of 50 min, and caffeine concentrations of 100 mg/L), and ANOVA analysis using the central composite design-response surface methodology indicated good agreement.

Figure:



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Biography

Graduate of the National School of Applied Sciences of Al Hoceima and holder of an engineering degree in water and environmental engineering. Badr Bouhcain is a Ph.D. student at the Faculty of Sciences and Technologies El Hoceima of Abdelmalek Essaadi University. He acquired his master's degree in engineering in water management and sanitation at the Faculty of Sciences of Tetouan in 2018. His research focuses on the study of the removal of emerging contaminants in wastewater using adsorption experiments with activated carbons from agricultural waste. Since 2019, he has been working as a substitute professor at the Faculty of Sciences and Technologies El Hoceima. He was on research mobility at the University of Leon, Spain, from 2020 to 2021. And actually, he has collaborative research with "Sivas Cumhuriyet University". Badr has thought it would be most effective to valorize agricultural waste and turn it into a commercial activated carbon.

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Corrosion-Inhibiting Powder Protects Bridge Cables During Construction

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[1]*National School of Architecture ENA, Oujda, Morocco*
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[3]*Laboratory of Applied Chemistry and Environment, Faculty of Sciences, University Mohammed Premier, B.P. 717, 60000 Oujda, Morocco,*
[4]*Laboratory of Advanced Materials and Process Engineering, Faculty of Sciences, Ibn Tofail University PO.Box 133, 14000, Kenitra, Morocco.*
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[6]*University of Technology and Humanities, Faculty of Mechanical Engineering, Department of Physics, 26-600 Radom, Poland.*

Abstract

Corrosion of steel reinforcement is the most significant factor in the deterioration of reinforced concrete structures. Applying corrosion inhibitors to the concrete to reduce the rate of corrosion of the steel has been shown to be effective. Generally, the inhibitor is adsorbed on the surface of the metal and modifies the composition and structure of the double layer or induces passivity.

Many types of inorganic- and organic-inhibiting systems are available, including concrete admixtures, rebar coatings and migrating compounds. Conclusions from previous studies on the effectiveness and field performance of these inhibiting systems on corrosion of reinforcing steel are controversial.

In this paper, eight commercial corrosion-inhibiting systems for reinforcing steel in concrete have been evaluated from a newly reconstructed barrier wall of a highway bridge. Results from a 5-year field survey and laboratory electrochemical study are presented. The methods and procedures of testing these systems are also discussed.

KEYWORDS: bridge coatings / corrosion inhibitors

Figure:

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Biography

Prof. Dr. Imane MERIMI
Associate Professor at National School of Architecture, Oujda, Morocco
Assistant Editor of Arabian Journal of Chemical Environmental Researches (AJCER),
pioneer in the field of evaluation and investigation of corrosion materials Powder Protects Bridge and environment. Her Focused is in the application of different inhibitors in order to reduce the corrosion inhibition of materials caused by acidic solution. Studied her PhD from the University IBN TOFAIL, Kénitra. She published more than 25 papers in prestigious journals. Her H-index is 16 on Scopus.

Alocasia Odora Extract as Environmentally Benign Corrosion Inhibitor for Aluminium in HCl: Electrochemical and Surface Study

F. Zulkifli[1], Jiyaul Haque[2], M.S.M. Ghazali[3], S.M. Zulaikha[4], Walid Daoudi[5], **W.B. Wan Nik[4]**

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[3]*Chemistry Department, Faculty of Science and Marine Environment, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia*
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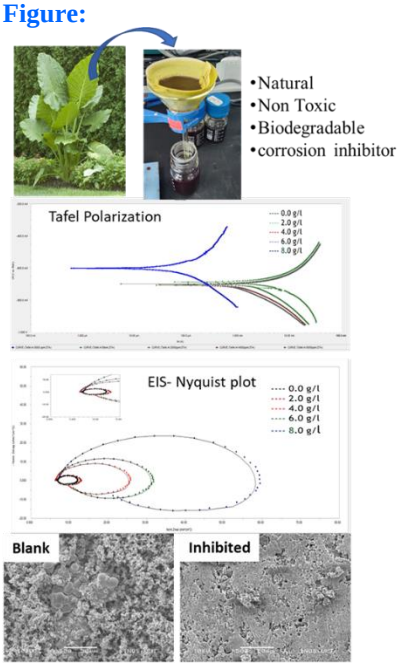
Abstract

The development of effective and environmentally benign corrosion inhibitors is now a major objective in the subject of corrosion. Traditional corrosion inhibitors, which are harmful and non-biodegradable, can be replaced with newly designed corrosion inhibitors. The impact of corrosion on aluminum in HCl has been investigated using leave extract of Alocasia Odora (A.Odora) from Araceae family. Alocasia Odora) is indigenous to Southeast Asia, more especially the area that encompasses portions of Thailand, Laos, Vietnam, and Cambodia. The selected plant extract is nontoxic with LD50 > 0.5 g/kg (oral mice) and biodegradable in nature. The leave extract of Alocasia Odora was easily dissolved in HCl solution. The corrosion inhibition studies of plant extract were carried out using the weight loss, potentiodynamic polarization and electrochemical impedance spectroscopic (EIS). The A. Odora retards the rate of dissolution by 94%, exhibit the excellent corrosion inhibitor aluminum in HCl. The plant extract also shows the potential inhibition (69%) at longer immersion time (48h). The polarization curves showed how A. Odora acts as the cathodic inhibitor. A big capacitive loop presented in the EIS at high frequencies, followed by a big inductive loop at low frequency values compared to blank, suggesting the effective corrosion inhibition in presence of inhibitor. SEM results also depicted that the surface of aluminum with A. Odora extract smoother compared to blank.

Figure:



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5. Chauhan D.S. et al., *Journal of Molecular Liquids*, 321 (2021), 114747.

Biography

Prof. Dr Wan Mohd Norsani B. Wan Nik
Professor in Faculty of Ocean Engineering Technology, Universti Malaysia Terengganu
Dean for Faculty of Maritime Studies, Universiti Malaysia Terengganu
Founder for Marine Materials Research Group and Marine Corrosion SIG, Universiti Malaysia Terengganu
Environmental and Corrosion Research:
Has supervised and examined more than 40 PhD students
Has supervised and examined more than 200 MSc. Students
Has published more than 130 papers, with 150 co-authors
1953 citations, 24 H Index (Scopus)
Academic Backgound:
2005 – Phd Mechanical Engineering (Material) – Universiti Teknologi Malaysia
1995 – MSc. Fluid Power Systems, Bath University, Bath, United Kingdom
1988 – BSc. Mechanical Engineering, George Washington Univ., Washington DC, USA
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Experimental and theoretical study of new epoxy resin synthesized as corrosion inhibitor of mild steel 1 M HCl

A. El Amri [1], N. El-Aouni[2], R. Sayed[1], S. Sadaoui[1] , N. Dkhireche[1], M. Ebn Touhami[1].

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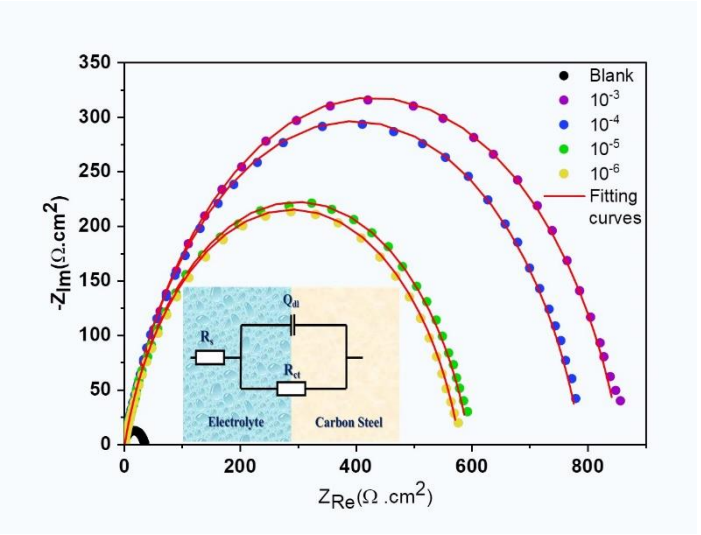
[2] *Laboratory of Organic Chemistry, Catalysis and Environment ,Department of Chemistry, Faculty of Sciences, Ibn Tofail University, PB 133-14000, Kénitra, Morocco.*

Abstract

The effectiveness of the synthesized new epoxy resin as a corrosion inhibitor for mild steel was evaluated in an aggressive 1 M HCl medium using techniques such as electrochemical frequency modulation (EFM), scanning electron and atomic force microscopy (AFM, SEM), potentiodynamic polarization (PDP), density functional calculations (DFT) as well as electrochemical impedance studies (EIS). The results showed a growth in efficiency with concentration and a reduction with temperature, reaching a peak of 95.9% at a concentration of 10^{-3}M at 298 K. The adsorption of the epoxy polymer on the steel interface is consistent with the Langmuir adsorption isotherm, and surface analyses confirmed the formation of a protective layer (SEM and AFM). The value of ΔG_{ads} indicates that the adsorption is chemical in nature.

Figure



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Biography

The author is interested in the inhibition of mild steel in 1M HCl solution by new epoxy resin.
I registered for a PhD in 2021, Faculty of Sciences of Kénitra, University IbnTofail, Morocco.
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Comparative Study of MeSQX and BrSQX as Corrosion Inhibitors for Mild Steel in HCl Solution: Experimental and Theoretical Insights

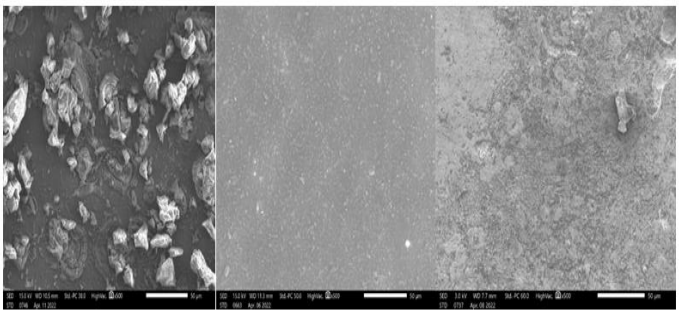
A. Belkheiri[1], M. Khattbi[1], K. Dahmani[2], M. Galai[1], N.Dkhireche[1], R.a.Belakhmima[1], M. Rbaa[2], M. Ebn Touhami[1], B. Lakhrissi[2]

[1]Laboratory of Advanced Materials and Process Engineering, Faculty of Sciences, Ibn Tofail University PO.Box 133, 14000, Kenitra, Morocco.
[2] Laboratory of Organic Chemistry, catalysis and Environment, Faculty of Sciences, Ibn Tofaïl University, PO Box 133, 14000, Kenitra, Morocco.

Abstract

The main aim of this research was to look into the effect of MeSQX and BrSQX on mild steel rust in a 1.0 M HCl solution. To identify the best circumstances for maximal suppression, the compounds were tried at various amounts and temps. Weight reduction, PDP, EIS, SEM, EDS, and theory techniques were used to evaluate inhibition efficacy. The inhibitors created a solid and impermeable organic layer on the steel surface, restricting electrolyte access and stopping rust, according to SEM research.At 298 K, the maximal inhibitory effectiveness of MeSQX in 1.0 M HCl was 90%, while that of BrSQX was 86%. Based on their polarization properties, both compounds function as inhibitors of mixed type. These compounds inhibit corrosion by adsorbing onto corrosive substances, according to EIS findings. The observed adsorption data correlated well with the isothermal model of Langmuir. The relationship between theoretical and experimental findings was evident.

Figure



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2. Galai, M., M. Rbaa, M. Ouakki, K. Dahmani, S. Kaya, N. Arrousse, N. Dkhireche, S. Briche, B. Lakhrissi, and M. Ebn Touhami.Chemical Physics Letters 776 (2021): 138700.
3. -Galai, Mouhsine, Mohamed Rbaa, Moussa Ouakki, Lei Guo, Khadija Dahmani, Khalid Nouneh, Samir Briche, Brahim Lakhrissi, Nadia Dkhireche, and Mohamed Ebn Touhami. Journal of Molecular Liquids 335 (2021): 116552.

Biography

A. Belkheiri has her expertise in evaluation and passion in improving the corrosion protection science.
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THE POWER OF DIFFERENT ENERGY SOURCES TO EFFECTIVELY MEET ENERGY NEEDS

Eco-Friendly Sustainable Materials Based On Construction Waste

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[2] *Mechanics and Numerical Calculation Laboratory, National School of Applied Sciences, Oujda, Morocco*

Abstract

The Cities are the urbanized territories most favorable to the consumption of resources (materials, energy). In Morocco, the economic capital Casablanca is one of them with its 4M inhabitants and its 60% share in the economic and industrial activity of the kingdom.

In the absence of a legal status in force, urban development has promoted the generation of millions of tons of demolition and construction wastes scattered in open spaces causing significant harm to the environment and human health. The main objective of our work is therefore to recover and valorize concrete widespread and abandoned.

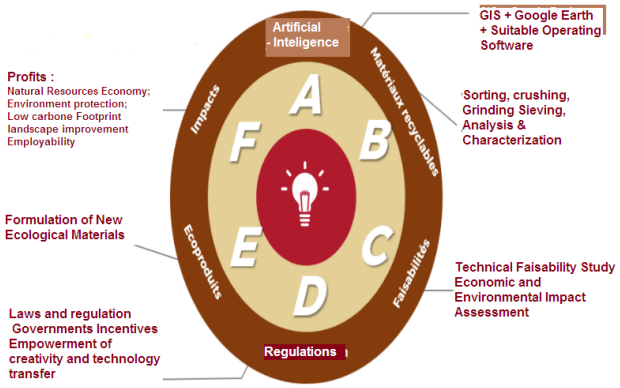
The representative waste is mainly concrete, and fired clay bricks, ceramic tiles, marble panels, gypsum, and scrap metal...

The work carried out includes Geolocation by coupling artificial intelligence with Google earth to geolocate and estimate the quantity of this waste per site. Then the sorting, crushing, grinding, and physicochemical characterization of the collected samples leads us to define the operating routes of each fraction extracted for integrated management of the hole waste.

In this work, we have exploited the fractions obtained after sieving the representative samples to incorporate them into the manufacture of new ecological materials for construction. These prepared formulations have been tested and characterized: physical criteria (specific surface, flexural and compressive strength, etc.) and appearance criteria (cracks, deformations, etc.).

Keywords: *Demolition and construction waste, combined GIS software with Google Earth, Inert waste recovery, ecological materials, Casablanca, Morocco*

Figure: Graphic summary



Recent Publications

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2. Recovery and Valorization of demolition and Construction Wastes spread over The City of Casablanca (Morocco); Mourad MORSLI, Mohamed Tahiri Youssef Halimi, Mehdi MAANANE, 12th Int. Conf. on Geothnique, Construction Materials & Environment, Bangkok, Thailand, 22-24 Nov. 2022, ISBN 978-4-9091106087 C3051.
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Biography

Mourad MORSLI*, Ph.D. student 2nd-year FSAC Casablanca, Project Director at AM2O.*
Studies: *FSAC – Hassan II University Casablanca.* ***Dipl.*** *Master in Water and Sustainable Development (2010).*
Carr. *Has 10 years of experience in managing urban cleanliness in Casablanca.*
I am interested *in themes related to the environment, sustainable development, solid sanitation, and related technological innovations.*
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Green City: towards a new urban sustainability in Morocco

Loubna AZIZI and Nouredine Kouddane

Lab. LAPABE, Faculty of Sciences, Mohammed first university, Oujda, Maroc

Abstract

The concept of green cities is becoming increasingly important worldwide due to the image of cities as well as economic, social, and especially ecological reasons. The concept and practice of green cities are studied and analyzed by different scientific disciplines. Different characteristics of green cities can be observed depending on their origin, the role of government and local authorities in development planning, and the role of public-private partnerships.

For several years, Morocco has been committed to sustainable urban development as part of its transition policy towards a green economy and its commitment to sustainable development. The country has launched several initiatives and projects to promote sustainable urban development, such as green cities.

This concept of green cities is widely used in diverse contexts, with different goals in each case. However, this trend is often articulated around an idealistic vision, influenced by international standards, which can be in contradiction with local urban contexts. In this article, we propose, firstly, a conceptual framework of green cities based on a review of research results and data from various sources. Secondly, we will examine the characteristics of various green cities around the world, with a focus on European cities. Our aim is to provide a critical analysis of the different criteria and standards that have defined green cities so far. We will then evaluate the relevance, plausibility, and degree of applicability of these criteria in the Moroccan context.

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6. Freire, M.E. Urbanization and Green Growth in Africa. Green Growth Series, Report Number 1; Growth Dialogue: Washington, DC, USA, 2013.

Biography

Loubna AZIZI is an environmental PhD candidate working on her research on the concept of green cities: towards a new urban sustainability in Morocco. She is a qualified architect, having graduated in 2001 from the Free University of Brussels (Belgium), with over 10 years of experience in the field of architecture and space planning in compliance with the sustainable development goals of cities. She is also a lecturer at the ENA Oujda School of Architecture
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Novel Nasicon-typed porous $Ni_{1.5}V_2(PO_4)_3$/C and $Mn_{1.5}V_2(PO_4)_3$/C as anode materials for lithium-ion batteries: Crystal structure and electrochemical lithiation/delithiation reaction mechanism.

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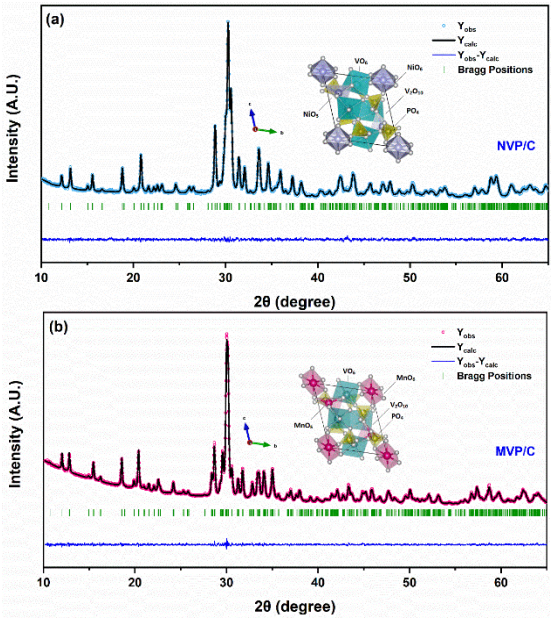
2Université de Pau et des Pays de l'Adour, E2S UPPA, CNRS, IPREM, Pau, France.
[3]*Karlsruhe Institute of Technology (KIT), (IAM-ESS), Hermann-von-Helmholtz-Platz 1, D-76344 Eggenstein-Leopoldshafen, Karlsruhe, Germany.*
[4]*Applied Chemistry and Engineering Research Centre of Excellence (ACER CoE), Mohammed VI Polytechnic University, Lot 660, Hay Moulay Rachid, Ben Guerir 43150, Morocco.*

Abstract

Current commercial Li-ion batteries (LiBs) depend on graphite as an anode material owing to its good cycle life and low working potential vs. Li^+/ Li. This carbonaceous compound relies on intercalation/de-intercalation mechanism during the insertion and extraction of Li ions. However, it shows a limited specific capacity of 372 $mAh.g^{-1}$, poor rate capability and safety concerns. To meet the market requirements, regarding anodes, in terms of high energy density, cost efficiency and cycle life, more efforts should be deployed. Besides the intercalation/de-intercalation mechanism two other mechanisms are observed in the case of anodes: alloying/de-alloying, and conversion. To find an alternative to graphite, more materials with different storage mechanisms should be explored.

This work introduces two novel NaSICon-typed phosphate materials $Ni_{1.5}V_2(PO_4)_3$/C (NVP/C) and $Mn_{1.5}V_2(PO_4)_3$/C (MVP/C) as anodes for Li-ion batteries. These compounds were synthesized via sol-gel process with an annealing under Ar flow. The structure, morphology, and cycling performances of both materials as anodes for LiBs were investigated. Regarding the structure, the samples crystallized in a distorted triclinic system with a $P\bar{1}$ space group. They exhibited a conversion mechanism, displaying reversible initial charge capacities of 495 $mAh.g^{-1}$ and 550 $mAh.g^{-1}$ at 0.2C rate for NVP/C and MVP/C, respectively. They showed a good cycling stability at high rates and good rate capability with high coulombic efficiencies. The materials can maintain a good reversible capacity for long term cycling, although a continuous decrease was noticed during the first cycles. *In* operando XRD and XPS were used to evidence the structural changes and the SEI growth impacting the electrochemical performances of the materials.

Figure



Recent Publications

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2. Amou M., Larhrib B., Saadoune I., *J. Electroanal. Chem.*, 881 (2021), 114957.
3. Amou M., Larhrib B., Srout M., Saadoune I., *Mater. Today: Proc.*, 37 (2021), 3928-3931.
4. Srout M., Amou M., Fromm K. M., Saadoune I., J. *Electroanal. Chem.*, 880 (2021), 114913.

Biography

Mohja has an expertise in materials science, electrochemistry and energy storage, more specifically Li ion batteries. She worked on the development of new positive and negative electrode materials for Li ion batteries, based mainly on phosphate and transition metals and dedicated to grid storage. Mohja was awarded her PhD in March 2023 from Cadi Ayyad University, Marrakech, Morocco. She has published several paper including those cited above and presented her work in several conferences, previously.

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Characterization of ionic flux and ionic energy in several plasma discharge reactors

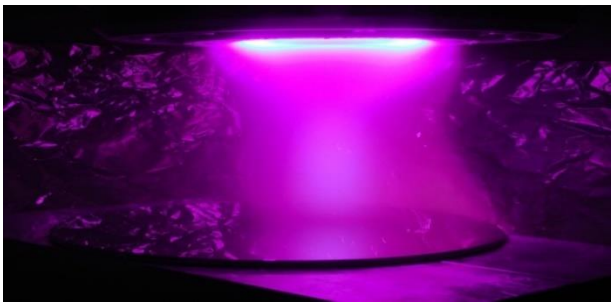
Grari Meryem [1], Guetbach yassmina, Zoheir CifAllah [1].

[1]*Mohamed first University, Department of Physics, LETSER Laboratory, Oujda, Morocco.*

Abstract

In the context of thin films solar cells deposition, we are interested in the plasma-surface interaction which influence highly the uniformity of the surface. In this work, we investigate different reactors by varying several parameters of plasma discharge to find the best evolution of ionic energy and ionic flux which are essential in the study of the plasma-surface interaction. The results show the evolution of the ionic flux and the ionic energy in asymmetric DC, CCP and pulsed RF CCP reactors. By comparing these results, we aim to determine the adequate reactor which provides a better thin films deposition without deteriorate of the surface.

Figure: treatment of the surface using plasma process



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3. M. Grari, C. Zoheir, Yousfi Y., et al. *Chin. Phys. B* 30 (2021) 055205
4. M. Grari and C. Zoheir, *International Conference on Electronic Engineering and Renewable Energy, Springer, Singapore,* (2020) 223-230.
5. M. Grari and C. Zoheir, *Int. J. Eng*, 33 (2020) 1440-1449.

Biography

She Holds a PhD degree in Electric Discharges and Renewable Energies. His research areas are Plasma discharge, Numerical simulation and Thin Film Solar Cell. She was warded her PhD in 2021 from the Mohamed first University, Department of Physics, LETSER Laboratory, Oujda, Morocco.

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Cooling of photovoltaic panels by using groundwater with quality analysis

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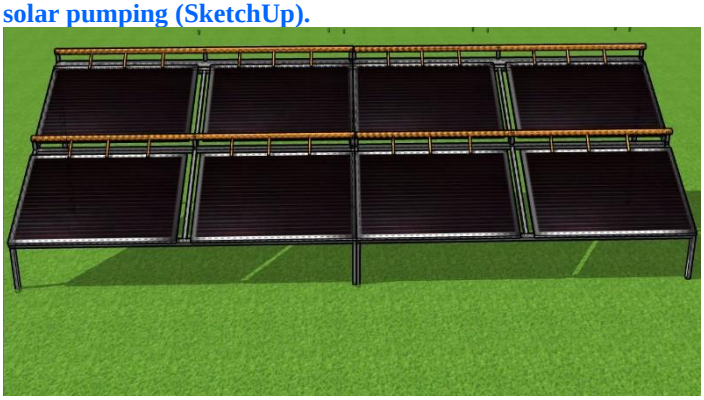
Abstract

The purpose of this work is to; to propose a solution to the problem of the decrease in the yield of photovoltaic panels, with a quality analysis. It is a system of cooling and cleaning of these panels through the use of groundwater to expect an increase in their performance. This system is installed in a rural commune in the Darra Tafilalet region, Morocco. The region is characterized by an arid and semi-arid climate, with high temperatures in the summer. These weather characteristics affect the efficiency of these cells and especially the photovoltaic panels (PV) and finally lower their yield.

We have installed a photovoltaic park with a cooling and cleaning system using groundwater based on a solar pumping system without storage tank. In order to avoid the deposit of salts on the top of the panels, a water sample was taken and then it was analyzed in the laboratory before comparing the results to the Moroccan standards of drinking water treatment.

The results of the study proved that water is very effective and suitable for cooling solar panels, especially it does not cause any deposit of salts and limestone on top of them, which can clog the panels.

Figure: Design of cooling system and cleaning of panels by solar pumping (SketchUp).



Recent Publications

1. Mustapha ALAOUI, Hattab Maker, Azeddine MOUHSEN, Hicham HIHI "High Power PV Array Emulator Based on State Feedback Controller Under Uniform and Non-Uniform Insolation". Trans. Electr. Electron. Mater. (2022). https://doi.org/10.1007/s42341-022-00418-4.
2. Mustapha ALAOUI, Hattab Maker, Azeddine MOUHSEN, Hicham HIHI Real time emulation of photovoltaic energy using adaptive state feedback control. SN Applied Sciences, 2:492, V2 issue 3. https://doi.org/10.1007/s42452-020-2294-2.

Biography

Ali Ait Ali Was born in Rissani Errachidia, Morocco. He received the master degree in energy in 2022, from National School of Arts and Crafts university Mohammed V. Rabat, He has over six years of experience in the fields of mapping, surveying and civil engineering. Currently, he is preparing a PhD degree at renewable energies at the Laboratory of Engineering, Systems and Applications (LISA) in Sidi Mohamed ben Abdellah University of Fez, Morocco. Her research is in renewable energy, energy efficiency, materiel, electrical engineering and thermal energy.

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Hicham HIHI Was born in FEZ, Morocco. He is a Full Professor at the National School of Applied Sciences and at the Laboratory of Engineering, Systems and Applications in Sidi Mohamed ben Abdellah University of Fez. He received the Ph.D degree in 2008 from the Ecole Centrale Lille, in Control Engineering and the HDR degree in 2016 from the Cadi Ayyad University of Marrakech. From 2015 to 2018, he was director of the electrical engineering engineers at ENSA in Marrakech at Cadi Ayyad University. Also, he is president of the international conference on monitoring industrial systems since 2011. From 2015 to 2019, he was president of the Association of Research and Industrial Innovation (Rinnovaindus) and vice-president since 2019. His research interests include: 1) Modeling and simulation of physical systems. 2) The advanced management energy of electrical systems. He is the author of more than 100 scientific publications. Since 2020 he has been responsible for the research team: "Renewable's energy and control systems" at the ENSA of Fez.

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Feasibility Study on the Production of Green Hydrogen using Floating PV in the Moroccan Framework

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Abstract

The energy sector in Morocco depends primarily on the Hydrocarbons imports. By 2030, Morocco envisions to become one of the top producers of green Ammonia and own a sizable portion of the Green Hydrogen market using the Power to X (PtX) concept in Middle East and North Africa (MENA) region. One approach to producing green hydrogen is to use Floating Photovoltaic (FPV). FPV which is a system installed in water bodies composed of photovoltaic panels connected to a floating platform. These systems have been proven to offer several advantages over their traditional land-based solar installation and are a promising technology that can provide numerous benefits for energy production and for the environment. Hydrogen production by means of water electrolysis is the most popular and mature technology of producing Hydrogen. Morocco is an African leader in Hydroelectricity, with a production of 345GWh in 2022, which makes up a percentage of 4.47% of renewable electricity. There's a significant untapped potential when it comes to coupling H2 production using FPV in dams in Morocco. This paper investigates a feasibility study of installing a H2/FPV station. A techno-economic analysis is elaborated in order to determine the relevant Key Performance Indicators (KPIs) for sizing the system. PVsyst software is used to size the FPV system and determine the minimum requirements for optimal Hydrogen production. Levelized cost of Hydrogen LCOH calculations are found to be more attractive using the FPV than using conventional PV. Future work lies on investigating the economic viability of converting the Hydrogen produced from FPV to Liquid Organic Hydrogen Carriers such as Green Ammonia and green Methanol and their impact of the green Hydrogen value chain in Morocco.

Figure

Recent Publications

1. Y. Benmoussa, M. Ezziani, A.-F. Djire, Z. Amine, A. Khaldoun, H. Limami, Mater Today Proc (2022).
2. Y. Benmoussa, A. Mabrouki, S. Berrada, I. Azhari, Y. Salih-Alj, in: 2021 9th International Conference on Smart Grid and Clean Energy Technologies, ICSGCE 2021, 2021.
3. H. El Hafdaoui, H. El Alaoui, S. Mahidat, Z. El Harmouzi, A. Khallaayoun, Energies (Basel) 16 (2023) 753.
4. R. Lghoul, M.R. Abid, A. Khallaayoun, S. Bourhnane, K. Zine-Dine, N. Elkamoun, M. Khaidar, M. Bakhouya, D. Benhaddou, in: 2018 International Conference on Smart Energy Systems and Technologies (SEST), IEEE, 2018, pp. 1–6.

Biography

Rita Azerhouni.
Senior student at Al Akhawayn University in Ifrane. Currently majoring in Engineering and Management science.
Thematic area in Modelling and Simulation and heat and mass transfer: Application in aeronautics.

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Thermal and mechanical proprieties of PES fabric-CMC composite panel for thermal insulation in building

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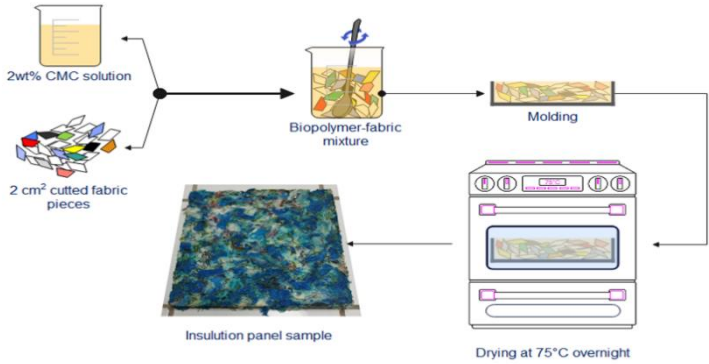
Abstract

The development of lightweight, high-performance materials for thermal insulation in buildings has been a key focus of research in recent years. In this study, we investigated the thermal and mechanical properties of composite panels made from Polyester (PEs) fabric and Carboxymethyl Cellulose (CMC) for use as thermal insulation in building applications. The composite panels were made by combining varied weight ratios of PEs fabric and CMC solution and then drying the resulting material to form a stiff, solid panel. A hot plate device was utilized to analyze the thermal conductivity of the composite panels, and compressive and flexural tests were used to evaluate their mechanical properties. The results showed that the thermal conductivity of the composite panels was in the spectrum of standard insulating materials such as fiberglass and foam. Furthermore, the panels demonstrated excellent mechanical properties, including a high degree of stiffness and strength, making them suitable for use in construction applications. Further analysis using Scanning Electron Microscopy (SEM) revealed that the PES fabric-CMC composite panels had a well-defined morphology, and that the CMC acted as an adhesion agent between the PES fibers. This resulted in a more uniform and stable composite material, with improved mechanical and thermal properties. Overall, our findings suggest that PES fabric-CMC composite panels have great potential as a lightweight, high-performance thermal insulation material for use in building applications. The unique combination of low thermal conductivity and excellent mechanical properties make these panels an attractive alternative to conventional insulation materials, offering significant energy savings and reduced environmental impact.

Figure



Recent Publications

1. Sandin, G., Peters, G.M., 2018. J. Clean. Prod. 184, 353–365. Mohd H. H., Mohammed J. K., *J Phy. Sci.* 21 (2010) 1.
2. A. Ledhem, R.M. Dheilly, M.L. Benmalek, M. Quéneudec, Constr. Build. Mater. 14 (2000) 341–350.
3. F. Balo, A. Ucar, H.L. Yucel, Ceramics – Silikáty 54 (2010) 182–191.

Biography

I am a second year motivated PhD student at Laboratory of Physical-Chemistry, Materials and Catalysis (LCPMC), Hassan II University of Casablanca.

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Energy and Environmental Assessment of Alternative Fuel Rails in Morocco

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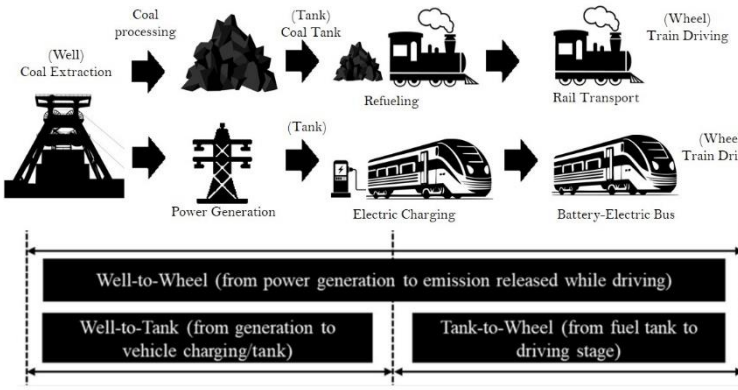
Abstract

The heavy reliance on fossil fuels in the transport sector, especially rail transport, results in substantial emissions of greenhouse gas emissions. A significant obstacle on the path to a more sustainable rail transportation is the employment of alternative fuels with lower environmental impacts. Very little in-depth well-to-wheel studies in developed countries assessed railroad energy and emissions, and extrapolating those results to markets in developing countries presents a challenge because of the significant differences in local fuel conditions, energy profiles, and power production mixes. Notably, this study provides the first national-level environmental well-to-wheel assessment of alternative fuel rail technologies in Morocco and compares current coal trains to potential hybrid-electric and battery-electric trains. The model and approach used in this study is application to other countries. Total energy use broken out by fuel type, greenhouse gas emissions, and criteria air pollutants are the primary outcomes of this investigation. Findings highlight an energy cut of over 28.7% from hybrid trains and 39.2% from battery-electric trains; additionally, alternative fuel trains proved to be less polluting in terms of CO_{2e}, CH_4, N_2O, VOC, CO, NO_x, PM_{10}, $PM_{2.5}$, and SO_x. Given Egalitarian Environmental Impact Assessment, alternative fuel trains would lead to a decrease in climate change, air pollution, acidification, and eutrophication by minimum 34.6%.

Figure: Graphical Abstract



Recent Publications

1. El Makroum, R.; Khallaayoun, A.; Lghoul, R.; Mehta, K.; Zörner, W. Home Energy Management System Based on Genetic Algorithm for Load Scheduling: A Case Study Based on Real Life Consumption Data. *Energies* **2023**, *16*, 2698.
2. El Hafdaoui, H.; El Alaoui, H.; Mahidat, S.; El Harmouzi, Z.; Khallaayoun, A. Impact of Hot Arid Climate on Optimal Placement of Electric Vehicle Charging Stations. *Energies* **2023**, *16*, 753.

Biography

Ahmed Bazzi is a Master's student and a research assistant of sustainable energy management in Al Akhawayn University in Ifrane. Ahmed is engaged in sustainable transportation and smart grid researches. He has his Bachelor's degree in General Engineering, and he is expected to graduate with a Master's of Science from School of Science & Engineering on Summer 23.

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Safe and fast charging and anode material for lithium-ion batteries

Ghizlane ElOMARI[1], Loubna HDIDOU[1], Hicham LARHLIMI[1], Mohamed MAKHA[1], Jones ALAMI[1] and Mouad DAHBI[1]

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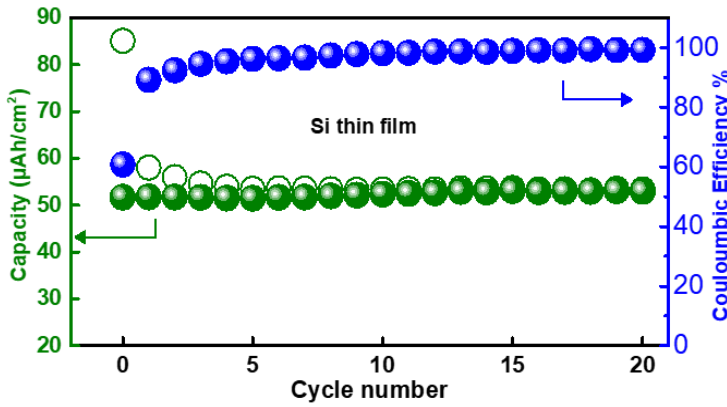
Abstract

Lithium-ion battery (LIB) is widely used in portable consumer devices and electric cars, and it shows great potential for large-scale energy storage [1]. LIB with high energy and power densities have been the primary motivators for the development of new electrode material. Silicon as a negative electrode is gaining popularity for the next generation LIB thanks to its good specific capacity and safe alloy potential [2]. Nevertheless, the significant volume change that occurs during the insertion/extraction processes remains an obstacle to its commercialization [3]. In this research project, the amorphous silicon thin film with enhanced lithium-ion diffusion, less volume expansion, and higher specific capacity was prepared using an efficient one-step physical vapor deposition and applied as anode material for LIBs. The as-obtained electrodes were characterized through profilometry, X-ray diffraction, Raman spectroscopy, scanning electron microscopy, and voltage profiles. The charge/discharge analyses indicated that the produced Si has a sufficient reversible capacity of 53 Ah/cm2 with a capacity retention of 62.7% after 20 cycles Fig.1.

Figure: Long-term cycling of Si thin film at C/5 current rate.



Recent Publications

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2. W. Bao et al., *Cell Reports Phys. Sci.*, 2 (2021) 100597
3. M. Ashuri, Q. He, and L. L. Shaw, *Nanoscale*, 8 (2016) 74–103.

Biography

ELOMARI Ghizlane is a doctoral student in electrochemistry within the Materials Science Energy and Nanoengineering (MSN) department at Mohammed 6 Polytechnic University, Bengruire, Morocco. Before beginning her doctoral studies, Miss. ELOMARI Ghizlane graduates with a Master of materials science and an engineering degree from Mohammed 6 Polytechnic University in 2021. Her master's thesis focused on the valuation of by-products for fast-charging lithium-ion battery anode materials. Her present research projects focus on safe and fast-charging anode materials for next-generation lithium-ion batteries.

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Climate Change and Building Materials: Implications for Durability and Performance- A case study of Morocco.

Khaoula Benaomar [1], Abdelkader Outzourhit [2], Hicham Mastouri [3], Mohamed El Mankibi [4], Karim Limam [5].

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2 Department of physics and engineering, Faculty of Science Semlalia, Cadi Ayyad University, Morocco.
3 School of Architecture, Planning & Design, Mohammed VI Polytechnic University,Morocco.
4 ENTPE LDTS, University of Lyon, France.
5 Laboratory of Engineering Sciences for Environment, University of La Rochelle, France.

Abstract

Climate change is one of today's most challenging environmental issues, with far-reaching impacts on all aspects of human establishments, including the built environment. Buildings and infrastructure are becoming increasingly vulnerable to the impacts of climate change, especially the rising temperatures, extreme weather events and rising sea levels. Building materials such as concrete, steel and wood are also affected by climate change, which can lead to higher costs, lower durability and lower performance. In the meantime, building materials can contribute in their turn to climate change by rising the carbon footprint of the built environment and increasing energy consumption. This highlights the dual role of the built environment as both a contributor to climate change and a key to mitigating its impacts. Therefore, this paper seeks to study the impact of climate change on the built environment with a focus on construction materials and their related energy consumption. For this aim, an analysis will be conducted on both rural and urban buildings from different climatic regions of Morocco. The analysis seeks to demonstrate how changes in temperature and moisture levels, induced by climate change and coupled with occupant behavior, in both rural and urban areas, can affect the performance and durability of different construction materials. The paper concludes with guidelines for climate change mitigation through sustainable design and construction practices.

Recent Publications

1. Huang, B., Gao, X., Xu, X., Song, J., Geng, Y., Sarkis, J., ... & Nakatani, J. (2020). A life cycle thinking framework to mitigate the environmental impact of building materials. *One Earth*, *3*(5), 564-573.
2. Perera, A. T. D., Nik, V. M., Chen, D., Scartezzini, J. L., & Hong, T. (2020). Quantifying the impacts of climate change and extreme climate events on energy systems. *Nature Energy*, *5*(2), 150-159.
3. Phillipson, M. C., Emmanuel, R., & Baker, P. H. (2016). The durability of building materials under a changing climate. *Wiley Interdisciplinary Reviews: Climate Change*, *7*(4), 590-599.
4. Röck, M., Saade, M. R. M., Balouktsi, M., Rasmussen, F. N., Birgisdottir, H., Frischknecht, R., ... & Passer, A. (2020). Embodied GHG emissions of buildings–The hidden challenge for effective climate change mitigation. *Applied Energy*, *258*, 114107.

Biography

Ms. Khaoula Benaomar is an architect and urban planner. After her graduation from the National School of Architecture of Rabat in 2017, she joined Mohammed VI Polytechnic University (UM6P) where she co-founded and worked in the management of the School of Architecture, Planning & Design (SAP+D). During her work at UM6P, she was highly engaged in the development of educational programs and research- action projects. Her research interests focus on sustainable buildings, integrated territorial development, rural-urban linkages and climate- conscious urban development. Ms.Benaomar is currently pursuing her PhD studies at Cadi Ayyad University; her thesis addresses the topic of urban systems planning and climate change mitigation.

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Recycling red brick waste into aerogel for thermal insulation applications

Ait khouya Oumaima [1, 2], Jammoukh Mustapha [1], Zamma Abdellah [1], El farissi Latifa [2].

[1] *Laboratory of modeling and simulation of intelligent Industrial systems M2S2I, Higher Normal School of Technical Education Mohammedia, University of Hassan II Casablanca, Morocco.*
[2] *Technical center of Plastics and rubber CTPC, Casablanca, Morocco.*

Abstract

In order to enhance the circular economy, this paper focuses on the recycling of demolition waste, particularly red bricks, and their transformation into thermal insulation materials for buildings. Aerogels have great insulating properties due to their very low thermal conductivity, high porosity, and low density, so that they can guarantee good thermal insulation using a low thickness of material. Herein, we propose a new source of precursors for silica aerogel synthesis using the sol gel method and drying at ambient pressure in a short process time. Moreover, a special treatment was done to prevent the aerogel from shrinkage during the drying process and to increase its mechanical strength. Many tests were done to evaluate the produced aerogel's performance. First, XRF analysis confirms that the waste contains 67% silicone and aluminum, which makes it a good precursor. Second, the prepared aerogel has a low density of 1,08 g/cm^3 in addition to an extremely porous network, according to SEM analysis. In order to characterize its thermal performance, 10% of aerogel was added to plastic matrix. The composite was tested by the heat flow meter method. The results showed that thermal conductivity of the composite decreased by 35% and 26,3% at a low and high temperatures of 10°C and 35°C respectively.

Figure: Graphical abstract

Biography

Ait khouya Oumaima is a PhD student at Mohammedia's Higher Normal School of Technical Education's Laboratory of modeling and simulation of intelligent industrial systems (M2S2I). In 2020, she graduated with a master's degree in environmental science and management from Mohammedia's Faculty of Science and Techniques.
In the context of a circular economy and a low carbon footprint, her research project focuses on the recycling and valorization of waste into high-value products for various applications.
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Additive manufacruring, Litterature review

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Abstract

Analyzing the history of industry, we can see that since the industrial revolution, man has sought to improve industrial performance, ensure customer satisfaction by reducing expenses.

Nowadays, additive manufacturing is increasingly used in many companies around the world, due to the ability to create complex, high-quality products in a limited amount of time.

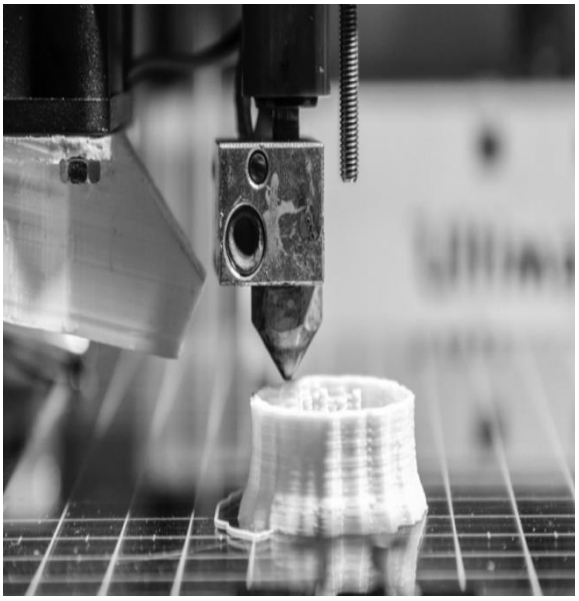
Therefore, additive manufacturing can be seen as one of the keys to minimizing waste by eliminating unnecessary work and quality defects to achieve better results in lean construction.

In this article, our objective is to introduce the process of additive manufacturing, the machine used in this technology and some of its characteristics, material used in AM, as well as to define the advantages and disadvantages of using additive manufacturing.

In order to focus on the topic of lean construction and to know the relationship between lean construction and AM, we present the meaning of lean construction and the effect of additive manufacturing on it.

Several studies have been conducted in this context, so the approach used in this paper is a literature review of the latest studies.

Figure



Recent Publications

1. A comparison of traditional manufacturing vs additive manufacturing, the best method for the job Pereira T, Kennedy J, Potgieter J, Procedia Manufacturing, (2019), 11-18
2. Applicability and integration of concrete additive manufacturing in construction industry: A case study Mohamed Ramadany and Mohamed Saad Bajjou (2021),1338-1348, 235(8).

Biography

Author is a 2nd year PhD Student in industrial technics laboratory in the Faculty of Science and Technology of FEZ, sidi Mohamed ben Abdellah university, she is working on a thesis entitled contribution to additive manufacturing for lean construction.

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A new rural establishment planning towards the sustainability of integration: The development potential for rural communes in the Rehamna province of Morocco.

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Abstract

The enhancement of rural establishment planning often has a beneficial impact on the sustainability of territories. By suggesting an organizational framework of rural communes to guide strategic spatial planning, this study investigates a novel strategy to promote rural development potential. This strategy can aid in resolving the myriad social, economic, and environmental issues that rural have. By evaluating rural development potential indicators that prompt rural and their territories, it attempts to bring about the sustainability integration of rural regions. The research examined 23 communes in Morocco's Rehamna province, which is part of the Marrakech-Safi area. Based on the examination of rural development using four dimensions of indicators (Location and fabrics, Supply of resources, Economic dynamism, and development constraints) and GIS tools. The analysis further classifies the communes into three categories: Vital Planning Area, Prevalent Planning Area, and Initial Planning Area, with different percentages of occupation. Based on these results, this study generates a new rural strategic spatial structure for achieving rural sustainable development and enhances the development status of rural areas through clustering planning needs orientations. the paper offers an analytical structure for the government, institutions, stockholders, and planners to formulate relevant development policies in rural and highlight indicators for achieving rural sustainable development.

Recent Publications

1. Chen, J., Wang, C., Dai, R., Xu, S., Shen, Y., & Ji, M. (2021). Practical village planning strategy of different types of villages—a case study of 38 villages in shapingba district, chongqing. Land, 10(11). doi: 10.3390/land10111143
2. Kostyaev, A. I. (2020). On the scientific basis for developing rural development strategies. Agricultural Science Euro-North-East, 21(4), 462–474. doi: 10.30766/2072-9081.2020.21.4.462-474
3. Lin, J., Lei, J., Yang, Z., & Li, J. (2019). Differentiation of Rural Development Driven by Natural Environment and Urbanization: A Case Study of Kashgar Region, Northwest China. Sustainability, 11(23), 6859. doi: 10.3390/su11236859
4. Sokolova, E., & Zakharova, T. (2020). Factors of Formation and Development of Human Capital in Rural Areas. Proceedings of the International Scientific Conference The Fifth Technological Order: Prospects for the Development and Modernization of the Russian Agro-Industrial Sector (TFTS 2019). doi: 10.2991/assehr.k.200113.218.

Biography

Author has her expertise in rural establishment planning and architecture towards integrated sustainable development. Her focus is based on the use of inner resilience of rural to promote holistic, and interdisciplinary integration in the field. She graduated as architect, urban planner in 2019 from national school of architecture in Rabat and is a PhD student in University Mohamed VI polytechnic of Benguerir.

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Structural and Electrochemical properties of new spinel oxides $MgFe_{2-x}Mn_xO_4$ as anode materials for Li-Ion Batteries

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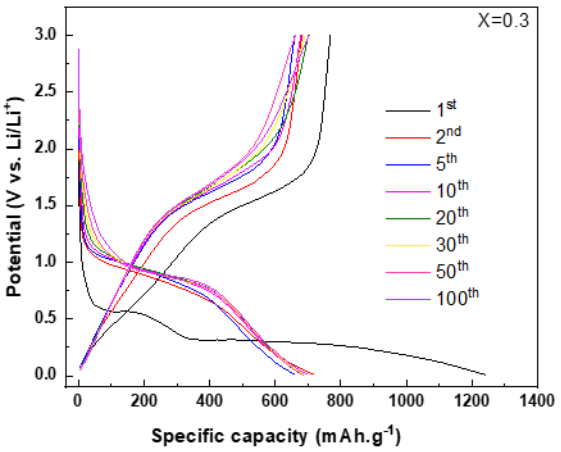
Abstract

Over the past few decades, lithium-ion batteries (LIBs) have attracted much attention as the most competitive electrical energy storage system. Lithium-ion batteries are increasingly becoming the storage medium of choice for electric vehicles (EVs) due to their high capacity, long life, low self-discharge rate, high energy density, and environmental friendliness. The improvement of lithium-ion battery performance mainly depends on the chemical composition, crystal structure, and morphology of the negative electrode material [1] [2]. Therefore, it is expected to further improve the chemical performance by developing novel electrode materials. Compared with commercial carbon materials (theoretical capacity 372 $mAh.g^{-1}$), transition metal oxides, especially spinel materials, have a higher reversible capacity of about 400-1000 $mAh.g^{-1}$[3]. For this reason, the new lower-cost $MgFe_{2-X}Mn_XO_4$ nanomaterials were prepared by sol-gel method. The crystal structure and morphology of the as-prepared materials were evaluated using X-Ray diffraction (XRD) analysis, Scanning electron microscopy (SEM), and Raman spectroscopy techniques. The results show that the new anodes exhibit a cubic symmetry with the space group (Fd-3m). The SEM images suggest that the particles exhibit a nanometric size of around 60-70 nm. The Raman spectroscopy results showed that there are five Raman active modes (A1g (1), A1g (2), T2g (1), T2g (2), and Eg which are observed at 800 °C. The electrochemical properties were evaluated by galvanostatic charge-discharge and cyclic voltammetry. $MgFe_{1,7}Mn_{0,3}O_4$ demonstrates a high initial discharge/charge capacity of 1537/938 mAh/g, with a capacity retention of 70 %. As shown in the figure, $MgFe_{1,7}Mn_{0,3}O_4$ materials provide excellent cycling stability after 100 cycles.

Figure: **Discharge/Charge curves of $MgFe_{2-X}Mn_xO_4$ (x=0.3) at 150 mAg^{-1} current rate.**



Recent Publications

1. A. Chari, K.ElOuardi , M. Tayoury et al. Journal of Power Sources 548 (2022) 232046
2. R. Muruganantham, J.-A. Chen, C.-C. Yang et al. Materials Today Sustainability 21 (2023) 100278
3. Z. Chchiyai, L. Hdidou, M. Tayoury. et al. Journal of Alloys and Compounds 935 (2023) 167997.

Biography

OUMAYEMA EL GHALI, Ph.D. student at Hassan 1 University, is working on the elaboration and characterization of novel spinel oxides for Li-ion battery applications. She was a participant in the Abaa-13 conference and the first bi-national workshop at UM6P university.

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Supply chain & Building industry

A. GARNI [1], A. EL BARKANY[1], F. JEFFALI[2]

[1]*Laboratoire Génie Mécanique, Faculté Sciences et Technique Fés-Université Sidi Mohamed Ben Abdellah, Fés, Maroc.*
[2]*Laboratoire des Matériaux, Ondes, Énergie et Environnement, Équipe, Matériaux, Énergie, Génie Civil et Environnement, École Supérieure de Technologie (ESTO) - Université Mohammed Premier (UMP), Oujda, Morocco.*

Abstract

The research problem is to find solutions to improve the efficiency of the supply chain in the construction sector in Morocco, taking into account the difficulties encountered by Moroccan companies in this field. Indeed, the construction sector represents a significant portion of the Moroccan economy, but it suffers from delays, cost overruns, market losses, and contract losses due to the absence of an efficient supply chain. To address this problem, this study proposes to adopt several methodological principles to optimize the supply chain, such as organizing procurement, identifying materials, planning deliveries, managing stocks and waste, as well as coordinating interconnected activities. To evaluate the efficiency of the supply chain, dashboards using qualitative and quantitative indicators will be put in place. This study also highlights the importance for Moroccan construction companies to adapt their management and organization to new managerial cultures, continuously evaluate their overall and functional strategy, and be managed based on performance objectives. This will enable them to face increased competitiveness in the sector, increase their market share, and maintain their sustainability.

Recent Publications

1. I. JARROUDI (2020) Planning and optimization of construction logistics in urban areas
2. T. CAZIN (2021) Designing logistics chains for modular construction projects
3. C. ELOCKSON (2017) Supply chain risk management and business performance
4. J. Guffond and Gilbert Leconte, (2021) Article "Managing distributed activities: the case of construction sites"
5. Benkaddour, M. A. (2007). Use of modularization in the design of supply chains for companies in the aerospace sector. Ecole de Technologie Supérieure, Montreal, Canada.

Biography

Amal GARNI PHD Student, Registered in the Mechanics engineering laboratory, Faculty of science and technics Fez, University Mohammed Ben Abdellah, Fez, Morocco.

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Autonomous solar cooker (Heating plate) using both PV panels and batteries

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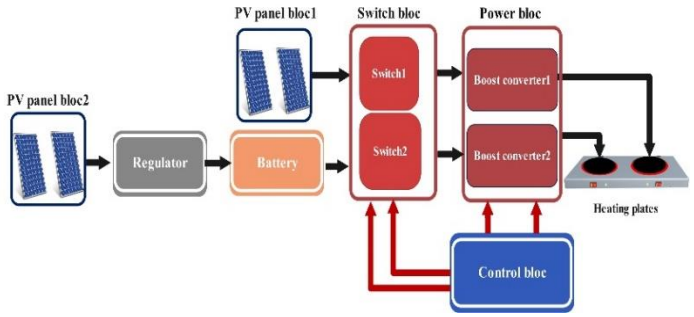
Abstract

The main aim of this paper is the design, experimentation and validation of a new autonomous cooking device powered by PV panels and solar batteries. The desired objective, within the framework of Next Generation SoCoNexGen project (2022-2025), in collaboration with European and African partners, is to propose an innovative cooker that works, day and night, according to the users' daily cooking needs. As shown in figure 1, the proposed cooker is made up of four photovoltaic panels with a power of 1.2 kWp, solar batteries (48V/200Ah) equipped with a charge/discharge regulator, a bloc of two power switches, two DC/DC boost converters controlled by a control and regulation bloc, and a heating plate with two resistors. One resistor is heated by two PV panels via DC/DC converter 1, and the other by the batteries via DC/DC converter 2. This innovative architecture allows the use of the cooker on a 24 hours scale. On sunny days, the cooker uses the PV panels power directly, while on nights and cloudy days, it uses the power stored in the solar batteries. The experimental results show that the efficiency of the solar cooker is above 90 %. The heating plate reaches a high temperature of around 500°C after 40 minutes of heating. Moreover, to validate our prototype with practical results, we experimented the reliability of the proposed system in heating 1 liter of water and 1 liter of oil respectively. The results support the effectiveness of the cooker. Indeed, the water reaches the boiling temperature after only 15 minutes, while the oil attains a temperature of 230°C after 20 minutes of heating. All the results obtained show better performances compared to the current solar cookers [1-5], in terms of temperature and cooking time, and its usefulness in both rural and urban areas.

Figure: Proposed solar cooker synoptic diagram with PV panels and solar batteries.



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5. Edmonds, I. Low cost realisation of a high temperature solar cooker. Re-newable Energy (2018), 121, 94-101.

Biography

Solar Indoor Cooking Systems of the Next Generation SoCoNexGen project (2022-2025) is part of the Long-term Europe Africa Partnership on Renewable Energy LEAP-RE programme. This project is funded by the Ministry of Higher Education, Scientific Research and Innovation (Morocco).
This LEAP-RE has received funding from the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement 963530.

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Understanding PV module durability in desert climate conditions for a new durable module

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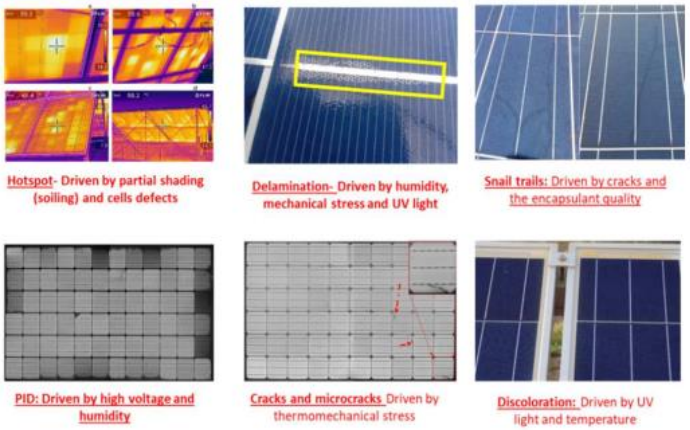
Research Institute for Solar Energy and New Energies (IRESEN), GEP, Benguerir, Morocco[2]

Abstract

In recent years, PV module performance and durability researchers have focused on the PV aging mechanisms to save module life and reduce LCOE. We present preliminary work performed in the desert PV module project for the climate of Morocco as the base to guide the national market and contribute to the future of research and development applied to the industry. The purpose of this project is to develop a desert PV module adapted to arid and semi-arid climate of Morocco. Indeed, the started with an outdoor inspection of PV systems operating for more than three years in the climate of Morocco. For detailed inspection, we used advanced characterization techniques such as electroluminescence (EL), infrared (IR) imaging and I-V measurement. The general observation brings us to the severity of such climatic conditions on the durability of standard PV modules. This is noticeable not only at the level of the different aging mechanisms but also in terms of degradation rate values. The various degradation mechanisms are manifested by hotspots, cracks, encapsulants discolorations, potential induced degradation (PID), and delamination and snail tracks. In addition, degradation rates ranged from 2.02% up to 2.73%. Furthermore, we have proposed a new PV module design, based on the approach to mitigate the observed real aging mechanisms, the purpose of which is to save the life of the modules and improve their LCOE.

Figure



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3. Touili, Samir, et al. "Performance analysis and economic competiveness of 3 different PV technologies for hydrogen production under the impact of arid climatic conditions of Morocco." International Journal of Hydrogen Energy 47.74 (2022): 31596-31613..
4. Ameur, A., Berrada, A., Bouaichi, A., & Loudiyi, K. (2022). Long-term performance and degradation analysis of different PV modules under temperate climate. Renewable Energy, 188, 37-51.

Biography

Abdellatif BOUAICHI received the Ing. degree in Industrial Engineering from the FST in Errachidia Morocco and the Ph.D. in the field of Electrical Engineering and Renewable Energy with the focus on photovoltaic module characterization, photovoltaic system performance and degradation analysis in desert applications.
2017-2020, he was working as a Full time Researcher in the Research Institute for Solar Energy and New Energies (IRESEN), Morocco, in the Green Energy Park at Benguerir where his focus was to optimize module design to ensure high durability in desert climatic conditions. The research work has resulted in publications in international indexed journals (currently I have 17 articles with an H index of 9).
Since 2021, he is working as Research Assistant Professor at the Moroccan School of Engineering Sciences – EMSI, Rabat. EMSI is the main multidisciplinary private engineering school in Morocco recognized by the State.
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Battery Separators Based on Phosphate-Functionalized Cellulose

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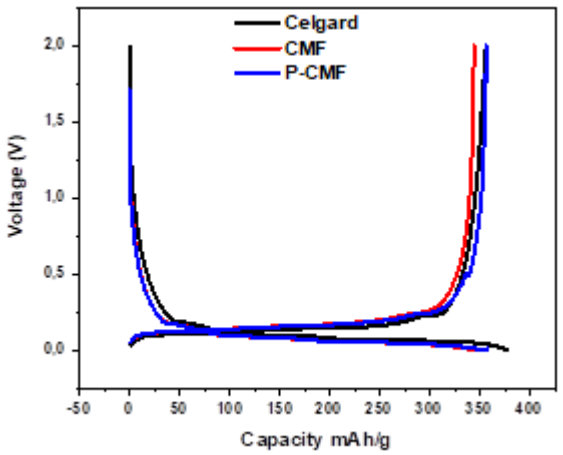
Abstract

Many initiatives have been taken to develop cost-effective and renewable materials to replace the commercial separator membrane currently used in lithium-ion batteries1. In this study, we describe a novel method for the valorization of Alfa fibers in the development of cellulose battery separators. Cellulose microfibers (CMF) and phosphorylated cellulose microfibers (P-CMF) were prepared by alkali and bleaching treatments of raw fibers, and by a chemical modification process using di-ammonium phosphate\urea system to graft phosphate groups on the CMF surface. Subsequently, CMF and P-CMF separators were obtained via a paper-making process. Using various characterization techniques, the effect of phosphorylation on the chemical structure, crystallinity, porosity, morphology, thermal stability, flame retardancy, wettability, and tensile properties of the samples was investigated. In terms of electrochemical properties, the prepared cellulosic separators were compared to a commercial separator membrane (Celgard 2325). The findings demonstrate that P-CMF separators are electrochemically inert in the potential range between 0 and 5 V and have good cycling stability for graphite anode materials as shown in (figure 1). These newly developed P-CMF from Alfa fibers could be considered as a potential candidate for the development of lithium-ion battery separators.

Figure1: Discharge/charge curve of graphite tested at C/10(P-CMF separator).



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Biography

Hiba el fallah is a first-year PhD student at materials science, energy and nanoengineering department (MSN). Her research focused on biopolymer-based functional separator for electrochemical energy storage under the supervision of Pr. Dahbi Mouad. She has a bachelor's degree in process engineer from the faculty of sciences and technologies, Tangier. and a Master's in materials for energy storage from Mohamed IV Polytechnique University, Benguerir.

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A Facile Preparation of spinel-type λ-MnO2 as Cathode Material for High-Performance Zinc-Ion Battery

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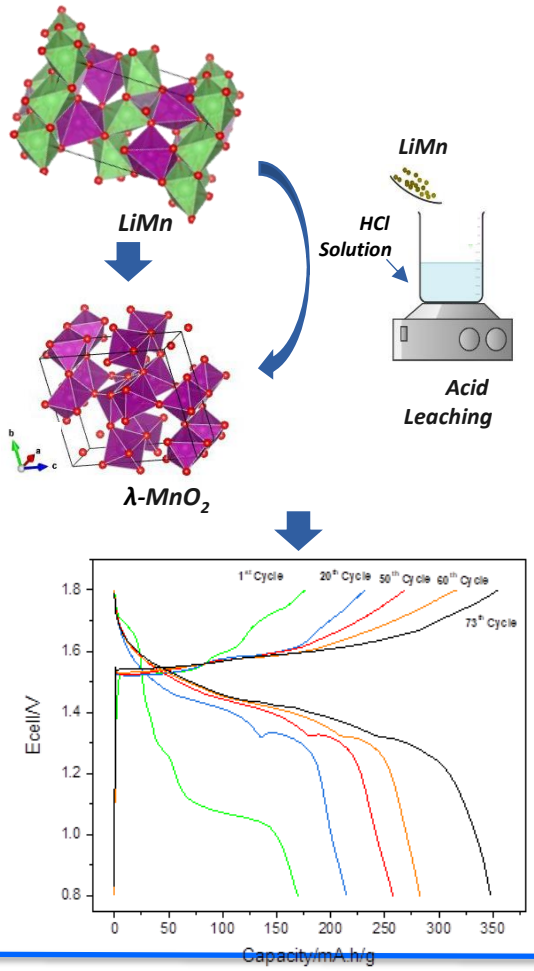
Abstract

Aqueous rechargeable batteries are emerging as a promising alternative to conventional lithium-ion batteries for high-scale energy storage, especially zinc-ion ones since they are considered safer and more stable due to their non-flammable electrolyte and reduced risk of thermal runaway, they exhibit high ionic conductivity "twice that of non-aqueous electrolytes", and the use of a cheaper electrolyte salt and solvent, making them more cost effective.

Various types of manganese oxide MnO_2, including α, β and δ have been studied as cathode material for zinc-ion batteries, but the low capacity and cycling life limited their large-scale application, while spinel-type λ-MnO_2 is still rarely reported because the intercalation of the Z-ion in the spinel lattice is assumed to be limited by the narrow three-dimensional tunnels which limits its energy density. Herein, we report λ-MnO_2 synthesized via acid leaching of $LiMn_2O_4$ on which we are currently working. The electrochemical measurements performed so far show promising results. The resulting λ-MnO_2 cathode offers a high reversible specific capacity of about 350 $mAh.g^{-1}$ at specific currents of 50 mA/g in the operating potential window of 0.8-1.8 V, with high-capacity retention after 70 continuous cycles. We are currently confirming the stability of the cathode during a long cycling measurement.

Key words: spinel-type manganese dioxide, acid leaching process, zinc-ion batteries.

Figure:



Biography

***H**amza **A**FARYATE graduated from Mohammed V University in 2020 with a master's degree in Analytical Chemistry and Instrumentation before joining Mohammed VI Polytechnic University in another master's degree in Materials Science and Engineering, majoring in Materials for Energy in the MSN Department (Department of Materials Science, Energy and Nano-engineering). In 2022, he started his thesis in the same department working on rechargeable aqueous batteries.*

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Graphite surface modification for Improving VO^{2+}/VO_2^{+}Redox Kinetics in Zinc-Vanadium Redox Flow Batteries

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Abstract

The proper storage and utilization of energy are equally crucial to advancing high-performance energy generators. As renewable energy-generation systems, such as solar cells and wind-powered generators, continue to grow globally, there is an increasing need for energy storage solutions that can deliver superior performance. With the growing popularity of renewable energy-generation systems such as solar cells and wind-powered generators on a global scale, there is an escalating need for high-capacity energy storage solutions in modern times, including electric vehicles, factories, energy-efficient buildings, and so on. As a result, the development of large-scale energy-storage systems, such as redox flow batteries, is crucial for the next generation of electricity grids[1]. There are many kinds of aqueous redox flow batteries, Zn/V[1] ,Zn/Br[2] and All vanadium[3]. Herein Due to its advantageous properties, including extended cycle life, versatile design, minimal ion-crossover, and exceptional electrochemical reversibility, the Zinc-vanadium redox flow battery is regarded as one of the most promising energy-storage systems, but is still at laboratory level due to low relatively low power and energy density. Here a newly graphite electrode doped with oxygen-rich phosphorus group, cobalt oxide, nickel oxide. The electrochemical performances toward VO^{2+}/VO_2^{+} in the catholyte side and Zn/Zn^{2+} in the anolyte side Can be improved by the doping of rich oxygen functional groups, Cobalt, and nickel oxide into graphite surface electrodes.

Figure

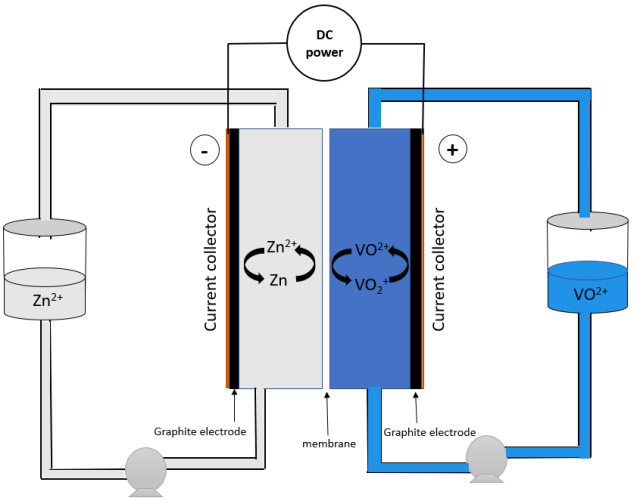

Figure 1: schematic illustration of Zn-V redox flow battery.

Recent Publications

1. M. Ulaganathan, S. Suresh, K. Mariyappan, P. Periasamy, et R. Pitchai, « New Zinc–Vanadium (Zn–V) Hybrid Redox Flow Battery: High-Voltage and Energy-Efficient Advanced Energy Storage System », ACS Sustain. Chem. Eng., vol. 7, no 6, p. 6053 6060, mars 2019, doi: 10.1021/acssuschemeng.8b06194.
2. K. Wedege, J. Azevedo, A. Khataee, A. Bentien, et A. Mendes, « Direct Solar Charging of an Organic-Inorganic, Stable, and Aqueous Alkaline Redox Flow Battery with a Hematite Photoanode », Angew. Chem. Int. Ed., vol. 55, no 25, p. 7142 7147, juin 2016, doi: 10.1002/anie.201602451.
3. J. Luo, B. Hu, C. Debruler, et T. L. Liu, « A π-Conjugation Extended Viologen as a Two-Electron Storage Anolyte for Total Organic Aqueous Redox Flow Batteries », Angew. Chem. Int. Ed., vol. 57, no 1, p. 231 235, janv. 2018, doi: 10.1002/anie.201710517.

Biography

Yassine SEFFAR is a PhD student at MSN department works on the topics of design and engineering of soft and smart materials as electrodes for energy storage systems. Have had his master degree in Analytical chemistry at Hassan II University Casablanca. His research area focuses on Flow energy storage and conversion system and Water desalination by electrochemical systems.

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Valorization of low-grade pyrolusite and the preparation of $LiMn_2O_4$ materials for lithium-ion batteries

Mohamed KERROUMI, Fatima El BACHRAOUI, Mariam BAAZIZI, Said MANSOURI, Bouchaib MANOUN, Youssef TAMRAOUI, Fouad GHAMOUSS

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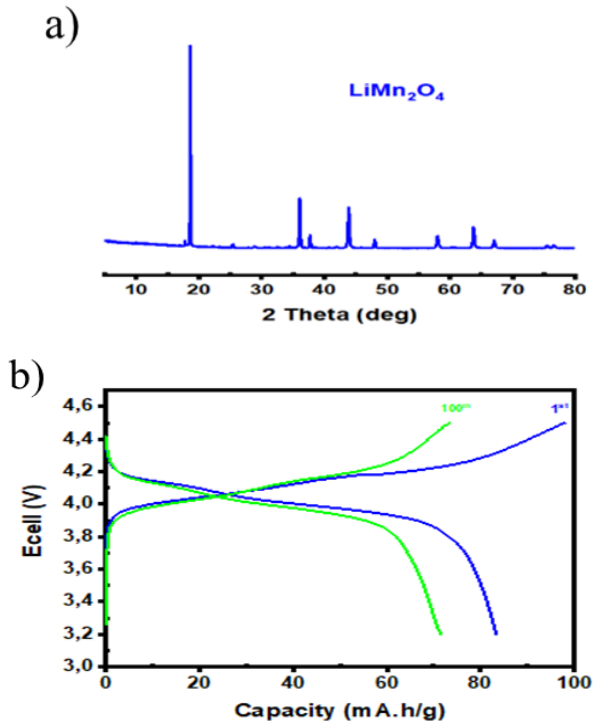
Abstract

As the global society transitions to low-carbon and renewable energy resources, the need for metals and minerals will increase. Enormous amounts of mineral materials (e.g., pyrolusite and dolomite) and based metals, as well as smaller amounts of precious metals, will be necessary for the construction of the battery storage facilities to meet the demands of the "electric planet" of the future [1].

Morocco, as a country with a long tradition of mining, has extensive activity in the fields of energy and mining. This mining activity is encouraged by the presence of numerous mineral ores [2]. Hence, the valorization of these natural resources requires a mineral process to extract valuable minerals to produce high purity synthetic materials and remove the tailing.

In this work, we succeeded in recovering high-purity manganese sulfate from natural pyrolusite ore, which is used later to prepare high-purity Mn3O4. Thereafter, LiMn2O4, an electrode material for lithium-ion batteries, is successfully prepared by solid-phase synthesis with Mn3O4 as a manganese source. The initial charge-specific capacity of LiMn2O4 is 83.53 mAh·g−1 at 0.1 C, with a capacity retention of 85.84% after 100 cycles. The process has the characteristics of being short, simple, easy to operate, economical, and reasonable, which is helpful to realize the efficient recovery and reuse of manganese resources in the pyrolusite.

Fig1. a) XRD pattern of $LiMn_2O_4$ cathode material, b) Charge–discharge curves of $LiMn_2O_4$ at room temperature at 0.1C.



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2. A. ALAOUI, « Traitement Hydrométallurgique des Résidus Miniers de Manganèse ». 05 2017..

Biography

KERROUMI Mohamed obtained a bachelor's degree in Fundamental Chemistry, option Materials Chemistry, in 2020 at the Faculty of Sciences Semlalia, Cadi Ayyad University, before joining the University Mohammed VI Polytechnic in a Master specialized in Materials Science and Engineering, option Materials for Energy, within the department MSN (Materials Science, Energy, and Nano-Engineering department). In 2022, he joined the Mohammed VI Polytechnic University in the MSN department as a PhD student on the topic of the valorization of local minerals in secondary batteries for stationary applications.

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PVP additive-assisted synthesis and Ti doping: a dual-modification strategy for improving the electrochemical performance of NMC cathode materials for rechargeable lithium-ion batteries

Khadija KOUCHI [1], Mohamed AQIL [1], Abdelwahed ChARI [1], Ayoub EL BENDALI [1], Jones Alami [1], and Mouad Dahbi [1]

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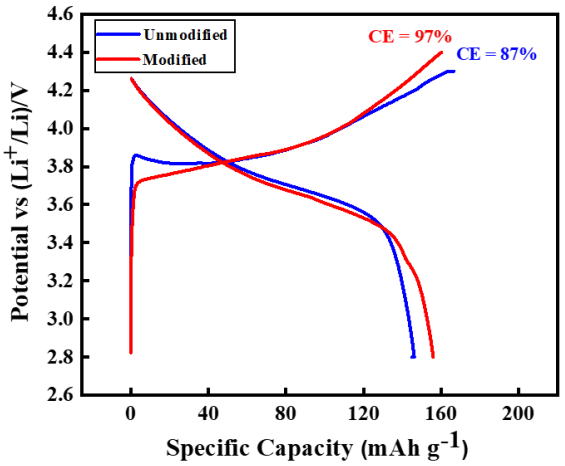
Abstract

High-capacity NMC layered oxide cathodes show great application prospects to meet the ever-increasing demand for further improvement of the energy density of rechargeable lithium-ion batteries (LIBs) [1]. However, severe bulk structural degradation and undesired electrode–electrolyte interface reactions seriously endanger the cycle life and safety of the battery [2].

This study investigates a dual-modification strategy, incorporating PVP additive-assisted synthesis and Ti doping, to enhance the electrochemical performance of NMC cathode materials in rechargeable lithium-ion batteries. PVP additive was employed during the synthesis to optimize morphological and structural properties [3], while Ti doping reinforced the NMC lattice's structural stability [4]. Electrochemical analysis revealed a synergistic effect, with the modified NMC cathodes displaying a higher initial discharge capacity with a coulombic efficiency of 97% compared to undoped and unassisted samples. This dual-modification approach shows promise for improving lithium-ion battery technology and addressing the increasing demand for efficient and reliable energy storage solutions.

Figure:



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3. M. Kim, J. Zhu, L. Li, C. Wang, and G. Chen, "Understanding Reactivities of Ni-Rich $Li[NixMnyCo_{1-x-y}]O_2$Single-Crystal Cathode Materials," ACS Appl Energy Mater, vol. 3, no. 12, pp. 12238–12245, Dec. 2020, doi: 10.1021/acsaem.0c02278.
4. Y. Cheng et al., "Stabilizing effects of atomic Ti doping on high-voltage high-nickel layered oxide cathode for lithium-ion rechargeable batteries," Nano Res, vol. 15, no. 5, pp. 4091–4099, May 2022, doi: 10.1007/s12274-021-4035-2.

Biography

Khadija KOUCHI is a dedicated second-year Ph.D. student, focusing on the development of NMC cathode materials for fast-charging lithium-ion batteries. With a passion for advancing energy storage technology, she has been actively involved in exploring innovative solutions to enhance the charging capabilities and performance of rechargeable lithium-ion batteries. As part of her commitment to knowledge-sharing and collaboration, Khadija has presented her research at two international conferences, ABAA13 and IRSEC21, making a significant impact in her field.

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LiNi0.8Fe0.1Al0.1O2 as Cobalt-free Cathode material with High-Capacity for Lithium-Ion Batteries

Elhoucine ELMAATAOUY[1], Abdelwahed CHARI[1], Ayoub EL BENDALI[1], Marwa TAYOURY1, Rachid AMINE[2], Mohamed AQIL[1], Gui-Liang XU[3], Tongchao LIU[3], Jones ALAMI[1], and Mouad DAHBI[1]*

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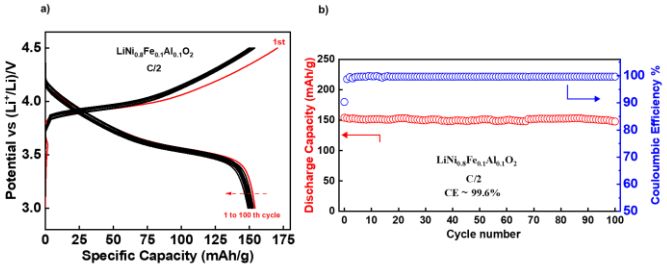
Abstract

The success of electric vehicle technologies depends on the electrochemical performances of cathode materials with high capacity and cycle stability[1]. However, most of the commonly used materials with these properties contain toxic and expensive cobalt. To address this issue, a new cobalt-free cathode material, LiNi0.8Fe0.1Al0.1O2 (NFA), has been synthesized for the first time with solid-state reaction. This class of materials offers high capacity and helps reduce battery costs by removing cobalt without compromising the structural stability and safety of NFAs. The NFA cathode material was characterized by various techniques, including Scanning electronic microscopy, X-ray diffraction, X-Ray Fluorescence, Infrared and Raman spectroscopies. The electrochemical activity and diffusivity of Li-ion during lithium removal and insertion in the bulk of NFA cathode demonstrated high-yield specific capacities of ≈180 mAh g-1 at 0.1C, and a reasonable rate capability and cycling stability with a capacity retention of ≈99.9% after 100 charge/discharge cycles at a rate of C/2, Figure 1. The operando X-ray diffraction experiments were used to study the crystallographic transactions during the lithiation-delithiation reaction.

Figure 1. Galvanostatic discharge/charge curves vs. Li/Li+ for (a) NFA cycled at a rate of C/2 in 1.0 mol dm-3 LiPF6 EC:DEC, cycle performance and Coulombic efficiency of (b) NFA electrode cycled between 3.0 and 4.5 V versus Li/Li+ at C/2 current rate.



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2. Youngjin K, Won Mo.S, Arumugam M, Energy Storage Materials, 34,(2021), pp. 250-259..

Biography

ELMAATAOUY Elhoucine received his MS degree in materials science and engineering from Mohammed VI Polytechnic University (Morocco) in 2021. Currently, he is a Ph.D. student in the group of Prof. DAHBI Mouad at Mohammed VI Polytechnic University (Morocco). His research interest focuses on developing new free cobalt cathode material for the next generation LIBs.

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Techno-econo-environmental study of the integration of renewable energy in a desalination plant: case study of Laayoune, Morocco

A. Azouzoute [1], A. Bouaichi [2], M. El Ydrissi [3], M. El Mesellek [4], M. Benhaddou [5],C. Hajjaj [6], F. Jeffali [7].

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[2] *EMSI: École Marocaine des Sciences de l'Ingénieur, Rabat, Morocco..*
[3] *Laboratory of Signals, Systems and Components (LSSC), Faculty of sciences and technologies of fez (FST), Morocco.*
[4] *Laboratory of Signals, Systems and Components (LSSC), Faculty of sciences and technologies of fez (FST), Morocco.*
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Abstract

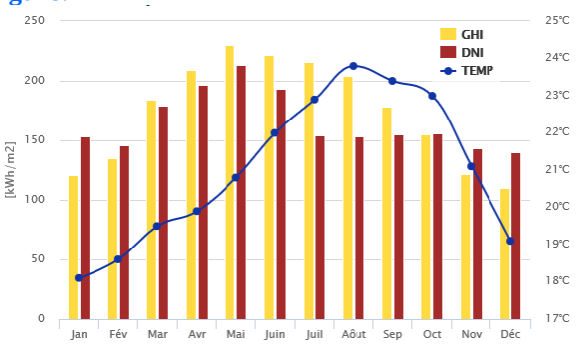
The aim of this work is the energy, economic and environmental evaluation of the integration of a hybrid system in a desalination plant at Laayoune in the south of Morocco. The region is known for its arid climate with a huge potential for the development and deployment of a sustainable source of energy for desalination units. The main conclusions that can be determined from the economic and environmental analysis of the system studied:

The economic feasibility study confirms that the coupling of Reverse Osmosis desalination units with conversion systems presents a promising solution to meet the energy and drinking water needs of rural populations living in isolated regions of southern Morocco.

The comparison study between the hybrid system and the conventional system (generator only + grid) revealed that even if the diesel generator alone has the lowest investment cost, it results in the highest net present value (NPV) of the whole project. In addition, the diesel generator is harmful to the environment and operates at lower efficiency (22.1%).

Hybrid systems using wind generators offer better economic feasibility, lower emissions, and the generator set operates at a higher efficiency (29%) which ensures a longer operating time.

Figure:



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1. A. Azouzoute, H. Zitouni, M. El Ydrissi, C. Hajjaj, M. Garoum, E.G. Bennouna, Developing a cleaning strategy for hybrid solar plants PV/CSP: case study for semi-arid climate, Energy (2021). https://doi.org/10.1016/j.energy.2021.120565.
2. A. Azouzoute, C. Hajjaj, H. Zitouni, M. El Ydrissi, O. Mertah, M. Garoum, A. Ghennioui, Modeling and experimental investigation of dust effect on glass cover PV module with fixed and tracking system under semi-arid climate. Solar Energy Materials and Solar Cells (2021). https://doi.org/10.1016/j.solmat.2021.111219.
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Biography

Doctor in Energy and Engineering Sciences, Mohammadia School of Engineers, Mohammed V University. Currently is the head of the Research and Innovation Platform, Cluster Valbiom in Oujda. He is a CEO and co-founder of IOM Solutions startup, Intelligent Operation and Maintenance Solutions.
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Remote sensing of urban thermal environment's quality assessment.

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Abstract

In the last few decades, urban areas around the world have known a significant urban expansion in metropolitan cities. This urban expansion has important effects on urban thermal comfort, which ties in with various aspects such as health risks, living environment, and the population's well-being. In this context, the conventional temperature-humidity indexes (THIs) that rely on on-site data have been commonly utilized to evaluate the urban thermal environment's quality. However, these indexes do not provide spatial information on thermal comfort. Therefore, this study used the modified temperature-humidity index (MTHI), which is based on the Land Surface Temperature and Normalized Difference Moisture Index obtained via remote sensing instead of the on-site air temperature and relative humidity. The MTHI was used to investigate the spatial characteristics of the urban thermal environment's quality (UTQ) in Casablanca city and the surrounding area. Furthermore, the obtained result was spatially mapped under five classes (Uncomfortable, Less comfortable, Moderate, Comfortable, and More comfortable). The results showed significant variations in the spatial patterns of urban thermal comfort across the study area. Yet, thermal comfort is discomforatble in more than 50% of Casablanca city, which is the most crowded area in the city (nearly two-thirds of the population). These areas are characterized by an important concentration of buildings, elevated structures, roads, and parking lots. It indicates that urban design is the main factor affecting urban thermal comfort.

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2. A. Malah, H. Bahi, H. Radoine, M. Maanan, and H. Mastouri, "Assessment of Urban Environmental Quality : A Case Study of Casablanca, Morocco," vol. XLVI, no. October 2021, pp. 5–6, 2022.

Biography

Anass Malah is a Ph.D. Student at the School of Architecture, Planning & Design. He is broadly interested in territorial performance and remote sensing. His dissertation focuses on the use of new technological tools to evaluate the performance and sustainability of the territorial system to provide new direction and recommendations for improving land use planning and development and enhancing sustainability, resilience, and well-being in the most vulnerable areas. Before starting his Ph.D. at SAP+D, Anass completed a Master's Degree from Hassan II University - Faculty of Science Ain Chock Casablanca in Geographic Information System and Territory Management.
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6th Edition of the International Conference on Materials & Environmental Science ICMES-2023 & Exhibition for Science
"Health, Sustainability, & Resiliency Through Research & Innovation"
June 7-11, 2023, Hôtel Oasis Atlantico Saidia Palace & Blue Pearl, Saïdia, Morocco

Effect of tilt angles on the PCM melting behaviour in a rectangular cavity: A numerical study

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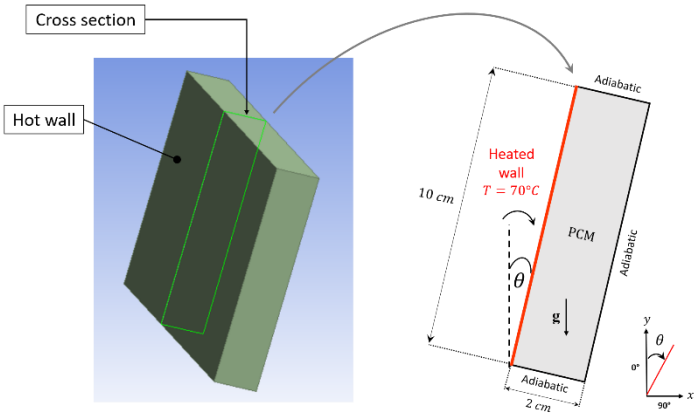
Abstract

Phase change materials (PCMs) have great potential to enhance the energy efficiency of thermal systems. The melting of PCM inside a rectangular cavity has attracted significant interest due to its many technical applications, especially in solar Photovoltaic and building applications. In this context, the aim of this research is to assess the effects of different tilt angles on the melting characteristic of the PCM as a passive cooling material inside a rectangular container. The numerical tests are performed at four different angles, namely, 0°, 30°, 60°, and 90°, by applying the heat on one of the rectangular container's walls at a constant temperature of 343 K. The melting process of Paraffin wax RT-26 as PCM was numerically investigated using ANSYS Fluent software. For different inclination angles, the PCM liquid fraction contours, maximum velocity, the total stored energy as well as the surface Nusselt number were calculated and compared as time progressed. The simulation results indicated that natural convection dominates the heat transfer during the melting process. Moreover, as the inclination angle increased from the vertical to the horizontal position (0° to 90°), the effect of the convection heat transfer decreased, as well as the total melting time and total energy absorbed by the PCM. The shortest melting time to complete the PCM charging cycle occurred when the container was tilted close to the vertical angle (0°) with melting time of 2925 s. Additionally, the thermal behaviour of the PCM at a tilt angle of 90° was nearly pure conductive heat transfer.

Figure. Schematic of the physical model.



Recent Publications

1. M. Salihi, M. El Fiti, Y. Harmen, Y. Chhiti, A. Chebak, … , C. Jama., "Evaluation of Global Energy Performance of Building Walls Integrating PCM: Numerical Study in Semi-Arid Climate in Morocco," Case Stud. Constr. Mater., vol. 16, no. February, p. e00979, 2022, doi: 10.1016/j.cscm.2022.e00979.
2. Y. Harmen, Y. Chhiti, M. El fiti, M. Salihi, and C. Jama, "Eccentricity analysis of annular multi-tube storage unit with phase change material," J. Energy Storage, vol. 64, no. January, p. 107211, 2023, doi: 10.1016/j.est.2023.107211.

Biography

Mustapha Salihi is a PhD student at the Green Technology Institute (GTI) at Mohammed VI Polytechnic University, Morocco. In 2019, he earned a master's degree in Renewable Energy Engineering and Energy Efficiency from Sultan Moulay Slimane University in Beni Mellal, Morocco. His main research interests are energy efficiency in buildings, solar thermal, thermal energy storage, and Computational Fluid Dynamics (CFD).

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ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, ENGINEERING AND SIMULATIONS

Comparison between experimental testing and numerical simulation of polyester matrix composites reinforced with silica glass fibers

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Abstract

Composite materials are very attractive due to their physical and chemical characteristics which make them ideal for high-tech applications and could even be strategic for certain industries. To respond effectively to the growing demand for composites worldwide, simulation is becoming an essential tool for developing new products and helps companies keep competitive and support industrial innovation, particularly in transport and energy sectors.

This study focuses on glass fiber reinforced polymers (GFRPs) which are materials highly used in transport and energy. Our objective is to perform a numerical simulation of composite materials based on polyester resin using Abaqus software. GFRPs specimens were prepared by mixing the polyester resin with short glass fibers. Mechanical tests were performed in tension and bending to determine mechanical properties, according to the fiber-glass rate in the material.

The experimental results revealed that the strength and the Young's modulus of the elaborated composites are significantly improved when the rate of reinforcement of the polyester increases. These results were then analysed using the Abaqus software that made it possible to establish a numerical model. The experimental data and simulated values are strongly correlated, so the numerical model has been validated and then adopted for the prediction of mechanical behavior of composite depending on the material composition. Consequently, suitable formulations of the composite could be predicted and identified to meet the various requirements of use of the GFRPs.

Biography

Houda Foulah is a highly skilled engineer with extensive experience in mechanical energy and mechatronic manufacturing across various industries. She holds a Bachelor's degree in Physics from the Faculty of Science Ben Msik at the Hassan II University in Casablanca, as well as a Diploma of Professional Qualification in Mechatronic Manufacturing from ISTA-IE, with honors. She completed her Master's degree in specialized engineering and management of technological innovation from the same university in 2019.Houda has held multiple positions, including Project Manager at the Office National des Aeroports, where she successfully implemented the RFID solution at the Mohamed V airport. She also worked as a Continuous Improvement Engineer at the Technical Center of Plastics and Rubber, followed by UAP Manager and Quality Manager at Intertronic Maroc. Houda served as a project manager for INJAZ el Maghreb, where she designed and managed the production of a plant-based hair product.Houda is currently pursuing her Ph.D. at the LIMAT laboratory in Casablanca, Morocco. She has diverse expertise in engineering, innovation management, quality control, and project management.

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Spatio-temporal analysis of land use land cover changes (LULCC) for detecting urban sprawl using support vector machine (SVM): A Case Study of Casablanca

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School of Architecture, Planning and Design, Mohammed VI Polytechnic University, Benguerir, Morocco.

Abstract

Rapid Urbanization is a significant global trend that present challenges for sustainable development, over the past few decades Casablanca saw a substantial increase in urban population and in urbanization rate where that increase was at the expense of agriculture lands which may not only threatens biodiversity but also poses risks to human health and well-being. Mapping land use land cover changes (LULC) provides essential insights of how urbanization rate has changes over time, consequently, to understand and study spatiotemporal dynamics of these changes in Casablanca, we used remotely sensed Landsat imagery (Landsat TM, Landsat ETM+, Landsat OLI/TIRS) between the 1986 and 2020 period by collecting surface reflectance scene that were already pre-processed by google earth engine platform. Then support vector machine (SVM) model was applied to perform pixel-based classification to classify four land cover classes, namely, Urban, Vegetation, Barren, Water with tuning different hyperparameters including Kernel, Cost, and gamma to optimize model performance in terms of accuracy. Following the retrieval of spatial LUCC maps, different metrics were used to measure the overall accuracy and class accuracy like Overall accuracy, Kappa Accuracy, Precision, Recall, F1-Score.

Results Shows During the study period between 1986 and 2020, Casablanca witnessed an increase from 132.8 Km2 to 174.2 Km2, resulting in an increase of 41.9km2 (19.53%) of urban areas, In the other hand, loss of vegetation lands has been decreased from 77.5 Km2 in 1986 to 32.03 Km2, with a reduction equivalent to 20.88% loss, this loss of vegetation is primarily due to urbanization (R2 = -0.985). The results of this study cloud be promising since with the help of it we can have a global overview about areas that are sustainable, and which are not for ensuring efficient land use planning processes and regulations that take into account the social, economic, and environmental factors.

Table 1: Land cover areas and percentage changes during 1986 and 2020

Land Cover	Area 1986 (Km^2)	Area 2020 (Km^2)	Area Change (Km^2)	Percentage Change (%)
Urban	132.28	174.2	41.9	19.53
Vegetation	77.5	32.03	-45.47	-20.88
Barren	3.11	7.62	4.51	2.1
Water	1.74	0.78	-0.96	-0.43

Recent Publications

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3. Zhao, Y.; An, R.; Xiong, N.;Ou, D.; Jiang, C. Spatio-Temporal. Land 2021, 10, 1149.
4. Gu, C.; Zhang, Y.; Liu, L.; Li, L.; Li, S.; Zhang, B.; Cui, B.; Rai, M.K. Land 2021, 10, 173.
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6. Hao, J.; Lin, Q.; Wu, T.; Chen, J.; Li, W.; Wu, X.; Hu, G.; La, Y. Remote Sens. 2023, 15, 1813.

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Biography

The author is a pre-doctoral PhD student in the School of Architecture, Planning, and Design, Mohammed VI Polytechnic University in Benguerir, Morocco, specialized in remote sensing and GIS. His thesis focuses on examining changes in land use and land cover in the context of rapid urbanization and territorial regeneration. Using remote sensing and GIS tools, the author intends to evaluate and monitor urban and peri-urban agriculture from multiple perspectives. tackling the issues presented by growing urbanization and changes in land use.

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Prediction of the mechanical behaviour of HDPE pipes: Using the Finite Element Method (FEM) and Artificial Neural Network technique (ANN)

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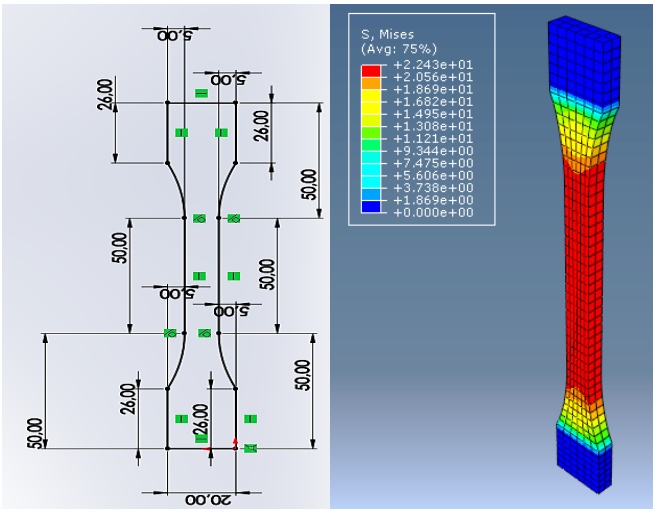
[2]*Technical Center of Plastics and Rubber (CTPC), Casablanca, Morocco.*

Abstract

Current statistics show that in recent years, more than 90% of the water and gas distribution pipes installed in the world are made of plastic, exclusively polyethylene (PE), due to its advantages such as ease of installation, flexibility, and cost-effectiveness. Due to the extensive use of these materials, it is necessary to have a good understanding of the mechanical properties of HDPE used for water distribution system piping. In this paper, experimental tensile tests were conducted to obtain the mechanical properties of HDPE pipes. Therefore, the first part of this work focuses on the mechanical tests, specifically tensile tests, while the second part centers on the numerical procedure for modeling the mechanical characteristics. The finite element method was used to evaluate the deterioration of the mechanical performance of the pipes and to simulate the real operating conditions in order to validate the experimental tests performed previously. For this purpose, the finite element analysis (FEA) version of ABAQUS was used. Our primary objective is to use the experimental data on the specimens to validate the numerical model on ABAQUS. For this purpose, several ANN models were created to predict the mechanical behaviour of pipes based on experimentally obtained data.

Figure: HDPE pipes specimens

Figure: Design of the pipes specimens by SOLIDWORKS in the first picture and visualisation-Abaqus in the second picture.



Biography

Srii Ihssan is a passionate scientific researcher, currently in her second year of a PhD in engineering sciences at the Higher Normal School of Technical Education Mohammedia, Hassan II University of Casablanca, Morocco. She obtained a bachelor's degree in mechanics-energetics at the ben m'sik faculty of science in 2019. She then went on to obtain a technical master's degree in engineering and physics of advanced materials at the Mohammedia faculty of sciences and techniques in 2021. Her current research focus on the ageing studies and modelling of plastic materials, development of mathematical models for the prediction of different material behaviour. Srii Ihssan is interested in materials, artificial intelligence, piping systems, predictive techniques, and material properties. Her passion for research and commitment to innovation are the driving forces behind her academic and professional career.
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Inverse design of topological properties of photonic systems using deep learning

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Abstract

Photonic topological states play an important role in recent optical physics and has led to devices with robust properties[1]. The topological properties in photonic systems relate to several optical phenomena. In one-dimensional systems, for instance, this topological property is called Zak phase that can be used to predict the existence of topological interface states[2] which are states characterized by their robustness to perturbation and disorder in the system.

The works about topological photonics reported to date are mostly based on a forward-design approach where first we precisely define the geometric parameters and subsequently obtain the wave response such as wave dispersion/frequency response[3]. In this process, a set of geometric entities are supplied and wave response is calculated based on trial and error method. But what is even more interesting is the inverse design problem, meaning the direct retrieval of the proper structure for the desired optical performance, which traditionally seems infeasible as it requires exploration of a much larger degree of freedom in the design space, and hence is more challenging. However recently, deep learning (DL), a subset of machine learning that learns multilevel abstraction of data using hierarchically structured layers, offers an efficient means to design photonic structures and also it was proved to be very efficient in solving the inverse design problem[4].

In this communication we seek to develop DL data-driven models to inversely design a topological photonic system with targeted topological property where we focus on Zak phases, which are the topological properties of one-dimensional photonics crystals. After learning the mapping between the geometrical parameters and the Zak phases, the neural network can be used to obtain the appropriate photonic structures by applying the objective Zak phase properties. Our work would give more insights into the application of deep learning on the inverse design of the complex photonic systems.

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Biography

Mohamed El Ghafiani is a PhD student in phononic and photonic systems at Mohamed First University Oujda, Morocco. Having received His Master's degree in physics of matter and radiation from the same institution. Currently, his research focuses on 1D systems. Mohamed El Ghafiani is supervised by Prof. El Houssaine El Boudouti and Prof. Adnane Noual, is a member of Physics of Matter and Radiation Laboratory (LPMR), and enjoys reading in his free time.

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Observation of FW-BIC in a stub with two lateral branches

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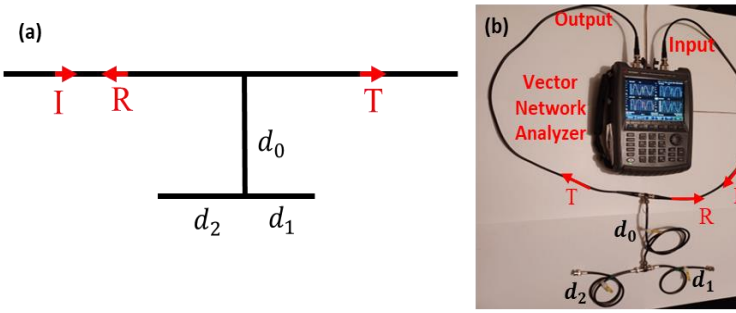
Abstract

Bound states in the continuum (BIC)[1] are special kinds of resonant states with an infinite lifetime that remain confined in some part of the system even though their frequencies lie in the radiative system. Of special interest is Friedrich-Wintgen (FW) BIC[2,3], which is associated with the interaction of two modes belonging to the same cavity. Here, we give analytical and experimental evidence of FW-BIC in a stub of length d_0 with two lateral branches of lengths d_1 and d_2 in the shape of a T. The boundary conditions at the ends of the lateral guides can be either E = 0 (vanishing electric field) or H = 0 (vanishing magnetic field) on both sides or E = 0 on one side and H = 0 on the other side.

First, we show theoretically that BIC is induced by the two lateral branches when d_1 and d_2 are taken commensurate. This BIC is unaffected by d_0 and the infinite waveguide to which the entire cavity will be attached. Furthermore, we show that, depending on d_0, the FW-BIC appears as a result of the interaction of two resonant modes associated with the T-cavity where the width of one resonance vanishes, giving rise to the FW-BIC, whereas the width of the second resonance broadens. Moreover, we demonstrate that a slight deviation from the BIC position converts the latter into electromagnetically induced transparency (EIT) resonance. FW-BICs have been investigated recently in a phononic T-shaped cavity[4]. Also, in plasmonics, a T-shaped cavity has been produced to study PIT (the plasmonic analog of EIT) resonances and for sensing applications in MIM waveguides[5]. The T-shaped cavity studied here is presented in Fig. 1(a). The theoretical results obtained by means of the Green's function method, are confirmed experimentally in the radio-frequency domain using coaxial cables (Fig. 1(b)).

Figure: (a) Photonic T-shaped cavity made of two lateral guides of lengths d_1 and d_2 coupled to a stub of length d_0. The cavity is connected to two semi-infinite waveguides. (b) Experimental set-up based on coaxial cables and a vector network analyzer.



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Biography

Rezzouk Yamina is a PhD student at the Laboratory of Physics of Matter and Radiation of the Mohamed Premier University of Oujda (Morocco). Her research focuses on photonic and plasmonic structures.

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Study of the oscillatory motion of a coupled pendulum and the flapping phenomenon using the MicroLab ExAO interface with an electronic sensor

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Abstract

The objective of this experimental work is to study the oscillatory motion of a coupled pendulum using an electronic distance sensor with the MicroLab ExAO interface. The coupled pendulum consists of a coupling of two simple pendulums connected by a well-defined torsion wire. The distance sensor used is able to easily capture the distance of objects at intervals ranging from 10 cm to 80 cm with high accuracy. The connection of this sensor with the MicroLab ExAO board generates an alternating signal that allows us to easily visualize the oscillatory motion curve in the ExAO interface. The results of this manipulation are used to calculate several physical quantities, including the period, amplitude and phase of the oscillatory motion. The phenomenon of flapping is also studied in this work.

The phase shifts of two oscillations with slightly different amplitudes are superimposed, resulting in a periodic variation of the amplitude. Indeed, the experimental study of the motion of this type of pendulum using the Micro LabExAO interface allows obtaining practical and accurate results, compatible with the usual classical results, in a fast and less expensive time. Finally, this experimental study is very useful for various applications such as physics education and mechanical systems.

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4. Cuevas, J., English, L. Q., Kevrekidis, P. G., Anderson, M., Physical review letters. 102 ((2009) 224101.

Biography

Author has her expertise in evaluation and passion in improving the bone and cement used in dental medicine. Her focus is based on the use of natural phosphate to have application in health field. She was warded her PhD in 2013 from the University of ...., Country. She published more than 20 papers. Her H-index is X on Scopus.

Electron transport analysis through a GaAs and AlGaAs based cylindrical nanowire cell using the transfer matrix method.

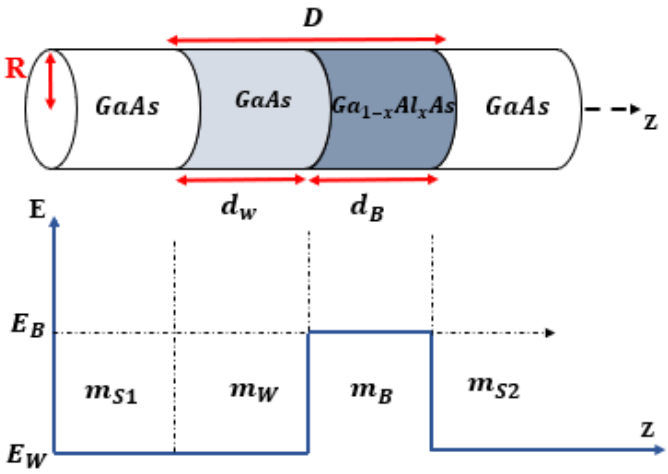
S. Machichi[1], M.R. Qasem[1], T. Touiss[1], F. Z. Elamri[1], F. Falyouni[1], D. Bria[1]

[1]*Laboratory of Materials, Waves, Energy and Environment, Team of Acoustics, Photonics and Materials, Faculty of Sciences, Mohamed First University, Oujda, Morocco.*

Abstract

In this study, the transfer matrix method (TMM) was used to examine the electronic transport through a nanowire cell. This cell is formed of two layers, one of which is a cylindrical GaAs semiconductor quantum wire (CQWR) and the other is an AlGaAs semiconductor CQWR placed between two identical semi-infinite media (substrates). The results showed that increasing the radius of the quantum wire leads to a decrease in the energy levels towards lower energies in the transmission spectrum and the band structure. These energy levels depend on various parameters of the system, such the mole fraction of aluminum and the length of the quantum wire. They appear from a critical value of the radius (Rc) below which the electron waves cannot propagate. This theoretical and analytical study gives significant results on the electronic properties of cylindrical nanowires and can be useful to improve their design for future applications.

Figure



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2. Qasem, M. R., Ben-Ali, Y., Falyouni, F., Bria, D., In Solid State Phenomena. 335 (2022) 23-30.
3. Mayer, A., Physical and Chemical News, 16 2004) 46-53.

Biography

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Acoustic Splitter Waves Based on Ramified System Made Of Waveguides and Resonators

Ilham El-Atmani [1], Ilyass El Kadmiri [1], Aissam Khaled [1], Driss Bria [1], Mounsif Ech Cherif EL Kettani [2], Pierre Marechal [2]

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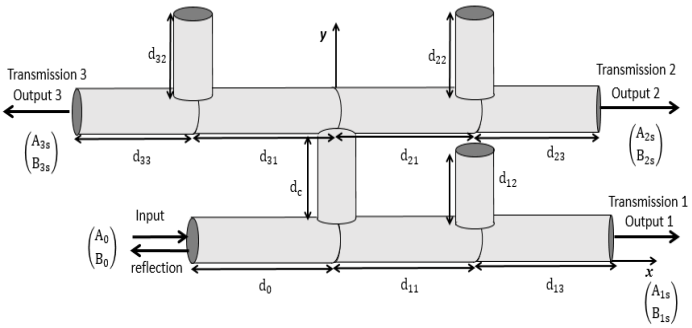
Abstract

This work focuses on studying the propagation of acoustic waves in ramified system. Our proposed system contains an input waveguide and three output lines (three channels). each output line i (i=1-3) contains an acoustic waveguide of length d_{i1} grafted in its extremity by one resonator of length d_{i2}. The theoretical analysis is based on Transfer Matrix Method (TMM), which allows to calculate the three transmission and the reflection rates.

We demonstrate that our proposed three-channel system can be used to design a multifunctional device that functions as an amplitude splitter: an incident sound wave is splited to three output channels. The output frequency signal depends on the dimensions of the waveguide and the resonator. This system is capable of achieving various waveguiding characteristics with perfect channels transmissions.

Figure



Recent Publications

1. Khattab, M. S., El Kadmiri, I., Ben-Ali, Y., Khaled, A., Jeffali, F., & Bria, D. (2023). Propagation of the acoustic waves in a one-dimensional parallel guides and symmetric/asymmetric resonators. Materials Today: Proceedings, 72, 3319-3325.
2. Khattab, M. S., Ben-Ali, Y., Barkani, J., Yousfi, J., & Bria, D. (2023). Induced guided acoustic waves in waveguides and resonators. Materials Today: Proceedings, 72, 3398-3403.Ben-Ali
3. Ben-Ali, Y., Barkani, J., Khaled, A., Jeffali, F., & Bria, D. (2023). Y-shaped phononic demultiplexer based on Fano and acoustically induced transparency resonances in one dimensional asymmetric/symmetric loops structure. Materials Today: Proceedings, 72, 3360-3368.
4. El-atmani, I., Khaled, A., Bria, D., El Kettani, M. E. C., & Maréchal, P. (2023). Acoustic Splitter Waves Based on Ramified System Made of Waveguides. In E3S Web of Conferences (Vol. 364, p. 04002). EDP Sciences.

Biography

1ère année doctorat à la faculté des sciences, Université Mohammed premier Oujda.
Participation à la conférence ICMES 2022
Une publication dans un journal bien indexé sur SCOPUS
Domaine d'étude : Etude théorique et expérimentale des démultiplexeurs acoustiques

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Hall effect sensors Based Experiment to Study the viscosity of a fluid in Real-time

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Laboratory of Mechanics & Energetics, Department of Physics, Faculty of Sciences, Mohammed First University, Oujda 60000, Morocco.
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Computer Science Research Laboratory, Department of Mathematics and Computer Science, Faculty of Sciences, Mohammed First University, Oujda 60000, Morocco.
Faculty of Sciences, Mohammed V University, Rabat.

Abstract

Viscosity is an important physical property that characterizes the friction within a fluid produced by the molecular attraction that opposes its movement. Various methods have been proposed to measure viscosity, including capillary methods, rotating coils or crucibles, oscillating plates, dropping a ball into the liquid, levitation by damping surface oscillations, etc. The falling ball method is a simple way to measure viscosity. However, conventional measurements can be subject to errors during the experiment and therefore lead to a low accuracy of the viscosity value.

To this end, this paper investigates the viscosity of different fluids, at a constant temperature, using the principle of dropping a ball whose speed is related to the viscosity of the fluids. The detection of the ball's movement is performed by Hall effect sensors located at different positions in order to improve the accuracy of the viscosity value, and the Arduino interface is used as a data acquisition tool. The results show that the automatic detection method gives better results than the conventional method.

Recent Publications

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2. El Hadi, M., El Moussaouy, A., Ouariach, et al., Physics Education, 55(2020) 055027.

Biography

Mohamed El Malki has a Doctoral Degree in Acoustics and Materials Physics at Mohammed First University, Faculty of Sciences Oujda, Morocco. He was part of a research project funded by the Erasmus Plus mobility program (JAMIES2020) at Minho University – Portugal. Currently, he continue his research in the laboratory of Materials, Waves, Energy, and Environment at Faculty of Science Oujda. His main research interest focused on the acoustic noise reduction using periodic structures.

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Innovative Teaching Method for Thermodynamics: Real-Time Verification with Pressure and Temperature Sensors

A. **Baidri**[1], F. Z. Elamri[1], M. Hbibi[1], A. Ouariach[1], F. Falyouni[1], J. Youssfi[2], M. Himmi[3], A. Anakkar[4] and D. Bria[1]

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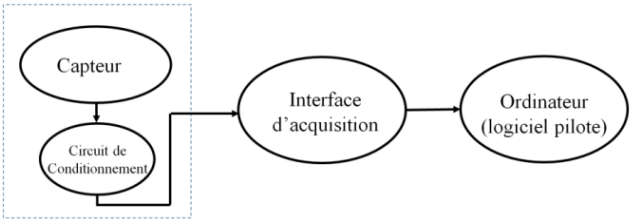
[3]*Faculty of Sciences, Mohammed V University, Rabat.*
[4]*Superior Faculty of Sciences and Technology, University of Lille, France.*

Abstract

Traditionally, the verification of the laws of thermodynamics has been done using classical methods involving the use of measuring instruments such as thermometers, pressure gauges, barometers, etc. However, the process of analyzing experimental data can be quite slow due to the manual acquisition of data, particularly through graphs on millimeter paper or tables. In our work, we aimed to improve these methods of verifying thermodynamic laws by automating the experiments and developing cost-effective teaching materials. We used computer-assisted experimentation (CAE), which offers several advantages in terms of real-time graphical representation of observed phenomena. To do this, we created pressure and temperature sensors, the assembly of which was validated by experimental protocols, to verify some laws of thermodynamics using computer-assisted experimentation. We used a Microlab interface to collect real-time data, which were then analyzed using specialized software to obtain accurate results. This approach can thus contribute to improving the efficiency and quality of teaching thermodynamic laws, while reducing the costs associated with measuring instruments. This opens the way to more modern and efficient methods of verifying thermodynamic laws in teaching and research contexts.

Figure 1. Les éléments d'une chaine ExAO



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1. Achouch, S., Bousseta, R., Regragui, F., and Gharbi, M. (2022). Conception and realization of a novel design for a capacitive pressure sensor with high sensitivity and linear response. Results in Engineering, 15, 100535.
2. Achouch, S., Masmoudi, L., Nonnon, P., and Gharbi, M. (2021, January). 3D printed capacitive relative pressure sensor for use in a CAE environment. In 2021 IEEE 11th Annual Computing and Communication Workshop and Conference (CCWC) (pp. 1366-1369). IEEE.

Biography

My name is Abdelkader Baidri, I am a Ph.D. student at the Laboratory of Materials, Waves, Energy and Environment, Department of Physics, Faculty of Sciences, Mohammed First University, Oujda, Morocco. My research field is materials physics, and my thesis is about multi-quantum well sensors based on semi-conductors. I published two articles indexed in Scopus.

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Analysis of the movement of a spring with a piezoelectric sensor connected to a Microlab interface

Y. Errouas[1], I. Antraoui[1], A. Bria[2], D. Bahia[3], S. Amraqui[2], M. Gharbi[4], S. Rihab[4] and D. Bria[1]

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Abstract

In this work, we experimentally studied the motion of a spring mass using a piezoelectric sensor connected to a MicroLab ExAO interface. This interface allows to acquire data in order to convert them into an electrical signal. This experimental method makes it possible to measure the frequency and amplitude of the movement of the spring linked to a mass in response to an external force. To do this, the piezoelectric sensor is attached to the spring and connected to the MicroLab interface, which is then configured to record the measurement data. The data can then be analyzed to determine the characteristics of the spring's motion, such as its period, amplitude, and resonant frequency.

This experimental study yields very satisfactory results that are mainly used in the fields of scientific research and physics education due to their accurate analysis of the motion of a spring.

Recent Publications

1. Kassarian, E., Sanfedino, F., Alazard, D., Evain, H., Montel, J., Aerospace Science and Technology. 112 (2021) 106607.
2. Wojewoda, J., Czolczynski, K., Maistrenko, Y., Kapitaniak, T., J. Scientific reports. 6 (2016) 34329.
3. Dudkowski, D., Grabski, J., Wojewoda, J., Perlikowski, P., Maistrenko, Y., Kapitaniak, T., Scientific Reports. 6 (2016) 29833.
4. Cuevas, J., English, L. Q., Kevrekidis, P. G., Anderson, M., Physical review letters. 102 ((2009) 224101.

Biography

YOUNES ERROUAS, Doctoral researcher in Optics and Materials at the Faculty of Science Oujda. My research focused on the study of the electromagnetic properties of periodic and aperiodic tapered type composite structures and their possible applications in detection processes based on electromagnetic (optical) filtering.

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Surface Plasmon Resonance in Bilayer Structures: Modeling and Applications

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[1]*Euromed Research center, Euromed University of Fez, Campus UEMF, 30070 Fez, Morocco*

Abstract

In this paper, we present a theoretical study of surface plasmon resonance (SPR) in bilayer structures consisting of a metal layer and a dielectric layer. We use numerical simulations based on the finite-difference time-domain (FDTD) method to investigate the dependence of SPR properties on the thickness and refractive index of the dielectric layer, as well as the wavelength and angle of incidence of the incident light.

Our results show that bilayer structures can exhibit a strong SPR response, with the resonance angle of incidence depending strongly on the thickness and refractive index of the dielectric layer. We also demonstrate that the SPR properties of bilayer structures can be tuned by varying the thickness of the metal layer, enabling the design of customized SPR sensors with enhanced sensitivity and resolution.

We further investigate the potential applications of bilayer SPR sensors in biosensing and surface-enhanced Raman spectroscopy (SERS). We show that the high sensitivity and selectivity of bilayer SPR sensors make them promising candidates for label-free detection of biomolecules and trace analysis of chemical compounds.

Our study provides valuable insights into the design and optimization of bilayer SPR structures for sensing applications.

Recent Publications

1. KUMAR, Amrit, V, Manjuladevi, et GUPTA, R. K. The Effect of Relative In-Plane Twisting in Graphene Bilayer on Sensing Using Surface Plasmon Resonance. Plasmonics, 2023, vol. 18, no 1, p. 213-224.
1. BASAK, Chaity, HOSAIN, Md Kamal, ISLAM, Md Saiful, et al. Design and modeling of an angular interrogation-based surface plasmon resonance biosensor for dengue virus detection. Optical and Quantum Electronics, 2023, vol. 55, no 5, p. 438.
2. PAN, QingHui, ZHOU, SiHong, GUO, YanMing, et al. Enhanced photoelectric responsivity of bilayer graphene/GaAs photodetector using plasmon resonance grating structures. Optik, 2022, vol. 259, p. 169031.
3. GHODRATI, Maryam, MIR, Ali, et FARMANI, Ali. Improving the Angular Sensitivity of a Surface Plasmon Resonance Biosensor Based on bilayer of Ag and MXene: a Simulation-Based Approach.
4. YUN, Chidi, SHUN, Miki, JACKSON, Keypi, et al. The use of bilayers consisting of graphene and noble metals has been explored for biosensors that employ inverted surface plasmon resonance. International Journal of Science and Information System, 2022, vol. 12, no 8-2022.

Biography

Nidal El BIYARI, 27-year-old Moroccan researcher and Mechatronics engineer currently pursuing my Ph.D. at Euromed University in Fez. My doctoral thesis focuses on developing an optofluidic biosensor for detecting and monitoring breast cancer. I'm holding a degree in Mechatronics engineering from FST Fez, which I earned in 2019. I have demonstrated a keen interest in the intersection of engineering and medicine and I am committed to contributing to the development of innovative medical technologies that can improve healthcare outcomes. my research experience and academic achievements reflect my dedication to advancing the field of biomedical engineering and my passion for making a positive impact on society.
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Terahertz applications and integrated circuits for communication systems

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[2] *LSEED Laboratory, UPF, Fez, Morocco.*

Abstract

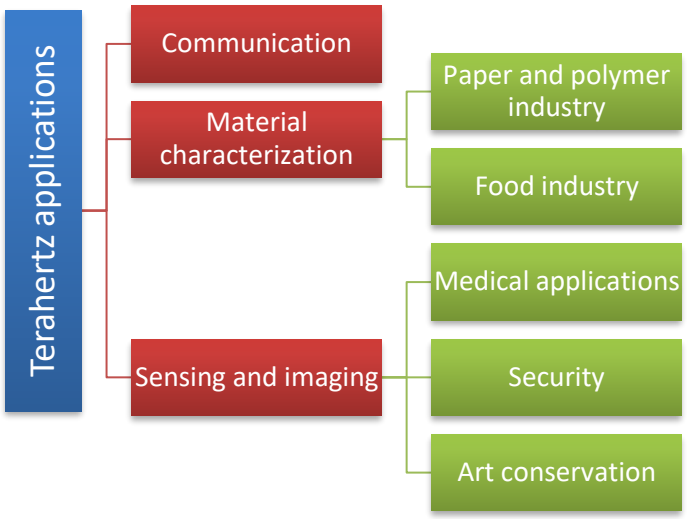
The increasing demand of unoccupied and unregulated bandwidth for wireless communication systems will inevitably lead to the extension of operation frequencies toward the Terahertz (THz) frequency range. This band, which is located between the microwave and the infrared bands, has shown countless assets that have allowed researchers to make huge advances in different sectors. With pandemic covid19, terahertz applications have experienced unprecedented growth in various fields [1].

In this article we give an overview of terahertz applications and circuits in some areas such as communication, imaging and material characterization.

In the field of terahertz communication systems, we will present the topology and simulation results of an active bandpass filter and a low noise amplifier intended for terahertz applications around 145 GHZ [2]. This filter has the particularity of being tunable over a 300 MHz band.

Keywords: Terahertz Communications, Imaging, Medical Applications, bandpass filter, LNA, frequency tuning.

Figure



Recent Publications

1. Mordorintelligence, https://www.mordorintelligence.com/industry-reports/terahertz-technologies-market, last accessed 2021/12/07.
2. I. Halkhams, W. El Hamdani, S. Mazer, M. El Bekkali and M. Fattah: Terahertz band frequency tuning for a CMOS active filter. Terahertz Wireless communication components and system technologies. *Springer Nature Singapore*. (2022).

Biography

Wafae EL HAMDANI is Professor of electronics in the Department of Applied Engineering at Higher School of Technology of Oujda.
She is a qualified Professor of Electrical Engineering with the Mohammed 1st University at Oujda. She received the Ph.D. degree from the fez University (USMBA) in 2015,
Her research covers the design of RF and analog integrated circuits for communication systems.

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Moroccan Sub-Saharan areas hourly air temperature prediction model using Deep Learning methods

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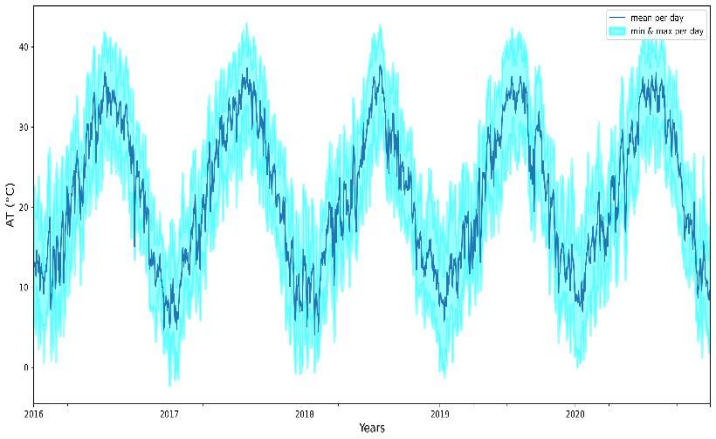
[1] *Optoelectronics and Applied Energy Techniques, Faculty of science and technology, Moulay Ismail University of Meknes, Errachidia, Morocco.*
[2] *Materials and Modelling Laboratory, Department of Physics, Faculty of Science, Moulay Ismail University of Meknes, Meknes, Morocco.*
[3] *New Energies and Materials Engineering, Faculty of science and technology, Moulay Ismail University of Meknes, Errachidia, Morocco.*

Abstract

Solar energy conversion systems are designed to efficiently convert solar energy into electrical energy. Nevertheless, their operation can be influenced by various factors, including weather fluctuations and environmental conditions such as air temperature and solar irradiance. To deal with this challenge, this work focuses on the thermal effect on solar photovoltaic (PV) systems that produce energy. Therefore, we propose an optimal temperature prediction model to improve the operating temperature of solar PV systems or any other type of solar energy in the South-East regions of Morocco. Also, contribute to predicting air temperature since it directly affects thermal comfort and impacts several socio-economic activities.

To that purpose, Deep Learning (DL) techniques can contribute to the accurate estimation of future temperature changes based on historical characteristic weather data such as temperature, dew point temperature, relative humidity, and wind speed. Based on the Mean Square Error (MSE) and the correlation coefficient (R), we compared and evaluated the Multi-Layer Perception (MLP) model, Long and Short Term Memory (LSTM) model, the Gate Recurrent Unit model (GRU) and the hybrid LSTM&GRU model.

Figure: Daily air temperature volatility curve for data from 2016 to 2020 at Errachidia, Morocco.



Recent Publications

1. Chen, G.J., Hua, J., Shi, Y., Ren, C. Urban Clim. 47 (2023) 101400.
2. Bouknana D., Jain, S., Rathee, S., Kumar, A., Sambasivam, A., Boadh, R., Choudhary, T., Kumar, P., Kumar Singh, P. Mate. Today: Proce. 56 (2022) 194-199.
3. Tran, T.T., Bateni, S.M., Ki, S.J., Vosoughifar, H.R., Water 13 (2021) 1294.
4. Bouaichi, A., Amrani, A.E., Ouhadou, M., Lfakir, A., Energy 190 (2020) 116368.
5. Mishra, S., Bordin, C., Taharaguchi, K., Palu, I., En. Rep. 13 (2020) 1962 - 1986.

Biography

Mohamed Khala graduated with a Master's degree in Solar Technologies and Sustainable Development from the Faculty of Sciences and Techniques of Errachidia, Moulay Ismail University, Meknes, Morocco in 2021. Currently a PhD student at the same institution in Optoelectronics and Applied Energy Techniques research unit. His passion for Physics and Artificial Intelligence (AI) led him to pursue a career in this field. His primary areas of research are solar energy, AI, machine and deep learning, and smart grid. He developed a growing interest in how machines can learn to solve problems related to energy management, water and environmental monitoring, and meteorology. He has also started to participate in International conferences and workshops on AI and its applications and has scientific publications indexed under Springer in this field.
Besides his research, Mohamed Khala also worked as a meteorological observer and aeronautical protectionist at the Moroccan Meteorological Department.
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Experimental study of an oscillatory motion of a simple and heavy pendulum using a distance sensor with the MicroLabExAO interface

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[2]*Faculty of Sciences, Mohammed V University Rabat.*

Abstract

In this practical demonstration, we studied the oscillatory motion of a simple and heavy pendulum using a distance sensor connected to a MicroLabExAO interface. The objective of this study is to determine the characteristics of the oscillatory motion such as period, amplitude and frequency, using the distance data collected by the distance sensor. The electronic part of the sensor as well as the ExAO interface are also presented in this work. The experimental results obtained are in agreement with the expected theoretical results. This shows the accuracy of the distance sensor and the efficiency of the MicroLabExAO interface in the study of oscillatory motion. This study is very useful in the field of physics and engineering because of their potential applications. Finally, we have shown that this experimental study provides accurate, precise, and fast results for determining the nature of the motion of the simple, heavy pendulum.

Recent Publications

1. Chiriacescu, B., Chiriacescu, F. S., Miron, C., Berlic, C., Barna, V., Romanian Reports in Physics, 72(1) (2020) 1-14.
2. Suchatpong, N., Suknui, V. Photogate sensor for compound physical pendulum experiments. In Journal of Physics: Conference Series, 1144 (1) (2018) 012127.
3. Mohammad, T., engineering and technology, 51 (2009) 293-299.

Biography

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Machine learning for embodied carbon life cycle assessment of buildings

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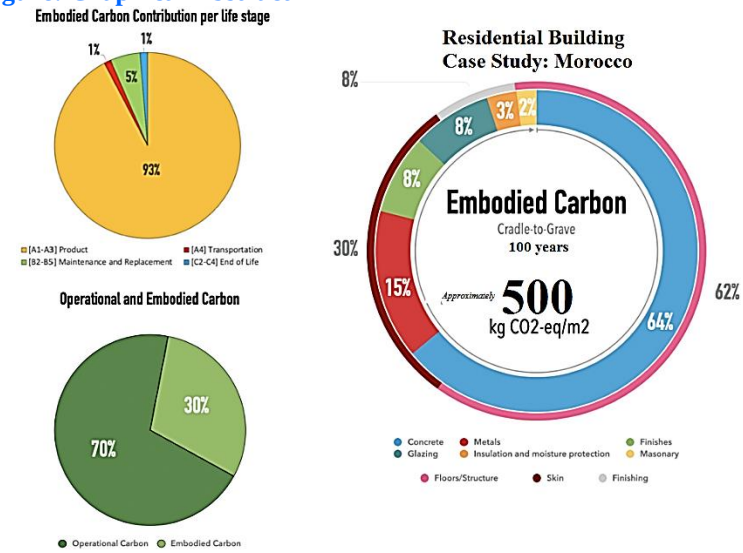
[2] *National School of Applied Sciences, Sidi Mohamed Ben Abdellah University, 30000 Fez, Morocco*

Abstract

The fight against global warming has led to significant efforts to make buildings more energy efficient during their operational phase. However, the embodied carbon in building materials used during construction also plays a vital role in mitigating climate change. This study develops an algorithm and a mathematical model to examine the embodied carbon footprint of buildings by assessing the total cradle-to-gate embodied carbon emissions of major building materials. The proposed model is tested on a typical residential 3-storey building. Results reveal that concrete and steel, which are widely used in Moroccan buildings, account for one third total emissions, and the total embodied carbon amounts to 500 Kg CO_{2e}/m^2 over the 100-year life cycle of the building. Although there is currently no regulation to enforce mandatory whole life cycle carbon assessment, this study aims to promote methods, strategies, and practices that encourage the decarbonization of the built environment in Morocco by increasing awareness and understanding of embodied carbon among the industry and academia before legal requirements are imposed.

Figure: Graphical Abstract



Biography

Hamza El Hafdaoui has received his B.S. degree in engineering and management science and M.S. degree in sustainable energy management from Al Akhawayn University in Ifrane, whilst Ph.D. researcher in energy management from National School of Applied Science of Sidi Mohamed Ben Abdellah University. Research interests includes energy efficiency in buildings, alternative fuel vehicles, and sustainable energy distribution systems.
In addition to covered engineering intern positions, from 2018 to 2020, he has held research assistant position in Al Akhawayn University in Ifrane, Morocco. From 2020 to 2021, he was a lecturer professor in EMAA Business School in Agadir with the Computer Science Department. Since 2021, he is holding a position of Adjunct Professor in School of Science & Engineering in Al Akhawayn University.
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Numerical simulation of the thermal behavior of a new bio-composite with a durable charge

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[1] *Hassan II University of Casablanca, Higher Normal School of Technical Education Mohammedia (ENSET-M), Laboratory: Signals, Distributed Systems and Artificial Intelligence (SSDIA), Morocco.*
[2] *Hassan II University of Casablanca ; Higher Normal School of Technical Education Mohammedia (ENSET-M), Laboratory: Modeling and Simulation of Intelligent Industrial Systems (M2S2I), Morocco.*

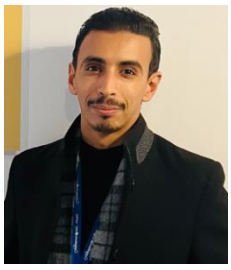
Abstract

The polymers, mainly the polyvinyl chloride (PVC), are widely used in many industrial and commercial applications for their advantageous physicochemical properties. However, their production and use have a significant impact on the environment, and also their thermomechanical characteristics can be improved.

For all these reasons, we considered bio-composites as an environmentally friendly alternative. A new bio-composite was implemented by combining biomass of animal origin with polyvinyl chloride (PVC). In this attention, we modeled the heat transfer in a bio-composite specimen composed of 10% bioburden and 90% PVC using numerical simulation.

Considering the thermal properties of the constituent materials and the boundary conditions, the heat transfer model was created using the finite element method approach. The targeted results of this simulation showed that the addition of the filler in question to the polyvinyl chloride (PVC) qualitatively improves the thermal properties of the latter. These numerical results agree with the experimental observations obtained previously by thermogravimetric analysis and suggest that these types of bio-composite could be promising materials. Classified as green materials, they can contribute massively to future bio-industrial applications.

Biography



Hamza ENNADAFY is a State Engineer in Industrial Engineering and Logistics, Mechanical Engineering from the Ecole Normale Supérieure de l'Enseignement Technique de Mohammedia, graduating in 2020. Currently, he is in his third year of doctoral studies (Ph.D student)at the Signals, Distributed Systems and Artificial Intelligence (SSDIA) laboratory, where he specializes in materials science, particularly composite materials. His doctoral dissertation focuses on the physicochemical study and characterization of bio-filled bio-composite materials of animal origin, using experimental methods and numerical simulations.

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Modeling structural, electronic and optical properties of Vanadium silicide compound based on Density Functional Theory

Siham MALKI [1], EL FARH Larbi[1], DARHI Zakaria[1], GUESMI Ibtissam[1], CHALLIOUI Allal[2]

[1]*Mohammed 1st University, Faculty of Sciences, Physics Department, Oujda, Morocco*
[2]*Mohammed 1st University, Faculty of Sciences, Chemical Department, Oujda, Morocco*

Abstract

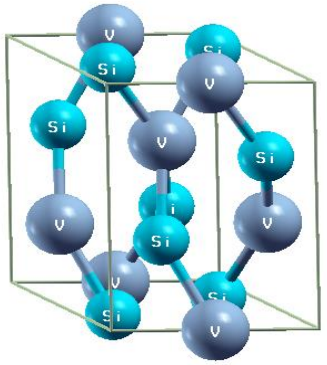
This work presents in detail ab-initio calculations based on Density Functional Theory ″DFT″ to determine structural, electronic and optical properties of the vanadium silicide VSi_2. This compound which crystallizes in the hexagonal structure has been investigated using the Full-Potential Linearized-Augmented Plane Wave (FP-LAPW) method as implemented in Wien2k code [1]. We employed the Perdew-Burke-Ernzerhof Generalized Gradient Approximation (PBE-GGA) for the exchange correlation potential.

The fitting of the total energy as a function of the volume by the Brich-Murnaghan's equation of states [2], allowed us to determine the structural parameters of VSi_2 material, such as the bulk modulus B, its first pressure derivative B', the minimum energy E_0 and the equilibrium volume V_0.

Calculation of the band structure and the density of states confirmed the metallic character of the VSi_2 compound.

The optical properties have been studied in detail in the energy range from 0 to 14 eV.

We interested in the study of this material because several recent works have shown interesting properties for this type of material [3-6].



Recent Publications

1. Blaha P., Schwarz K.,Madsen G.K.,Krasmicka D.Z.,Luitz Z., WIEN2k. An augmented plane wave+local orbitals program for calculating crystal properties (2001).
2. Murnaghan F. D., Proc. Natl. Acad. Sci.U.S.A.30 (9) (1944) 244.
3. Zhang H., Zhong X., Shaw J C., Liu L., Huang Y., Duan X. Energy. Environ. Sci. 6 (9) (2013) 2621-2625.
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6. Nguyen M.T., Tran Q.T. Chem. Phys. Let. 721(2019) 111-116.

Biography

Author is PhD degree, in physical and engineering formation, specializing in materials, Computational Materials Science, condensed matter physics and physics of materials. Her objective is the study of the properties of materials that can be used in the energy conversion and/or storage. She has published twelve articles.
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Optimization of propagation acoustic waves in one-dimensional via a waveguide tube with a local copper patch resonator

Moulay Said Khatab[1], Tarik Touiss [1], Ilyass El kadmiri [1,2], Driss Bria[1].

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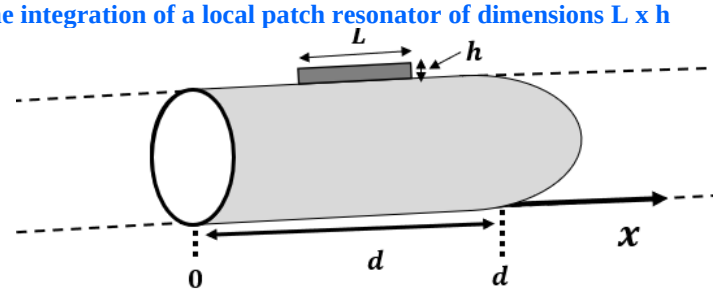
Abstract

The transfer matrix method (TMM) is a well-established technique for studying acoustic wave transmission in one-dimensional systems, such as a guide tube of length d_1. However, to improve the performance of this system, a parallelepipedal local resonator (patch resonator) of dimensions L x h can be used. The plate of conductive material, such as copper, placed perpendicular to the tube axis at a specific location forms a resonant cavity that enhances the sound waves at a given frequency, thus improving the transmission of acoustic energy through the tube at that frequency. The use of copper in the patch can also reduce Joule effect losses. The resonance modes introduced by the resonator have a high transmission rate and depend on the geometrical characteristics of the resonator, thus allowing specific acoustic frequencies to be selected and filtered. By using the transfer matrix method to study this system with a local resonator, it is possible to understand in detail the transmission of acoustic waves through the system and optimize its performance.

Figure: Schematic of the geometry of a waveguide tube with the integration of a local patch resonator of dimensions L x h



Recent Publications

1. Farooqui, M., Elnady, T., and Akl, W. (2016). Sound attenuation in ducts using locally resonant periodic aluminum patches. *The Journal of the Acoustical Society of America*, *139*(6), 3277-3287.
2. Farooqui, M., Elnady, T., and Akl, W. (2016). Validation of low frequency noise attenuation using locally resonant patches. The Journal of the Acoustical Society of America, 139(6), 3267-3276.
3. Khattab, M. S., El Kadmiri, I., Ben-Ali, Y., Barkani, J., Yousfi, J., & Bria, D. (2023). Induced guided acoustic waves in waveguides and resonators. Materials Today: Proceedings, 72, 3398-3403.
4. Khattab, M. S., El Kadmiri, I., Ben-Ali, Y., Khaled, A., Jeffali, F., & Bria, D. (2023). Propagation of the acoustic waves in a one-dimensional parallel guides and symmetric/asymmetric resonators. Materials Today: Proceedings, 72, 3319-3325.

Biography

Moulay Said Khatab 2nd year doctoral student at the Faculty of Science. He works on the propagation of acoustic waves in diverse systems. he published two scientific papers.

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IoT-enabled Maintenance 4.0: Optimizing Maintenance Processes and Equipment Performance

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[2]*Équipe des Matériaux, Énergie, Génie Civil et Environnement, Ecole Supérieure de Technologie d'Oujda, Université Mohammed Premier.*
[3]*Laboratoire de Génie Mécanique (LGM), Faculté des Sciences et Techniques, Fès, Université Sidi Mohamed Ben Abdellah.*
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Abstract

Maintenance 4.0 is an emerging concept that aims to optimize maintenance processes and equipment performance by integrating advanced technologies such as the Internet of Things (IoT), artificial intelligence, and big data analytics. IoT plays a crucial role in Maintenance 4.0, enabling real-time monitoring, predictive maintenance, and condition-based maintenance. Through the use of sensors and data analysis, IoT technology allows for early detection of potential problems or failures, resulting in timely maintenance interventions and reduced downtime.

The implementation of IoT in Maintenance 4.0 offers significant benefits, including improved maintenance efficiency, reduced downtime, increased equipment lifespan, and improved safety. By automating data collection and analysis, Maintenance 4.0 can increase the accuracy of decision-making, leading to better-informed decisions and more effective maintenance interventions. Additionally, the predictive maintenance enabled by IoT technology can help organizations reduce costs and extend the lifespan of their equipment.

However, there are also challenges associated with the implementation of IoT in Maintenance 4.0. These include effective data management, including data storage, processing, and analysis, as well as cybersecurity concerns. It is essential to address these challenges to ensure the safety and effectiveness of the system.

In conclusion, the integration of IoT in Maintenance 4.0 offers significant potential to optimize maintenance processes and equipment performance across various industries. By leveraging the power of IoT technology, organizations can improve maintenance efficiency, reduce downtime, and improve safety. However, careful consideration of data management and cybersecurity concerns is necessary for the successful implementation of IoT in Maintenance 4.0.

Keywords: Maintenance 4.0 ,Internet of Things (IoT) , Predictive Maintenance, Condition-based Maintenance ,Data Management.

Figure:

Recent Publications

1. B.D. Benahmed, F. Jeffali, El Barkany, A. Bakdid, "Design and realization of an aeronautical cleaning robot for aircraft maintenance 4.0 based on artificial intelligence", Matériels Today, Sciendirect, 2022, Indexed Scopus.
2. F. Jeffali, A. Ouariach, B. El Kihel, A. Nougaoui, Diagnosis of three-phase induction motor and the impact on the kinematic chain using Non-Destructive Technique of Infrared Thermography, Journal Infrared Physics & Technology, ScienceDirect, Volume 102, November 2019, 102970
3. M.J. Picazo-Ródenas, R. Royo, J. Antonino-Daviu, J. Roger-Folch, "Use of the infrared data for heating curve computation in induction motors: Application to fault diagnosis", Engineering Failure Analysis, 35 (2013) 178- 192.
4. Faouaz Jeffali, A. Ouariach, A. El Kihel, A. Nougaoui, Infrared thermography based diagnosis of the impact on the kinematic chain, Journal Materials Today: ScienceDirect 13 (2019) 949-955.

Biography

The experience that BENAHMED Badr Eddine had in previous fields such as industrial engineering and aeronautical industry gave him the idea of the project and the passion to accomplish the task, He was awarded a master degree in industrial engineering at "EMSI" an international school of engineering and then experience in the field of airline company Royal Air Maroc , where he began the planning of the project while working on aircrafts. He was influenced by robotics devices and the way they complete their tasks as planned and without mistakes, also expected that in the future they will replace human workers in production facilities and factories. That's where the idea of the cleaning robot design got it.

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Long-term and high frequency hydrochemical monitoring in the Sebou catchment: Hydrosystem dynamic and modeling

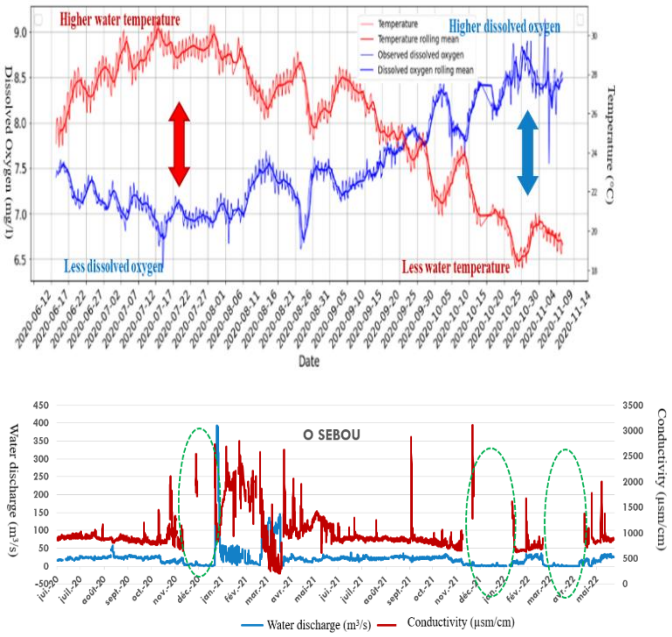
S. Haida [1], S. El Mrissani [1], J-L. Probst [2], L. Misane[3], A. Benmohammadi[1], H. Sibari[1]

[1]*Lab. Ressources Naturelles et Développement Durable, Faculté des Sciences, Université Ibn Tofail, Kénitra, Morocco*
2 Lab. Ecologie Fonctionnelle et Environnement, Université de Toulouse, CNRS , France.
3 Agence du Bassin Hydraulique du Sebou, Fes, Maroc

Abstract

Within the climate change and anthropogenic pressures, the response of such a complex ecosystem requires the development of an ecosystemic survey, which integrates hydrology, geochemistry, and ecology over the long term to manage the quantity and quality of the water resources. The Sebou basin has an estimated place within the country's strategy, given its great potential for water resources, the challenges of managing and controlling water resources in the river basin, and the large-scale projects for water transfer to other basins. Since June 2020, the Sebou catchment monitoring was managed by UIT and ABHS (Morocco) in collaboration with INPT and "Agence de l'Eau Artois-Picardie" (France) to measure continuously, model, and manage water quality. High frequency (every 1 hour) measures were performed for temperature, turbidity, dissolved oxygen, conductivity, pH, redox potential, nitrate, and chloride, water discharge contents by automatic multiparameter probe YSI-EXO2 with various intelligent and high precision optical sensors at the Sebou river outlet (Mechra bel ksiri gauging station). Water samples collected at the stream outlet every week and analyzed in the laboratory for anions and cations were used to calibrate the parameters measured by the probe sensor. Continuous probe measurements show a wide concentration range, particularly capture of high concentration period of nitrates, chloride, and conductivity of water Sebou (1250µs/cm, 2881µs/cm, 1610 µs/cm, and 1639 µs/cm), and often accompanied by an excessive under saturation in dissolved oxygen. High-frequency measurements of dissolved oxygen, temperature, and nitrate highlight nycthemeral cycles at the day scale and seasonal evolution to model their behavior using a "data-centric" approach. This approach demonstrates that it is possible to develop simple models based on a temporal database to estimate the variability of physicochemical parameters in the river environment and thus eliminate the bias introduced by point measurements.

Figure: Hourly variations and the rolling mean of water temperature, dissolved oxygen concentration and water discharge on the Sebou River



Recent Publications

1. Tasnim B., Jamily J. A., Fang X., Zhou Y. and Hayworth J.S.. *Water*, *13*(14), (2021) p1980.
2. Valerio C. De Stefano, L., Martínez-Muñoz G., and Garrido A.. *Science of the Total Environment*, 750, (2021), p.141252.
3. El Mrissani S., Haida S., Probst J.L., and Probst A.. *Water* 13.22 (2021), p. 3203.
4. Guasch H., Armengol J., Mart E., and Sabater S.. Water Res., 32, (1998). Pp.1067-1074.

Biography

Souad Haida 57 years, Morrocan Nationality, is a Professor (teaching and Research scientist) Class C assigned to Natural resources and sustainable development laboratory (Faculty of Sciences, Ibn Tofail University, Kénitra, Morocco). She has been working on dissolved and solid transfer fluxes of Moroccan river water systems for 38 years. Her research has been focused to describe the physical interactions between the flows and chemistry of the contaminants in rivers by integrating interface zones between the surface water and the river beds from the scale of the processes to the scale of the watershed.

Projects: 7 national, and 9 international projects

30 publications in scientific journals and refereed book chapters indexed in the Journal Citation Report, 7 in Scopus and 19 publications in conference proceedings, around 140 abstracts in conferences.

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A Hybrid Genetic Algorithmic Approach for Energy Management in a Multi-Source Smart Grid: A Case Study in LAMHIRIZ, Morocco

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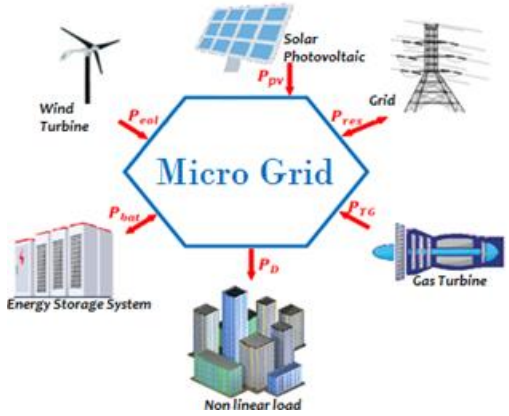
Advanced School of Biomedical Engineering, Mohammed VI University of Health Sciences (UM6SS), Casablanca, Morocco.
EEIS-Lab, ENSET Mohammedia, Hassan II University, Casablanca, Morocco.
Smartilab EMSI, Rabat Morocco
ERERA, ENSAM, Mohammed V University, Rabat Morocco,

Abstract

Efficient energy management in a multi-source smart grid is crucial for achieving sustainable and reliable power supply. In this paper, we propose a hybrid approach that combines the Bellman algorithm and genetic algorithm to optimize energy dispatch in a complex smart grid system with photovoltaic (PV) fields, wind turbines, gas turbines, lithium batteries. The Bellman algorithm models the dynamic programming framework for optimal energy dispatch considering the time-varying characteristics of renewable energy sources and energy storage systems. The genetic algorithm evolves a population of candidate solutions to find the most optimal energy dispatch strategy. Our approach considers the grid's power balance, greenhouse gas (GHG) reduction targets, operational constraints, and cost reduction considerations of various energy sources and storage systems. We present a case study in LAMHIRIZ, a fishing village in southern Morocco, to demonstrate the applicability of our proposed approach in a real-world context. Simulation results based on actual data from LAMHIRIZ show that our approach can effectively optimize energy management, leading to improved GHG reduction, efficient energy utilization, enhanced grid reliability, and cost reduction. In conclusion, our hybrid genetic algorithmic approach presents a novel solution for optimized energy management in multi-source smart grids, with a case study in LAMHIRIZ, Morocco demonstrating its effectiveness.

Figure: Studied MG overall architecture



Recent Publications

1. F. Zahraoui, H. Eddine Chakir, M. Et-Taoussi and H. Ouadi, "Smart Grid Cost Optimization: Comparing Bellman and Genetic Algorithms," *2021 9th International Renewable and Sustainable Energy Conference (IRSEC)*, Morocco, 2021, pp. 1-6, doi: 10.1109/IRSEC53969.2021.9741131.
2. Zahraoui, F.Z., Chakir, H.E., Ouadi, H. (2022). Cost Reduction in Smart Grid Considering Greenhouse Gas Emissions Using Genetic Algorithm. In: Saidi, R., El Bhiri, B., Maleh, Y., Mosallam, A., Essaaidi, M. (eds) Advanced Technologies for Humanity. ICATH 2021. Lecture Notes on Data Engineering and Communications Technologies, vol 110. Springer, Cham. https://doi.org/10.1007/978-3-030-94188-8_5.

Biography

Author is a passionate researcher in Energy, Optimization Strategies, and Smart Grids. She has a deep understanding of Genetic Algorithms in the Optimization Strategies field. She has a strong academic background, holding a TELECOM engineer degree from the Mohammadia School of Engineers. Morocco.
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An energy management system of hybrid microgrid using metaheuristic strategy

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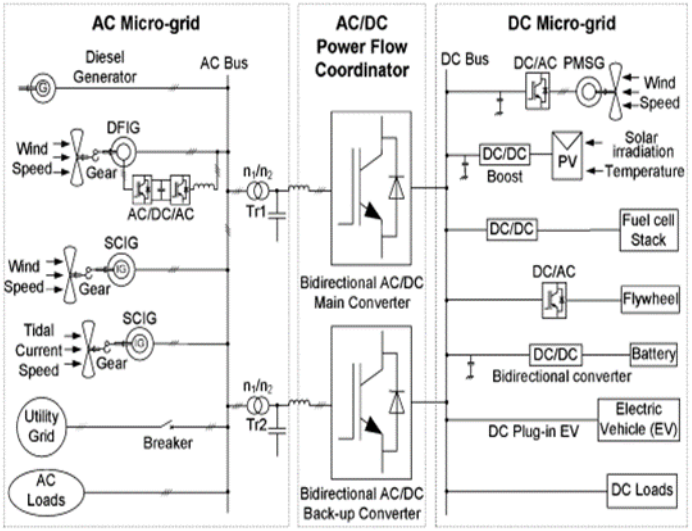
[2]*Laboratoire SMARTiLab, Ecole Marocaine des Sciences de l'Ingénieur (EMSI), Rabat, Morocco*
[3]*Ecole des mines de Rabat (ENSMR), Rabat, Morocco*

Abstract

This paper proposes a metaheuristic-based Energy Management System (EMS) for monitoring power-flow in hybrid AC/DC Microgrids (MGs). The suggested metaheuristic-based EMS selects an optimal functional mode by collecting data such as the energy delivered by Distributed Energy Resources (DER), the load demand, and state of charge of Energy Storage System (ESS). The proposed EMS relies on a hybrid MG controller, which minimizes the operational costs for different DER units in the connected MG. Then, it aims at reducing the CO2 emissions by optimizing both the operating point of the polluting sources and the ESS employment. In addition, the EMS establishes operational parameters for the bidirectional AC/DC converters between the AC and DC sub-grids to secure stable operation of the MG by controlling power exchange between the AC and DC sides. Simulation results on a connected mode hybrid AC/DC MG are delivered. The results show the efficiency and robustness of the suggested strategy.

Figure:



Recent Publications

1. Charadi S, Chaibi Y, Redouane A, Allouhi A, El Hasnaoui A, Mahmoudi H. Efficiency and energy-loss analysis for hybrid AC/DC distribution systems and microgrids: A review. Int Trans Electr Energ Syst. 2021;e13203. doi:10.1002/2050-7038.13203.
2. S. Charadi, A. Salbi, A. Redouane and A. El Hasnaoui, "Smart Hybrid AC-DC Distribution System for Solar Electric House: Case of an Air Conditioner System," 2019 1st International Conference on Sustainable Renewable Energy Systems and Applications (ICSRESA), Tebessa, Algeria, 2019, pp. 1-4, doi: 10.1109/ICSRESA49121.2019.9182502..

Biography

Ssadik CHARADI received his master's degree in automation, signal processing and industrial computing from Hassan 1 University, Settat, Morocco in 2013. He is currently working toward his PhD degree in Electronics Power and Control at Mohammadia School of Engineering, Rabat, Morocco. His fields of interest include renewable energy-based systems and energy management systems for microgrids and embedded system. He published two articles.
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Assessing Lithium-ion Battery State of Charge Estimation for Drones Operation using an Extended Kalman Filter Algorithm

Kamal ANOUNE[1], Anas El Maliki[2], Abdessamad Benlafkih[3] and Abdelkader Hadjoudja[2]

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[2]*Laboratory of Electronic Systems, Information Processing, Mechanics and Energetics, Faculty of Sciences, University Ibn Tofail, Kenitra, Morocco*
[3]*Advanced Systems Engineering Laboratory, University Ibn Tofail, Kenitra, Morocco*

Abstract

Drones have grown in popularity in recent years as a result of their capacity to execute a wide range of activities efficiently and effectively. Battery Management Systems (BMS) are critical components in drones since they monitor and manage the battery's health and performance. A well-designed BMS guarantees that the drone's battery is always functioning at peak performance, extending its lifespan and performance. The BMS can assist avoid the drone from running out of power in mid-flight by precisely monitoring the SOC, which can be dangerous and costly. To accurately estimate the SOC of a battery, the Thevenin model and EKF technique are utilized. The Thevenin model provides a simple and accurate equivalent circuit for the battery, while the EKF algorithm increases estimation accuracy by dynamically modifying the model parameters.

In this paper, Thevenin model and EKF technique are implemented in a proposed MATLAB application to estimate SOC in real-time utilizing input readings from the battery. using a drone load profile as reference. The results show that the SOC's estimating accuracy has greatly increased. The root-mean-square error is significantly improved.

Keywords

State of charge, drones, Battery Management Systems, extended Kalman filter, Drones

Recent Publications (maximum 5)

1. Anoune, K., Ghazi, M., Bouya, M., Laknizi, A., Ghazouani, M., Abdellah, A. Ben, & Astito, A. (2020). Optimization and techno-economic analysis of photovoltaic-wind-battery based hybrid system. Journal of Energy Storage, 32. https://doi.org/10.1016/j.est.2020.101878
2. Anoune, K., Bouya, M., Astito, A., & Abdellah, A. Ben. (2018). Sizing methods and optimization techniques for PV-wind based hybrid renewable energy system: A review. Renewable and Sustainable Energy Reviews, 93, 652–673.
3. Anoune, K., Laknizi, A., Bouya, M., Astito, A., & Ben Abdellah, A. (2018). Sizing a PV-Wind based hybrid system using deterministic approach. Energy Conversion and Management, 169, 137–148. https://doi.org/10.1016/j.enconman.2018.05.034
4. Anoune, K., Bouya, M., Laknizi, A., Ben Abdellah, A., Astito, A., & Ghazouani, M. (2019). Techno-economic investigation of solar-wind potential to power an industrial prototype using a hybrid renewable energy system. SN Applied Sciences, 1(11), 1313. https://doi.org/10.1007/s42452-019-1358-7
5. Anoune, K., Bouya, M., Abdellah, A. Ben, & Astito, A. (2017). Optimizing and Controlling the Productivity of a Flat Plate Collector by Using an Electronic System. Energy Procedia, 107, 180–187. https://doi.org/10.1016/j.egypro.2016.12.166.

Biography

Kamal ANOUNE *currently a Research Professor at EMSI-Rabat, Honoris United Universities, he received his state engineering degree in electrical engineering in 2012, after he launched his start-up specializing in automation and renewable energy, his passion for knowledge in R&D led him to rejoint university in 2015 and obtained his Ph.D. degree in 2020 related to Sizing-Optimization of PV-Wind-Battery based Micro-Grid System, his current works are focused in Smart Grid, Energy Auditing, Green Hydrogen, and Energy Management Opportunities. He can be contacted at email: kamal.anoune@gmail.com.*

Numerical simulation of the risk of flooding of the national road N°2 at the crossing of the Sefrou wadi south of the city of Bni Drar

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Abstract

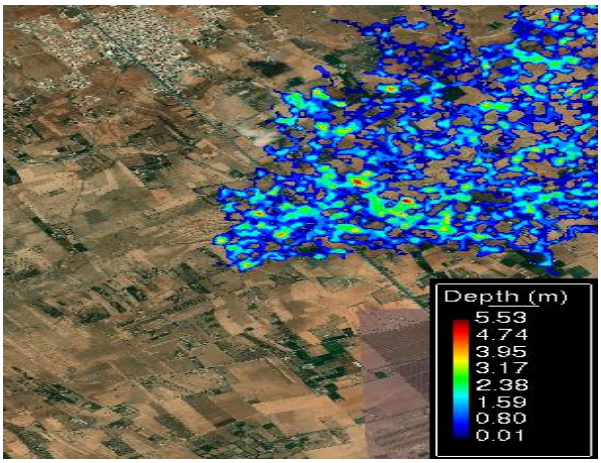
In the present work, we study the risk of flooding in the plain of the watershed on the wadi Sefrou south of the city of Bni Drar. The main objective is to assess the extent of flooding and its impact on the study area, especially on the National Road 2 at the crossing of the wadi Sefrou.

To carry out this study, we used the HEC-HMS method for the spatial analysis of the catchment area and for the elaboration of flood hydrographs. As for the hydraulic simulation, we used the IBER software.

The obtained results allow to map the flooding showing the maximum flood extent, the water depth and the flow velocity for the specific return period of 100 years.

This study aims to help the concerned state services in the management of the flood risks and the consideration of the necessary preventive actions.

Figure:



Recent Publications

6. *Zahaf Toufik, Sabar Hichame, Boushaba Farid, Mimoun Chourak, Mapping the risk of flooding of the national road N°2 at the crossing of the wadi Tamdmadt north of the city of Bni Drar*
7. *Zahaf Toufik, Boushaba Farid, Mimoun Chourak, Study of the vulnerability to the risk of flooding in the urban area of Bni Drar.*
8. *Zahaf Toufik, Ijfiri Rachid, Boushaba Farid, Mimoun ChourakF.Risk of flooding of the national road N ° 6 at the right of crossing the wadi Asla in the region of Taourirt.*

Biography

The author is interested in research on the axis of the impact of the mapping of the risks of flooding of the road network by highlighting the contribution of GIS. He started his PhD in 2019 at Mohammed Premier University in Morocco. He published his first communication in the fourth edition of ICMES2020.
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Artificial Intelligence in medical diagnostic: Advancements and challenges

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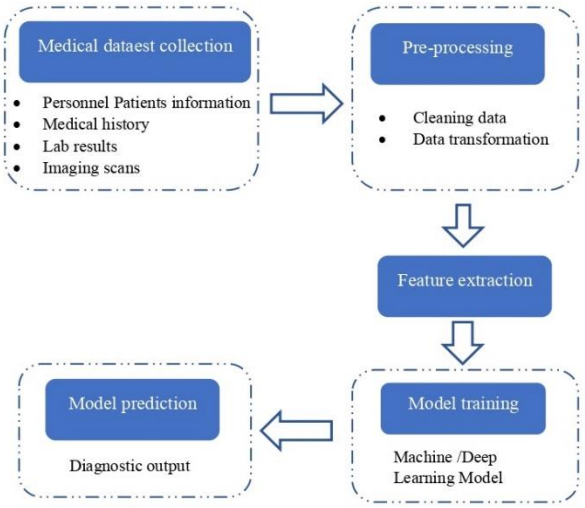
Abstract

Medical diagnostic systems powered by artificial intelligence (AI) hold great promises for improving accuracy and saving lives. The present article provides a review of recent advancements in AI-powered medical diagnostics, including relevant studies and future directions for the technology in different medical domains such as cardiology, radiology, oncology, and dermatology. The importance of medical diagnostics and the potential role that AI can play in improving them is also discussed. The paper explores various techniques that AI uses to analyze complex medical data, including electronic health records (EHRs), clinical decision support systems (CDSS), medical image analysis, and speech recognition to identify patterns and make predictions. Additionally, the paper discusses challenges and limitations of AI-based medical diagnosis related to data privacy and security, algorithm bias, and the need for human oversight and interpretation of AI-generated diagnoses. Potential solutions to address these issues, such as standardized data formats, diverse and representative training data sets, and collaborative efforts between healthcare professionals and AI experts, are proposed. Finally, the paper presents a proposed multimodal system that attempts to enable the AI-based system to recognize patterns and identify diseases more accurately and efficiently than traditional diagnostic methods.

Figure: Flowchart of the medical diagnostic process based on AI



Recent Publications

1. Emharraf .M, H. Taous, W. Benzekri, A. E. Moussati, et K. Aberkani, « Intelligent Agriculture Platform Based on Low Energy and Cost Wireless Sensors for Efficient Water Irrigation », in Advances in Smart Technologies Applications and Case Studies, Cham, 2020, p. 460 469.
2. I. Kerrakchou, S. Chadli, Emharraf. M, et M. Saber, « Analysis Jamming Attack Against the Protocol S-MAC in IoT Networks », in Digital Technologies and Applications, Cham, 2021, p. 311 321. doi: 10.1007/978-3-030-73882-2_29.
3. Mrabti .M, B. Bellach, Y. Ech-Choudany, F. Morain-Nicolier, et H. Tairi, « Human Motion Tracking via the Local Dissimilarity Map », Pattern Recognit. Image Anal., vol. 32, p. 162 173, mars 2022, doi: 10.1134/S1054661822010047.
4. Mrabti .M, H. Tairi, F. Morain-Nicolier, et B. Bellach, « Human motion tracking under indoor and outdoor surveillance system », Int. J. Innov. Comput. Appl., vol. 11, p. 181 192, nov. 2020, doi: 10.1504/IJICA.2020.111226.

Biography

Mrabti Wafae is aCEDOC-EMPO. His research interests include Indoor robot control, Smart Agricultural, Computer Engineering, Human-computer Interaction, and artificial intelligence. He has published 29 papers in peer-reviewed journals and conference proceedings, He has also served as a reviewer for several scientific journals and as a prn assistant professor of computer science at Mohamed First University, Oujda, Morocco. She received her Ph.D. in Computer Science and image processing from Faculty of Sciences, Sidi Mohammed Ben Abdallah University, Fez, Morocco in 2020. Her research interests include image processing, computer vision, and artificial intelligence She has published several papers in peer-reviewed journals and conference proceedings, she has also served as a reviewer for several scientific journals and as a program committee member.

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Emharref Mohamed is a professor of robotics at National School of Applied Sciences, Mohamed First University, Oujda, Morocco. He received his Ph.D in 2017 from CEDOC-EMPO. His research interests include Indoor robot control, Smart Agricultural, Computer Engineering, Human-computer Interaction, and artificial intelligence. He has published 29 papers in peer-reviewed journals and conference proceedings, He has also served as a reviewer for several scientific journals and as a program committee member.

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ADVANCED MATERIALS FROM ORGANIC AND INORGANIC DEVICES

Combustion of sewage sludge in a counter-current fixed bed: an experimental study

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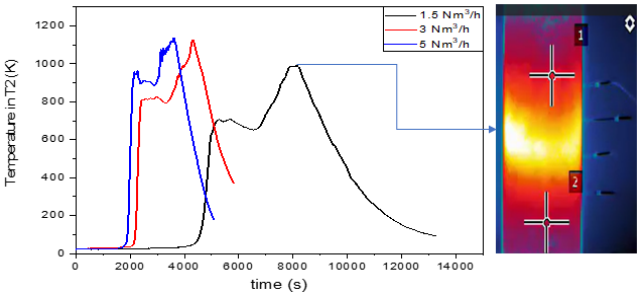
(2) Green Energy Park (IRESEN, UM6P), BenGuerir, Morocco,

Abstract

The management of the increasing amount of sludge produced by wastewater treatment plants is a major challenge, which requires its valorization as a management method. This work experimentally investigated the combustion of sewage sludge as an energy recovery method for this type of waste. In a vertical fixed bed counter current boiler, the propagation of the flame front is followed using thermocouples, connected to a data acquisition system, which records the temperatures in four different positions along the bed. The combustion air supply comes from the bottom of the boiler, in the opposite direction to the propagating flame front, controlled by a flow meter and a control valve in order to maintain a fixed flow during the combustion test. The experimental tests were carried out with well-dried sludge at a temperature of 105°C for 24 hours as fuel with three normal air flow rates (1.5, 3 and 5 Nm3/h). The results obtained showed the influence of this parameter on the temperature profiles which reaches important values (993°C for 1.5 m^3/h, 1126°C for 3 m^3/h, and 1137°C for 5 m^3/h) and were compared to other biomass results in the literature. The average bed center temperature, ignition front velocity, ignition mass rate, and conversion layer thickness were also analyzed.

Figure: Temperature profiles for thermocouple T2 and a picture of the ignition front at time 8000 s



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Biography

The author is a doctoral student at the GREEN ENERGY PARK research platform and at the Ecole Nationale Supérieure d'Art et Métier in Rabat. She works on the energetic valorization (combustion, pyrolysis, and gasification) of biomass, especially sludge from wastewater treatment plants.

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Elaboration of calcium alginate-based hybrid bio-capsules: Insight into the effect of clay content on the mechanical performance

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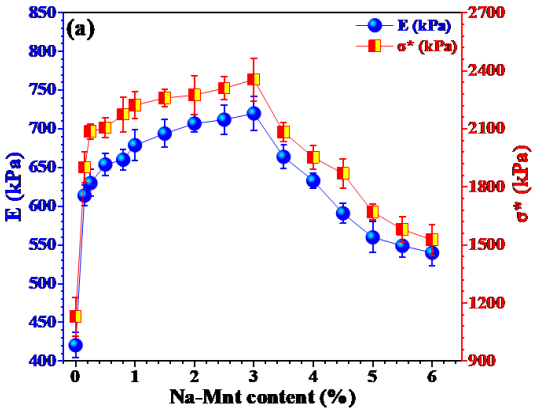
Abstract

Over the past few years, the rise of ideas such as circular economy, sustainable development, industrial ecology, and green chemistry has been accompanied by advancements in the field of materials. Within this realm, there has been notable progress in the development of fully biodegradable polymer composites. These composites offer the advantages of being both high-performance and cost-effective, while also aligning with environmental and regulatory standards for recycling. The formulation and elaboration of hybrid bio-capsules has paved the way for advanced applications such as food, nutraceutical, pharmaceutical, and agriculture industries. Continued research in the field holds promise for the development of innovative bio-capsule designs, enhanced biocompatibility, and improved control over encapsulation and release processes. The present work serves to elaborate of simple alginate and hybrid alginate@clay capsules using the ionotropic gelation method. The resulting hybrid alginate@clay capsules were characterized using different complimentary analysis. The effect of clay type and content on the mechanical properties of the hybrid capsules, namely the elastic modulus and nominal rupture stress of the prepared alginate-based hybrid capsules were investigated. However, the effect of compression speed on the elasticity and the resistance at the rupture of elaborated capsules were examined. Besides, this study aims to employ a theoretical model based on the Boltzmann superposition principle to effectively model the experimental results.

Key words: Hybrid capsules, Clay, Ionotropic gelation, Biodegradable materials, Mechanical properties.

Figures: Variation of elastic modulus "E" and nominal rupture stress "σ*" versus sodium montmorillonite



Recent Publications

1. **Kamal Essifi**, Mohamed Brahmi, Abderrahim Ed-Daoui, Abdelghani Boussetta, M"hammed Benelmostafa, Mohammed Dahmani, Samira Salhi, Amine Moubarik, Ali El Bachiri, Abdesselam Tahani. Investigating the effect of clay content and type on the mechanical performance of calcium alginate-based hybrid bio-capsules. International Journal of Biological Macromolecules (2023).
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3. **Kamal Essifi**, Mohamed Brahmi, Doha Berraaouan, Abderrahim Ed–Daoui, Ali El Bachiri, Marie Laure Fauconnier, and Abdesselam Tahani, Influence of Sodium Alginate Concentration on Microcapsules Properties Foreseeing the Protection and Controlled Release of Bioactive Substances". Journal of Chemistry (2021).
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Acknowledgement

This work was supported by the MESRSFC and CNRST (Morocco) under grant No. PPR 15-17, and UMP under grant No. PARA1-2019.

Biography

Kamal ESSIFI he is doctor in Physical Chemistry and Materials Science, His research interests include the elaboration of simple and bio hybrid material for encapsulation systems. His research focuses on the development of novel bio-based microcapsules for different applications.

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A new chelating support based on PAN fibre waste; synthesis, experimental design and characterization.

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Abstract

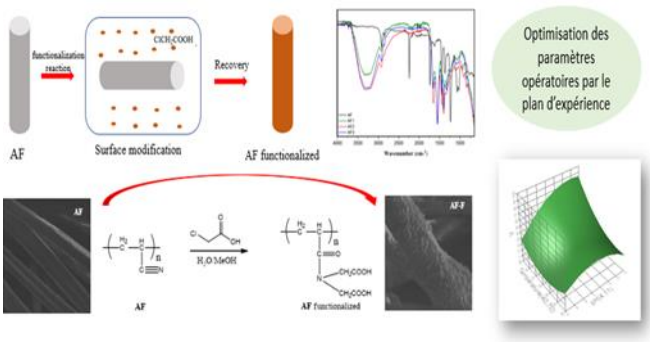
This work focused on the preparation of a new chelating support based on acrylic fiber waste AFW with conversion of nitrile groups into iminodiacetic groups by chemical reaction. We tested the capability of the transformed fiber in removing high metals and organic persistent dyes. We studied the influence of some key parameters such as: pH, Temperature, chelation agent concentration and time duration of the reaction on the conversion rate of nitrile groups. We elaborated the experimental design involving these parameters and made an optimization of operational conditions.

The results proved the success of the functionalization reaction; the nitrile groups have been transformed into Iminodiacetic groups. The optimal conversion rate of nitrile groups was approximately 81.4%, furthermore the temperature reaction and duration time influenced the conversion rate of nitrile groups. As a result, the optimal values were 70°C, and 90 min, moreover the characterization showed thermal stability and a high mechanical strength in the functional fiber. Experiments conditions reveal that the modification reaction happened in smooth medium and doesn't cost much.

The structural characterization, thermal properties were evaluated by using Fourier transform infrared spectroscopy FTIR, scanning electron microscopic SEM and TGA analysis; The mechanical properties of the adsorbent have also been investigated for the functional fiber elaborated.

Acknowledgement are addressed to the funders of APRD projects (UM6P, OCP Group, CNRST, MESRSI)

Figure



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Biography

SAADOUNI Meriem, Phd student 2nd year at Organic Synthesis Extraction and Valorization Laboratory, Ain Chok's Sciences Faculty, (OSEV), Hassan II University of Casablanca, Morocco; and part time researcher at REMTEX Laboratory of High School of Textile and clothes industry.

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Polymethyl methacrylate-g-carboxy-methylcellulose material: from synthesis to slow release fertilizer application

EL Hassan Boutriouia [1], Taha El Assimi [1*], Mustapha Raihane[1], Redouane Beniazza [2], Hicham Ben youcef [2], Mehdi Khouloud [3], Mohamed Hassen V Baouab [4], Abdelkrim El Kadib [5], Mohammed Lahcini [*1, 2]

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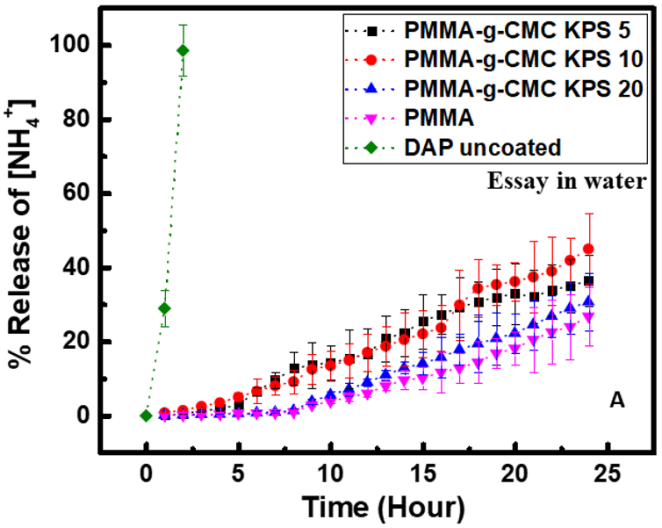
Abstract

Food security is becoming a critical issue because of the continuous growth of the world's population and will be a very challenging problem to face in the upcoming years. To address this issue, nearly 70% increase of agricultural production will be necessary by 2050. Unfortunately, urbanization, low soil fertility, and other constraints are known to limit the cultivated area and reduce global agricultural production. For this reason, the use of conventional fertilizers is becoming more essential. However, the use of fertilizers still suffers from the fast dissolution of nutrients, which has a negative impact on the environment, especially on the groundwater resources via a leaching process. One of the main solutions deployed is the coating of fertilizer using polymers as coating materials, in order to delay the fast release of nutrients. In This way, we have prepared Polymethyl methacrylate-g-carboxymethylcellulose via *in-situ* free radical polymerization using potassium persulfate (KPS) as an initiator. The prepared copolymers (PMMA-g-CMC) were fully characterized using Transform Infrared Spectroscopy (FTIR), Thermogravimetric analysis (TGA), Differential Scanning Calorimetry (DSC), Dynamic light scattering (DLS), X-Ray diffraction (XRD), Brunauer Emmett Teller (BET), size exclusion chromatography (SEC). Scanning electron microscopy (SEM) and mechanical tensile testing. Next, the prepared copolymer was used as a coating material to prepare slow-release fertilizers (SRF).

Figure: Cumulative release of Nitrogen (NH_4^+) in water from coated (prepared PMMA-g-CMC and neat PMMA) and uncoated Diammonium phosphate (DAP) fertilizer



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Biography

Boutriouia el Hassan is a Ph.D. student in polymer chemistry at the University of Cadi Ayyad of Marrakech. He got his Bachelor's degree in chemistry from the University of Mohammed I (Oujda) in 2017 and a master's degree in organic chemistry from the University of Cadi Ayyad (Marrakech) in 2019. He was a visiting master's student at LCC-CNRS Toulouse-France in 2019, visiting Ph.D. student at the University of Helsinki-Finland in 2022 and at the faculty of chemical engineering and technology Zagreb-Croatia in 2022. His main field concerns the preparation of polymer-based composites using free-radical and ring-opening polymerization (ROP). The development of free metal and green catalysts for controlled ring-opening polymerization is also a topic of interest.
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Reuse Correlation between P-wave velocity and Schmidt rebound hardness with unconfined compressive strength of Taza marl-limestone in Morocco

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Abstract

The characterization of materials used in civil engineering and geotechnical is the most crucial step in judging the suitability of the material under investigation. However, the use of indirect tests can reduce the time of investigation; P-wave velocity and Schmidt hardness are non-destructive tests, which have been used for many years in civil engineering and geotechnical as tests for rapid evaluation of mechanical properties especially of rocks and concrete, due to their speed, ease and non-destructive character. The present paper examined for the first time in Morocco the correlation between P-wave velocity and Schmidt hardness with unconfined compressive strength of Taza marl-limestone by empirical equations. In addition, we compared the accuracy of P-wave velocity and rebound hardness for estimating the mechanical properties of rocks.

For this purpose, 78 types of marl-limestone were taken from different sites and tested in the laboratory. The tests included determination of P-wave velocity and Schmidt rebound index, and unconfined compressive strength. Using data analysis and statistical approaches, empirical equations were developed to estimate mechanical properties from P-wave velocity and Schmidt hardness. Moreover, the results show that the P-wave velocity seems to be more reliable than the Schmidt hardness for estimating mechanical properties. Consequently, we propose empirical equations to determine the unconfined compressive strength of marlstone based on non-destructive testing.

Keywords: marl-limestone, P-wave velocity, Schmidt rebound hardness, unconfined compressive strength, geotechnical test.

Figures

Biography

I am currently an engineer within the Public Laboratory of tests and study - the Regional Technical Center of Fez-Meknes. I am graduated from the national school of mineral industry Rabat as a geotechnical engineer and I am conducting my thesis within the Intelligent Systems, Georesources and Renewable Energies laboratory. Indeed, my research is focused on the physical-mechanical characterization of malrs-limestone of Taza and their reuse in the field of civil engineering.

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Effect of Aluminum Sawdust Waste on the Technological Properties of Unfired Clay Bricks as a Construction Material

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[2] *Regional Center for Education and Training Professions Fez-Meknes.*
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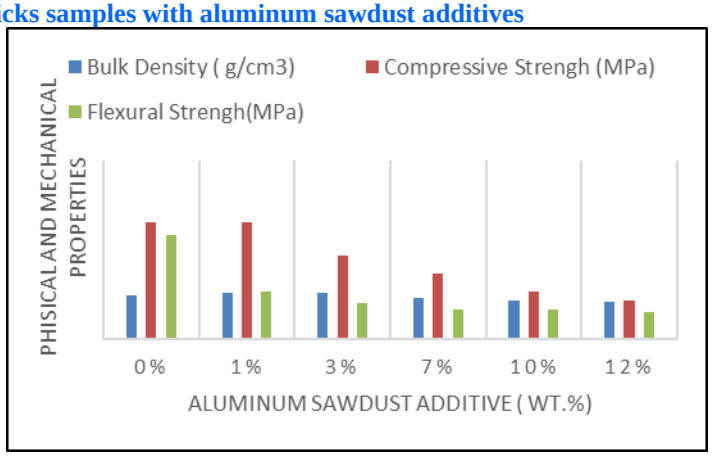
[4] *Laboratory of Sustainable Energy Materials, Al Akhawayn University, Ifrane 53000, Morocco.*

Abstract

With the aim of obtaining construction bricks with improved properties, this paper provides a design of unfired clay bricks based on extracted clay from Oulad Azam village in the region of Taounate in Morocco and additive of Aluminum sawdust. The main objective is to study the influence of Aluminum sawdust dosage on the physical and mechanical properties of unfired bricks. First, X-ray diffraction analysis according to standard NF EN 13925-1 on a sample of powdered clay showed that the clay studied is of the Illite type with non-swelling characteristics. Aluminum sawdust additive was incorporated in the form of powder of sizes ranging from zero to one millimeter produced by grinding and sieving, considering a variation of the percentage by weight of the additive (0%; 1%; 2%; 4%; 6%; 8%; 10%; 15% & 20%). The measurements of the bulk density according to NM EN 772-16 showed that the bricks obtained are light since their bulk density does not reach 2.75 g/cm^3 as the limit value prescribed by the aforementioned standard. The results of the compressive strength according to NM EN 772-1 showed a noticeable decrease as the percentage by weight of the additive exceeds 1%, which is explaining by the fact that the dosage of 1% provides a better consistency between the layers of clay, prevent deformation of the brick, causes homogeneity and uniforms distribution within the clay brick. On the contrary, the measurements of flexural strength according to NM EN 772-2 showed a notable decrease in bricks resistance following a direct increase in the dosage of Aluminum sawdust additives. According to the German DIN 18945(2013-08) standard the bricks obtained have a good use in the field of earth construction. Hence, a positive impact on the local socio-economy and ecology of the region is envisioned thanks to the valorization of its natural resources.

Figures: Physical and mechanical properties of unfired clay bricks samples with aluminum sawdust additives



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5. H. Limami, I. Manssouri, K. Cherkaoui, L. Amazian, A. E. Baraka and A. Khaldoun, *7th International Renewable and Sustainable Energy Conference (IRSEC), Agadir, Morocco.* (2019), pp. 1-6.

Biography

Author is a PhD student at ENSAM-Meknes, Moulay Ismail University, and holder of a civil engineering degree of FST Marrakech, Cadi Ayad University. He started his professional career in the private sector as a structural engineer. Then he joined the public sector as Engineer in charge of the Infrastructure Service in the Ministry of Equipment and Water. His focus is based on ecological construction material based on clay and bio-based additives.

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Accelerated and ultra-accelerated photoaging of polyethylene films used as greenhouse cover

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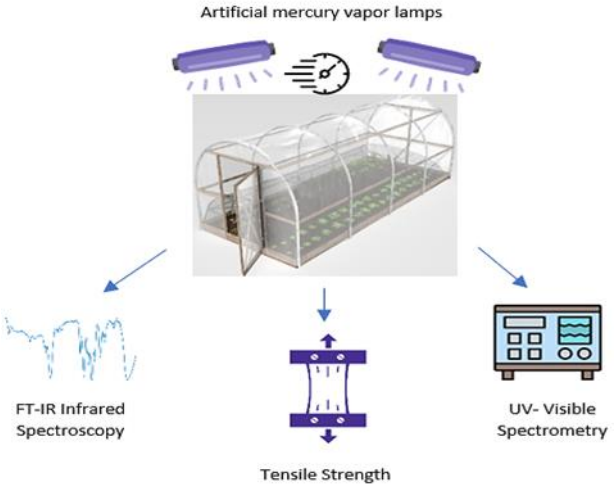
[2]*Laboratory of Modeling and Simulation of Intelligent Industrial Systems (M2S2I), Higher Normal School of Technical Education (ENSET) Mohammedia, University Hassan II of Casablanca.*

Abstract

UV degradation of greenhouse films is a common occurrence that can shorten their lifespan and affect crop growth. UV stabilizers are frequently added to films during production to reduce the effects of UV degradation. The purpose of this paper is to investigate the results of the accelerated and ultra-accelerated artificial aging of 6 types of greenhouse films, the samples were exposed in an artificial mercury vapor lamps aging cell. The aging of the films was followed by various physicochemical characterization techniques, including FTIR infrared spectroscopy, UV-Visible Spectrometry and tensile strength. The results revealed that the composition of the polymer, the nature and amount of the antioxidant, the UV opacity of the film are key factors for the photostability of greenhouse films.

Figure: General figure of the process.



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Biography

Lina Goudali is a second-year PhD student in Science and Materials Engineering at the Higher Normal School of Technical Education (ENSET) of Mohammedia, which is affiliated with the Hassan II University of Casablanca. Prior to her enrollment at ENSET, Ms. Goudali earned a Bachelor's degree in Agri-Food Engineering and a Master's degree in Agri-Food Science and Technology. Currently, she holds a position as a Research, Development, and Innovation Engineer at the Technical Center of Plastics and Rubber (CTPC) in Casablanca. Ms. Goudali is committed to research and is enthusiastic about the development of novel composites and materials that can reduce the environmental impact of conventional synthetic polymers.

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New pyrazole-tetrazole compounds: synthesis, characterization and in-vitro α-amylase inhibition

Ahlam Oulous[1], Nour Elhouda Daoudi[2], Mounir Cherfi[1], Tarik Harit[1], Mohamed Bnouham[2], Fouad Malek[1]

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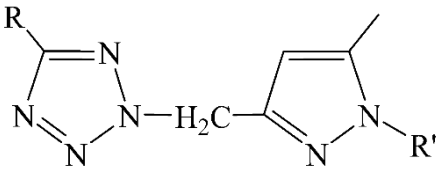
[2]*Laboratory of Bioresources, Biotechnology, Ethnopharmacology and Health, Faculty of Sciences, Mohammed First University, Oujda, Morocco*

Abstract

The synthesis, characterization and in-vitro α-amylase inhibition of a new pyrazole-tetrazole compounds were achieved. Their structures are identified by several technique including NMR, FTIR spectroscopies and mass spectrometry. Also, their in-vitro α-amylase inhibition was examined by spectrophotometric methods. the compounds possess an interest activity, especially the molecule entitled 2-(1-((5-methyl-1H-pyrazol-3-yl) methyl)-1H-tetrazol-5-yl) pyridine 4 which was found to be extremely potent compared to the used positive controls. The obtained results are also supported by DFT calculation and molecular docking study. On the other hand, the results obtained from compound 4 are sufficient to make it a good drug candidate to treat Type 2 diabetes.

Figure



Recent Publications

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Biography

Ahlam oulous a PhD student at faculty of Sciences - Mohammed 1st University Oujda, run research about the synthesis and characterization of new pyrazole-tetrazole compounds and their application.

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Microwave absorption properties of WC / Al_2O_3 ceramic composite at X-band frequencies

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Abstract

In this paper, we studied the ceramic composite WC/Al2O3 with three concentrations of tungsten carbide (WC). The aim is to study the effect of WC content on the dielectric and microwave absorption properties of this composite by simulation in the frequency range from 8.2 to 12.4 GHz. The results obtained show that the complex permittivity increases with increasing WC content and decreases with increasing frequency in the X-band. When the WC content increases up to 40 vol%, the composite exhibits the optimum microwave absorption property with RL bandwidth less than -10 dB is 1.72 GHz, and it is obtained in the frequency range from 9.4 GHz to 10.5 GHz and the minimum reflection loss is -26.36 dB at 11.5 GHz. This indicates that the studied composites may be potential candidates for microwave absorption.

Table 1. Comparison between the microwave absorption properties for the three WC contents of the composite studied.

RL_{min} (dB)	f_m (GHz) of RL min	Bandwidth for RL<-10dB	Bandwidth for RL<-20dB	
Al2O3-20%WC	-1.46	10.62	------	-----
Al2O3-30%WC	-26.36	11.2	10.44 GHz at 11.94 GHz (1.5 GHz)	10.88 GHz at 11.5 GHz (0.62 GHz)
Al2O3-40%WC	-37.15	10.52	10.10GHz at 11.02 GHz (0.92GHz)	10.32 GHz at 10.74 GHz (0.42GHz)

Figure 1. The real part of complex permittivity of WC/Al2O3 ceramic composite with different WC contents in the X band

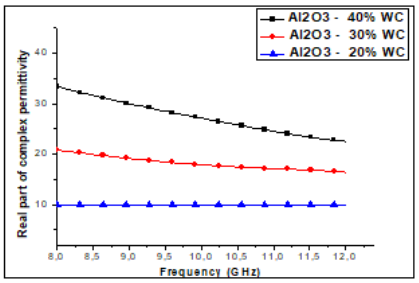


Figure 2. The imaginary part of complex permittivity of WC/Al_2O_3 ceramic composite with different WC contents in the X band

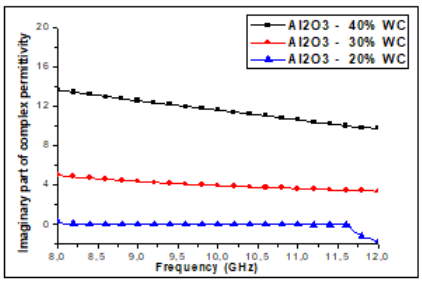
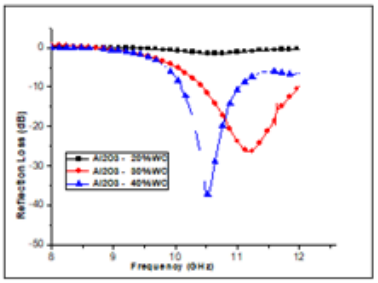


Figure 3. Reflection loss (RL) of WC/Al2O3 composite with different WC contents in the X-band.



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Biography

The author OUHASSAN Youssef is a doctor in electrical engineering, a researcher member in the Laboratory of Electronic Systems, Information Processing, Mechanics and Energy, Faculty of Sciences, Ibn Tofail University, Kenetra, Morocco. His expertise is the study of the dielectric and microwave absorption properties of ceramic composite materials at microwave frequencies. He obtained his doctorate in 2022 at Ibn Tofail Kenitra University under the theme: Microwave characterization of ceramic matrix composite materials in the X and Ku bands. He has published 4 articles. Its H index is 2 on Scopus.
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Surface states in one-dimensional Graphene-Dielectric photonic crystal

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Abstract

In this work, we study the propagation and localization of electromagnetic waves in a semi-infinite and infinite superlattice made out of graphene/dielectric bilayers [1-2]. Our goal is to show

The possibility of existence of band gaps in an infinite superlattice even though the weak thickness of the graphene layer.

The possibility of existence of surface modes in a semi-infinite superlattice terminated by a thin cap layer by analogy with the surface modes already obtained in one dimensional superconducting photonic crystal [3]. The cap layer can be either dielectric or graphene. These modes fall below the light line of vacuum and inside the superlattice band gaps. An analysis of the electric and magnetic fields of these modes allowed us to study the spatial localization of these modes in the system.

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Biography

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Fabry-Perot bound states in the continuum in a mesoscopic loop connected to two resonators

K. Lamayny[1], O. El Abouti[1], T. Mrabti[2], M. Amrani[3], S. Khattou[3], Z. Labdouti[3], A. Mouadili[4], E.H. El Boudouti[3]

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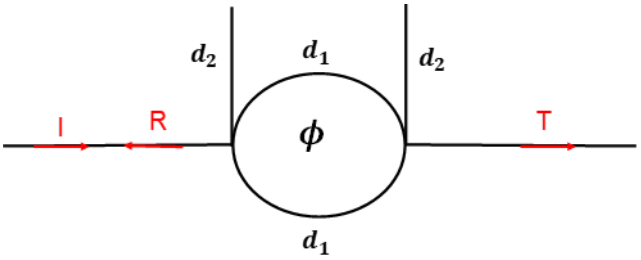
Abstract

Bound states in the continuum (BICs) attract much interest in recent works in wave physics [1-5]. (BICs) are resonances with zero width (infinite lifetime) without any leakage into the surrounding media. Due to their infinite quality (Q) factor, BICs are used in a wide range of applications such as light-matter interactions, biological sensing, and optical communications. The goal of this work is to show the possibility of existence of Fabry-Perot (FP) BICs in a simple mesoscopic structure made of one symmetric loop of length $2d_1$ connected to two resonators of lengths d_2 in presence of a magnetic flux ϕ (Aharonov-Bohm effect) (Figure 1). We demonstrate that the FP-BICs can be induced by the mesoscopic structure and we have shown analytically the conditions that should be satisfied by the lengths d_1 and d_2 in order to obtain such BICs. These BICs are independent on the magnetic flux. When deviating from the BIC position, the latter transforms to a Fano resonance, its width depends on the magnetic flux.

Figure 1: Schematic representation of the symmetric loop of length $2d_1$ connected to two resonators of lengths d_2 in presence of a magnetic flux ϕ. I, R and T design the incident, reflected and transmitted waves.



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Biography

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Investigation of coal fly ash and electric furnace slag as potential local materials for sensitive thermal storage of industrial waste heat

R. Chattahy[1,2], M. Bakkas[1], K. El Maalam[2], M. Ben Ali[2], S. Boukheir[2], A. Chbihi[2], A. Eljersifi[2], S. Naamane[2]

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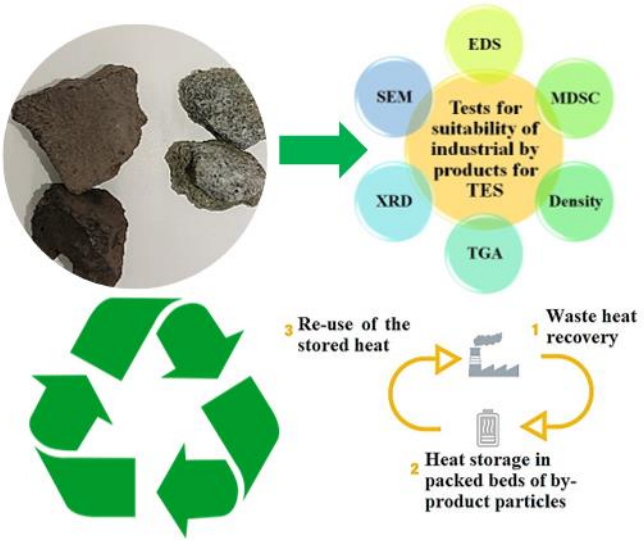
Abstract

Benefiting from waste heat to reduce the need for heat in industrial processes requires an efficient, secure and less expensive Thermal Energy Storage (TES) system. The packed bed system can reduce the infrastructure investment costs for thermal storage, compared to the two-tank molten salt system, and also contribute on the valorization of low-cost materials such as rocks, sand and industrial wastes or by-products (asbestos, demolition waste, steel slag, coal ashes...).

Solid wastes from the coal-fired power plant industry and electric steel mills show a great potential as thermal storage materials. The objective of this work is to validate this finding through an experimental laboratory study and also examine the application of these materials for TES up to 500 °C. This study concerns the structural and thermal characterization of locally available solid by-products obtained from the local coal-fired power plant and steel industry, namely coal fly ash and electric furnace steel slag, respectively. After the analysis of the characterization results, these industrial waste materials in their raw or shaped form will be experimentally tested and validated on a laboratory-scale prototype of 150 kWh.

Figure: 1. Valorization process of industrial by-products for thermal energy storage.



Biography

The author is an engineer and a PhD-student specializing in industrial thermal and renewable energy and passionate about sustainable development and environmental protection. He focuses on industrial energy efficiency and the recovery of industrial waste as sensitive thermal storage materials. He obtained his engineering degree in 2021 at the National School of Arts and Crafts, Meknes.

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Surface acoustic waves interaction with confined phonons in a single layered ridge set on top of a multilayer design

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Abstract

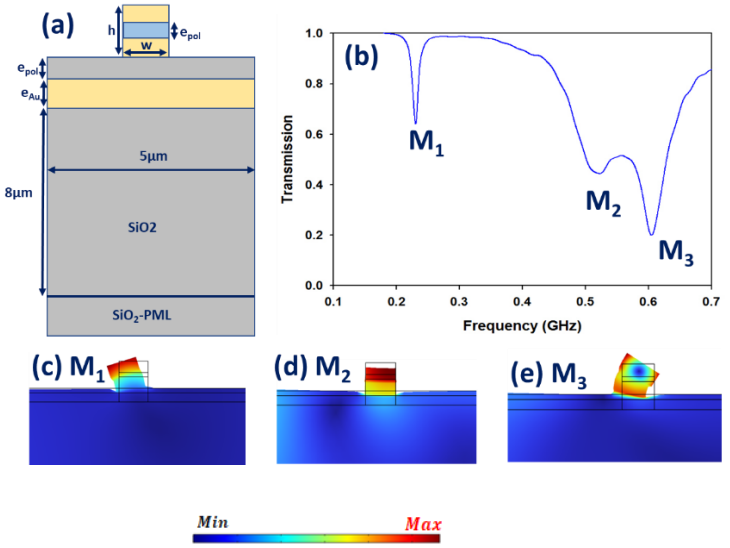
Lately, nanoscale multilayered structures designs have attracted a great deal of interest due to their interesting properties in terms of the highly localized acoustic or optical modes they support[1,2]. Such systems have shown interesting optomechanical phenomena[2,3], and could be harvested for sensing applications[4].

Motivated by this, we present in this communication a theoretical study about the interaction between surface acoustic waves (SAW) propagating at the surface of a multilayer nano-structure and highly confined phonons within a single Au ridge, supported by the design on top. Specifically, the device consists in a glass substrate with a gold film placed near the top surface covered by a thin polymer material, over which the gold ridge is set. The latter contains a thin polymer layer lying at its middle plane. We show efficient interaction between SAW and the localized phonons in the ridge, which gives rise to dips in the transmission spectrum.

The numerical investigations are performed based on the finite element method (FEM), using Comsol Multiphysics. In order to simulated the transmission, we employ a mechanical excitation line force on top at the left side of the ridge (Fig. 1(a)) and then register the transmission coefficient near the system output. The transmission coefficient is normalized with respect to the case where the ridge is not present.

Fig. 1(a), shows a sketch of the system, while in Figs. 1(b), we give the corresponding transmission. One notes the excitation of three modes appearing as dips in the spectrum, at the frequencies, $f_1 \approx 0.231\,GHz$ (mode M1), $f_2 \approx 0.518\,GHz$ (mode M2) and $f_3 \approx 0.604\,GHz$ (mode M3). These modes correspond, according to their displacement field map distribution in Figs. 1(c)-4(e), to first order flexural, compressional and a higher order flexural mode, respectively.

Figure: (a) Sketch of the design, made of a gold metal film of thickness e_{Au} = 100nm lying underneath a polymer film of thickness e_{pol} = 50nm over which a gold ridge is set. The latter contains a thin polymer layer of thickness, e_{pol}, in the middle. The system is deposited on a SiO_2 substrate. We set PMLs all around the structure to avoid spurious reflections. (b) Corresponding transmission coefficient, normalized with respect to that of a flat surface with no ridge. (c)-(e) Displacement field distribution in the geometry at the frequencies of the dips in (b), $f_1 \approx 0.231\,GHz$ (mode M1), $f_2 \approx 0.518\,GHz$ (mode M2) and $f_3 \approx 0.604\,GHz$ (mode M3).



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Biography

Mohamed El Ghafiani is a PhD student in phononic and photonic systems at Mohamed First University Oujda, Morocco. Having received His Master's degree in physics of matter and radiation from the same institution. Currently, his research focuses on 1D systems. Mohamed El Ghafiani is supervised by Prof. El Houssaine El Boudouti and Prof. Adnane Noual, is a member of Physics of Matter and Radiation Laboratory (LPMR), and enjoys reading in his free time.
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Green and sustainable synthesis of metal-organic frameworks for the adsorption of phosphate

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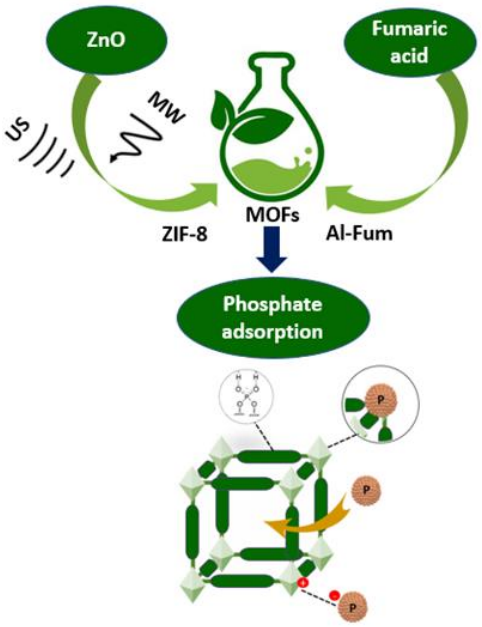
Abstract

Metal-organic frameworks (MOFs) are a new emerging type of materials, defined as crystalline micro/mesoporous hybrid materials composed of metal ions or metal clusters interconnected by organic linkers. These materials exhibit tunable functionalities and porosity as well as high surface areas and framework flexibility. These fascinating features promote MOFs as suitable materials for applications in gas storage, catalysis, and drug delivery, as well as adsorption and sensing [1]. In addition, scientists today are targeting the green and sustainable synthesis of these MOFs, taking into consideration the associated cost, as well as the environmental impacts of the precursors and the synthesis procedures [2]. Thus, our study aims to produce MOFs sustainably by using green organic and metallic precursors and reducing the reaction time and energy. The first study described the use of aluminum-based fumarate MOF (Al-Fum) for phosphate adsorption from water with a comparison with Al-MOF-derived dicarboxylic acids (Al-BDC) and tricarboxylic acid (Al-BTC). The phosphate adsorption performance of the different synthesized Al-MOFs was evaluated with the help of different batch experiments related to the effect of adsorbent and adsorbate concentrations, contact time, pH and temperature. Interestingly, Al-Fum displayed the highest adsorption capacity (67,62 mg P/g) compared to Al-BDC (47,58 mg P/g) and Al-BTC (23,17 mg P/g) at RT [3]. The second work focused on the conversion of oxide into MOFs which is considered as an environmentally friendly way for the fabrication of MOFs. For the first time, we used ultrasound (US) and microwave (MW) for the conversion of zinc oxide into ZIF-8 in different solvent mixtures. The results revealed different morphologies and particle sizes in different synthesis conditions and solvents with higher conversion rate using US over MW. The synthesized MOFs demonstrated excellent phosphate adsorption capacity, thereby giving them the potential to be used as effective adsorbent materials for wastewater treatment [4].

Figure: Illustration of the green synthesis of ZIF-8 and Al-Fum for phosphate adsorption.



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Biography

Loubna BAZZI, is currently a PhD student at Chemical and Biochemical Sciences, Green Process Engineering department at Mohammed VI Polytechnic University (UM6P). She obtained her master's degree in 2018 in functional materials from the Faculty of Sciences and Technologies-Cadi Ayyad University-Marrakech. She is currently working on the sustainable synthesis of Metal-organic frameworks for adsorption applications under the supervision of Prof. Samir EL HANKARI.

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Green froth flotation for a selective separation of calcium-bearing minerals: exploring the potential of bio-based alternatives to conventional collectors.

Manar DERHY [1,2], Yassine TAHA [1], Asmae EL BAHI [1], Yassine AIT KHOUIA [1], Mostafa BENZAAZOUA [1], Rachid HAKKOU [1,2].

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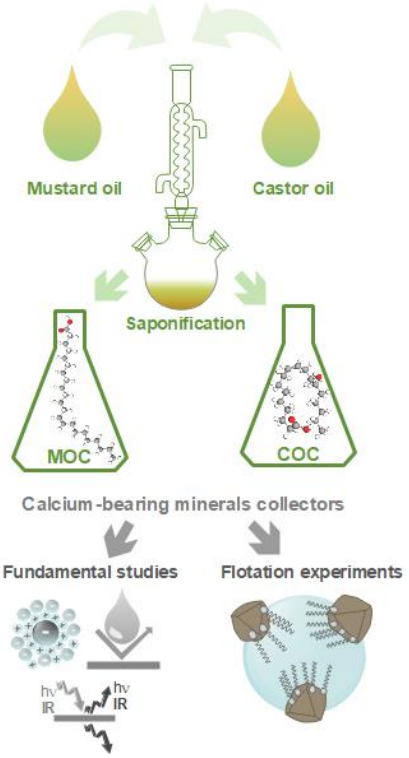
Abstract

Fatty acids are commonly used in calcium-bearing minerals flotation. Their carboxylic groups engage with the mineral particles under physical/chemical interactions. Their hydrocarbon groups on the other hand interact with the gas phase. Ultimately, this process renders the mineral particles hydrophobic, isolated in a mineral lather, and separated from the other mineralization comprised in the processed ore. Fatty acids are usually used owing to their availability and low cost. They are often petroleum-based, synthesized following polluting processes. Conversely, bio-based fatty acids represent a safer and sustainable alternative. These are mainly derived from vegetable oils and regarded for their effectiveness, abundance, and eco-friendliness. In the present study, two vegetable oils were investigated on their eligibility as unconventional resources of fatty acid collectors. Castor and mustard oils are the subject for this study in view of their fatty acid profiles as they comprise high ricinoleic and erucic acid contents respectively. Accordingly, the oils were characterized then saponified. The reaction products were characterized using FTIR, and critical micellar concentration determination. The two bio-based collectors were tested in a sedimentary phosphate ore system. This ore contains calcite and dolomite as gangue minerals and apatite as the valuable one. The selectivity of the bio-based collectors towards each mineral surface was assessed trough fundamental studies. These include zeta potential, surface characterization and wettability assessments. Intense peaks characterizing fatty acid alkyl chains and calcium-carboxylate formation were recorded by FTIR analyses. Additionally, important contact angle increases were observed during the wettability assessment. Ultimately, results underlined the affinity of the castor and mustard oil collectors towards carbonate (calcite and dolomite) and apatite respectively. Moreover, Flotation tests conducted on a phosphate ore have further proved the eligibility of the castor soap as a selective calcite and dolomite collector (SE and SI of 66.29 % and 14.18 respectively).

Figure



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Biography

Received her master's degree in Materials Physico-Chemistry and Analysis from the Faculty of Science and Technology- Hassan II University, Morocco. Currently, she is a PhD student at Mohammed VI Polytechnic University and Cadi Ayyad University, Morocco. Her research interests relate to froth flotation for upgrading phosphate ores. She published and contributed to three papers. Her H-index is 3 on Scopus.
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Flexible Piezoelectric Nanocomposite films based on PVDF doped with $CoLa_{0.2}Fe_{1.8}O_4$ For Energy Harvesting Applications

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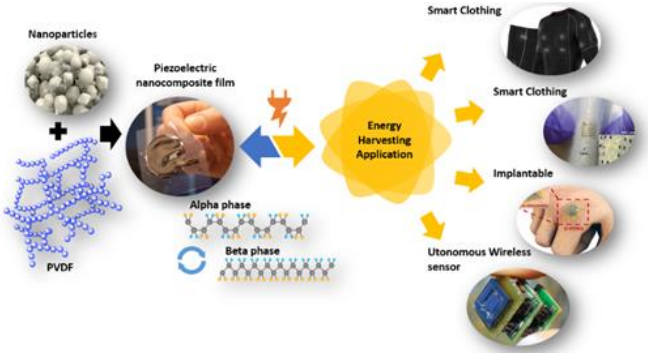
Abstract

Energy harvesting is the process of acquiring the energy surrounding a system and converting it into electrical energy that can be utilized. In recent years, research around this field has grown considerably owing to the advanced developments in wireless technology and low-power electronics, such as microelectromechanical systems. Evidently, energy is all around us, and the energy conductor is the most important component of energy collection. Using piezoelectric materials with high mechanical vibration energy conversion capability has sparked a great deal of interest and much research has gone into developing simple and efficient devices using these materials. Piezoceramics and piezopolymers are two types of representative piezoelectric materials. Accordingly, the focus of this study is on the nucleation of the β-phase of piezoelectric polymer poly (vinylidene fluoride) (PVDF) by incorporating rare earth element lanthanum (La) doped spinel cobalt ferrite synthesized through co-precipitation method, leading in this way to the preparation of piezoelectric nanocomposites films (PVDF/$CoLa_{0.2}Fe_{1.8}O_4$) with polar β-phase formation making use of solvent casting technique. Different characterization techniques are used to characterize the physicochemical properties of nanoparticles as well as the nanocomposite. Finally, in this work, we want to study the effect of nanoparticle loading on the increase of the piezoelectric β-phase content and how this material can be used for current and future power generation applications.

Keywords: Energy harvesting, polyvinylidene fluoride (PVDF), Ceramics, nanocomposite, piezoelectricity.

Figure



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Biography

Chaymae BAHLOUL is a first year PhD student within Polymer & Composites (PolyCom) tribe of MSN department at Um6p. She's working on PhD project entitled "Development and Characterization of Electroactive Polymers for Energy Harvesting Applications". In 2022, she graduated her master's degree in Materials Science at Mohammed V University of Rabat. She obtained her bachelor's degree in chemistry at Mohammed V University of Rabat in 2020. During her academic cursus, she developed knowledge in materials chemistry, which is an interdisciplinary science that involves inorganic, organic, polymeric, hybrid materials, and thus materials incorporate nanoscience and polymer chemistry.
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First-principles investigation of electronic, elastic, optical and thermoelectric properties of strontium-based anti-perovskite Sr_3MN (M= P and As) for potential applications in optoelectronic and thermoelectric devices

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[2]*Department of Physics, Faculty of Sciences and Engineering, University of Nusa Cendana, Kupang, Nusa Tenggara Timur, 85001, Indonesia.*

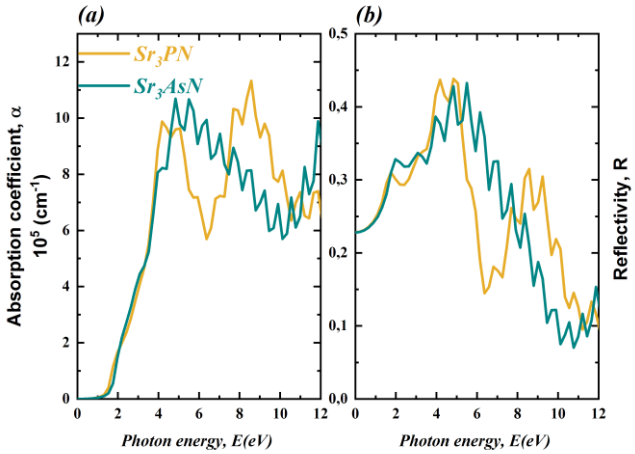
Abstract

The search for new materials with unique physical and chemical properties is a major challenge for industries today, across various fields such as nanotechnology, biomaterials, and electronic, optical, and thermoelectric systems. Anti-perovskite structures have garnered significant interest in the past two decades due to their unique electronic and optical properties. Recently, anti-perovskite compounds based on nitrides have become a subject of significant theoretical and experimental research.

In this study, we investigate the electronic, elastic, optical, and thermoelectric properties of Sr_3MN (M = P and As) anti-perovskite using density functional theory implemented in the Quantum Espresso code, employing the standard GGA-PBE approximation for the exchange-correlation energy description. This research is important because the development of new materials with unique properties can lead to significant advancements in various fields and applications. Our findings indicate that the chosen Sr_3MN compounds possess optimal lattice values of 5.07Å, 5.11Å, respectively. These compounds exhibit direct band gaps at the Γ point, which refers to the direct transition of an electron from the valence band to the conduction band at a specific point in the Brillouin zone, with values of 0.56 eV, 0.40 eV respectively. Furthermore, we investigate the chemical stability of the compounds by calculating their formation energies, which indicates their potential for experimental synthesis. The elastic constants of the compounds follow stability criteria, and their optical properties show high light absorption and low reflectivity in the ultraviolet light spectrum, demonstrating their potential for various applications such as solar cells and optoelectronics.

Moreover, using the BoltzTraP code, we predict the influence of temperature on the thermoelectric parameters of the compounds. We found that the thermoelectric properties of the compounds exhibit interesting temperature-dependent behavior. Our comprehensive analysis of the properties of anti-perovskite Sr_3MN compounds can have important implications for their practical applications in various fields.

Figure: The calculated absorption coefficient (a), and reflectivity (b) of Sr3MN (P and As)



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Biography

I am currently in my third year of a doctoral program, with a research focus on developing novel perovskite materials for various applications. Recently, my research efforts led to the publication of two articles in indexed journals on the used perovskite materials in photovoltaic, solar cells and thermoelectric applications.
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Electronic states in GaAs/AlGaAs/GaAs Core/shell Cylindrical Quantum Wires

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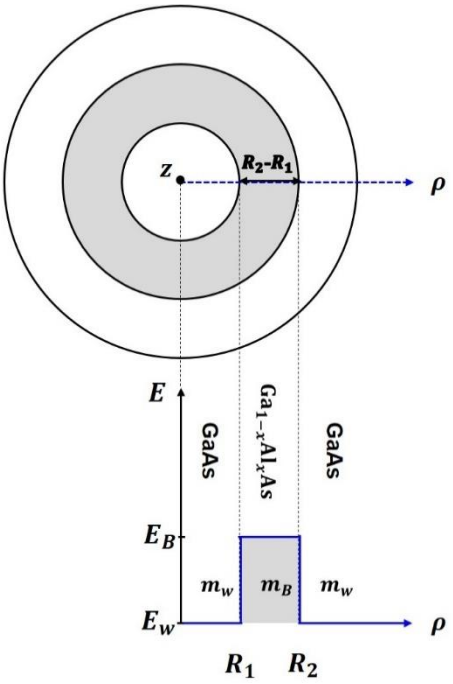
[2]*Engineering Sciences Laboratory (LSI), Multidisciplinary Faculty of Taza, Sidi Mohamed Ben Abdellah University, B.P. 1223, Taza Gare, Morocco.*

Abstract

Cylindrical quantum wires based on GaAs/AlGaAs/GaAs core-shell semiconductors, also known as core-shell nanowires, are three-layer semiconductor nanostructures that exhibit interesting electronic properties. In this review, we explore in detail the electronic band structure and electronic transmission in these core-shell nanowires using the Green's function formalism, an advanced theoretical approach for describing quantum electronic properties. We discuss the electronic properties, including energy levels, quantum confinement effects, and transport properties, that are influenced by the core-shell structure. We use the Green's function formalism to characterize the electronic states in these nanostructures. We also highlight the potential applications of GaAs/AlGaAs/GaAs core-shell nanowires in fields such as electronics, optoelectronics and photonics. The results show that the electronic energy levels in a core/shell CQWRs shift to high energies when the radius is very small, due to the geometrical confinement. In addition, when the barrier concentration increases, the electronic energy levels shift in the top of energy. This review aims to provide a comprehensive overview of the electronic states in GaAs/AlGaAs/GaAs core-shell nanowires, highlighting their potential for future applications in nanoelectronics.

Keywords: Core-shell, Nanowires, Electronic properties, Cylindrical Quantum Wire, Electronic states, Green Function.

Figure



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Biography

Author has her expertise in evaluation and passion in improving the bone and cement used in dental medicine. Her focus is based on the use of natural phosphate to have application in health field. She was warded her PhD in 2013 from the University of ...., Country. She published more than 20 papers. Her H-index is X on Scopus.
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Influence of secondary electron emission on the plasma characteristics in an argon inductively coupled discharge

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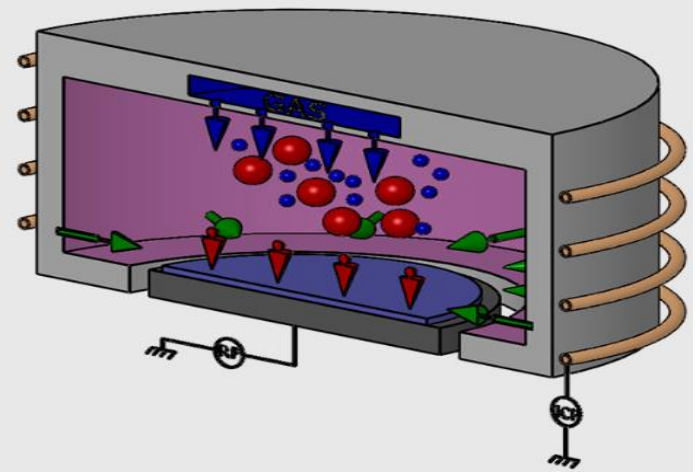
Abstract

In this work, we studied the effect of the secondary electron emission coefficient on the discharge characteristics plasma, such as electron density, electric field, electron temperature and ionization rate. The results obtained showed a significant increase of the electron density and a decrease of the sheath thickness when the number of secondary electrons increases. In addition, the electron temperature increased only in the sheath regions, and remained constant in the central region of the plasma. These results also showed the appearance of the ionization rate in each sheath as the secondary electron emission increases, indicating that the discharge may be sustained by secondary electrons as well.

Figure: Plasma discharge in ICP Reactor



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1. G. Yassmina, G. Meryem, S. Sara, E S, Abdenacer and Z. Cifallah, *Materials Today: Proceedings*, 72 (2023) 3564-3569.
2. Sun, J. Y., Zhang, Q. Z., Liu, Y. X., & Wang, Y. N., Plasma Sources Science and Technology, 29 2 (2020) 024001.
3. M. Grari, C. Zoheir, Yousfi Y., et al. *Chin. Phys. B* 30 (2021) 055205
4. Wen, Ying-Ying, Zhang, Yu-Ru, Jiang, Ge, et al, AIP Advances, 9 5 (2019) 055019.
5. M. Grari and C. Zoheir *Int. J. Eng*, 33 (2020) 1440-1449.

Biography

My name is Yassmina Guetbach, I am a Ph.D. student at the LETSER Laboratory of the University Mohammed the First's physics department, Oujda, Morocco. My research area is Plasma Discharge and Renewables Energies, and My thesis focuses on plasma discharge in an ICP plasma reactor to have applications in the field of thin-film solar cells.

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Structural, morphological, optical and magnetical properties of $NiFe_2O_4$ micro particles and nanoparticles and their effect on thermoplastic matrix

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Abstract

Soft magnetic ferrites, in general, possess useful properties such as a significant saturation magnetization, a high electrical resistivity, low electrical losses, and mechanical hardness, making them an appealing class of magnetic materials appropriate for a wide range of uses. Nevertheless, their low corrosion resistance and their higher energy consumption during the processing, makes them susceptible to degradation of the magnetic properties. One possible solution is the development of innovative polymeric composite magnetic materials. This composite material is a composition of particles with magnetic properties incorporated into an extended polymer thermoplastic matrix to create an integrated functional system with additional magnetic properties. Which allows to these materials to be used in different applications such as automotive and aeronautics fields. In addition to their magnetic properties, their corrosion resistance, cost effective and their lower energy consummation during the processing, makes them the best substitute for current materials. In this sense and in order to obtain novel high-performance magnetic polymeric composite using injecting molding, NiFe2O4 particles have been synthesized with two different methods and used as a filler in a polymeric matrix. X-ray Diffraction (XRD), Fourier Transform Infrared (FTIR), UV visible, Raman spectroscopy and Scanning Electron Microscopy (SEM) were used to study the structural and morphological characteristics of the magnetic particles as well as the composite materials, magnetic properties were investigated by using Vibrating Sample Magnetometer (VSM), and Thermogravimetric analysis (TGA) was used to examine thermal stabilities of magnetic composite materials.

Figure: schematization of Co-precipitation method, solid state rout and fabrication of composite materials

Recent Publications

1. conductive polyurethane composites with high content of two functional fillers base on 'Root' inspired microstructure," Compos. Part B Eng., vol. 252, no. December 2022, p. 110512, 2023, doi: 10.1016/j.compositesb.2023.110512.
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3. A. Kania, K. Berent, T. Mazur, and M. Sikora, "3D printed composites with uniform distribution of Fe3O4 nanoparticles and magnetic shape anisotropy," *Addit. Manuf.*, vol. 46, p. 102149, 2021, doi: 10.1016/j.addma.2021.102149.
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Biography

Sarah Baayyad, is currently a PhD student at Materials Science and Nanoengineering department –Mohammed VI Polytechnic University– Benguerir- Morocco. She received in 2021 her master's degree in functional materials and additive manufacturing from Euromed Polytechnic School – Euromed University-fez-Morocco. She is currently working on the development, and characterization of high performance magnetic materials based on thermoplastic polymers.

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Enhancing Thermal Properties of Wood flour/High-Density Polyethylene Composites through Incorporation of Phase Change Materials

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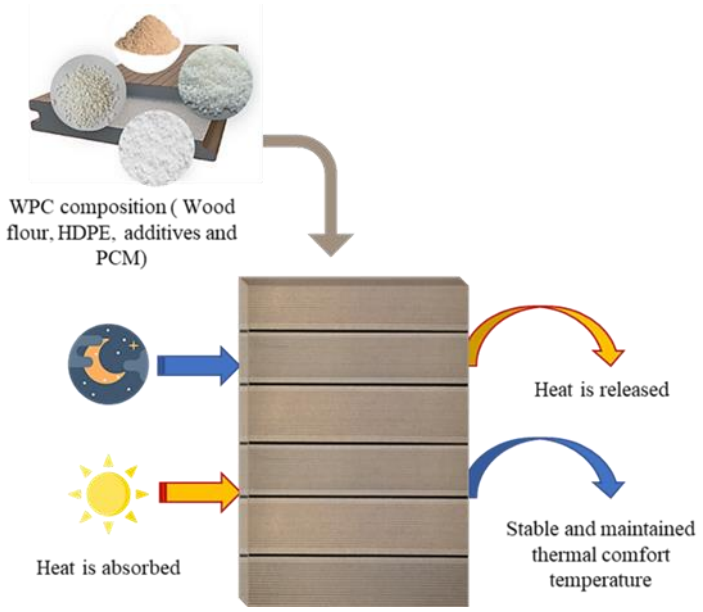
Abstract

The use of phase change materials (PCMs) in building products is increasing due to their ability to store and release thermal energy during phase transitions such as melting and solidification by absorbing and releasing heat efficiently. Wood-plastic composites (WPCs), on the other hand, are a combination of wood fibers and thermoplastic materials, commonly used in outdoor applications. This scientific paper investigates the potential of incorporating phase change materials (PCMs) into WPCs to improve their thermal properties. The incorporation of PCMs into WPCs could result in materials with enhanced thermal regulation and energy efficiency properties. In this study, different types of PCMs were evaluated for their compatibility with WPCs and their impact on thermal properties, resulting in the enhancement of their thermal regulation and energy efficiency while maintaining acceptable mechanical properties, especially when a high loading of PCM is used. This research opens up new possibilities for the development of novel and sustainable materials for outdoor applications. The optimal PCM loading for the WPCs is found to be around 10 wt%, with a uniform distribution of the PCM particles throughout the composite. These findings offer promising insights into the design and optimization of WPCs with improved thermal energy storage properties for sustainable building applications.

Figure: WPCs incorporated with Phase Change Material (PCM)



Recent Publications

1. Morchid F. Z., Akkouri N., Elfarissi L., Zamma A., Idiri M., Jammoukh M., *MT. Proceedings.* 72 (2023) 3602-3608.

Biography

Morchid Fatima Ezzahrae is a second-year PhD student in Engineering Sciences at ENSET Mohammedia, UH2C. She has a strong passion for sustainable development and is dedicated to the research of finding innovative solutions for the valorization of industrial waste. Her current research focuses on the development of new formulations of wood-plastic composites from waste materials. Specifically, she aims to create a new composite material that can be used for exterior cladding applications while also promoting energy efficiency. Currently working in a technical center specialized in plastics, rubber, and composites. She has a significant experience in scientific research methods and is skilled in material characterization, and thermal and mechanical analysis.
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A novel green lignin modification for designing slow-release fertilizers using coating technology

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[2]*AgroBioSciences Department (AgBS), Mohammed VI Polytechnic University (UM6P), Lot 660 – Hay Moulay Rachid, Benguerir, 43150, Morocco*
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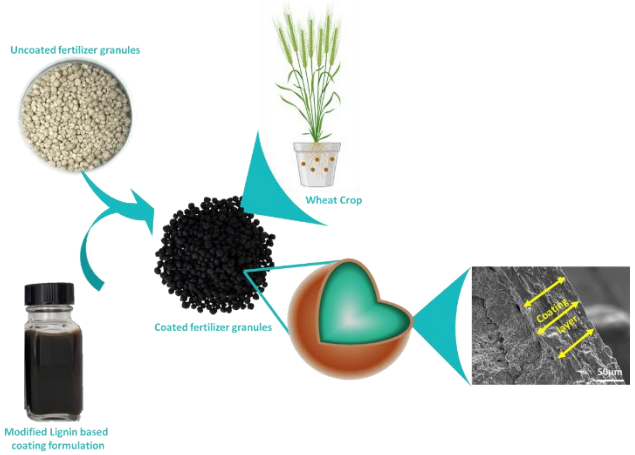
Abstract

Slow release fertlizers are mainly designed to enhance nutrients use efficiency and ensure a sustainable agriculture. In the attempt to develop a novel coated fertilizer with combined slow release and water retention properties; an eco-friendly coating material based on biodegradable polymers was developed.

Lignin was initially extracted from Moroccan alfa plant and then modified using a simple and green process. The elaborated coating material was then characterized and applied onto Di-ammonium Phosphate (DAP) water-soluble fertilizer in a rotating pan machine. Experimental results showed an improved morphology and hardness of DAP fertilizer granules after coating (up to 3 times) as well as a positive impact on the water retention capacity of the soil. Nutrients leaching (P and N) in soil was monitored for 100 days and substantial reduction of nutrients leaching up to 80 % was successfully achieved using coated DAP fertilizer. Furthermore, the gradual concentrations released were essential and high enough to stimulate the growth of wheat crop, including leaves evolution and roots architecture, in addition to the physiological parameters.

Figure: Development of slow-release DAP fertilizer.



Recent Publications

1. **El Bouchtaoui F.-Z.** et al., Slow-release fertilizers based on lignin–sodium alginate biopolymeric blend for sustained N-P nutrients release, J. Coat.Technol. Res. (2022).
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3. Kassem, I. et al., Cellulose Nanofibers/Engineered Biochar Hybrid Materials as Biodegradable Coating for Slow-Release Phosphate Fertilizers. ACS Sustainable Chemistry & Engineering 2022, 2168-0485.
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5. Kassem, I. et al., Cellulose Nanocrystals-Filled Poly (Vinyl Alcohol) Nanocomposites as Waterborne Coating Materials of NPK Fertilizer with Slow Release and Water Retention Properties. Int. J. Biol. Macromol. 2021, 189 (August), 1029–1042.

Biography

Fatima-Zahra EL BOUCHTAOUI, 26 years old, is currently a PhD student at Materials Science, Energy and Nanoengineering department –Mohammed VI Polytechnic University– Benguerir- Morocco. She received in 2019 her master's degree in Polymer Materials & Environment from Faculty of Sciences and Technologies – Cadi Ayyad University-Marrakech-Morocco. She is currently working on the development of new lignin-based formulations for the coating of water-soluble fertilizers, in order to achieve slow-release fertilizers with high nutrients use efficiency.

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Magnetic Polymeric Composites based on Magnetic Nano and microparticles for Industrial Applications

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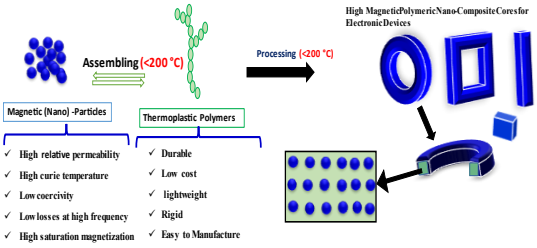
[2]*Moroccan Foundation for Advanced Science, Innovation and Research (MAScIR), Rabat Design Center, Rue Mohamed El Jazouli, Madinat El Irfane, 10100 Rabat, Morocco.*

Abstract

To reduce materials' cost, materials' weight and simplify the manufacturing process of current soft magnetic components consisting of metallic soft magnetic particles, we suggested an approach is the preparation of high-performance magnetic polymeric composites based on soft magnetic ferrite particles with (high values of Curie's temperatures, electrical resistivity, and magnetic saturation, and low values of coercivity, and remanent magnetization) as a filler and thermoplastic polymer as the matrix. To achieve these goals cobalt ferrite micro & nanoparticles ($CoFe_2O_4$) were synthesized by two different methods: solid-state reaction and coprecipitation method and used as a filler to prepare soft magnetic polymeric composites using the extrusion process. Structural morphological, optical, magnetic, thermal, and mechanical properties of all materials were investigated using different techniques (X-ray diffraction (XRD), Raman Spectroscopy, Fourier transform infrared spectroscopy (FT-IR), Scanning electron microscopy (SEM), Energy dispersive x-ray spectroscopy (EDS), Transmission electron microscopy (TEM), UV-Vis spectroscopy, Thermogravimetric analysis (TGA), Differential scanning calorimetry (DSC), and Tensile strength). (XRD), (FT-IR), and Raman spectroscopy confirms the successful synthesis of Co ferrites. The magnetic behavior of Co ferrite was investigated using Vibrating sample magnetometry (VSM). This paper opens the possibility that novel high-performance soft magnetic polymeric composites may be alternative candidates for the construction of magnetic components (inductors and transformers) with low-cost and lightweight properties for use in advanced applications such as electronic devices.

Figure: Processing scheme to prepare magnetic polymeric micro- and nanocomposites.



Recent Publications

1. L. M. Bollig, P. J. Hilpisch, G. S. Mowry, and B. B. Nelson-Cheeseman, "3D printed magnetic polymer composite transformers," J. Magn. Magn. Mater., vol. 442, pp. 97–101, 2017, doi: 10.1016/j.jmmm.2017.06.070.
2. L. M. Bollig, P. J. Hilpisch, G. S. Mowry, and B. B. Nelson-Cheeseman, "3D printed magnetic polymer composite transformers," J. Magn. Magn. Mater., vol. 442, pp. 97–101, 2017, doi: 10.1016/j.jmmm.2017.06.070.
3. C. Zhang et al., "3D Printing of Functional Magnetic Materials: From Design to Applications," Adv. Funct. Mater., vol. 31, no. 34, pp. 1–38, 2021, doi: 10.1002/adfm.202102777.
4. K. J. Merazzo et al., "Magnetic materials: A journey from finding north to an exciting printed future," Mater. Horizons, vol. 8, no. 10, pp. 2654–2684, 2021, doi: 10.1039/d1mh00641j.
5. conductive polyurethane composites with high content of two functional fillers base on 'Root' inspired microstructure," Compos. Part B Eng., vol. 252, no. December 2022, p. 110512, 2023, doi: 10.1016/j.compositesb.2023.110512.

Biography

ESSHOUBA Youssef received a B.S. degree from the University Chouaib Doukkali Faculty of Science in El Jadida, Morocco, in 2020, in Physics of Condensed Matter, and an M.S. degree from the University Hassan II Casablanca Faculty of Science and Technology, Mohammedia, Morocco, in 2022, in Engineering and Physics of Advanced Materials. Currently, he is a Ph.D. student at the MSN department, Mohammed VI Polytechnic University, Benguerir, Morocco. Her research interests include the development and processing of innovative magnetic thermoplastic (Nano) composite parts for advanced industrial applications.

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Comparative study of the mechanical properties of innovative materials for wind turbines.

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[1]*Hassan II University of Casablanca, Higher Normal School of Technical Education Mohammedia (ENSET-M), Laboratory: Modeling and Simulation of Intelligent Industrial Systems (M2S2I), Morocco.*
[2]*Hassan II University of Casablanca, Higher Normal School of Technical Education Mohammedia (ENSET-M), Laboratory: electrical engineering and intelligent systems (IESI), Morocco.*

Abstract

The production of wind turbine blades requires the use of composite materials meeting specific requirements to cope with fatigue and aerodynamic constraints. Generally made of fiberglass and synthetic resins, the classic composites used in this manufacture have a harmful environmental impact due to their origins. Therefore, our research focuses on the use of innovative and sustainable composite biomaterials that promote recycling and preserve the environment. To achieve this objective, our study focused on numerical simulation to model the mechanical characteristics of composite materials commonly used in the manufacture of commercial wind turbine blades.

Then, we conducted a comparative study with a new bio-composite material using the finite element method. The results of the evaluation of the mechanical properties obtained from these materials by this simulation showed that our bio-composite has similar or even better mechanical properties than the conventional composite materials used in the blades of commercial wind turbines. However, our bio-composite exhibits higher fracture toughness and lower density, making it a promising and sustainable bio-industrial alternative.

Biography

Hamza OUTAR is a first-year Ph.D student in engineering sciences at ENSET Mohammedia, specialized in materials science and wind turbines. He obtained his specialized master's degree in renewable energies and energy systems in 2020 from the Faculty of Sciences Ain Chok, Hassan 2 University, Casablanca. His doctoral thesis focuses on the use of bio-sourced materials to improve the performance of wind turbines.
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Encapsulation of therapeutic molecules by starch-cellulose nanocomposites for controlled release

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Abstract

Therapeutic molecules are often sensitive to environmental conditions, such as humidity and light, which can alter their stability and effectiveness. Encapsulation of these molecules can improve their stability and lifespan, as well as their controlled release in the body. Starch-cellulose nanocomposites are promising materials for the encapsulation of therapeutic molecules due to their biocompatibility, biodegradability, and low cost.

Our study aims to encapsulate therapeutic molecules in starch-cellulose nanocomposites and evaluate their stability and controlled release.

We prepared starch-cellulose nanocomposites containing different amounts of montmorillonite clay by the precipitation-deposition method. The therapeutic molecules were encapsulated in the nanocomposites by the complex coacervation method. The nanocomposites were characterized in terms of structure, morphology, and physicochemical properties. The stability of the encapsulated therapeutic molecules was evaluated based on their active compound content and controlled release profile.

Our results suggest that starch-cellulose nanocomposites can be effectively used for the encapsulation of therapeutic molecules, offering improved stability and controlled release of the active compounds. The nanocomposites can be used for the production of prolonged-release drugs or to improve the efficacy of existing drugs.

Keywords: Therapeutic molecules, Encapsulation, Starch-cellulose nanocomposites and montmorillonite

Recent Publications

1. Wei, H., Li, S., Liu, Z., Chen, H., Liu, Y., Li, W., & Wang, G. (2022). International Journal of Biological Macromolecules, 194, 962-973.
2. Meng, Y., Qiu, C., Li, X., McClements, D. J., Sang, S., Jiao, A., & Jin, Z. (2022).. Critical Reviews in Food Science and Nutrition, 1-15.
3. Brondi, M., Florencio, C., Mattoso, L., Ribeiro, C., & Farinas, C. (2022). Carbohydrate Polymers, 295, 119876.

Biography

Pr Mohammed Koudad from the Multidisciplinary Faculty of Nador. He is a chemist specializing in the synthesis of organic molecules, particularly in the field of therapeutic molecules. His work is often focused on the design and synthesis of new classes of molecules that can have enhanced therapeutic effects, such as anti-cancer or anti-microbial activity. He obtained his PhD in 2018 from Mohamed 1er University, Morocco.

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Inhibition of Corrosion of Mild Steel by Oxazole and Isoxazole Derivatives in 1M HCl Medium

Abdelmalik El Aatiaoui [1], Walid Daoudi [1], Emanchar Hanan [1], Mohamed El Mahamdi [2], Selma Lamghafri [3], Noureddine Benchat [2] and Mohamed Abou-Salama [1]

[1] Laboratory of Molecular Chemistry, Materials and Environment (LCM2E),Departement of chemistry, Multidisciplinary Faculty of Nador, University Mohamed I, 60700 Nador, Morocco.
[2] Laboratory of Applied Chemistry and Environment (LCAE), Department of Chemistry, Faculty of Sciences, University Mohamed I, Po. Box 717, 60000 Oujda, Morocco.
[3] Laboratory of Applied Sciences, National School of Applied Sciences Al-Hoceima, Abdelmalek Essaâdi University, Tetouan, Morocco;

Abstract

Corrosion of mild steel in acidic media poses a significant challenge to various industrial processes. In this study, we investigated the corrosion inhibition properties of oxazole and isoxazole derivatives on mild steel in 1M HCl solution using various techniques such as infrared spectroscopy (IR), scanning electron microscopy (SEM), UV-Vis spectroscopy, electrochemical impedance spectroscopy (EIS), and polarization studies. Our results show that the oxazole and isoxazole derivatives effectively inhibit the corrosion of mild steel in the acidic medium. The SEM analysis revealed that the derivatives form a protective film on the mild steel surface, which prevents further corrosion. The UV-Vis spectroscopy studies also showed the formation of a protective film on the mild steel surface. The EIS and polarization studies indicated that the derivatives significantly increase the resistance to charge transfer and decrease the anodic and cathodic current densities, respectively. Overall, our findings demonstrate that the oxazole and isoxazole derivatives are effective inhibitors for the corrosion of mild steel in 1M HCl solution, and the inhibition mechanism is attributed to the formation of a protective film on the mild steel surface. These results suggest that these derivatives can be potentially used as corrosion inhibitors in various industrial applications.

Recent Publications

1. DAOUDI, Walid, GUO, Lei, AZZOUZI, Mohamed, et al. Evaluation of the corrosion inhibition of mild steel by newly synthesized imidazo [1, 2-a] pyridine derivatives: experimental and theoretical investigation. Journal of Adhesion Science and Technology, 2023, p. 1-24.
2. DAOUDI, Walid, AZZOUZI, Mohamed, DAGDAG, Omar, et al. Synthesis, characterization, and corrosion inhibition activity of new imidazo [1.2-a] pyridine chalcones. Materials Science and Engineering: B, 2023, vol. 290, p. 116287.
3. EL AATIAOUI, Abdelmalik, DAOUDI, Walid, EL BOUTAYBI, Ali, et al. Synthesis and anticorrosive activity of two new imidazo [1, 2-a] pyridine Schiff bases. Journal of Molecular Liquids, 2022, vol. 350, p. 118458.

Biography

Abdelmalik El Aatiaoui is an expert in organic synthesis as well as in the field of polymer modification.p I obtained my PhD in 2015 at Mohamed I University. I have published more than 20 papers. My H index is 12 on Scopus.
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Characterization and Adsorption Study of cationic dye on purified and hydrophobic modified diatomaceous earth

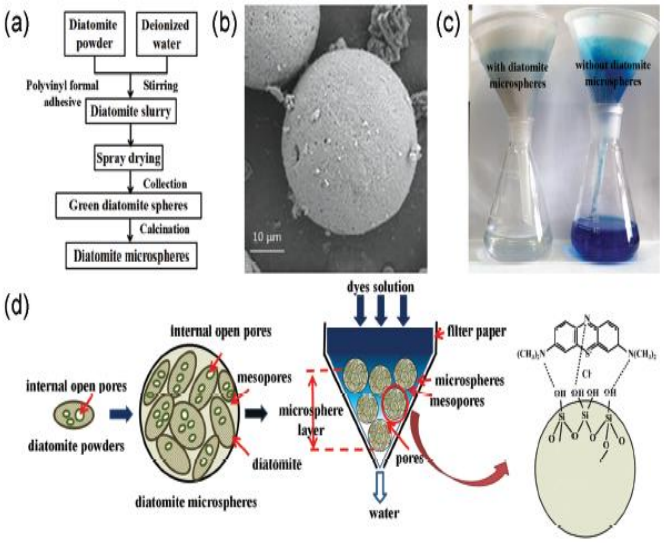
Mohamed EL MIZ[1], Abdelilah ELHADDAR[1], Marie-Laure FAUCONNIER[2], Mohamed ABOU-SALAMA[1]

[1] *Laboratory of Molecular Chemistry, Materials and Environment (LCM2E), Multidisciplinary faculty of Nador, Mohammed First University. Nador, Morocco.*
[2] *Laboratory of Chemistry of Natural Molecules, Gembloux Agro-Bio Tech, University of Liège, Belgium*

Abstract

The present study aimed to characterize the purified and hydrophobic modified diatomaceous earth (DE) and investigate their adsorption efficiency towards a cationic dye, methylene blue (MB). The DE was purified and modified using hexadecyltrimethylammonium bromide (HDTMA-Br) and cetyl pyridinium chloride (CPC). The characterization of the DE was performed using different techniques, including scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDX), Fourier transforms infrared spectroscopy (FTIR), and X-ray diffraction (XRD). The adsorption process was carried out by varying the initial dye concentration, contact time, and pH. The results showed that the modified DE had a higher adsorption capacity than the purified DE due to the hydrophobic nature of the HDTMA-Br. The maximum adsorption capacity was found to be 277.8 mg/g for the modified DE and 192.3 mg/g for the purified DE. The adsorption kinetics followed a pseudo-second-order model, while the isotherm data fitted well to the Langmuir model. The pH of the solution was found to play a crucial role in the adsorption process, with the optimum pH being 8. The study concluded that the modified DE could be a promising adsorbent for the removal of cationic dyes from wastewater.

Figure



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1. Berraaouan, Doha, et al. "Adsorption of carvacrol on modified bentonite in aqueous solutions." *Materials Today: Proceedings* 31 (2020): S28-S32.
2. Elmiz, Mohamed, et al. "Adsorption thermodynamics and isosteric heat of adsorption of Thymol onto sodic, pillared and organic bentonite." Mediterranean Journal of Chemistry 8.6 (2019): 494-504.2.
3. El Boutaybi, Mohamed, et al. "Synthesis, Characterization, DFT, and Thermogravimetric Analysis of Neutral Co (II)/Pyrazole Complex, Catalytic Activity toward Catecholase and Phenoxazinone Oxidation." *Crystals* 13.2 (2023): 155.

Biography

Professor Mohamed El Miz has his expertise in the characterization and the synthesis of new clay-based materials, which are subsequently used for the adsorption and binding of bioactive molecules, which are used in various fields: medical, pharmaceutical, agri-food, etc.
He was awarded his PhD in 2019 from the University of Mohamed 1st, and currently, he is an assistant professor at FPN Nador, Morocco. He published more than 12 papers.

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Reinforcement of concrete by using the composites materials: A review

Yasmina ED DARIY

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SmartiLab Laboratory, Moroccan School of Engineering, Rabat, Morocco

Abstract

Currently the needs in terms of repair and reinforcement of works are very important. The reinforcement of Civil Engineering structures aims to repair or bring existing works into conformity either for reasons of loss of initial properties or for reasons of refurbishment level linked to new standards or new uses. One of the methods which has met with great success in the field of upgrading reinforced concrete structures is exterior bonding using composite materials.

This article summarizes all the fibers that are used as a means of reinforcing reinforced concrete elements while comparing them from a technical, environmental and economic point of view.

Keywords: composite material, concrete, reinforcement, FRP

Recent Publications

1. Y Ed-Dariy, N Lamdour, T Cherradi, A Rotaru, M Barbuta, P Mihai. Effect of alkali treatment of Jute fibers on the compressive strength of normal-strength concrete members strengthened with JFRP composites. Journal of Applied Science and Engineering 23 (4), 677-685. 2020.
2. Y Ed-Dariy, N Lamdouar, T Cherradi, A Rotaru, M Barbuta, P. Mihai. The behavior of Concrete Cylinders confined by JFRP composites: Effect of KOH solution. 5th World Congress on Civil, Structural, and Environmental Engineering. 2020.
3. Y. ED-DARIY, N LAMDOUAR, T CHERRADI, A ROTARU, M BARBUTA. Experimental investigation of the effects of NaOH and KOH solution on the behavior of concrete square columns reinforced by JFRP Composites. 5th World Congress on Civil, Structural, and Environmental Engineering. 2020.
4. Y Ed-Dariy, N Lamdouar, T Cherrad, A Rotaru, M Barbuta, P Mihai. The Influence of the Curing Conditions on the Behavior of Jute Fibers Reinforced Concrete Cylinders. Periodica Polytechnica Civil Engineering. 2021.

Biography

Yasmina EDDARIY is a Phd in Civil Engineering, working in reinforcement of structures by using the FRP composites , she has 5 publications on scopus and 1 patent.
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Insights into corrosion inhibition mechanism of mild steel in 1M HCl solution by quinoxaline derivatives: electrochemical, SEM/EDAX, UV-visible.

Moussa Ouakki[1,3], Zakaria Benzekri[1], Mouhsine Galai[2], Elhachmia Ech-chihbi[4], Khadija Dahmani[1], Said Boukhris[1], Mohamed Ebn Touhami[2], Mohammed Cherkaoui[1,3]

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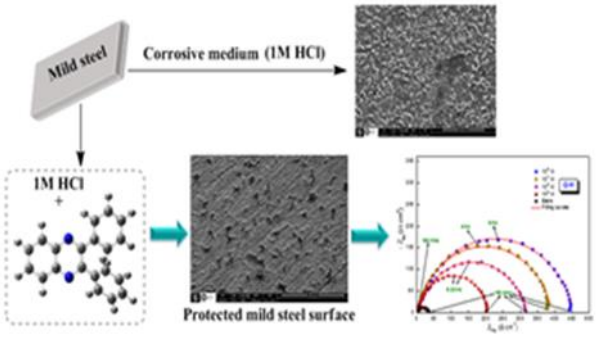
Abstract

In this work, we are interested to study the effect of three heterocyclic organic compounds derived from quinoxaline namely 6-methyl-2,3-diphenylquinoxaline (Q-CH_3), 6-nitro-2,3-diphenylquinoxaline (Q-NO_2) and 2,3-diphenylquinoxaline (Q-H) on the corrosion inhibition of mild steel in acidic medium 1 M HCl. This study was performed using chemical, weight loss, electrochemical, scanning electron microscope (SEM), Energy dispersive X-ray analysis (EDAX), UV–Visible spectra and computational techniques. The obtained results indicate that Q-CH_3, Q-NO_2 and Q-H act as excellent inhibitors for mild steel in 1 M HCl and displayed anodic type inhibition. The maximum inhibition efficiencies (based on electrochemical results) were obtained 90.2%, 87.6% and 92.4% for Q-CH_3, Q-NO_2 and Q-H, respectively. Quinoxaline derivatives retard corrosion at room temperatures and show high inhibition efficiency at higher temperatures. The quinoxaline derivative adsorption onto the mild steel surface follows the Langmuir adsorption model.

Figure



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2. Z. Benzekri, H. Serrar, S. Boukhris, A. Ouasri, A. Hassikou, A. Rhandour, A. Souizi. FRENCH-UKRAINIAN JOURNAL OF CHEMISTRY 05 (2017).
3. M. Ouakki, M. Galai, M. Rbaa, A.S. Abousalem, B. Lakhrissi, E.H. Rifi, M. Cherkaoui, Heliyon 5 (2019) e02759.

Biography

Dr OUAKKI Moussa received his PhD thesis in Physical Chemistry of Materials from Ibn Tofail University, Kenitra in 2019. He is an expert in corrosion sciences, especially in corrosion of metals, alloys, and their inhibition in acidic medium using organic and inorganic compounds and plant extracts. His work deals with corrosion inhibition by using chemical, electrochemical techniques and computational calculations. He is currently working at the National Superior School of Chemistry, Ibn Tofail University, Kenitra. He has published more than 67 papers including 2 book chapters cited by 1238 documents and an inventor of 1 patent, with a focus on materials and their applications. He has participated in more than 70 conferences. His H-index is 23 on Scopus.

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Elaboration and characterization of new bismuth-borate glasses for corrosion inhibition of copper in 1M H2SO4 0.5M medium.

Issam Saber[1], Khadija dahmani [2], Moussa Ouakki[3], Mouhsine Galai[2], Mustapha Belfaquir[2], Mohammed Cherkaoui[3], Salaheddin El Youbi[1]

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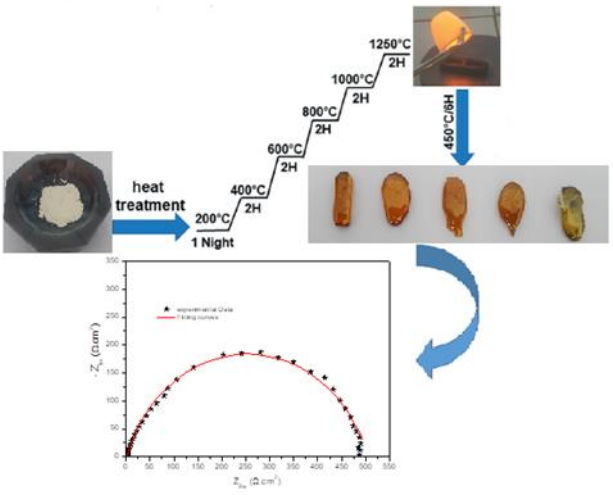
Abstract

Bismuth-borate glasses are the considerable interest, as they have several application in different fields such as medicine, optics, electronics, corrosion inhibition,... [1-3].

The objective of our work is the synthesis and characterization of new glass for the protection of copper against corrosion in sulfuric acid (H2SO4 0.5 M).These elaborate glasses have been characterized and confirmed by Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD) and differential scanning calorimeter (DSC).Then, the corrosion inhibition was investigated by different electrochemical techniques namely polarization potentiodynamique (PDP) and electrochemical impedance spectroscopy (EIS). Results obtained by PDP and EIS show that the inhibition efficiencies reaches maximum values around 90% at optimal concentration (10^{-3}).The charge transfer resistance increases with increasing concentration and the double layer capacitance decreases.Scanning electron microscope (SEM) results show that the steel surface is protected by the formation of protective layer.

Figure:



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2. Khalidou Ba, AbdelkrimChahine, Mohamed EbnTouhami, TouriaJermoumi&AbdelillahShaim (2021): Materials Research Innovations, DOI: 10.1080/14328917.2021.1885578
3. GhizlaneGhenimi, Moussa Ouakki, HananeBarebita, Asmae El Fazazi, TaoufikGuedira and Mohammed Cherkaoui. Anal. Bioanal. Electrochem., 12, 2020, 1-20.

Biography

Author has her expertise in Materials and Corrosion Science. He was registered her PhD in 2019 at Ibn Tofail University, Morocco.
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Experimental and theoretical correlation of inhibitory efficacy of L-Serine and L-Tyrosine on carbon steel in 1M HCl

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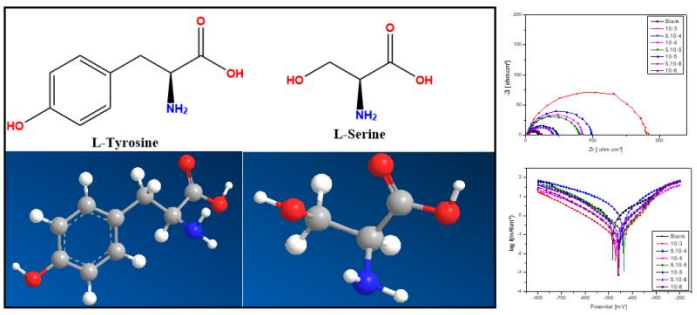
Abstract

Corrosion inhibition effect of L-Serine, and L-Tyrosine on carbon steel corrosion in 1M HCl solution was studied by using weight loss, electrochemical polarization and electrochemical impedance spectroscopy (EIS) techniques. The experimental results showed that the inhibitory efficiency of the aminoacids improves with the increase of concentration to reach the maximum value of 90% for L-Tyrosine, and 88% for L-Serine for a concentration of 10^{-3}M, which translates that the surface covered by the inhibitor increases with the concentration. The effect of temperature on the corrosion rate was investigated and some thermodynamic parameters were calculated. Polarization studies show that two studied inhibitors control the anodic as well as cathodic reactions and act as mixed type in nature. The results show that L-Serine and L-Tyrosine are good inhibitors, and the adsorption of each inhibitor on carbon steel surface obeys a better fit of the Langmuir isotherm through mixed adsorption (physisorption as well as chemisorption) process. In addition, the quantum approach based on density functional theory (DFT), monte Carlo (MC) and molecular dynamics (MD) simulations was confirmed the reactivity of the studied compound towards the corrosion process.

Figure:



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2. W. Daoudi, A. El Aatiaoui, O. Dagdag, K. Zaidi, R. Haldhar, S. Kim, A. Oussaid, A. Aouinti, A. Berisha, F..Benhiba, E. E Ebenso, O. Adyl, , Coatings, 13 (2023) 611.
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Biography

Zaidi Kaoutar is specialized in the electrochemical and theoretical study of the inhibitors. She focuses on the synthesis of new ligands for applications in chemistry. She is a 4th year PhD student at Mohammed Premier University, in Morocco. She has published 8 papers.
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Surface Analysis and Interface Properties of a Newly Synthesized Quinoline-Derivative Corrosion Inhibitor for Mild Steel in Acid Pickling Bath: Mechanistic Exploration through Electrochemical, XPS, AFM, Contact Angle, SEM/EDS, and Computational Studies

M. Galai[1], K. Dahmani[2], O. Kharbouch[1], M. Rbaa[2], M. Khattabi[1], I. Saber[1], A. Belkheiri[1], M. Ebn Touhami[1], B. Lakhrissi[2]

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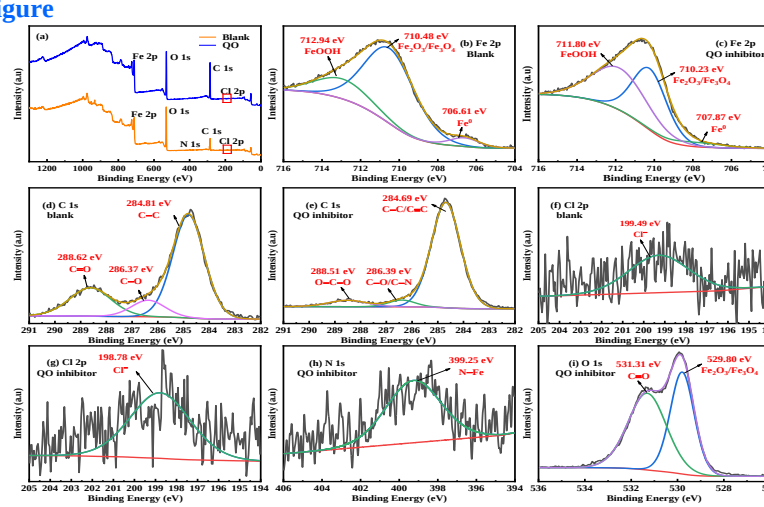
Abstract

The two novel heterocyclic quinoline derivatives, 5-(methoxymethyl)-2-methylquinolin-8-ol (QO) and 5-((2-hydroxyethoxy)methyl)-2-methylquinolin-8-ol (QOOH) are examined in this work for their ability to adsorb against the corrosion of mild steel (MS) in a molar hydrochloric acid (HCl) media.After the synthesis of these two compounds, we proceeded some analytical methods such as: The nuclear magnetic resonance of the proton and the carbon (NMR ^{13}C and NMR ^{1}H).Potentiodynamic polarization (PDP), Electrochemical frequency modification (EFM), and impedance spectroscopy (EIS) were the methods used in the experimental examination. The results showed that QO and QOOH's concentration-dependent inhibitory effectiveness rises. Both inhibitors exhibit mixed type behavior, according to the findings of polarization. Following that order was QO's and QOOH's inhibitory efficiencies 93.20% (QO)> 88.84% (QOOH). The Langmuir adsorption model is used in the adsorption process of these two chemicals. A barrier layer encasing the MS was shown to exist by SEM, energy dispersive X-ray analysis, atomic force microscopy(AFM), contact angle, and XPS were all used in the examination of the surface characterization. The DFT findings indicate that the greatest interactions with the iron surface are made by inhibitors with electron-accepting capabilities.

Figure



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2. Galai, M., M. Rbaa, M. Ouakki, K. Dahmani, S. Kaya, N. Arrousse, N. Dkhireche, S. Briche, B. Lakhrissi, and M. Ebn Touhami.Chemical Physics Letters 776 (2021): 138700.
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Biography

Galai mouhsine has her expertise in evaluation and passion in improving the corrosion protection science.. i was warded my PhD in 2017 from the University of ibn tofail, morocco. I published more than 150 papers. H-index is 32 on Scopus.
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Toxic trace metals extracted from aqueous solutions using a new ecologic hybrid material created by grafting tetrazole and bi-pyrazole CN junction entities onto the surface of silica

Yousra Bahjou [1,2], , Smaail Radi [*,1], Mohamed El Massaoudi [1], Youssef Draoui [1], Marilena Ferbinteanu[3], Haralampos N. Miras [4], Yann Garcia[*,2]

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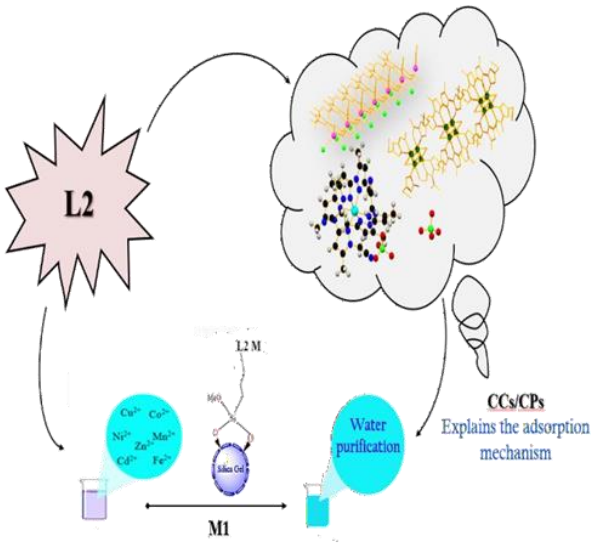
[2] *Institute of Condensed Matter and Nanosciences, Molecular Chemistry, Materials and Catalysis (IMCN/MOST), Université catholique de Louvain, Belgium.* yann.garcia@uclouvain.be
[3] *Inorganic Chemistry Department, Faculty of Chemistry, University of Bucharest, Panduri Road, no. 90, Bucharest 050663, Romania.*
[4] *School of Chemistry, Joseph Black Building, University of Glasgow, Glasgow G12 8QQ, UK.*

Abstract

C-N junctional tetrazole and bi-pyrazole motif ligands can easily form various types of coordination frameworks, which have attracted interest due to their diverse architectures and topologies, as well as their broad potential applications in molecular magnetism, medicinal chemistry, photoluminescence, and catalysis [1,2]. A series of new tetrazole andC,N-bipyrazole ligands, 2-(3,5,5'-trimethyl-1'H-[1,3'-bipyrazol]-1'-yl)acetonitrile (**L1**) and 1'-((1H-tetrazol-5-yl)methyl)-3,5,5'- trimethyl-1'H-1,3'-bipyrazole (**L2**), were prepared and identified by different spectroscopic methods, including ^{1}H-NMR, ^{13}C-NMR, FT-IR and HRMS. The reaction of the two new ligands (**L1**) and (**L2**)with several metals, Ni(II), Cu(II), Co(II) and Cd(II) lead to the formation of a new group of mononuclear coordination complexes, namely: $[Ni(\mathbf{L1})_3](ClO_4)_2$ (**1**), $Cd(\mathbf{L1})_2Cl_2$ (**2**), $[Cu(\mathbf{L2})_2]ClO_4$ (**3**), $[Cu(\mathbf{L2})_2]$ (**4**) and $[Co_2(\mathbf{L2})_2Cl_3]$ (**5**). These different coordination complexes were characterized by single crystal X-ray diffraction and show diverse structures due to the nature of the metal ion and the structural features of the organic ligands as well as the counter anion [3].

The main goal was to use model complexes to realize the simultaneous synthesis of a new hybrid material based on silica **M1**, whose surface was decorated with the ligand **L2**, which was prepared and identified using standard methods of solid state material characterization: FT-IR, elemental analysis, HRMS, TGA, solid state NMR, BET and SEM. We aim to assess the efficiency and contribution of our hybrid material for the removal of heavy metals from real water solutions.

Figure:



Recent Publications

1. 1. S. Radi, M. El-Massaoudi, H. Benaissa, N. Adarsh, M. Ferbinteanu, E. Devlin, Y. Sanakis, and Y. Garcia, New J. Chem., 2017, **41**, 8232-8241.
2. 2. Y. Draoui, S. Radi, A. Tanan, A. Oulmidi, H. N. Miras, R. Benabbes, S. Ouahhoudo, S. Mamri, A. Rotaru and Garcia, *RSC Adv.*, 2022, **12**, 17755-17764.
3. 3. Y. Bahjou, S.Radi, M. El Massaoudi, Y. Draoui, N. N. Adarsh, H. N. Miras, M. Ferbinteanu, S. Ouahhoud, N. Bentouhami, R. Benabbes, M.Wolff, K. C. Hultzsch, Y. Garcia [Submitted].

Biography

I'm a PhD student. third year, at both UCLouvain and Univ. Mohammed I Morocco. Mystudy includes organic chemistry, coordination chemistry and applications in environment.
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Schiff base ligand M^{III}(M = Fe, Mn) mononuclear complexes with *psca* as an anion

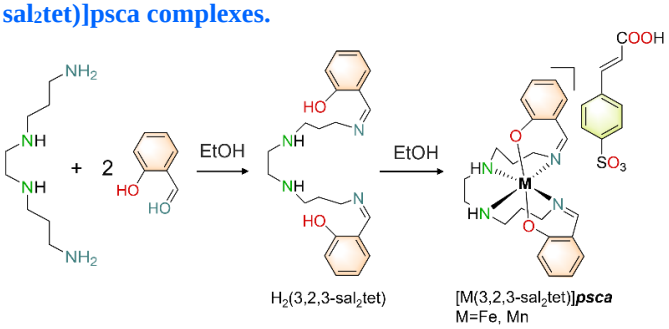
Xiaochun Li, Yann Garcia*

Institute of Condensed Matter and Nanosciences, Molecular Chemistry, Materials and Catalysis (IMCN/MOST), Université catholique de Louvain, Place L. Pasteur 1, 1348 Louvain-la-Neuve, Belgium

Abstract

Spin crossover (SCO) compounds have been studied extensively over the last few decades for potential applications in high-density information storage devices, quantum computers and spintronics [1]. In this work, a new mononuclear Fe(III) complex, [Fe(3,2,3-sal$_2$tet)]***psca***, based on hexadentate Schiff-based ligand, 3,2,3-sal$_2$tet = *N*, *N'*, *N''*, *N'''*-1,5,8,12-tetraazadodecane-bis(salicylaldiminato), and ***psca*** = p-sulfocinnamic acid) was prepared by subcomponent self-assembly method. Single crystal X-ray diffraction and ^{57}Fe Mössbauer spectroscopy indicate that the Fe(III) complex is in a low-spin (LS) state configuration at both 100 K and room temperature. However, due to the ligand field strength being directly affected by the length of the methylene chain in the ligand, it is anticipated to obtain Fe(III) SCO complexes by changing the number of methylene chains in the ligands [2]. We have, in addition, developed a new synthetic route to obtain [Fe(H$_2$O)$_6$](***psca***)$_2$·2H$_2$O was used to obtain other metal salts, e.g. [Mn(H$_2$O)$_4$(***psca***)$_2$]·2H$_2$O. The [Mn(3,2,3-sal$_2$tet)]***psca*** was also prepared. AD-LISC effect [3] is anticipated, given that our ***psca*** anion undergoes [2+2] photodimerization at room temperature under UV light irradiation [4].

Figure: Schematic representation of the formation of [M(3,2,3-sal$_2$tet)]psca complexes.



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2. S. Hayami, T. Matoba, S. Nomiyama, T. Kojima, S. Osaki, Y. Maeda, *Bull. Chem. Soc. Jpn*. 70 (1997) 3001.
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4. V. Kumar, L. Fusaro, C. Aprile, K. Robeyns, Y. Garcia, *Cryst. Growth Des.* 20 (2020) 7850.

Biography

Xiaochun Li is a 2nd year PhD student at UCLouvain. She joined Prof. Yann Garcia's research group in 2021.
Her main research interests are Spin crossover phenomena and Photo- and thermoswitchable coordination compounds.

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The development of a new polyaniline@oak acorn biocomposite for the efficient removal of Orange G dye from aqueous solutions.

Abdelillah Shaim[1], Omar Doughmi[1], Reda El-bardai [1], Driss Rair[1, 2], Touria Jermoumi[1], Abdelkrim Chahine[1], Abdelghani Hsini[1, 2]

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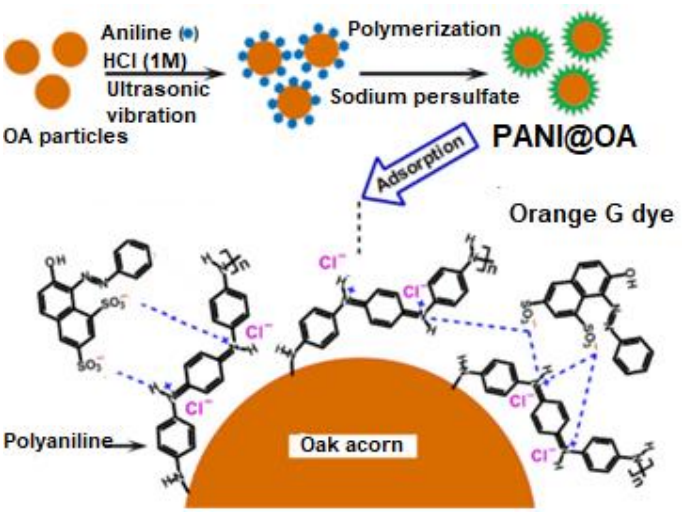
[2] *National Higher School of Chemistry (NHSC), University Ibn Tofail, BP. 133-14000, Kenitra, Morocco.*

Abstract

A novel polyaniline@Oak acorn (PANI@OA) biocomposite was synthesized via a facile in situ chemical polymerization method. The as-synthesized adsorbent was characterized using various analytical techniques such as Fourier transform infrared spectroscopy (FTIR), X-ray energy dispersive spectroscopy (EDS), and scanning electron microscopy (SEM). A batch adsorption system was applied to investigate the as-synthesized adsorbent ability to remove Orange G (OG) textile dye from aqueous solutions. Obtained results revealed that the adsorption process was strongly dependent upon the physicochemical parameters. The adsorption of OG dye onto PANI@OA was better described by the pseudo-second-order-kinetic model and followed the Freundlich isotherm model. The maximum uptake was 254.68 $mg.g^{-1}$ for OG dye. We further evaluated that PANI@OA biocomposite could be regenerated easily with NaOH solution and efficiently reused for OG dye removal from aqueous media. Thus, these results indicated the potential practical application of PANI@OA biocomposite for wastewater treatment.

Keywords Adsorption. Isotherm. Kinetics. Orange G dye. Polyaniline. Biocomposite. Regeneration

Figure:



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4. Shaim, A., & Et-Tabirou, M. (2003, March). In Annales de Chimie Science des Matériaux (Vol. 28, No. 2, pp. 17-23). No longer published by Elsevier.

Biography

The author is a professor at the Faculty of Science, Ibn Tofail University. He focuses on the use of phosphate for glass-making applications. He received his Ph.D. in 2001, in Morocco. He has published more than 20 papers.

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Mycelium-based materials: tuning properties through knowledge and engineering

Hasna Nait M'Barek [1], Soukaina Arif [2,3], Benaziz Mohamed[4], Patrick Perré [1]

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[2] *Moulay Ismail University, Faculty of Sciences, Biotechnology, and Bioresources Valorization Laboratory, BP 11201, Zitoune Meknes, Morocco*
[3] *Moulay Ismail University, Cluster of Competency «Agri-food, Safety and Security» IUC VLIR-UOS, Marjane 2, BP 298, Meknes City, Morocco*
[4] *Sultan Moulay Slimane University, Higher School of Technology, 3 BIO laboratory, BP 170, 54000 Khenifra Morocco*

Abstract

The Mycota is a versatile kingdom harboring species of the utmost potential, resistance, and adaptative fitness across the Tree of Life. The fungal cell unit is organized into filaments, agglomerated into hyphae, in a nested and wired network where polarized growth takes on for each species to search and thrive on its nutrients. Recently, the use of fungi in materials production has emerged from borderline advancements in biotechnology and materials engineering, giving birth to high-value applications in society, industry, and design. Mycelium-based materials are materials produced mainly using pure mycelium or combining a reinforcement block of agriwaste biomass cemented with a matrix of fungal network to form a biocomposite where the fungal cell constituents (chitin, glucans, proteins) are the linking glue. Even though it has demonstrated high and diverse performances as thermal/acoustic insulators for green buildings, tensile and quality animal leather substitutes in textiles, and for prototyping in indoor/outdoor design and electronic devices, their uncontrolled growth features frequently limit tuning properties and innovating the field. In this presentation, essential mechanisms of fungal polarized growth, orientation, connectedness, machinery, mycofluidics (fluid dynamics of the fungal cell), and implications are all-together explained and discussed for the same main objective: encountering challenges and tailoring functionalities.

Figure

Recent Publications

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5. Du H., T. Tran, Perré P., (2019). J. Theoretical Biology, 470: 90-100.

Biography

Hasna Nait M'Barek is a Research Engineer in the Chair of Biotechnology of CentraleSupélec, France. She has her expertise in Microbial Biotechnology and focuses on the use of fungi as a renewable resource to produce natural biopolymers, biomaterials, and enzymes with high-value biotechnological applications. She was awarded her Ph.D. in 2021 from the University of Moulay Ismail, Morocco, and has published 9 peer-reviewed papers, co-supervised 5 Master's degree thesis, and has participated in the organization of 2 international conferences. Hasna Nait M'Barek works also as an affiliated lecturer at different universities.

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Mining biocatalysts for local biorefineries: lignocellulolytic enzymes production by four filamentous fungi under different fermentation systems for olive stones valorization

Soukaina Arif[1,2], Hasna Nait M'barek[3], Geert Haesaert[4], Hassan Hajjaj[1,2]

[1]Moulay Ismail University of Meknès, Laboratory of Biotechnology and Bioresources Valorization, BP 11201, Zitoune Meknes City, Morocco.
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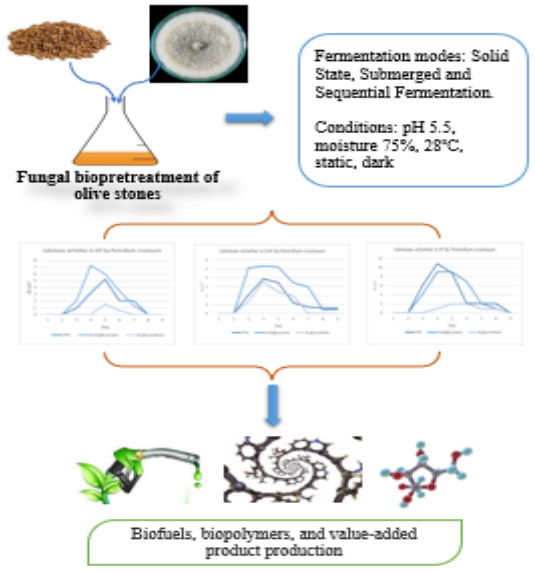
[3] Paris-Saclay University, CentraleSupélec, European Center of Biotechnology and Bioeconomy (CEBB) - LGPM, 51110 Pomacle, France.
[4] Ghent University, Faculty of Bioscience Engineering, Department of Plants and Crops, Valentin Vaerwyckweg 1, Schoonmeersen - gebouw C 9000 Ghent, Belgium.

Abstract

Lignocellulolytic enzymes are currently in widespread industrial use. They are highly sought after for their efficient conversion of lignocellulosic biomass (LC) into biofuels, biopolymers, and other high-added-value platform molecules. However, they are constrained by their production yields, costs, and stability. Therefore, their production by producers adapted to the local environments can address the limits of their performances. Additionally, the choice of raw materials plays a key role in creating an environmentally sustainable process, aligning with national and international policies for total circularity and waste management. In nature, fungi are among microorganisms that are highly adept at breaking down LC, thanks to their ability to secrete a diverse range of hydrolytic and oxidative enzymes that specifically target the various components of plant cell walls. In this context, and due to the large amounts of olive stones generated in Morocco, fungal environmental isolates, molecularly identified as *Penicillium crustosum, Fusarium nygamai, Trichoderma capillare, and Aspergillus ustus*, are cultivated in three fermentation modes to evaluate their potential to produce lignocellulolytic enzymes along 15 days of dark cultivation. According to the results, the first species expressed a maximum of 10.88 $IU.ml^{-1}$ of total cellulase activity in sequential fermentation (SF), 3.55 $IU.m^{-1}$ of β-glucosidase activity in submerged fermentation (SmF), and 0.2 $mIU.ml^{-1}$ of laccase activity in solid state fermentation (SSF). The second fungus reached 9.05 $IU.ml^{-1}$ maximum laccase activity in SSF. The last isolate produced respectively: 9.2 $mIU.ml^{-1}$ lignin peroxidase and 11.55 $IU.ml^{-1}$ of endoglucanase activities both in SF. The optimal production of cellulases is after the 5th day for SF and SmF, while ligninases between 9 and 11 days in SSF. The outcomes highlight the potential applicability of these fungi as biomass-active decomposers for green biorefinery processes.



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3. Nait M'Barek H., Taidi B., Smaoui T., Ben Aziz M., Mansouri A., Hajjaj H. (2019). Biotechnol. Agron. Soc. Environ. 23(4), 207-217

Biography

Soukaina Arif is a young female research candidate at Moulay Ismail University of Meknes (UMI). With a food processing engineer background from the Faculty of Sciences and Technology of Fez, she works on olive mill waste valorization through biotechnological and sustainable treatments. Soukaina Arif has published 6 original research works in recognized journals and has participated in several national and international scientific events.

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NATURAL PRODUCTS AND THEIR VALORISATIONS

Electrosorption of paraquat pesticide on activated carbon modified by aluminium oxide (Al_2O_3) in capacitive deionization

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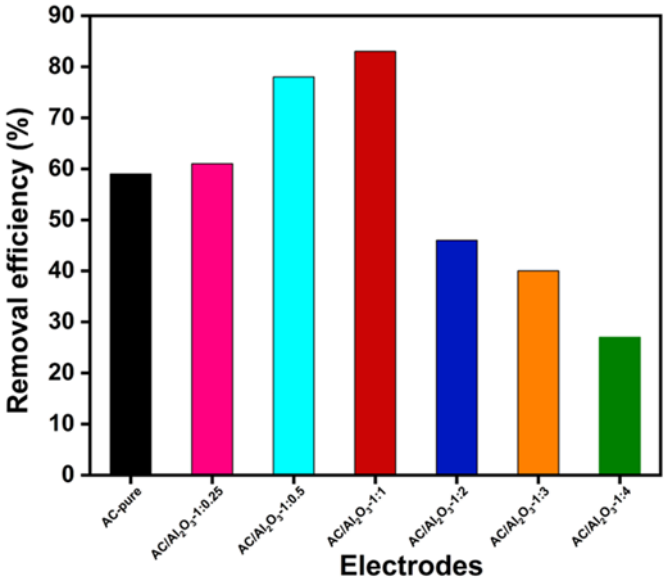
[3] *Department of Physics, College of Natural and Mathematical Sciences, University of Dodoma, P.O. Box 338 Dodoma, Tanzania.*

Abstract

Composite electrode materials for removing paraquat from contaminated water were synthesized by loading aluminium oxide onto activated carbon via co-precipitation. The properties of the composite were investigated by by X-ray diffraction, scanning electron microscopy, Fourier transform infrared spectroscopy, energy-dispersive X-ray spectroscopy and Brunauer-Emmett-Teller analysis. The electrosorption of paraquat herbicide by the composite electrode and the pristine activated carbon was compared in capacitive deionization batch experiments. The performance of the composite electrodes showed that the removal efficiency and adsorption capacity was dependent on the aluminium content loading, applied potential, flow rate, and charging time. At 1.2 V, a flow rate of 15 mL/min, and a charging time of 3 hours, the composite electrode demonstrated a removal efficiency of 95.5% for paraquat herbicides, while the unmodified activated carbon showed a removal efficiency of only 62%. The calculated electrosorption capacity was 1.27 mg/g for the modified carbon and 0.83mg/g for pristine AC. The composite electrode was also found to be reusable, as there was no significant decrease in its regeneration efficiency even after multiple cycles.

Figure: Electrosorption of the unmodified AC and modified AC at different ratios of Al_2O_3 conducted at 20 mg/L PQ concentration, 1.2V applied voltage, 15 mL/min flowrate for 60 min



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2. Alfredy, T., Elisadiki, J. & Jande, Y. A. C. (2021) Capacitive Deionization for the Removal of Paraquat Herbicide from Aqueous Solution. Adsorption Science & Technology 2021. https://doi.org/10.1155/2021/9601012
3. Alfredy, T., Elisadiki, J. & Jande, Y. A. C. (2021) Capacitive deionization: a promising technology for water defluoridation: a review. Water Supply. https://doi.org/10.2166/ws.2021.287
4. Alfredy, T, Jande, Y. A. C. Pogrebnaya, T. Removal of Lead Ions from water by Capacitive Deionization Electrode Materials Derived from Chicken Feathers, Journal of Water Reuse and Desalination, https://doi.org/10.2166/wrd.2019.074, volume 9, issue 3 (2019)

Biography

Tusekile Alfredy is an assistant lecturer and Ph.D. scholar at the Department of Materials, Energy Science, and Engineering at Nelson Mandela African Institution of Science and Technology. She completed her MSc in Materials Science and Engineering in 2019 from the Nelson Mandela African Institution of Science and Technology and her Bachelor of Education in Science from the University of Dar es Salaam in 2012 in Tanzania. Tusekile's research interests revolve around the development of novel materials for water purification using energy-efficient capacitive deionization technology.

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Thermal study of unfired clay bricks with pretreated wheat straw

Yousra Lehleh[1, 2], Imad Manssouri[1], Houssame Limami[1,2], Taj Eddine Manssouri[4], Hassane Sahbi[3], Abdessitir Deraoui [1], Asmae Khaldoun[2].

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[2]*Laboratory of Sustainable Energy Materials, Al Akhawayn University, Ifrane, Morocco.*
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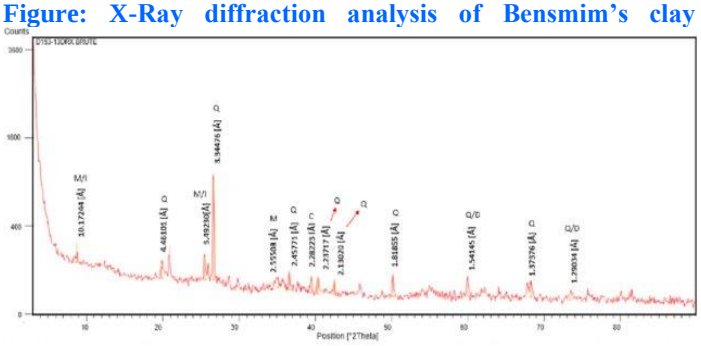
[4]*Regional Center for Education and Training Professions Fez-Meknes, Morocco.*

Abstract

The primary aim of this study is to evaluate the chemical and thermal properties of a clay-straw composite for the production of building materials that conform to Moroccan national and international construction standards. Two different sizes of straw (0.5-1cm and 1.5-2cm) were used at varying proportions (0%, 1%, 3%, 5%, and 7%) with clay. The straw was pretreated thermally to enhance its chemical properties, and boiling water was used to dissolve the sugar in the fiber, which increased the adhesion between the clay and straw. Reference bricks were produced with untreated straw at the same proportions for comparison purposes. After a 21-day curing period, a steady-state thermal conductivity test was conducted on the brick samples. The results revealed that both treated and untreated straw improved the chemical and thermal performance of the clay bricks, but treated straw had a greater effect. Treated additives produced less porous brick samples than untreated ones, leading to an improvement in thermal insulation properties. Using large lengths and a high content of additives results in specimens with lower thermal conductivity, enhancing the samples' thermal properties, and benefiting from high thermal conductivity gain percentages.

Keywords: Unfired clay brick, straw additive, thermal properties.

Figure: X-Ray diffraction analysis of Bensmim's clay



Recent Publications

1. Limami, H., Manssouri, I., Lehleh, Y., et al. Thermophysical and Mechanical Assessment of Unfired Clay Bricks with Dry Grass Fibrous Filler. Int J Thermophysics 43, 114 (2022). https://doi.org/10.1007/s10765-022-03043-8
2. H. Limami, I. Manssouri, , A. Khaldoun, Effect of reinforced recycled sawdust-fibers additive on the performance of ecological compressed earth bricks, Journal of Building Engineering Volume 68, 1 June 2023, 106140 https://doi.org/10.1016/j.jobe.2023.106140.

Biography

Yousra Lehleh was born in FES Morocco. She received her master's degree in industrial engineering from the faculty of science and technology in FES. She is currently PhD student at ENSAM Meknes. Part of the Laboratory of Mechanics, Mechatronics, and Command, Team of Electrical Energy, Maintenance and Innovation in ENSAM MEKNES, and the Laboratory of Sustainable Energy Materials in Al Akhawayn University in IFRANE. Her thesis topic is clay-based building materials, including the enhancement of the mechanical properties of the clay by adding several types of additives and study the effect of additives on the thermal properties of the unfired clay bricks.

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Study of the conversion of the waste of *Opuntia Ficus-Indica (L.) Miller* into reducing sugars using dilute acid hydrolysis and autohydrolysis

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Abstract

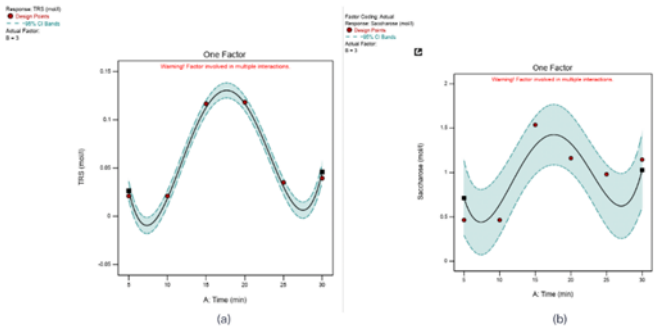
The production of sugar from lignocellulosic biomass (LCB) requires careful consideration of the biomass characteristics, pretreatment method, and hydrolysis conditions. Acid hydrolysis is a well-established method for releasing monosaccharides, known for its simplicity, cost-effectiveness, and efficiency. However, the technique still lacks a technological component.

This research paper presents findings on the optimal saccharification rate obtained when processing the wastes of OFI (*Opuntia Ficus-Indica)* through acid hydrolysis at a temperature of 121°C for 20 minutes using a 3% sulfuric acid solution and a solid-to-liquid ratio of 1:10. The saccharification rate achieved was 0.121 mol/l.

To further optimize the results, Response Surface Methodology (RSM) and Central Composite Design (CCD) were employed, and the data were computed in Design Expert. Under the best conditions of 121°C and a solid-to-liquid ratio of 1:10, the maximum yield of total reducing sugars (TRS) was 0.13 mol/l, and the maximum yield of sucrose was 1.42 mol/l. Both of these were reached in just 17.5 minutes with 3% acid.

These results show that acid hydrolysis optimization could be a good way to use OFI as a promising renewable resource for making bioethanol.

Figure 1. Reaction time optimization of TRS (a) and Saccharose (b) responses



Recent Publications

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2. Al-Obaidi M., Al-Nedawe B., Mohammad A., Mujtaba I., Chem. Prod. Process Model., 16 (3) (2021), pp. 193-203, 10.1515/cppm-2020-0025
3. Dávila I. , Gullón P. , Labidi J., Waste Manag., 120 (2021), pp. 146-155, 10.1016/j.wasman.2020.11.014.

Biography

Insaf Nori is a dedicated process and chemical engineer with a strong interest in researching the production of biofuel from biomass. Her primary focus is on utilizing waste biomass to produce second-generation biofuels. Currently, Insaf is pursuing her PhD at ENSA Khouribga, part of the University Sultan Moulay Slimane, where she is undertaking groundbreaking research in this field.
Insaf's research has already yielded impressive results, as demonstrated by her recent publication in Mor J Chem. Her work has also been recognized by the academic community.
As an expert in her field, Insaf is committed to contributing to the development of sustainable energy sources that have a positive impact on the environment. Her enthusiasm for her work is evident in her tireless dedication to her research.

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Antioxidant proprieties and polyphenols content of quinoa cultivated in Morocco in the region of Béni Mellal Khénifra

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[3]*Agro-food Technology and Quality Laboratory, Regional Center of Agriculture Research of Tadla, National Institue of Agricultural Research (INRA), Avenue Ennasr, BP 415 Rabat Principal 10090Rabat, Morocco*

Abstract

Quinoa (Chenopodium quinoa Willd.) is a plant species of the Chenopodiaceae family, native to the Andean region, which can adapt to different edaphic-climatic conditions. It is a pseudo-cereal with a high nutritional value due to in proteins, lipids, fibers, vitamins and minerals, and has an extraordinary balance in essential amino acids. For all these reasons, quinoa has attracted the attention of the community and scientific research, although it is not widely consumed, for several reasons, such as the high cost of importation and the lack of knowledge about its benefits among the consumer. This study aims to evaluate the physicochemical and morphological properties of Quinoa cultivated for the first time by our team in Regional Center of Agriculture Research of Tadla (CRRAT) studied by our mixed research team of LEAT and CRRAT. In this part, the content of polyphenols, flavonoids, anthocyanin, and tannins in cultivated quinoa was determined and the antioxidant activity was evaluated by two different methods The results obtained showed a better content of phenolic content in the cultivated quinoa, which indicates a high anti-oxidant activity; these results are suitable in comparison with other research works done on quinoa and other cereals. According to the results we can say that the culture of the quinoa found a better attitude in the region of Béni mellal Khénifra what gives naissance to a new agriculture suitable for the development in the conditions of drought lived in Morocco as abroad.

Figure: Quinoa cultivated in Regional Center of Agriculture Research of Tadla (CRRAT).

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1. Navruz-Varli, S., and Sanlier N. "Nutritional and health benefits of quinoa (Chenopodium quinoa Willd.)." Journal of cereal science 69 (2016): 371-376.
2. Alvarez-Jubete, L., et al. "Polyphenol composition and in vitro antioxidant activity of amaranth, quinoa buckwheat and wheat as affected by sprouting and baking." Food chemistry 119.2 (2010): 770-778.
3. Hirich, A., et al. "Development of quinoa value chain to improve food and nutritional security in rural communities in rehamna, morocco: Lessons learned and perspectives." Plants 10.2 (2021): 301.

Biography

Ajbli Nouhaila, doctoral student in the 3rd year at Laboratory of the engineering and applied Technologie, Higher School of Technology, Sultan Moulay Slimane University, my thesis topic is: the characterization and valorization of quinoa grains. We have communicated last year some results concerning the valorization of quinoa grains by the production of a yoghurt based on goat milk and quinoa in two international conferences.

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The effect of drying mode on the chemical composition of *Cannabis L Sativa* seeds harvested from Morocco

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Abstract

Cannabis L Sativais a plant belonging to the family of C*annabaccae***,** it is one of the most ancient plants found in a variety of habitats and altitudes. It has psychoactive and medicinal activities.

To date, over 500 compounds have been identified in the *Cannabis L Sativa*, such as cannabinoids, fatty acids, polyphenols, flavonoids, terpenoids and sterols.

Therefore, in the present study, we investigated the effect of drying mode on the yield and the chemical composition of the *Cannabis L sativa* seeds harvested from ketama Morocco.

Keywords: *Cannabis L sativa* seeds, drying mode, chemical composition.

Figure:

Recent Publications

1. Shivani Sharma, T. Tamilselvan, Mohammad Shakebc and Pichan Prabhasankar, *Hydrothermal treatment of hemp seeds (Cannabis sativa L.): impact on its dehulling yield, fatty acid profile and nutritional characteristics*, J Sci Food Agric 2022, 1-9.
2. Aatif Rashid, Villayat Ali, Manu Khajuria, Sheenam Faiz, Sumeet Gairola, Dhiraj Vyas, *GC–MS based metabolomic approach to understand nutraceutical potential of Cannabis seeds from two different environments*, Food Chemistry 339 (2021) 128076.

Biography

Oumayma BOUSSETTA is PhD student in Applied Chemistry and Environment Laboratory at Faculty of Sciences, University Mohamed I Oujda under the scientific direction of Pr. Mohamed RAMDANI. Her current researchers are focused on the chemical composition of Cannabis L Sativa seeds.
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Effect of initial morphological traits on field performance of *Tetraclinis articulata* seedlings in a semi-arid Mediterranean area

Rachid EL HADDADI[1], Amina OUAZZANI TOUHAMI[2], Abdelali EL MEKKAOUI[3] and Allal DOUIRA[4]

[1, 2, 4] *Laboratory of Vegetal Animal Production and Agro-industry, Team of Botany, Biotechnology and Plant protection. Faculty of Sciences, Ibn Tofail University, P.O.Box 133, Kenitra, Morocco,*
[3] *Laboratory of Natural Resources Geosciences, Department of geology. Faculty of Sciences, Ibn Tofail University, P.O.Box 133, Kenitra, Morocco.*

Abstract

Forest seedlings size is still a subject of debate when producing plants for reforestation programs in Mediterranean semi-arid area [1, 2]. In the Mediterranean environment, water stress is the main limiting factor for the survival of plantations and therefore for the success of forest restoration projects [3, 4]. The aim of the present study was to assess the effect of initial morphological traits of *Tetraclinis articulata* containerized seedlings on survival rate and growth performance after 11 months outplanting in a semi-arid site (Figure1). Rooting depth of dead and alive seedlings was also explored to determine the effective rooting depth that optimizes survival and consequently characterize the critical minimal soil water content that seedlings need to overcome drought season. Survival probability of *T. articulata* seedlings was strongly influenced by initial seedling collar diameter, showing an increasing pattern with a critical minimum of 3.24mm. Sturdiness index affected survival probability showing a trend downwards with critical maximum of 5.97cm/mm. Seedlings shoot height relative growth rate was significantly affected by initial morphological class, giving more advantage to small seedlings, while, collar diameter relative growth seemed to be insensitive to initial seedlings size. The evaluation of the rooting depth in relation to seedlings survival allowed the characterization of a minimum depth of 57.52cm that the roots must exceed in order to reach the wettest soil layers; this soil depth corresponds to a minimum critical gravimetric water content of 12% below which the roots cannot survive. These results suggest that under uncertainty about soil water content in semi-arid areas, due to rainfall scarcity, short- stemmed seedlings with large collar diameter and deep root plug can improve first year post-planting survival and shoot growth.

Figure:

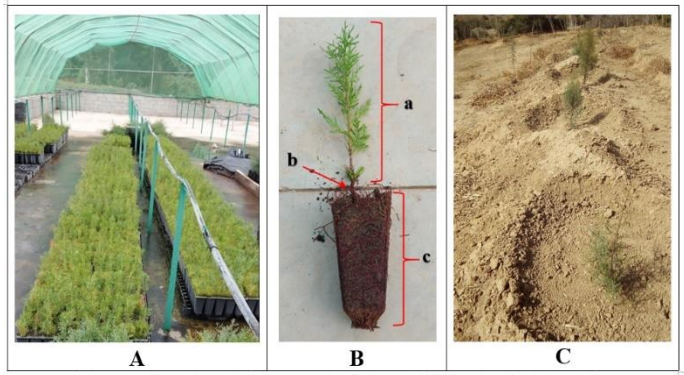

Figure 1: Thuya seedlings from the nursery to the field: (A) at lifting time in the nursery (December 10, 2019), (B) after extraction from the container showing: [a] shoots, [b] collar, [c] root plug, (C) after outplanting in the field (July 15, 2020).

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3. Oliet JA, Ortiz de Urbina E, Sanchez-Pinillos M, Tardio-Cerrillo G. 2019. Matching seedling size to planting conditions: interactive response with soil moisture. iForest 12: 220-225.
4. Ovalle J, Arellano E, Oliet J, Becerra P, Ginocchio R. 2016. Linking nursery nutritional status and water availability post-planting under intense summer drought: the case of a South American Mediterranean tree species. iForest 9: 758-765.

Biography

Rachid EL HADDADI is an experienced forest engineer with twenty-three years in the field, studying forest conditions and characteristics, assisting managers, rangers and conservative scientists in the sustainability improvement and protection of forests. He is also a doctoral student at Ibn Tofail University Kenitra Morocco. Recent publication:
EL Haddadi R, Errifi A, Msairi1 S, Ouazzani Touhami A, Douira A. 2021.Effect of interaction between Fusarium solani and Rhizoctonia Solani on damping-off and root rot disease of Tetraclinis articulata seedlings. Forestry studies- Metsanduslikud Uurimused, Vol. 75 n°1, pages 166-175. DOI: 10.2478/fsmu-2021-0018
El Haddadi R, El Mekkaoui A, Zouahri A, Ouazzani Touhami A and Douira A, 2022. Effect of growing media on morpho-physiological quality attributes of Tetraclinis articulata seedlings, Forest Science and Technology, DOI:10.1080/21580103.2022.2104936

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Comparative assessment of total phenolics content and in vitro antioxidant capacity variations of leaf extracts of *Origanum grossii* and *Thymus pallidus*

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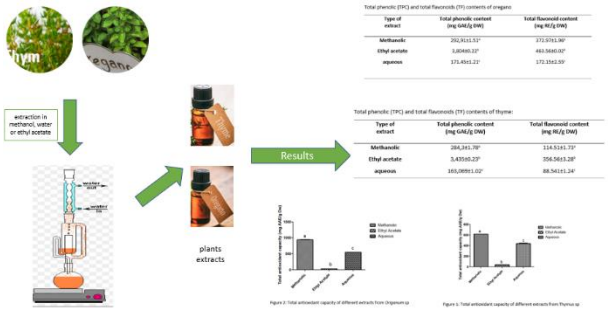
2 Sidi Mohammed Ben Abdellah University, Faculty of Sciences Dhar El Mahraz, Department of Chemistry, B. P. 1796 Fes-Atlas, Morocco

Abstract

The present study aimed to determine the potency of Origanum grossii and Thymus pallidus leaf extracts in natural phenolic compounds with various antioxidant properties. The extracts obtained were investigated for their total phenolic and flavonoid content, total antioxidant activity (TAC), as well as for their ferric reduction capacity (FRAP), and for their radical scavenging activity by the extent of their DPPH scavenging capacity. Total phenolic content ranged from 292.91±1.51 to 3.804±0.22mg/g DW in oregano samples and from 284.3±1.78 to 3.435±0.23 mg/g DW in thyme samples, expressed as gallic acid equivalents and presented in the descending order: methanolic extracts > aqueous extracts > ethyl acetate extracts. In addition, for both species, the highest reducing and antiradical power as well as the highest total antioxidant capacities were obtained by the methanolic macerated leaves. This highly revealed antioxidant power of the extracts was significantly correlated to the contents of total phenols (TP) and total flavonoids (TF) detected. Based on the results attained, it can be concluded that oregano and thyme leaves show promising antioxidant capacities to potentially serve as rich sources of phenolic compounds with variable antioxidant properties and could be used as healthy biological preservatives.

Figure:



Recent Publications

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2. Lfitat A., Zejli H., Bousselham A., El Atki Y., Lyoussi B., Gourch A., Abdellaoui A., 2020: Comparative evaluation of Argania spinosa and Olea europaea leaf phenolic compounds and their antioxidant activity. Botanica, 26(1): 76–87.

Biography

The author is a doctoral student passionate about valorising aromatic and medicinal plants, especially on the antioxidant and antibacterial side. She carried out an ethnobotanical study in order to identify the maximum of indigenous medicinal plants.
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A Comparatice Study of the Biometric, Germinative, and Physicochemical Characteristics of Fruits and Oils of Three Cannabis Strains (Cannabis sativa L.var indica) Cultivated in the Rif Region of Morocco

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1. UPR of Pharmacognosy, Mohammed V University, Faculty of Medicine and Pharmacy, Av. Mohammed Belarabi El Alaoui, BP 6203- Rabat institut-Rabat-Morocco.

Abstract

There are two sets of criteria that could be used to categorize the fruits of Rif cannabis strains. The first set includes biometric, physiological, and physical criteria, while the second set includes phytochemical criteria. The study revelated that there are notable differences in the biometric properties and germination rates of the achenes of the strains studied. Additionally, significant variations were observed between the strains with regards to their oil yield, as well as the levels of polyphenols and flavonoids.

Furthermore the results demonstrated the possibility to predict the fruit's weight from their width and that there is a negative correlation between the biometric parameters and the polyphenol levels and the germination rate.

The studied oils are extra virgin and the fruits are rich in antioxidant, which is beneficial for nutrition and human health.

Keywords: cannabis strains, Rif, fruit, biometry, germination, oil.

Figure: Fruit and oil of Cannabis sativa. var indica strains cultivated in the Rif region of Morocco.

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3. 3. Babiker.E.,Uslu.N., Al Juhaimi.F., Mohamed. Ahmed.I., Ghafoor.K., Ozcan.M.M., Almusallam.I.A. *LWT - Food Science and Technology* .139 (2021) 110537
4. 4.Abdollahi.M.,Sefidkon.F.,Calagari.M.,Mousavi.A.,Mahomoodally. M.F. *Ind. Crops Prod*. 152 (2020) 112397.

Biography

The author is professor-researcher at the Faculty of Medicine and Pharmacy at Mohammed V University in Rabat (laboratory of Pharmacognosy). He is specialist in plant biology & ecophysiology and systematic botany of aromatic and medicinal plants. He is also associate professor in Biology & Geology andTeacher trainer in pedagogy and didactics of Life and Earth Sciences. The author has published several research papers and books.

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Biochar from brown seaweed *Sargassum muticum* as a potential biosorbent for wastewater treatment

J. Chaouay [1], F. Bentiss [1], M. Zbair [2], Z. Belattmania [3], B. Sabour [3], C. Jama [4]

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[2] *Université de Haute-alsace, CNRS, IS2M UMR 7361, F-68100 Mulhouse, France*
3 Chouaib Doukkali University, Faculty of Sciences, Laboratoire de Biotechnologie Végétale, Ecologie et Valorisation des Ecosystèmes / Unité de Recherche Labellisée
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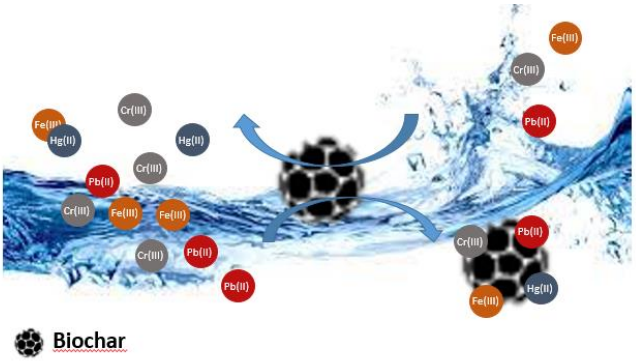
Abstract

The businesses constantly leak heavy metals into wastewater as a result of their operations, which poses a serious threat to human health. Algae as a biomass exhibit different functional group on their surface compared to lignocellulosic biomass, and this character is crucial for adsorbent materials as a tool for environmental decontamination. Biochars are currently popular and advantageous materials for eliminating potentially hazardous metals. In this study, different biochars were prepared using a pyrolysis process from the residue of the brown algae *Sargassum muticum* extraction to remove several toxic ions, notably Hg(II), Pb(II), Cu(II), and Fe(III) ...

The samples were subjected to heat treatment at different temperature 350, 450, and 550 °C during 60, 90, and 120 min, and labeled using the flowing nomenclature RT/t where T and t represent, respectively, the temperature and duration of the pyrolysis. The samples were characterized using thermogravimetric analysis (TGA), scanning electron microscopy (SEM-EDS), Brunauer-Emmett-Teller surface area, Fourier transform infrared (FTIR), Raman spectroscopy and adsorption isotherms kinetic. The results show that the adsorption isotherms are well fitted using Langmuir model and the pseudo-first-order for ions adsorption kinetic. Despite the low specific surface area of the biochars, determined using the BET technique, the results show that they are very effective for the elimination of metallic ions: the % of elimination reaches a value up to 99%, in particular for Hg (II). This high removal efficiency is due to the presence of functional groups on their surface, as evidenced by FTIR technique. The outcomes showed that the residue of *Sargassum muticum* extraction, pyrolyzed at 350°C, might be a suitable, inexpensive, and ecofriendly material for wastewater treatment.

Figure:



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Biography

s a Phd student, I work to develop both my knowledge and my expertise in the field of materials and wastewater in my two laboratories LCCM at Chouaib Doukkali University and UMET at Centrale Lille Institute, I had the opportunity to work on that.

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Phosphorylated cellulose nanofibers based films: tailored thermal, optical, structural and mechanical properties.

Naji Majoudi[1], El-Houssaine Ablouh[1*], FatimaZahra semlali[1], Houssine Sehaqui[1], Abou el kacem Qaiss[2], Rachid Bouhfid[2], Mounir El Achaby[1*].

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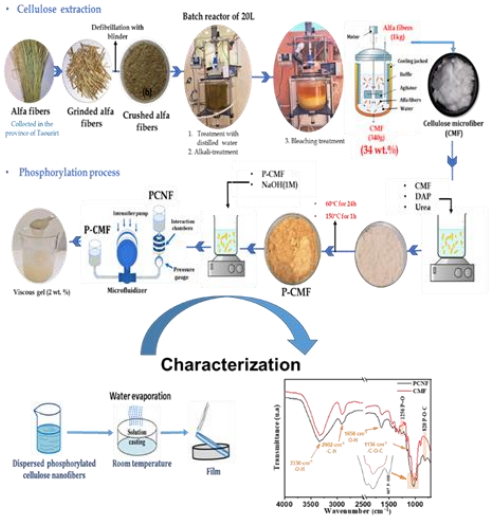
[2]*Composites and Nanocomposites Center (CNC), Moroccan Foundation of Advanced Science Innovation and Research (MAScIR), Rue Mohamed Al Jazouli Madinat Al Irfane, 10100 Rabat, Morocco.*

Abstract

Phosphorylated Cellulose Nanofibrils (PCNF) are small building blocks made from renewable biomass using different chemical and physical methods [1].They have grown in popularity as they offer unique structural and mechanical properties at the nanoscale level compared to their larger counterparts. They are highly versatile, thanks to their high length-to-diameter ratio, exceptional rheological properties, minimal thermal expansion, large surface area, high strength, and stiffness, abundance, renewability, biodegradability, low weight, and cost-effectiveness. These features have made them a subject of interest in many fields such as coating agent, paper-making, engineering composites, biomedical materials, aerogels, food science, hydrogels, water filtration films, and more [2]. This study aimed to produce a phosphorylated cellulose nanofibers (PCNF) with lower energy consumption and improved properties using phosphorylation, a low-cost, non-toxic pretreatment method. Cellulose microfibers extracted from Alfa fibers were treated with a combination of di-ammonium phosphate, and urea at 150 °C, then mechanically fibrillated to produce PCNF gel [3]. The resulting PCNF were analyzed for various characteristics. The results showed that phosphorylation was effective and producing higher-quality PCNF compared to no pretreatment, with the good results achieved using a specific reagent concentration and reaction time. The surface chemistry, nanofiber diameter distribution, crystalline structure, thermal stability, and rheological properties of the obtained PCNF were characterized and compared. The results demonstrated that the resulting nanofibers have nanometric dimensions (<50 nm), with charge content of 5.2 mmol g-1. Then, the PCNF films produced was evaluated for its swelling, surface, and mechanical properties before and after cross-linking. The present approach has been shown that PCNF films exhibit high water swellability with improved mechanical and thermal properties after cross-linking. Furthermore, this approach has potential benefits such as being environmentally friendly, generating less waste, and being cost-effective [4].

Figure:



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Biography

MAJOUDI Naji obtained a bachelor's degree in fundamental chemistry, option organic chemistry in 2019 at the Faculty of Science of the University mohammed I-Oujda before joining the University mohammed VI Polytechnic in master specialized in Materials Science and Engineering option polymers and composites within the department MSN (Materials Science, Energy and Nano-Engineering department). In 2022, he joined the Mohammed VI Polytechnic University in the MSN department as a PhD student on the topic of the valorization of Alfa fibers for the production of cellulose papers.

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Promising porous carbons derived from argan waste and their application in CO_2 storage

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Abstract

Biomass is an abundantly available and sustainable resource, which is widely utilized as precursor for producing activated carbons.

In this work, argan waste, was used as precursor for the preparation of activated carbon by chemical activation with KOH as activating agent. The effect of the carbonization and activation temperatures on activated properties was analysed. The gas capture performance of the prepared activated carbons was evaluated in CO_2 adsorption at differents temperatures up to 1 bar.

Experimental results showed that activated carbons possesses mixtures of micropores and mesopores. The optimized Brunauer-Emmett-Teller (BET) specific surface area of ACP-300-800 reached ~1600 m^2/g and total pore volume reached 0.87 cm^3/g. The APC-300-800 showed the highest CO_2 uptake of 6.00 mmol/g at 273 K.

This study offers a sustainable approach for valorizing an underutilized argan waste product into a valuable resource for environmental applications such as gas adsorption and water treatment.

Keywords: Argan waste, Chemical activation, Activated carbon, CO_2 capture

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Fig.ure 1: SEM image of APC-300-800 activated carbon.

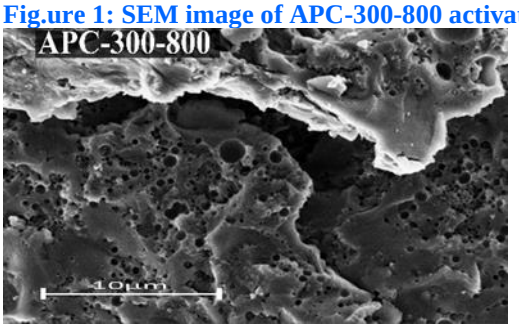
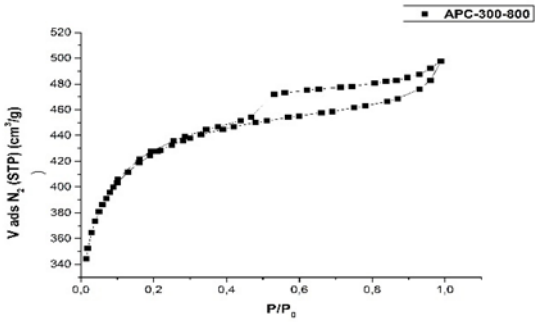


Figure 2: N_2 adsorption isotherm of APC-300-800 activated carbon.



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Biography

Yahia El habib : is a PhD student at Faculty of Sciences and Techniques, University Abdelmalek Essaadi, Tangier. Yahia does research in preparation of porous carbons materials, CO_2 capture. Their current project is " biomass-based activated carbon production and their application in gas adsorption".

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Utilization of seaweeds extracts as an eco-friendly alternative of agrochemicals for sustainable agriculture

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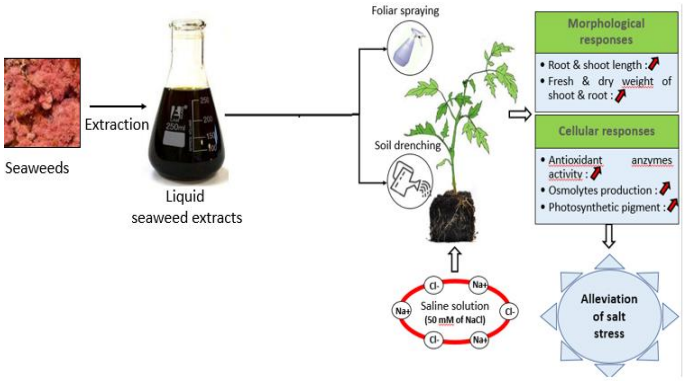
Abstract

The present investigation aimed to examine the effects of seaweed extracts (SWE) prepared from *Jania rubens (J. rubens)* on tomato plants under saline condition (50 mM of NaCl). Our finding has showed that under salt stress, the application of fresh seaweed at 2% significantly increased plant height (26.28 cm) compared with the non-treated stressed control (17.65 cm). Based on these results we evaluated the effect of *J. rubens* on some biological and biochemical parameters of tomato plants. In fact, increased contents of chlorophylls and total soluble sugars (TSS) were observed in seaweeds-treated plants compared to the control plants. Moreover, the treatment of stressed plants with SWE revealed a significant improvement in antioxidant enzyme activity of superoxide dismutase (SOD). According to all the above, the SWE tested in the present study can be used as biostimulant to enhance salt stress tolerance of tomato plant.

Keywords: *Solanum lycopersicum*; salinity; seaweed extracts; *Jania rubens*; antioxidant enzyme; biostimulant.

Figure 1: Experimental protocol used in our work



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Biography

The effect of extraction processes on the physico-chemical properties and bioactive compounds of the Prunus dulcis (almonds oil) in the eastern of Morocco.

Oumayma Sayah*, Hamza Bouakline, Imane Ziani, Abdesselam Tahani, Abdelmonaem Talhaoui. Ali El Bachiri,

Mohammed First University, Faculty of Sciences, Chemistry department, Laboratory of Environment and Applied Chemistry (LCAE), Oujda, Morocco

Abstract

This study aimed to determine the quality of oil extraction of the Prunus Dulcis almonds existing in the eastern region of Morocco (SIDI BOUHRIA), and to characterize each species; Marcona, sweet Beldi, bitter Beldi, Fournat, Roussi, and to evaluate the suitable extraction technics of almond seeds oil, by the use of the conventional solid-solvent extraction (the soxhlet extract and maceration) and the mechanical extraction using the cold press. The results shows that these cultivars are rich in fat and mineral matter. The Beldi variety has total sugars with contents in the range of 2.281–2.646 g/100g of raw material respectively the soxhlet extract and maceration. The sweet almond of the Beldi variety showed better antioxidant properties by the soxhlet extraction method, the soxhlet extract having a lower IC50 value and the highest antioxidant content thus the highest polyphenol potency. The mechanical extraction got the highest oil yeild (48% - 50%) but it had a significant impact on the tocopherol content of almond seed oils, The tocopherol contents of almond oils expressed using cold press method were generally low when compared to Soxhlet oil samples. In addition, a-tocopherol contents of the oil samples varied significantly (p\ 0.05) from 14.18 to 16.86 mg/100 g in Beldi and 15.71–17.96 mg/ 100 g in Fournat for cold-press and soxhlet extracted oils, respectively.

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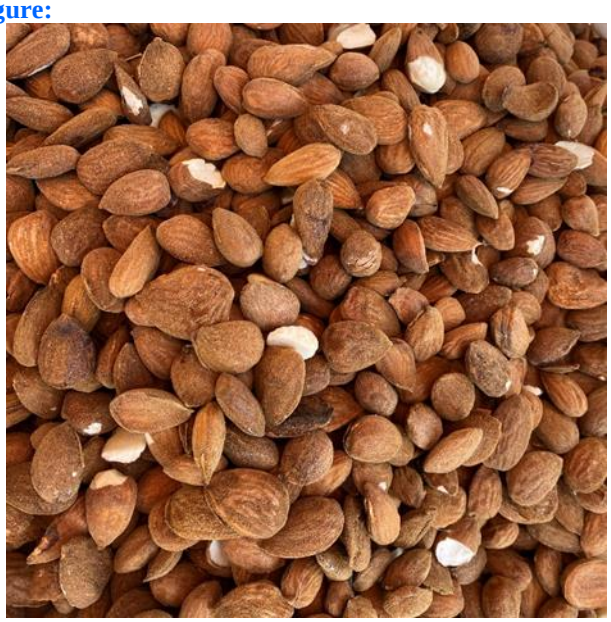
Figure:



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Biography

Oumayma SAYAH, a first year PhD student in Laboratory of Environment and Applied Chemistry (LCAE), Faculty of Sciences, Mohammed First University, in Oujda, with a Master's Degree in analysis and quality control of drugs and health products based on natural products in Mohammed V university in Rabat.

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The role of gamma irradiation to induce genetic variability and improve the yield of groundnut (*Arachis hypogaea* L)

H. Mesbahi[1, 2], I. Saibari[2, 3], M. Ezziyyani[1]., A. Hamim[2]

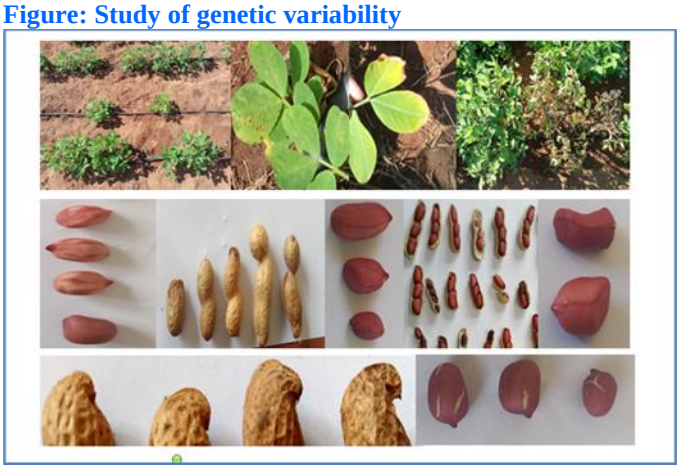
[1]*Abdelmalek Essaâdi University, Polydisciplinary Faculty in Larache, Department of Life Sciences, BP: 745 Poste Principale, 92004 Larache-Morocco, Team: Vegetable Biotechnology, Microbial, Marine & Precision Agriculture*
[2] Research unit of nuclear techniques, Environment and quality. *National Institute for Agricultural Research*, CRRA Tangier.
[3]*Biotechnological Valorization of Microorganisms Laboratory, Department of Life Sciences, Faculty of Sciences and Techniques, AbdelmalekEssaadi University, Old Airport Road, km10, Ziaten, Tangier, Morocco.*

Abstract

Peanut (*Arachis hypogaea*) is an oilseed crop, annual, food and fodder, native to South America, a natural hybrid of two wild species, cultivated on an average area of 25.670 in thousand hectares with a production of 726.176 in thousand quintals in Morocco. The species it has the unique ability to fix atmospheric nitrogen by symbiotic association with Rhizobium.

In addition, *A. hypogaea* it reproduces by self-fertilization; the low genetic variability makes it susceptible to diseases and abiotic stress. In this sense, gamma irradiation can be an effective tool to induce genetic improvement and the creation of mutants with desirable traits. The aim of this study is to evaluate the yield development of two varieties which are KP29 and Flower 11 as well as the new improved mutants. The seeds were already irradiated with three doses, namely 100, 150 and 200Gy of gamma rays (cobalt60).The results were indicated that there is a genetic variability between the mutants and the control, there is a development of new mutants, among them, those that have seeds and pods of different color, shape and size in comparison with the control in the different doses, also, mutants that are characterized by a higher number of seeds and pods compared to non-irradiated seeds. Regarding the agronomic traits, the treatment results of the variety KP29 were shown that there is a significant difference between the control and the seeds irradiated by 200Gy in terms of weight of pods and seeds ($p<0.05$) compared to other doses, on the contrary, there is no significant difference between the control and the doses regarding the number of pods and the number of seeds ($P>0.05$), on the other hand, the results of the variety of Fleur11, were indicated that there is a significant difference between the control and the three doses for the four agronomic parameters studied ($P<0.05$).

Figure: Study of genetic variability



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Biography

I am a first-year doctoral student at Abdelmalek Essaadi University, polydisciplinary faculty of Larache, Department of Life Sciences, I do my research in the plant biotechnology and plant improvement laboratory at the National Institute for Agricultural Research, RRA Tangier.

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Green Chemistry Approach to Cellulose Modification: Homogeneous esterification using anhydride and acyl chloride reagents

Ayoub Abarkan[1], Nafea Achalhi[1], Ridouan El Yousfi[1], Abdessamade Benahmed[1], Abderrahmane El Idrissi[1]

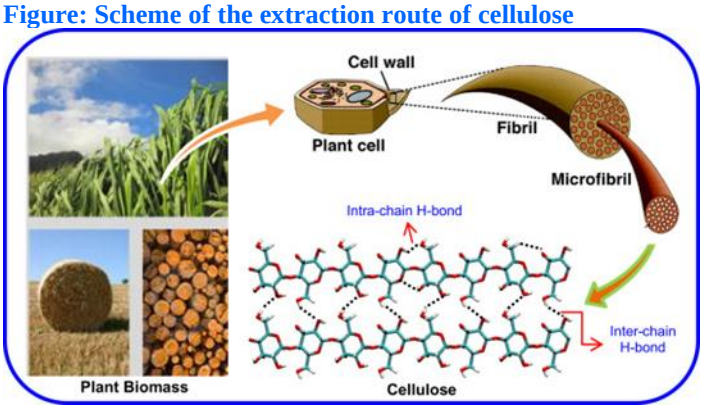
[1] *University Mohammed Premier, Faculty of Sciences, Laboratory of Applied Chemistry and Environment (LCAE) Oujda-Morocco.*

Abstract

The use of ionic liquids (ILs) as green solvents for chemical reactions has gained significant attention due to their low volatility, non-flammability, and tunable properties. In this study, four different ILs, namely 1-butyl-3-methylimidazolium bromide [C4mim]Br, 1-allyl-3-methylimidazolium chloride [Amim]Cl, 1-butyl-3-methylimidazolium acetate [C4mim]oAc, and 1,8-diazabicyclo[5.4.0]undec-7-enium acetate [DBU]oAc, were synthesized and employed as green solvents to carry out the homogeneous esterification of cellulose using various anhydride and acid chloride reagents. Cellulose derivatives were characterized by FT-IR, XRD, TGA, and DSC. Cellulose derivatives' structure and the reaction results were discussed.

Keywords: cellulose, ionic liquids, cellulose esters, solubility.

Figure: Scheme of the extraction route of cellulose



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Biography

Ayoub Abarkan, born in 1998, a Moroccan Ph.D. student at the University Mohammed Premier, Faculty of Sciences, Chemistry department in Oujda. In 2019, He received his bachelor's degree in chemistry. Then in 2022, he received his master degree in applied chemistry. His research focuses on the synthesis and characterization of new cellulose derivatives. His research also includes synthesizing and characterizing other biodegradable polymers. Green chemistry is an important concept of chemistry that he is following since the synthesizing route of his research should not include steps that involve the use of hazardous and toxic solvents or reagents.

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New Chitosan based biomaterials and their application in dentistry

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Abstract

Chitosan is a natural polysaccharide obtained from the deacetylation of chitin. It is abundantly present in the exoskeletons of crustaceans and insects and has generated great interest as a biomaterial in dentistry due to its multiple biological properties. It is increasingly being used in various dental disciplines, including preventive dentistry, conservative dentistry, endodontics, surgery, periodontics, and orthodontics. The objective of this study is to assess the knowledge, attitude, and practice of chitosan in dentistry in Morocco and to provide an overview of its importance, properties, and practical uses in dentistry.

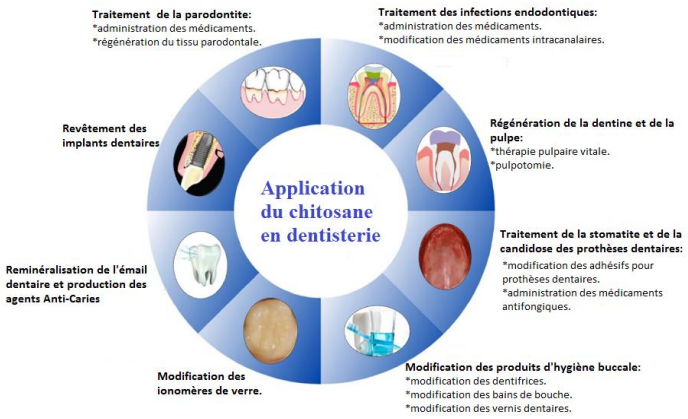
Methodology: This descriptive and analytical cross-sectional study was conducted among dentists, pharmacists, prosthodontists, and chemists in Morocco (n = 85) using a questionnaire that included sections on demographic characteristics, knowledge, attitude, and practice of chitosan. The study was conducted on the Google Forms platform and was disseminated online. The data were entered and analyzed in SPSS software.

Results: In this study, we found that 60% of our sample were not familiar with the chitosan molecule, 92.9% had never used a product containing chitosan, and only 10% to 20% of our population knew that this material is used in dentistry and its various disciplines.

Results: In this study, we found that 60% of our sample were not familiar with the chitosan molecule, 92.9% had never used a product containing chitosan, and only 10% to 20% of our population knew that this material is used in dentistry and its various disciplines.

Conclusion: Based on our study, we found that the majority of our sample were not familiar with chitosan and its properties and applications in dentistry. Therefore, we need to improve and encourage research on this molecule in dentistry to benefit from its multiple advantages.

Figure:



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Biography

The author obtained the master of Oral Biology and Materials from the Faculty of Dental Medicine, Mohammed V University. She is a Ph.D. student in Faculty of Medicine and Pharmacy, Mohammed V University in Rabat, Morocco. Her current research area includes new biomaterials and their application in dentistry.

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A novel biotechnological valorization approach of shrimp shells based on fermentation by *Lactiplantibacillus plantarum* S61 and ultrasound treatment

MOUMNASSI Sara[1], LMIMOUNI Meryem[1], BENTOUHAMI Nour Eddine[1], IDRISSI YAHYAOUI Meryem[1], BRAHMI Mohamed[2], BELLAOUCHI Reda[1], EDDABBEH Fatima-Ezzahra[1-3], HASNAOUI Ismail[1], ABOUSALHAM Abdelkarim[4], JAOUADI Bassem[5], SAALAOUI Ennouamane[1], ASEHRAOU Abdeslam[1]

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[2]*Laboratory of Applied Chemistry and Environment, Department of Chemistry, Faculty of Sciences, Mohammed Premier University, 60 000 Oujda, Morocco*
[3]*Laboratory of Bioresources, Biotechnology and Bioinformatics, Higher School of Technology of Khenifra, Université Sultane Moulay Slimane, 54000 Khénifra, Morocco*
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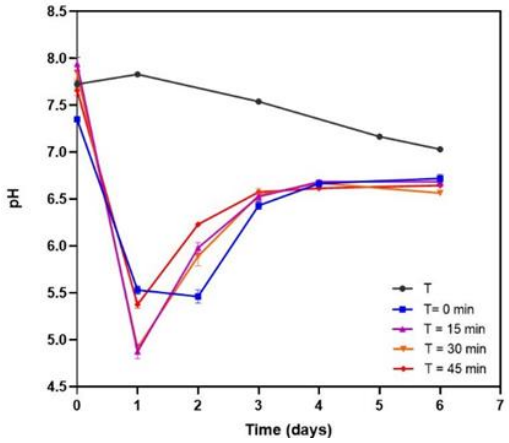
Abstract

Nowadays, the high consumption of shrimp generates significant amounts of residues, which are discarded in the environment with no treatment [1]. However, previous studies showed a high content of this residue with the co-product Chitin. Chemical methods are usually developed to extract this co-product by using toxic solvents for deproteinization and demineralization of shrimp waste. The aim of this study is to develop an eco-friendly method for chitin extraction, based on fermentation by *Lactiplantibacillus plantarum S61* isolated from olives and selected for its enzymatic and probiotic properties [2]. Shrimp were first treated with ultrasound at different times (T: 0, 15, 30, and 45 min), followed by the addition of date syrup (DS) as ~~a~~ nutrients source (1.5 and 3%) for the fermentation process, and then inoculated with *L. plantarum* S61. The results obtained after 7 days of fermentation showed a decrease in pH during the first 3 days for all samples. However, a maximum decrease was observed for the samples treated with T= 15min-DS-1.5% and T= 30min-DS-3% of carbon source, reaching pH of 5.85 and 4.91, respectively. The biotechnologically extracted chitin was characterized by XRD, FTIR and TGA analysis, which confirm that the obtained chitin is of the alpha-chitin form with a low crystallinity caused by the use of the ultrasound, although, the demineralization and degradation of the shrimp was found to be incomplete. Therefore, the 3% concentration of date syrup allowed favorable results with the samples treated between 15 and 30 min by ultrasound. Further research works are needed to develop a more efficient biotechnological method of chitin extraction.

Figure:



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Biography

MOUMNASSI Sara is a PhD student at the University Mohammed First, Faculty of Sciences in Oujda, Morocco, working in the Laboratory of Bioresources, Biotechnology, Ethnopharmacology and Health, and focuses on the biotechnological valorization of bioresources

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Extraction and characterization of Cellulose and Lignin from Two-phase olive mill waste.

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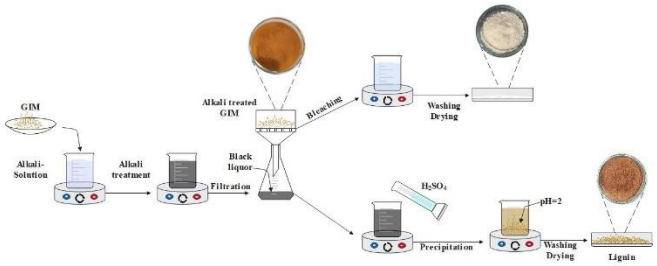
Abstract

The rapid increase in waste from olive oil production has raised widespread concern. There are various methods for the olive oil extraction, we were interested to work with the two-phase olive oil extraction, since it produces one and only waste which is a wet pomace (WP). WP is composed of olive-mill wastewater (Margines) and a semi-solid material (olive stone, mesocarp, skin, and fatty remnants) [1]. Lignin is one of the most abundant natural polymers after cellulose on the planet [2]. Both polymers offer several benefits, including biodegradability, biocompability, non-toxicity and widespread industrial availability [3]. The current work provides a novel and simple methodology for valorising two-phase olive mill waste via extracting cellulose micro fibers and lignin. This contribution will summarize the materials characterization in term of morphology, chemical composition, and thermostability. The final yield of the cellulose and lignin extraction was determined gravimetrically and found to be 11.72% and 12.5%, respectively.

Figure



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Biography

Second year PhD student at the Polydisciplinary Faculty of Sultan Moulay Slimane University, graduated with a Master degree specialized in Industrial Chemistry at Abdelmalek Essaadi University, Completed the end-of-study internship at the MSN department at Mohammed VI Polytechnic University. Worked on the extraction of bio-polymers and the synthesis of carbonaceous composites for wastewater treatment
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Rubia tinctorum Madder: Towards an ecofriendly dyeing of the traditional Moroccan carpet

Bensalem EL JEDDAOUI[1*], Imane FIKRI[1], Abdelmajid El Bakkali [1], Saadia Ait Lyazidi[1], Ali Amechrouq[2], Mustapha Haddad[1], Stefano LEGNAIOLI[3] and Marina BICCHIERI[3]

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Abstract

Red coloring in the Moroccan carpet craftsmanship is of great importance. However, since several years the mastery of wool dyeing with madder red, of which the use in the Mediterranean region dates back to the XVIth Century B.C.[1], continues to be lost in favor of the use of chemically synthesized dyes that are harmful to environmental compartments and to craftswomen health, and unfortunately easy to use. The present work relates to a return to the natural dyeing plant of Madder (Rubia tinctorum) in view to master, in an ecological way, red coloring in the Moroccan artisanal carpet. Chemically, the red coloring compounds in madder are mainly Alizarin and Purpurin hydroxy-anthraquinones [2] found in the cortical parenchyma below the root bark.

Wool dyeing baths with extracts of madder roots, sampled in the regions of Fez-Meknes and Draa-Tafilalet in Morocco, were carried out optimizing the various factors determining the final wool color. All of W/L ratio, mordant, bath pH as well as the metallic kind of the dyeing bath container were considered.

The obtained colors, ranging from orange to deep dark red, were evaluated in terms of chromatic coordinates ($L*$, $a*$ and $b*$) and in terms of K/S color depth values by means of optical reflectance spectroscopy [3]. Washing fastness tests were also carried out considering two washing stages, and color differences have been calculated.

On another side, 3D fluorescence/Total Excitation Emission Matrices discriminating Alizarin and Purpurin emitting signals have been measured on the dyed wool fibers; these fluorescence landscapes permitted fingerprinting of red dyed wool by madder originating from the two regions. The relative emission intensities corresponding to the main coloring components Alizarin and Purpurin seem depending on the madder geographical origin [4].

The present work seeking the valorization of dyeing plants and mastering natural dyeing skills aims at promoting the Moroccan traditional carpet into an eco-friendly product of Morocco.

Key words: Madder, ecofriendly wool dyeing, fastness, Colorimetry, Reflectance, 3D Fluorescence

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4. Barbache, S. and al. J. Dyes and Pigments,153(2018) 256-265. *https://doi.org/10.1016/j.dyepig.2018.02.033*
5. .

Biography

Bensalem EL JEDDAOUI, PhD student at the Laboratory LASMAR-URL CNRST N°7 in the Faculty of Sciences of the University of Moulay Ismail in Meknes. His works consist in the analysis of dyes in ancient textiles, and developing new protocols in the dyeing process of traditional carpets with natural dyes. His technical skills relate mainly to the optical absorption and 3D fluorescence spectroscopies in addition to XRF and chromametry.

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Comparative study of antioxidant and antibacterial activity from the essential oil obtained from Pistacia Lentiscus stems via different extraction methods: Hydrodistillation, Microwave, Ultrasounds, and Supercritical fluid extraction

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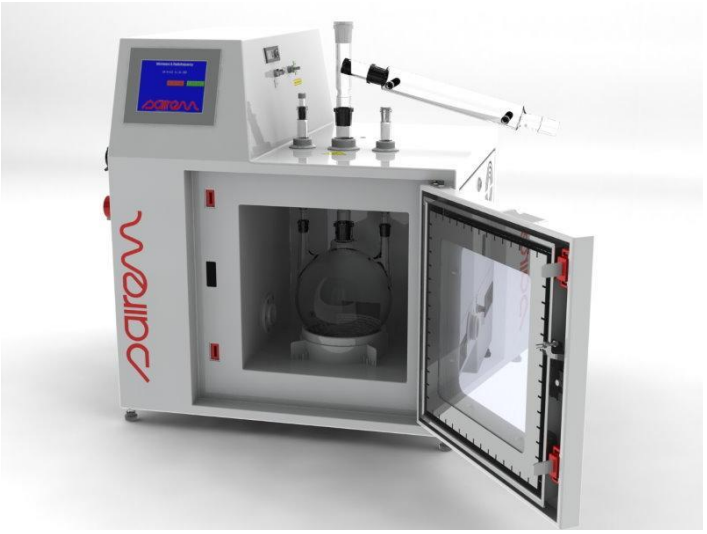
Abstract

The essential oil of Pistacia Lentiscus, which is an aromatic and medicinal plant, has been used traditionally to improve varicose veins and heavy legs, congestion, and venous stasis, as well as external and internal hemorrhoids. Due to their physicochemical properties that are very interesting, the knowledge of the extraction method allows to have a high yield, to extract the maximum possible volatile compounds, to be fast, easy, economical, easy to maintain, and that does not have a dangerous on the environment is something that must be taken into consideration. To improve the effectiveness of the extraction method, and evaluate its effect on the chemical composition of essential oil of Pistacia Lentiscus stems, antioxidant, and antibacterial activity, we evaluate four extraction methods including Hydrodistillation (HD), ultrasound-assisted extraction, Microwaves assisted extraction (MAE), and supercritical fluid extraction (SFE).



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Biography

Beraich Abdessamad, a PhD student at the faculty of sciences Oujda of Mohammed First University, working on the extraction of essential oil and the valorization of aromatic and medicinal plants

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Brassicaceae methanolic extract for mild steel protection in HCl 1M

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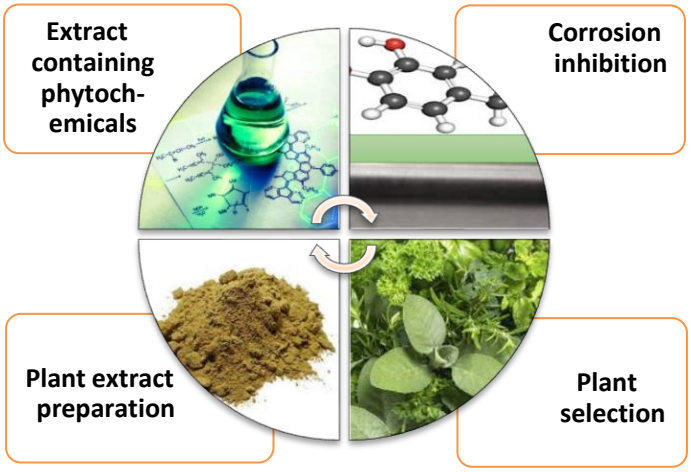
Abstract

In recent years, particular attention has been paid to corrosion inhibition to improve and enrich the socio-economic environment by using environmentally friendly, non-toxic, and biodegradable products to reduce the degradation of metals in the industrial sector. In the current study, a plant methanolic extract from the Brassicaceae family is used to inhibit the corrosion of mild steel in a solution of HCl 1M. Various techniques have been used in the study, namely mass loss, potentiodynamic polarization (PDP), and electrochemical impedance spectroscopy (EIS). Surface analyses (SEM/EDX) were performed to establish the corrosion properties of the samples. The extraction was carried out using a Soxhlet-type apparatus. The structure of the extracted phytochemicals was characterized by gas chromatography/mass spectrometry (GC-MS) analysis. The EIS results showed a maximum inhibition efficiency of 92% with an inhibitory concentration of 400 ppm at 298 K. The polarization curves indicated that the plant extract and its fractions are mixed-type inhibitors with stronger anodic inhibitory activity. In addition, inhibitor efficiency increases with inhibitor concentration and decreases with temperature increase. The thermodynamic parameters were also examined to determine the absorption type.

Figure:



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2. **Anitha, R**, Chitra, S, Hemapriya, Chung, I, V, Kim, S, Prabakaran, M., Construction and Building Materials 213 (2019) 246–256
3. **Pal, S**, Lgaz, H, Tiwari, , Chung, I , Ji, G, Prakash, R, J. of Molecular Liquids, 276 (2019) 347–361.
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Biography

Omar BELHADJ is a PhD student from Ibn Tofail University. He is trying to find some efficient extracts against corrosion of mild steel. He also extracts certain oils which will be used in cosmetics. Omar has some articles on their way to be published.

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Equilibrium and kinetic studies on the adsorption of Zn^{2+} from an aqueous solution using natural Moroccan clay

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[b] *Laboratory of optics, information processing, Mechanics, Energetics and Electronics, Department of Physics, Moulay Ismail University, B.P 11201, Zitoune, Meknes, Morocco*
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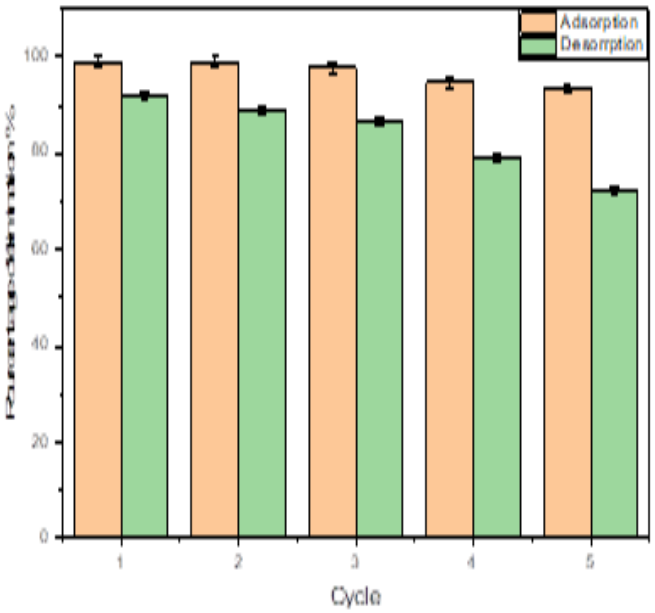
Abstract

This study examined the adsorption properties of natural Moroccan clay for the removal of zinc from aqueous solutions. The results showed that the amount of adsorbed zinc metal ions increased with increasing metal ion concentration, contact time, and solution pH, while decreasing with adsorbent amount and system temperature. The intraparticle diffusion model confirmed these findings. The kinetic experiments revealed a two-step process for the adsorption of zinc metal ions on natural clay, with a rapid adsorption on the external surface followed by slow diffusion of intraparticle inside the adsorbent. The pseudo-second-order kinetic model was found to best describe the zinc adsorption process. The study calculated several parameters, including rate constant, adsorption half-hour, and diffusion coefficient, under various physico-chemical conditions. The equilibrium adsorption data fit the Langmuir isotherm better than the Freundlich models, as evidenced by the Freundlich constant (n) and the separation factor (R_L) of Langmuir's equation. Thermodynamic studies indicated that the adsorption process was exothermic due to the negative (ΔH°), associated with a decrease in entropy and a change in Gibbs free energy (ΔG°).

Figure:



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Biography

The author of this study is a researcher who specializes in the field of adsorption and the removal of micropollutants from aqueous solutions.
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Chemical Composition and Antioxidant Activity of *Gracilaria* bursa-pastoris red seaweed extracts

Safae Ouahabi, El Hassania Loukili, Mohamed Ramdani, Marie-Laure Fauconnier

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Laboratory of Chemistry of Natural Molecules, Gembloux Agro-Bio Tech, University of Liège, Belgium

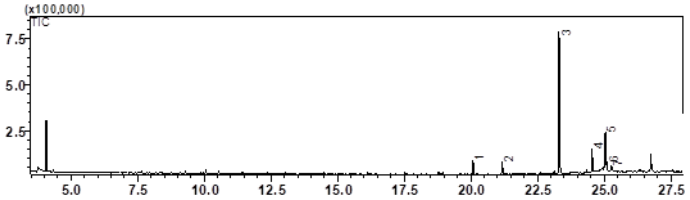
Abstract

Seaweeds are considered as a source of bioactive compounds as they are able to produce a great variety of secondary metabolites characterized by a broad spectrum of biological activities* 1. Marine seaweeds are a source little explored in Morocco, while they constitute an economic development issue. The present work has for objectives, to provide informations on nutritional composition of *Gracilaria bursa-pastoris* seaweed from the eastern region of Morocco and to exploit these seaweeds of interest in the field of search for a new source of antioxidants.

The extracts and of the red seaweed *Gracilaria bursa-pastoris* was prepared by maceration and soxhlet. The chemical composition of the ethyl acetate and the hexanic extracts have been identified by GC/MS chromatography 3. It revealed the presence of palmitic acid as the majority compound with a percentage of about 50%, linoleic acid, Oleic acid and other Componds with low percentage. The antioxidant activity of the methanolic extract was evaluated by the Scavenging 2, 2-Diphenyl-1-picrylhydrazyl Radical Test and by the β-. Carotene Bleaching Test. The IC50 values obtained showed that this extract has a high antioxidant power.

KEY WORSD: *Gracilaria bursa-pastoris, GC/MS, antioxidant activity,* DPPH.

Figure: chromatographic profil of ethyl acetate extract



Recent Publications

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Biography

Safae OUAHABI is PhD student in Applied Chemistry and Environment Laboratory at Faculty of Sciences, University Mohamed I Oujda under the scientific direction of Pr. Mohamed RAMDANI. Her current researchers are focused on valorization of seaweed from Nador lagoon by investigating their chemical compositions, biological activities and discovering new applications' fields. She did one scientific internships ERASMUS+ of six month at the laboratory of Chemistry of Natural Molecules under the supervision of Pr. FAUCONNIER Marie-Laure at Gembloux Agro-Bio Tech, University of Liège, Belgium.
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Study of the steel corrosion inhibition in an acid medium by the Centaurium erythraea plant extracts

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Abstract

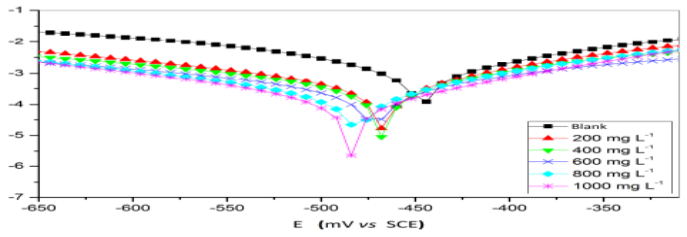
The possibility of using green corrosion inhibitors has now become an interesting alternative compared to other protection methods. Several researchers have been interested in finding new and more environmentally friendly ways of corrosion inhibition based on plant extracts for metals protection.

Our work focuses on the use of the Centaurium erythraea plant extracts as corrosion inhibitor for steel in 1M HCl medium.

The qualitative analyses carried out by chromatography on a thin layer of silica gel followed by analyses of liquid chromatography, have assured that the studied extracts are rich in antioxidant phenolic compounds.

The inhibiting power was evaluated by different methods (Characterizations, gravimetric and electrochemical). The results of the extracts inhibitory effectiveness studies showed that there is a good resistance against the corrosion, this one is more important when the inhibitor concentration and the time of immersion increase. This protection is translated by the formation of a film on the metal surface.

Identification of phenolic compounds by HPLC



Polarization curves

Recent Publications :

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Biography

The Author has a master degree in metal protection systems, conception and environment from Faculty of science, Ibn il University,Kenitra Morocco. She is currently pursuing the third year of her doctoral studies in the organic chemistry laboratory: ysis and environment of the same university.

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Characterization, phytochemical study and evaluation of the antioxidant power of certain polar and apolar extracts of Chamaerops humilis L fruit (pericarp, seed and mixture) from western Morocco

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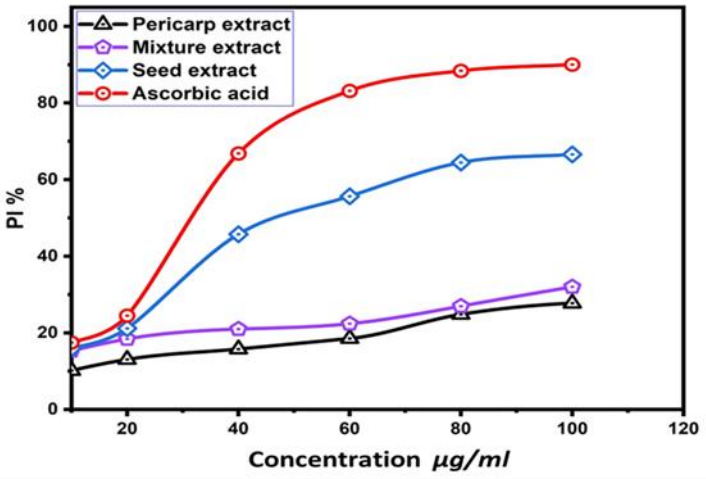
Abstract

Recently, the valorization of fruit seeds oils and extracts has known a significant interest due to their economic importance and therapeutic qualities. This study reports the physico-chemical, phytochemical, and fatty acid composition of the Moroccan dwarf fan palm fruit [pericarp (section 1), seed (section 2), and mixture of both sections]. The specific objective was to determine how the chemical composition and antioxidant activity of the generated extracts were affected by the separation of various fruit sections. The results revealed that oleic acid is in majority and, between the three extracts; the seed oil has the highest oleic acid content (67,25 %). The methanolic seed extract showed also the highest total polyphenolic content (TPC) equal to (34,224 mg GAE/ g DM), and total flavonoid content (TFC) equal to (1,026 mg QE/g DM). The highly antiradical character explains its very interesting antioxidant capacity with an IC50 of 60,1 µg/ml.

Figure: Antioxidant activity of methanolic extracts of C.humilis L seed, pericarp and mixture.



Recent Publications

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2. Zaazaa L., Naceiri Mrabti H., Ed-Dra A., Bendahbia K., Hami H., Soulaymani A., Ibriz M., Advances in Pharmacological and Pharmaceutical Sciences, 2021.
3. Gonçalves S., Medronho J., Moreira E., Grosso C., Andrade P. B., Valentão P., Romano A., 3 Biotech, v8(2), 2018,pp. 1-8.

Biography

MHANNI Dounia received a master's degree in Organic Chemistry from the Faculty of Sciences, Ibn Tofail University, Morocco, in 2019 and is now a Ph.D. student in organic chemistry at Ibn Tofail University. Her research is focused on the valorization of vegetable oils and plant extracts as corrosion inhibitors.

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Study on the removal of cobalt and chromium heavy metals by adsorption using a natural clay from Morocco: modeling and optimization using response surface methodology (RSM)

I. Mariouch[1], R. Mariouch [1], M. Belfaquir [1], M. S. Elyouibi[1]

[1] *organic chemistry, catalysis and environment laboratory*

Abstract

Clay is a plentiful and cost-effective natural material with unique physicochemical properties, including a large specific surface area, high adsorption capacity, high electrical charge, and the ability to bind with metal ions. As a result, using clay for heavy metal removal is an effective, affordable, and eco-friendly method. The aim of this study was to assess the capability of clay sourced from the Azrou region of Morocco to remove heavy metal ions, specifically chromium and cobalt, from aqueous solutions via adsorption. To achieve this goal and reduce the number of experiments required, we used the response surface methodology (RSM) based on a central composite design. This allowed us to develop predictive models, optimize the reduction of heavy metals, and study the interactions between the different operating parameters. Thirty experiments were conducted to evaluate the impact of operations on the adsorption of the two heavy metals, including initial concentration (IC) (A), adsorbent dose (B), pH (C), and agitation rate (V). The results show that the interaction between variables was found to be non-significant. The statistical analysis demonstrates that the predictive models for both heavy metals are highly significant with very low probability values ($p < 0.0001$). The removal efficiency of cobalt and chromium under these optimal conditions ranges between 99% and 99.33%, respectively. Overall, the study concludes that Azrou clay has great potential as an effective adsorbent for treating heavy metal-contaminated wastewater.

Recent Publications

1. Adsorption of methylene blue dye from aqueous solution onto natural clay: Equilibrium and kinetic studies. Materials today :Proceedings, 72(1-3), September 2022.

Biography

Author is a doctoral student at Ibn Tofail University; her research project concerns the depollution of wastewater by natural products.

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Chemical composition and antibacterial activity of *Salvia officinalis* essential oil against multidrug-resistant bacteria

A. Azghar [1.2.3], M. Dalli[1.3], S. Azizi[3], E. Benaissa[4.5], Y. Lahlou[4.5], M. Elouennass[4.5], A. Maleb[1.2.3]

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Abstract

Diseases caused by multi-drug-resistant bacteria are a serious threat to humanity (1). Essential oils are considered a viable approach for the creation of new antibacterial agents (2,3). The present study investigated the chemical components and antibacterial activity of essential oils derived from *Salvia officinalis*. The volatile compounds from the *Salvia officinalis* Eo were obtained by hydrodistillation using a Clevenger apparatus and analyzed by gas chromatography–mass spectrometry (GC-MS). The evaluation of the antibacterial activity was performed by agar diffusion method and broth microdilution method on six gram-positive and negative bacteria. Four clinical multidrug-resistant bacteria encompassing extended-spectrum β-lactamase-producing *Escherichia coli (ESBL-EC)*, carbapenem-resistant *Acinetobacter baumanni* (*CRAB*), ceftazidime-resistant *Pseudomonas aeruginosa* (*CRPA*), and methicillin-resistant *Staphylococcus aureus* (*MRSA*), and two sensitive reference bacterial strains (*Escherichia coli* ATCC 25922, *Staphylococcus aureus* ATCC 29213). Chemical analysis revealed the existence of 18 chemical substances, of which eucalyptol (22.87%) and beta-thujone (21.58%) dominated. The essential oils were found to be bactericidal against all tested microorganisms. E. coli ATCC 25922 and CRAB showed low MICs (90 g/ml), while ESBL-E. coli and CRPA showed MICs ranging from 110 to 130 g/ml. MICs of 180 g/ml inhibited S. aureus ATCC 29213 and MRSA (4,5). We have shown that essential oils derived from citrus peels exhibit remarkable antibacterial activity, which may be due to the interaction of the various components. Further investigation into the mechanisms behind this antibacterial action is necessary. This encourages the use of this natural arsenal in the search for novel antibacterial agents.

Table 1: Inhibition Zone diameter (mm) of *Salvia officinalis (L.) (Eo)*

	Multidrug-resistant strains			
	CRAB	*ESBL-EC*	*CRPA*	*MRSA*
Salvia officinalis (L.) (Eo)	40.3 ± 1.5	No inhibition	No inhibition	55.5 ± 1.3
Ceftazidim 10µg	-	12 ± 0.58	11 ± 1.15	-
Cefoxitine 30 µg	-	-	-	19 ± 0.5
Imipenem 10µg	13 ± 0.58	-	-	-

Table 2: Minimum Inhibitory Concentration (MIC)(µg/ml) values of *Salvia officinalis (L.) (Eo)* on various bacteria

	EC ATCC 25922	*SA ATCC 29213*	*CRAB*	*ESBL-EC*	*CRPA*	*MRSA*
Salvia officinalis (L.) (Eo)	90	180	90	120	130	180

E. coli ATCC 25922; *Escherichia coli* ATCC 25922™; *S.aureus* ATCC 29213 : *Staphylococcus aureus* ATCC 29213™ ; CRAB: carbapenem-resistant *Acinetobacter baumannii*; ESBL-EC: extended-spectrum β-lactamase-producing *Escherichia coli*; CRPA: ceftazidime-resistant *Pseudomonas aeruginosa* ;MRSA : methicillin-resistant *Staphylococcus aureus*; *NI : No inhibition,

Recent Publications

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3. Dalli M, Azizi SE, Benouda H, Azghar A, Tahri M, Bouammali B, et al.. Evidence-based Complement Altern Med. 2021;2021.
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5. Mendes FSF, Garcia LM, Moraes T da S, Casemiro LA, Alcântara CB de, Ambrósio SR, et al.. Anaerobe. 2020;6.

Biography

My name is Azghar Ali. I am a doctoral student in 5th year at the faculty of science, university Mohammed First Oujda. my research subject is the research of natural substances with antibacterial activity against multidrug-resistant bacteria.

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Posters

HEALTH AND NUTRITION SCIENCES

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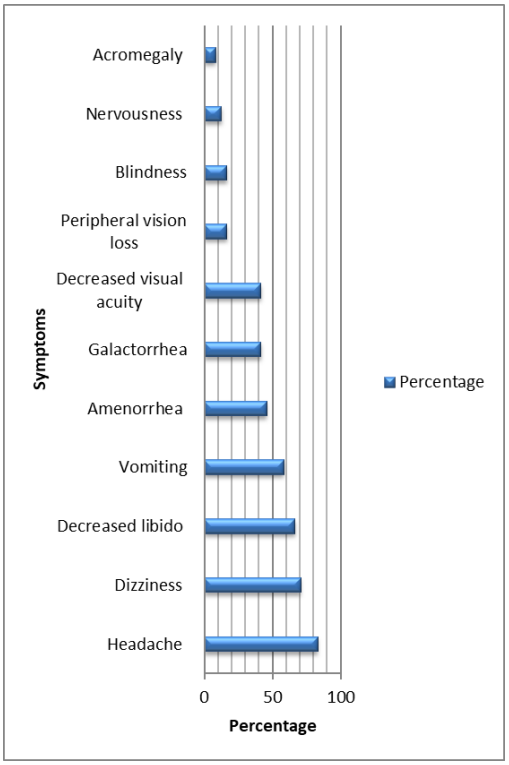
Abstract

Introduction : Pituitary adenomas are tumors the pituitary gland . In this work, we will describe the epidemiological aspect of pituitary adenomas admitted to the neurosurgery department in the hospital of specialities of the university hospital of Rabat-Morocco. Materiel and methods : Our study is a descriptive epidemiological study targeting patients admitted from January 1 to December3,2020, and whose diagnosis is a pituitary adenoma. We excluded any patients outside of this period and also differential diagnosis. Data collection was carried out from medical files and reports. For each patient, we collected demographic data, age, sex, clinical examination data, symptoms, syndroms and type of tumors. Results : We collected 24 patients with pituitary adenoma, including 19 women and 5 men ; 41,67% of them comes from Rabat. The average age of patients is 45,38years and the average of the onset of symptoms before consultation is 9.54 months. For symptoms we found, headache with a percentage of 83,33%, dizziness : 70,83%, decreased libido: 66,67%, nausea:58,33%, amenorrhea: 45,83%, galactorrhea: 41,67% , decreased visual acuity: 41,67%, loss of peripheral vision:16,67%, blindness:16,67%, nervousness:12,5% and acromegaly with 8,33%. Syndroms founded are Cushing's syndrom : 25%, Intracranial hypertension: 33,33% and Opto-chiasmatic syndrom :41,67%. For types, we found 15 prolactinomas, 2 growth-hormone-producing tumors, 6 ACTH-secreting tumors and 1 thyroid-stimulating tumor. According to the size 20 are macroadenomas and 4 are microadenomas.Conclusion : Pituitary adenomas are infrequent tumors and differ according to the type of hormone secreted; headaches remain their most telling symptom headaches is their most commun symptom.

Figure:



Recent Publications

1. Legmouz.M, Elouahabi.A, S.Boulbaroud, F.Azzaoui, *A Neuropsychologica*. 20 (2022) 3. *345-353*.

Biography

My name is Maria Legmouz, I'm a Phd Student in the laboratory of biology and health, the faculty of science at the ibn tofail university, I am passionate about brain tumors and my thesis is on this subject.
I published a paper in acta neuropsychological and my second paper will be published the next month in Annals of medicine and surgery.
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Health care security in primary healthcare context

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Abstract

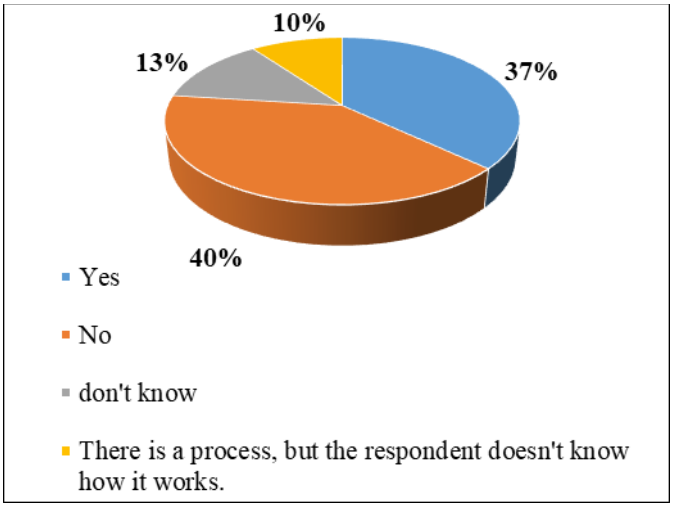
Background: Each year, many people suffer medical errors or lose their lives due to unsafe and poor quality care. Most of these occurrences could be prevented. To date, most research on health security has focused mainly on health services' security in hospitals and has paid little attention to the context of primary healthcare, which represents the main means of achieving sustainable universal health coverage. This study falls within this perspective.

Methods: Descriptive exploratory study, based on documentary analysis of health security studies in the context of primary healthcare, questionnaires and interviews, conducted in 2021 with 272 professionals from primary healthcare establishments, following proportional stratified sampling.

Results: The main results revealed that, generally, the culture of safety in primary healthcare is poorly developed or even absent. More than 53% of respondents consider that the security level of primary healthcare is low. Also, over 65% are unaware of errors that occur in their primary healthcare establishments. 40% declare the absence of a process for collecting and reporting medical errors or adverse effects related to healthcare. More than 60% of respondents consider that factors related to working conditions, daily tasks and organizational factors have a strong influence on healthcare safety.

Findings: It is essential to improve healthcare safety and quality, which is an issue of global importance, and to act on several factors to reduce the incidence of adverse effects of care.

Figure: Availability of a process for reporting errors and adverse reactions



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1. Chanelière M, Jacquet F, Occelli P, Touzet S, Siranyan V, Colin C. (2016). Assessment of patient safety culture: what tools for meedical students? BMC Medcial Education 2016; 16(1), 255.
2. Chanelière M, Oriol J.M, Senez B, Keriel-Gascou M, Fanjat H, Blanc M.D, Colin C. CADYA : un outil pour analyser des incidents en Soins Primaires. Risques & qualité 2014 11(2); 34-40.
3. Mallouli, M., Aouicha, W., Tlili, M., Limam, M., Ajmi, T., Mtiraoui, A. & Zedini, C. (2017). Culture de sécurité des soins dans les centres de soins primaires tunisiens : une étude multicentrique. Santé Publique, 29, 685-691. *https://doi.org/10.3917/spub.175.0685*.
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5. Jha A, Godlee F, Abasi K. Delivery on the promise of universal health care. BMJ 2016;353:i2216.

Biography

The author is Doctor, Public Health specialist, technical focal point for coordinating UNFPA projects with the Ministry of Health and Social Protection. She also has a Master's degree in Nursing Education and a Master's degree in Law. She worked for 7 years as a teacher and manager of continuing education at the Human Resources Directorate before joining the Population Directorate as manager of health programs. As a researcher, she works, among others, on the management of health organizations, primary healthcare, health policies, migrant health, sexual and reproductive health, digitalization in the health field... She has scientific publications on primary health care, migrant health and youth health. She has published 4 articles. Her H index is 1 on Scopus.

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Perceived stress and coping strategies in Beni Mellal nursing students.

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Abstract

Perceived stress is more noticeable in nursing students because of the particularity of this social training [1]. Students have to cope with these stress factors while using coping strategies.

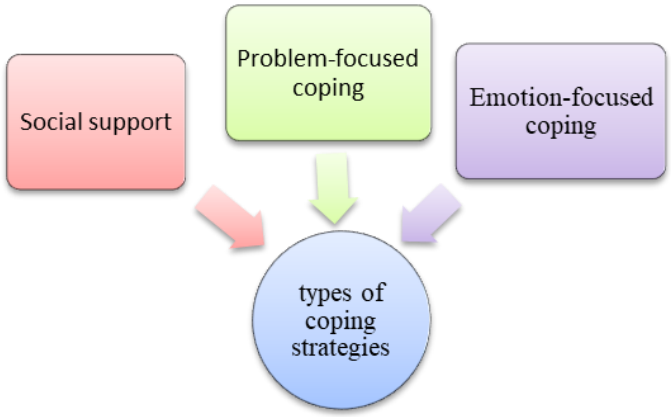
The aim of this cross-sectional study is to determine the level of perceived stress and the coping strategies used by nursing students at the Higher Institute of Nursing and Health Techniques in Beni Mellal.

A total of 199 students were recruited using stratified sampling to ensure representativeness of each level of study. The data were collected using a self-administered questionnaire including a socio-demographic questionnaire, a perceived stress scale (PSS-10) and the French version of the Ways of Coping Checklist (WCC).

The results revealed that the female gender is the most dominant (83%). 76% of students aged between 18 and 20 years old. The results also showed that the majority of students had high stress levels: (74.46%), (70.90%) respectively for second and third year. Most students (61%) used emotion focused coping to manage their stress and only a minority of first year student's focus on social support.

This study has determined that a significant number of students were experiencing a high stress level. Furthermore, an emotion focused coping strategy were used. Thus, we hope that this initiative will be the starting point for further studies in particular to explore perceived stressors and coping strategies adopted.

Figure: Conceptual framework from the literature review.



Recent Publications

1. Dugué.M, 2018. "Psychological characteristics of stress in nursing student". Revue d'épidemiologie et de santé publique, volume 66,Issue 6 November 2018,347-354.

Biography

The author is a permanent teacher at Higher Institute of Nursing and Health Techniques in Beni Mellal, and she is currently, a PhD student at Ibn Tofail University, Kenitra. Also, she participated actively at national and international conferences (EPA 2023, AI2SD2022, ...)

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WATER, SOIL, AIR, AGRICULTURE AND ENVIRONMENTAL ISSUES

Comparative study of the quality of treated water and sludge from wastewater treatment plants in the peri-urban area of Casablanca

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[3]*Laboratoire de biologie et d'écologie animales, Ain Chock's Sciences Faculty, Hassan II University of Casablanca, Morocco*

Abstract

In the context of water resources shortage that Morocco is experiencing in recent years, the mobilization of non-conventional resources becomes a necessity. The reuse of treated water and the bioconversion of biological sewage sludge into value-added products is considered an environmentally friendly and economical approach to the management of this significant resource which represent at least 80 % of consumed fresh water.

In this work we compare the quality of treated water and sewage sludge from wastewater treatment plants in the peri-urban Casablanca by analyzing different physicochemical and

bacteriological parameters. The choice was made for three wastewater plants installed in different regions and monitored either by LYDEC and Commune of Had Soualem and use

different technologies. Recycling of treated water in agriculture and watering of green spaces is dependent on the compliance of the parameters with international standards (WHO, FAO, …etc.)

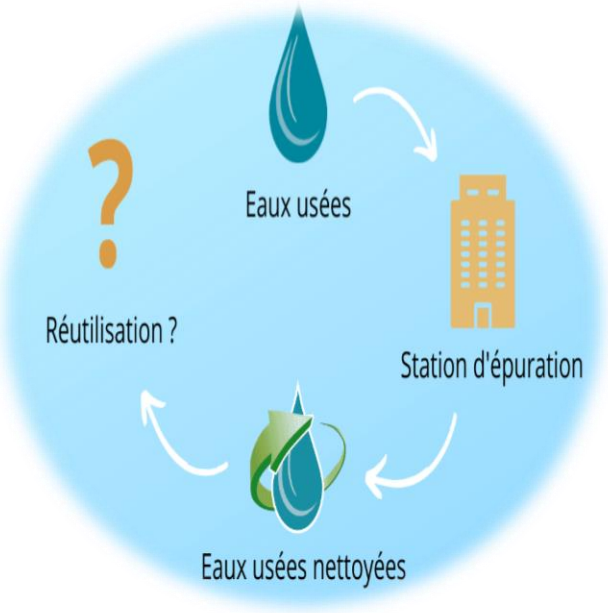
The preliminary tests of the samples taken during the second half of the year 2021 showed that the advanced technologies put in place at the level of the Mediouna and the airport zone

stations (membrane reactor and activated sludge respectively) give water to the output of the stations more respectful of the standards required in terms of physicochemical parameters

(pH, Conductivity, Tubidity, COD, BOD5, TNK and TPK) and bacteriological (fecal germs, Escherichia Coli, streptococci, Helminthes eggs). The parameters relating to the Had Soualem natural lagoon station are generally at the tolerance's threshold.

The results of analyzes relating to the residual sludge collected at the end of the cycle are on the whole satisfactory despite a fluctuating variability of the bacteriological parameters.

Figure



Recent Publications

1. [1]R. Bourrier, M. Satin, and B. Selmi, Guide Technique d'assainissementcollecte-épuration-conception-exploitation, 4éme édition, 2018.

Biography

ZARRI Meryem, Phd student, Organic Synthesis Extraction and Valorisation Laboratory, Ain Chok's Sciences Faculty, (OSEV), Hassan II University of Casablanca, Morocco
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Long-term impact of treated wastewater irrigation on organic matter in agricultural soils: Case of the locality of Ain Taoujdate in the region of Fez-Meknes

Omar Taoussi[1*], Hassan Ba-Haddou[1,3], Salim Foudeil[1], Abdelmajid El Bakkali[1], Saadia Ait Lyazidi[1], Mustapha Haddad[1], Hubert Cabana[2], Margoum Christelle[3]

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Abstract

One of the perspectives of the "Programme National d'Assainissement Mutualisé" (PNAM) underway in Morocco since 2019 is to achieve, in the horizon of 2030, 325 Mm^3 of treated wastewater (WW) mobilized mainly for irrigation. However, in the long term, the excessive input of organic matter due to the residual organic fractions in effluents can disrupt the soil microbiome and compromises the properties of its intrinsic organic matter [1].

The objective of the present investigation is the analysis of the water extractable organic matter (WEOM) in two types of agricultural soils of the Ain Taoujdate locality in the region of Fez-Meknes. The first soil is irrigated by conventional waters; the second one is irrigated by partially treated WW, effluent from the WWTP of the locality. The extracts, in water, of two sets of 35 randomly distributed soil samples have been considered. The analysis combined UV–Visible absorption and 3D fluorescence supported by PARAFAC chemometrics.

Based on the absorption spectra measurements, E_2/E_3 and E_4/E_6 absorbance ratios, $S_{275-295}$, and $S_{350-400}$ spectral slopes, along with their ratios S_R, have been calculated. Fluorescence measurements allowed for the calculation of fluorescence FI and humification HIX indices [2]. All these parameters have been interpreted and compared between the two types of soils.

3D fluorescence maps crossed with PARAFAC chemometrics highlighted all soil WEOM-emitting species and pointed out different WEOM behaviors depending on the type of the irrigating water. Also, 3D fluorescence/PARAFAC revealed a relative high content of all OM components, namely the fulvic fraction, in the WW irrigated soils as a consequence of a high supply of organic matter through the irrigation.

This work is scheduled to continue for at least three years in view to evaluate more objectively and more precisely the impact of high organic matter supply while irrigating agricultural soils with partially treated WW in the locality of Ain Taoujdate.

Recent Publications

1. Jaramillo M.F., Restrepo I., Sustainability. 9(10) (2017) 1734.
2. Ba-Haddou H., Hassoun H., Foudeil., El Bakkali A., Ait Lyazidi S., Haddad M., Masson M., Coquery M., Margoum C., *Journal of Fluorescence*, 32 (2022) 2141–2149.

Biography

Omar TAOUSSI, Ph.D student in the first year of the doctorate. His works are ongoing in the framework of the recent CNRST-FRQ collaboration program between the Moroccan LASMAR - URL CNRST N°7 at the University of Moulay Ismail in Meknes and the Laboratory of Environmental Engineering at the University of Sherbrooke in The Quebec. In the framework of a formal thesis joint supervision, the researches works of Omar Taoussi are currently co-directed by Pr S. Ait Lyazidi and Pr H. Cabana.

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THE POWER OF DIFFERENT ENERGY SOURCES TO EFFECTIVELY MEET ENERGY NEEDS

Thermal inertia performance of recycled wastewater treatment plant sludge with lightweight earth bricks.

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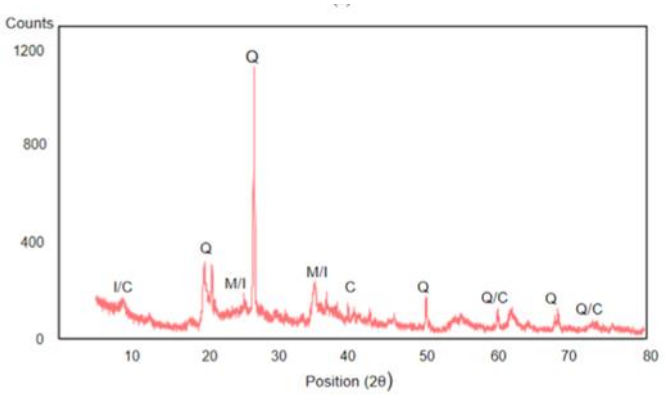
[1]*Laboratory of Mechanics, Mechatronics, and Command, Team of Electrical Energy, Maintenance and Innovation, ENSAM-Meknes, Moulay Ismail University, Meknes, Morocco*
[2]*Regional Center for Education and Training Professions Fez-Meknes, Morocco*
[3]*Moulay Ismail University, Meknes, Morocco*
[4]*Laboratory of Sustainable Energy Materials, Al Akhawayn University, Ifrane, Morocco*

Abstract

This study evaluates the thermal inertia performance of recycled wastewater treatment plant sludge as a construction material additive to ecological lightweight earth bricks. Prominent improvements in thermal performance were seen with 43% and 30% gains in thermal conductivity and specific heat capacity, respectively. The aim of this research is to analyze the dynamic thermal inertia performance of the prepared specimens used as a construction building material using computer-based simulations via TRNSYS software. In order to calculate the time lag, decrement factor, and heating and cooling loads of the analyzed brick samples with varying percentages and various external wall thicknesses, bulk density, thermal conductivity, and specific heat capacity will be employed as inputs in dynamic thermal inertia models.

Figure : X-ray Diffraction of wastewater treatment plant sludge sample. Indexes: M -muscovite, I- illite, C -calcite, Q -quartz, D- dolmite.



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2. H. Limami, I. Manssouri, K. Cherkaoui, M. Saadaoui, A. Khaldoun, Thermal performance of unfired lightweight clay bricks with HDPE & PET waste plastics additives, Journal of Building Engineering. (2020) 101251. doi:https://doi.org/10.1016/j.jobe.2020.101251
3. H. Limami, I. Manssouri, K. Cherkaoui, L. Amazian, A. E. Baraka and A. Khaldoun, "Unfired Clay Bricks with Additives and Mechanical Simulation of Perforated Bricks," 2019 7th International Renewable and Sustainable Energy Conference (IRSEC), Agadir, Morocco, 2019, pp. 1-6, doi: 10.1109/IRSEC48032.2019.9078296

.

Biography

Ghizlane El Hajoui has an energy and renewable energy engineering degree from the International University of Rabat (2022) and is currently a PhD student at the National School of Arts and Crafts in Meknes, currently working on the exploitation of recycled waste materials as additives to clay bricks. The produced construction materials are characterized via mechanical, physicochemical and thermal properties to assess their overall performance
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Remote sensing of urban thermal environment's quality assessment.

Anass Malah [1], Anas Sabri[1], Hicham Bahi [1].

[1] *School of Architecture, Planning, and Design, Mohammed VI Polytechnic University, Benguerir, Morocco*

Abstract

In the last few decades, urban areas around the world have known a significant urban expansion in metropolitan cities. This urban expansion has important effects on urban thermal comfort, which ties in with various aspects such as health risks, living environment, and the population's well-being. In this context, the conventional temperature-humidity indexes (THIs) that rely on on-site data have been commonly utilized to evaluate the urban thermal environment's quality. However, these indexes do not provide spatial information on thermal comfort. Therefore, this study used the modified temperature-humidity index (MTHI), which is based on the Land Surface Temperature and Normalized Difference Moisture Index obtained via remote sensing instead of the on-site air temperature and relative humidity. The MTHI was used to investigate the spatial characteristics of the urban thermal environment's quality (UTQ) in Casablanca city and the surrounding area. Furthermore, the obtained result was spatially mapped under five classes (Uncomfortable, Less comfortable, Moderate, Comfortable, and More comfortable). The results showed significant variations in the spatial patterns of urban thermal comfort across the study area. Yet, thermal comfort is discomforatble in more than 50% of Casablanca city, which is the most crowded area in the city (nearly two-thirds of the population). These areas are characterized by an important concentration of buildings, elevated structures, roads, and parking lots. It indicates that urban design is the main factor affecting urban thermal comfort.

Recent Publications

4. A. Malah and H. Bahi, "Integrated multivariate data analysis for Urban Sustainability Assessment, a case study of Casablanca city," Sustain. Cities Soc., vol. 86, p. 104100, Nov. 2022, doi: 10.1016/j.scs.2022.104100
5. A. Malah, H. Bahi, H. Radoine, M. Maanan, and H. Mastouri, "Assessment of Urban Environmental Quality : A Case Study of Casablanca, Morocco," vol. XLVI, no. October 2021, pp. 5–6, 2022.

Biography

Anass Malah is a Ph.D. Student at the School of Architecture, Planning & Design. He is broadly interested in territorial performance and remote sensing. His dissertation focuses on the use of new technological tools to evaluate the performance and sustainability of the territorial system to provide new direction and recommendations for improving land use planning and development and enhancing sustainability, resilience, and well-being in the most vulnerable areas. Before starting his Ph.D. at SAP+D, Anass completed a Master's Degree from Hassan II University - Faculty of Science Ain Chock Casablanca in Geographic Information System and Territory Management.
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ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, ENGINEERING AND SIMULATIONS

Sustainability assessment framework for green infrastructure

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Abstract

Recent rapid urbanization has exposed urban land and resources to many difficulties in cities' transition towards sustainability, particularly in developing countries. Green infrastructure is an emerging solution for sustainable urban planning and efficient management of urban spaces. The integration of this new sustainable urban planning tool can help cities achieves adaptation and mitigation of climate change effects. This study reviews current models for evaluating the performance of green infrastructure and assesses these models using a variety of selection criteria that the authors suggest based on a literature review and stakeholder interviews. A novel conceptual framework that identifies and combines the criteria and important indicators was then proposed. The developed framework can be applied to elaborate a composite indicator-based assessment model to measure and monitor the performance of green infrastructure projects and support future urban studies and decisions. The article examines also the role and efficiency of green infrastructure in overcoming sustainability problems that cover the related environmental and socioeconomic aspects.

Recent Publications

1. Mohd H. H., Mohammed J. K., J Phy. Sci. 21 (2010) 1.
2. ElHajjaji F., Greche H., Taleb M., ChetouaniA.,,Aouniti A., Hammouti B., J. Mater. Environ. Sci. 7 (2) (2016) 566-578.
3. Bouknana D., Hammouti B., Messali M., Aouniti A., Sbaa M., Port. Electrochim. Acta, 32 (2014) 1-19.
4. Ali A.I., Megahed H.E., El-Etre M.A., Ismail M.N., J. Mater. Environ. Sci. 5 (2014) 923-930.

Biography

Rachida El-Bouayady is a third-year PhD student at the School of Architecture Planning and Design from Mohammed VI Polytechnic University. She holds an energy engineer from Rabat School of Mines (ENSMR). She is interested in urban infrastructure sustainability and resource management and planning in cities. Her first article dealt with urbanization and infrastructure development in African cities, giving an overview of the drawbacks of sustainability transition of these cities. Her work is related to developing frameworks to understand and plan future infrastructure development within cities using concepts such as integration, holism and data-driven planning to make informed planning decisions.
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Radar remote sensing indices for extracting impervious surfaces: a comprehensive review and analysis.

S. TAYI [1], H. RADOINE [1], R. EL-BOUAYADY[1].

[1]*School of Architecture, Planning & Design (SAP+D), Mohammed VI Polytechnic University (UM6P), Ben Guerir, Morocco*

Abstract

Mapping impervious surfaces using remote sensing data has become an essential task in urban studies due to its crucial role in urban planning and environmental management. Radar remote sensing has emerged as a promising technology for achieving this end thanks to its all-weather capability and ability to penetrate obstructions such as vegetation cover. The aim of this research is to investigate existing radar indices and evaluate their performance in extracting impervious surfaces using google earth engine (GEE). To accomplish this goal, a comprehensive literature review was conducted by thoroughly searching multiple databases, including Scopus and Web of Science. Relevant studies were selected and analyzed to identify the prevalent radar indices, the algorithms employed, and the dataset used. The selected indices were then implemented using GEE to compare the accuracy of impervious surface mapping results. The findings of this work indicate that several radar indices can effectively map impervious surfaces; nevertheless, further research is required to attain enhanced mapping accuracy. This paper contributes to the understanding of state-of-the-art radar indices for the extraction of impervious surfaces and provides guidance for researchers working in this field.

Recent Publications

1. D. Ratha, P. Gamba, A. Bhattacharya, et A. C. Frery, « Novel Techniques for Built-Up Area Extraction from Polarimetric SAR Images », *IEEE Geoscience and Remote Sensing Letters*, vol. 17, nº 1, p. 177-181, 2020
2. A. Verma, S. Dey, C. Lopez-Martinez, A. Bhattacharya, et P. Gamba, « Dual-Pol Radar Built-Up Area Index for Urban Area Mapping Using Sentinel-1 SAR Data », présenté à International Geoscience and Remote Sensing Symposium (IGARSS), 2022, p. 5282-5285.
3. S. Dey, N. Bhogapurapu, A. Bhattacharya, A. C. Frery, et P. Gamba, « BUILT-UP AREA MAPPING USING FULL AND DUAL POLARIMETRIC SAR DATA », présenté à International Geoscience and Remote Sensing Symposium (IGARSS), 2021, p. 1693-1696..

Biography

Soukaina TAYI is in her second year of the Ph.D. program at the School of Architecture Planning & Design (SAP+D), Mohammed VI Polytechnic University (UM6P) in Morocco. Her research interests are in in spatial data and urban planning. She holds a GIS engineer Diploma of geographic information sciences from the Hassania school of public works, in Casablanca, Morocco.

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Theoretical study on the efficiency of new organic dyes based on (E)-2-(2-(thiophen-3-yl)vinyl)-1,1'-bipyrrole as DSSC sensitizers.

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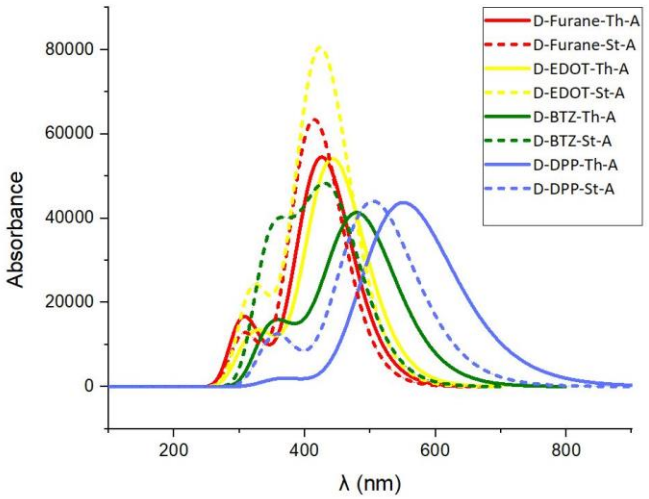
Abstract

Since their creation by Grätzel and O'Regan in 1991 [1], the dye-sensitized solar cells (DSSCs) have captured the attention of both the scientific and business communities, and have gained critical importance as a leading emerging photovoltaic technology for low-cost power generation due to their simple production, light weight, their applicability to the development of flexible photovoltaic devices, and their use of abundant and inexpensive materials, including metal-free organic dyes that have several advantages over Ru complex dyes, such as high molar extinction coefficients, simple synthesis, and easy-to-implement molecular design. In this context and in the continuity of our work in the laboratory on DSSCs [2-4], we conducted a theoretical study using DFT and TD-DFT calculations to evaluate the photovoltaic performance of eight new organic dyes. Each of these dyes contains an (E)-2-(2-(thiophen-3-yl)vinyl)-1,1'-bipyrrole as an electron donor and a cyanoacrylic acid group as an electron acceptor and anchoring group. The donors and acceptors are bridged by eight different π-conjugated spacers consisting of the auxiliary donor and acceptor groups, including EDOT, furan, BTZ, and DPP linked to either styrene or thiophene. We calculated several parameters for each dye, including E_{HOMO} , E_{LUMO} , E_{gap} , λ_{max} , E_{ex} , open-circuit photoelectric voltage (V_{OC}), light harvesting efficiency (LHE), and free injection energy (ΔG_{inject}). We have also studied the effects of additional acceptor groups (DPP and BTZ) and additional donor groups (EDOT and Furan) on the electronic structure and photovoltaic performance of each dye. The results showed that the new dyes can considerably give good performance and remarkable energy conversion efficiency, specifically the dyes that contain the DPP acceptor group in the π-bridge were found to be the most promising for an efficient DSSC sensitizer.

Figure:



Recent Publications

1. B. O'Regan, M. Grätzel, Nature, 353, 6346, 1991.
2. I Arbouch, Y Karzazi, J Cornil. *Physical Review Materials* 4 (11), 115401, 2020.
3. I Arbouch, D Cornil, Y Karzazi, B Hammouti, R Lazzaroni, J Cornil, *Physical Chemistry Chemical Physics* 19 (43), 29389-29401, 2017.
4. Z. El Aslaoui, Y Karzazi, *Mor. J. Chem.* 4(3), 838, 2016.

Biography

I'm a first year PhD student at the University Mohammed I of Oujda. I obtained my master degree in 2022 in Applied Chemistry. My research area is the theoretical study of optoelectronic properties of new organic compounds for their application in solar cells.
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An analysis of blockchain-based electronic health record and compliance with GDPR and HIPAA

N. ETTALOUI[1], S. AREZKI[1], T. GADI[1]

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Abstract

The healthcare sector is a massive producer and a dependent user of data, making the data gathering, its treatment and sharing of big importance. Advances in technology have enabled healthcare providers to store it in a digital form called electronic medical records (EMRs). These records are shared with various stakeholders such as patients, healthcare professionals, providers, insurance companies, pharmacies, etc. In a field as sensitive as healthcare, the integration of new technologies is crucial. Blockchain technology has emerged as an immutable technology ready to support changes in the healthcare system due to its transparency and decentralized features. As healthcare information are highly sensitive, it is also highly regulated to ensure patient privacy. Regulatory frameworks such as the General Data Protection Regulation (GDPR) and the Health Insurance Portability and Accountability Act (HIPAA) are designed to help reduce the risk of health data breaches. Blockchain characteristics can improve interoperability, anonymity, and control of access to health data; however, blockchain applications must comply with the current regulatory framework to increase their viability in the real world. This paper analyzes the compliance of blockchain-based EHR systems with HIPAA and GDPR, as well as other areas for improvement.

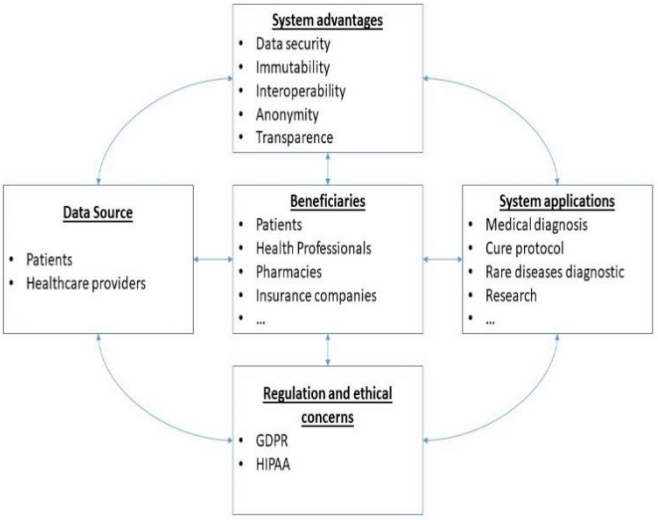

Figure: Blockchain-based HER ecosystem

Recent Publications

1. R. Belen-Saglam, E. Altuncu, Y. Lu, S. Li, A systematic literature review of the tension between the GDPR and public blockchain systems, *Blockchain: Research and Applications*, vol. 67, pp. 1-67 2023,
2. A. B. Haque, A. K. M. N. Islam, S. Hyrynsalmi, B. Naqvi and K. Smolander, "GDPR Compliant Blockchains–A Systematic Literature Review," *IEEE Access*, vol. 9, pp. 50593-50606, 2021.
3. U. Tatar, Y. Gokce, B. Nussbaum, "Law versus technology: Blockchain, GDPR, and tough tradeoffs", *Computer Law & Security Review;* Vol. 38 pp. 1-11, 2020..

Biography

Nehal ETTALOUI is in her fourth year of the Ph.D. program at the 1Faculty of science and Technology, University Hassan First, Settat in Morocco. Her research interests are in Blockchain healthcare applications. She holds an IT engineer Diploma from the Hassania school of public works, in Casablanca, Morocco.
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Education in the era of artificial intelligence, a literature review

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Laboratory of Biology and Health, Faculty of science, Ibn Tofail University, Kénitra, Morocco 2
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Abstract

This literature review examines the impact of artificial intelligence (AI) on education. With the increasing integration of AI into our daily lives, it is essential to investigate the ways in which this technology is transforming education. This review includes 30 articles published between 2015 and 2022, which were selected based on their relevance and quality.

The review finds that AI has the potential to revolutionize education by enhancing learning outcomes, improving access to education, and reducing the workload of teachers. The use of AI technologies, such as adaptive learning systems, chatbots, and intelligent tutoring systems, can personalize learning, identify learning gaps, and provide instant feedback to students. This can lead to improved learning outcomes and increased student engagement. The use of AI in education can also help reduce the workload of teachers by automating administrative tasks such as grading, scheduling, and providing feedback.

However, the review also highlights some potential challenges associated with the use of AI in education. These include the need for robust data protection and privacy policies, ensuring the fairness and transparency of AI algorithms, and addressing the potential impact of AI on employment in the education sector.

Overall, this review concludes that AI has the potential to transform education by enhancing learning outcomes, improving access to education, and reducing the workload of teachers. However, there is a need for careful consideration of the potential challenges associated with the use of AI in education. Future research should focus on exploring the best ways to integrate AI into education while addressing these challenges.

Figure

Recent Publications

1. Humble, N., & Mozelius, P. (2019, October). Artificial intelligence in education—A promise, a threat or a hype. In Proceedings of the european conference on the impact of artificial intelligence and robotics (pp. 149-156).
2. Coombs, C., Hislop, D., Taneva, S. K., & Barnard, S. (2020). The strategic impacts of Intelligent Automation for knowledge and service work: An interdisciplinary review. The Journal of Strategic Information Systems, 29(4), 101600.
3. [Consulté le: 18-no. Lin, M. P. C., & Chang, D. (2020). Enhancing post-secondary writers' writing skills with a chatbot. Journal of Educational Technology & Society, 23(1), 78-92.

Biography

I am a Ph.D student in the University of Ibn tofail in Kenitra.. I obtained a Master's degree in mathematics and teaching from kenitra faculty of sciences Morocco in 2019. I have my expertise in in the field of education and teacher training. My focus is based on the use of AI in education.

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Digital education in Morocco: The impact of the digital classrooms project on science subject teachers

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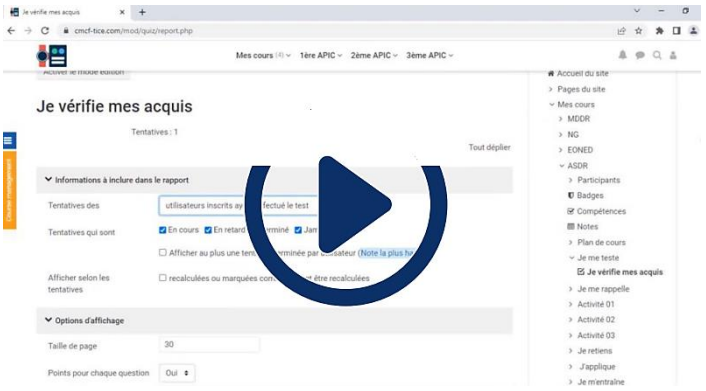
Abstract

The global health crisis caused by the COVID-19 coronavirus pandemic has significantly impacted education. After 2020, schools have had to adopt distance learning models using digital tools to ensure the continuity of educational systems. In this context and to ensure the continuity of education even in the event of future disruptions in Morocco, the Minister of National Education for Preschool and Sport announced the launch of a project to create digital classrooms in the Kingdom's educational institutions. This new pedagogical situation based on digital tools aims to strengthen the teaching of science subjects (Mathematics, Physics, and Life and Earth Sciences). This digital pedagogical revolution has become one of the most appropriate forms of learning for various social groups (people with disabilities, refugees…) and circumstances (war, pandemic...). This research aims to measure the impact of digital classrooms on the performance of science teachers in the Rabat Sale Kenitra region to evaluate the evolution of the situation and suggest the generalization of the use of this pedagogical digitalization and its integration into the teaching practices of other subjects to ensure inclusivity and equal opportunities among learners.

Figure



Recent Publications

1. H. Boudine, 2021, La classe inversée : expérience d'un modèle pédagogique adopté pendant la crise sanitaire pour soutenir l'enseignement par alternance doi.org/10.48379/IMIST.PRSM/mjqr-v3i1.30851
2. H. Boudine1, 2023 Flipped Classroom and Digital Classes in Morocco: Experience Quality Educational Digitization with Ease resmilitaris.net/menu-script/index.php/resmilitaris/issue/view/9

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Biography

Author has an expertise in evaluation and passion in improving the bone and cement used in innovation pedagogy. His focus is based on the use of the flipped classroom pedagogies and digital innovation on education. He was warded his PhD in 2018 from the University of IBN TOFAIL, MOROCCO. He published more than one papers. Her H-index is X on Scopus.
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The impact of implementation of an AGV in supply chain management: a systematic literature review.

Elammari Aicha[1], Arif Jabir[1]

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Abstract

In this work we present the importance of industry 4.0 in the industry and especially the implementation of AGV (Automated guided vehicles) in supply chain management, in order to improve the distribution and transportation; the project is a part of lean manufacturing approach, which aims to achieve continuous improvements and eliminate any kind of waste and irregularity that results in losses for the company, the concept is to automate the flow by using an AGV. The system is currently working in lot of companies with great success.

The proposed solution can be used as an optimization for production in all process from upstream to downstream of supply chain in order to minimize the costs and improve the timing.

The aim is to analyze the published papers in this topic and all parameters studied and take it in consideration in this new technology and also the impact to the company.

Recent Publications

1. Vo Thu Ha1, Than Thi Thuong1, Vo Thanh Ha2, International Journal of Power Electronics and Drive Systems (IJPEDS) Vol. 14, No. 2, June 2023, pp. 1300~1308.
2. Muhammad Atif Javed , Faiz Ul Muram, Sasikumar Punnekkat b, Hans Hansson ,Journal of Systems Architecture.
3. Nadia Pourmohammad-Zia, Frederik Schulte , Rosa G. González-Ramírez , Stefan Voß , Rudy R. Negenborn, Computers & Industrial Engineering.
4. Jakob Axelsson, Senior Member, IEEE , Safety in Vehicle Platooning: A Systematic Literature Review.
5. Petri, Michael, Turi, Attila, Mocan, Marian, Warehouse Redesign Challenges—Adapting Layout and Improving Process Flow..

Biography

Aicha Elammari is a PhD student (first year) at Sidi Mohaed ben Abdellah University in Morocco.

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The Energy Efficiency Measures and Economic Performance: Empirical Evidence from Morocco Using a Computable General Equilibrium Model

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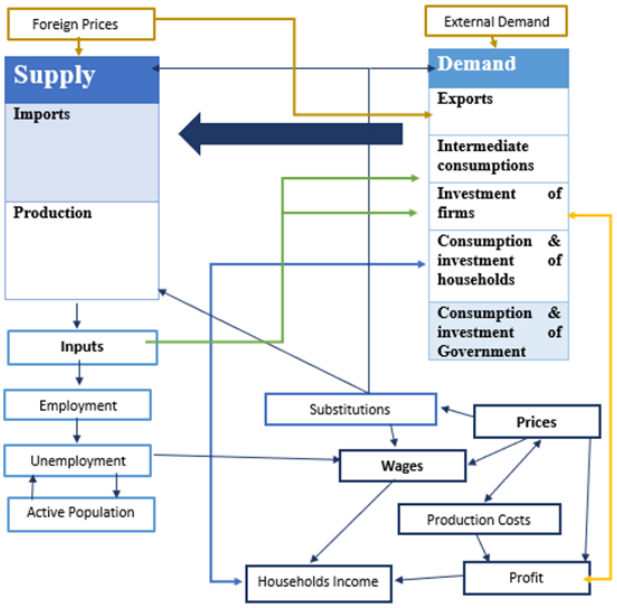
Mohammed V University, Rabat, Morocco
National Institute of Statistics and Applied Economics, Rabat, Morocco

Abstract

In Morocco, energy efficiency offers an excellent opportunity to improve the country's economic competitiveness, increase purchasing capacity, energy efficiency also contributes to strengthening energy security and reducing the country's energy dependence. The importance of energy efficiency measures is also reflected in the country's determined national contribution and in the achievement of the Sustainable Development Goals. Energy consumption on the other hand continues to grow due to the socio-economic development of the country and the generalization of energy access to rural areas. Energy data alone is not sufficient to assess the impact of energy efficiency measures in the country in detail. In fact, energy intensity, which represents the ratio of a country's energy consumption to its gross domestic product (GDP), is an important indicator for assessing energy efficiency. To examine the role of energy policies on economic growth, we developed a computable general equilibrium model (CGEM) in which the micro-macro relationship is carried out by macroeconomic data provided by the summary tables of the national accounts as well as production information from the database of the Haut Commissariat au Plan. Our model is based on changes in energy consumption patterns, as a result of energy efficiency measures, can affect the demand for goods and services in various sectors, which would in turn affect the production and prices of those goods and services The results of our study also support the fact that energy efficiency measures have an impact on overall economic performance and growth in most economic sectors.

Figure



Recent Publications

1. El Baraka H. & FADLALLAH A. (2022). Stabilite politique, investissement et croissance economique : Etude empirique sur l'afrique. African Scientific Journal, 3(13), 63. https://doi.org/10.5281/zenodo.6983767
2. El Baraka H., Fadlallah A., Mouti R & Mouhil I. Investing in education: what effect on inequality in Morocco? A simulation study using a computable general equilibrium model. ICATH 2022 conference proceeding Springer Lecture Notes on Data Engineering and Communications Technologies (pending).

Biography

Hamza El Baraka is a PhD student in macroeconomics modeling and public policies. With a strong background in economics and a passion for public policy, he is dedicated to exploring the ways in which economic models can be used to inform and shape policy decisions. Through his research, they have developed a deep understanding of the complex economic systems that underpin modern society, and are skilled at using a range of modeling techniques to analyze the impact of policy interventions on these systems

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The use of infrared thermography in Industry 4.0 maintenance

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[1]*Laboratoire des Matériaux, Ondes, Energie et Environnement, Faculté des Sciences, Université Mohammed Premier*
[2]*Équipe des Matériaux, Énergie, Génie Civil et Environnement, Ecole Supérieure de Technologie d'Oujda, Université Mohammed Premier*
[3]*Laboratoire de Génie Mécanique (LGM), Faculté des Sciences et Techniques, Fès, Université Sidi Mohamed Ben Abdellah*
[4] *Centre universitaire d'appui à la recherche scientifique, Université Mohammed Premier*

Abstract

Industry 4.0 maintenance is an innovative approach to industrial maintenance that utilizes advanced technologies such as the Internet of Things (IoT), data analytics, augmented reality, and infrared thermography to improve maintenance efficiency and reliability. Infrared thermography is a method of remotely measuring surface temperature that is widely used in preventive maintenance to detect thermal anomalies that may indicate impending equipment failures.

Infrared thermography can be used to monitor the temperature of critical components such as motors, transformers, electronic control enclosures, and cooling systems. By using infrared cameras and advanced image analysis software, technicians can visualize temperature variations on equipment surfaces and detect problem areas. This information can be used to plan preventive maintenance, reduce downtime, minimize maintenance costs, and improve safety.

Furthermore, infrared thermography can be integrated with remote monitoring and predictive maintenance systems to enhance the efficiency of Industry 4.0 maintenance. Temperature data can be collected from wireless sensors or infrared cameras connected to the IoT and analyzed in real-time to detect temperature changes that could indicate impending failure. Technicians can be automatically alerted by early warning systems to take immediate action to resolve issues before they cause damage

Keywords: Infrared thermography, thermal analysis, rotating machines, misalignment, fault diagnosis.

Figure :

Recent Publications

1. B.D. Benahmed, F. Jeffali, El Barkany, A. Bakdid, "Design and realization of an aeronautical cleaning robot for aircraft maintenance 4.0 based on artificial intelligence", Matériels Today, Sciendirect, 2022, Indexed Scopus.
2. F. Jeffali, A. Ouariach, B. El Kihel, A. Nougaoui, Diagnosis of three-phase induction motor and the impact on the kinematic chain using Non-Destructive Technique of Infrared Thermography, Journal Infrared Physics & Technology, ScienceDirect, Volume 102, November 2019, 102970
3. M.J. Picazo-Ródenas, R. Royo, J. Antonino-Daviu, J. Roger-Folch, "Use of the infrared data for heating curve computation in induction motors: Application to fault diagnosis", Engineering Failure Analysis, 35 (2013) 178- 192.
4. Faouaz Jeffali, A. Ouariach, A. El Kihel, A. Nougaoui, Infrared thermography based diagnosis of the impact on the kinematic chain, Journal Materials Today: ScienceDirect 13 (2019) 949-955.

Biography

The experience that BENAHMED Badr Eddine had in previous fields such as industrial engineering and aeronautical industry gave him the idea of the project and the passion to accomplish the task, He was awarded a master degree in industrial engineering at "EMSI" an international school of engineering and then experience in the field of airline company Royal Air Maroc , where he began the planning of the project while working on aircrafts. He was influenced by robotics devices and the way they complete their tasks as planned and without mistakes, also expected that in the future they will replace human workers in production facilities and factories. That's where the idea of the cleaning robot design got it.

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Smart Cities: Mapping an Urban Environement by Decision Tree Method

AMESLEK Oumaima[1], ZAHIR Hafida[2], El BACHAOUI Mostafa [1]

1.Remote Sensing and Geographic Information Systems Applied to Geosciences and Environment Laboratory, Faculty of Science and Technology, Beni Mellal, Morocco.
2. Bio-processes and Bio-interface Laboratory, Faculty of Science and Technology, Beni Mellal, Morocco.

Abstract

Classification is a crucial stage in the processing of satellite images that influence considerably the quality of the result. A variety of methods is proposed in the literature for the purposes of image classification. They present many differences in their basic principles, thus in the quality of the results obtained. Therefore, a study of different classification methods seems to be essential. The classification of satellite images with conventional methods can be done in several ways using different algorithms. These algorithms can be divided into two main categories: supervised and non-supervised. Decision tree on the contrary is a machine learning tool. It is a plain model characterized by the simplicity of understanding and interpretation. This work aims firstly, to classify a high resolution Quickbird satellite image of an urban area by the decision tree method and compare it with the conventional classification algorithms in order to evaluate its efficiency. The methodology consists of two main stages: classification and evaluation of results. The second is based on the calculation of a number of statistical indices derived from the confusion matrix: the statistical parameter "kappa" and the overall coefficient of precision.

Figure :

Biography

Oumaima AMESLEK ingénieur géomètre topographe et doctorante à l'université Sultane Moulay Slimane à Béni Mellal.
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ADVANCED MATERIALS FROM ORGANIC AND INORGANIC DEVICES

Characteristics of alginate@clay-based hybrid capsules reinforced with different loading and clay types

Kamal Essifi[1]*, Mohamed Brahmi[1], Abdelghani Boussetta[2], Hassan Charii[2], Abderrahim Ed-Daoui[3], Anass Ait Benhamou[4], M'hammed Benelmostafa[3], Mohammed Dahmani[3], Samira Salhi[1], Amine Moubarik[2], Ali El Bachiri[1], Abdesselam Tahani[1]

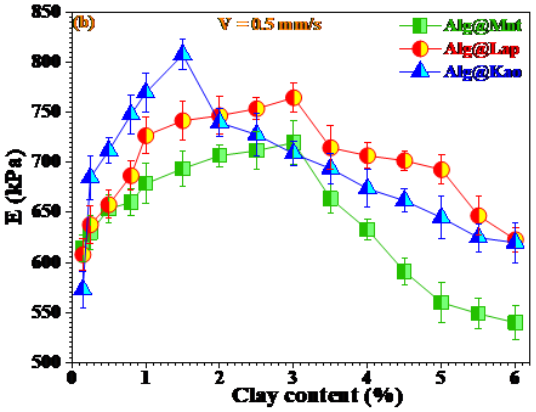
[1] *Physical Chemistry of Natural Substances and Process Team, Laboratory of Applied Chemistry and Environment (LCAE-CPSUNAP), Faculty of Sciences, Mohammed 1st University, Oujda.*
[2]*Laboratory of Chemical Processes and Applied Materials Laboratory, Polydisciplinary Faculty, Sultan Moulay Slimane University, 23000 Beni-Mellal, Morocco.*
[3]*Laboratory of Theoretical Physics, Particles Modeling, and Energetic, URAC 07, Faculty of Science, Mohammed First University Oujda, Morocco.*
[4]*Materials Science, Energy and Nanoengineering (MSN) Department, Mohammed VI Polytechnic, University, Lot 660 – Hay Moulay Rachid, 43150, Ben Guerir, Morocco.*

Abstract

The objective of this research is to investigates the mechanical behavior of alginate-based simple capsules and alginate@clay-based hybrid capsules using uniaxial compression. This study aims to understand the effect of clay type and content on the Young's modulus and nominal rupture stress of the capsules. The optimal alginate@clay-based hybrid capsules were characterized using Scanning Electron Microscopy (SEM) and Fourier Transform Infrared Spectroscopy (ATR-FT-IR). Herein, this work demonstrates that montmorillonite and laponite clays exhibit optimal performance at a content of 3 wt%, resulting in significant increases in Young's modulus (63.2% and 70.34%) and nominal rupture stress (92.43% and 108.66%) compared to pure alginate capsules. Kaolinite clay, on the other hand, exhibits optimal results at a content of 1.5 wt%, with notable improvements in Young's modulus (77.21%) and nominal rupture stress (88.34%). However, exceeding the optimal clay content leads to decreased elasticity and rigidity due to incomplete dispersion of clay particles within the hydrogel network, as confirmed by SEM micrographs showing clay aggregates at higher clay contents. Generally, the mechanical properties of the hybrid capsules are strongly influenced by the content and type of clay, as well as the interactions between alginate-alginate, alginate-clay, and clay-clay. This finding suggests that the use of clay in the elaboration of bio-based capsules is a suitable to enhance the mechanical performance. Overall, this research provides scientific insights into the mechanical behavior of alginate@clay-based capsules, offering potential applications in drug delivery systems and tissue engineering. The findings contribute to our understanding of how clay incorporation can improve the mechanical properties of alginate capsules and guide the development of advanced encapsulation systems.

Key words: Clay; Calcium alginate; hybrid bio-capsules; Mechanical performance.

Figure: Effect of clay type and content on elastic modulus of alginate-based simple and hybrid capsules.



Recent Publications

1. **Kamal Essifi**, Mohamed Brahmi, Abderrahim Ed-Daoui, Abdelghani Boussetta, M"hammed Benelmostafa, Mohammed Dahmani, Samira Salhi, Amine Moubarik, Ali El Bachiri, Abdesselam Tahani. Investigating the effect of clay content and type on the mechanical performance of calcium alginate-based hybrid bio-capsules. International Journal of Biological Macromolecules (2023).
2. **Kamal Essifi,** Abdourahim Hammani, Doha Berraaouan, Ali El Bachiri, Marie–Laure Fauconnier, Abdesselam Tahani, "Montmorillonite nanoclay based formulation for controlled and selective release of volatile essential oil compounds". Materials Chemistry and Physics 277 (2022) 125569.
3. **Kamal Essifi**, Mohamed Brahmi, Doha Berraaouan, Abderrahim Ed–Daoui, Ali El Bachiri, Marie Laure Fauconnier, and Abdesselam Tahani, Influence of Sodium Alginate Concentration on Microcapsules Properties Foreseeing the Protection and Controlled Release of Bioactive Substances". Journal of Chemistry (2021).
4. **Kamal Essifi**, Mohammed Lakrat, Doha Berraaouan, Marie-Laure Fauconnier, Ali El Bachiri, Abdesselam Tahani. "Optimization of gallic acid encapsulation in calcium alginate microbeads using Box-Behnken Experimental Design". Polymer Bulletin (2020).
5. **K. Essifi**, A. Ed-Daoui, D. Berraaouan, M. Benelmostafa, M. Dahmani, A. Tahani. Materials Today: Proceedings (2020)..

Acknowledgement

This work was supported by the MESRSFC and CNRST (Morocco) under grant No. PPR 15-17, and UMP under grant No. PARA1-2019.

Biography

Kamal ESSIFI he is doctor in Physical Chemistry and Materials Science, His research interests include the elaboration of simple and bio hybrid material for encapsulation systems. His research focuses on the development of novel bio-based microcapsules for different applications.

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Optimization of the adhesion of polyurethane paint on a thermoplastic elastomer

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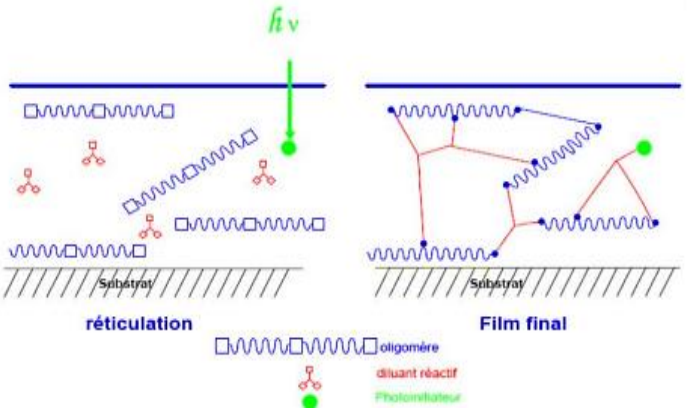
Abstract

The Moroccan automotive industry has experienced significant growth in recent years, confirmed by the increase in foreign investment flows and the export performance achieved, especially in the manufacture of automotive seals which adopts on injection molding operation; it is an efficient method to produce high quality parts and products. Each company adopts a strategy of continuous improvement and operational excellence to progress towards performance.

Consequently, the work presented in this paper is structured and is a component of the quality approach, with the objective to detect and minimize defects at the level of the adhesion of polyurethane (PU) paint to elastomer thermoplastic TPE. To begin, TPE elastomer samples and paint layers were characterized by X-ray diffraction to determine their compatibility and to determine how UV rays affected the crosslinking of PU paint. In addition, this work followed Taguchi's experimental design approach, allowing us to determine the variables affecting adhesion and how to adjust them to achieve the ideal conditions. The ANOVA analysis is used to develop the linear regression model and determine which factors have a significant influence on the response (adherence). The ANOVA analysis is used to develop the linear regression model and determine which factors have a significant influence on the response (adherence). Results from XRD show that TPE is a polyurethane elastomer TPU, which is compatible with the PU paint used. The XRD diagrams also showed that the intensity of the peak corresponding to the hard segments of polyurethane increases as the temperature rises during drying, and therefore the crosslinking under UV radiation increases with the temperature. Taguchi's analysis clearly shows that crosslinker dosage and drying temperature have the greatest statistical influence on the evolution of adhesion, followed by diluent dosage and drying time.

Figure: Crosslinked polymers



Biography

Soukaina ATARIA, holder of a master's degree in Analytical Chemical and Quality at Faculty of Sciences and Techniques, Al Hoceima. My graduation project was entitled: Optimization of the adhesion of polyurethane paint on a thermoplastic elastomer.
Currently, a 1st year PhD student at Abdelmalek Essaâdi University, Faculty of Sciences and Techniques, Tangier. The topic of my thesis is entitled "Identification of the sources of phthalates and alkylphenols (emerging pollutants) in urban areas and understanding of elimination processes" under the supervision of Professor MOURABIT Fouad and MOURABIT Taoufik.

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Electrodeposition of Zn-Ni alloy coating to enhance the corrosion resistance in automotive industry

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Abstract

Corrosion is a major problem in industrial environments, with significant economic and safety implications. The electrodeposition of the Zinc-Nickel (Zn-Ni) alloy coatings have gained popularity as a highly protective coating for steel due to their superior corrosion resistance compared to other Zn alloys coatings.(1–3) The purpose of our research work is to study the effect of various temperatures on an electrolytically deposited Zn-Ni alloy coatings based on acidic bath composition, and on the electrodeposition quality to resist against corrosion. The resistance of corrosion was controlled using electrochemical techniques such as EIS and liner polarization I-E and salt spray chamber using NSS standard in which the coating proved good corrosion resistance over 500h of exposition.

Recent Publications

1. Tafreshi M, Allahkaram S, Farhangi H*Materials Chemistry and Physics (2016) 183 263-272*
2. Ghaziof S, Gao W*Applied Surface Science (2014) 311 635-642*
3. Burliaev D, Kozaderov O, Volovitch P*Kondensirovannye Sredy Mezhfaznye Granitsy (2013)*.

Biography

Author is a Ph.D student at ibn Tofail university of kenitra. has her passion in applying electrochemistry and materials sciences to improve and innovate what has been found in previous physical chemistry researches.and specially to use it in the benefit of the environment.
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Six Diaza Benzene Ligands Complexed with Cu(II), Co(II), Mn(II) and Ni(II) Metals: An Excellent *in-situ* phenoxazinone synthase Catalysts

Bouchra Bouabdellaoui [1,2*], Zakariae Abbaoui[1], Mohamed El Kodadi [3], Souheyla Chetioui[4,5], Ahmed Atlamsani[2], Rachid Touzani[1]

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[2] *Faculty of Sciences Tétouane, University Abdelmalek Saadi.*
[3]*Regional Centers for Education and Training Professions.*
[4] *Environmental and Molecular Structural Chemistry Research Unit, (CHEMS), Faculty of Exact Sciences, Department of Chemistry, University of the Mentouri Brothers, Constantine 1, Constantine 25000, Algeria.*
[5] *Faculty of Technology, Mohamed Boudiaf University, M'sila, Algeria.*

Abstract

One of the main multicopper oxidases is phenoxazinone synthase [1,2]. In nature, aminophenozaxinones are formed by the oxidative cyclocondensation of 2-aminophenols with the enzyme phenoxazinone synthase [3]. Compounds containing phenoxazinone are receiving increasing attention for various applications industrial, in particular as antifungal and antimicrobial agents, dyes [4]. We used Transition metals complexes of six ligands containing benzene and naphthalene associated by diazenyl groups, these ligands have garnered attention due to their ability to provide N, O-bidentate chelation through the phenylazo-naphtholate group, which is valuable in stabilizing both transition and main group metal complexes [5]. Different metals, including copper, cobalt, manganese, and nickel, were tested for their aminophenoxazinone synthase under ambient conditions. Catalytic oxidation of 2-aminophenol (OAP) was carried out in methanol in following increased absorbance of 2Aminophenoxazinone (APX) at λ=430nm. The substrate used in this oxidation was 2-aminophenol (4. 10^{-3} mol/L).

Figure1: Oxidation reaction of 2-aminophenol

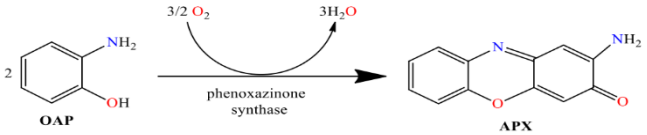
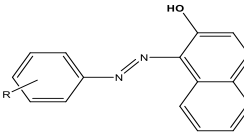


Figure 2: ligands diaza benzene



R= -NO2, -CH3, -COOCH3, -CN, -COC6H5

Recent Publications

1. Boutaybi, M et al., (**2023**). Synthesis, Characterization, DFT, and Thermogravimetric Analysis of Neutral Co (II)/Pyrazole Complex, Catalytic Activity toward Catecholase and Phenoxazinone Oxidation. Crystals, 13(2), 155.
2. Smith, A. W et al., (**2006**). Structure of phenoxazinone synthase from Streptomyces antibioticus reveals a new type 2 copper center. Biochemistry, 45(14), 4378-4387.
3. Pasceri, R et al., (**2013**). Aminophenoxazinones as inhibitors of indoleamine 2, 3-dioxygenase (IDO). Synthesis of exfoliazone and chandrananimycin A. Journal of medicinal chemistry, 56(8), 3310-3317.
4. Jose, J., & Burgess, K. (**2006**). Benzophenoxazine-based fluorescent dyes for labeling biomolecules. Tetrahedron, 62(48), 11021-11037.
5. Chetioui, S et al., (**2016**). Crystal structures of a copper (II) and the isotypic nickel (II) and palladium (II) complexes of the ligand (E)-1-[(2, 4, 6-tribromophenyl) diazenyl] naphthalen-2-ol. Acta Crystallographica Section E: Crystallographic Communications, 72(8), 1093-1098.

Biography

Bouchra Bouabdellaoui born in 1998, is a master student at University Abdelmalek Saadi Tetouan, Faculty of Sciences. In 2019, she received her bachelor's degree in chemistry at University Mohamed Premier Oujda. Currently, she spends her internship at the Faculty of Sciences Oujda. Her project focuses on miming enzymatic oxygen activation, an excellent in-situ phenoxazinone synthase catalysts.
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Simple and fast electrochemical detection of nitrate ions using a poly 1,8 diaminonaphthalene and copper oxide film on carbon paste electrode

S. BENHAIBA [1], O. SALHI [1], A. EL ATTAR [1], A.EZZAHI[1], M.EL RHAZI[1]

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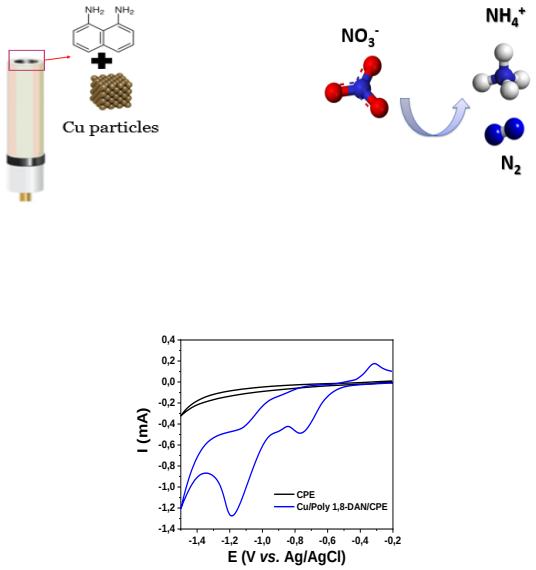
Abstract

The contamination of groundwater, rivers and lakes by nitrates has become a serious problem. The latter, mainly from agricultural activity, such as the use of chemical fertilizers, harm the aquatic ecosystem and the supply of drinking water. In some regions of Morocco, nitrate concentrations in groundwater and drinking water exceed 100 mg/L-1 of NO3-. On the other hand, the World Health Organization (WHO) recommends a maximum level of 50 mg/L of NO3- in water, but this threshold is often exceeded, making drinking water unfit for consumption in many regions. In this context, sensitive and reliable detection methods have become a top priority.

In this work, we have developed and characterized electrodes based on carbon paste modified by a composite based on poly 1,8 Diaminonaphthalene (1,8 DAN) and copper-oxide metal particles, the synthesis time of the electrode is 2 minutes. The developed electrochemical sensor is named poly 1,8-DAN /Cu/CPE. The prepared electrode showed electroactivity towards nitrate ions in a concentration range between 10-100 µM with a detection limit of 2,05 µM. The sensor (poly 1,8-DAN /Cu/CPE) showed very good repeatability and reproducibility and was successfully tested in environmental and food samples.

Figure



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2. Malha, SIR, J. Mandli, A. Ourari et A. Amine (2013). Electrodes modifiées au noir de carbone comme outils sensibles pour la détection électrochimique du nitrite et du nitrate. Electroanalysis , 25 (10), 2289-2297.
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Biography

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A bibliometric review of research on construction materials durability, 1990-2023

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SMARTiLab, Moroccan school of Engineering Sciences (EMSI), Corner of Zerhouni and Ejoukak - Aid Brahim Souissi, Rabat, Morocco2
Hassan II University of Casablanca, FSBM, Chemistry Department, Laboratory LIMAT, Casablanca, Morocco3

Abstract

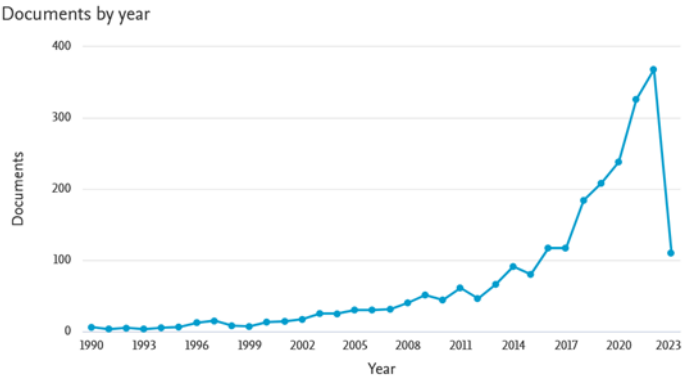
This bibliometric review of research on construction materials durability aimed to document and resume research trends over the past 30 plus years. Through bibliographical analysis of a number of Scopus-indexed documents, the review found an increase of relevant documents since 2012.

The study examines the number of publications, authors, countries, institutions, and journals involved in research. It also identifies the field's most cited authors, countries, institutions, and journals. In addition, the review examines the most frequently used keywords in research and the most common research topics.

Citation analysis aims to identify key authors and documents with significant relevance to this literature. Author co-citation analysis aims to identify the dominant fields in this inquiry.

Finally, this study analyzes research trends over the past 30 years and proposes future research directions.

Figure 2 : Published documents by year of the study field



Recent Publications

1. Zheng, L., Chen, K., & Lu, W. (2019). Bibliometric analysis of construction education research from 1982 to 2017. *Journal of Professional Issues in Engineering Education and Practice*, 145 (3)
2. Det Udomsap, A., Hallinger, P. A bibliometric review of research on sustainable construction, 1994-2018. *Journal of Cleaner Production*, Volume 254, 2020 .

Biography

Yasser Tajmout *received a state civil engineering degree at the Moroccan school of Engineering Sciences, Morocco in 2018. And a Master's degree in structures, materials and building energy from the Lorraine University, in 2018. He is currently pursuing Ph.D. degree with ENSAK at the Ibn Tofail University, Morocco. His research interest includes construction materials and their properties.*
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Detailed experimental and computational explorations of pyran derivatives as corrosion inhibitors for mild steel in 1 M HCl: Electrochemical/surface studies

Moussa Ouakki[1,3], Mouhsine Galai[2], Zakia Aribou[2], Zakaria Benzekri[1], Elhachmia Ech-chihbi[4], Khadija Dahmani[1], **Bousalham Srhir[2,3],** Said Boukhris[1], Mohammed Cherkaoui[1,3]

[1]*Laboratory of Organic Chemistry, catalysis and Environment, Faculty of Sciences.*
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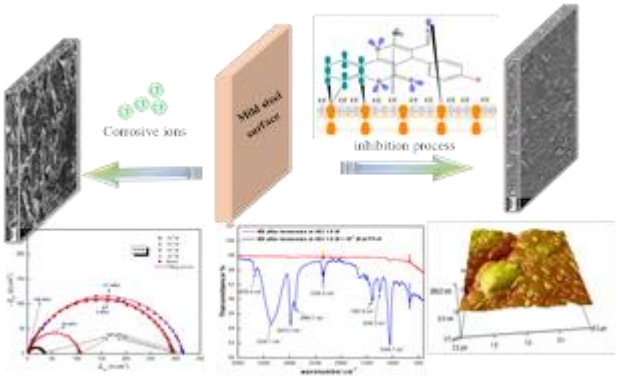
[4]*Laboratory of Organometallic, Molecular Materials and Environment, Faculty of Sciences, University Sidi Mohamed Ben Abdellah, Fez, Morocco*

Abstract

The present work examines the adsorption of two novel heterocyclic compounds of the pyran derivatives, namely, 2-amino-5-oxo-4-(p-tolyl)-4H,5H-pyrano[3,2-c]chromene-3-carbonitrile (PY-CH_3) et 2-amino-5-oxo-4-phenyl-4H,5H-pyrano[3,2-c]chromene-3-carbonitrile (PY-H) against the corrosion of mild steel in molar HCl medium. The experimental investigation was carried out utilizing a series of techniques including Electrochemical Impedance Spectroscopy (EIS) and Potentiodynamic Polarization (PDP). Inhibition efficiencies of PY-CH_3 and PY-H followed the order: 80.0% (PY-CH_3) < 90.0% (PY-H). The adsorption process of PY-CH_3 and PY-H on the mild steel surface follows the Langmuir adsorption model. Surface characterization analysis utilizing Scanning Electron Microscopy (SEM) coupled with Energy dispersive X-ray analysis (EDS), Atomic Force Microscopy (AFM), X-ray diffraction analysis (XRD) and Infrared Spectroscopy (FT-IR) supported the existence of a barrier layer covering the mild steel. WL measurements were also tested utilizing inductively coupled spectroscopy (ICP) and UV-vis spectrometry (UV-vis).

Figure:



Recent Publications

1. M. Ouakki, M. Galai, Z. Benzekri, Chandrabhan Verma, E. Ech-chihbi, S. Kaya, S. Boukhris, Eno E. Ebenso, M. Ebn Touhami, M. Cherkaoui. *Colloids Surf, A Physicochem Eng Asp.,* 611 (2021) 125810.
2. M. Galai, M. Rbaa, M. Ouakki, K. Dahmani, S. Kaya, N. Arrousse, N. Dkhireche, S. Briche, B. Lakhrissi, M. Ebn Touhami. *Chem. Phys. Lett.* 776 (2021) 138700.
3. M. Ouakki, M.Galai, Z. Benzekri, Z. Aribou, E. Ech-chihbi, L. Guo, K. Dahmani, K. Nouneh, S. Briche, S. Boukhris, M. Cherkaoui, *J. Mol. Liq.*, 344 (2021) 117777

Biography

sciences, especially in corrosion of metals, alloys, and their inhibition in acidic medium using organic and inorganic compounds and plant extracts. His work deals with corrosion inhibition by using chemical, electrochemical techniques and computational calculations. He is currently working at the National Superior School of Chemistry, Ibn Tofail University, Kenitra. He has published more than 67 papers including 2 book chapters cited by 1238 documents and an inventor of 1 patent, with a focus on materials and their applications. He has participated in more than 70 conferences. His H-index is 23 on Scopus.
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Using materials derived from cellulose to remove heavy metals from wastewater through adsorption

AMAL EL MAHDAOUI,[1,2] SMAAIL RADI,[1] ABDERRAHMANE EL IDRISSI,[1] M.G.P.M. SILVA NEVES,[2] M. AMPARO F. FAUSTINO,[2] NUNO MOURA,[2] MOHAMED EL-MASSAOUDI,[1]

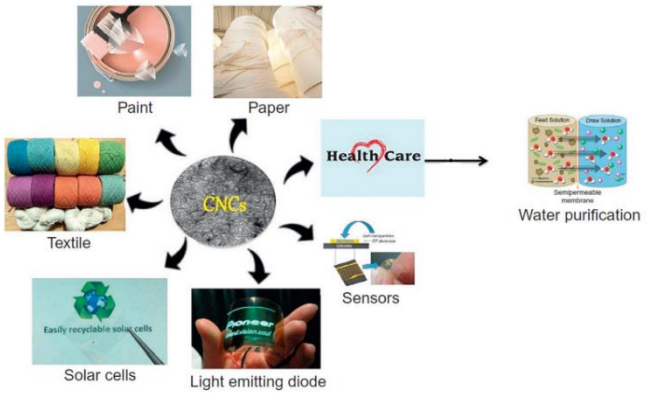
[1]*LCAE, Départ. De Chimie, Faculté des Sciences, Université Mohamed I, 60 000 Oujda, Morocco.*
[2]*QOPNA & LAQV-REQUIMTE, Department of Chemistry, University of Aveiro, 3810-193 Aveiro Portugal.*

Abstract

Environmental pollution, especially in aquatic ecosystems, is often attributed to chemical substances. Among these pollutants are toxic heavy metals such as mercury, cadmium, lead, and chromium, which are commonly found in contaminated water resources. Removing heavy metal ions from these sources is now a crucial environmental protection concern. A few treatment advances for heavy metal removal are broadly examined, like adsorption [1], membrane filtration, chemical precipitation, natural process, electrochemical treatment advances, etc. The above-mentioned techniques have the disadvantage of being costly and really time-consuming. Among them, adsorption is mostly preferred thanks to its high efficiency, easy use, low energy requirements, recyclability and effectiveness [2,3]. Various low-cost adsorbents derived from agricultural waste, industrial by-products, natural materials or modified biopolymers have recently been developed and applied for the removal of heavy metals from metal-contaminated wastewater.

Keywords: Cellulose, Heavy metal, Wastewater treatment methods.

Figure 1. Cellulose applications including water purification. Adapted from Ref. [4]. Copyrights: Elsevier, 2018.



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2. Barakat, M.A, doi: 10.1016/j.arabjc.2010.07.019.
3. Almeida, F.T.R. de; Ferreira, B.C.S.; Moreira, A.L. da S.L.; Freitas, R.P. de; Gil, L.F.; Gurgel, L.V.A. doi: 10.1016/j.jcis.2015.12.037.

Biography

Amal El Mahdaoui is a fourth-year PhD student at Mohamed I University at the chemistry department at LCAE lab. She works under the supervision of Prof. Smaail Radi and her research focuses on applied chemistry and environment, namely in the area of heterocyclic chemistry and biomaterials. She did an internship at the Catholic University of Louvain in Belgium in 2021 under the supervision of Prof. Yann Garcia. Amal also did another internship at the University of Aveiro in Portugal in 2022 under the supervision of Prof. Neves and Prof. Amparo. She also got a bachelor and master degree at Mohamed I University.

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Synthesis of selenium-*N*-heterocyclic carbene compounds: Investigation of antimicrobial and anticancer potential

Hanae Meziane[1], Imane Oualdi[1], Mohamed El Kodadi[2], Sghir El Kadiri[1], IsmailOzdemir[3] and Rachid Touzani[1]

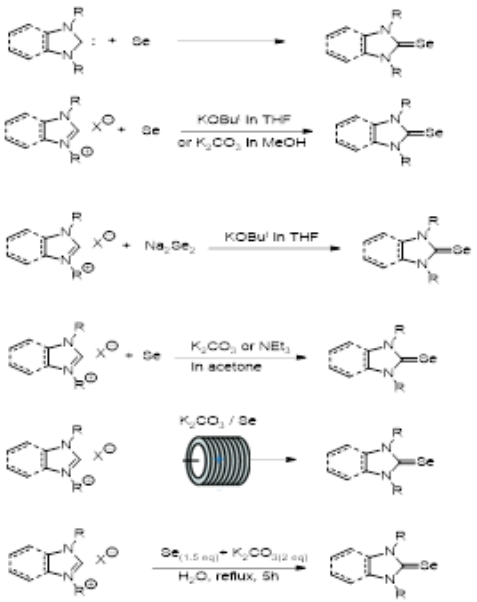
[1] *Mohammed First University , Laboratory of Applied Chemistry and Environment , Morocco*
[2] *Mohammed First University, Regional Center for Education and Training Professions (CRMEF) – Oujda Morocco,*
[3] *Inönü University, Catalysis Research and Application Center, 44280 Malatya, Turkey,*

Abstract

Selenoureas, since their first report in 1963, have attracted significant interest with respect to their bonding, structure and more importantly as an ancillary ligand for complexation with various metals. Starting as an analogue of N-heterocyclic carbene (NHC), selenoureas, are considered as promising molecules in chemistry with numerous applications in various important processes. Based on the development of selone chemistry over the last 20 years, especially with their structural heterogeneity, interesting bonding properties and most importantly, due to their versatile reactivity and applications, selenoureas, can be arguably coined a worthy successor of *N*-heterocyclic carbene. Several organoselenium compounds, including ebselen, ethaselen, and Se-*N*-heterocyclic carbene (Se-NHC) compounds have been shown to inhibit cancer cell growth in vitro and in vivo. It was also reported that they have synergistic effects in combination with chemotherapy. Therefore, organoselenium compounds with different scaffolds have been used as chemotherapeutic agents attributed to their significant anticancer bioactivity.

The purpose of this study is to prepare benzimidazolium salts that have bulky functional groups bonded to the nitrogen. ^{1}H-NMR, ^{13}C-NMR, FT-IR, and microanalysis techniques will be applied to elucidate the structure. The benzimidazolium salts will interact with selenium, *N*-heterocyclic selenourea compounds will be prepared and structurally elucidated. Then, agar solvation techniques will be used to investigate the antimicrobial properties of Se-NHC compounds against Gram-negative bacterial strains E.coli and P.aeruginosa; Gram-positive bacterial strains S. aureus and E.faecalis; and fungal strains C.albicans and C. glabrata. Anticancer properties of samples will be evaluated against A549, MCF-7, HCT116, SH-SY5Y, BEAS-2B cells lines

Figure:



Recent Publications :

1. YADAV, Sangeeta, DEKA, Rajesh, et SINGH, Harkesh B. Recent developments in the chemistry of NHC-based selones: Syntheses, applications and reactivity. *Chemistry Letters*, 2019, vol. 48, no 2, p. 65-79.
2. Ismail Özdemir, Serpil Demir, Bekir Çetinkaya, Christophe Gourlaouen, Feliu Maseras, Christian Bruneau, and Pierre H. Dixneuf *Journal of the American Chemical Society* 2008 *130* (4), 1156-1157 DOI: 10.1021/ja710276x
3. CREMER, Christopher, ELTESTER, M. Alexander, BOURAKHOUADAR, Hicham, *et al.* Dehydrogenative C–H Phenochalcogenazination. *Organic Letters*, 2021, vol. 23, no 9, p. 3243-3247.
4. BENCHOUAIA, Rajaa, NANDI, Shiny, MAURER, Clemens, *et al.* O2-Mediated Dehydrogenative Phenoxazination of Phenols. *The Journal of Organic Chemistry*, 2022, vol. 87, no 7, p. 4926-4935.

Biography

I'm Hanae MEZIANE, a PhD student in second year at University Mohammed Premier, Faculty of Sciences, Chemistry department, Laboratory of applied chemistry and environment, Oujda, Morocco. I received a bachelor 'degree in chemistry in 2019 and a master's degree in applied chemistry in 2021. Currently my main research work is focused on organic chemisty and catalysis.
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Symmetrical azine ligand-based evaluation of their phenoxazinone activities

Z. Abboui[1*], H. Meziane [1], M. El kodadi[1,2], E.B. Yousfi[1,3], T. Salima[4], A. Djedouani[4,5], R. Touzani [1]

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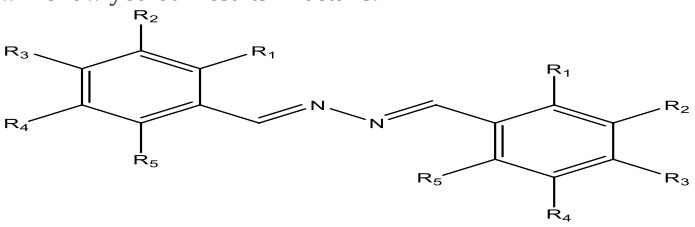
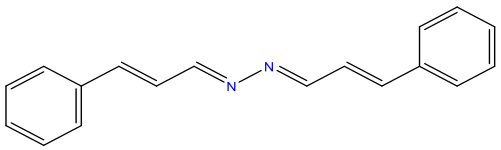
[2]*Laboratory of Innovation in science, Technology and Education (LISTE), CRMEF Oriental, Oujda, Morocco*
[3]*Higher Institute of Nursing and Health Professions techniques, ISPITS, Oujda, Morocco*
[4]*Laboratory of analytical Physicochemistry and Crystallochemistry of Organometallic and biomolecular Materials, UFMCI, 25000, Constantine, Algeria*
[5]*Higher School Normal, Constantine, Algeria*

Abstract

Symmetrical azine ligand-based (L_1-L_5) (figure 1) have been evaluated for their phenoxazinone activity by combining them in situ with different metal salts ($Cucl_2$, $Cu(NO_3)_2$, $Cu(CH_3OO)_2$, $NiCl_2$, $CoCl_2$, …) the complexes exhibited significant catalytic activity in oxidizing aminophenol to phenoxazinone (figure 2) at ambient conditions in the presence of dioxygen as an oxidant, especially for the combination of L2/$CuCl_2$ which give the best rate, the study showed that several parameters influence on the catalytic activity of mimicking enzymes such as the nature of ligand, ion metal, counter anion, the concentration of ligand and substrat. In my presentation, I will show you our results in details.



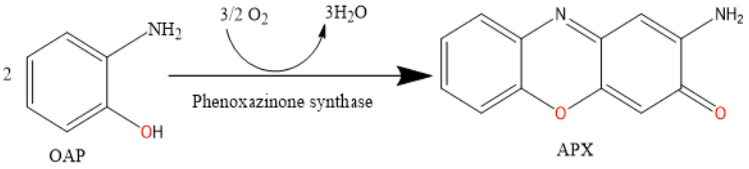
L_1:R_1=R_2=R=R_4=R_5=H
L_2:R_1=R_2=R_4=R_5=H, R_3=CH_3
L_3:R_2=R_3=R_4=H, R_1=R_5=Cl
L_4:R_1=R_2=R_5=H, R_3=OCH_3, R4=OH



L_5

Figure 1: ligand structures L_1-L_5

Figure 2: phenoxazinone synthase activities



Recent Publications

1. El Arkoubi, I., Bouammali, H., El Kodadi, M., Yousfi, E. B., Rahhou, I., Salima, T., ... & Touzani, R. Symmetrical azine ligand-based evaluation of their catecholase activity. *Materials Today: Proceedings*, (2023), *72*, 3463-3470.
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3. I.A. Koval, P. Gamez, C. Belle, K. Selmeczi, J. Reedijk
4. Synthetic models of the active site of catechol oxidase: mechanistic studies Chem. Soc. Rev., 35 (9) (2006), pp. 814-840.

Biography

Zakariae ABBAOUI, Moroccan of Oujda origin. Has a degree in chemistry in 2020, and has a master's degree in chemistry of environment in 2022 in University Mohammed first, Faculty of Sciences, and Chemistry department in Oujda. Currently, working in scientific research focuses on the application of the concepts of green chemistry, such as the use of some chemical elements that are not harmful to health or the environment. Furthermore, looking for an internship abroad in the hope of getting new opportunities to develop my research on the subject.
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New materials based on pyrazole and metals: synthesis, characterization, application and the kinetic study

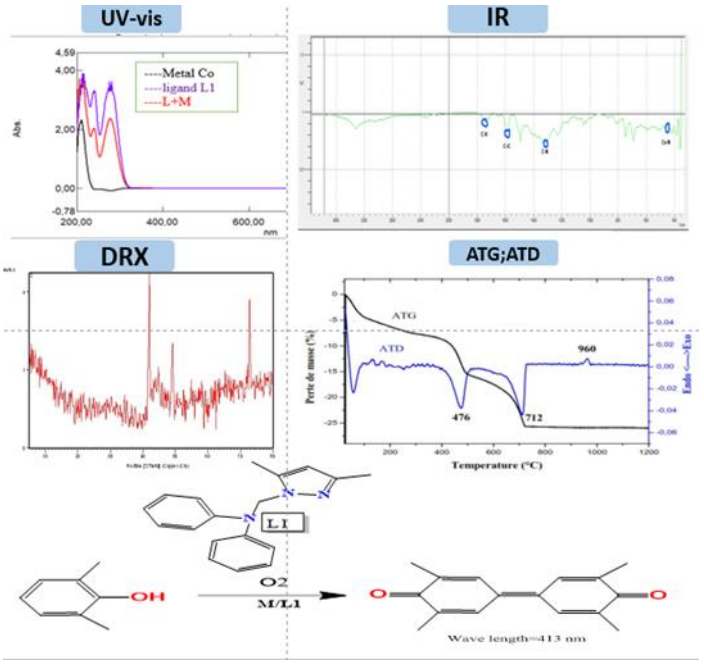
Abdessamad Benabbou[1*], Mohamed El Boutaybi[2], Youssef Draoui[1], Mohamed El Kodadi[1,3], Rachid Touzani[1], Zahra Bahari[2].

[1] *University Mohammed Premier, Faculty of Science, Laboratory of Applied Chemistry and Environment (LCAE), Oujda, Morocco (benabbou.abdessamad0@gmail.com)*
[2] *University Mohammed Premier, Multidisciplinary Faculty of Nador, Laboratory of Molecular Chemistry Materials and Environment (LMCME), Oujda, Morocco*
[3] *CRMEF Oriental, Centre Regional des Metiers de l'Education et de Formation Oujda, Morocco*

Abstract

Interactions between metals and ligand (N-((3,5-dimethyl-1H-pyrazol-1-yl) methyl)-N-phenylaniline) moieties are being found in an increasing number of biological systems with functions ranging from metal ion internalization to biomaterial synthesis. Although metal–Ligand interactions have been studied in the past, we present the first systematic study of an array of these compounds, all prepared under identical conditions. We report the ultraviolet–visible absorption (UV–vis) spectra and IR for ligands and tironate complexes of the first-row transition elements. Generation and identification of these species were accomplished by preparing solutions with varied ligand ∶ metal ratios and subsequently titrating with (MeOH). Controlled ligand deprotonation and metal binding resulted in sequential formation of complexes with one, two, and sometimes three ligand or tironate ligands bound to a metal ion. then, scanning electron microscopy was used for morphology observation and in particular the X-ray diffraction analysis (XRD) and ATD/ATG. The second goal is to find a good catalyst to mimic the catalytic activity of 2,6 Dimethyl Phenol. The kinetic study of the oxidation of 2,6 Dimethyl Phenol has shown that certain complexes formed in situ are good catalysts.

Keywords: Coordination; pyrazole; transition metal; characterization, The kinetic study.



Recent Publications

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Figure

Biography

I'm Abdessamad Benabbou, I'm 24 years old, I'm from Morocco and I live in Oujda. My origin city is Figuig. I obtained my license degree in chemistry at the faculty of sciences Oujda in 2020, my license Project under the theme "the extraction of essential oils from salvia officinalis". I obtained my master's degree in applied chemistry environment sustainable development at the faculty of sciences Kénitra, in 2022. My master's project under the theme "comparative study between the normative method of ammonium dosage according to the ISO7150 standard and the method developed by the laboratory Oujda ". My hobbies are running, soccer and I love animals such as dogs and cats. Email: benabbou.abdessamad0@gmail.com

NATURAL PRODUCTS AND THEIR VALORISATIONS

Solanum elaeagnifolium Cav fruits: Studies and Applications

A. Laksir*, H. Bouammali, R. Touzani.

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Abstract

Solanum elaeagnifolium, also known as *silver nightshade*, is an invasive herb of the Solanaceae family native to the southwestern United States and northeastern Mexico. The fruit is a globose, yellow berry, 8-20mm in diameter, polysperm, containing between 70 and 170 seeds [1]. Solanum is a vast and diverse genus of flowering plants that includes three food crops of great economic importance: potato, tomato and eggplant. The genus Solanum is the largest of the family Solanaceae containing about 2000 species [2].

Solanum elaeagnifolium has been used for medicinal purposes such as the treatment of toothaches (The fruit is burned on the fire and the smoke is taken into the mouth to take away pain in the teeth) [3]. In northern Mexico, its berries were used to make cheese as a rennet to curdle milk [4]. Although *Solanum. elaeagnifolium* fruit is toxic to many animals, whole plant extracts were recently shown to exhibit analgesic, anti-inflammatory, antioxidant and hepatoprotective activities [5].

Figure1: picture of Solanum elaeagnifolium plant, taken by A. Laksir in Oujda, MORROCO,21/03/2023.

Figure2: picture of Solanum elaeagnifolium fruit showing inside the seeds, taken by A. Laksir in Oujda, MORROCO, 21/03/2023.

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Biography

My name is **Laksir Asmae**. I was born in Oujda on January 15, 2000. I have continued my high school studies of specialty physics I used to get my baccalaureate in 2018. After finishing high school, I started another era: university. I got my basic degree in 2021, and in 2023 I started my studies the master in second year Under the direction of Professor **Rachid Touzani** at University Mohammed Premier, Faculty of Sciences, Chemistry department in Oujda. My focus is based on extraction and valorization of solanum elaeagnifolium and study of its compounds.

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Ecofreindly materials for catecholase reaction: naturel products and metals

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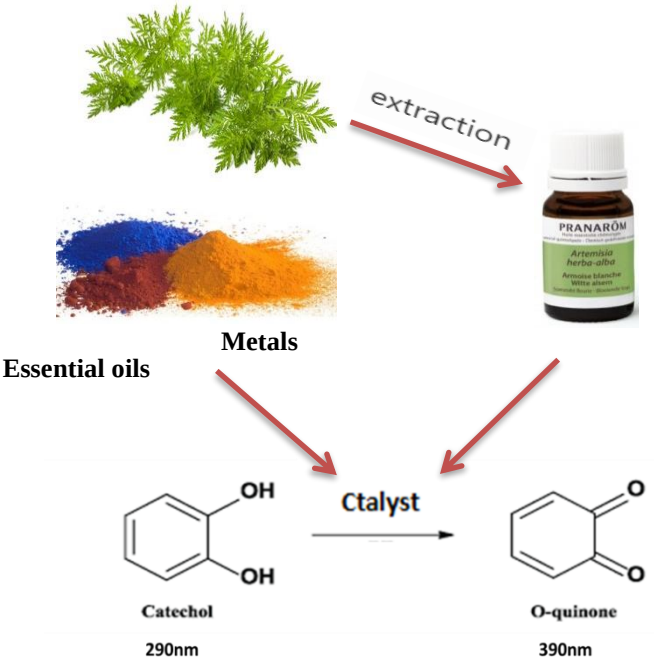
Abstract

Essential oils-based on remarin have been evaluated for their catecholase activity by combining them *in situ* with different metal salts. The result shows that the complexes containing copper acetate with different oils exhibited good catalytic activity in oxidizing catechol to o-quinone at ambient conditions in the presence of dioxygen as an oxidant, especially for the combination of essential oils with cu(ch$_3$coo)$_2$ which give a good results. The study showed that several parameters are contributed on the catalytic activity of mimicking enzymes such as the nature of essential oil (ligand), ion metal, counter anion, the concentration of ligand and substrate. Kinetic parameters have been determined for the best combinations following the Michaelis Menten and the results obtained are in agreement with this model.

Keywords: Catechol ; metal salt ; essential oil.

Figure 1: oxidation reaction of catechol



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Biography

Abdelhakim M'HARZI is a student in 2nd year Master's in the Laboratory of Applied Chemistry and Environment at the Faculty of Sciences, the University of Mohammed Premier, Oujda-Morocco. Under the direction of Professor Rachid TOUZANI. The main research work focuses on the catalyze

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Comparison of various Pistacia lentiscus leaves essential oil extraction methods: yield, chemical composition and antioxidant activity

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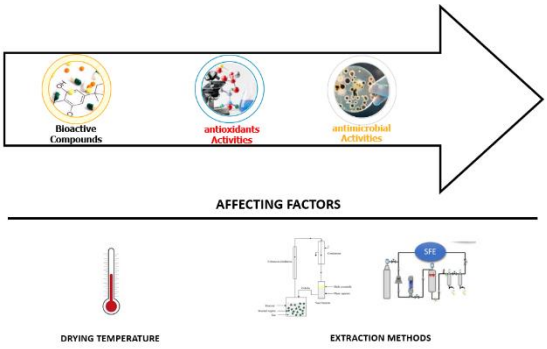
[1]Mohammed first University, Faculty of Sciences, chemistry department, Laboratory of Environment and Applied Chemistry, Oujda, Morocco. [2]Laboratory of Bioresources, Biotechnology, Ethnopharmacology, and Health. Team: Biochemistry applied to the valorization of bioresources, Department of Biological Sciences Faculty of Sciences Mohammed First University, Oujda 60000, Morocco.

Abstract

The purpose of this study is to assess the impact of various extraction methods on the chemical composition of essential oil obtained from Pistacia lentiscus leaves. Both conventional methods such as hydro distillation (HD) and innovative green methods as supercritical fluid extraction (SFE) were used. The extractions were performed on both fresh and dried leaves at varying temperatures. The efficiency and selectivity of conventional and innovative extraction methods were evaluated based on the extraction yield and antioxidant activity of the essential oil. The essential oils obtained from HD and SFE were analyzed using GC-MS and antioxidant activity was determined using the DPPH assay. The results showed that the extraction procedure and air-drying procedure had a significant effect on the extractive yield and antioxidant activity of the extracted essential oil.

Figure



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Biography

Hamza Bouakline a PhD student at faculty of Sciences - Mohammed 1st University Oujda, Hamza run research about the effect of the drying process and extraction methods on the bioactive compound of the Medicinal and Aromatic Plants.

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Chemical Composition and Biological Activities of Cedar Essential Oil

Imane OUALDI[1], Redouane BENABBES[2], Sabir OUAHHOUD[2], Bilkisu ADEDOYIN[3] Kaoutar Elfazazi[4], Hanane Azzouzi3, Rachid TOUZANI[1]

[1] *Laboratory of Environment and Applied Chemistry (LCAE), Faculty of Sciences, Mohammed First University Oujda-Morocco.*
[2]*Laboratory of Biochemistry and biotechnology, Faculty of Sciences, Mohammed First University Oujda-Morocco.*
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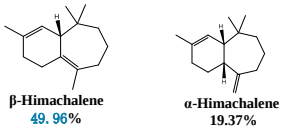
Abstract

The fusarium of the date palm is a fungal disease whose causal agent is the *Fusarium oxysporum Albidinis*, it is a microscopic fungus of telluric origin. Essential oils from medicinal and aromatic plants have very interesting biological properties, which are applied in various fields such as medicine, pharmacy, cosmetics, and biocide. In this study, the antifungal activity of the essential oil isolated from the cedar plant was analyzed through the method of direct contact against *Fusarium Oxysporum Albidinis*, furthermore, its antibacterial activity was tested against *Salmonella Newport* and *E. coli*. The antioxidant activities were also tested by three methods; DPPH, ABTS, and Metal Chelating. The essential oil was extracted by the steam distillation method at a cooperative located in the eastern region of Morocco (Taourirt) and their chemical composition was determined by gas chromatography coupled with mass spectrometry (GC/MS), β-Himachalene (49.96%) and α-Himachalene (19.37%) are the main compounds of the essential oil of cedar. The study of the antimicrobial and antioxidant activities revealed that this essential oil inhibits the growth of fungi and bacteria strains and it is a good antioxidant. The results showed that the essential oil has antifungal activity with CIM50= 51 µl in addition *E. coli* and *S. Newport*, giving MIC values of 120.54 µg/ml, and 241.08 µg/ml, respectively. The antioxidant activities for all methods show IC50=1.5mg/ml.

Figure 1: Cedar

Figure 2: The main compounds of essential oil of Cedar



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Acknowledgments

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Biography

Imane OUALDI is a PhD student in 3rd year in the Laboratory of Applied Chemistry and Environment at the Faculty of Sciences, the University of Mohammed Premier, Oujda-Morocco. Under the direction of Professor Rachid TOUZANI. The main research work focuses on the valorization of aromatic and medicinal plants. Characterization of essential oils and biological applications (antioxidant antifungal and antibacterial).

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Exploring the medicinal properties of rosemary: potential for the development of antioxidant and anti-cancer drugs through docking analysis

Haytham Bouammali[a], Linda Zraibi[b], Mohammed Merzouki[a], Lamiae Bourassi[a], Oualdi Imane[a], Elmehdi Fraj[a], Hanae Meziane[a], Chaymae Bourhou, Boufalja Bouammali[a], Allal Challioui[a] , Rachid Touzani[a]

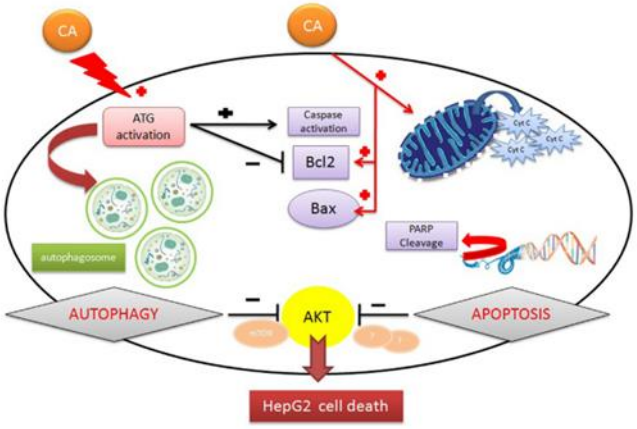
[1] *Mohammed First University , Laboratory of Applied Chemistry and Environment , Morocco*

[2] *Mohammed First University, Regional Center for Education and Training Professions (CRMEF) – Oujda Morocco.*

Abstract

Cancer cells display increased growth rates and resistance to apoptosis. The capacity of cancer cells to escape homeostasis and proliferate uncontrollably while avoiding Programmed cell death/apoptosis is acquired by mutations of key signaling molecules, which regulate pathways involved in cell proliferation and survival. Compounds of plant origin, including food components, have come to the attention of scientists for their use as agents' cancer prevention and treatment. The exploration of natural products offers an excellent opportunity to evaluate new anti-cancer agents as well as to understand new mechanisms of action potentially relevant. Rosemary extract is said to have antioxidant, anti-inflammatory, antidiabetics and anticancer drugs. Indeed, it contains many polyphenols with carnosic acid and rosmarinic acid found in the highest concentrations. This review summarizes the in vitro studies and in vivo studies on the anticancer effects of rosemary extract, polyphenol extracts, acid carnosic acid, rosmarinic acid, and their effects on key signalling molecules.

Figure : Anticancer mechanism of carnosic acid



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2. 2) A.L.K. Faller, E. Fialho, Polyphenol content and antioxidant capacity in organic and conventional plant foods, Journal of Food Composition and Analysis 23 (2010) 561–568. doi:10.1016/j.jfca.2010.01.003
3.
4. 3) Al-Mariri, A., & Safi, M. (2013). The antibacterial activity of selected Labiatae (Lamiaceae) essential oils against Brucella melitensis. Iranian Journal of Medical Sciences, 38(1), 44.

Biography

I'm Haytham BOUAMMALI, a PhD student in second year at University Mohammed Premier, Faculty of Sciences, Chemistry department, Laboratory of applied chemistry and environment, Oujda, Morocco. I received a bachelor 'degree in chemistry in 2019 and a master's degree in applied chemistry in 2021. Currently my main research work is focused on organic chemisty and catalysis.

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In Vitro Characterization of Lactic Acid Bacteria from Moroccan fermented milk product "Lben" as Probiotics with Cholesterol-Lowering Effect

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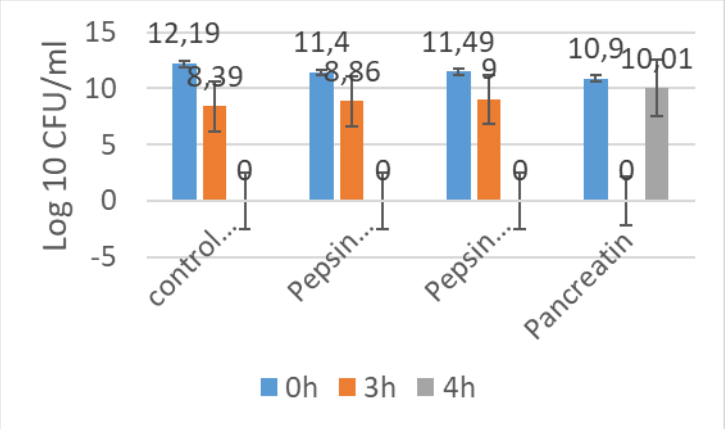
[2]: Maternal-Child and Mental Health Laboratory (LSMIM), Faculty of Medicine and Pharmacy, Mohammed First University, BP-717, 60000 Oujda, Morocco.

Abstract

Cardiovascular disease has one of the highest global incidences and mortality rates. Overmuch cholesterol in the blood and diet is a major risk factor for coronary heart disease and colon cancer. For each 1 mmol above the normal cholesterol level, the risk of coronary heart disease was approximately 35% higher and coronary death was 45% higher. Recently, lactic acid bacteria (LAB) have attracted attention as potential cholesterol-lowering agent. The reduction of serum cholesterol could be an important health benefit of LAB. Lben is one of the main dairy products in Morocco and it is considered a potential source of lactic acid bacteria (LAB). The aim of this study was to screen lactobacilli with probiotic characteristics isolated from Moroccan fermented milk (Lben), and to determine the effect of the screened Lactobacillus strains for their ability to lower cholesterol. The ability of strains isolated from "Lben" on lowering cholesterol in vitro was determined by o-phtshalaldehyde method. The LAB isolates were analyzed for their resistance to acid and bile salt. Strains with lowering cholesterol activity, their autoaggregation and coaggregation abilities are evaluated. The supernatant of the strain showed a high cholesterol assimilation capacity with 77% at the bile concentration of 1%. High tolerance was observed by strains essential gastric conditions such as acidity, bile salts and fluids of the small intestine, as well as resistance 0.4% phenol for 24 h of exposure. The strain's autoaggregation and coaggregation abilities were recorded at 89.5 – 99.4 % and 44–57%, respectively. It can be concluded that Moroccan fermented milk product "Lben" contain LAB potentially acting as probiotics capable of reducing cholesterol.

Figure: Survival in simulated stomach and small intestine condition of L.acidophilus.



Biography

SELLAM Asmae: PhD student in Microbiology. My research studies in microbiology focus on the evaluation of the probiotic and biotechnological properties of lactic acid bacteria, the extraction of bacteriocins.

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Phytochemical Screening and Antioxidant Activity of Aristolochia longa: molecular docking, DFT studies and POM analysis

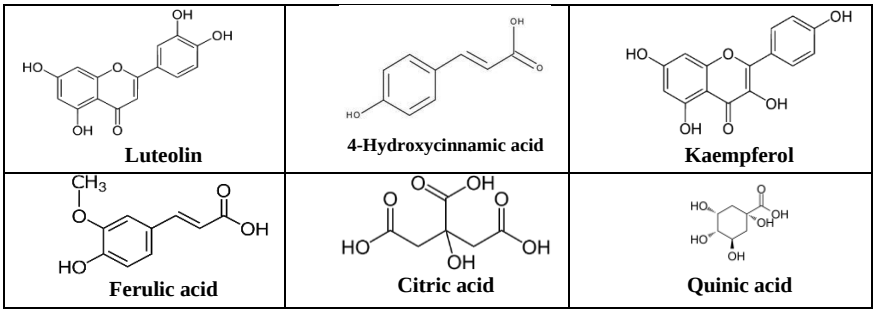
Cherriet S.[1], Merzouki M.[2], Soulaymani A.[1], Hammouti B.[2], Ibriz M.[1], Elbekkaye K.[2], Ouasghir A.[3],

[1] *Laboratory of Biology and Health, Faculty of Science, Ibn Tofail Univesity, Kenitra, Morocco*
[2] *Université Mohammed I er, Faculty of Sciences, 60000 Oujda – Morocco.*
[3] *Université Mohammed I er, Faculty of Medecine & Pharmacy, 60000 Oujda – Morocco*

Abstract

Aristolochiaceae family includes about 500 species for most tropical, subtropical, and Mediterranean countries. This family has been reported in the forest of America, Asia, Africa, Europe, and rarely in other continents. Aristolochia longa, Mediterranean specie in North Africa, known as "Barraztam," was recommended since antiquity against ovarian insufficiency and snake bites. The present study aimed to corelate the excellent antibacterial activities of *Aristolochia longa* root extracts. Bibliography shows that A. longa is widely studied and phytochemical analysis showed the presence of several major bioactive compounds such as Luteolin, 4-hydroxycinnamic acid, Kaempferol, ferulic acid, citric acid, and quinic acid. The tests indicated the higher efficiency against: Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Enterococcus faecalis, and S. aureus. Molecular docking studies is a good tool to interpret the higher antibacterial activity.

Figure



Recent Publications

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Biography

Cherriet Soufiane prepares his PhD under the supervising of Prof Soulaymani at the Faculty of Science, Uniuversity Ibn Tofail, Kenitra in Collaboration with Prof Ouasghir and El Bekkaye from the University Mohammed First, Oujda.
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