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MOCEDES CEMADES
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CENTRE MAROCAIN DU DÉVELOPPEMENT ET DES SCIENCES

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Institut de Recherche en Energie Solaire et en Energies Nouvelles

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Faculté des Sciences

Virtual Conference

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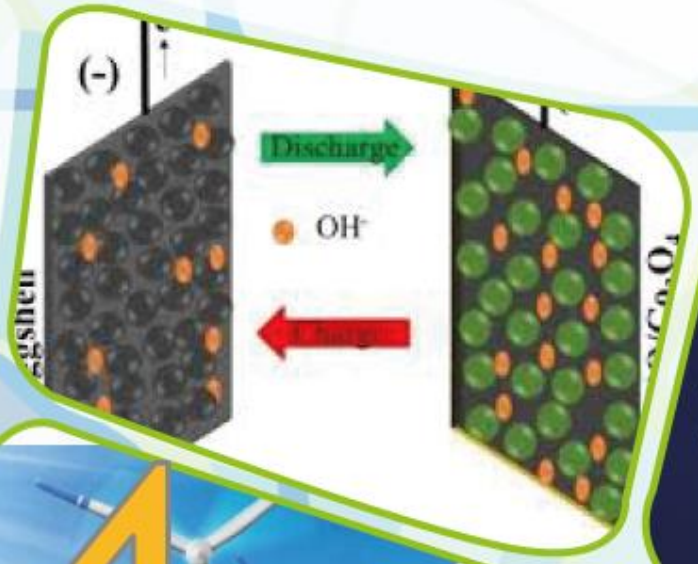
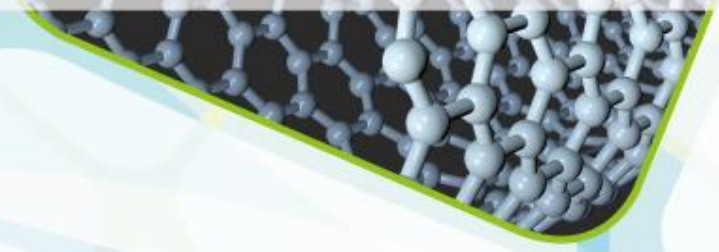


4th International Virtual Conference on Materials & Environmental Science ICMES 2020

« New Materials for Sustainable Energy Development »



Proceedings

November 19 - 21 2020
Oujda-Morocco

http://www.mocedes.org/icmes2020

LIVE GOOGLE MEET YouTube 19 - 21 November 2020

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Introduction

On behalf of the Organizing Committee of the **4th International Conference on Materials and Environmental Science: ICMES2020**, we are pleased to welcome you **in Oujda, Morocco, on November 19-21, 2020.** This conference will be virtual in regards of the limitation of people movement caused by the pandemic **COVIDE19, Novel Coronavirus.**

The **ICMES2020** is organized by **Mohammed Premier University, Research Institute for Solar Energy and New Energies – IRESEN, Faculty of Science, Oujda Morocco and the Association: Moroccan Center for Sciences Development -MoCeDeS**. This scientific meeting is the continuation of other organized sessions as fellow:

2016: The 1st International Conference on Materials and Environmental Science (**CMES2016), 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).

2018: The 2nd International Conference on Materials and Environmental Science (**ICMES2018**), 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).

2019: The 3rd International Conference on Materials and Environmental Science (**ICMES2019**) has been hold 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/)

The main objectives for ICMES2020 are:

- *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 speakers and participants, keynotes, oral presentations and posters

The main themes selected for the ICMES@2020 are:

- Organic, inorganic and nanomaterials.
- From natural products to their biotechnological applications
- Quality, water, environment, health and safety at work
- Renewable energies and sustainable development
- Electrical engineering and physics simulations
- Materials physics and chemistry
- Soil and water management techniques in agriculture
- Emerging materials for energy storage
- Materials and devices
- Advanced energy materials

The scientific program includes:

24 Speakers – 120 Oral presentations – 30 poster presentations.

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/icmes2020/index.html

Organizing Committee of ICMES2020

Invited Speakers

Analytical Nanometrology: from the characterization to the determination of nanomaterials

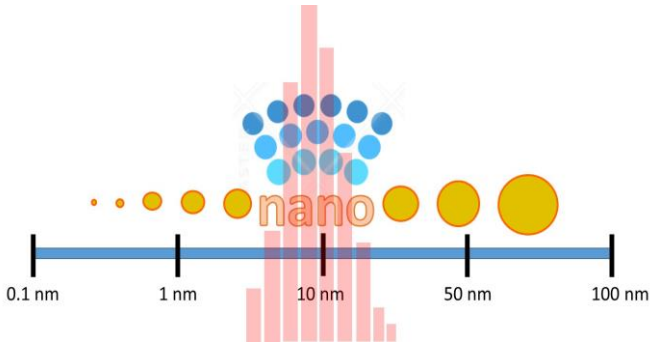
Ángel Ríos [1,2]

[1] *Department of Analytical Chemistry and Food Technology, University of Castilla-La Mancha, 13071, Ciudad Real, Spain*
[2] *Regional Institute for Applied Chemistry Research (IRICA), University of Castilla-La Mancha, 13071, Ciudad Real, Spain*

Abstract

Nanoscience and Nanotechnology (N&N) have had a deep impact in Analytical Chemistry [1]. First, because the interesting use of nanomaterials as analytical tools for developing or improving analytical processes, with especial impact in sample treatment and new detection units, (bio)chemical sensors mainly [2]. Second, because the interest to monitoring or determining nanomaterials in different types of samples [3]. This double interest deals with analytical approaches from the detection and characterization to the determination of nanomaterials in different samples. Particularly, the determination of nanomaterials (nanoparticles in many cases), in specific types of samples is a recognized challenge in today analytical science [3,4]. Analytical nanometrology (ANM) merges as the metrology applied to nanomaterials for analytical purposes. In this field nanomaterials are considered as analytes, and the analytical goal is the development of analytical strategies for the analysis of specific samples in which they are present. This approach is different than the proper characterization of nanomaterials, and it can be seen as full analytical processes, or screening methods for a rapid information about the presence of nanomaterials in particular samples. For this last objective direct spectroscopic and electrochemical techniques can be very useful, whereas for full analytical processes commonly instrumental separation techniques must be involved [5].

Figure:



Recent Publications

1. *Soriano M.L., Zougagh M., Valcárcel M., Ríos A., Talanta, 177 (2018) 104-121.*
2. *Zougagh M., Ríos A., Anal. Methods, 5 (2013) 4558-4565.*
3. *López-Sanz S., Guzmán F.J., Rodríguez R.C., Ríos A., Anal. Chim. Acta, 1059 (2019) 1-15.*
4. *Moreno V., Zougagh M, Ríos A., Anal. Chim. Acta, 1050 (2019) 169-175.*
5. *Adelantado C., Rodríguez N., Rodríguez R.C., Zougagh M., Ríos A., Anal. Chim. Acta, 923 (2016) 82-88.*

Biography

Angel Ríos is Full Professor of Analytical Chemistry in University of Castilla – La Mancha (Faculty of Chemistry, Ciudad Real, Spain), where at this moment is the Dean of the Faculty. He received his PhD (1983) from the University of Córdoba. His research interests dealt with automation, simplification and miniaturization of chemical measurement processes, particularly the development of chemical sensors integrated in screening analytical systems or miniaturized arrangements, and the use of nanomaterials for analytical purposes. He has published more than 300 articles in international journals. Its research activity has also been addressed to metrology in chemistry, analytical nanometrology, and the development of new tools for the validation of qualitative analytical methods in the framework of quality assurance programmes.

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From Molecule to Multifunctional Switchable Materials

Smail Triki

Université de Brest, UMR CNRS 6521, CEMCA, 6 Avenue Victor Le Gorgeu, C. S. 93837, 29238 Brest Cedex 3, France

Abstract

Among the molecular switchable materials, the spin crossover (SCO) complexes are of particular interest, notably because of their potential applications in the development of new generations of electronic devices. Among the few systems exhibiting remarkable SCO behaviour, the systems based on the 1,2,4-triazole ligands still remain among the most promising materials. However, the major lack of high quality single crystals with complete structural data for those materials prevent any deep magneto-structural correlations which are essential to fine tune their SCO properties by acting of their cooperativity. In this contribution we report (i) the first series of triazole-based SCO Fe^{II} trinuclear complexes (Figure 1a),[1-3] exhibiting similar structural features but different magnetic behaviours, making them a wonderful experimental platform to evidence; and (ii) an original multifunctional material exhibiting SCO and fluorescence in a synergic manner (Figure 1b).[4] These particular and intriguing behaviours will be discussed according to their molecular and inter-molecular structural parameters..

Figure :

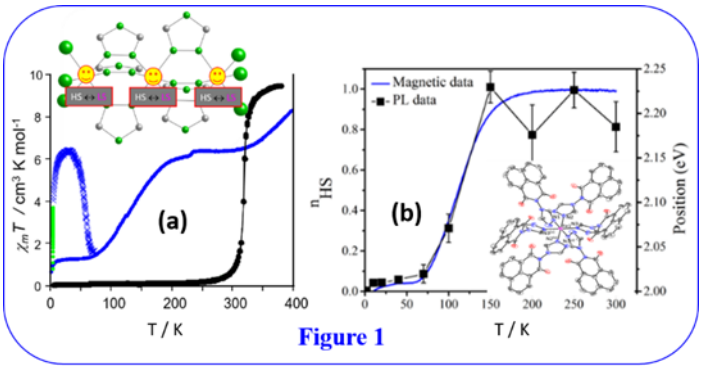

Figure 1

Recent Publications :

1. *Pittala N., Thétiot F., Triki S., Boukheddaden K., Chastanet G., Marchivie M., Chem. Mater. 29 (2017) 490.*
2. *Pittala N., Thétiot F., Charles C., Triki S., Boukheddaden K., Chastanet G., Marchivie M., Chem. Commun. 53 (2017) 8356.*
3. *Nebbali K., Mekuimemba C. D., Charles C., Yefsah S., Chastanet G., Mota A. J., Colacio E., Triki S., Inorg. Chem. 57 (2018) 12338.*
4. *Benaicha B., Van Do K., Yangui A., Pittala N., Lusson A., Sy M., Bouchez G., Fourati H., Gómez-García C. J., Triki S., Boukheddaden K., Chem. Sci. 10 (2019) 6791-6798.*

Biography

Smail TRIKI is a Professor of Chemistry at the University of Brest and Head of "Switchable and Multifunctional Materials" Group (UMR CNRS 6521) at the same university. His research work is located the field of molecular chemistry, including design and syntheses, and covers certain aspects of material sciences, such as magnetic, switchable, luminescent materials, including multifunctional systems. He published more than 134 papers (see details in: https://scholar.google.fr/citations?user=o6aDuqU5uKoC&hl=fr&oi=ao). His h-index is 34 with more than 3600 citations (web of science, March 2020).

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Towards Sustainable Desalination Technologies in the MENA region

Jauad El Kharraz

Middle East Desalination Research Center (MEDRC), Oman

Abstract

Desalination has become the most appropriate solution to produce fresh water to serve the continuously growing population in the world and to contribute to ensuring water security. Desalination is vital for MENA countries and their reliance on this source is expected to grow fast. This growth will only be possible by continuing to improve the sustainability of related technologies. Desalination can reasonably be considered a worthwhile adaptation strategy only if we ensure proper construction, minimize environmental impacts and generate electricity from renewable energies. There is an urgent need to make desalination technologies more affordable and extend them to low-income and lower-middle income countries. At the same time, though, we have to address potentially severe downsides of desalination — the harm of brine and chemical pollution to the marine environment and human health. The good news is that efforts have been made in recent years and, and we see a positive and promising outlook, with continuing technology refinement to decrease costs and increase the sustainability, using advanced pre-treatments that minimize the use of chemicals, and brine discharge methods that help dilution and improving economic affordability, we see a positive and promising outlook. Especially important is to decrease energy consumption, which has an impact on the operation costs and also the environmental impact through carbon dioxide emissions. If we learnt something from Covid19 crisis, is that the MENA region needs to localise knowledge and technology. By designing incentives for local businesses, governments can attract domestic investments in manufacturing critical components and cultivating local innovations to attain economic sustainability. Government and enterprises should not continue to build and operate desalination plants as before; steps should be taken to attract local investors using set targets for locally produced products and labor force and to manage these assets minimising the life-cycle cost of environmental impact.

Figure:

Recent Publications:

1. **J. El Kharraz,** et al., A collaboratively-derived international research agenda on legislative science advice, Palgrave Communications volume 5, Article number: 108 (**2019**), https://www.nature.com/articles/s41599-019-0318-6

2. M. Laqbaqbi, M.C. García-Payo, M. Khayet, **J. El Kharraz**, M. Chaouch, Application of direct contact membrane distillation for textile wastewater treatment and fouling study, Separation and Purification Technology (ScienceDirect), Volume 209, 31 January **2019**, Pages 815-825, https://doi.org/10.1016/j.seppur.2018.09.031

3. L. Gebrati, M. El Achaby, H. Chatoui, M. Laqbaqbi, **J. El-Kharraz**, F. Aziz, Inhibiting effect of textile wastewater on the activity of sludge from the biological treatment process of the activated sludge plant, June **2018**, Saudi Journal of Biological Sciences, https://doi.org/10.1016/j.sjbs.2018.06.003

4. **J. El Kharraz**, Desalination as an alternative to alleviate water scarcity and a climate change adaptation option in the MENA region, regional study funded by Konrad Adenauer Stiftung (in press) (To be published on April, **2020**)

5. **J. El Kharraz**, G. Zaragoza, N. Ghaffour, Prospects of Desalination using Solar Energy in the MENA Region, pp. 17-24, Proceedings of the Workshop on Water-Energy-Food-Ecosystems (WEFE) Nexus and Sustainable Development Goals (SDGs), JRC Conference and Workshops reports, **2018**. https://www.un-ihe.org/sites/default/files/19_jrc_procworkshopwaterenergyfoodecosystemsnexusandsdgs.pdf

Biography

Dr. El Kharraz is head of Research at MEDRC (Oman) where he manages its research programs. He has more than 20 years of experience (Spain, France, Oman, Euro-Mediterranean region) in water issues. He was chair of evaluation of PRIMA program water projects, apart from evaluator of the Palestinian-Dutch Academic Cooperation Program on Water. He has been projects manager at the Euro-Mediterranean Water Information System in France for 12 years. He has published and contributed to hundreds of conferences in more than 55 countries, journals and reports in the fields of water management, desalination, remote sensing and scientific research. He co-authored UNESCO science report 2015. He contributed to numerous projects funded by the EC, ESA, USAID, and other programs (FP, H2020, ENPI CBC-Med, LIFE, SMAP…). He got MSc & PhD degrees in Physics from the University of Valencia, Spain. He got a Diploma in Enterprises Management from SKEMA Business School, France.

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Synthesis, characterization and some applications of Metal Oxide Nanoparticles deposited on conducting polymers

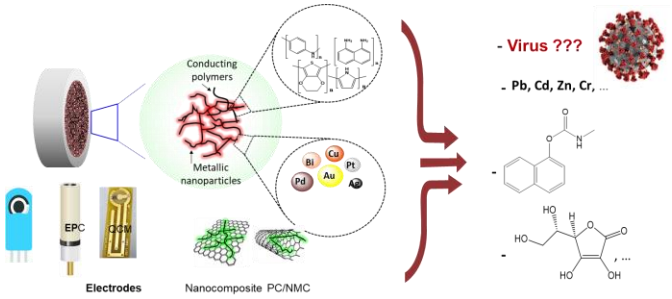
Mama El Rhazi*, Anas El Attar, EZ-ZINE Tarik, Salhi Ouissal

Faculty of Sciences and technologies- University Hassan II of Casablanca - Laboratory of Materials, Membranes and Environment – Mohammedia – Morocco. (elrhazim@hotmail.com)

Abstract

It seems that the main problems encountered with the ethanol oxidation were related to the fact that the electrochemical reaction (EOR) into carbon dioxide and protons is slow and incomplete on bare electrodes. Moreover, Pt catalyst used for the electrooxidation of ethanol in alkaline medium suffers from self-poisoning caused by CO-like species and its high cost limits the use of Pt in DEFCs. It is therefore necessary to improve the efficiency of EOR using more cost-effective means [1-4]. Metal oxides such as Nickel, Ruthenium or Copper oxide are widely used for DEFC applications due to their interesting optical, catalytic and electrical properties [5]. We will report here the synthesis, characterization and some applications of Metal Oxide deposited on conducting polymers. An original and facile strategy to enhance the electrooxidation of ethanol reaction through the variation of deposition mode of copper on conducting polymers was investigated. The effect of regeneration of the electrode will be discussed taking into account that structural defects in the deposited copper. We will also describe a very simple approach to modify screen printed electrode with carbon nanofibers and polypyrrole (CNF/PPy) for detection of caffeine or Nitrates in different samples by electrochemical methods. The developed nanocomposites offer a great potential for application as sensors or electrocatalysts. We look for future collaborations to apply our sensors for detection of Viruses.

Figure: Modification of the surface of the electrode



Recent Publications

1. Anas El Attar, Larbi Oularbi, Mama El Rhazi, International Journal of Hydrogen Energy, 2020, 45, 8887-8898
2. Larbi Oularbi, Mireille Turmine, Fatima Ezzahra Salih, Mama El Rhazi, Journal of Environmental Chemical Engineering; 2020, 8, 103774.
3. Halim, E.M., Demir-Cakan, R., Perrot, H., El Rhazi, M., Sel, O.,. Journal of Power Sources. 2019, 438, 227032.
4. Halim, E.M., Elbasri, M., Perrot, H., Sel, O., Lafdi, K., El Rhazi, M., International Journal of Hydrogen Energy. 2019, 44, 24534–24545.
5. T. Song, F. Gao, L. Jin, Y. Zhang, C. Wang, S. Li, C. Chen, Y. Du, J. Colloid Interface Sci. 560 (2020) 802–810.

Biography

Mama El Rhazi (*Vice dean in charge of scientific research and cooperation at Faculty of Sciences and Technologies of Mohammedia*) 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 - Mohammedia (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 is president of Federation of African Societies of Chemistry (2017-2021), member of Pan African Chemistry Network. Chair and Co-chair of several international conferences (ASCD 2010, ACSD2013, ACD2016). 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.

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Dynamical Quantum Filtering of *para*-H_2 via Enhanced Scattering on the Orientationally Anisotropic Potential of $SrTiO_3$(001)

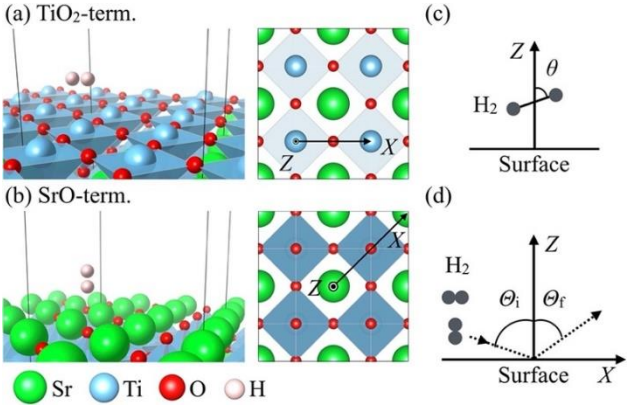
Koji Shimizu[1], **Wilson Agerico DIÑO[1,2],** Hiroshi NAKANISHI[3], Hideaki KASAI[3], Kotaro TAKEYASU[4], Katsuyuki FUKUTANI[4], Ayako YAJIMA[5]

[1]*Department of Applied Physics, Osaka University, Osaka, 565-0871, Japan*
[2]*Center for Atomic and Molecular Technologies, Osaka University, Osaka 565-0871, Japan*
[3]*National Institute of Technology, Akashi College, Hyogo 674-8501, Japan*
[4]*Institute of Industrial Science, The University of Tokyo, Tokyo 153-8505, Japan*
[5]*Kawasaki Heavy Industries, Ltd., Hyogo 673-8666, Japan*

Abstract

We performed quantum dynamics calculations, on top of density functional theory (DFT)-based total energy calculations, to study the scattering of H_2 on $SrTiO_3$(001) (cf., Fig. 1). We found increased *para*-H_2 (*p*-H_2) to *ortho*-H_2 (*o*-H_2) ratio of scattered H_2 (viz., ca. 4.96 and 16.1) along the $SrTiO_3$(001)[100] and $SrTiO_3$(001)[110] of the TiO_2- and SrO-terminated $SrTiO_3$(001), respectively). For reference, *normal*-H_2 (*n*-H_2) would have a *p*-H_2 to *o*-H_2 ratio of 1/3, at room temperature (T=300K). We can attribute these results to the strongly orientation-dependent (electrostatic) interaction potential between the H_2 (induced) quadrupole moment and the surface electric field of the ionic $SrTiO_2$(001). These results suggest that ionic surfaces (with tunable surface terminations) could function as *scattering/filtering* media to realize rotational state-resolved H_2. This could find significant applications not only in H_2 storage and transport, but also in realizing materials with the desired (pre-determined) characteristic properties. Further details will be presented at the meeting.

Figure: *A depiction of H_2 adsorption **(a)** atop the Ti-site and **(b)** atop the O-site on the TiO_2- and SrO- terminated $SrTiO_3$(001), with corresponding preferential orientations $\theta = \pi/2$ and 0, respectively. The lower left panel shows which colored balls correspond to which element. **(c)** A depiction of H_2 with the H_2 center-of- mass (CM) at a distance Z from the surface, and the H-H bond at an orientation θ with respect to the surface normal. **(d)** A depiction of H_2 scattering on $SrTiO_3$(001) with angle of incidence Θ_i and scattering angle Θ_f. X corresponds to the surface lateral position of the H_2 CM along the **(a)** [100] and **(b)** [110] direction on the TiO_2- and SrO-terminated $SrTiO_3$ (001), respectively. (Taken from [1])*



Recent Publications

1. *K. Shimizu et al., Sci. Rep. 10 (2020) 5939-1-11.*
2. *M. Rittiruam et al., Jpn. J. Appl. Phys. 59 (2020) 035003-1-7.*
3. *M.K. Agusta et al., Surf. Sci. 691 (2020) 121505-1-11.*
4. *N. Tanaka et al., Rev. Sci. Instrum. 91 (2020) 013313-1-5.*
5. *R. Ahmed et al., Sci. Rep. 9 (2019) 16882-1-8.*

Biography

Wilson Agerico Diño
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.
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Cellulose macromolecule as a source for advanced materials preparation

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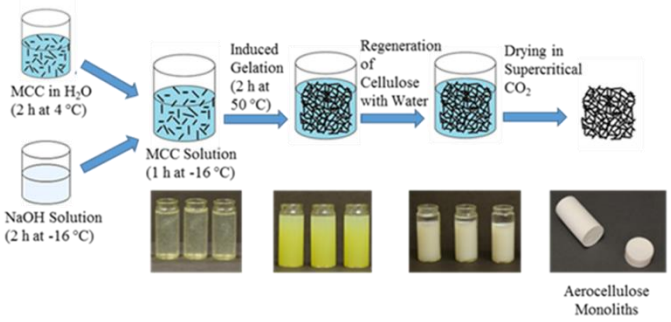
Abstract

Cellulose is the most abundant, biopolymer on Earth. It has numerous applications in many industries and can be engineered into fibers, films, sponges, beads, and other cellulosic materials. Of special interest, cellulose aerogels (aerocellulose) with high surface area and better pore characteristics have attracted considerable attention due to their properties such as biodegradability, biocompatibility, etc. The surface area of these materials and their porosity characteristics can be significantly enhanced and controlled using inorganic salts.

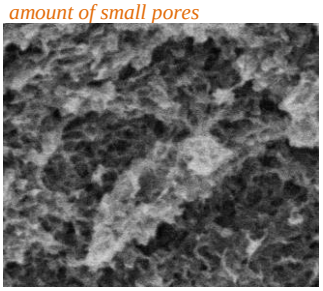
The current CO_2 Capture, Storage, and Utilization technologies include absorption, adsorption, membrane and cryogenic processes. Among those, the adsorption processes on solid adsorbents have been regarded as the most attractive technique due to their high CO_2 sorption capacity, low cost, low energy and reusability. In this regard, solid sorbents prepared from cellulose are promising because of their relative abundance, sustainability, biodegradability, non-toxicity, renewability, thermal stability and good sorption properties. Activated carbons possess high surface areas and low chemical reactivity, therefore, they have been widely used as adsorbents at low and ambient temperatures. On the other hand, amidoximes have recently recognized as practical candidates for high temperature sorbents over typical amine-based solid sorbents. Here, we report the data for the CO_2 capture by CO_2-activated aerocellulose-derived carbon monolith with enhanced microporosity and amidoxime-functionalized cellulose-based polymers at low (0°C) and elevated temperatures (120°C), respectively.

Figures:

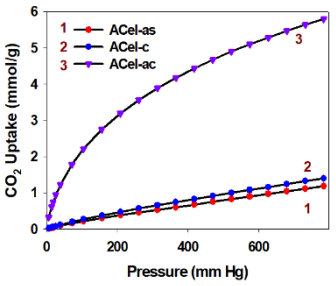
Preparation of aerocellulose monoliths



Exfoliated morphology with large amount of small pores



CO_2 adsorption isotherms at 0°C and 1 atm



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1. *N. Dissanayake, V.D. Thalangamaarachchige, T. Jackson, S. Troxell, E. Quitevis, N. Abidi. Cellulose, 25(2018)6887-6900.*
2. *Y. Hu, S. Acharya, N. Abidi. International J. Biological Macromolecules. 123(2019)1289-1296*
3. *X. Wu, J. Wang, X. Zhou, H. Liu, N. Abidi, Y. Zhu, H. Pan. Materials Science & Engineering C, 99(2019)333-343.*
4. *Md-J. Uddin; N. Abidi, J. Warzywoda, H. Gill. ACS Applied Materials & Interfaces, 11(2019) 20628-20641.*
5. *N. Dissanayake*, V.D. Thalangamaarachchige¥, M. Thakurathi, M. Knight, E. Quitevis, N. Abidi. Carbohydrate Polymers, 221(2019)63-72.*

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 97 refereed journal publications, 2 books, 16 book chapters, more than 160 presentations, 3 patents, and 1 pending patent. Abidi has served as PI or co-PI on funded research grants totaling more than $16M. 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. His H-index is 23 on Scopus.

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Hybrid nanomaterials: towards new opportunities for energy and environmental applications

Abdelhafed TALEB

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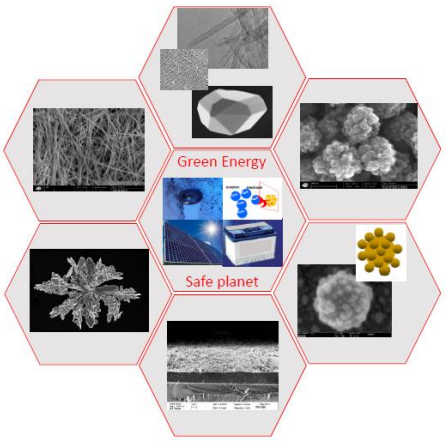
Abstract

Over the last century, a great attention has been paid to the development of new materials, with desired and optimized properties for existing and new applications. Hybrid materials are versatile and composed of both inorganic and organic components. Furthermore, they appear to be one of the most promising approaches to prepare materials with on-demand properties for targeted applications.
In this presentation, different approaches to design hybrid nanomaterials, with specific architectures and properties, will be reported. The assembly of the prepared hybrid nanomaterials will also be discussed, as a crucial parameter to tune their properties. We will also give a particular attention to the final application, such as sensing, photovoltaic solar cells, self-cleaning surfaces, among other possibilities.

Figure: *It shows: different designs of hybrid nanomaterials, architecture of thin film based on them and some related applications*



Recent Publications

1. *Taleb, F. Mesguich, X. Yanpeng, C. Colbeau-Justin P. Dubot. Solar Energy Materials and Solar Cells, 148 (2016) 52.*
2. *Taleb, Y. Xue, P. Dubot, Applied surface science, 420 (2017) 110.*
3. *S. Falah, X. Yanpeng, A. Taleb, M. Beji, Electrochemica Acta, 292 (2018 594).*
4. *S. Mehraz, P. Konsong, A. Taleb, N. Dokhane, L. Sikong, Solar Energy Materials and Solar Cells, 189 (2019) 254-262.*
5. *S. Wang, Y. Xue, C. Ban, Y. Xue, A. Taleb, Y. Jin, Surface and coating technology, 385 (15) (2020) 125390*

Biography

Abdelhafed Taleb is associate professor at Sorbonne University in the "Institut de recherche de Chimie Paris" (IRCP / Chimie ParisTech). He received his PhD diploma in nanomaterials science from UPMC in Paris in 1998. During his PhD, he pointed out a new collective's properties due to nanoparticles organization. In 2000, he joined the UPMC, where he worked on the synthesis of inorganic-organic hybrid nanomaterials and the development of new strategies to assemble them in different structures of coating. Since 2009, he leads the group, "Elaboration and Modelling of Nanostructred Films", focusing on the design of nanostructured films with novel architectures and their applications. He has more than 20 years of experience in nanomaterial synthesis, characterizations, the study of their physical properties and their applications. He authored and co-authored a number of publications and patents on various topics, focusing on advanced materials and their applications.

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New metamaterials for thermophotovoltaic solar cells

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Abstract

Increasing conversion efficiency of thermophotovoltaic TPV is a crucial key and active field of research today. TPV is highly efficient alternative relying on the direct emission of photons and electrons [1]. Meta-materials (MTMs) exhibit remarkable optical properties such as negative and/or near zero values of reflective indices [2]. In this work thermophotovoltaic (TPV) system based on a selective metamaterial (MTM) emitter has been investigated, following a brief overview of MTMs foundation, operating mechanisms with state of the art of TPV technologies. A variety of compact nearly perfect absorbers operating at mid-infrared frequencies have been designed, namely broadband absorber, thermal tunable absorber, and optically low-loss absorber; all the structures exhibits adequate performances for TPV requirement such as: polarization-insensitive, with wide angle of incidence, thermal stability given by high melting temperature point of the used materials (SiN and Tungsten).

The strategy is to combine the auto-adjustment of the emittance of the designed MTM emitter accompanied with tandem cell of (InAs/GaInAsSb), can thus achieve highest TPV conversion efficiency of 41% at high temperature (1500 ºC), and an appreciable TPV conversion efficiency of 11.82% at lower temperature (300 ºC).

For all designs, it was simulated, through both numerical modeling software HFSS by ANSYS, and CSTMICROWAVE STUDIO, simultaneously, which are based on two different rigorous approaches, the Finite Element Method (FEM), and the Finite-Different Time-Domain method (FDTD), respectively

The suggested system achieves highest TPV conversion efficiency of 41% for blackbody radiation temperature (TBB) = 1500 ºC, and lowest TPV conversion efficiency of 11.82% for (TBB=300) ºC. The TPV combined system thus operates in wide temperature range from 300 ºC to 1500 ºC, and higher performance when the compact MTM emitter component is included. It also shows higher performance than literature having no MTM emitter.

Recent Publications

1. A. Datas and R. Vaillon, *Thermionic-enhanced near-field thermophotovoltaics*, *Nano Energy 61 (2019) 10–1711.*

2. Fathi Bendelala, Ali Cheknane and Hikmat Hilal, *Enhanced low-gap thermophotovoltaic cell efficiency for a wide temperature range based on a selective meta-material emitter, Solar Energy 174 (2018) 1053–1057*

Biography

Ali CHEKNANE is a full-Professor at the Amar Telidji University of Laghouat-Algeria. He has completed his PhD in physics. Ali is having 25 years teaching graduate and post-graduate teaching experience at the university as temporary, associated and permanent position. He has published many papers in various journals and conference proceedings on renewable energy subjects. He published more than 50 journal papers, did more than 40 conference presentations and served as an editorial board member for several technical and organizing committees for international conferences.He has many years' experience of supervising several postgraduate and graduate students. He got an incentive award from "Centre de Development des Energies Renouvelables-CDER". He was awarded for the best publication in physics in Algeria from the ANDRU agency in 2008. He is the Head of the research team: "Photovoltaic Systems & Devices" at the Laboratory of Semiconductors and Functional Materials. He is a reviewer in many Journals as: Solar Energy, Conversion Energy and Management Journal; Electronics Journal, International Journal of Engineering Innovations and Research, Measurement and International Journal of Electronics…etc. Ali CHEKNANE is actually the Dean of the Faculty of Technology at Amar Telidji University of Laghouat- Algeria.

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Mössbauer spectra analysis and magnetic hystereses decomposition of iron-bearing environmental samples

T. Szumiata [1], K. Brzózka [1], B. Górka [1], M. Gawroński [1], R. Świetlik [2], M. Trojanowska [2], S. Olszowski [3], T. Magiera [4], M. Rachwał [4], M. Wawer [4].

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[2] *University of Technology and Humanities, Faculty of Chemical Engineering and Commodity Science, Department of Environmental Protection, 26-600 Radom, Chrobrego 27 Str., Poland.*
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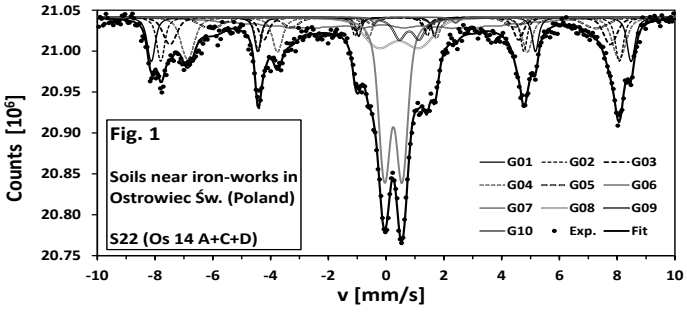
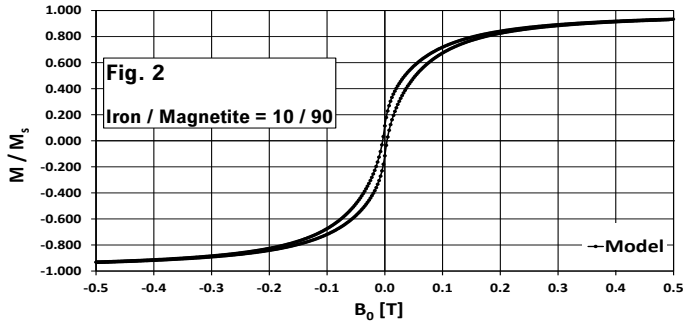
[4] *Institute of Environmental Engineering, Polish Academy of Sciences, M. Skłodowskiej-Curie 34 Str., Zabrze, Poland.*
The study was funded in part by the Polish National Science Centre (project No: 2016/23/B/ST10/02814) and by the University of Technology and Humanities in Radom under statutory grant 3179/25/P from Ministry of Science and Higher Education in Poland.

Abstract

Urban and industrial dust emitted from different sources to the atmosphere and finally deposited on the soil surface contain particles with magnetic properties. They are called "technogenic magnetic particles" (TMPs) and their presence is usually correlated with significant concentration of heavy metals. These particles are iron minerals (mainly oxides) formed during high-temperature processes, from various iron forms initially present in raw materials, additives or fuel used by different branches of industry. The investigated soil samples were collected from the areas close to the specific (still operating or historical) pollution sources as: iron and nickel smelters, iron foundry, glassworks, coking and cement plants, dumps of industrial wastes and big railway junctions. The Mössbauer spectrometry analysis (Fig. 1, [1,2]) has been utilized in order to differentiate the iron-bearing mineralogy of magnetic separates of soils depending on the proximity of definite TMPs emitter. Contrary to the soils affected be industrial activity, the indoor-dusts [3] are expected to contain metallic iron except iron oxides (magnetite, hematite). Preliminary Mössbauer measurements (among others in the case of dusts from ventilation and air-conditioning systems) confirm such hypothesis, whereas first attempts to see the influence of metallic iron on hysteresis loops are not conclusive. That is why the simulation of "wasp-waists" shaped magnetization curves for the mixture of magnetite and iron have been performed (Fig. 2) within Langevin model [4].

Figures:





Recent Publications

1. *Szumiata T., Gzik-Szumiata M., Brzózka K., Górka B., Gawroński M., Świetlik R., Trojanowska M., Nukleonika 60 (1) (2015) 151-154.*
2. *Szumiata T., Rachwał M., Magiera T., Brzózka K., Gzik-Szumiata M., Gawroński M., Górka B., Kyzioł-Komosińska J., Nukleonika 62(2) (2017) 187-195.*
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Biography

Author has his expertise in the applications of Mössbauer spectrometry in environmental sciences. His great passion is joining this technique with advanced magnetic methods. His focus is based on the iron speciation in technogenic magnetic particles, which are natural carriers for heavy metals in soils, airborne particulate matter, fly ashes, street dusts and geothermal water sediments. He was awarded his PhD in 2002 from the Institute of Physics of Polish Academy of Sciences in Warsaw, Poland. He is an associate professor at University of Technology and Humanities in Radom, Poland. He participated in scientific internships in Finland, France, and Great Britain. Besides environmental studies he is an expert in magnetoelastic effects, magnetic nanomaterials, magnetic defectoscopy and modern mass metrology. He has close scientific connections with Université Mohammed Premier d'Oujda (UMP, Morocco). He published more than 56 papers cited by 238 documents. His H index is 9 on Scopus.

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Inkjet printing processing from nanofabrication to R2R manufacturing

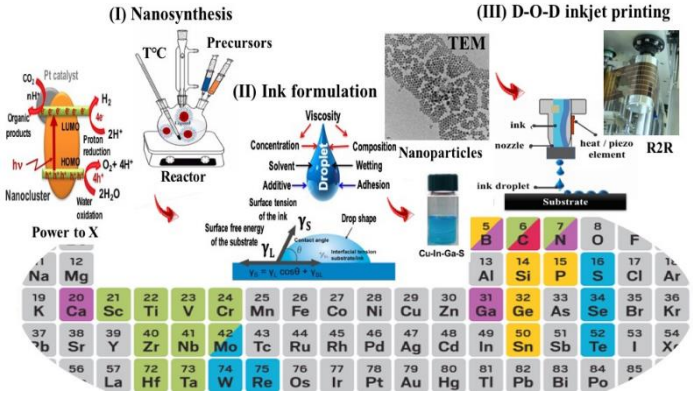
Ahmed Ennaoui

President of the scientific council of Research Institute for Solar Energy and New Energies, IRESEN / Rabat, Morocco / Retired from Helmholtz-Zentrum Berlin (HZB) for materials and energy

Abstract

In this talk we firstly introduce a fundamental approach for the synthesis of a broad range of alternative and earth abundant compounds by combining atoms of different group within the periodic table with the objectives to achieve electronic properties and photocatalytic criteria enabling efficient photoinduced electron transfer converting the quanta of solar energy into electrical energy or to a combustible gas or to capture of Carbone dioxide CO_2. Such research portfolio plays a crucial role to decarbonize a wide range of industrial sectors and accelerates the energy transition. Secondly, we present a low-cost process scenario which has the potential to produce and upscale a variety of functional materials and related solar devices. It consists of three-steps approach for processing light absorbing compounds: (I) Nano-synthesis (or molecular synthesis) of the required precursors, (II) Ink formulation of long-term printable stability, (III) Drop-On-Demand (D-O-D) inkjet printing layers followed by a reactive annealing process. The first step, nanofabrication is a "mature" process for processing compounds with tunable size, shape, and surface passivation that can exhibit new behavior and change of the material properties compared to the bulk materials. The second step plays a crucial role to design and optimize a functional printable ink in term of composition, viscosity, band gap tuning, and wettability. The third stage is an additional fabrication technique printing picotiter drops of the formulated ink with negligible materials waste and significant reduction of raw materials cost without relying on expensive vacuum technology. The reactive annealing can promote both diffusion of the reactive elements (e.g. Sulfur and Selenium) in the printed layers and the crystallization of the alloy. The goal is to optimize a process well adapted for high efficiency Roll-to-Roll (R2R) and flexible technology and to produce monolithically integrated inkjet printing solar devices. We discuss several devices explored in my former group at Helmholtz-Center Berlin. Two emerging materials will be explored: Kesterite, Cu_2ZnSnS_4, (CZTS), and Chalcopyrite $Cu(In,Ga)(S,Se)_2$ (CIGSe), both exhibit promising photovoltaic performances. Finally, we will bring into focus the emergence of novel 2D materials and process by van der Waals "rheotaxy" and low-cost perovskite.

Figures: ***Graphical Abstract***



Recent Publications

1. M. Thema, F. Bauer, M. Sterner, Renewable and Sustainable Energy Reviews 112 (2019) 775
2. Ennaoui, S. Fiechter, Ch. Pettenkofer, A. Alonso-Vante, K. Bröker, M. Bronold, Ch. Höpfner, H. Tributsch, Solar Energy Materials and Solar Cells, 29, (1993) 289
3. X. Lin, A. Steigert, M.C.Lux-Steiner, A. Ennaoui, RSC Adv. 2 (2012) 9798
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5. X. Lin, R Klenk, L Wang, T Köhler, J. Albert, S. Fiechter, A. Ennaoui, and M.C. Lux-Steiner, Energy & Environ. Sci 9 (2016) 2037
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7. Gregor Kieslich, Shijing Sun and Anthony K. Cheetham, Chem. Sci. 6 (2015) 3430

Biography

Ahmed Ennaoui is a Physician and material scientist, born and grew up in south Morocco. He serves as full professor of physics and material sciences at University Mohamed V. He works as head of research group Helmholtz-Zentrum Berlin (HZB) for materials and energy, research director of solar energy group at Qatar Environmental and Energy Research Institute (QEERI) and Joint professor at Hamad Bin Khalifa University (HBKU). His research interests are primarily focused on alternative materials for emerging thin film solar technology, from planar films to nanostructures, Photo-electrochemistry and water splitting, Nano-synthesis, Inkjet-printing of functional materials and solar cells. At QEERI he was conducting research, managing research groups, recruiting top talents. He established a track record, building partnerships with industry and academia during the period from January 2015 to May 2017. He managed in his group QEERI's solar test facilities (STF with ~200 kW) and contributed to the development of PV soiling solution, improving O&M of the infrastructure at the STF. He proposed also a relevant low CAPEX manufacturing Thin Film PV technology to reduce the cost per watt peak of solar modules through building of a baseline for inkjet printing as a precision deposition technology. He designed a syllabus for the College of Science and Engineering at HBKU and taught several seminars on Solar Photovoltaic Technology for graduate students. Prior to joining HBKU/QEERI, he conducted research with Prof. Helmut Tributsch at Hahn-Meitner Institute-Berlin (HMI), Germany "Abteilung Solare Energetik und Materialforschung" focusing on earth abundant materials for solar energy conversion. He obtained in 1987 his Habilitation (summa cum laude) to conduct research and university teaching, he is then promoted head of research group at Helmholtz-Zentrum Berlin (HZB) managing in his group several EU's Framework programs and BMBF projects (CISLINE, NEBULES, ATHLET, NEUMAS, NANOPV) for technological development of thin film materials for solar energy conversion. He received several grants and explored successful R&D and feasibility studies with the industry (Siemens/Shell-Solar/Avancis, Solibro, Bosch, Atotech). All his projects are targeting photoelectrochemical solar cells, solid-state thin Film solar cells and new concept, from planar films to nanostructures. During his career at HZB, he supervised 40+ completed thesis and 15+ Postdoctoral have worked in his group, he was periodically invited by Prof. Michio MATSUMURA at the Research Center for Solar Energy Chemistry, Osaka university and taught research-seminars for graduate students on Advanced Thin Film chalcogenide materials for photovoltaics. He is author and co-author for more than 300 peer-reviewed journal articles including numerous conference contributions, 5 special issues and granted several patents. His published work has been recognized with (7207 citations, h-index 43, i10-index 94). He was organizing the Technical Program Committee chair of the conference series IRSEC 13-19 managing workshops, tutorials, keynotes and plenary sessions. He is permanently member of the editorial Board and managing special issue editor in peer review journal Solar Energy Materials Solar Cells (Cite Score 11.6 – Impact Factor 6.984). He is president of the Scientific Council of the Moroccan Solar Energy Institute "IRESEN" deeply engaged to support and reinforce R&D on renewable energy and supervising R&D projects of the institute. He is member of ISES and IEEE. Ahmed Ennaoui has recently delivered webinars related to material energy solution and sustainable development and plenary session at the Moroccan Hassan II Academy of Sciences and Technologies

Structure investigation of challenging organic and hybrid compounds by single crystal synchrotron microdiffraction

Anna Moliterni[1], Davide Altamura[1], Rocco Lassandro[1], Vincent Olieric[2], and Cinzia Giannini[1]

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Abstract

Organic and hybrid organic-inorganic semiconductors have recently attracted increasing interest due to the growing demand of new materials with remarkable and tunable optoelectronic properties.

A crystallographic study of this kind of compounds is the obliged step to be carried out for attaining a deep knowledge of the structure-property relationships, *via* the identification of the main intermolecular interactions determining the crystal packing, *i.e.*, the π-π interactions, that favor stacking arrangements, and all the non-covalent interactions influencing the physical properties of the materials.

Due to the difficulties in growing single crystals with size and diffraction power suitable for a successful investigation by conventional single crystal diffraction data, powerful X-ray microsources available at synchrotron beamlines revealed themselves an unavoidable tool to be exploited for obtaining high quality diffraction data whose completeness and accuracy are essential for a successful structure solution process.

Some examples of recent structure characterization by synchrotron microdiffraction data in case of organic semiconductors [1] (see Fig. 1) and hybrid organic-inorganic two-dimensional (2D) perovskites [2] (see Fig. 2) are here presented.

Synchrotron data were collected at the Swiss Light Source (SLS), Villigen, Switzerland, at the beamline X06DA-PXIII [3].

Structure solution was carried out by Direct Methods using *SIR2019* [4] and refined by *SHELXL2014/7* [5]. All non-hydrogen atoms were refined anisotropically; the carbon-bound H atoms were placed on geometrically calculated positions and refined using a riding-model approximation.

The crystallographic study, supported by the optical investigation, has enabled to explore and understand the intricate relationships between physical properties and synthesis, material composition and crystal structure.

The authors thank John E. Anthony (JEA), Andrea Camposeo (AC), Dario Pisignano (DP), and Luisa De Marco (LDM) for providing the crystalline samples, i.e., the anthracene derivatives compounds (JEA, AC and DP) and the hybrid organic-inorganic perovskites (LDM).

Figures:

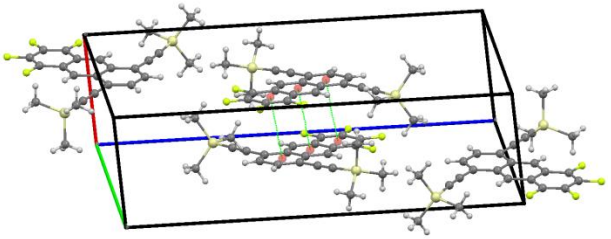

Fig. 1 1,2,3,4-Tetrafluoro-5,8-bis(trimethylsilylethynyl)anthracene: a view of the crystal packing. The parallel-offset π-π interactions are indicated by broken lines between centroids.

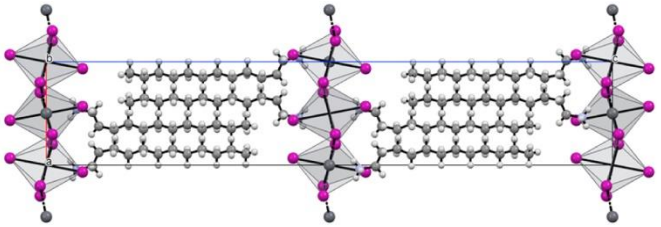

Fig. 2 n=1 dodecylammonium (DA) lead iodide perovskite $[(DA)_2PbI_4]$: a view of the crystal packing along *b*, showing the distortion of the inorganic layers.

Recent Publications

1. Moliterni, A., Altamura, D., Lassandro, R., Olieric, V., Ferri, G., Cardarelli, F., Camposeo, A., Pisignano, D., Anthony, J.E., Giannini, C., Acta Cryst B 76 (2020) 427-435.
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5. Sheldrick, G. M. Acta Cryst. A 71 (2015) 3-8.

Biography

Dr. Anna Moliterni is a researcher at the Institute of Crystallography (IC), CNR (National Research Council), in Bari, Italy. Her main research interests are in the field of crystallography and involve the development, the implementation in crystallographic software and the application of innovative theoretical, methodological and computing tools devoted to: structure solution and refinement by powder and single crystal diffraction data; qualitative and quantitative phase analysis by powder data.

Dr. Moliterni is co-author of over 100 scientific publications in ISI journals (H-index: 25, number of citations without self citations: over 11700) and seven book chapters [two of them recently published on a new volume of the *International Tables for Crystallography*, devoted to powder diffraction (Volume H)].

She is co-author of ten crystallographic computing programs (*OChemDb, QUALX2.0, EXPO2013, EXPO2009, QUALX, EXPO2004, Quanto, EXPO, SIR97, EXTRA*) distributed *via* the website of the Institute of Crystallography.

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X-ray hierarchical investigation of type I collagen in tissue engineering and pathology

Terzi A.[1], Sibillano T.[1], Altamura D. [1], Siliqi D.[1], De Caro L.[1], Salvatore L.[2], Madaghiele M.[2], Sannino A.[2] and Giannini C.[1]

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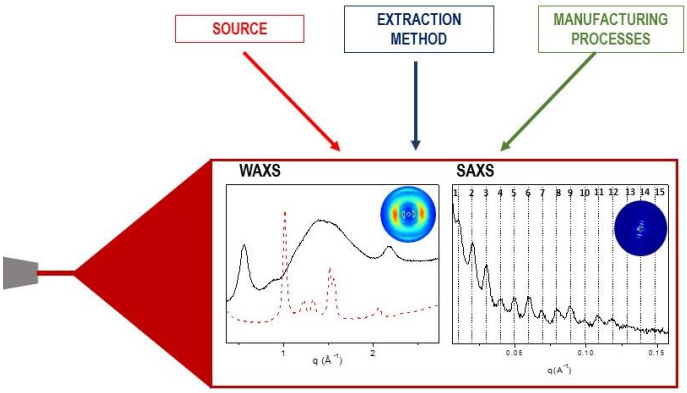
Abstract

Type I collagen, the main fibril-forming protein of the extracellular matrix (ECM), provides mechanical support to tissues and organs. Its distribution and organization is tissue-specific. From the molecular order, up to supramolecular scale, it is organized in triple helices assembled in fibrils and fibers, in accordance with a liquid crystalline arrangement at nanoscale. Thanks to its hierarchical structure and functional domains, collagen supplies physical support to cells attachment and growth, influencing tissue development. Thus its biocompatibility, bioactivity and biodegradability make it so attractive as biomaterial for implantable medical devices. Type I collagen can be extracted from different collagen-rich tissues of distinct animal species by chemical and/or enzymatic processes, that lead to structural alteration of the fibrillary arrangement. In our studies we demonstrate the worthwhile contribution of Wide and Small Angle X ray Scattering (WAXS, SAXS)[1] techniques in the structural evaluation of sub and supramolecular changes of the protein, during the biomaterial fabrication steps from fresh collagen-rich tissues (bovine dermis, equine tendon, fish skin) to the final scaffolds. The evidences show the impact of processing conditions on both molecular scale and fibrillary arrangement at nanoscale. Moreover, the demonstration that further manufacturing protocols deeply affect the features of the biomaterial itself, allow to screen the suitable protocols according to the tissue to regenerate[2,3].

Figures:



Recent Publications

1. D. Altamura, R. Lassandro, F.A. Vittoria, L. De Cari, D. Siliqi, M. Ladisa, C. Giannini, *J.Appl. Cryst*., **2012**, 45, 869–87
2. A. Terzi, E. Storelli, S. Bettini, T. Sibillano, D. Altamura, L. Salvatore, M. Madaghiele, A. Romano, D. Siliqi, M. Ladisa, L. De Caro, A. Quattrini, L. Valli, A. Sannino, C., Giannini, *Sci Rep*., **2018**, 8, 1, 1429
3. A. Terzi, N. Gallo, S. Bettini, T. Sibillano, D. Altamura, L. Campa, M.L. Natali, L. Salvatore, M. Madaghiele, L. De Caro, L. Valli, A. Sannino, C. Giannini, *Front Bioeng Biotechnol*., **2019**, 7, 203.

Biography

Dr. Alberta Terzi has a post-doc research fellow at the Institute of Crystallography (IC), CNR (National Research Council), in Bari, Italy. Her main research interests are in the field of X-rays (SAXS, WAXS) structural characterization of extracellular natural polymers (i.e. type I collagen) in physiologic and pathologic tissues and their application for the development of engineered tissues for regenerative medicine.

During her PhD, she performed experiments at The SwissLight Source (SLS) al Paul Scherrer Institut and she worked for six months at REMODEL _ Regenerative, Modular & Developmental Engineering Laboratory of the National University of Ireland, Galway.received the "Best PhD thesis award 2019" from the Italian Society of Synchrotron Light (SILS)

Dr. Terzi is co-author of 6 scientific publications in ISI journals and 2 proceedings (H-index: 3)

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State-of-the Art of Hydrogen-bonded Organic Frameworks (HOFs) Under Light and Related Photonic Applications

Eduardo Gomez[1], Boyko Cohen[1], Maria Rosaria Di Nunzio[1], Ichiro Hisaki[2] and **Abderrazzak Douhal**[1*]

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[2]*Graduate School of Engineering Science, Osaka University, 1-3 Machikaneyama, Toyonaka, Osaka 560-8531, Japan.*

Abstract

In addition to the classical silica-based materials (SBMs), metal-organic frameworks (MOFs), covalent organic frameworks (COFs), and hydrogen-bonded organic frameworks (HOFs) have emerged as new smart materials for a wide range of applications in science and technology like photonics, catalysis, gas storage and separation, and drug delivery.

While a comprehensive understanding of the photobehaviour of SBMs and MOFs have been reached in the latest 10 years, HOFs' spectroscopy is still in its infancy. HOFs are assembled from the organic units through H-bonding interactions. The strength of the resulting framework can be further enhanced via weak interactions such as π···π interactions, van der Waals interactions, C-H···π interactions. In this lecture, I will talk about our recent advances in exploring the ultrafast spectroscopy and related dynamics of several HOFs using ultrafast laser-based techniques and time-resolved single-crystal fluorescence microscopy. The experiments elucidated the interactions (proton and charge transfers, and π-π interactions) between the involved monomers, and the relevance of crystal defects in their photobehavior. I will also talk about few applications in photonics, and our first observation of sensing acid atmosphere using a HOF by means of either light absorption or emission. The observed results promise new developments in the field of smart materials and their photonic applications.

Recent Publications

1. Gomez, E. Maria Rosaria di Nunzio, Moreno, M.; Hisaki, I.; Douhal, A.; Shape-Persistent Phenylene-Ethynylene Macrocycles Spectroscopy and Dynamics: From Molecules to the Hydrogen-Bonded Organic Framework Material, J. Phys. Chem. C, 124 (2020) 6938. DOI: 10.1021/acs.jpcc.0c01369.
2. Gomez, E.; Suzuki, Y.; Hisaki, I.; Moreno, Q.; Douhal, A., Spectroscopy and Dynamics of a HOF and Its Molecular Units: Remarkable Vapor Acid Sensing, J. Mater. Chem. C, 7 (2019) 10818. DOI: 10.1039/C9TC03830B.
3. Hisaki, I.; Suzuki, Y.; Gomez, E.; Ji, Q.; Tohnai, N.; Nakamura, T.; Douhal, A., Acid Responsive Hydrogen-bonded Organic Frameworks, J. Am. Chem. Soc. 141 (2020) 2111. DOI: 10.1021/jacs.8b12124.
4. Hisaki, I.; Suzuki, Y.; Gomez, E.; Cohen, B.; Tohnai, N.; Douhal, A., Docking Strategy to Construct Thermostable, Single-crystalline, Hydrogen-bonded Organic Framework with Large Surface, Angew. Chem. Int. Ed. 2018 (2018) 12650. DOI: 10.1002/anie.201805472.
5. Gomez, E.; Gutierrez, M.; Cohen, B.; Hisaki, I.; Douhal, A.,
6. Single Crystal Fluorescence Behavior of a New HOF Material: Potential Candidate for a New LED, J. Mater. Chem. C 6 (2018) 6929. DOI: 10.1039/C8TC01808A.

Acknowledgement: This work was supported by the MINECO and JCCM (Spain) through projects MAT-2017-8653-R and SBPLY/19/180501/000212, and by KAKENHI grant numbers JP18H01966 and JP19H04557 from MEXT, Japan.

Biography

Abderrazzak Douhal, a full Professor of physical chemistry at the University of Castilla La Mancha (UCLM, Toledo), has received his Ph.D. degree in chemistry from the University of Kadi Ayyad (Marrakech). He worked at the Institute of Physical Chemistry of CSIC (1986-1990, Madrid), at the Institute for Molecular Science (1990-192, Okazaki, Japan), and at the Laboratoire de Photophysique Moléculaire (1992, University of Paris-Sud/CNRS). He was a visiting researcher at California Institute of Technology in several periods (1997-2000), collaborating with Prof. Ahmed H. Zewail. He is heading the Femtoscience and Microscopy research group at the UCLM (https://www.uclm.es/grupos/fmg), focusing his research on photoevents in advanced materials (silica-based materials, MOFs, COFs, HOFs, and perovskites). He published around 200 contributions, including 4 books. His members of several international scientific associations, and editorial boards of IJMS, CPL, JPPA and IJP journals. In 2018, he was awarded the Elsevier Lecture Award from the Japanese Photochemistry Association.

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Oral Presentations

Experimental characterization and DFT of conformational stability salicylic acid

Hayat EL Ouafy[1], Tarik EL Ouafy[2], Mustapha Oubenali[1], Mohamed Mbarki[1], Malika Echajia[1]

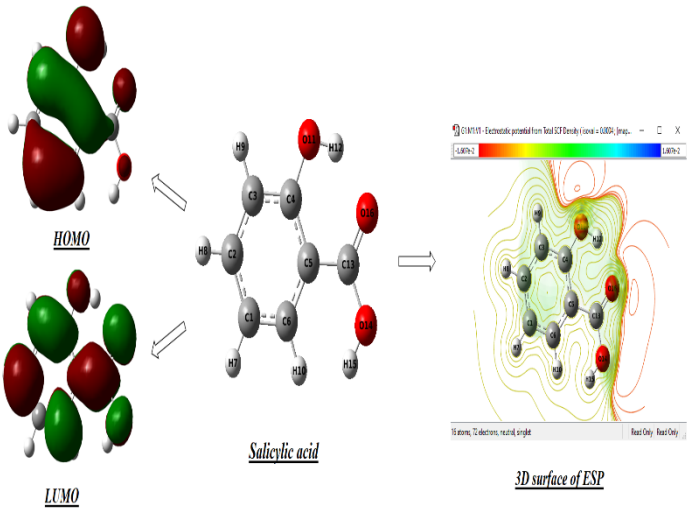
[1] *Laboratory of Organic and Analytical Chemistry, Sultan Moulay Slimane University, Faculty of Science and Technology, Beni Mellal, Morocco*
[2] *Laboratory of Organic and Analytical Chemistry, Sultan Moulay Slimane University, Polydisciplinary Faculty, Khouribga, Morocco*

Abstract

Salicylic acid is used as an anti-inflammatory drug and is chemically known as 2-hydroxybenzoic acid. Salicylic acid is a key ingredient in many skin-care products for the treatment of acne, psoriasis, calluses, corns, keratosis pilaris, and warts. It is known for its ability to ease aches and pains and reduce fever. These medicinal properties, particularly fever relief, have been known since ancient times, this colorless crystalline organic acid is widely used in organic synthesis and it functions as a plant hormone. Its molecular formula is $C_7H_6O_3$. S we used the quantum density theory (DFT) B3LYP / 6-311G (d, p) to determine the calculations of the chemical descriptor in particular, (μ) the electronic chemical potential, (η) chemical hardness, (ω) electrophilic and 3D maps of the HOMO (E=-11.946eV) and LUMO (E=-3.838 eV) orbits and harmonic vibrational frequencies, infrared intensities of the Salicylic acid molecule. The equilibrium geometries, the lengths, bond angles, were calculated by DFT and MP2 method with a 6-311G (d,p) basis set using Gaussian 09W program. A study on, molecular electrostatic potential (MEP) were also performed.

Keywords: Salicylic acid, DFT, Chemical Descriptor, Electrostatic Molecular Potential.

Figures:



Recent Publications

1. A. Philip Mackowiak, Brief history of antipyretic therapy, Clin. Infect. Dis. 31 (2000) 154–156.
2. R. G. Parr and R. G. Pearson, "Absolute hardness: Companion parameter to absolute electronegativity," Journal of the American Chemical Society, vol. 105, pp. 7512-7516, 1983.

Biography

I have experience in using the quantum density theory functional method (DFT) B3LYP / 6-311G (d, p) to determine the optimization of interatomic distances of molecules such as salicylic acid, and the energies, the electron density of certain atoms of the molecules, This method is implemented in the Gaussian 09 program. My objective is based on the determination of the stability and the electrophilic and nucleophilic character of the molecule. I graduated in 2018 at Sultane Moulay Sliman University, Faculty of Science and Technology in Beni Mellal, Morocco.

Email: elouafyhayat@gmail.com

Tris 2-aminoethyl amine (TREN) agent to quantify interaction and extraction capacity of VO^{2+} ions for oriented membrane processes

Imane Touarssi[1], S. Oukkass[1], Z. Habibi[1], Y. Chaouqi1, N. Sefiani[1], L. Lebrun[2], Miloudi Hlaibi[1,2]

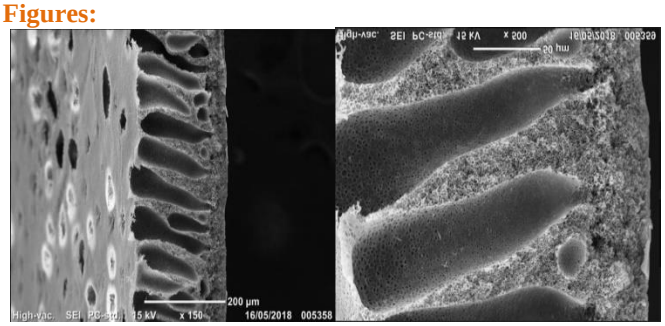
[1] *Génie des Matériaux pour Environnement et Valorisation (GeMEV), Faculté des Sciences Aïn Chock, Université Hassan II de Casablanca (UH2C), Casablanca Maroc.*
[2] *Laboratoire Polymères, Biopolymères, Surfaces (PBS), Equipe des membranes, UMR 6522 du CNRS Faculté des Sciences F-76821 Mont Saint Aignan France*

Abstract

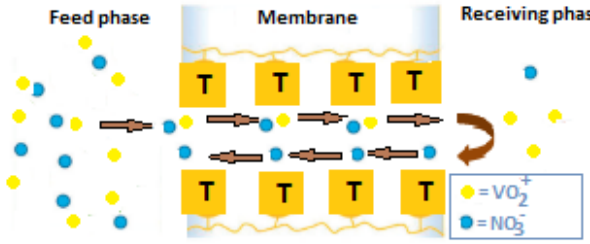
Correcting the depletion of natural resources such as metals is a necessity for the global economy. One of the techniques used to solve this problem is the extraction of metal ions by membrane processes from industrial waste. In recent years, the development of functionalized synthetic or natural polymer membranes with good mechanical stability has increased considerably for applications in different extraction and separation membrane processes. The technique of oriented processes through affinity polymer membranes is often adopted for the extraction of rare and value-added metal ions. Different types of affinity polymer membranes have been developed by insertion or grafting of extractive agents such as **TREN**, to extract and recover VO_2^+ ions from acid solutions of industrial leaching in order to remedy the massive consumption of the metal vanadium.

This research was carried out according to the oriented processes of the facilitated extraction of VO_2^+ ions from an acid medium through a polymer membrane functionalized with TREN and developed according to the method of precipitation by immersion. The impact and influence of the TREN agent as well as its concentration on the morphology, porosity, composition and performance of the developed PSU/PVP/TREN membrane were studied. Obtained membrane was characterized by different techniques: FTIR-ATR Spectroscopy, Scanning electron microscopy and Energy-dispersive X-ray spectroscopy. In the present work, the membrane developed and used has good stability and long lifetime for carrying out the processes studied under hard conditions of acidity and temperature. The performance of the elaborated membrane was evaluated by calculating the macroscopic parameters; permeability ***P*** and initial flux J_0. The apparent diffusion of VO_2^+ ions substrate through the organic phase according the formation and dissociation reactions of unstable entity (VO_2^+-TREN) was determined by the evolution of microscopic parameters; apparent diffusion coefficient ***D**** and association constant K_{ass}. In order to justify the results obtained for the studied processes, activation and thermodynamic parameters (energy ***Ea***, enthalpy $\Delta H^{\neq}$, entropy $\Delta S^{\neq}$ and enthalpy ΔH_{th}) were assessed. The evolution analysis of obtained values allows elucidating the kinetic or energetic aspects which control the studied processes mechanics and the performance of the adopted membrane.

Figures:



SEM micrographs of cross-section PSU/PVP/TREN membrane



Facilitated co-transport pathway

Recent Publications

1. I. Touarssi , I. Mourtah , Y. Chaouqi,c , O. Kamal , N. Sefiani , L. Lebrun ,M. Hlaïbi, Journal of Environmental Chemical Engineering, Volume 7, Issue 6, December 2019, 103182.
2. I. Mourtah, I. Touarssi , Y. Chaouqi,c, N. Sefiani , L. Lebrun , M. Hlaïbi ; Membrane oriented processes for elimination and recovery of Cr(VI) and Cr(III) through a grafted polymer membrane ; Materials Today: Proceedings 13 (2019) 1039–1048.
3. Y. Chaouqi, R. Ouchn, I. Touarssi, I. Mourtah, M. El Bouchti, L. Lebrun, O. Cherkaoui, and M. Hlaibi ; Polymer Inclusion Membranes for Selective Extraction and Recovery of Hexavalent Chromium Ions from Mixtures Containing Industrial Blue P3R Dye ; Ind. Eng. Chem. Res. 2019, 58, 18798−18809.

Biography

The author is in the process of defending his thesis at the Hassan II University of Casablanca, Faculty of Sciences Aîn chock. She has expertise in carrier-mediated transport mechanisms and facilitated transport chemistries, including the development of facilitated transport membranes. Her research focuses on the extraction and recovery of heavy metals in chemical effluents and wastewater.

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Experimental study of the notch effect on the HDPE material for V and U notches and for different openings

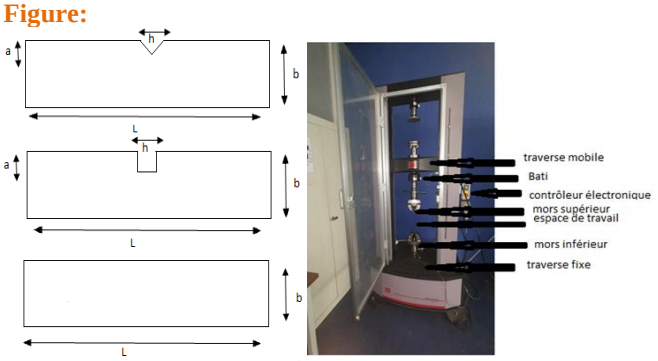
Rabiaa Elkori[1], Abdelilah HACHIM[1, 2], Amal LAAMARTI[1], Khalid EL HAD [1, 2]

[1]*Hassan II University of Casablanca (UH2C), National Higher School of Electricity and Mechanics, Laboratory of Control and Mechanical Characterization of Materials and Structures, CASABLANCA MOROCCO*
[2]*Higher Institute of Maritims Studies, CASABLANCA MOROCCO*

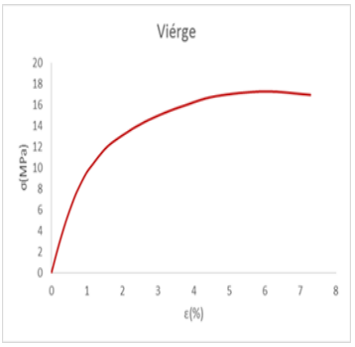
Abstract

'HDPE' high-density polyethylene is one of the most widely used thermoplastic polymers in the world in various industrial fields such as packaging materials (Goblet, bags ...) [Saadi,2016]. The existence of a defect may change the mechanical characteristics of the material. The purpose of this work is to initiate discussion on the mechanical behaviour of the HDPE under tensile test with flat-bottomed U and V defects for 5 and 10 mm openings in order to compare the mechanical behaviour of the material with U and V notches, and at the end we compare the results of all the notches. To perform the tensile tests, the '' MTS Criterion TM Series 40' machine was used at constant strain rate and ambient temperature, the results showed that the ductile behaviour of the HDPE becomes fragile to the presence of defects and that the more flat-bottomed U defects resist compared to the V defects which are easy to break.

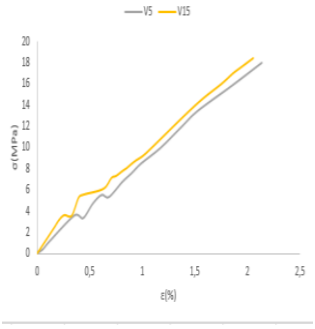
Figure:



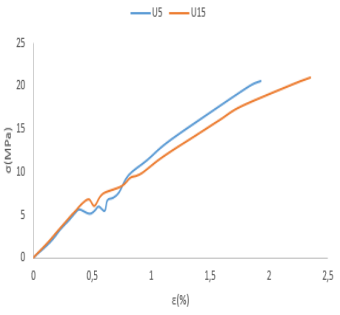
Sample shape and dimensions for testing MTS traction machine used



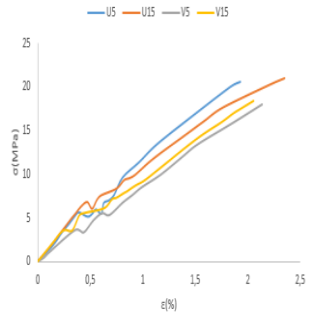
Characterization curve



V defect results for both openings



U defect results for both openings



comparison of results

Recent Publications

1. *SESSI. 2008. The French packaging industry in figures. Paris: Industrial Studies and Statistics Service, 2008*
2. *Lamri.2019. Effects of strain rate and temperature on the mechanical behavior of high-density polyethylene. 1Arts ET Métiers Paris Tech. Paris, 2019.*
3. *Bouaziz.2016. Sécurité des réseaux d'adduction d'eau potable en présence de défaut superficiel sous l'effet du phénomène de coup de bélier. L'Université de Lorraine Et L'École Nationale d'Ingénieurs de Sfax .Tunisie. France, 2016.*

Biography

Rabiaa Elkori student researcher on the study of the semi-crystalline polymer HDPE, my subject is based on the application of several tensile tests on the HDPE, she is preparing her doctorate the national school of electricity and mechanics (uh2c), Morocco.

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Treatment and strengthening of heritage manuscripts by the insertion of natural polymers. Structural and kinetic study

Saâdia Es-Sabbeur[1], J.-D. Massouk[3], I. Menchou[1], A. Chérif[1], L. Lebrun[2], Miloudi Hlaibi[1,2]

[1] *Génie des Matériaux pour Environnement et Valorisation (GeMEV), Faculté des Sciences Aïn Chock, Université Hassan II de Casablanca (UH2C), Casablanca Maroc.*
[2] *Laboratoire Polymères, Biopolymères, Surfaces (PBS), Equipe des membranes, UMR 6522 du CNRS Faculté des Sciences F-76821 Mont Saint Aignan France*
[3] *Laboratoire de Recherche sur les Matériaux Textiles (REMTEX), ESITH Casablanca, Maroc*

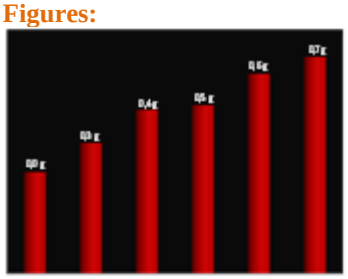
Abstract

Old manuscripts and books are precious and important to the history of mankind because of their diverse content and cultural sources. It is important and necessary to preserve this precious heritage from the history of our ancestors. Over time, the materials making up this historic heritage, including the manuscripts, deteriorate and become vulnerable. There is a great risk of loss and disappearance of heritage sequences and the history of mankind. Therefore It is necessary to develop simple and effective methods for the restoration and preservation of this heritage under good and reliable physical, chemical and biological conditions.

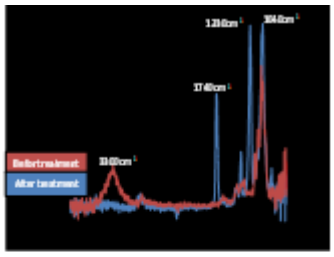
In this work, the objective of the research carried out within the **GeMEV** laboratory, is the development of a new technique based on the reinforcement of the manuscripts and the wooden objects by insertion of cellulosic polymers, in order to restore and store them for a durable preservation with long lifetime. The studies carried out consist in developing experiments relating to the insertion of natural polymers into the sample matrices of various used paper and wooden objects, according to a precise impregnation technique, using appropriate organic solvents. Studies of attraction tests and characterization of composition and morphology by FTIR spectroscopy and SEM microscope are very satisfactory and promising, while kinetic and thermodynamic studies are conclusive. Analysis of the obtained results indicates that the physico-chemical and morphological properties of the treated materials have been modified and improved. Consequently, restoration and conservation of these objects by the insertion of cellulose polymer compounds are possible and achievable objectives, provided that the necessary experimental techniques and the organic solvents suitable for the treatment are used without deterioration of the contents of manuscripts and objects treated and restored.

In fact, for the validation of this method, and the confirmation of qualitative results, kinetic and thermodynamic studies were carried out, in order to know the adsorbed quantity of polymer, the diffusion movement nature of polymer chains through the matrices of the treated materials, the influence of temperature factor on the insertion process, and the adsorption isotherms.

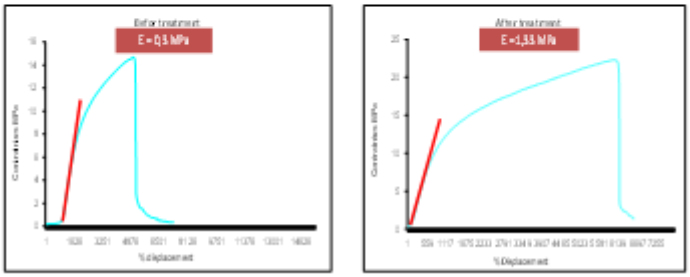
Figures:



Graphs shows the effect of the amount of polymer inserted on the thickness of a cellulosic material



IR spectra relating to a cellulosic material before and after treatment



MY (Module Young) of cellulosic material before and after treatment

Recent Publications

1. *MANNING, Raymond, Gilberte Pérotin et Sven Welander, responsables de la préparation et directeurs de la publication. Guide to the Archives of International Organization. Part. I. The United Nations System. Version préliminaire (PGI-79/WS/7). Paris, 1979. 301 p.*
2. *DAVID, J. C. et MÜLLER-CELKA, S. Le patrimoine Littéraire oraL et Les paradoxes de sa conservation écrite, L'exemple de La Littérature arabe populaire. Patrimoine institutionnel et patrimoine populaire. L'accession au statut patrimonial en Méditerranée orientale, 2010.*
3. *GUIZA, Sami et BAGANE, Mohamed. Étude cinétique de l'adsorption du rouge de Congo sur une bentonite. Revue des sciences de l'eau/Journal of Water Science, 2013, vol. 26, no 1, p. 39-50.*

Biography

- *Doctoral researcher in Chemistry and Valorization at the Faculty of Sciences Ain Chock, GeMEV Laboratory (Materials Engineering for Environment and Valorization).*
- *Holder of a training certificate in processing heritage manuscripts on behalf of BNRM and BUMS.*

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Tunability of band structures in a phononic crystal made of magneto-elastic disc

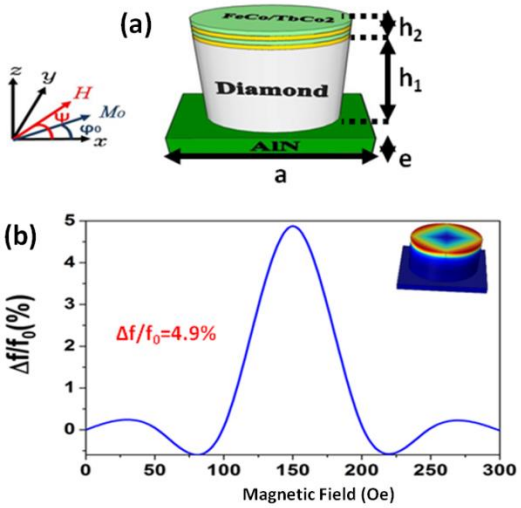
Mohammed Moutaouekkil [1, 2], Abdelkrim Talbi [2], El Houssine El Boudouti [1], Omar Elmazria [3], Bahram Djafari-Rouhani [2], Philippe Pernod [2], Olivier Bou Matar [2]

[1] *LPMR, Département de Physique, Faculté des Sciences, Université Mohamed Premier, 60000 Oujda, Morocco*
[2] *Univ. Lille, Centrale Lille, UVHC, ISEN, LIA LICS/LEMAC- IEMN UMR CNRS 8520, F-59000 Lille, France.*
[3] *Institut Jean Lamour (IJL), UMR 7198, Université de Lorraine - CNRS, Vandœuvre-lès-Nancy, France.*

Abstract

Phononic crystals are based on periodic structures made of two or more materials arranged along one-dimensional (1D), 2D and 3D. These materials are characterized by a strong contrast in their elastic properties and density. The periodicity in the materials introduces band gap frequencies in the dispersion curves where phonons are prohibited from propagation. This property has been exploited to propose these structures as new materials to control the propagation of elastic and acoustic waves. These systems have attracted a considerable attention from science and technology point view [1]. Similarly to photonic crystals, the interest in phononic crystals has been generated by their unique properties such as the formation of band-gaps, near zero group velocity, and anomalous dispersion (negative refraction). These properties make phononic crystals a viable choice for use in vibration and noise reduction applications [2] as well as in the design and implementation of components for Radio Frequency Micro-Electro- Mechanical Systems (RF MEMS) including filters, resonators, and advanced signal processing functions [3]. In this communication, we propose a design based on (TbCo2/FeCo) magneto-elastic materials in order to study sensitivity and detection range for magnetic field sensor application. The system is composed of a pillar deposited on a membrane. The pillar is capped with a magneto-elastic disc. The membrane is made of AlN thin film that has been considered in recent years as a viable technology for the fabrication of radio frequency passive components for use in telecommunication applications. The pillar is made of diamond films according to their excellent mechanical properties, the ability to grow nano-crystalline diamond using low temperature growth process, and to the increasing interest on this material for various sensing applications [4].
Now, we replace the gold by a multilayered composite disc conserving the property cited above for the design of a new kind of waveguide cavity structure that enables a high degree of confinement of elastic waves [5].

Figures: (a) Schematic representation of the unit cell composed of diamond pillar and the multilayered composite disc. (b) Magnetic field sensitivity for the breathing mode



Recent Publications

1. *Dobrzynski L., El Boudouti E. H., Akjouj A., Pennec Y., Al-Wahsh H., Leveque G., Djafari-Rouhani B., Phononics, Elsevier (2017).*
2. *Khelif A., Choujaa A., Benchabane S., Djafari-Rouhani B., Laude V., Z. Kristallogr. 220, (2005) 836*
3. *Jin Y., Pennec Y., Pan Y. and Djafari-Rouhani B., J. Phys. D: Appl. Phys. 50, (2016) 035301.*
4. *Talbi A. , Soltani A. , Rumeau A. , Taylor A., Drbohlavova L. , Klimsa L., Kopecek J., Fekete L., Krecmarova M. , Mortet V., Phys. Stat. Solidi A 212, (2015) 2606.*
5. *Moutaouekkil M., Talbi A., El Boudouti E. H., Elmazria O., Djafari-Rouhani B., Pernod P., Bou Matar O., J. Appl. Phys. 126, (2019) 055101.*

Biography

Mohammed Moutaouekkil received the PhD degree from the University Mohammed I of Oujda (Morocco) and the Ecole Centrale Lille (France). He joined Institut Jean Lamour (IJL) in Nancy, France as a post-doc, where he worked on thin films for SAW acoustic wave devices. He has gained great experience in numerical simulation in several domains of phononic crystals for applications as biosensors and magnetic sensors.

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Relationship between structure and properties of sodium alginate microbeads foreseeing the protection and release of polyphenolic compound

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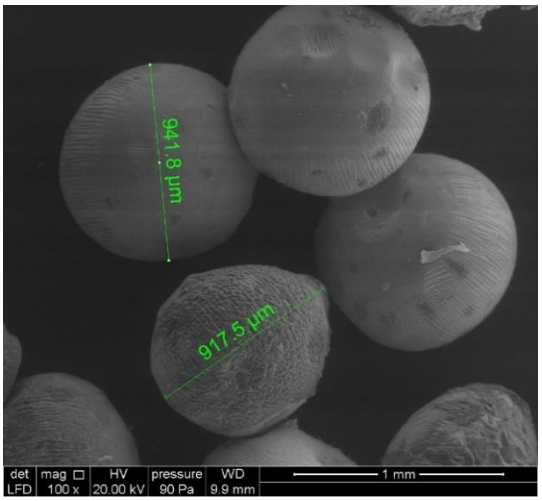
Abstract

Research and the application of polyphenols, have recently attracted great interest in the functional foods, nutraceutical and pharmaceutical industries, due to their several biochemical and physiological properties and potential health benefits to humans. However, the effectiveness of polyphenols depends on preserving the stability, bioactivity and bioavailability of the active ingredients. The unpleasant taste of most phenolic compounds also limits their application. The utilization of encapsulated polyphenols, instead of free compounds, can effectively alleviate these deficiencies. The technology of encapsulation of polyphenols by calcium alginate (CA) microparticles, including the ionotropic gelation, is discussed in this study. In addition, the mechanical properties of individual microgels by the micromanipulation technique and the release kinetics of polyphenolic compound such as gallic acid are also realized.

Acknowledgement

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

Figures: *SEM photographs of calcium alginate microbeads*



Recent Publications

1. ***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)*
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4. M. ELMIZ, **K. ESSIFI**, D. BERRAAOUAN, S. SALHI AND A. TAHANI. Mediterranean Journal of Chemistry 2019, 8(6), 494-504.
5. M. ELMIZ, **K. ESSIFI**, S. SALHI F. BERGAYA FAIZA AND A. TAHANI. Moroccan Journal of Chemistry, 7 N°2 (2019) 242-253.

Biography

Kamal Essifi is a PhD student at faculty of Sciences, Mohammed 1st University, Oujda. Kamal does research in microencapsulation by the biopolymers. Their current project is "Microcapsules of Hydrogels of Natural Substances: Relationship Structure Properties and Applications".

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Behavior study of backstepping speed control of a switched reluctance machine when faults appear

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Abstract

Improving the behavior of speed control in electric vehicles is currently a major challenge for researchers and engineers. The objective of this simulation is to show the behavior of a backstepping type speed regulator of a switched reluctance motor (SRM) used in hybrid Extended Range Electric Vehicle (EREV).

This original paper describes the behavior of backstepping 6/4 SRM control strategy when a fault appears, we will focus on the time and frequency behavior of:

- the total torque setpoint (T^*),
- the three control currents (i_{123}^*) of the backstepping phasic current regulators.

We will therefore prove the interest represented by the behavior of these control quantities in terms of signatures that can be used to make a real-time diagnosis of SRM faults.

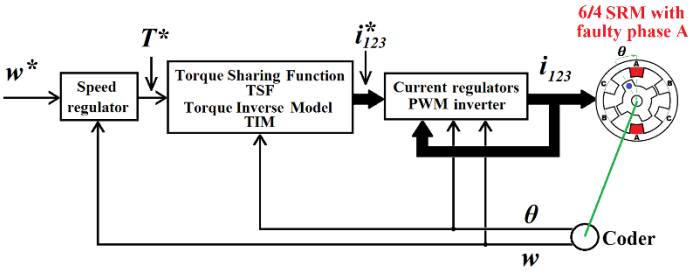
We claim to be able to contribute in these three axes:

- original method for choosing the order of Legendre polynomials used to describe the nonlinear behavior of SRM,
- original torque inverse model TIM,
- original use of reference currents as fault indicators.

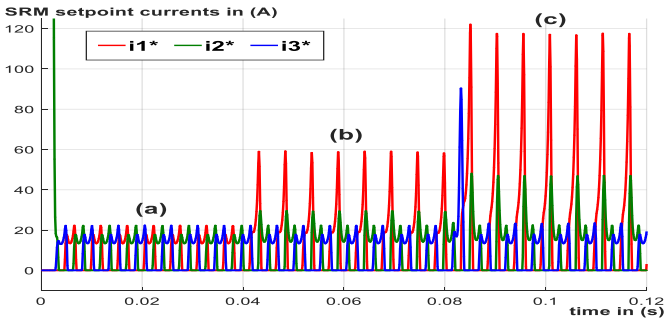
The simulation results show an imbalance in the three setpoints of the current loop. The setpoint current of the faulty phase increases with the severity of the partial short circuit in internal winding of this phase. This short circuit is given in percent of the total turns.

Our goal is to show the possibilities offered by the backstepping control in terms of fault tolerance, speed tracking and torque ripple's minimizing of a 60kW 6/4 SRM around a set speed (w^*) of 300rd/s.

Figures:



Block diagram of the backstepping command
(w^*, T^* and i_{123}^* are the set values of the different loops)



Behavior of the three control currents during faults in phase A (a) Healthy case, (b) 34% and (c) 66% of faulty cases

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Biography

Author is a PHD student in Mohamed 1st university, Oujda, Morocco. He is particularly interested in the control of rotating machines especially switched reluctance motors and induction motors. He received his Master's degree in electrical engineering from the ENSET engineering school of Mohammed 5 university, Rabat.

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Earth's construction and stabilization techniques - A review

Chaimaa Khalil[1], Mohamed Barbachi[1]

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Abstract

For millennia, Earth material has been used for construction in all over the world, e.g., in Europe (France, Spain, Portugal, and Italy, etc.), the Maghreb region (Morocco, Algeria, etc), Central and South America (Mexico, Peru, Brazil,.etc) and Asia [1].

It is accessible in various forms, in nearly all climates to almost all civilizations around the world where unique construction methods have been developed from cob wall, wattle and daub to modern rammed earth building technologies [2]. Among the earth's cultural monuments inscribed in the UNESCO World Heritage list, the Great Wall of China was erected 2000 years, and whose sections were built with rammed earth, the famous Alhambra Palace in Spain built in the 10th century constructed from rammed earth [1]. The Moroccan valleys of the Draa and Dades are filled with hundreds of rammed earth Ksars, such as Ait Ben Haddou (See Fig.) and Tamnougalt, the oldest is about 1000 AD [3]. Another iconic example is the Manhattan of the desert of Shibam city in Yemen built over 1500 years ago with local earthen materials, all unstabilized and using the procedures of adobe, cob and rammed earth with earth buildings up to 10 floors [4].

Earth material is one of the foremost attractive options because it is affordable, available, and can be extracted directly on the construction site and then transformed into construction material with low manufacturing energy. Furthermore, the earth is recyclable, inexhaustible, and, when properly manufactured, provides high resistance, excellent hygro-thermal properties, and low embodied energy at economical costs [5]. Despite these many advantages, the earth is less resilient to damage than conventional walling materials, such as concrete masonry units and fired brick materials, which seem not to be adapted to all environmental and social contexts. However, raw earth construction techniques are still evolving today, thanks to different stabilization processes. Several studies have been conducted on earth stabilization through chemical, physical, and mechanical processes to improve the mechanical behavior and durability of raw earth materials.

This paper presents an overview of the earth construction techniques used around the world, their advantages and limitations, as well as the different stabilization methods used.

Figures: Ksar of Ait-Ben-Haddou, Morocco [6]

Recent Publications

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Biography

Chaimaa Khalil is a Ph.D. student at the National School of Applied Sciences, Ibn Zohr University, Morocco. She received her M.Sc.in management and valorization of georessources in 2019 at Faculty of Sciences Ain Chock, Hassan II University, Morocco. Her research activities focus on traditional and modern earth's construction techniques, the earth's building rehabilitation and conservation, as well as on the different earth's stabilization methods.

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Comprehensive assessment of corrosion inhibition of mild steel in 1 M HCl medium by a novel spirocyclopropane compound: Outlooks from experimental and computational studies

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[3]*Department of Chemistry, Manipal Institute of Technology, Manipal University, Manipal 576104, India*

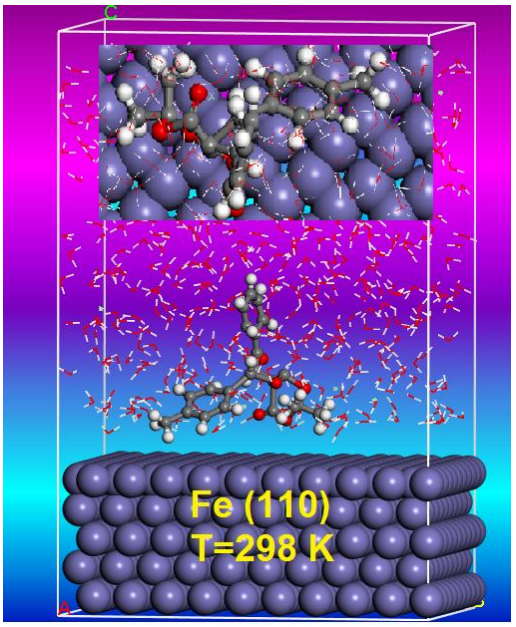
Abstract

The corrosion inhibition performances of a novel spirocyclopropane compounds namely, 1-benzoyl-6,6-dimethyl-2-(p-tolyl)-5,7-dioxaspiro[2.5]octane-4,8-dione (Spir-Me) as potential corrosion inhibitor of mild steel in 1 M HCl medium has been evaluated by using various techniques such as electrochemical measurement techniques, gravimetric and quantum chemical studies. The experimental results revealed that the hydrazide derivatives exhibited the highest inhibition performances and they increase with increasing the concentration of inhibitors. The potentiodynamic polarization (PDP) curves indicate that the studied compound act as mixed-type corrosion inhibitors. Electrochemical impedance spectroscopy (EIS) data showed that the studied inhibitor make a positive impact on the mild steel corrosion process by increasing the polarization resistance which leads to forming a thin protective film on the metal surface. In addition, scanning electron microscopy (SEM) analysis strongly confirmed the electrochemical findings. Furthermore, the adsorption of these inhibitors on mild steel surface responds significantly to the Langmuir isotherm model. More so, the corrosion inhibition behavior and interaction mechanism of hydrazide molecules were also investigated theoretically by density functional theory (DFT) computations, molecular dynamics (MD) simulations and radial distribution function (RDF). It can be noted that the insights of theoretical approach supported all the experimental results by demonstrating the successful interfacial adsorption of spirocyclopropane derivative on steel surface. These results and more will be shown and explained in detail during the ICMES.

Keywords: Corrosion inhibition; spirocyclopropane; DFT; RDF; MD simulation

6. .

Figures:



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4. *A. Chaouiki, H. Lgaz, R. Salghi, M. Chafiq, H. Oudda, K. Bhat, I. Cretescu, I. Ali, R. Marzouki, I. Chung, Colloids Surf. Physicochem. Eng. Asp., 588 (2020) 124366.*
5. *F N. Kovačević, A. Kokalj, Corros. Sci., 53 (2011) 909–921.*

Biography

Author has her expertise in corrosion science, especially the corrosion of metals, alloys, and their inhibition in acidic medium using organic compounds and plant extracts. Her focus is based on corrosion inhibition by using chemical, electrochemical techniques and quantum chemical calculations (DFT, MDS & other semiempirical methods). He participated in national and international scientific congresses, (Morocco, Romania, Moldova, Lebanon, Jordan). He had the opportunity to work as an invited researcher at the Institute of Applied Physics of the Moldavian Academy of Sciences, and also at the Faculty of Chemical Engineering and Environmental Protection of Iasi, ROMANIA. He was warded her PhD in 2020 from Ibn Tofail University, Morocco. He published more than 25 papers. His H-index is 5 on Scopus.

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Evaluation of extract of OBSO as green inhibitors for aluminium alloy 2024 - T3 corrosion in 3%NaCl media

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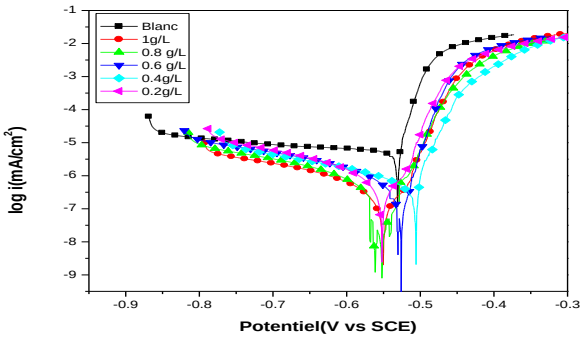
[1]Engineering Laboratory of Organometallic, Molecular Materials, and environment, Faculty of Sciences, University sidi Mohamed Ben Abdellah, Fez, Morocco
[2] Laboratory Materials, Electrochemistry and Environment ([LMEE), Faculty of Sciences, University Ibn Tofail, B.P. 133, Kénitra, Maroc.

Abstract

The plant extracts or various plant parts are used for the protection of metals in the aggressive environment, due the plant extracts are very rich in active phytochemical compounds, for this, we have studied the inhibition effect of extract (OBSO) on the aluminum alloy 2024-T3 in a 3% NaCl solution was examined using the methods, weight loss, potentiodynamic polarization (Tafel), and electrochemical impedance spectroscopy (EIS). The effect of concentration, temperature and immersion time on the corrosion behavior of the AA2024-T3 alloy in 3% NaCl with the addition of extract (OBSO). The experimental results showed that the effectiveness of corrosion inhibition increases with the increase in the concentration of extract (OBSO) up to 99 %(weight loss), 88.72 %(Tafel), 95.50 %(SIE) at a concentration of 1 g/L of extract. However, the effectiveness of extract inhibition decreases with temperature increase. Potentiodynamic polarization results showed that (OBSO) perform as mixed-type inhibitor with a cathodic nature.

Figures: Potentiodynamic polarization curve for the corrosion of AA2024-T3 in 3%NaCl solution in the absence and in the presence inhibitor at different concentrations, at room temperature



Biography

Fernine yasmine has her expertise is the synthesis of new organic compounds and their application as corrosion inhibitors using various techniques beside the theoretical study. She was a PhD student in first year from the University Sidi Mohamed Ben Abdellah, Fez, Morocco.

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The study of the interactions between sodium alginate and sodium montmorillonite

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Abstract

The interactions between polymers such polysaccharides and clay can be controlled by different factors, such as the functional group of the sugar, pH and salinity of the suspension [1,2]. This study was conducted to understand the various kinds of interactions between sodium Alginate (polyanion negatively charged) and sodium montmorillonite. The adsorption isotherms of alginate onto montmorillonite at neutral and acidic pH show two different modes; a negative adsorption at pH = 7 (fig a.1), diversely at acidic medium, the amount of sodium alginate adsorbed by the sodium montmorillonite increase as the initial concentration of the polymer increase (fig 1.b). XRD analysis was used to develop an overview about the interactions between the polyanion and the clay. The results (fig 2) show that the interlayer distance exhibit slow increase from 12.74 A° in sodium montmorillonite to 13.78 A° in modified montmorillonite at pH=2. However, the interaction at neutral pH shows no effect on the interlayer distance. These results could be explained by the effect that at neutral pH, the negative adsorption is related to the repulsion between the negative charge of the clay surface and the carboxylic group of sodium alginate.

The protonation of carboxylic groups at acidic pH, lead to reducing the negative charge of the polymeric chain that can be adsorbed. The adsorption occurs on the external surface of the clay layers without intercalation in interlayer of the clay. the small displacement and widening of the 001 line is due to the aggregation of the clay particles by adsorption of few polymeric chains on external surface.

Figures:

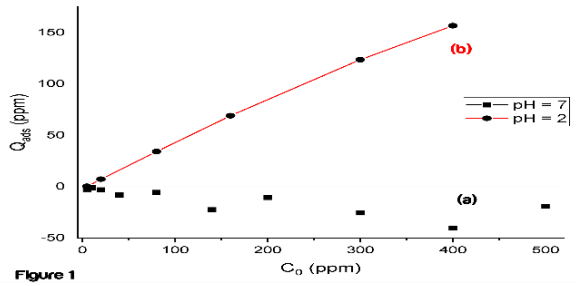

Figure 1

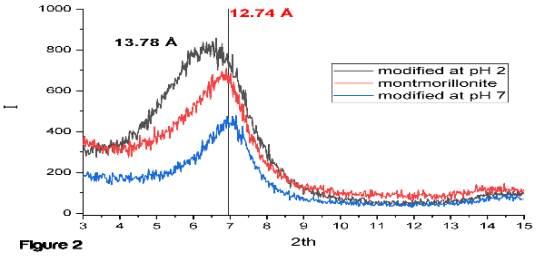

Figure 2

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2. J. Tarchitzky, Y. Chen, Soil Sci. 167 (2002) 791.

Acknowledgment

The authors are sincerely thankful to MESRSFC, CNRST-Morocco and UMP for financial support of Project PPR 15-17 and PARA1-2019

Biography

Mohamed Brahmi a PhD student at faculty of Sciences Oujda of Mohammed 1st University, Mohamed run research about the interactions between polymers and clay, his current project is "Elaboration of polymer or hydrogels composites and their applications".

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A theoretical bay DFT and molecular dynamics, and experimental comparative study of the inhibition of the corrosion of steel Carbone in HCl bay using of new molecule derived bay Quinoline

[1]H. fakhry, M. El Faydy[2], A. Zarrouk[3], A. Aouniti[3], B. Lakhrissi, [2] B. Hammouti[3] , H. Oudda[1]

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[1]Laboratoire des Matériaux, Nanotechnologies et Environnement Université Mohammed V- Agdal Faculté des Sciences BP 1014, Avenue Ibn Battouta-Rabat (Maroc)
[2]Laboratoire d'agro ressource et génie des procédés LAGP, qui a synthétisé le composés organique, Faculté des Sciences de Kenitra. Université Ibn Tofail, BP 242, 14000 Kénitra, Morocco.
[3]LCAE-URAC 18, Faculté des sciences, Université Mohamed Premier, BP 717-60000, Oujda, Morocco.

Abstract

In present work is made by two molecules (P1 and P2) derived from Quinoline in 1.0 M HCl using, electrochemical impedance spectroscopy and. From electrochemical impedance measurements it is observed that inhibition efficiency increases with concentration of this molecule and maximum efficiency reached is 94% at 10^{-3} M, and the other product noted P2, the efficiency reaches the maximum value 95,8% at 10^{-3} M. potentiodynamic polarization. The potentiodynamic study reveals these two molecules is a mixed type inhibitor with predominate cathodic action by blocking the active site of the metal. EIS plot indicates that the addition of inhibitor increases the charge transfer resistance and decreases the double-layer capacitance Cdl of the corrosion process **[1]**. The adsorption process follows Langmuir isotherm via chemical adsorption. The results obtained from the different methods are in good agreement. Arrhenius law and its transition equation lead to estimate the thermodynamic parameters and to conclude that adsorption is predominantly chemisorption, exothermic and support the mechanism of chemical adsorption of the corrosion process **[2]**. Quantum chemical calculations were carried out to investigate the corrosion-inhibiting property of this inhibitor.The theoretical calculation was investigated using the Density Functional Theory (DFT), and Molecular dynamics (MD) simulations were run using a software package such as Materials Studio 2016 **[3-4]**.

The calculated quantum chemical parameters are the highest occupied molecular orbital energy (EHOMO), lowest unoccupied molecular orbital energy (ELUMO), energy gap (ΔE), dipole moment (μ), electronegativity (χ), electron affinity (EA), global hardness (η), softness (S), ionization potential (IP), fraction of electrons transferred (ΔN), global electrophilicity (ω) and total energy. The results obtained from weight loss, electrochemical methods and theoretical calculation are in good agreement.

Figures:

Recent Publications

1. M. Rbaa, F. Benhiba, I.B. Obot, H. Oudda, I. Warad, B. Lakhrissi, A. Zarrouk , Two new 8-hydroxyquinoline derivatives as an efficient corrosion inhibitors for mild steel in hydrochloric acid: Synthesis, electrochemical, surface morphological, UV– visible and theoretical studies, Journal of Molecular Liquids, 276 (2019) 120 –133
2. Z. Rouifi , F. Benhiba, M. El Faydy , T. Laabaissi , H. About , H. Oudda , I. Warad , A. Guenbour , B. Lakhrissi , A. Zarrouk , Performance and computational studies of new soluble triazole as corrosion inhibitor for carbon steel in HCl, Chemical Data Collections, 22(2019) 100242.
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4. H. Sun, COMPASS: An ab Initio Force-Field Optimized for Condensed-Phase ApplicationsOverview with
5. Details on Alkane and Benzene Compounds, J. Phys. Chem. B, 102 (1998) 7338-7364.

Biography

PhD student at Ibn Tofail University. We are working on the study of the inhibition performance of the newly synthesized quinoline on carbon steel corrosion in hydrochloric acid, by the electrochemical techniques such as, electrochemical impedance spectroscopy, potentiodynamic polarization and Quantum chemical calculations.

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Performance analysis of twin tunnels lining under seismic loading

Abdelhay El Omari[1], Mimoun Chourak[1], Carlos Navarro Ugena[2], Seif-Eddine Cherif [3], Echebba El Mehdi[4] & Aboubakr Chaaraoui[5]

[1] *Mechanics and applied mathematics department, Industrial and Seismic Engineering research team ,National School of Applied Sciences of Oujda ,Mohammed First University, Morocco.*
[2] *Continuum Mechanics and Structural Analysis department, Carlos III University of Madrid ,Spain.*
[3] *Laboratoire de Géoressources, Géo-environement et Génie Civil (LGGG), Faculty of Sciences and Technologies of Marrakesh, Cadi Ayyad University, Morocco.*
[4] *LGCE, Ecole supérieure de technologie de Salé, Mohammed V University , Morocco.*
[5]*Laboratoire de Géosciences Appliquée , Faculty of Sciences of Oujda, Mohammed First University, Morocco.*

Abstract

The last seismic events have shown that tunnels lining may suffer extensive damage. The numerical modeling has a great importance for predicting and assessing their seismic performance. This work examines the tunnel lining of the ZAM (Zaouit Ait Mellal) twin tunnels located between the cities of Marrakesh and Agadir in Morocco. Dynamic analyses have been carried out using a two-dimensional finite-difference element model provided by FLAC 2D software in four soil cross-sections with different Rock reinforcement devices installed along the twin tunnels. Seismic signals obtained from three different earthquakes Al Hoceima 2004 in Morocco, EL Centro 1940 in USA, and Kobe 1995 in Japan have been adopted as input. The numerical results show that the tunnel lining in the soil cross-sections based on steel ribs presents a vulnerability compared to the ones based on Rock bolts during an earthquake. The comparison of the maximum displacement, shear force and bending moment on the tunnel lining in percentage terms allows us to predict its performance following an important range of earthquake scenarios.

Keyword: Tunnel lining, rock reinforcement, finite-difference element, soil cross-sections, seismic performance

Figures:

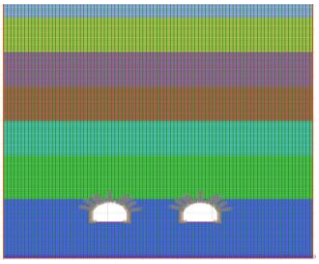

Figure 1: Constitutive model of cross section 1

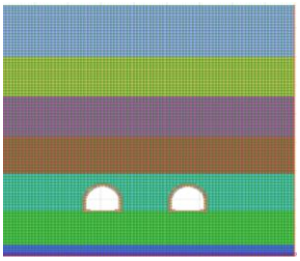

Figure 2 : Constitutive model of cross section 2

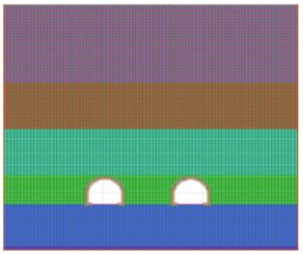

Figure 3: Constitutive model of cross section 3

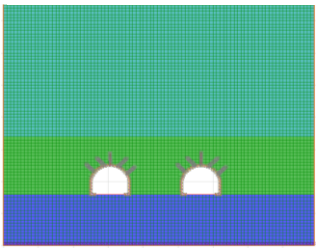

Figure 4: Constitutive model of cross section 4

Recent Publications

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3. *Chen LS and Gui GM .2011. Seismic performance of tunnel lining of side-by-side and vertically stacked twin-tunnels J. Cent. South Univ. Technol. (2011) 18: 1226−1234.*

Biography

The author is interested in research on Geotechnical problems, specifically the seismic behavior for bridge and tunnel cases. He starts his Ph D studies in 2017 within the research team Industrial Engineering and Seismic Engineering at the National School of Applied Sciences of Oujda, Mohammed first University ,Morocco. He published an article and contributed to several.

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The environmental Kuznets curve and the role of Fossil Fuel Energy Consumption to Environment quality in Morocco: Cointegration and Causality Analysis

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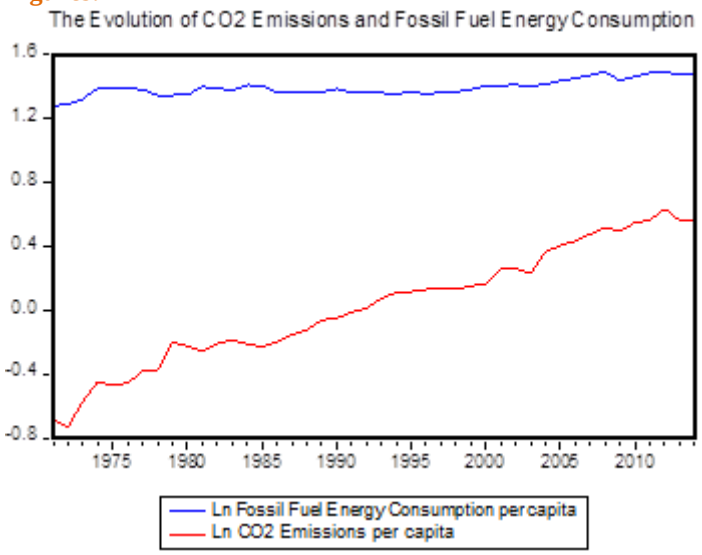
Abstract

This study investigate the dynamic relationship between Fossil Fuel energy consumption and CO2 emissions in the case of Morocco during the period of 1971-2014. Compared to previous studies, this paper uses different unit root tests with and without breaks in order to specify the order of integration of the variables. The cointegration relationship was performed using the ARDL approach. The results confirm the existence of cointegration for long run between fossil fuel energy consumption and CO2 emissions. Moreover, our empirical exercise indicates the presence of environmental Kuznets curve (EKC) in long run as well as in short run. The causality analysis reports the unidirectional hypothesis between fossil fuel consumption, economic growth and CO2 emissions.

Figures:



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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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Evolution of biometric parameters and oil fatty acid composition of « Argania spinosa L. Skeels » fruits from Beni-Snassen (Eastern Region of Morocco) during ripening

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Abstract

The aim of this study was to asses the evolution of biometric parameters and fatty acids composition of the argan fruits from Beni-Snassen region during ripening. Thus, according to the evolution of their fruit's ripeness, the studied argan tree could be classified into two major groups, namely: early-riped trees with oval or oval-apiculate fruits and late-riped trees with fusiform or spherical fruits. When considering the fruits size and weight, the highest values were recorded on late-ripened fruits, more particularly fusiform shapes. Regarding the evolution of the fatty acid composition during fruit ripening, the obtained results showed, on one hand, a significant difference in the unsaturated fatty acids, according to the fruit ripeness stage and shapes, being the later significantly affecting the stearic acid content; and on another hand, it was noted an increase of oleic acid content while linoleic acid decreased. In the maturation stage, the spherical shaped fruits were found to have the highest ratio of unsaturated to saturated fatty acids.

Furthermore, the results demonstrated the possibility to predict the kernel's weight from the fruit's length and that the biometric parameters are important criteria for the differentiation of argan tree fruits. However, these parameters are weakly correlated to the proportions of oleic and linoleic acids.

Keywords: Argan fruits, biometeric parameters, fatty acid, ripeness, Beni-Snassen

Figures: Different shapes of argan fruit of Beni-Snassen

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Biography

Author is a research professor at the Pharmacognosy laboratory (Faculty of Medicine & Pharmacy-Rabat). His focus is based on the conservation of plant biodiversity & the use of aromatic and medicinal plants in health and agronomy fields.
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Evaluation and modeling of nutritional loss indicators of clementine juice stored under light conditions

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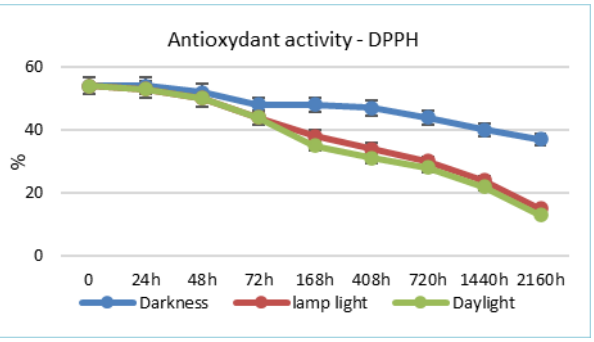
Abstract

Orange juice holds the leading position among juices in global consumption. The nutrient quality of orange juice is mainly related to its polyphenols content, vitamin C content and antioxidant properties. The degradation of bioactive compounds might be a critical factor for fruit juice quality. Therefore, the overall objective of this investigation is to assess the effect of light (daylight, lamp light and darkness condition) on the physicochemical and nutritional quality of orange juice during storage for 90 days at 4°C. Thus, physicochemical parameters (pH, total titratable acidity, total soluble solids, colour), bioactive compounds (total polyphenols, total flavonoids, total sugar, vitamin C) and total antioxidant capacity modifications were evaluated during storage time. Results showed that vitamin C, sugar content, total polyphenols, total flavonoids, colour (L*a*b* values) and antioxidant capacity followed a first-order reaction kinetics. Juice nutritional stability was better at darkness storage conditions compared to light storage conditions (lamp and daylight). The interaction of time-light-food matrix factor had a significant effect on vitamin C and antioxidant capacity.
Considerable alterations were observed in bioactive parameters during storage of under lamp light and daylight compared to darkness condition. Vitamin C, sugar content and polyphenols were almost entirely degraded through the entire storage period. It can be concluded that storage time and light are determined factors in the preservation of clementine juice quality.

Figures: Effect of storage conditions on antioxidant activity of clementine juice



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Biography

Dr. Elfazazi Kaoutar is an engineer in food science and technology from Hassan II Agronomic and Veterinary Institute (IAV). She holds a PhD degree in hygiene and food microbiology from Sultane Moulay Slimane University, Faculty of science and technics (FST) of Beni Mellal. As a scientific researcher at National Institute for Agricultural Research (INRA), Regional Centre for Agricultural Research in Beni Mellal, Dr. Elfazazi has an expertise in the evaluation of food quality by combining morphological, chemical instrumental measurements with a sensory evaluation. She also has an expertise in formulation technics and creation of new agri-food products. She published more than 10 papers. She has been part of national and international projects (CNRST project, PRIMA project, etc.).

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Taxonomic diversity and ethnobotanical-ethnopharmacological characteristics of the Lamiaceae family in the Fez-Meknes region

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Abstract

By the richness and diversity of Moroccan flora. This country constitutes a veritable plant and genetic reservoir, which allows it to occupy a privileged place among Mediterranean countries that have a long medical tradition and traditional know-how based on medicinal plants. However, the Moroccan medicinal flora remains unknown until today. In this sense floristic, ethnobotanical studies have been carried out in different regions of Morocco and have focused on a return of populations to the traditional use of medicinal plants. Our ethnobotanical, ethnopharmacological survey of herbalists in the Fez-Meknes region is the first effort performed to gather more information about Moroccan medicinal plants and their use, to enhance them and to safeguard some of the knowledge acquired by herbalists. The ethnobotanical, ethnopharmacological uses of Lamiaceae (the most cited family and used in the study region) were mentioned and supplemented by new data collected through semi-structured interviews in different prefectures and provinces of the regionFès-Meknes.*Salvia officinalis, Lavandula dentata, Rosmarinus officinalis, Origanum vulgare, Origanummajorana, Marrubium vulgare and Ocimumbasilicum*were the most plants used in the study area. Lamiaceae are the wide traditionally used as medicinal plants (80%), as food (14%), as domestic/cosmetic (4%) and as veterinarians (2%). Leaves and flowering luminaries are mainly used, especially in decoction or infusion, followed by chewing to mainly treat ailments or symptoms of the digestive system. Also, fumigation is considered important for the treatment of diseases of the respiratory system.

Keywords: Ethnobotanical-Ethnopharmacological Survey, Traditional Medicine, Medicinal Aromatic Plants, Lamiaceae, Fez-Meknes Region.

Figures:

Bibliography ⇨ Choice of region ⇨ Preparation of questionnaires ⇨ Several field trips ⇨ surveys Ethnobotanical⇨ surveys Pharmacological ⇨ Recovery of information ⇨ results (inventory on Pam used in the region)

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Biography

Ghada Beniaich is an administrator at the provincial direction of national education of Fez. she has her expertise Valorization of aromatic medicinal plants, her focus is the use of AMP in the chemical, pharmaceutical and cosmetic fields. she's registered for a PhD in 2018 in the University USMBA of fez, Morocco, and she's in the process of writing two scientific articles .

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Occurrence and fate of micropollutants during sludge treatment

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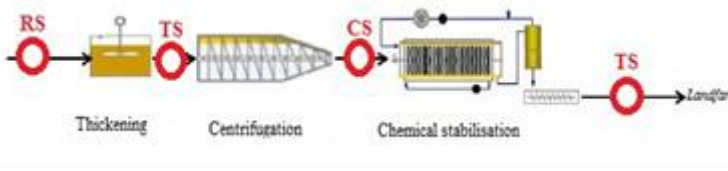
Abstract

The contamination of wastewater by numerous organic or metallic micropollutants has been highlighted over the last twenty years or so. More recently, this observation has led the scientific community to question the levels of contamination of sewage sludge from wastewater treatment plants (WWTPs) by numerous micropollutants, the fate of these compounds within the WWTP treatment processes, but also their fate in the receiving environments. However, there are far fewer studies of micropollutant contamination of wastewater sludge than in the water queue. This is partly due to the very high complexity of the sludge matrices, which have long posed significant analytical difficulties. The purpose of this study is to generate data on the contamination of various types of sludge and to evaluate their fate during different sludge treatment processes. To achieve this, a wide range of pollutants, 46 micropollutants, including heavy metals, polycyclic aromatic hydrocarbons, and polychlorinated biphenyls, are considered. Considering the quality of the treated sludge, we find similar micropollutant profiles for the different sludges studied (in mg / kg of dry matter). A total of 30 compounds were identified in the treated sludge. Some components are present in all types of sludge, while others are never detected. The excess sludge is the highest contaminated sludge, resulting from the concentration phenomenon during the different treatments. As far as treatment is concerned, liming does not generally have a significant effect on contamination of the sludge for metals and organic compounds, even though a slight removal seems possible with centrifugation for a variety of compounds. There are three behaviors that can be identified: no removal, and removal of dry matter, and higher removal. Therefore, this allows a net elimination of micropollutants that could possibly be improved significantly by increasing the elimination through modifications of the operational parameters (retention time, temperature, pre-treatment, etc.).

Figures:



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Biography

Yahya EL HAMMOUDANI is a third year PhD student in water and environment chemistry, from National School of Applied Sciences of Al-Hoceima, University of Abdelmalek Essaadi. His doctoral research investigates the occurrence, fate, and removal of organic and inorganic micropollutants in wastewater and during treatment steps. He published one full paper, and two short papers.

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What effects does an organic amendment to olive waste have on the soil?

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Abstract

Intensive agriculture or phenomena such as pollution, compaction and erosion lead to a decrease in the organic matter content of soils, thus causing a decrease in soil fertility. The use of an organic amendment in agriculture could combat soil degradation. In this sense, two organic amendments with spent olives (SO) and vegetable water (VW) have been manufactured within the framework of a project financed by the Ministry of the Environment.

The objective of this work is to examine capacity of these amendments to improve soil quality in comparison with manure (M) and NPK fertilizer (F). Three types of soil were tested: the first, never amended (S1), the second has been amended for two years with a compost of similar composition (S2), and the third corresponds to an agricultural soil that is amended with a chemical fertilizer (S3). All the trials were carried out on two vegetable gardens: potato and radish. The soils were characterized by measuring physicochemical parameters before and after cultivation. After cultivation, the capacity of composts to enrich the soil with nutrients is similar to that of fertilizer and better than that of manure for any crop. This had a positive effect on the morphological and production vegetative growth parameters studied.

In conclusion, the contribution of compost to olive waste as an organic soil improver has had an effect not only on the improvement of soil structure but also on the quality and yield of the vegetation. Consequently, this product could be an alternative to chemical fertilizers and considered as a perennial solution adapted to the context of sustainable development to the recovery of olive waste.

Keywords: Soil, organic amendment, olive waste, quality, physicochemical characterization, fertility.

Biography

Imane Mehdaoui. She was born in September 1991 in Fez, Morocco, where she completed her primary, secondary and university education. The latter were capped respectively by obtaining a Bachelor's in chemical analysis techniques and quality control at the Faculty of Sciences and Technologies of Fez in 2013 and a Master's degree in analytical chemistry and environmental technology at the Faculty of Sciences Dhar El Mahraz of Fez in 2016. Currently, she is pursuing for her Ph.D. degree subtopic "Valorization of olive waste pasta by composting" in Engineering Laboratory of Organometallic, Molecular and Environmental Materials at Sidi Mohammed Ben Abdellah University, Faculty of Sciences Dhar El Mahraz, Fez, Morocco.

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Ecofriendly procedure for the synthesis of 4-(Phenylamino)pent-3-en-2-one using an heterogenous catalyst - $ZnCl_2$/Natural Phosphate

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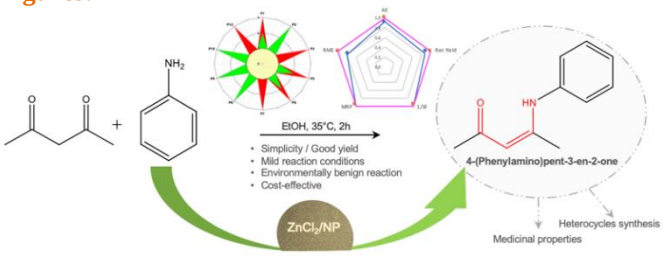
Abstract

A new environmentally friendly synthesis of 4-(Phenylamino)pent-3-en-2-one has been developed by condensing aniline with acetylacetone using $ZnCl_2$ supported on natural phosphate. The effect of catalyst nature and mass, solvents, reaction time, and temperature on the yield were conducted. The results showed that the condensation reaction was carried out efficiently during 2h at 35°C in ethanol. The catalyst could be reused during three cycles without a significant loss in its activity.

To investigate the environmental performance of this synthesis, a set of green chemistry metrics has been determined such as atom economy (AE), reaction mass efficiency (RME), stoichiometric factor (SF), and material recovery parameter (MRP). At the same time, we considered the Green Star Metric including simultaneously all of the principles of green chemistry. It appeared from the results that the environmental performance of this process has been significantly improved when recycling catalyst and solvent, however, the use of less hazardous reagents us well us a renewable raw material is highly recommended to improve the safety of the developed synthesis.

Figures:



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Biography

Laila LAASRI is a Professor at the Chemistry Department of the Faculty of Sciences Ben M'Sick, Hassan II University of Casablanca. Her research interests include the introduction of green organic chemistry in a laboratory describing the environmentally benign preparation of high added value products while enhancing natural phosphate as an efficient heterogeneous catalyst and a very abundant Moroccan natural resource. She was awarded her Ph.D. in Environmental chemistry in 2007 from the University of Hassan II of Casablanca, Morocco.

The author holds two patents related to the valuation of Moroccan natural resources. She published a dozen articles.

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In vitro probiotic effect of lactobacillus against potato late blight Phytophtora infestans

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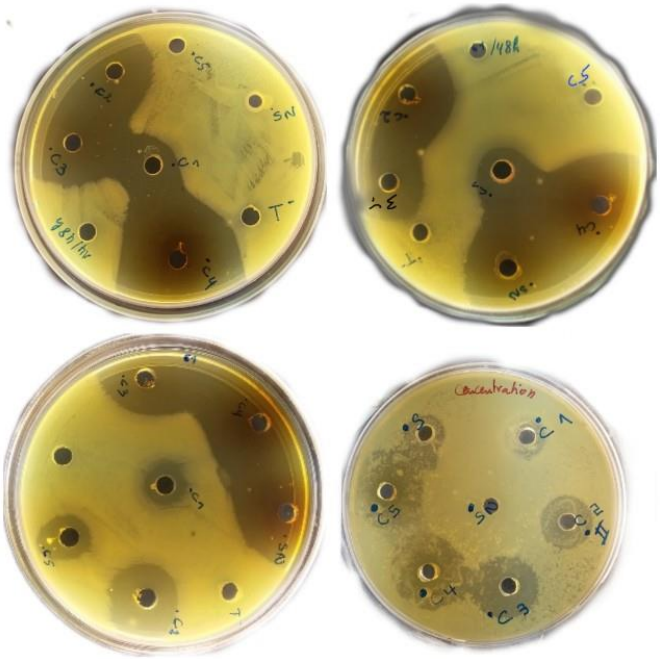
Abstract

Potato late blight *Phytophthora infestans* is a dreaded potato disease where it occurs, the disease causes serious phytosanitary problems to the crop all over the world and precisely in Morocco. The probiotic effect was carried out by eight strains of lactic acid bacteria (S14, S18, S23, S61, S62, S63, S71 and S72), in order to verify their antifungal effects on the most virulent isolate of *P. infestans* harvested from the Triffa Plain, Eastern Morocco.

100% of the LAB tested showed inhibitory activity against the most virulent isolate of *P.infestans*, all belonging to the genus Lactobacillus, three of them brevis (S14, S18, and S63), and five plantarum (S23, S61, S62, S71 and S72). Among the 8 LAB studied, 2 strains were selected in this work because of their large inhibition zones against *P.infestans.* The antifungal activity of both LAB begins after 24 h and the maximum obtained after 48 h, with an inhibition zone of 29.40 mm and 28.30 mm for LAB14 and LAB62 respectively. Lactobacillus plantarum and Brevis are capable of producing antifungal compounds at different incubation temperatures (4°C, 25°C, 37°C and 45°C), with maximum production at 37°C. The best inhibition was observed at pH 3 for LAB brevis 14 and pH 4 for LAB plantarum 62, respectively 19.25 mm and 10.6 mm. A better inhibition was observed on MRS medium in which glucose is replaced by sorbitol. The addition of glycerol in the medium increases the inhibitory effect of LAB. No inhibition was observed on MRS without meat extract and glucose. No inhibition was detected for the neutralized supernatant and supernatant, maximum inhibition is obtained for the ×4 concentration, respectively 30.55 mm for LAB14 and 30.30 mm for LAB62.

The incubation period, incubation temperature, pH, composition of the medium, carbon source, concentration of the supernatant and the strain itself affect the production of antifungal substances.

Figures: Effect of different supernatant concentrations on the hinibition of P. infestans



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Biography

A 6-year course in horticulture, agriculture and everything that is vegetal, whether edible or hornemental. Gave a rich and varied experience to the author. In 2017, she has enrolled in PhD, she seeks to use organic products to fight against potato late blight, the elementary crop among Moroccans. The author has published one article in the Moroccan plant protection journal, and three articles as co-author, one of which is published in scopus.

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Effect of two drying methods on sensory profile and physicochemical properties of figs (Ficus Carica L)

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Abstract

In Morocco, the majority of small farmers carry out solar drying of the fruits by traditional process on their farms. Such practice leads to losses in quality and quantity in dried fruits. This study aims to evaluate sensory and physicochemical quality of dried figs by using two drying methods:

- 1st method: Usual solar drying practiced by farmers;

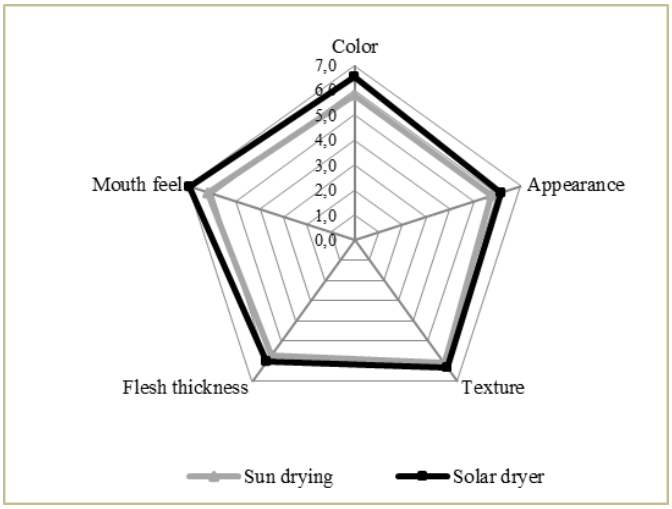
- 2nd method: Natural convection solar drying using a green solar dryer.

The obtained results showed that second method reduced the drying time from 10 days (first method) to 4 days on average. In addition, it was found that the green solar dryer allows an increase in the temperature inside the drying chamber of + 8.1°C, on average, compared to the ambient temperature.

Sensory analysis showed that the five assessed attributes (Mouth feel, color, appearance, flesh thickness and texture) were highly appreciated by using natural convection solar drying. The high difference was noted for the "mouth feel" attribute, followed by "color" which are the two main aspects searched by consumers. Regarding physicochemical properties, solar-dried figs are rich with citric acid (12.0 g/l vs 9.72 g/l) and in total soluble sugars (60.6% vs 56.0%) compared to sun-dried figs. The water activity was respectively 0.631 and 0.672 for the 1st and 2nd method.

In general terms, farmers are encouraged to enhance their drying methods by using natural convection solar drying as a preservative method that maintain nutritional and sensory quality of dried figs.

Figures: ***Sensory profile of dried figs using two drying methods***



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Biography

Author has her expertise in food analysis, conservation and valorization. His focus is based on developing new products using adequate and green process. He was warded his engineer diploma from IAV-Morocco in 2008 and his Advanced Master degree from the Louvain Catholic University in 2013. He published more than 10 papers. His score at Research gate is 4,51.

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Study of the thermodynamic parameters of an epoxy paint in food contact

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Abstract

The ability for food contact of an object means that the material of which it is made meets regulatory or normative requirements guaranteeing that there is no risk of induced toxicity, for food or drinks.

Food and beverage cans usually have an internal thin coating layer in order to avoid direct contact between food and metal. In this study we used an epoxy coating entended to come in contact with food stuffs. Epoxies are thermoset polymers obtained by reaction within epichlorohydrin and bisphenol A (BPA), which is a complex mixture of isomers and oligomers obtained by reaction of phenol with formaldehyde under acidic conditions. They form particularly strong bonds with many materials, thus they are used both as protective coatings and as adhesives.

This kind of materials should be sufficiently inert so that their constituents neither adversely affect consumer health nor impact the quality of the food.

In order to understand the behavior of the epoxy coating in contact with different simulant which represent different categories of foodstuffs, we report in this work the results of a gravimetric method, which helps to calculate a different thermodynamic parameters.

Key words: Epoxy coating, absorption, thermodynamic parameters, foodstuffs.

Figures:

Recent Publications

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Biography

Engineer in industrial processes and sustainable development, and student in the doctoral cycle chemistry and recovery section; I have done a lot of studies on food contact polymers including Epoxy, and we have contributed in our laboratory to the development of an epoxy paint in food contact using very selective raw materials and by carrying out tests of food stuffs (global migration and specific migration).

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Photovoltaic panel parameters determination using two numerical methods

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Abstract

This work proposes two methods in order to determine the electrical parameters of photovoltaic (PV) panel, from the short circuit current, the maximum power point and the open circuit voltage. The simple model for the photovoltaic panel is developed based on the single-diode PV model known as five parameters model [1] incorporating the shunt resistance, the series resistance, the photocurrent, the saturation current and the ideality factor. The first five parameters extraction method is based on Trust Region Dogleg algorithm (TRDLA) in order de solve a system of non-linear equations. It incorporates a new simple analytical equation obtained at the maximum power point which does not involve any iteration or complex calculation. Moreover, it allows to reduce the number of non-linear equations to be solved by TRDLA in order to determine the PV panel parameters. For the purpose of comparison, a second technique has been performed using the linear Least Squares Method (LSQM) developed by Bouzidi et al [2] basing on the Gromov technique [3]. The two methods, TRDLA proposed in this work and the performed LSQM, are tested in Matlab/MathWorks environment on a typical MSX60 polycrystalline silicon solar panel [4]. The experimental current-voltage characteristic I(V) is provided by the manufacturer's datasheet at standard test conditions (STC). The current-voltage curves are reproduced by solving the equation, which describes the non-linear behavior of the PV panel, considering the set of extracted parameters. This resolution was performed by the iterative Newton-Raphson method [5]. The main results of simulation show a good agreement between the experimental and simulated current-voltage and power-voltage characteristics mainly for the TRDLA as shown in figure 1. This good agreement for TRDLA is identified also by the lowest statistical errors (figure 2). So, the presented results confirm the validity and prove the effectiveness and accuracy of the proposed TRDLA in extracting the five parameters of the photovoltaic solar panel compared to LSQM.

Keywords: TRDLA, LSQM, PV parameters, statistical errors, Matlab/MathWorks.

Figures:

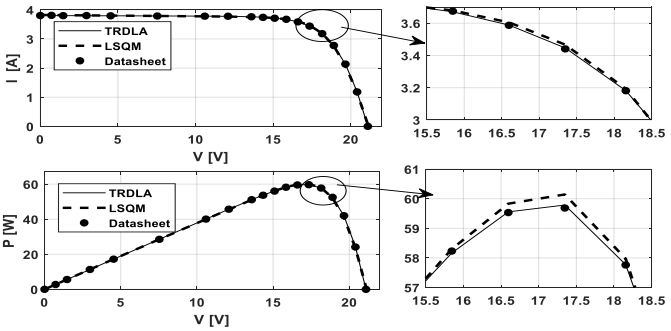

Fig.1 Experimental current-voltage I(V) and power-voltage P(V) characteristics of poly-crystalline (MSX60) silicon PV panel at STC compared to the calculated data by taking account of the five parameters obtained by TRDLA and LSQM.

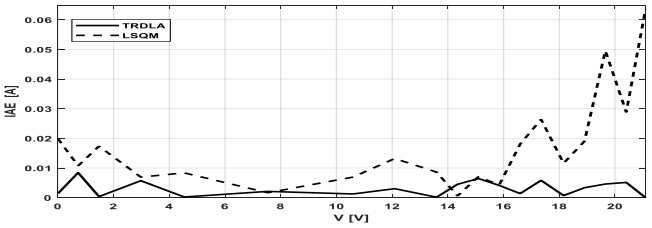

Fig.2 Individual absolute error (IAE) between experimental and simulated I(V) curves using the five parameters extracted by TRDLA or LSQM.

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Biography

HALI AISSA, is Ph.D. student in Laboratory of Renewable Energy, Embedded Systems and Data Processing, National School of Applied Sciences, Mohammed First University, Oujda, Morocco, My research focused on Simulation study of the influence of aging and climatic conditions on the electrical production of a photovoltaic module

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Comparative study of the treatment of the raw margins and pre fermented by anaerobic digestion

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Abstract

Olive mill water resulting from the extraction of olive oil, constitute a major problem for the environment, in particular for the aquatic environment because of their acidity and their non-biodegradable organic pollutant load.

This study is to look at the valorization of raw and pre-fermented olive mill water at a temperature of 37 ° C under anaerobic conditions for one month in view to of produce a biogas and reduce their toxic effect [Ghattas , 2004; Majbar, 2018, Lahlou, 2019].

Tests were carried out in a reactor with a volume of 2 L, which was half filled with substrates, then put under slow stirring of 20 rpm and brought to a temperature of 27 ° C throughout the treatment. The gas produced a function of time was titrated by volumetric dosing. The sludge from treatment raw and pre-fermented olive mill water was analyzed by measuring the samephysic-chemical parameters that characterize themthe initial substrates. The evaluation of the treatment efficiency took place by monitoring the evolution as a function of time, on the one hand, of the pH, of the chemical oxygen demand COD, of the biological oxygen demand BOD_5 and of the polyphenols in substrates; and on the other hand, the quantity of methane produced.

The pre-fermented olive mill waterare more acidic than raw olive mill water and are characterized by a reduction in the ForCODof 80.15% and 67.3% for polyphenols and an increasefor BOD_5 11 .8%. However, the final values remain much higher than the limit values for discharges of effluents into surface waters [BO, 2016]. They arerespectively 4560.15 mg of $O_2.L^{-1}$, 2.69 g / L and 5650 mg of $O_2.L^{-1}$.

The treatment of raw and pre-fermented olive mill water by anaerobic digestion for 60 days eliminatedalmost all of their organic pollutant load- in terms of the COD / BOD_5 ratio-with a methane production respectivelyof 512.8 cm^3 / L and 1631.2 cm^3 / L. The rate of methane increases as a function of time while passing through stages, unlike that of carbon gaz.This increase is very remarkable for the pre-fermented olive mill water.

The combined treatment of olive mill water by pre-fermentation and anaerobic digestion, leads to biodegradation of organic matter with elimination of 99% byCOD. It should be noted that, although the organic load of the olive mill water has become completely biodegradable; their BOD_5 load far exceeds the limit value of their release into the receiving

Keywords: Olive mill water, pre-fermentation, anaerobic digestion, polyphenols, gas production

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4. Majbar Zineb, Traitement des margines par un procédé couplant l'électrocoagulation et l'adsorption sur des charbons actifs de la sciure de bois d'eucalyptus et leur valorisation par la filière de compostage des déchets vinicoles, Thèse de Doctorat, Université Sidi Mohammed Ben Abdellah-Fès, Maroc, 2019.

Biography

Kaoutar Hjouj. She was born in October 1995 in Fez, Morocco, where she did her primary, secondary and university studies. The latter was gained by obtaining a bachelor's degree in chemistry science at the Faculty of Science Dhar Mahraz in Fez in 2017. As well as a master's degree specializing in the system of protection of metals, design and environment at the Faculty of sciences Iben tofail from Kenitra in 2019. Currently, she is pursuing the sub-theme "Energy recovery from treatment residues by methane production" for her doctorate; in the engineering laboratory of organometallic, molecular and environmental materials at Sidi Mohammed University Ben Abdellah, Faculty of Science Dhar El Mahraz, Fez, Morocco.

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Effect of structural properties of InAs/GaAs QDs on optoelectronic devices

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Abstract

The efficiency of Quantum Dots (QDs) devices is strongly related to their distribution, density and size, and shape in a QD array. In this paper, we report the simulation results of pyramidal InAs/GaAs QDs coupled to Wetting Layer (WL). In this work, we investigate the effects of the InAs/GaAs QDs size on the electronic states and the transition energy. In addition, the Wetting Layer thickness effects will be considered for a constant size of QDs with a varying thickness. In the first part, we calculate the strain distribution to find the band edges, while the second one concerns the variation of the electronic transition energy as a function of Quantum Dots (QDs) size by solving the stationary Schrodinger equation. This work shows clearly that the structural properties of QDs have strong effects on optoelectronic properties devices based on these nanostructures.

Figures:

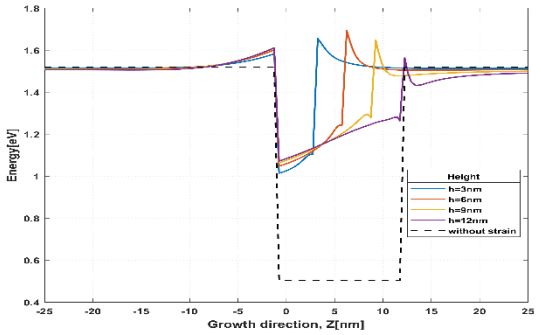

Fig.1. The conduction band with strain effect (solid line) for different heights and without strain effect in a QD structure with a height of 12 nm.

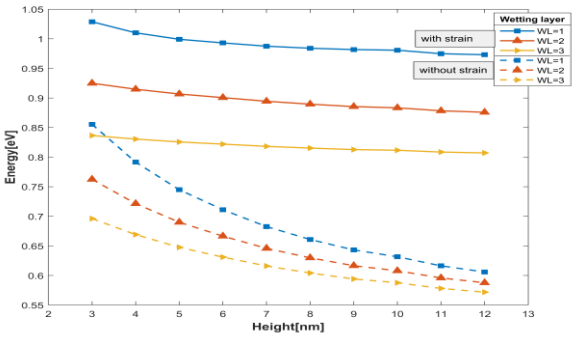

Fig.2. The transition energy of the first heavy hole (Ehh) quantification energy-to- first conduction band quantification energy (Ec) as a function of QD height for different WL in presence of strain effects (solid-lines) and without strain (dotted-lines).

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Biography

PhD student at Mohammed Premier University – MEER/LETSER, FSO – Oujda/Morocco. My main research work is focused on modeling and simulation of auto-assembled QDs. Characterization and applications.

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Photoluminescence (PL) characterization of InAs/GaAs Quantum Dots (QDs)

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Abstract

It is well known that before using thin films in applications, it is necessary to carry out their characterization because it provides informations on the degree of their quality. In this article, photoluminescence (PL) characterization of InAs/GaAs Quantum Dots (QDs) is reported. Analysis of photoluminescence spectra (full width at half maximum - FWHM) shows that the homogeneity and the density of the Quantum dots (QDs) depend on the temperature. Generally, a narrower FWHM means better quality of the QDs. Our simulation model is mainly based on a single QDs and temperature dependent photoluminescence (PL). A good agreement with experimental results is obtained.

Figures:

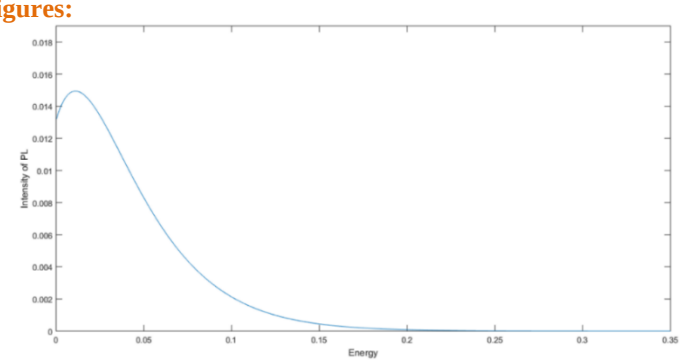

Fig. 1. Photoluminescence spectrum of a InAs/GaAs QDs at T = 77 K

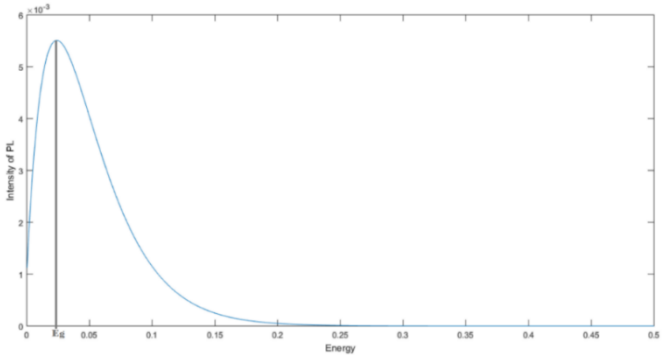

Fig. 2. Photoluminescence spectrum of a InAs/GaAs QDs at T = 300 K

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5. International Letters of Chemistry, Physics and Astronomy 57, (2015), 102-113

Biography

PhD student at Mohammed Premier University – MEER/LETSER, FSO – Oujda/Morocco. My main research work is focused on modeling and simulation of auto-assembled QDs. Characterization and applications.

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Evaluation of the pectin quality of clementine extracted by different extraction methods

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[3] Laboratory of Management and Valorization of Natural Resources, Faculty of Science and Technology. Beni Mellal, Morocco.

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Abstract

Agricultural and agro-industrial activities generate large amounts of waste. This waste is a definite nuisance for the environment and a waste of useful organic matter. This waste can create ecological problems, especially water pollution, since the presence of biological matter in orange peels such as essential oils, pectins, as well as sugars. These wastes could be turned into capital, if potentially marketable bio-products such as pectin can be extracted from the barks and fruits of low market value. Numerous studies have shown that waste from food processing industries are considered noble products and sources of new raw materials for many industries.

Therefore, the aim of this work is to establish a comparative analysis in terms of quality and yield between different methods of extracting pectin from citrus fruit, particularly, the clementine variety in the region of Béni Mellal -Khénifra. In this study, four types of extraction were chosen: chloridric acid, citric acid, lemon juice and finally water, and the pectin yield of each type of extraction will be compared. The extraction yield is different for each type of extraction: extraction by water has the low yield with a value of 5.88%, followed by extraction by chloridric acid 14%, while extraction by citric acid and lemon juice have a slight difference 18.95% for citric acid and 19% for lemon juice. This study allows us to choose the best type of extraction that will be used to optimize the extraction process for further use in food.

Figures: Image: extraction of pectin in hot acidic medium by hydrochloric acid

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Biography

The author is a PhD student in 3rd year specialized in the technological valorization of agricultural products, in the faculty of sciences and techniques Béni Mellal in convention with the national institute of agronomic research in Morocco. she has an article indexed thomsons reuters named: effect of thermal pasteurization on the physicochemical stability and nutritional quality of Moroccan Valencia late orange juice.

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Risk of flooding of national road N °6 at the crossing of the Asla wadi in the region of Taourirt

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Abstract

The purpose of this work is to study the risk of flooding of the N6 national road at the crossing of the Asla wadi in the Taourirt region. The choice of this study area is due on the one hand to the importance of this road which presents a strategic axis of transport for the eastern region, and on the other hand to the investigations around the recent floods recorded in this place that have caused road cuts for hours.

The adopted methodology consists of hydraulic simulation of floods at Asla wadi using HEC-RAS software. The input data for this simulation are determined by a hydrological study which will make it possible to define in particular the flood flow at different return periods and this by the use of empirical methods and statistical adjustment methods including the method of Gradex by using hydrometric data from existing measurement stations in the region.

This study will constitute a decision-making aid tool for the managers of the national road network in examining the advisability of flood protection actions by comparing the consequences of overflowing water for the road user, local residents and road works.

Figures: September 2019 flood at the bridge level on Aslla wadi

Recent Publications

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2. A. Grari1 & M. Chourak2 & F. Boushaba2 & S. Cherif3 & E. García Alonso4 Numerical characterization of torrential floods in the plain of Saïdia North-East of Morocco (2019)
3. A. Grari1,M. Chourak2 , F. Boushaba2 ,S. Cherif. Characterization of river floods on the plain Of Saïdia-North-East of Morocco (2017).
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5. Ven Te Chow, David R.Maidment, Larry W.Mays_Applied Hydrology (1988)

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 doctorate in 2019 at Mohammed First University in Morocco., Morocco.

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Using Artificial Neural networks of the type extreme learning machine for the modelling and prediction of the temperature in the head the column. -Case of a C6H11-CH3 distillation column-

Imad Manssouri [1], Bouchra Boudebbouz[1], Brahim BOUDAD[2]

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Abstract

This study establishes a reliable model based on artificial neural networks of the ELM (extreme learning machine) type. The use of this model must reflect the true behavior of the process under its normal operating conditions and enable distinguishing a normal mode from an abnormal one. The installation in this study is a continuous distillation column for methylcyclohexane from a toluene/methylcyclohexane mixture, which mass composition has been defined as 23% methylcyclohexane. The ANN-ELM model was applied to a database of 1000 samples. All the relevant inputs of the model are defined by the inputs of the continuous distillation column during its normal operation, namely: the heating power, the preheating power, the reflux rate, the feed rate, the pressure drops and the preheating temperature. On the other hand, the model's output is defined by the output of the continuous distillation column during its normal operation, namely the temperature at the head of the column. The ELM-type neural architecture obtained during the learning phase was tested on a 30% of the database. The results showed very good forecast accuracy using the ELM model. The low RMSE value (RMSE = 0.0168) was recorded during the test phase when the number of neurons in the hidden layer becomes 30. The prediction of the temperature at the head of the column by the ANN-ELM model has achieved its most accurate performance when the sigmoid activation function was adopted with a number of neurons in the hidden layer of 30. Moreover, the correlation coefficients were very close to unity during the test phase (R = 0.9345). The ANN-ELM prediction model is best suited for modeling the normal mode with variable operating points of the automated continuous distillation column and can be used online for the detection and diagnosis of malfunctions in this type of operation installation.

Figures: Diagram of the rectification column: 1- dosing pump, 2- boiler, 3-packed column, 4-timer, 5-condenser

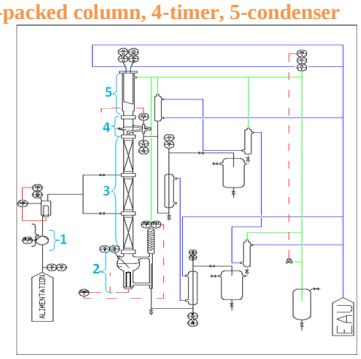
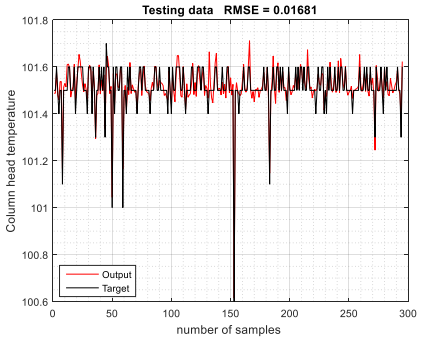


Figure. Correlation between the top column's estimated and actual temperature and the obtained error during the test phase.



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4. Limami, H., Manssouri, I., Cherkaoui, K., Amazian, L., El Baraka, A., $ Khaldoun, A. (2019, November). In 2019 7th International Renewable and Sustainable Energy Conference (IRSEC) (pp. 1-6). IEEE. Indexed by SCOPUS…
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Biography

Imad MANSSOURI is the founder and head of the electrical energy research team, maintenance, and innovation. Doctor of Engineering (2009). Qualified teacher at the national school superior of arts and trades-Meknes, Moulay Ismail University, Morocco (2016) Member of the reading committee of the newspaper 'American Journal of Neural Networks and Applications (AJNNA) 'since (2017). Its research activities concern detection and diagnosis by methods artificial intelligence of non-linear systems malfunctions strongly unstable, prediction and classification by artificial intelligence methods of environmental phenomena (drought, water quality, etc.) … Moreover, the author is working on the characterization of clayey materials with ecological and recycled construction additives, in terms of their mechanical, physicochemical and thermal performances.

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Optimization of total polyphenols and total sugars by the design of experiment methodology in carob beverages

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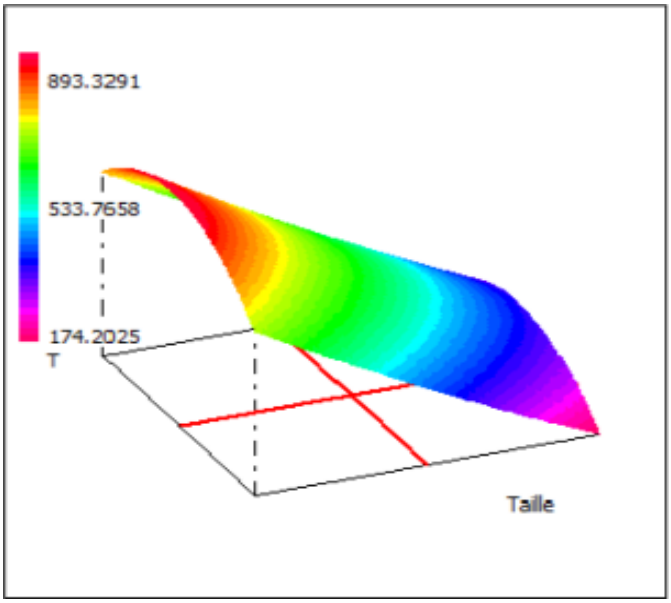
2 Laboratory of Food Science and Technology, Regional Center for Agricultural Research in Tadla (CRRAT), Beni Mellal, Morocco;
3 Laboratory of Management and Valorization of Natural Resources, Faculty of Science and Technology. Beni Mellal, Morocco.

Abstract

Rapid technological advances allow agri-food companies to introduce a variety of products to the market. However, the major concern is the success rate of what is introduced as a new product. There is a need for a clear guideline for the improvement of these products.The manufacture of carob beverage requires a set of unit operations that must be optimized to ensure a sufficient level of production, quality and safety.Therefore, the aim of this work is to develop and optimized the diffusion process of natural carob kernels beverage of Beni Mellal- Khenifra carob's in order to get the right amount of polyphenols content from it. Sample were harvest from different point of collect from Beni Mellal- Khenifra areas .the total polyphenols content obtained from carob were 165.2-757.42 (w:v) mg EAG/l, The total sugar and reducing sugar in pods obtained from different regions were 18.01–25.78 g EG/l (w:v). Experimental design was used to investigate the effect of three parameters (extraction temperature, extraction time and the Particle Size of the pulp) in this order we have been carrying out tests on the carob drink, varying those factors influencing the polyphenols diffusion, while following the process steps. In this study, we have followed two steps: The first step (exploratory) consists of carrying out a Placket-Burmann-type screening plan; the second step(optimization) in which we have used a Box-Behnken plan. in the light of previous experiments and their results, we can conclude that the optimal conditions to have a high level of total polyphenols and total sugars in the carob drink are Size=0.0001cm, Time>60min,75°C<Temperature<96°C .therefore do not work with high temperatures to avoid activating the polyphenols oxidase enzymes which are responsible for the degradation of bioactive compounds.

Figures: *Surface Plane of Total Polyphenol Concentration as a Function of the temperature and size with time setting in its upper level*



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Biography

The author is a PhD student in 3rd year specialized in the biochemical transformation and thtechnological valorization of agricultural products, in the faculty of sciences and techniques Béni Mellal in convention with the national institute of agronomic research in Morocco.

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Hybrid method coupling the stationary wavelet transform and the Kohonen self-organizing cards for the unsupervised classification of operating modes: Case of an industrial installation

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Abstract

This work deals with the unsupervised classification of the different operating modes of an industrial installation, using a hybrid method coupling the transform in stationary wavelets (SWT) and the self-organizing Kohonen cards (SOM). The installation which is the subject of this study is a methylcyclohexane rectification installation from a Toluene / methylcyclohexane mixture, the mass composition of which has been defined as 23% methylcyclohexane. The SOM method is applied on a database of 840 samples. The data include the approximations retained by the transformation into stationary wavelets of the two operating modes: Normal mode and abnormal mode which is represented by the four most common faults of the rectification column. The choice of the size of the SOM map was made according to the following two criteria: the quantification error (QE) and the topological error (TE). The selected size is 30x30 neurons because it has minimized these two errors. The use of the hierarchical classification on the SOM map made it possible to distinguish five classes. The 600 normal mode samples were mainly classified in class II with 99.66%, class I with 0.17% and class III with 0.17%. The four faults are represented by 60 samples each. The samples of the first defect were classified in class V with 98.33% and class II with 1.67%. Those of the second and fourth defect were classified respectively in classes IV and III with 100%. On the other hand, the samples of the third defect were distributed over class I with 66.66%, class II with 30%, class III with 1.67% and class IV with 1.67%. This study made it possible to highlight the capacity of the hybrid SWT-SOM method proposed for the distinction of the different modes of operation of the rectification column.

Figures:

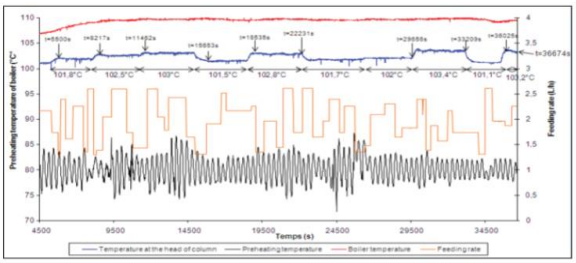

Fig. Normal behavior of rectification column.

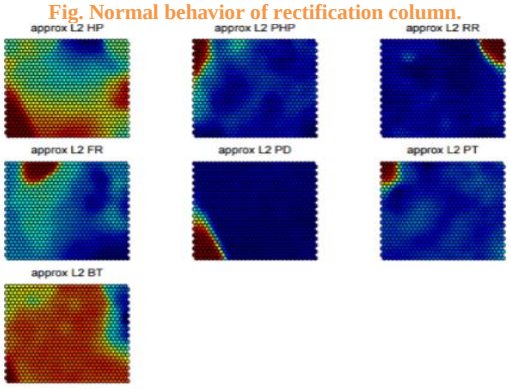

Fig. Plans of components SOM of the all data

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Biography

Imad MANSSOURI is the founder and head of the electrical energy research team, maintenance, and innovation. Doctor of Engineering (2009). Qualified teacher at the national school superior of arts and trades-Meknes, Moulay Ismail University, Morocco (2016) Member of the reading committee of the newspaper 'American Journal of Neural Networks and Applications (AJNNA) 'since (2017). Its research activities concern detection and diagnosis by methods artificial intelligence of non-linear systems malfunctions strongly unstable, prediction and classification by artificial intelligence methods of environmental phenomena (drought, water quality, etc.) … Moreover, the author is working on the characterization of clayey materials with ecological and recycled construction additives, in terms of their mechanical, physicochemical and thermal performances.

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Thermal Analysis of Lightweight Clay Bricks with Organic Typha-Fibers additives Composite

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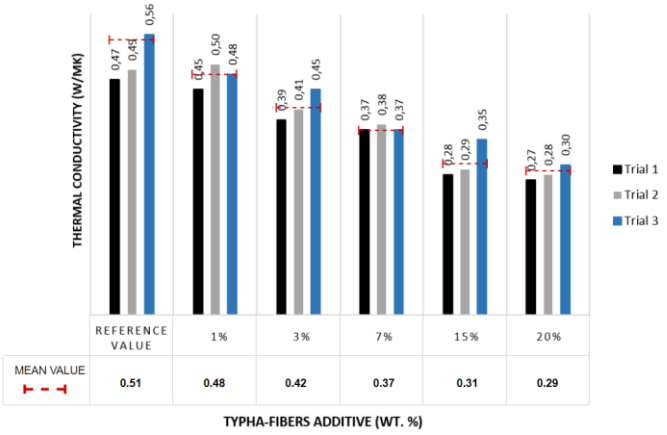
[2] *Laboratory of Sustainable Energy Materials, Al Akhawayn University, Ifrane, Morocco*

Abstract

This paper assesses the thermal performance of reinforced Typha-Fibers unfired clay bricks. Various Typha additive proportions (0%, 1%, 3%, 7%, 15% and 20%), by weight, in a fibrous form have been prepared for experimental testing. X-ray diffraction and fluorescence analysis showed that exploited clay is suitable for construction purposes with a predominant Quartz (SiO_2) content. Collected findings showed that higher Typha-fiber proportions produced brick samples with higher porosity levels. The highest recorded porosity, 14.95%, was obtained with the incorporation of 20% additive, compared to 1.14% porosity percentage for reference samples. This resulted in the production of more porous bricks with improved thermal properties. In fact, at 20% Typha-fibers additive content, 0.29 W/m.K and 0.76 kJ/Kg.K respective thermal conductivity and specific heat capacity values were recorded, compared to 0.51 W/m.K and 0.59 kJ/Kg.K at reference samples. This represents 43% and 23% gains in thermal conductivity and specific heat capacity, respectively. A dynamic thermal inertia simulation was also carried out in TRNSYS software to evaluate time lag and decrement factor parameters of prepared specimens as walling structures of a reference house. 38% and 45% gains in time lag and decrement factor were obtained with the incorporation of the highest additive proportion, 20%, compared to reference samples. Finally, four mathematical models are used to evaluate the thermal performance, in terms of thermal conductivity and specific heat capacity, of studied specimens, as a function of measured porosity. The comparison drawn between the models' theoretically predicted thermal properties and experimentally measured ones reflected a positive association between the two as the obtained correlation coefficient 'R' was found to be very close to 1.

Figures: *Thermal conductivity of unfired clay brick samples with Typha-Fibers additive*



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4. E. M. Saidi, A. E. Baraka, H. Limami and A. Khaldoun, 7th International Renewable and Sustainable Energy Conference (IRSEC), Agadir, Morocco, 2019, pp. 1-6,
5. Azzaoui, H, Mansouri, I, & Elkihel, B. (2019). Materials Today: Proceedings, 13, 597- 606. Indexed by SCOPUS

Biography

Author is a PhD student, and holder of a combined Bachelor and Master degree in Sustainable Energy Engineering from Al Akhawayn University in Ifrane, and currently working in the research field of ecological construction via the exploitation of local raw construction material, clay, retrieved from the region of Ifrane, using different set of ecological and recycled additive materials. The produced construction materials are characterized via mechanical, physicochemical and thermal properties to assess their overall performance.

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Physicochemical and Mechanical Assessment of Reinforced Unfired Clay Bricks with Typha-Fibers Composite as a Construction Material Additive

Houssame Limami[1,2], Imad Manssouri[1], Khalid Cherkaoui[1], Asmae Khaldoun[2]

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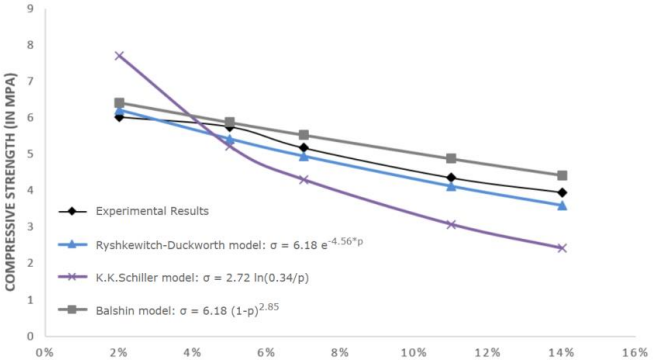
[2] *Laboratory of Sustainable Energy Materials, Al Akhawayn University, Ifrane, Morocco*

Abstract

The aim of this study is to evaluate the suitability of Typha-fibers as a construction material additive to unfired clay bricks. Physicochemical and mechanical performance of brick samples with Typha-fibers additives, at multiple proportions (0%, 1%, %, 7%, 15% and 20%) by weight, are investigated. A steady-state mixing technique via an electric stirrer, for 10 mins and at 95rpm, was adopted to ensure a homogenous distribution of the fibrous particles inside the clay matrix to produce homogenous mixtures. The used clay was found of type Illite with non-swelling characteristics and a dominant SiO_2 content, 59.6%, following X-ray diffraction and fluorescence tests. The incorporation of 20% of Typha-Fibers additive content reflected the highest porosity, of 14.95%, compared to reference samples, 1.14%. This prompted higher capillary water absorption coefficient with higher Typha-fibers proportions. A 55% increase in water absorption was observed with the incorporation of 20% additive content compared to reference samples; yet obtained capillary measurements were under the maximum permissible water absorption limit, according to Moroccan testing standards NM EN 772-11. In addition, bulk density measurements showed that prepared brick samples can be classified as lightweight structures as their bulk density is lower than 1.75 g/cm3. Moreover, produced specimens were classified as Earth Blocks Class 4 (EB4), Earth Blocks Class 3 (EB3) and Earth Blocks Class 2 (EB2) according to their recorded compressive strength.

Besides, only a 40% reduction rate in compressive strength was recorded with the incorporation of 20% Typha-fibers additives compared to reference samples thanks to the innovation mixing technique adopted, when previous studies reached 60% loss in strength with just 3% additive Typha concentrations. Finally, three mathematical porosity-strength models were used to assess the correlation between the experimental and theoretical findings. The computed correlation coefficients' closeness to 1 reflected the positive association between the experimental and theoretical results.

Figures: *Theoretical and experimental compressive strength-porosity behavior of unfired clay brick samples with Typha-Fibers additive*



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3. 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
4. E. M. Saidi, A. E. Baraka, H. Limami and A. Khaldoun, 7th International Renewable and Sustainable Energy Conference (IRSEC), Agadir, Morocco, 2019, pp. 1-6,
5. Azzaoui, H, Mansouri, I, & Elkihel, B. (2019). Materials Today: Proceedings, 13, 597- 606. Indexed by SCOPU

Biography

Author is a PhD student, and holder of a combined Bachelor and Master degree in Sustainable Energy Engineering from Al Akhawayn University in Ifrane, and currently working in the research field of ecological construction via the exploitation of local raw construction material, clay, retrieved from the region of Ifrane, using different set of ecological and recycled additive materials. The produced construction materials are characterized via mechanical, physicochemical and thermal properties to assess their overall performance.

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From biowaste to an organic resource: a solution for the future

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[2] *Superior School of Technology - Khenifra (EST-Khenifra), University of Moulay Ismail, PB 170, Khenifra 54000 Morocco*
[3] *Industrial Management, Energy and Technology of Plastic and Composite Materials Laboratory, ENSEM – Casablanca*
[4] *Natural Resources and Environment Laboratory, Polydisciplinary Faculty of Taza, Sidi Mohamed Ben Abdellah University, Fez, MOROCCO.*

Abstract

In Morocco, the olive industry occupies an important place in the national economy. Its development is associated with the production of huge quantities of two bio-wastes: the "margines" and the "olive-pomace" which pose both economic and ecological problems. Their valorization by aerobic digestion can give rise to a new bioresource, limit the transport of bio-waste and its environmental impact, and reduce the costs of their management.

The composition of olive bio-waste has been compensated by the addition of appropriately proportions of other organic waste after its characterization. Their transformation into an organic resource takes place through the action of micro-organisms that can modify the composition of the substrates by the production of enzymes under a specific set of temperature and pH conditions.

The monitoring of this degradation took place during 3 months by daily measurement of these and other physicochemical parameters. Maturation tests were performed on cress germination using spectroscopic analyses.
Finally, a neutral product was obtained, rich in fertilising elements, non-toxic and conforms to the French standard for organic amendments NF 44-51. The agronomic value of this product allows it to improve both the structure of the soil and the quality and yield of a vegetable garden crop

Keywords: aerobic digestion, margines, pomace, bioresource. agronomic value.

Biography

Ibrahim Atemni. He was born in October 1995 in Immouzer Kander, Morocco, where he completed his primary and secondary studies. In 2017, he obtained a bachelor's degree in Biology at the Faculty of Sciences Dhar Al-Mahraz in Fez and a Master's degree of Life and Earth Sciences at the École normale supérieure of Fez in 2019. Currently, he is pursuing for his Ph.D. sub-theme "Phosphate-based fertilizers: development, characterization and plant experimentation" in Engineering Laboratory of Organometallic, Molecular and Environmental Materials at Sidi Mohammed Ben Abdellah University, Faculty of Sciences Dhar El Mahraz, Fez, Morocco..

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Bioactive compounds from Moroccan plants as alternative in the water treatment process

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[2] *Biology and health Laboratory, Department of Biology, Faculty of Science, Abdelmalek Essaadi University, BP 2121, Tetuan, Morocco.*

Abstract

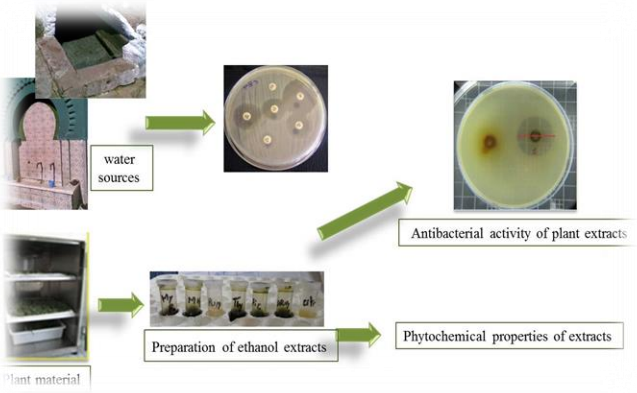
Rural citizens of Morocco are still taking their water supplies from unprotected sources such as wells and springs that are generally contaminated.

Even if traditional treatment of water using chlorine contribute to the control of bacterial pathogens, it may produce toxic compounds (trihalomethanes) that have health risks. So, it seems necessary to find alternative methods of water disinfection being effective and safe for health and environment. Morocco is reputed by a rich flora so why not to study the possibility of the valorization of plants.

The objective of this study is the evaluation of efficiency of some Moroccan plant extracts against a fecal bacterium: *Escherichia coli* (gram negative) found in the prospected springs.

Our results showed that the ethanolic extracts of *Origanum elongatum*, *Myrtus communis*, *Punica granatum* and *Thymbra capitata* had a significant antibacterial activity against *Escherichia coli*. On the other hand, preliminary phytochemical screening showed that there is an obvious correlation between the phenolic compounds level and the antibacterial activity. So, the use of these extracts in water treatment seems to be very promising.

Figures:



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3. Bongiovani M.C., Camacho F.P., Valverde K.C., dos Santos T.R.T., Nishi L., Bergamasco R., Chem. Eng.Trans. 43 (2015) 2323-2328.

Biography

Dr. Hikmat DOUHRI graduated with a master's degree in environmental engineering at the Abdelmalek Essaadi University (Tangier, Morocco) in 2006. Then, she was warded her PhD in water chemistry from the Abdelmalek Essaadi University (Tetuan, Morocco) in 2018. She is author of several research papers in international journals and she has also participated in many national and international conferences. Her research interests are in the area of development of natural process of water and wastewater treatment.

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Elaboration of bio-composites materials: polypropylene reinforced with raw sugar beet pulp, alkali treated and bleached cellulose fibers

Abdelghani BOUSSETTA[1], Anas AIT BENHAMOU[1,2], Amine MOUBARIK [1]

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[2]*Laboratory of Materials Reactivity and Process Optimization/Faculty of science Semlalia Cadi Ayyad University, Marrakech.*

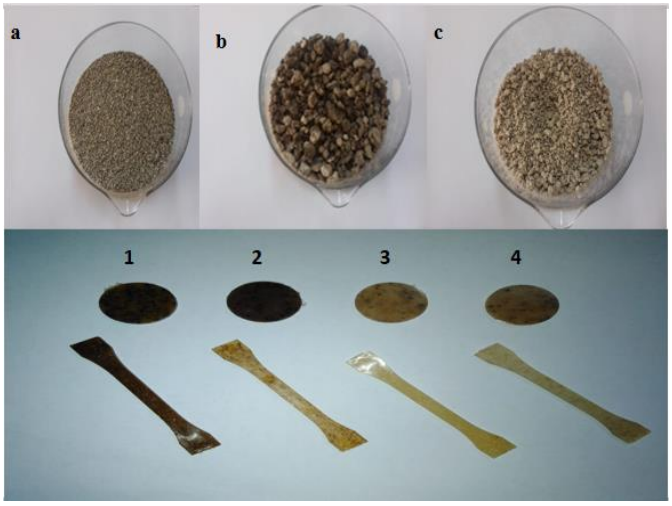
Abstract

With the growing of environmental appreciation and energy depletion, several academic and industrial research are oriented toward valorization of natural resource, notably those generated from agro-industrial activity. In the sphere of composite material number of researchers have been interested to produce polymer composites reinforced with natural fibers aiming to enhance advantages like, low-cost, excellent specific strength and high modulus, bio-composites with a high wear resistance than conventional metals, biodegradable and environmentally friendly materials derived from renewable agricultural waste or agro-industrial by-products[1].

Sugar is traditionally considered as a popular food in Morocco, and because of the high demand of Moroccan market, the agricultural authorities aims to produce a significant amounts of sugar in order to satisfy population needs. Sugar beet is one of the most cultivated plants used in Moroccan sugar industry, hence, many factories generates an important quantity of by-products (sugar beet pulp fiber) [2].

This way, the objective of study is to evaluate the effect of chemical modifications on mechanical properties of sugar beet pulp fiber/polypropylene composites. Fibers were pretreated applying alkali and bleaching treatments. These fibers were mixed with the polypropylene using twin-screw extrusion followed by injection molding to study the effect of loading starting from 2,5% to 10% for different fibers also the influence of coupling agent in polypropylene. All fibers were analyzed by different complementary analysis (FT-IR; DRX, ATG/ATD and SEM).Also the manufactured composite materials were characterized by mechanical, rheological investigation with a view to select which one exhibit excellent properties compared to others.

Figures: *Images illustrate raw sugar beet pulp fibers (a), after alkali treatment (b) and bleaching process (c). Below all bio-composite specimen*



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Biography

Abdelghani BOUSSETTA

; I am a PhD student at Department of chemistry, Laboratory of Chemical Processes and Applied Materials, Sultan Moulay Sliman University. Our team work, work on the elaboration and characterization of advanced bio-composite materials based on thermoplastic polymers and chemically modified natural fibers, particularly by-products generated from agriculture industry as well as those related to environmentally friendly compounds. We are also especially motivated by prioritizing them over their synthetic counterparts. On the other side, our orientation study focus on the formulation of new and green wood adhesive industry aiming to produce particleboard or plywood.

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Effect of temperature on structure and corrosion resistance of Zn coatings on steel substrates

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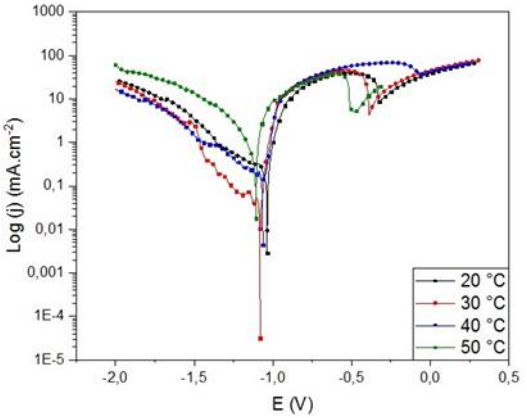
[2] *National Higher School of Chemistry (NHSC), Ibn Tofail University, B.P 133, Kenitra, Morocco*

Abstract

The application of sacrificial coatings onto steel and other ferrous substances has long been established as an effective standard of the industry for corrosion protection. Zinc has found widespread use as the basis of a whole range of sacrificial coatings for ferrous substrates. It is the most commonly used sacrificial coating and can be applied by a variety of techniques, including hot-dipping, metal spraying, cementation, cladding and electrodeposition. In this study, Zinc coatings are electrodeposited on mild steel from an acid bath using chronopotentiometry at different temperatures, ranging from 20°C to 50°C. The coated samples are immersed in 3.5 wt% NaCl solution and measurements of corrosion rate are done using linear polarization resistance. Activation energies, enthalpies and entropies were determined according to Arrhenius and absolute rate theories. The linear polarization resistance results showed that i_{corr} increased from 202.106 µA.cm^{-2} to 631.776 µA.cm^{-2} with increasing temperature from 20°C to 50°C, indicating a decrease in corrosion resistance with temperature. Zinc coatings with high corrosion resistance are achieved with deposited coating in the range 20-30 °C.

Figures: *Polarization measurements of electrodeposited coatings with different bath temperatures in 3.5% NaCl*



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Biography

Author is a materials engineer. She is currently working at the Department of Chemistry, Ibn Tofail University. She does research in Analytical Chemistry, Electrochemistry and Chemical Thermodynamics. She has a publication: El Fazazi A, Ouakki M, Cherkaoui M, Med. J. of Chem., 8, 30-41(2019) https://doi.org/10.13171/mjc8119021318mo.

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Coupled heat transfers in a hollow block with two air cells deep in vertical direction subjected to an incident solar flux

Mourad Najjaoui [1], Thami Ait-taleb [1], Abdelhalim Abdelbaki [2], Zaki Zrikem[2], Hassan Chaib [1]

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[2] *LMFE, Department of Physics, Cadi Ayyad University, Faculty of Sciences Semlalia, B.P. 2390, Marrakech, Morocco.*

Abstract

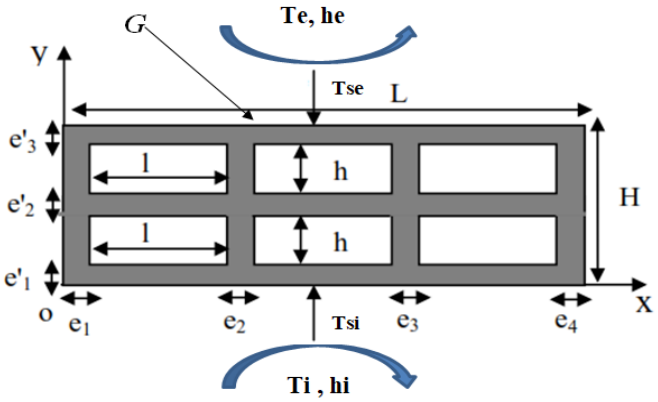
This work present the results of the numerical simulation, in steady state, of heat transfer coupled by natural convection, conduction and radiation in hollow block with two air cells deep in the vertical direction and three identical cavities in the horizontal one, submitted to real boundary conditions. This block constitutes a unit of the construction of buildings ceilings. The top horizontal face is subjected to an incident solar flux (G) and exchanges heat with the ambient air at the temperature Te with a surface exchange coefficient he. The lower face exchange heat with the indoor air of a room at the temperature Ti with a surface exchange coefficient hi, while the vertical surfaces are considered adiabatic. Equations governing natural convection in the different cavities of the system, radiation heat exchanges between the internal surfaces of cavities and heat conduction in the surrounding walls are solved using the control volumes method and the SIMPLE algorithm.

Figure 1 below shows the physical model of the studied configuration. It is a simple representation of a hollow brick block which is formed by six rectangular cavities each one of width l and height h and having vertical conductive walls of thickness ex and other horizontal ones of thickness ey.

It has been found that thermal transfer through this system depends highly on the thermal conductivity of solid partitions ks.

This parameter changes the structure of flow inside the cavity and contributes in the global heat transfer growth in a significant way, and the two-cell slabs in the vertical direction allow a considerable reduction of the heat transfer between the inside and the outside of the roof.

Figures: *Schematic of the studied hollow block*



Biography

Doctorat student at the Ibn Zohr University, Polydiscilinary Faculty of Ouarzazate, Department of Physics-Chemistry,, Morocco. He received the Licence (2013) and the master(2016) in physics from Cadi Ayyad University, Faculty of Sciences Semlalia, Marrakech,

Morocco. It's research field is the study of coupled heat transfer by natural convection, conduction and radiation in building elements and the development of the heat transfer functions for these elements. articles in scientific journals and international congresses have been published.

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Control of Brushless DC Motors Using sensorless Back-EMF Integration Method

A. ATTAR [1], J. BOUCHNAIF [1], K. GRARI [1]

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Abstract

This paper presents the Back Electromotive Force (Back-EMF) integration method, one of indirect Back-EMF commutation methods, used to control the sensorless Brushless Direct Current (BLDC) motor. As its name indicates this technique is based on integration of the electrical Back-EMF signal to get instantaneous information about the mechanical rotor position, correspondingly the objective of this work is to control BLDC motor without using velocity and/or position sensors, just by integration of the Back-EMF signal of the non-fed phase's to determine the position of the commutation point in order to drive the inverter. Therefore, The proposed control technique is developed using MATLAB / Simulink with simscape library. The effectiveness of the proposed technique has been validated by simulation results.

Keywords : Brushless DC motor, sensorless, Back-EMF integration, commutation points **.**

Figure 1 : *BLDC motor sensorless control scheme based on a Back-EMF integration*

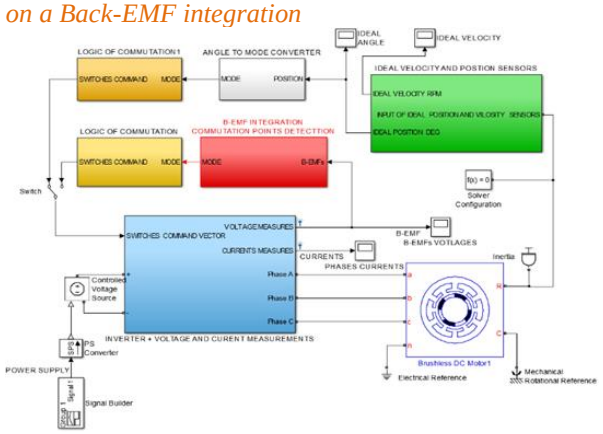
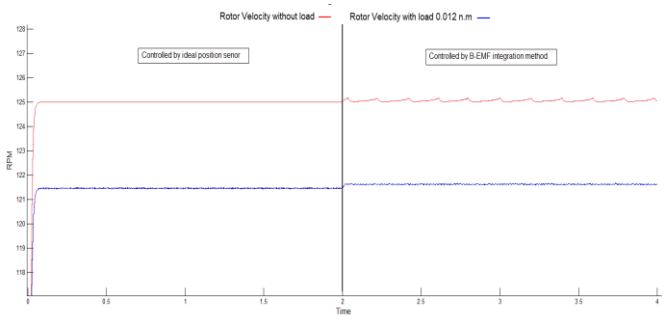


Figure 2 Rotor Velocity with and without load



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2. Grari, K., Bouchnaif, J., Azizi, M., Fadil, H., n.d. 2016, Sensorless Control Of Switched Reluctance Motor With Fuzzy-Pi Controller.
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4. Gamazo-Real, J.C., Vázquez-Sánchez, E., Gómez-Gil, J., 2010. Position and Speed Control of Brushless DC Motors Using Sensorless Techniques and Application Trends. Sensors 10.
5. Tae-Hyung Kim, Hyung-Woo Lee, Mehrdad Ehsani, 2005. 31st Annual Conference of IEEE Industrial Electronics Society, 2005. IECON 2005.

Biography

A.ATTAR has his expertise in control of brushless DC motor for electrical vehicle application, He's currently served in Electrical Engineering and maintenance Laboratory of High School of Technology of Oujda, Morocco. he received his degree of electronics and industrial computing engineer in 2011 from the National School of Applied Sciences Oujda, Morocco.

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Real-time Driver Drowsiness and Yawn Detection System using Computer Vision Techniques for the Prevention of Road Accidents

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Abstract

Driver drowsiness is one of the reasons for a large number of road accidents in the world. In the United States, an estimated 1 in 25 adult drivers report having fallen asleep while was driving in the previous 30 days [1]. In this paper, we propose driver drowsiness and yawn detection system with an alert system for the prevention of road accidents. The proposed system uses two important computer vision techniques: facial landmarks and eye aspect ratio (EAR), the facial landmark detector implemented inside Dlib [2] produces 68 (x, y) coordinates that map to specific facial structures. Each eye is represented by 6 (x, y) coordinates, the blink detector uses these coordinates to compute a metric called the eye aspect ratio (EAR), introduced by Tereza Soukupova and Jan Cechin in their 2016 paper [3] to determine if the eyes are closed. The proposed system uses a camera that takes images of the driver's face. If the driver's face is found; we apply facial landmark detection and extract the eye regions after that we compute the EAR to determine if the eyes are closed. If the EAR indicates for a sufficiently long enough amount of time that the eyes have been closed, we use an alert system to wake up the driver. Yawn detector system uses also the facial landmark detector by computing the distance between the top lip and low lip (x, y) coordinates. The proposed algorithm has been implemented in a Raspberry Pi 2 with graphical user interface GUI and an alert system composed of sound alarm by playing a WAV file, Text to Speech using espeak Python library, and vibration motor installed inside a driver's seat to wake up the driver before anything undesired happens.

Figures:

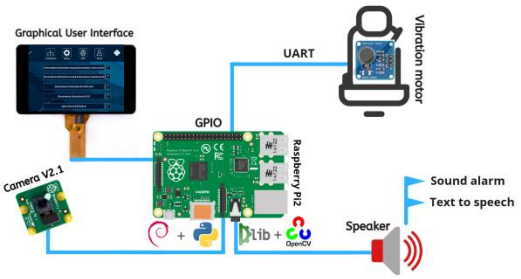

Fig. 2. The architecture of the proposed drowsiness and yawn detection system.

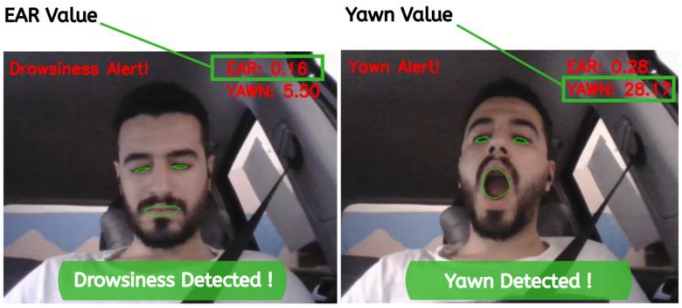

Fig. 3. Real-time Drowsiness and Yawn Detection

Recent Publications

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Biography

Ismail NASRI was born in Oujda, Morocco, in 1990. He received his M.Sc. degree in mechanical engineering from the Mohammed V University in Rabat, Morocco, in 2014. He is currently working toward a Ph.D. degree, in Electrical Engineering and Maintenance Laboratory, High School of Technology, Mohammed First University, Oujda, Morocco. Since 2019, his research interests include the implementation of an on-board embedded system for monitoring driver drowsiness and yawn for the prevention of road accidents using Artificial Intelligence, Deep Learning, and Computer Vision Techniques.

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Erosion of vegetal biodiversity by anthropoization in Morocco (Taounate)

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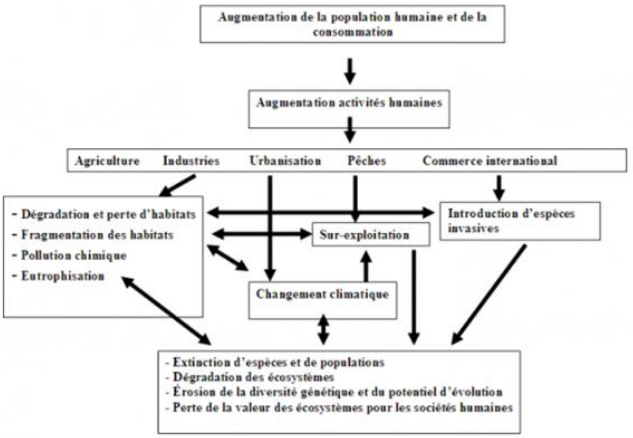
Abstract

Due to its geographical location, Morocco enjoys the overlapping of several bioclimatic floors that give it the benefit of a unique plant biodiversity. A general pattern of which the region of Tattooing (pre-rif) is a part of it; Morocco which gloats with a forest area of more than 40,631.49 has covered by a rich cocktail of aromatic and medicinal plants that make the jewel of this province.

The present study is a subject to an alarming population explosion in the absence of employment opportunities pushing the survival population on the forest field. An anthropogenic activity that will unequivocally lead to the imbalance of ecosystems and the regression of vegetation cover. In response to this data, this work has been undertaken to assess the state of biodiversity under anthropoization, in order to raise awareness of the importance of natural resources. As investigative tools at all levels we used a questionnaire addressed to the different social elites (rural population, farmers, students, students, teachers and administrative persons). The results obtained have led to the inference that its various anthropogenic activities have a detrimental impact on plant biodiversity, which is increasing day after day by the continued increase in the rural population. Otherwise, it is noted that the surface of the plant cover cut from 2013 to 2018 is estimated by 347,28886 Ha and the most cut types of vegetation are successively as a follow-up: aromatic and medicinal plants come first followed by green oak, cork oak and finally pine. The results would be of vital importance to sound the alarm on the deterioration of biodiversity in the Taounat region in order to encourage all stakeholders to be effectively involved in safeguarding this heritage.

Keywords: anthropogenic activities; Tattooing; vegetable cover; Biodiversity.

Figures:



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2. El Mazi M, (2018). Evolution spatio-temporelle des écosystèmes forestiers dans les massifs numidiens de la chaîne rifaine (Maroc) : cas de Jbel Outka, Geo-Eco-Trop.
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4. Rapport I : Direction Provinciale des Eaux et Forêts et de la Lutte Contre la Désertification de Taounate, 2016.

Biography

A. Laftouhi has expertise in teaching the science of life and earth. He is interested in the study of the effect of climate change and anthropization on plant biodiversity. He is enrolled in the PhD program in 2018 at the University Sidi Mohamed Ben Abdellah, Fez, Morocco.

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A hydro-chemical and bacteriological study of five sources of groundwater in the Ghis-nekor and the Bokoya aquifers Al Hoceima

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[1] *Abdelmalek Essaâdi University, Faculty of Science and Technology of Tangier, Department of Earth Sciences / Geosciences research team on natural risks (GeoNaRes).*

Abstract

This study was carried out on the BOKOYA and GHISS-NEKOR tablecloth which are located in the North of Morocco. The aim of this work is to study the quality of groundwater in the Al Hoceima region intended for human consumption, and their physico-chemical and bacteriological characterization. As well as the determination of the main sources of contamination for the purpose of their protection and their preservation according to the Moroccan water law, especially since these waters are very requested by the inhabitants of the region, which constitutes a potential risk when the waters of these tablecloths are consumed without any treatment. Main water analyzes carried out: i) Physico-chemical analyzes of drinking water (Total Organic Carbon, Total and residual chlorine, Water hardness and alkalinity, Metals, Nitrites / nitrates, pH, turbidity, color), ii) Microbiological analyzes (Total coliforms and atypical bacteria, Fecal coliforms (E. Coli), Fecal Streptococci and enterococci). Analysis of the overall water quality revealed that the results of the physico-chemical analyzes of points P1 and P2 and P4 are of poor quality to very poor quality. And for the bacteriological results the points P1 and P2 and P3 are average to poor quality. Multivariate data analysis (PCA) has made it possible to classify these waters into two groups: more mineralized group (P1, P4, P5), and less mineralized group (P2, P3).The deterioration in the quality of the water in the BOKOYA and GHISS-NEKOR tablecloth may be of anthropogenic origin and may also be related to the dissolution of the minerals that make up the soil.

Figures:

Recent Publications

1. Chaimae Benaissa, ACM digital library scopus (March 2020). No.: 15 Pages 1–5https://doi.org/10.1145/3399205.3399221.

Biography

Author has her expertise in environnement and quality of water and study of sources and groundwater. She was warded her PhD in 2019 from the University of Abdelmalek Essadi, Morocco. She published 1paper on ACM.

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Validation of a Monaco TPS on an ELEKTA synergy MLCi2:using statistical methods and Gamma index for fullpackage beams

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[1] *LPMR Laboratory Department of Physics, Faculty of Sciences, Mohamed 1st University, Oujda, Morocco*
[2] *Medical physics Department, Part Consult Company, Casablanca, Morocco*
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Abstract

Intensity modulated radiotherapy (IMRT) is an advance technique of radiotherapy. The clinical implementation of (IMRT) requires spacial quality assurance (QA) procedures for multileaf collimator(MLC). The relationship between the MLC and delivered dose was controled by package called FullpackageQA provided by the manufacturer; this package was carried out to refine the modeling of MLC in order to establish a QA protocol.

In order to study how the modifications of the parameters of the treatment planning system (TPS) affect the calculations of the delivered dose distributions, we introduced different plans proposed by the FullPackage QA in the TPS and we compared their dose distribution to the dose distribution measured obtained from ElektaSynergy (MLCi2) in MyQAPatient (IBA, Germany).

All the FullPackageQA beams and IMRT / VMAT treatment plans for different locations were calculated in water phantom (30cmx30cmx30cm) using Monaco 5.11 TPS using 1% per control point statistical uncertainty, and verified on the machine using the gamma index factor.

Our results show the importance of gamma analysis method to predict the quality of dose calculation, and we demonstrate that the FullpackageQA can be integrated into an IMRT quality assurance programme.

Figures:

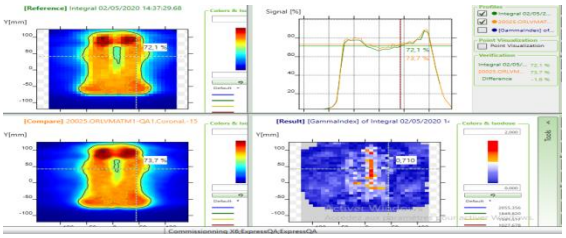

Fig1: 2D distribution along x and y of calculated and measured dose ORL

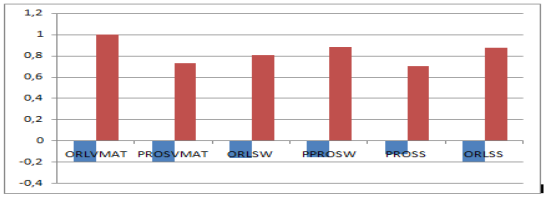

Table1: statistical resultants of clinical cases

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2. Strahinja -S, Luo -O, Xuejun- G,Arnold -,P, Qinan -B, Timothy D-S,AAPM , 2015 , Pages 154-165.
3. Qingyang -S, Andrew -G , Long- H ,Peng- Q , Ping- X, AAP M , 2017 , Pages 80-88.

Biography

Khalid el Ouardy: Born on 1 January 1984,. He follows scientific studies at the faculty of the Sciences Rabat then passes a thesis in medical physics studies at the Faculty of Medicine and Pharmacy in Casablanca at the same time he was working at Private Center of Oncology in Casablanca Radiotherapy Service, since July 2018 he works as a medical physicist and a person responsible of quality assurance accelerator at a private clinic in Oujda.

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Characterization of the mixed radiation field and the contribution of fragments produced by 400AMeV of carbon ions in H2O using GEANT4-simulation

Ayoub MARHOU[1], Mohammed HAMAL[1]

[1]*Department of Physics, Laboratory of physics of matter and radiation, Faculty of sciences, first Mohamed University, Oujda.*

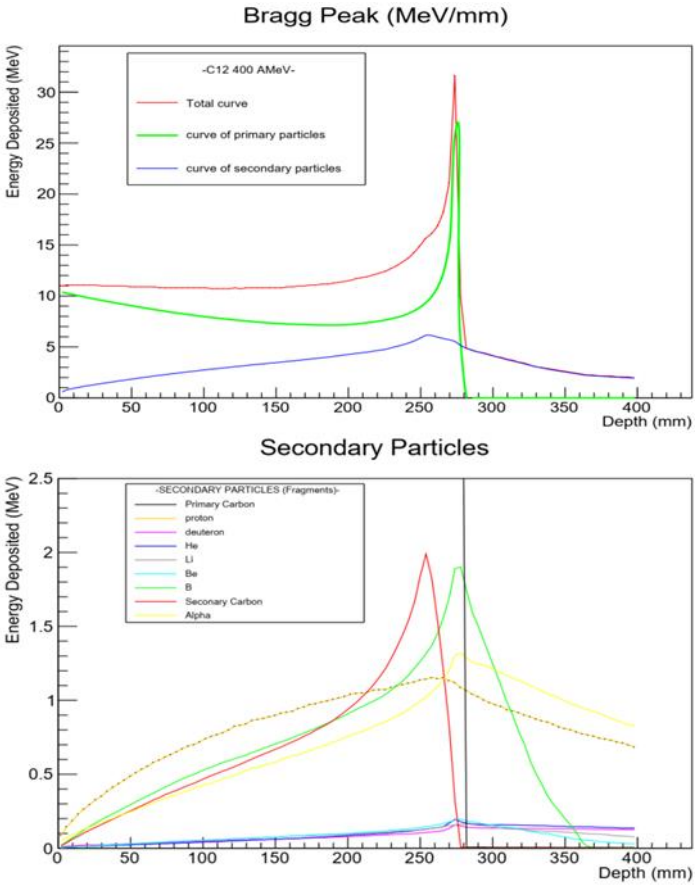
Abstract

Today, radiation-therapy is one of the most widely used methods for treating cancer caused by uncontrolled-proliferation of cells in a part of human-body. The most common way to apply radiation therapy is to irradiate the tumor with high energy-photons. However, the treatment with photons not ideal due to the deposition of the energy decreasing with depth. This deficiency helped us to propose a new treatment with new particles more effective at depth with less dose delivered to healthy-tissue and maximum dose to the tumor. A method that uses hadronic-particles like protons and heavy-ions is used currently in order to ameliorate the shooting-accuracy. This method is used very frequently to treat localized-tumors in depth.

The problem with hadrons and especially heavy-ions is when a beam of carbon-ions arrives in a medium it can have inelastic-collisions with the nuclei of the target which are at the origin of the fragmentation. These reactions lead to an attenuation of primary-beam and a production of the light-fragments. Consequently, these fragments can deposit their own energies beyond the tumor area, this dispersion called queue-of-fragments. This leads to an affect of the treatment efficiency.

Energy-deposition due to fragments produced can cause undesirable damages in healthy-tissues, especially at the area near to sensitive-organs like heart-or-brain for this reason, it is necessary to be more familiar with this method to avoid all errors in treatment. In fact, this work investigates the impact of fragmentation on treatment and the distribution of dose by secondary particles in phantom and also serves to characterize the radiation-field produced by carbon-ions beam. The study has been performed using GEANT4-simulation of carbon ions with energy of 400.AMeV in water phantom. Preliminary results agree with literature studies these are show the benefits of carbon ions which allow either providing higher dose in tumor-target and reducing it in the healthy-tissues.

Figures:



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2. Hai-Feng Ou, Bin Zhang, Shu-Jun Zhao. Monte Carlo Simulation for calculation of fragments produced by 400 MeV/u carbon ion beam in water. J Phys 2017;396:18-25.

Biography

A. MARHOU is a first year PhD student in physics at Mohammed first University, Oujda, Morocco under the direction of professor Mohammed HAMAL. The main research centre around Monte Carlo simulation of radiation-matter interactions in different environments.

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Comparative assessment of total phenolics content and in vitro antioxidant capacity variations of macerated leaf extracts of Olea europaea L. and Argania spinosa (L.) Skeels

A. Lfitat[1*], H. Zejli[1], F. Z. Bousraf[2], A. Bousselham[1], Y. El Atki[1], A. Gourch[2], B. Lyoussi[1], A. Abdellaoui[2]

[1]*Laboratory of Physiology Pharmacology and Environmental Health, Sidi Mohamed Ben Abdellah University, Fez, Morocco.*
[2]*Laboratory of Electrochemical Engineering, Modeling and Environmental, Sidi Mohamed Ben Abdellah University, Fez, Morocco.*

Abstract

The present study aims to ascertain the potency of *Olea europaea* L. and *Argania spinosa* (L.) Skeels leaves extracts in natural phenolic compounds of variable antioxidant properties. The obtained extracts were investigated for their total phenolic and total flavonoid content, total antioxidant activity (TAC), as well as evaluated for their ferric reducing ability (FRAP), β-carotene bleaching inhibition capacity and radical scavenging activity toward $DPPH^{\bullet}$ and $ABTS^{+}$ radicals.

Antioxidant results were expressed as IC_{50} and the inhibition in percentage (%). Total phenolic content was ranged from 378.10 ± 2.05 to 22.51 ± 0.07 mg/g DW in argan samples and from 226.50 ± 1.32 to 15.02 ± 0.04 mg/g DW in olive samples, expressed as gallic acid equivalents and shown in the decreasing order: methanolic extracts > aqueous extracts > ethyl acetate extracts. Moreover, for both species; the highest reducing and antiradical power as well as the greatest total antioxidant capacities, were obtained by the methanolic leave extracts, whilst the most distinguished β-carotene bleaching inhibition was observed for aqueous extracts of olive (90.67%) and argan (87.39%) macerated leaves. This highly revealed antioxidant activity was significantly linked to the important correlations between the *in vitro* executed assays and the extracts total phenolic (TP) and total flavonoid (TF) contents. Based on the obtained results, it could be concluded that argan and olive leaves display promising antioxidant capacities to potentially serve as rich sources of phenolic compounds with variable antioxidant properties.

Figures:

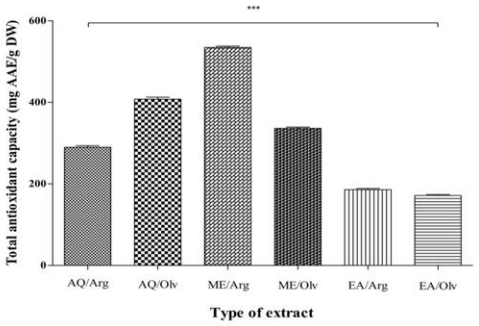

Fig. 1: Total antioxidant capacity of different argan and olive leaves extracts expressed as mg AAE/g DW (mg ascorbic acid equivalents/g dry weight). Arg: argan, Olv: olive, AQ: aqueous, ME: methanolic, EA: ethyl acetate. Each column value represents the mean ± SD of three different trials.

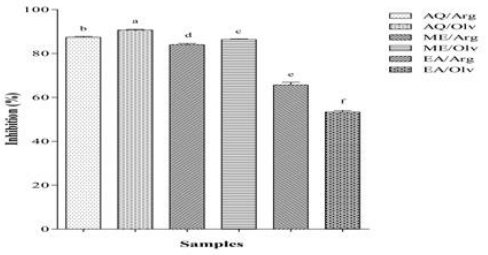

Fig. 2: Percentage (%) of β-carotene bleaching inhibition in various argan and olive leaf extracts. Each column value represents the mean ± SD of three different trials. Arg: argan, Olv: olive, AQ: aqueous, ME: methanolic, EA: ethyl acetate. Vertical bars labeled with different letters are significantly different ($p < 0.05$).

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2. Taroq A., El Kamari F., Aouam I., El Atki Y., Lyoussi B., Abdellaoui A., Asian J. Pharm. Clin. Res. 11 (12) (2018) 540–543.

Biography

Author is a PhD student, has her expertise in *in vitro* antioxidant activity evaluation and passion in encouraging the use of natural products by large population. Her focus is based on the valorization of natural bioactive molecules derived from plants parts.

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Numerical study of coupled heat transfers in an unvented trombe wall

Z. CHARQUI[1], M. BOUKENDIL[1], L. El MOUTAOUAKIL[1], Z. ZRIKEM [1], A. ABDELBAKI [1]

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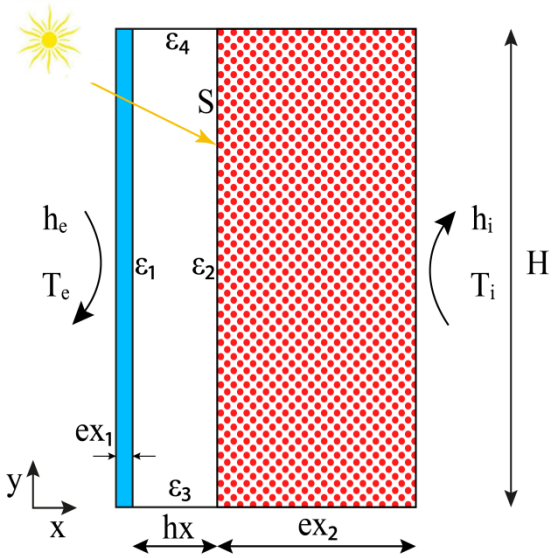
Abstract

Recently, several numerical and experimental studies have been conducted to study passive solar systems of trombe wall type [1-4]. This type of systems attracts the interest of many researchers due to their ability to cover a large part of the energy demand of buildings. Bellos et al. [1] studied the thermal behavior of an unvented trombe wall bearing a window. They found that this configuration is much more appropriate for buildings located in Athens. Abbassi et al. [2] studied the thermal behavior of a trombe wall having multiple fins to improve its thermal efficiency. Kaloyanov et al. [3] analyzed the thermal performance of a single and double-glazed trombe wall and they also examined the effect of heat transfer on the mechanical behavior of such a construction. Stazi et al. [4] experimentally studied the thermal behavior of a trombe wall under summer conditions. They found that a shaded trombe wall can reduce the cooling energy by 59.7% to 72.6%. In the present work, we are interested to study, under steady state, the coupled heat transfer by conduction, convection and radiation in an unvented trombe wall subjected to a solar flux (Figure). The extreme surfaces of the structure exchange heat with the inside and outside ambiences respectively with heat transfer coefficients h_e = 17 W/m²K and h_i = 8.3 W/m²K, while the horizontal surfaces are assumed to be adiabatic. The aspect ratio of the cavity is A_c = H/hx, the temperature difference between the two ambiences is maintained at ΔT=10K and the solar flux can vary from 1 to 1000W/m². The examination of the effect of glass and solid wall emissivities as well as the thickness and the aspect ratio of the air gap on the flow and heat transfer in such a structure will be the subject of this study.

Figures: Unvented trombe wall



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2. Abbassi F., Dehmani L., Energy and Buildings, 105 (2015) 119-128.
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Biography

Zouhair Charqui received his Bachelor in physics sciences from Cadi Ayyad University, Marrakesh, Morocco, in 2017. Two years later, he earned his Master degree in Fluid Mechanics and Energetics from the same university. He is currently a PhD student. His main areas of research interest are computational fluid dynamics, heat transfer and solar energy.

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Waste Effect on The Thermal Performance of Cement-based Composite

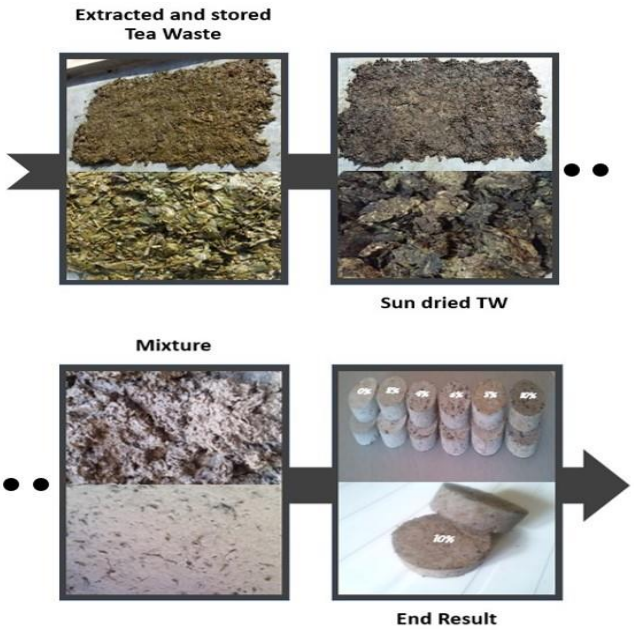
Othmane Horma [1], Mouatassim Charai [1,2], Ahmed Mezrhab [1]

[1] *Mohammed First University, Faculty of Sciences, Mechanics and Energetics Laboratory, 60000 Oujda, Morocco*
[2] *Université Paris-Est, CERTES, 61 Avenue du Général de Gaulle, 94010 Créteil Cedex, France*

Abstract

Energy sustainability has become a major worldwide concern in recent decades, because of the imminent depletion of fossil fuel along with its disastrous effect on the environment. The buildings and construction industries are leading sectors in energy consumption and CO2 emissions. Thus, efficient resources management by recycling waste through innovative building materials is necessary and cost-effective, to enhance building thermal performance. Agricultural wastes are the most common to be integrated into conventional binders, due to their pore making ability, leading to smart lightweight composites. This work tries to capture the thermal insulating potential of tea waste in cement-based composite. using Hot Disk Method. Experimental results indicate the positive influence of tea waste, as conductivity and diffusivity drop from 0.67 to 0.27 W/m.K and 0.36 to 0.23 mm^2/s, respectively. While a notable decrease in density related to the lightweight aspect was observed. Finally, through Energy-Plus, an annual simulation was carried out, in Eastern Morocco (Oujda), replacing in a building envelop, regular concrete with this new material to illustrate its comfort and economic benefits. Numerical results show remarkable impact of the tea waste composite on passive heating, representing 60% reduction compared to the reference case.

Figures: Sample preparation process



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3. H. Sghiouri, A. Mezrhab, M. Karkri, and E. Naji, vol. 18, pp. 292-302, 2018.

Biography

Author is a first year PhD student at the University of Mohammed First in Oujda, Morocco. His work concerns energy efficiency in buildings and specifically the development of innovative construction.

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Thermal analysis of hollow clay bricks submitted to a sinusoidal heating

B. Jamal, M. Boukendil, A. Abdelbaki and Z. Zrikem

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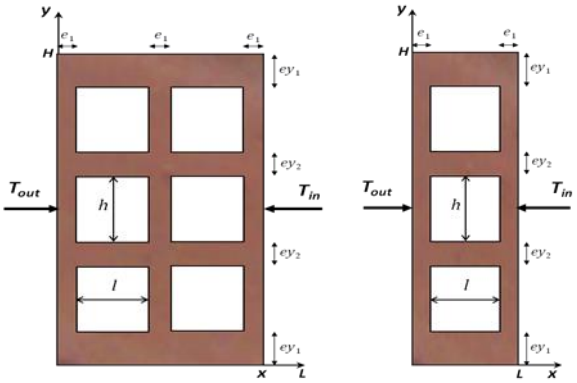
Abstract

The hollow bricks are usually used in the construction of building walls in Morocco. In recent years, several studies have been performed to investigate coupled heat transfer through hollow bricks [1-4]. The aim of the present work is to study numerically, in a transient state, the thermal behavior of three types of hollow bricks mostly used in the construction of building walls in Morocco. The coupled heat transfer by conduction through the surrounding walls, natural convection and surface radiation are taken into account. The outside vertical surface is submitted to a sinusoidal thermal excitation, while the inside vertical surface is maintained at a constant temperature. The top and bottom horizontal sides are assumed to be adiabatic. The governing equations for conservation of mass, momentum and energy are discretized by the finite volume approach and solved by the SIMPLE algorithm. The main parameters governing the problem are the amplitude, the period of the exciting temperature and the emissivity of the walls. The effect of these parameters on the global heat transfer through each structure is presented and examined. The results report that the hollow brick of Type 3 allows a good reduction of heat transfer from exterior to interior surfaces of the building walls and hence providing an adequate thermal comfort. The emissivity of the internal surfaces affect considerably the heat transfer through the hollow bricks. The use of low emissivity materials on internal surfaces of the hollow bricks would greatly help in improving the energy consumption in buildings.

Figures: *Studied hollow clay bricks*



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2. Henrique dos Santos G., Fogiatto M. A., Mendes N., Numerical analysis of thermal transmittance of hollow concrete blocks, J. Build. Phys., 1 (2017), pp. 1–18.
3. Fogiatto M. A., dos Santos H., and Catelan J. V. R., Numerical two-dimensional steady-state evaluation of the thermal transmittance reduction in hollow blocks, Energies, 12 (2019).
4. Sassine E., Cherif Y., Dgheim J., Antczak E., Experimental and Numerical Thermal Assessment of Lebanese Traditional Hollow Blocks, International Journal of Thermophysics, 47 (2020), 1-21.

Biography

Jamal Bouchaib is a phd student at laboratory of fluid mechanics and energetic, Faculty of Sciences Semlalia, Cadi Ayyad University, Marrakech, Morocco. He obtained a master's degree (2015) in energetic and environment from Cadi Ayyad University. His thesis subject is the study of coupled heat transfer by natural convection, thermal conduction and surface radiation through building walls.

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Development of multi-scale biocomposites from flax, nanocellulose and epoxy by resin infusion

ADLOUNI YOUSSEF [1*], ECHAABI JAMAL [1], MALLIL EL MOSTAPHA [1]

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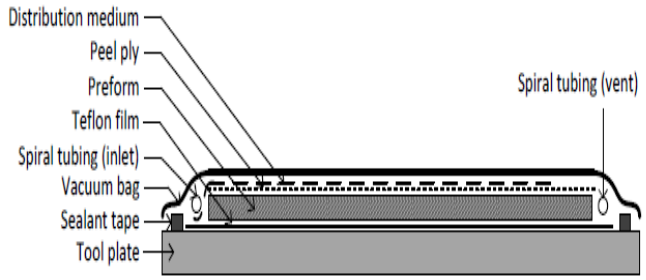
Abstract

Bio-based composite materials are increasingly gaining acceptance as viable alternatives to conventional composites. In parallel with their development, there have been significant advancements in the
Understanding of nano-modified composites. This includes the use of bio-based nano-modifiers such as Nano cellulose (NC) which is promising due to its abundance, low cost and excellent mechanical properties [1]. Advancement in these two areas raises the possibility of producing novel multi-scale biocomposites, which could mimic the hierarchical structure of highly efficient materials found in nature.
Some studies have already shown noticeable increases in mechanical properties by making use of hierarchical structures in biocomposites using conventional manufacturing processes [2].
This paper begins with a description of the fabric treatment process followed by the manufacturing of multi-scale plates by the resin infusion process. The results from void analysis, drop-weight impact testing and short beam testing are then discussed.
Multi-scale composites based on flax, epoxy and nanocellulose were developed using the resin infusion process. Two methods to incorporate the NC were explored; a grafting technique based on a silane treatment and a wet-layup of aqueous NC solution in the
resin infusion pre-filling stage. Void analysis revealed that the silane-based grafting technique led to a high amount of interlaminar voids and consequently a reduction in short beam and drop-weight impact properties. Conversely, the wet layup technique did not lead to interlaminar voids. However, a marked decrease in impact properties was still noted for this method in drop-weight impact tests. Overall, the incorporation of NC by the studied methods did not lead to an improvement in interlaminar properties. This study highlights the link between the incorporation of nano-modifiers such as NC in composite manufacturing processes and the final quality of the composite part.

Figures: *Bagging arrangement for resin infusion laminate manufacturing*



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2. Okubo, K., T.Fujii, and E.T. Thostenson, "Multi-scale hybrid biocomposite: Processing and Mechanical characterization of bamboo fiber reinforced PLA with microfibrillated cellulose". Composites Part A: Applied Science and Manufacturing, 40(4): p. 469-475, (2009).

Biography

Author has her expertise in resin infusion treatment and the simulation of the phenomenon. His focus is based on comparison between conventional composites and bio-composites. He is preparing his PHD in 2020 from university Hassan II in Casablanca.

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Forecast risk maps of land movements in the eastern rif-Morocco

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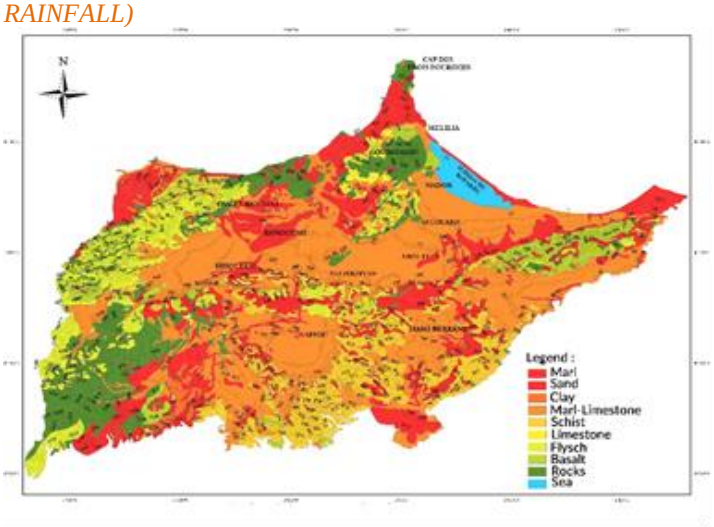
Abstract

The Estern Rif is a geographical area known for its strong dips at the level of the coast, enhanced by its mountainous topography, it is also known for its poor lithological context due to the predominance of soils with weak Geotechnical parameters, namely: shale…; as well as its heavy rainfall due to its Mediterranean climate; the latter is relatively medium and often in the form of thunderstorms, sometimes very strong, mainly due to hot weather depressions; finally it is also known by its strong seismic activity given its position on the border of the African tectonic plate which moves towards the Eurasian plate (area 5 according to RPS 2000 version 2011),

These four parameters: Topography, lithology; Rainfall; Seismicity; make the eastern rif an area rich in slope instabilities whose treatment requires high costs of public expenditure, these soil movements hinder the development of this region, namely: the extension of agglomerations; the ramification of the road network; the equipment of electrical network as well as drinking water infrastructure…

At the time of their appearance, landslides constitute natural disasters generating very significant human and material damage, like the disaster of the landslide between Kassita-Driouech in 2008, hence the interest of establishing Forecasting risk maps taking into account the coexistence of the four aforementioned parameters to illustrate the level of risk of landslides in an evolutionary way which leads us to define four scenarios from which four risk maps will result depending on the simultaneity of existence of said parameters. These four risk maps that did not previously exist in the study area; will serve as guides to avoid high-risk areas when planning new infrastructure projects. Notably in the ministry of equipment, transport logistics and water; the provinces; the municipalities: as well as the Technical design department; Laboratories; and executing company...

Figures: *Risk Map SCENARIO 3: NOT DRAINED WITHOUT EARTHQUAKE (WITH THE PRESENCE OF HEAVY RAINFALL)*



Recent Publications

1. Methodology for mapping natural hazards linked to land movements in the Provinces of Nador and Driouch- Eastern Rif, Morocco.Belhadj Kamal ; Conference Abstract ; 2020 2nd International Conference on Geomatics (MORGEO 2020).

Biography

The author is a state engineer in civil engineering from the Hassania School of Public Work promotion of 2011; he held the position of a technical director of a renowned design office in the oriental region specialized in the design of buildings and public works. Currently, he is regional director of a technical control office of national renown in construction and civil engineering since 2015; besides he is a temporary professor at the Mohammed first University since 2012 for the benefit of the master's degrees M1 and M2 and licenses L1 and L2 falling under the Laboratory of Applied Geosciences. He is currently a Ph.D. student in the third year at the same laboratory in the Specialty of Geosciences of Environment and Civil Engineering; he recently participated as a speaker at the international conference MORGEO 2020 which was held by virtual conference due to worldwide spread of the COVID-19 pandemic.

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Hydrosilylation of allylic benzene derivatives with cyclic siloxane D4H and their polymerization

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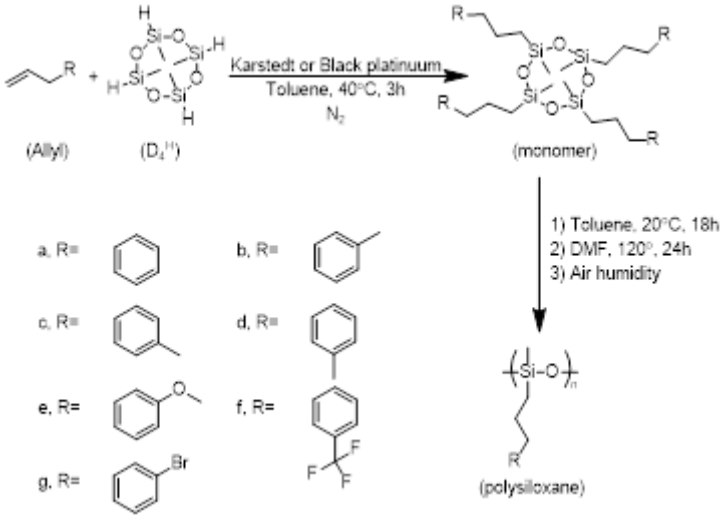
Abstract

There are many enough publications on the hydrosilylation of allyl benzene and related compounds with various hydrosilanes in the presence of the complexes of cobalt, nickel, zirconium, palladium, platinum, rhodium and so on [1]. However, there are only a few publications concerning synthesis of styrene derivatives containing Si–H group. For example, a reaction of α-methylstyrene with α,ωbis(trimethylsiloxy)methylhydro-siloxane in anhydrous toluene or tetrahydrofuran has been described and results should a height regioselectivity[2].

Indeed, the introduction of a functional group in polysiloxane can lead to radical changes in the physico-chemical characteristics of the latter. After the monomers have been obtained, there are two polymerization methods that give access to linear polysiloxanes: the polycondensation of linear functional oligomers and the ring-opening polymerization of cyclosiloxanes. This last type of polymerization has been described in numerous publications [3].

We have developed a simple and easy method to synthesize functionalized siloxanes using D_4^H as the starting siloxane, the reaction is highly regioselective. Karstedt's-catalyst appeared to be most efficient. The same kind of reactivity and selectivity were observed with black platinum, although 100 times more catalyst was used [4]. Polysiloxanes have been synthesized using BiLu as initiator in toluene, the propagation is catalyzed by the addition of DMF and desactivation took place in ambient air. The hydrosilylation reaction and the polymerization are carried out according to the following scheme.

Figures: *Hydrosilylation of allylic benzene derivatives with cyclic siloxane D4H and their polymerization*



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2. Mukbaniani, O., Tatrishvili, T., Titvinidze, G., and Mukbaniani, N., J. Appl. Polym. Sci. (2006) vol. 101, p. 388
3. Casey L. E. and Timothy E. L., Macromolecules (2004) 37, 6657-6659.
4. El Malki, Hannioui A., Rakib E. M., Knouzi N., Vaultier M., Letters in Organic Chemistry (2011) 8(5), 361-363.

Biography

Zainab RBIHI, first year PhD student at the Faculty of Science and Technical in Beni Mellal, Morocco.

I am interested in the development of an easy and simple method to synthesize functional polysiloxanes by optimizing the reaction condition. I have been included in two publications (second author, third author).

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Optimization of the Process Parameters of the Resin Film Infusion Manufacturing Process

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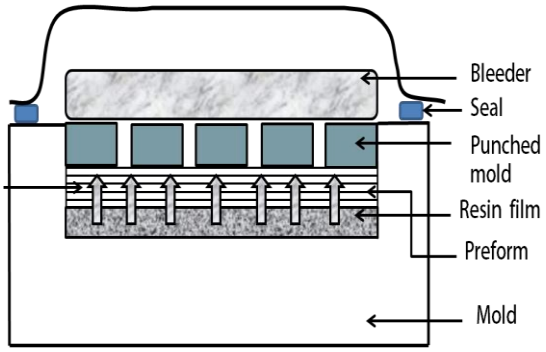
Abstract

Resin film infusion (RFI) is one of the liquid moulding techniques which is increasingly gaining the attention of composite material manufacturers. In this respect, it has been shown that this process offers a significant reduction in tooling costs, since it is based on the use of a single rigid face, unlike the resin transfer moulding process, to which RFI is favourably comparable, given the main technological limitations relating to cost and the moulds designed for this purpose.

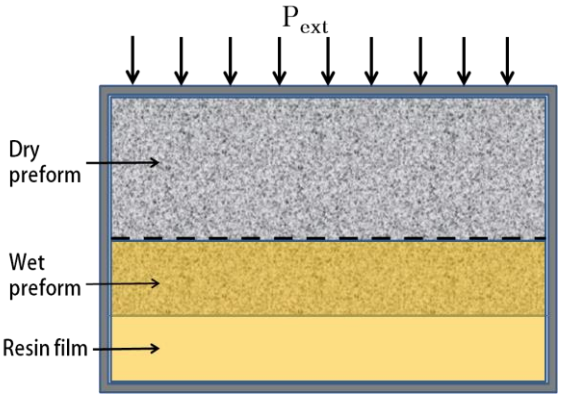
Especially known for the low investment cost required, the RFI process is increasingly used in the aeronautical industry. However, many aspects of this process are poorly mastered. In other words, the physical quality of the final part depends on the process used. In the present case of RFI, the control of the physical characteristics such as thickness, fiber content and void ratio remain major issues.

In this paper, our study proposes to highlight the impact of the different parameters of the polymerization cycle on the quality of the product, as well as the procedure to control these parameters in order to enhance and optimize the mechanical properties of the composite obtained by the RFI process.

Figures:



a – The RFI mold components



b – The filling scheme of RFI process

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3. Yenilmez B., Senan M., Sozer E M. 2009. Composites Science and Technology 69 (2009) 1710–1719
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5. Zhou Z.J., Li M., Gu Y.Z., Ma X.Q., Li Y.X., Jia L.J., Zhang Z.G. POLYM. COMPOS., 35 (2014) 681–690

Biography

Author has a short experience in the field of scientific research, since this is the first participation with an article in a conference. Member of the Applied Research Team on Polymers, at the High National School of Electricity and Mechanics, Hassan II University of Casablanca. PhD student in 2nd year at the ENSEM school, no paper yet.

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Y-shaped mesoscopic demultiplexer device based on Fano and induced transparency resonances

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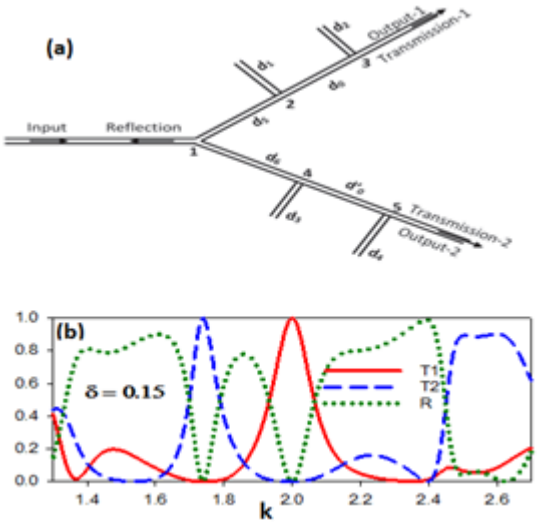
[2]*LSTA, Département de Physique, Faculté Polydisciplinaire de Larache, Université Abdelmalek Essaadi, Tétouan, Morocco*
[3]*LPMCER, Département de Physique, Faculté des Sciences et Techniques de Mohammedia, Université Hassan II, Casablanca, Morocco*

Abstract

Electromagnetically induced transparency (EIT) is a phenomenon that can transform an opaque system into a transparent system. This effect was observed for the first time in the Strontium vapor by Boller et al. [1]. Besides EIT resonances, Fano resonances are a universal phenomenon. Historically, it has been discovered in the asymmetric profile of the absorption spectrum of rare gases [2]. In condensed matter physics, the analog of Fano and EIT phenomena has been demonstrated in different types of structures, such as acoustic waveguides [3], photonic circuits [4], and electronic transport in mesoscopic systems [5].

In this work, we study a simple mesoscopic demultiplexer device (Fig. (a)) using induced transparency resonances (EIT) and Fano resonances. The objective of this work is the following: i) we show that a simple mesoscopic structure composed of two quantum stubs grafted at two different positions with the shape of U, may present Fano and EIT resonances. ii) The U-structure is then proposed to make a mesoscopic demultiplexer with an input waveguide and two output waveguides where a specific U-structure is placed on each output line, namely, two resonators of lengths d_1 and d_2 separated by a distance d_0 are inserted along the first waveguide at a distance d_5 from the input waveguide, while the second waveguide is composed of two resonators of length d_3 and d_4 separated by a distance of d'_0 and from the input by a wire of length d_6 (Fig. (a)). In this context, we have determined analytically the expressions of the lengths of the different guides to obtain the total transmission in one output line without perturbing the other line. In Fig. (b), we have presented this phenomenon through an analysis of the transmission coefficient versus the reduced wave vector along both output lines. We can see that for an appropriate geometrical parameters of the system, when the transmission in one line is unity, the reflection and the transmission in the other line is zero and vice versa.

Figures: *(a) Diagram of a Y-shaped mesoscopic demultiplexer with one input line and two output lines. (b) Variation of the transmission along the output 1, the output 2 and the reflection in the input of the demultiplexer as a function of the wave vector*



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2. J.O.Connerade and A. M. Lane, Rep. Prog. Phys. 51 (1988) 1439.
3. H. Al-Wahsh, E. H. El Boudouti, B. Djafari-Rouhani, A. Akjouj, T. Mrabti, and L. Dobrzynski, Phys. Rev. B 78 (2008) 075401.
4. A. Mouadili, E. H. El Boudouti, A. Soltani, A. Talbi, A. Akjouj, and B. Djafari-Rouhani, J. Appl. Phys. 113 (2013) 164101.
5. T. Mrabti, Z. Labdouti, A. Mouadili, E.H. El Boudouti, B. Djafari-Rouhani, Physica E 116 (2020) 113770.

Biography

The Author has an expertise in modeling and simulating (numerically) electronic transport in mesoscopic systems. He is a PhD student at the Faculty of Sciences, University Mohammed I, Oujda (Morocco).

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Realization and demonstration an attack technique on the vehicle's electrical system to control a computer via the CAN bus

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Abstract

In most current vehicles produced, the functionalities regulated by electronic control units (ECU) which communicate with each other through the standard communication protocol CAN (Controller Area Network), described by the ISO 11898 standard, are considered one of the main characteristics of current vehicles. The quality of data transport by this CAN bus is perfect by ensuring a wide propagation in order to reach all areas of a vehicle in a reduced time. On the other hand, this technique does not attach much importance to a security system due to the lack of confidentiality and the ease of access (physical or remote), which makes the CAN bus control system vulnerable. This powerlessness leaves the possibility of controlling the vehicle externally and of putting the occupants of the vehicle in danger. The purpose of this paper is to describe the current vulnerability of the security system against attacks, as well as a demonstration of hacking technique on the automotive network (CAN Bus) to control the dashboard computer. The tests are carried out on a DACIA Dokker vehicle available at the Oujda Higher Technical School (ESTO).

Figures:

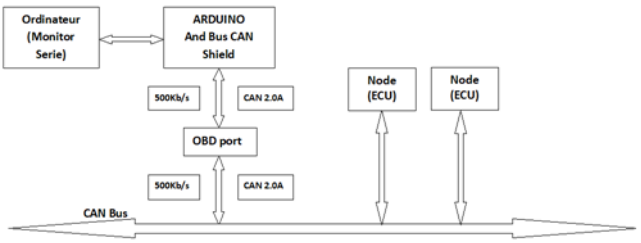

Fig.1. System Block Diagram

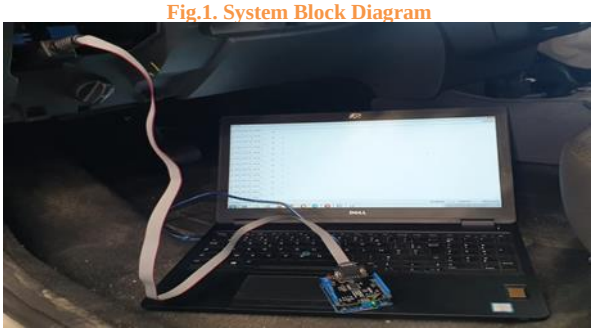

Fig.4. Working model

Recent Publications

1. ISO11898-1:2015, "Road vehicles -- Controller area network (CAN) -- Part 1: Data link layer and physical signaling," Feb. 2015
2. OMID AVATEFIPOUR1, AMEENA SAAD AL-SUMAITI 2, (Member, IEEE), AHMED M. EL-SHERBEENY3, EMAD MAHROUS AWWAD4, MOHAMMED A. ELMELIGY5, MOHAMED A. MOHAMED 6, (Member, IEEE), AND HAFIZ MALIK 1, (Senior Member, IEEE), An Intelligent Secured Framework for Cyberattack Detection in Electric Vehicles' CAN Bus Using Machine Learning, date of publication August 26, 2019, IEEE Access.

Biography

Mohammed KARROUCHI was born in Oujda, Morocco, in 1994. He received his M.Sc. degree in optics and materials from the Mohammed I University in Oujda, Morocco, in 2018. He is currently working toward a Ph.D. degree, in Electrical Engineering and Maintenance Laboratory, High School of Technology, Mohammed First University, Oujda, Morocco. Since 2018, his research interests include the implementation of an on-board system dedicated to the inspection of the vehicle condition, as well as the ease and fluidity of driving to acquire progress in the field of automotive technology.

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Natural convection in a square cavity containing two heat-generating cylinders with different geometries

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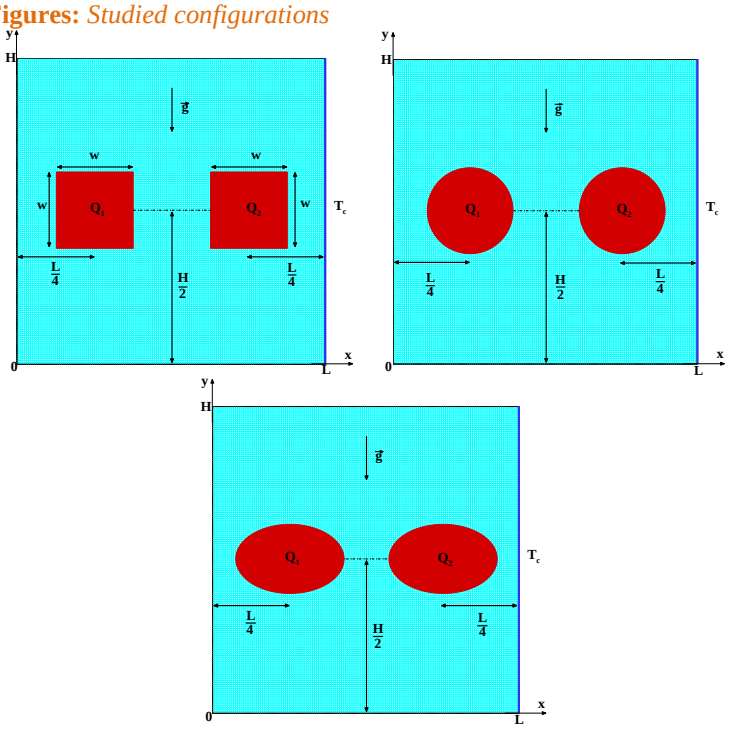
[1]*LMFE, Department of Physics, Cadi Ayyad University, Faculty of Sciences Semlalia B.P. 2390 Marrakech, Morocco.*

Abstract

Over the last few years, the study of heat transfer by natural convection in closed cavities containing blocks, active or inactive, has constituted a pole of attraction leading to a bibliography on this type of configuration. This attention was dictated by the importance of such configurations in various fields of engineering and the habitat field. Thus, natural convection can adequately ensure the evacuation of surplus energy when the powers released are low. Many researchers [1-5] have studied this problem, either from improving the rate of heat transfer or from optimizing the shape of the studied blocks.

It appears from this review of the literature and according to our knowledge, that natural convection around the two heat-generating cylinders of different geometric shapes in a cavity cooled by one of these sides has not been studied. For this purpose, we propose in this work to study numerically the two-dimensional natural convection in a square air-filled cavity (figure). Inside this cavity are two cylinders that can have several geometric shapes (square, circular, elliptical) generating uniform volume powers Q_1 and Q_2. The surface of the circular cylinders is in all cases identical to that of the square cylinder on the side w = L/4. The finite volume method based on the SIMPLE algorithm was used to solve the equations governing this problem. The right wall of the cavity is cooled uniformly with a constant temperature T_c, while the other walls are assumed to be perfectly adiabatic. The two cylinders are placed on the horizontal median of the cavity. In this work, the effect of the geometrical shape of the two blocks and the two-volume powers on the flow structure and heat transfer are studied for the two Rayleigh numbers ranging from 10^3 to 10^7.

Figures: *Studied configurations*



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2. *Hussain S. H., Rahomey M. S., J. Heat Transfer. 141 (2) (2019) 022501.*
3. *Selimefendigil F., Öztop H. F., J. Taiwan Inst Chem Eng. 56 (2015) 42-56.*
4. *House J. M., Beckermann C., Smith T. F., Numerical Heat Transfer. Part A, 18 (1990) 213–225.*
5. *Oh J. Y, Ha M. Y, Kim K. C, Numerical Heat Transfer. Part A, 31 (1997) 289-303.*

Biography

Rachid Hidki is currently a PhD student at the Department of Physics, Faculty of Science Semlalia, Cadi Ayyad University, Marrakesh, Morocco. He obtained his Master of Fluid Mechanics and Energy in 2019 at Cadi Ayyad University. His thesis work focuses on numerical simulation of heat transfer and fluid flows in cavities containing heating blocks.

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Thermodynamic and electrochemical study of manganese complex as Efficient Inhibitor of Corrosion of Mild Steel in Acidic Solution 1 M HCl

A. RADI[1], B. El MAHI[1], A. AOUNITI[1], M.El MASSOUDI[1], S. RADI[1] ,M. KADDOURI[1], A. ZERROUK[2]

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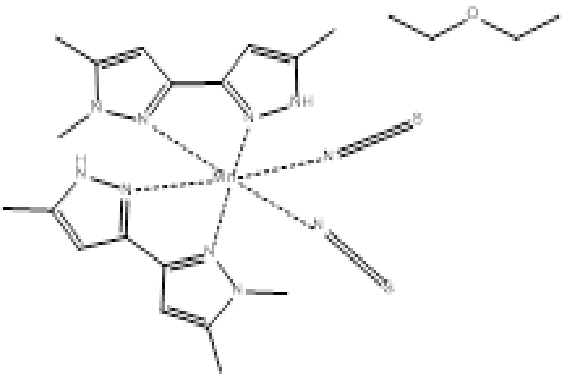
[2] *Laboratoire de Matériaux, Nanotechnologie et Environnement-LMNE FSR*

Abstract

Nowadays, prevention against metallic corrosion is becoming a necessity, given the enormous role of metals in many industrial applications **(1)**. Faced with this problem, the presentation of inhibitors becomes mandatory. Most well-known inhibitors are organic compounds containing heteroatoms, such as O, N and/or S and multiple bonds **(2,3)**, which allow adsorption on the metal surface. Moreover, the adsorption of these molecules on the metal surface is due to the presence of substituents and functional groups such as the aromatic ring, the π conjugated system, the mesomeric and inductive effect and steric factors through physico-chemical interactions. In our case, we used manganese (II) complexes. Thus, according to gravimetric and electrochemical methods **(4)**, these coordination compounds show good inhibition properties for the corrosion of steel in an HCl (1M) acid bath. The inhibitory action of this complex is mainly on cathodic and anodic sites with cathodic predominance. The thermodynamic study shows that the inhibitory action of this molecule on the surface of the steel is obeyed by the Langmuir adsorption isotherm. these results are confirmed by the optical image method and the visible UV spectrometry **(5).**

Figures:



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2. I. Ahamad, M.A. Quraishi, Corros. Sci. 51 (2009) 2006.
3. I.B. Obot, N.O. Obi-Egbedi, Corros. Sci. 52 (2010) 198.
4. Omar A. Hazazi, Ahmed Fawzy, Mohamed R. Shaaban, Mohamed I. Awad. Int. J. Electrochem. Sci., 9 (2014) 1378 - 1389
5. M. Rbaa, Ashraf S. Abousalem, M. Ebn Touhami, I. Warade, F. Bentiss, B. Lakhrissi, A. Zarrouk. Journal of Molecular Liquids290 (2019)111243.

Biography

Author has expertise in the synthesis and characterization of novel compounds based on amino acids grafted on pyrazoles: synthesis and electrochemical applications. She is in her third year of doctorate at the University of Oujda in Morocco. She participated in several congresses. She published two articles on pyrazole ligands in 2007. She has articles in treatment.

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From Argan nut shells towards mesoporous activated carbons

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Abstract

In this work we report a new and simple approach for converting biomass into mesoporous activated carbon (MAC) with high specific surface area. Argan nut shells were chemically activated using phosphoric acid (H_3PO_4) as chemical activator. The activation conditions such as the activating temperature and the impregnation ratio on H_3PO_4 were optimized and their effects into the yield and the physical-chemical properties of activated carbons were investigated. Regardless the activation conditions, the activated carbons have shown a great porosity development (BET surfaces areas up to 1879 m^2/g), as well as excellent oxygen-functionalized surfaces. Besides, the surface functionality and the well-balanced micro/meso-porosity of the optimized material confer to it a wide field of applications such as gas and energy storage, catalysis and water treatment (the mesopores occupied 50 % of the total volume). However, in this work we had chosen to evaluate the adsorption performance of MAC on an organic molecule classified as endocrine disruptor for living organism noted bisphenol A (BPA). Promising results in the adsorption of BPA were obtained, showing the efficiency of the present synthesis strategy for converting a low value lignocellulosic biomass into high surface area mesoporous carbons, which could be destinated for the wastewater treatment field.

Figures:

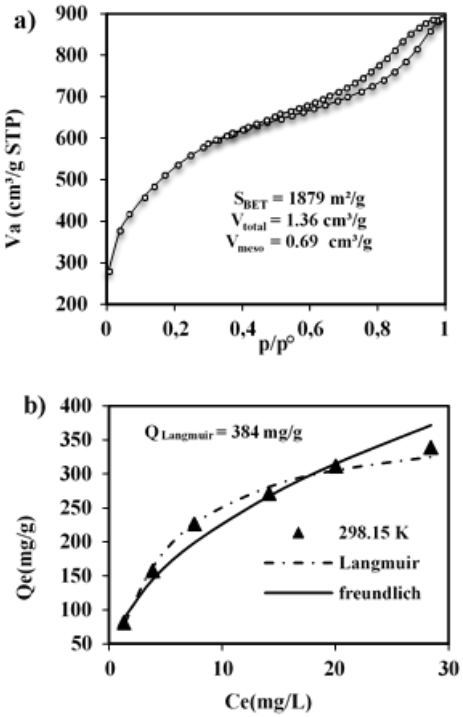

Figure. a) N_2-sorption isotherms of MAC and **b)** BPA-adsorption isotherms of MAC

Biography

CHATIR El Mehdi

The author is a second years PhD student in environmental catalysis chemistry at Chouaïb Doukkali University. His work focus on the preparation of porous carbonaceous materials from biowaste for catalysis and wastewater treatment.

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Discovery new 3,5-disubstituted indole as hematological anticancer, using 3D-QSAR studies

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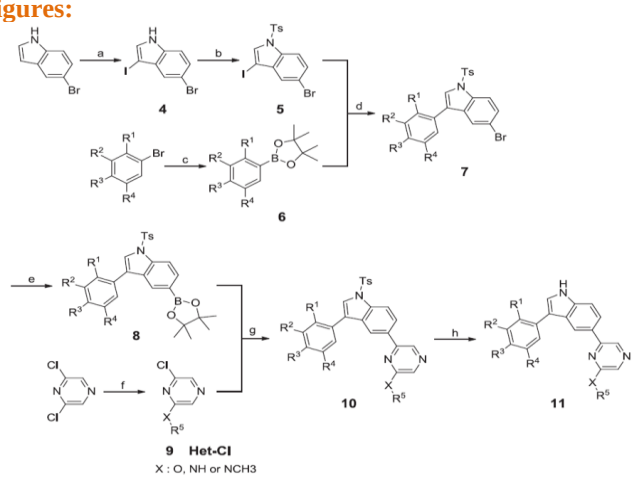
Abstract

The World Health Organization (WHO) considers cancer as the deadliest disease, according to the increase in the death toll in the 21 century. In the new therapeutic molecules, the scientific researches consider the proviral integration moloney (Pim) kinases as promising therapeutic targets for the treatment of hematological cancers. A series of thirty-four 3,5-disubstituted indole derivatives as potent Pim1 kinase inhibitors were studied based on the 3D-QSAR (CoMFA and CoMSIA) and molecular docking. CoMFA analysis showed Q^2 value of 0.562, the R^2 value of 0.857 and r_{test}^2 value of 0.779, while CoMSIA analysis showed a Q^2 value of 0.732, the R^2 value of 0.935 and the r_{test}^2 value of 0.603. The methods models were performed using 28 compounds in the training set and 6 compounds in test set. Furthermore, the contour maps, acquired from the CoMSIA and CoMFA models, used to rationalize the principal structural necessities accountable for the activity. Therefore , the four new molecules were designed, molecular docking study was carried out on the highest, the least and the predicted X_3 potent compounds, it revealed the important interactions between the predict X_3 and receptor.

Figures:



Scheme 1. Reagents and experimental conditions: (a) NaI, NCS, DMF, RT; (b) NaH, TsCl, DMF, RT;(c) bis(pinacolato)diboron,$PdCl_2$(dppf),KOAc,1,4-dioxane, microwave; (d) $Pd(PPh_3)_4$, 2 M Na_2CO_3, DME, microwave; (e) bis(pinacolato)diboron, $PdCl_2$(dppf), KOAc, 1,4-dioxane, microwave; (f) NaH, R^5OH, THF, microwave or R^5NH_2 (or R^5NHCH_3), K_2CO_3, DMF, RT; (g) $Pd(PPh_3)_4$,2MK_2CO_3, 1,4-dioxane/EtOH (2:3), microwave; (h) K_2CO_3, 2-methoxyethanol, microwave or i) 2 M HCl, DCM, ii) K_2CO_3, 2-methoxyethanol, microwave.

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Biography

The author has the experience of predict new organic compounds, this one have highly anticancer activity, and to use in the pharmaceutical industry, by using the 3D-QSAR et CoMFA and CoMSIA contours . he published more than 3 papers.

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Organic materials based with D– π –A structure based on thiophene and anthracene for application in dye-sensitized solar cells

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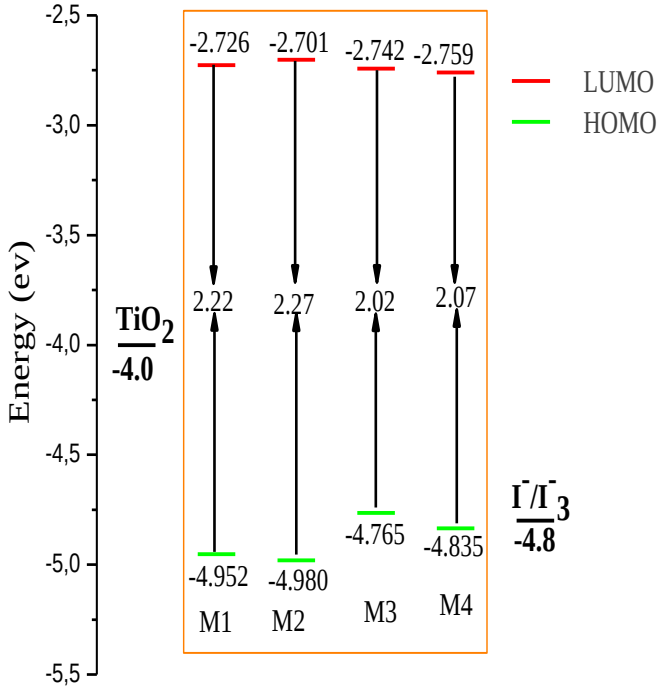
Abstract

In search of new high-performance materials to be used in organic solar cells by changing the bridge of molecules already synthesized, we used the functional density theory (DFT) and Time-dependent density-functional theory (TD/DFT) with several methods such as B3LYP, PBEPBE, B3PW91, mPW1PW91 and the basic set 6-31G (d, p), the electronic structures and optoelectronic properties of four organic dyes based on 2-(6-substituted-anthracen-2-yl)-thiophene as the π conjugated bridge, different amines as electron donors, and cyanoacrylic acid group as an electron acceptor have been calculated and discussed theoretically in the aim to obtain the most suitable method. The calculated electronic levels HOMO, LUMO, and Egap of the studied compounds show that the B3LYP method with the 6-31G base set (d, p) offers better performances such as lower energy gap. Then, we studied the influence of the change of bridge (anthracene) by thiophene and benzene on the electronic, optical and photovoltaic properties of these organic dyes.TD-B3LYP functional was used to describe optoelectronic properties such as the UV-visible spectrum for the various compounds studied. Furthermore, the free energy of electron injection (ΔG inject), LHE and O.S were calculated and analyzed. In conclusion, the calculated results reveal that the new compounds studied can be used as good candidates for dye-sensitized solar cells (DSSC) due to its best electronic and optical properties and good photovoltaic parameters except for compound M3.

Figures:



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Biography

AZAID Ahmed 34 years old born in Sidi Ifni, doctoral student in Chemistry at Moulay Ismail University in Meknes (Morocco) 2019/2020, specializing in physical chemistry of materials, renewable energy and the environment.

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Theoretical design of new organic compounds based on diketopyrrolopyrrole and phenyl for organic bulk heterojunction solar cell applications: DFT and TD-DFT study

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[3] *MEM (LASMAR) ESTM, Moulay Ismail University of Meknes, Morocco*

Abstract

In this work, a theoretical study of π-conjugated materials based on diphenyl-diketopyrrolopyrrole is presented with the aim of proposing new organic materials for BHJ solar cells. Moreover, four compounds M_1, M_2, M_3 and M_4 have been reported. The geometric and electronic properties for these studied compounds are calculated after optimization in their fundamental states with DFT/B3LYP/6−311G (d, p). Using this method, several parameters such as frontier molecular orbital, the HOMO and LUMO energies levels, the bandgap, chemical reactivity indices, the V_{oc} and molecular electrostatic potential (MEP) have been discussed. The optical properties such as the transition energy, the wavelengths (λ_{max}), the excitation vertical energy and the corresponding oscillator strengths have been carried out at the ground-state geometries using the TD−DFT method at CAM–B3LYP/6–311G (d, p). This investigation has been used to carry out the next synthesis to compounds more effective as active materials in optoelectronic.

Keyword: Bulk heterojunction; Solar cells; DPP; Bulk heterojunction; Phenyl; TD-CAM B3LYP

Figure: *Chemical structure for the proposed compounds M1, M2, M3 and M4*

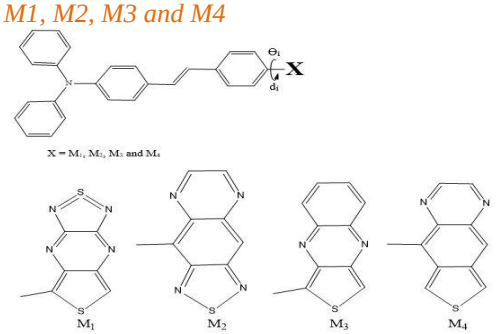

Table 1: Energies E_{HOMO}, E_{LUMO} and E_{gap} for the studied molecules obtained by DFT/ B3LYP/6−311G (d, p).

Compounds	$-E_{HOMO}$ (eV)	$-E_{LUMO}$ (eV)	E_{GAP} (eV)
M1	3.87	5.36	1.49
M2	3.29	5.09	1.80
M3	3.01	5.00	1.99
M4	2.71	5.05	2.34

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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.

In Silico Design of Novel Pyrazole Derivatives Containing Thiourea Skeleton as Anti-cancer Agents using: 3D-QSAR, Docking Molecular and ADMET Prediction

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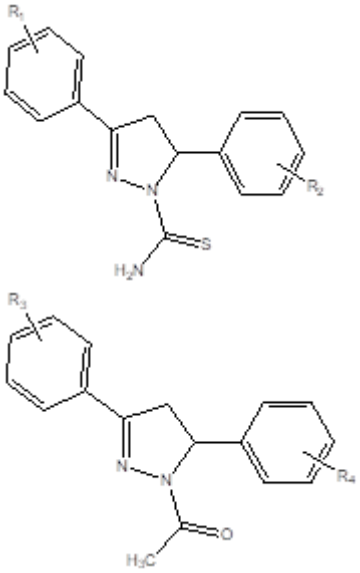
[1]Natural Substances and Molecular Chemistry Laboratory (SOOM), Faculty of Science, Moulay Ismail University of Meknes, Morocco
[2]Materials, Environment and Modeling (MEM), LASMAR Laboratory, ESTM, Moulay Ismail University, of Meknes, Morocco
[3]LIMOME laboratory, Faculty of sciences Dhar El Mahraz, Sidi Mohamed ben abdellah university, Fez, Morocco

.

Abstract

A forty two compounds of Pyrazole derivatives containing thiourea analogs, as potential EGFR kinase (epidermal growth factor receptor) inhibitors have been subjected to 3D-QSAR (3-Dimensional Quantitative Structural-Activity Relationship) studies using CoMFA (Comparative Molecular Field Analysis) and CoMSIA (Comparative Molecular Similarity Indices Analysis). The training and the test set of pyrazole derivatives have been used for the generation and validation of QSAR model, respectively. Dataset alignment has been performed using the lowest energy conformer of the most active compound. The best generated CoMFA and CoMSIA models exhibit conventional determination coefficients R^2 of 0.92 and 0.90 as well as the Leave One Out cross validation determination coefficients Q^2 of 0.58 and 0.73, respectively. Moreover, the predictive ability of those models was evaluated by the external validation using a test set of five compounds with predicted determination coefficients R^2test of 0.72 and 0.76, respectively. Docking results are in concordance with CoMSIA contour maps, gave the information for interactive mode exploration. Based on those satisfactory results, ten new compounds have been designed and predicted by in silico ADMET method. This study could expand the understanding of pyrazole derivatives as EGFR kinase inhibitors and would be of great help in lead optimization for early drug discovery of highly potent anticancer activity.

Figures: *The chemical structure of the studied compounds*



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2. L. El Mchichi, A. Belhassan, A. Aouidate, A. Ghaleb, T. Lakhlifi, and M. Bouachrine, "QSAR Study of New Compounds Based on 1, 2, 4-Triazole as Potential Anticancer Agents," Phys. Chem. Res., vol. 8, no. 1, pp. 125–137, 2020.

Biography

Qualified secondary school teacher 1st grade –specialty physic and chemistry. Materials, Modeling & Environment Laboratory (MME) University Moulay Ismail, BP 11201-Zitoune, Meknes, 50070, Morocco.

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Bismuth-triflate-catalyzed for the preparation of flexible polyurethane foams

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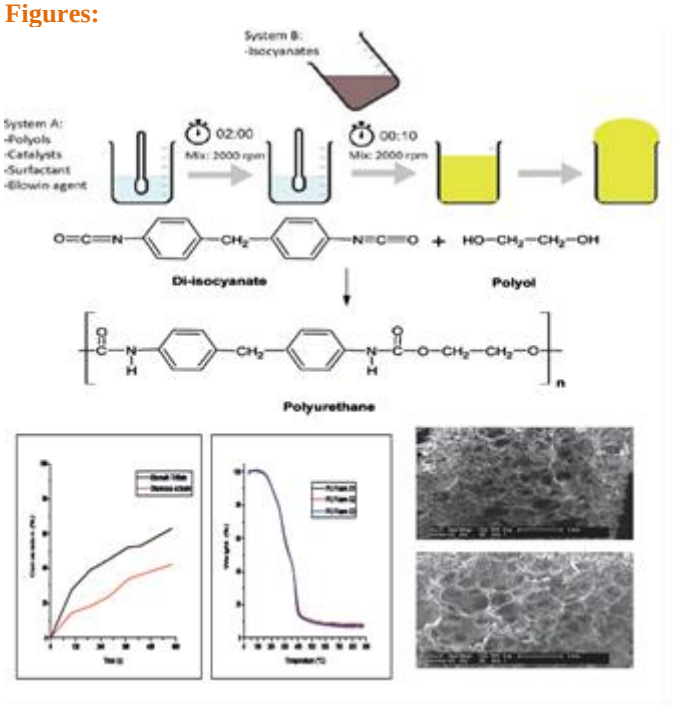
[2]*Instituto de Ciencia y Tecnología de Polímeros, ICTP-CSIC, 28006 Madrid, Espagne*

Abstract

Polyurethanes (PUs) are versatile polymers which have been produced from petroleum, they can be produced in different forms, elastomers, adhesives, coating and foams . The latter is the most widely used in a large number of applications and areas, for instance thermal insulation and the construction industry. Bismuth Triflate, which is known to be a green catalyst, is one of the most efficient catalysts used in ring opening polymerization, Polycodensation and polyadditions reactions. It's highly soluble in water, whereby the idea of using it as a catalyst for the gelling reaction in polyurethane foams has been suggested. Indeed, the most commonly used metallic catalyst for this reaction is Stannous Octoate (SnO) [1, 2]. In spite of its high catalytic effectiveness, it encompasses a series of limitations such as the production of tin oxide after mixing the reagents with water and SnO that are not active toward a polycondensation and polyaddition. Recently, many studies have shown that bismuth complexes and salts are a good catalyst for polycondensation reactions such us polyesterification leading to a polymers with a high molecular weight [3]. In the process of synthesizing polyurethane, the catalyst plays an essential role in increasing the production efficiency and the reaction rate, as well as eliminating the side reaction [4,5]. There are two main types of catalysts, amine catalyst and metallic catalyst. The first participates in blowing reaction, moreover like most amines; it also offers some contribution to the gelling reaction. .The main contribution of this study is adopting a new strategy that has successfully produced the flexible polyurethane foams using Bismuth Triflate as a non toxic catalysts instead of $Sn(Oct)_2$ the commonly used catalyst fot this reaction. Indeed, bismuth triflate significantly reduces the level of toxicity , as the enormous body of information available on the toxicity of Bi-salts suggests that bismuth is the least toxic heavy metal. In the present work, the thermal and mechanical properties of foams prepared with different rates of catalyst, and the investigation of the kinetics of formulation of FPUR foams with FTIR gave slightly satisfactory results.

Figures:



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5. Mikko Muuronen, Peter Deglmann, Zeljko Tomovic, J.org.chem. 2019,84,8202-8209

Biography

Said El Khezraji obtained his first master's degree in 2016 at the Caddi Ayad University in Marrakech, on Production and valorization of natural substances and biopolymers. Afterwards, he moved to France where he obtained his second master's degree in Organic and analytical chemistry in 2017 from the University of Lorraine. During these two end-of-studies projects, he worked on the synthesis of anticancer molecules as well as the functionalization of calixarenes for therapeutic interests. He is now doing his PhD on bio-based foams.

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The risk of contamination of the hospital environment: case of pseudomonas aeruginosa reservoirs at the level of resuscitation and intensive care service of the med V hospital of al-hoceima

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[2] *Biologist in charge of medical laboratory at Med V hospital in Al-Hoceima*

Abstract

The hospital environment constitutes an ecological niche of microorganisms which can have clinical significance, this contamination varies qualitatively and quantitatively from one establishment to another, and also within the same establishment according to the services, patients, care practiced and the survival capacity of microorganisms in the environment (Cavallo et al., 2002).

The major impact of the hospital environment on public health is at the risk of nosocomial infections (IN), which can have serious consequences for patients, hospital staff and the general population in particular, mortality and morbidity, the extension of the hospital stay from 3 to 7 days, the additional cost, the selection of multi-resistant germs (Alfandari, 1997).

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In hospitals, it is known that after Escherichia coli and Staphylococcus Auraeus, P. Aeruginosa (PA) is the third bacteria responsible for nosocomial infections (eurosurveil, 2009; Hosp infect. 2004) frequently identified in intensive care units and intensive care services and found in aseptic solutions and on instruments such as catheters, probes , or in pipes and sinks (Wolfgang et al., 2003).

Therefore, microbiological monitoring of the hospital environment must be an integral part of the prevention of nosocomial infections. The main objective of this study is to propose tools to assess the risks of contamination of the hospital environment: specific case of Pseudomonas Aeruginosa reservoirs for medical resuscitation and intensive care services at Mohammed V hospital in Al Hoceima

Keywords: Coronavirus, Covid19, medical and pharmaceutical waste (DMP), Waste healthcare activities with infectious risks (DASRI)

Biography

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Smart Grid implementation in Morocco: Case study

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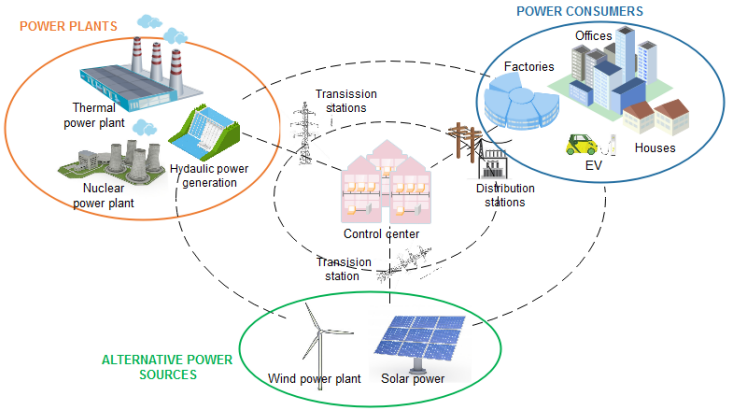
Abstract

Like all industrial sectors in Morocco, the electricity network is facing challenges due to energy demand growth, and environmental protection requirements. Therefore, in 2009, a new Moroccan energy strategy has been adopted to respond to the sustainable development revolution. Its main objectives are to provide sufficient and reliable energy to the country with minimum costs and impacts on the environment. Smart Grid (SG) is one of the aspects that can ensure the success of such strategy. Its implementation helps ensuring more efficient energy and a reduction in greenhouse gas emissions by adapting production to demand while reducing consumption, integrating renewable energies, and using advanced communication and control technologies. Through this article, we will study the existing state of the Moroccan network, as well as the obstacles and barriers to smart grid development in Morocco. Finally, we will propose solutions and strategies for deploying smart grids in the Kingdom.

Keywords
Smart grid, energy management, renewable energies, smart energy systems, Moroccan grid

Figures: *The concept of a Smart Grid*



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Biography

I am **MELIANI Meryem,** a first year PhD student in the Faculty of Science and Techniques Sidi Mohammed Ben Abdellah University, in the mechanical engineering laboratory. Her doctoral research investigates the management and integration of the smart grid.

I have a master's degree in renewable energies and energy efficiency from the Euro-Mediterranean University.

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A new system to fight against fuel fraud for a transport company

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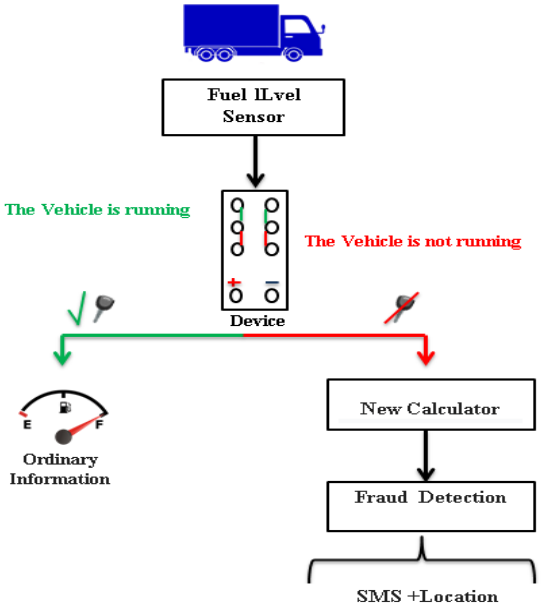
Abstract

Fuel theft from the tanks of transport trucks is a major and serious problem. In spite of the security and the guards on the car park, the thefts are constantly increasing; a truck that spends the night on a car park before continuing its journey, finds the next day that the tank has been siphoned off and completely emptied which result material damage, delivery will be delayed because of this simple problem a loss of millions of dirhams will be declared. Sometimes this theft is carried out by the employee after each refueling and therefore the company is faced with undetectable losses. In our article we have proposed a simple solution with a low cost and more efficient to fight against this type of fraud and instantly monitor the fuel tank in order to send an instant message to the company to inform it about the fraud attempt (use of GSM card) and locate its position (use of GPS module). When the vehicle is traveling, the fuel level sensor informs the driver in an ordinary way of the fuel level. In case the vehicle is at rest a device will switch the fuel level sensor to the new calculator, if the fuel volume drops suddenly (theft or leakage) a message will be sent to the company (Notification and location).

Figures: *Scheme of proposed solution*



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Biography

Hajar Snoussi was born in Oujda, Morocco, in 1995. She received her M.Sc. degree in optics and materials from the Mohammed I University in Oujda, Morocco, in 2018. She is currently working toward a Ph.D. degree, in Electrical Engineering and Maintenance Laboratory, High School of Technology, Mohammed First University, Oujda, Morocco. Since 2019, her research interests include the vulnerabilities of vehicle and implementing an easy and inexpensive system on cars to protect the driver or the companies involved.

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Impact of date extract and some micronutrients foliar application on the fruiting of "Assiane " date palm cultivar

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[2]*Laboratory Dynamics of arid environments: regional planning and development, FLSH Oujda*

Abstract

Artificial pollination of the date palm (*Phoenix dactylifera* L) is a practice that arose very early in the evolution of date culture. Despite the crucial role of pollination, this practice is still traditional and uncontrolled in most Moroccan phoenicultural areas. The cultivar "Assiane" is the most date palm cultivar widely planted in Figuig oasis. Pollination and fruit setting constitute serious problems for this date palm cultivar. Spraying date extract at different concentrations and some macro and micro nutrients have important role in fruit set, yield and quality improvement. This work was carried out during two successive seasons on "Assiane "date palm cultivar in order to evaluate the influence of spraying date extract, boric acid, sucrose and zinc sulfate on yield, fruit setting and date quality and stability. Trees of same size and same age were subjected as bunch spraying of date extract (Brix degree 5 to 15%), boric acid at 1500 ppm ,boric acid at 300ppm + 2g/L sucrose, Zinc sulfate at 1.5g/L and boric acid at 1000ppm + 300ppm Zinc sulfate. The five spraying treatments were performed twice; 2 hours before pollination and one month after pollination. Bunches were pollinated manually. All spraying treatments improved fruit set and yield. Boric acid at 300 ppm + 2g/L sucrose and date extract at 15 % Brix degree increased significantly physical and chemical fruit properties in comparison to the control and other treatments. This study showed the economic and ecological importance of using low-quality date extract compared to other nutrients.

Figures:

Bunches sprayed 2 h before pollination

Recent Publications

1. Khayat M,Tafazoli E,Eshgui S and Rajaee S., J. Agric.Environ.Sc.,Vol.2 No3,(2007) 289-296.
2. Iqbal, M., U.U. Rahman, M. Niamatullah, S.M. Khan and A. Akhtar. Pak. J. Sci (2012) 259- 264.

Biography

Author, **HASNAOUI Amina** currently works at the Department of Biology, University Mohammed First. Amina does research in Horticulture, Environmental Science and Food Science. Her current project is 'food biotechnology and date palm pathology'. She was awarded her PhD in 2013 from the Faculty of Sciences, Oujda Morocco. She published more than 10 papers.

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Flotation of low grade Moroccan phosphates: beneficiation routes and challenges

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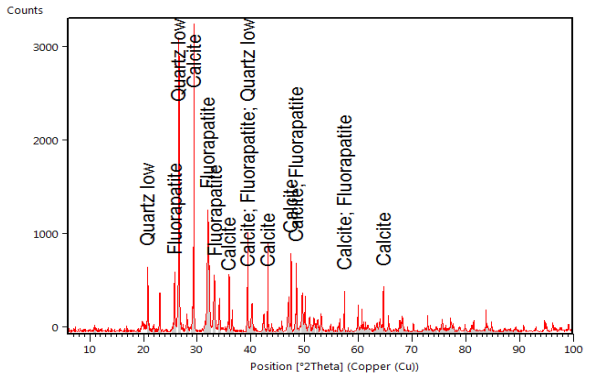
Abstract

Due to increased population growth, arable land is becoming more and more depleted. Phosphorus is then needed more than ever. Therefore the focus is brought to the possibility of returning to the deposits considered so far without interest [1-4]. Within a major project with the group OCP, this work aims at upgrading low grade phosphates. New beneficiation routes are investigated to selectively separate apatite from gangue minerals, mainly carbonates and quartz. A micro-flotation study was conducted on pure minerals of fluorapatite, calcite and quartz based on mineralogical feature of low grade Moroccan phosphates. Results showed the possibility for a direct flotation. The most potent combinations of reagents were: carboxymethylcellulose and sodium alginate when used with sodium oleate and ATRAC as collectors [5]. A scale up of these findings to the mechanical cell fail to obtain the same tendency. An asymmetrical fractional factorial design was used with, as parameters: the type of the collector and depressant, their dosage and conditioning time, flotation time, pH and desliming. Partial matrix results presented in this work confirmed the non-possibility of direct flotation under these conditions, but a reverse flotation is possible.
Conclusions will be drawn once the DOE results are completed, considering the possibility of direct and reverse flotation of low grade phosphate ore.

Figures: *Moroccan phosphate ore sample diffractogram*



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1. Chen, Wei, Qiming Feng, Guofan Zhang, Qun Yang, et Cheng Zhang. 2017. Minerals Engineering 113 (novembre): 1-7.
2. Dong, Xu, Liu Siqing, Yao Yanqing, Liu Hailin, et Pei Yi. 2017. IOP Conference Series: Earth and Environmental Science 63 (mai): 012043.
3. Filippov, Lev O., Inna V. Filippova, Zineb Lafhaj, et Daniel Fornasiero. 2019. Colloids and Surfaces A: Physicochemical and Engineering Aspects 560 (janvier): 410-17.
4. Aarab, Imane, Derqaoui, Mohammed, Abidi, Abdelmoughit, Yaacoubi, Abdelrani, El Amari, Khalid, Etahiri, Abderahman, Baçaoui, Abdelaziz. 2020. (Under review).

Biography

Imane AARAB is a young chemical engineer and a PhD student at the Laboratory of Applied Chemistry in the Faculty of Sciences Semlalia- UCA. Keen on scientific researches, she is working on a major project in collaboration with the OCP group to enrich low-grade phosphates. She is developing her expertise in flotation process with the advanced methods of planning experiments and the tools of optimization to find industrial solutions; in addition to all the accompanying analytical methods starting from characterization to zeta potential measurements, contact angle, IRTF analyses and adsorption tests..., etc. Her focus is based on the development of new strategies more adapted to the selective flotation of low grade Moroccan phosphates.

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Numerical analysis of the properties of nanofluids and their impact on the thermohydrodynamic phenomenon in a heat exchanger

Jamal-Eddine Salhi *, [1], Najim Salhi[1]

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Abstract

The objective of the work undertaken in this paper is to numerically study the impact of nanofluid properties on the flow structure and process of heat transfer by forced convective and turbulent flow in three dimensions. The study field is a channel of constant circular cross-section whose wall is maintained at a uniform and constant temperature T. The cooling fluid used is water as the base fluid, to which firstly Al_2O_3 nanoparticles and then ZnO nanoparticles are combined. The numerical analysis was done with a Reynolds number in the range of Re = 50000 to 100000, and for a volume concentration ranging from 1% to 3%. The diameters of the nanoparticles were chosen in the range of 30 nm to 60 nm. The resolution of the differential equations system governing the problem is ensured by a finite volume scheme associated with the SIMPLE algorithm (Semi Implicit Method for Pressure Linked Equation). For the turbulence modeling, the k e model was used. The calculated numerical results are presented as representative curves of the Nusselt number, friction coefficient, pressure difference, heat flow, and thermal efficiency. The results show that the Nusselt number increases with increasing volume concentration and decreases the nanoparticles' diameter. Thus a nanofluid as a coolant in a heat exchanger allows a good improvement of its performance in heat transfer. This numerical study allowed us to make a statement on the efficiency of nanofluids in heat exchangers as a cooling fluid.

Figures:

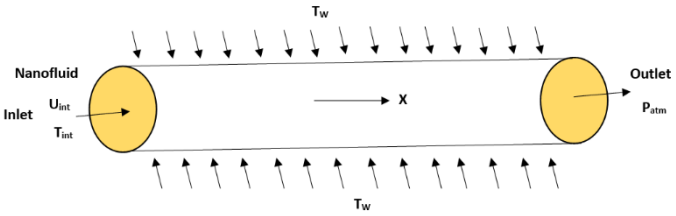

Figure 1: Schematic of the physical model.

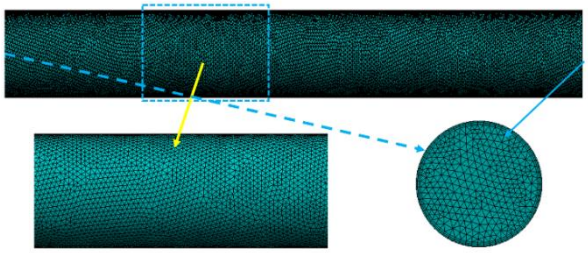

Figure 2: Meshing of the computational domain

Table 1. Thermophysical properties of the base fluid and the nanoparticles

	Water	Al_2O_3	ZnO
ρ (kg/m^3)	996.5	3600	5600
C_P (J/kg.K)	4181	765	495.2
λ (W/m.K)	0.613	36	13
μ (Ns/m^2)	0.001	---------	---------

Recent Publications

1. M. Corcione, , International Journal of Thermal Sciences, 49 (2010) 1536–1546.
2. Bijan A.. 3rd Ed. New York: Wily; (1984).
3. Fotukian SM, Nasr Esfahany M. Int. J. Heat Fluid Flow 31(2010) 606–12.
4. I.V. Lienhard, V. Lienhar, Third Edition Phlogiston Press, (2006).
5. F., A.P. Rallabandi, D.H. Rhee, Z. Gao, J.C. Han, International Journal of Heat and Mass Transfer 53 (2010) 4663–4671

Biography

Jamal-Eddine SALHI, preparing a Ph.D. student in Physics & Engineering at the Mechanics & Energetics Laboratory attached to the Faculty of Sciences of Oujda.

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Thermoelectric properties of $Mg_2Si_{1-x}Sn_x$ compounds synthesized by direct co-melting and spark plasma sintering SPS

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Abstract

The ability of waste heat recovery made of thermoelectric materials an attractive alternative technology for generating electrical power. In particular, magnesium silicide-based TE materials, have attracted large attention due to their potential power-generation in the mid-temperature range. However, producing these compounds through conventional approaches remains a challenge, because of the high vapor pressure and reactivity of elemental Mg at elevated temperatures. In this present paper, an attempt is made to establish an appropriate process to synthesize bulk Mg2Si1-xSnx compounds through direct co-melting of the elements followed by spark plasma sintering SPS. A major advance of this study was to diminish the loss of Mg through evaporation, which was reduced to about 1.5%. Measurements of Seebeck coefficient S and electrical conductivity σ were carried out on a Nemesis® SBA-458 apparatus (Netzsch GmbH).

Keywords: Thermoelectric materials, Magnesium Silicides, Material synthesis, Spark plasma Sintering, Thermoelectric measurements

Figures:

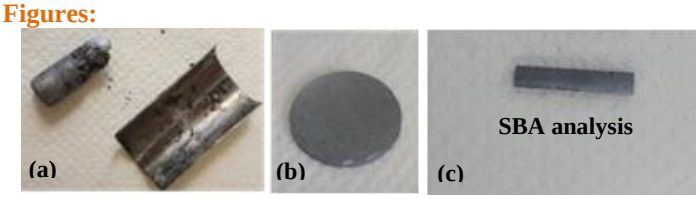

Figure 1. (a) Obtained ingot from melting, (b) Pellet gotten from SPS sintering, (c) Pellet cut for SBA analysis

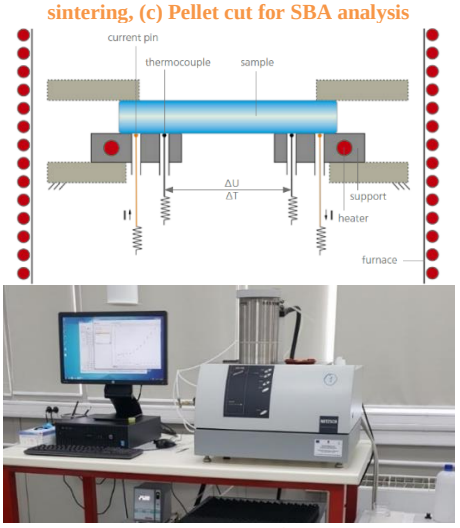

Figure 2. Measurement setup of the SBA 458 Nemesis

Recent Publications

1. *Nozariasbmarz A., Agarwal A., Coutant Z.A. et al. Jpn. J. Appl. Phys., 56 (2017) 05DA04*
2. *Boor J., Dasgupta T., Saparamadu U., et al. Mater. Today Energy, 4 (2017) pp. 105-121*
3. *Li J., Li X., Chen C., et al. J Mater Sci 53 (2018) pp. 9091–9098*
4. *Ramirez, D. C., Macario, L. R., Cheng, X., et al. ACS Appl. Energy Mater., 3 (2020) pp. 2063-2071*

Biography

Ilhame Assahsahi is PhD Student preparing her Doctoral Thesis in thermoelectric materials for power generation at the Engineering Laboratory of Electrical Systems and Telecommunications of the National School of Applied Sciences at Kenitra, Morocco.

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Effect of Ce^{3+}/Nd^{3+} co-doping on the down-conversion luminescence of lanthanum phosphate for crystalline silicon solar cells

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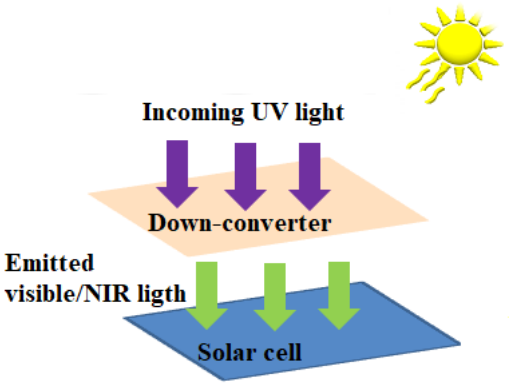
Abstract

In order to enhance the spectral response of solar cells, an experimental study on $LaPO_4$: $0.01Ce^{3+}/xNd^{3+}$ (x = 0.00, 0.02, 0.04 mol%) was carried out, where structural and morphological properties of the prepared samples were well characterized by the means of X-ray diffraction (XRD), Fourier transform infrared spectroscopy surface (FTIR) and scanning electronic microscope (SEM). Additionally, the photoluminescence (PL) behavior of phosphors in ultraviolet-visible (UV–VIS) and Near-infrared (NIR) regions were investigated to confirm the energy transfer (ET) from Ce^{3+} to Nd^{3+}. Moreover, the ET efficiency of Ce^{3+}/Nd^{3+} co-doped samples was calculated and the possible ET process was described. Accordingly, the LaPO4: Ce^{3+}/Nd^{3+} phosphors can convert the UV light (285 nm) into NIR photons (approx.1059 nm) due to an efficient ET process from Ce^{3+} sensitizer ions to Nd^{3+} activators. Obtained NIR down-conversion emissions are suitable for improving the conversion efficiency of c-Si solar cells.

Figures:



Recent Publications

1. Tai Y., Zheng G., Wang H., Bai J., J. Photochem. Photobiol. A Chem. 303–304 (2015) 80–85.
2. Sheeba P., Panigrahi P., Subramanium G., Mater. Lett. 249 (2019) 9–12.
3. Karunakaran S. K., Lou C., Arumugam G. M., Huihui C., Pribat D., Sol. Energy 188 (2019) 45–50.
4. Sani E., Brugioni A., Mercatelli L., Parisi D., Zharikov E. V., Lis D. A., Subbotin K. A., Opt. Mater. 94 (2019) 415–422.

Biography

Aitmellal Oussama is a PhD student in the Materials Physics at University Sultan Moulay Slimane (USMS), Beni-Mellal, Morocco. He is also affiliated to the science unit of material (USM/DERS) at National Center for Energy, Sciences and Nuclear Techniques (CNESTEN), Rabat, Morocco. Before joining the doctoral studies he received his Engineering Degree at the Faculty of Sciences and Techniques (FST) Beni-Mellal in physical engineering ''materials and energy'' and the University Degree of Technology in control of energy and renewable energies at University Ibn Zohr (UIZ) Agadir. His primarily researches concerned the development and the study of functional materials with a potential application in energy: synthesis and characterization of rare earth orthophosphates.

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Micromechanical modeling of the effective elastic properties of sewage sludge ashes-mortars

Sara Naamane [1 2], El Hassane Barhdadi[1], Fatima Zohra Bouaich [2], Nour El Hoda Mtarfi [2], Zakia Rais [2], Mustapha Taleb[2]

[1] *Laboratory of Engineering Sciences and Applications, National School of Applied Sciences of Al-Hoceima, Ctre Ait Youssef Ou Ali 32003, Morocco.*
[2] *Laboratory of electrochemical engineering, modeling and environment, Faculty of Sciences Dhar El Mehraz, BP 1796, 30000 Atlas, Fez, Morocco.*

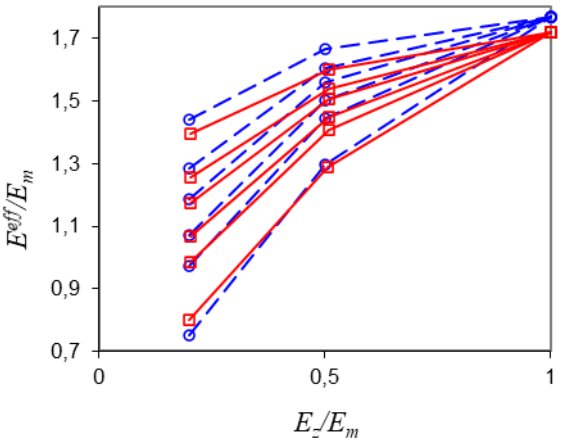
Abstract

The establishment of wastewater treatment plants for sewage treatment has become a necessity dictated by Moroccan and global standards and required by the alarming state of degradation of the natural environment of our planet. Whatever the adopted treatment system, the treatment of wastewater results in the production of significant quantities of sewage sludge. The management of this sludge has become an expensive and environmentally sensitive problem, since enormous quantities of this waste are produced each year requiring an adequate disposal method. Recently, the use of this residue, after treatment, in construction materials has become a growing option and an attractive disposal method of sewage sludge, because of its technical, economical and environmental benefits.

The objective of the present research was to study the influence of sewage sludge ashes on the strength and elastic properties of mortars. Therefore, a micromechanical modeling based on the generalized self-consistent scheme is used to predict the effective elastic properties of mortars containing sewage sludge ashes. The resulting three and four phase models consisting of inclusions, coating, matrix layer and equivalent homogeneous medium, assumes that all constituents are elastic and perfectly bonded. The overall elastic moduli are obtained using a micromechanical modeling based on the Green function techniques and the interfacial operators.

Keywords: Sewage sludge ash; Mortars; Elastic properties; Compressive strengths; Modeling.

Figures:



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1. Naamane S., Rais Z., Taleb M., Constr. Build. Mater.112 (2016) 783-789.
2. Naamane S., Rais Z., Taleb M., Mtarfi N.H., Sfaira M., , J. Mater. Environ. Sci. 7 (1) (2016) 67-72.
3. Naamane S. , Rais Z., Mtarfi N.H., El Haji M., Taleb M., Phys. Chem. News. 74 (2014) 44-50.

Biography

Author has her expertise in the valorization of wastes in construction materials and improving the physico-chemical and the mechanical characterization of cement-mortars containing wastes. Her focus is based on the environmental evaluation and the study of the leaching behavior of materials. She was warded her PhD in 2019 from the University of Sidi Mohamed Ben Abdellah, Morocco. She published 8 papers. Her H-index is 5 on Scopus.

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Acoustic Tamm states in slender tubes

Soufyane Khattou[1], Madiha Amrani[1], Abdelkader Mouadili[2], El Houssaine El Boudouti[1], and Bahram Djafari-Rouhani[3].

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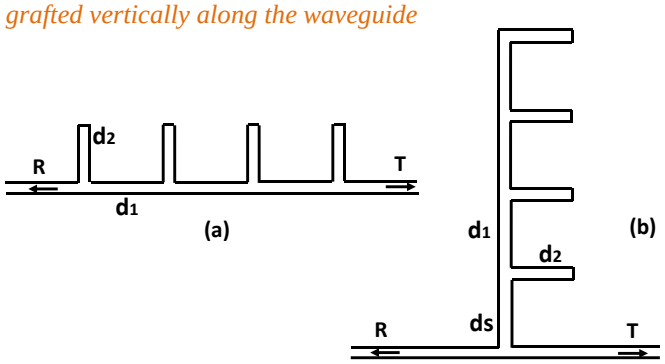
[2]*LPMCER, Département de Physique, Faculté des Sciences et Techniques de Mohammedia, Université Hassan II, Casablanca, Morocco.*
[3]*IEMN, UMR CNRS 8520, Département de Physique, Université de Lille 1, 59655 Villeneuve d'Ascq, France.*

Abstract

We present an analytical demonstration of the possibility of existence of surface localized modes, the so-called Tamm states[1], in a one-dimensional (1D) comb-like acoustic structure. The structure studied here is similar to the photonic one proposed by some of us to detect experimentally the surface localized modes in a 1D comb-like photonic structure[2] using coaxial cables in the radio frequency regime. Recently, the surface modes have been also studied in optical range[3] and piezoelectric metallic phononic superlattices (SLs)[4]. Our motivation behind this work is to highlight the existence of Tamm states for acoustic waves in a 1D comb-like periodic structure. The structure consists of periodic stubs of length d_2 grafted periodically along a waveguide and separated from each other by a tube of length d_1 (Fig.1(a)). The boundary conditions at the end of the dangling stubs d_2 are rigid, and all the tubes are assumed to be of the same cross-section. The finite structure is grafted either horizontally or vertically along the waveguide (Fig. 1). We derive a general rule about the existence of surface modes in such systems; namely, when one considers two complementary semi-infinite structures obtained by cutting the infinite one into two parts, we obtain one surface mode in each gap. This mode is induced by one of the two surfaces of the semi-infinite systems. In addition, we show that in vertical system, when the finite periodic structure is grafted vertically along the waveguide, the surface modes of the finite structure are obtained from the maxima or the minima of the transmission spectrum. Our analytical calculations are obtained with the help of the Green's function method[5]. These results may find many practical applications in noise control and highly sensitive phononic crystal sensors.

Figures: *(a) Schematic illustration of the 1D finite structure consists of N stubs of length d_2 grafted periodically along a waveguide, and distant from each other by a tube of length d_1. The whole structure is inserted between two semi-infinite tubes. (b) The semi-infinite structure with a surface defect d_s grafted vertically along the waveguide*



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3. O. El Abouti, E. H. El Boudouti, Y. El Hassouani, A. Noual, and B. Djafari-Rouhani, Physics of Plasmas 23, 082115 (2016).
4. M. Alami, E. H. El Boudouti, B. Djafari-Rouhani, Y. El Hassouani, and A. Talbi, Ultrasonics, 90, 80 (2018).
5. L. Dobrzynski, E.H. El Boudouti, A. Akjouj, Y. Pennec, H. Al-Wahsh, G. Lévêque, B. Djafari Rouhani, Phononics, Elsevier, (2017).

Biography

Soufyane Khattou is a PhD student in LPMR laboratory, Mohamed First University Oujda (Morocco). His researches interests concern photonic and phononic structures.

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Comparison of AHP and Fuzzy AHP methods combined with GIS for large scale CSP site selection. Case study in Marrakesh-Safi region

Ouafae Jbaihi[1,2],

Fatima-zahra Ouchani[1,2], Mohamed Cherkaoui [1], Abdellatif Ghennioui [2], Zakaria Naimi [2]

[1] *Electrical Engineering Department, Mohammadia School of Engineers, Mohammed V University, Agdal Rabat, Morocco.*
[2] *Green Energy Park (IRESEN, UM6P), Benguerir, Morocco*

Abstract

This study aims to compare two methods: Analytical Hierarchy Process (AHP) and Fuzzy Analytical Hierarchy Process (AHP) in order to aid the decision for a large scale Concentrated Solar Power (CSP) site selection. In fact, AHP is the most commonly used method among the ones known as Multi-Criteria Decision Making (MCDM) methods. They allow us to evaluate the problem while taking into account several criteria (parameters) impacting the decision. A pairwise comparison is done with the aim of calculating the weights of each criterion. Once calculated, these latter are implemented in a Geographic Information System (GIS) software to display the final maps of suitable areas for large scale CSP power plants [1]. In our case, two maps will be generated: the first according to the calculated weights as shown below in (table 2), and the second according to new FAHP calculations. In fact, even though the AHP is known as an effective method, it is always described as subjective, since the pairwise comparison is done by people. It is its only flaw, and many studies have countered the issue by consulting a group of experts before aggregating their judgements [2]. Meanwhile, other researchers have opted for the FAHP since the fuzziness reduces the subjectivity and thus ensures more accuracy. The target of this work evolves around the visualization and comparison of results of both methods, not only in terms of calculations but also the geographical distribution and its variation. Our results show slight differences of weights that might not be noticed since the ranks are quite the same. However, the mapping through the GIS software will widen the gap to highlight the suitable areas and showcase the sensitivity of the parameters and their impact on the decision-making.

Tables:

Criteria	Sub-Criteria	Detailed weights	Global weights
Climate	Solar radiance values (DNI) (kWh/ m2/year)	57,40%	57,40%
Orography	Slope (°)	25,90%	25,90%
Water resources	Distance from water ways (km)	9,30%	11,7%
	Distance from dams (km)	2,38%	
Location	Distance from cities and urban areas (km)	1,42%	5,0%
	Distance from road and railway network (km)	0,48%	
	Distance from airports (km)	0,60%	
	Distance from Electricity grid (km)	2,58%	
	Sum	100%	100%

Table 1: Criteria weights calculated with the Fuzzy AHP Method (using Geometric Mean Method)

Criteria	Sub-Criteria	Detailed weights	Global weights
Climate	Solar radiance values (DNI) (kWh/ m2/year)	57,70%	57,7%
Orography	Slope (°)	25,58%	25,6%
Water resources	Distance from water ways (km)	9,36%	11,7%
	Distance from dams (km)	2,34%	
Location	Distance from cities and urban areas (km)	1,40%	5,0%
	Distance from road and railway network (km)	0,45%	
	Distance from airports (km)	0,60%	
	Distance from Electricity grid (km)	2,55%	
	Sum	100%	100%

Table 2: Criteria weights previously calculated with the AHP Method [3]

Recent Publications

1. Alami Merrouni, A., Elwali Elalaoui, F., Ghennioui, A., Mezrhab, A. & Mezrhab, A. Eastern Morocco. Sol. Energy 166, 2–12 (2018).
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3. Tazi, G., Jbaihi, O., Ghennioui, A., Merrouni, A. A. & Bakkali, M.. IOP Conf. Ser. Earth Environ. Sci. 161, (2018).

Biography

Author has an engineer diploma in energy and renewable energy. She is a PhD student at Mohammadia School of Engineers, Mohammed V University, and also at the Green Energy Park. Her focus is based on the use Geographical Information System (GIS) in renewable energies assessment studies.

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Mapping of water resources research in Morocco: ascientometricanalysis

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https://orcid.org/0000-0002-2008-5991
[2]*Water and Environment Geosciences Laboratory , Faculty of Sciences, Mohammed V University Rabat-Morocco*
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Abstract

Researchers from the South want to publish in international databases so as to enhance their impact and visibility. This affects local research aiming to satisfy needs of national development., Researchers, moreover, still encounter difficulties choosing between international themes to be indexed in international databases and national themes to resolve local problems.

Morocco is a semi-arid to arid ecosystem which is vulnerable to water stress and climate change impact. Thus, study, management and planning of water resources (surface water, groundwater or not conventional water) is among scientific research issues priorities.The present study aims to provide science indicators to define national science policies. It tries to map the national and international scientific output in the field of Water resources and to analyze research thematic.

In order to valorize national publications, we propose of an open repository a pilot project to widely disseminate Moroccan scientific production and increase its visibility.

To carry out the present study, we identify the publication per author's name in WOS database because Moroccan researchers do not specify their affiliation. We use data visualization tool to analyze the scientific production of morocco in the field of "Water resources". The main sources used to analyze the Moroccan scientific production, are the international databases «Scopus» and «Web of Science», despite their biased indexing and coverage of southern countries. This impedes the accessibility and visibility of Moroccan science.

The present communication relates the first scientometric study that deals with Moroccan production and that relies on data based on national publications as well as international databases. Research result can confirm that the creation of national open repositories can enhance the international visibility of Moroccan scientific production. This will encourage researcher to develop local research and deal with priority issues.

Enhancing the visibility and impact of Moroccan research requires the adoption of the model of emergent and developing countries, which have succeeded in integrating international databases. Latin American, Chinese, Korean universities succeed in having their own national platform to access, disseminate and empower their local scientific output. Open access to scientific production is the key to enhance the global health research and build a performant health system in southern countries. We will finally present the open repository DREAM (www.edream.ma Digital resources and electronic open access library of Morocco) to disseminate medical scientific output in Morocco.

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1. Boyack, K. W., &Klavans, R. (2010). The Journal of the Association for Information Science and Technology, 61(12), 2389404.
2. Chen, C. (2017). Science mapping, 2(2), 1-40
3. Ferrand É, et al. Indicateurs de notoriété des revues scientifiques, des chercheurs et des articles publiés en santé : perspective pharmaceutique. Ann Pharm Fr (2018),
4. Mitchell, N.C. Comparing the post-WWII publication histories of oceanography and marine geoscience. Scientometrics 124, 843–866 (2020).

Biography

Lrhoul Hanae is Professor of Library and Information Science at Rabat School of the Information Sciences in Morocco. Her current work focuses on open access resources, open repositories and science mapping. As an avid Librarian, she is engaged in the development of the open access in the Maghreb region since 2009. She's is currently president and founder of the Moroccan association for the development of scientific information aiming to develop the open access and open repository in the North Africa region. She also serves on the board of the DOAJ (Directory of Open Access Journal) as Associate Editor for Middle East and North Africa (MENA) regionhttp://www.edream.ma/

El Assaoui Naima is 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. She is member of: the Moroccan Association for the Development of Research and Scientific Information (AMIS); the International Association of Hydrogeologists (IAH); scientific and organization committees for several scientific congresses and events. Email: nelassaoui@gmail.com

Calage d'une prise d'eau potable dans un barrage envasé par modélisation numérique bidimensionnelle Horizontale : cas du barrage Mechraa Hammadi

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[2] *Reseach Laboratory in Materials Sciences and modeling Sultan Moulay Slimane University Khoribga Polydisciplinairy Faculy, Khouribga - Morocco, E-mail address: Email: mcharafi@hotmail.com*
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Abstract

Several studies of water resources in the North East of Morocco, showed their insufficiency to meet water needs, particularly for agriculture and drinking water supply. Among the possible solutions is the use of surface water from the Moulouya River. These resources are regulated by the Mohamed V and Mechraa Hamadi dams.

This research presents a numerical model based on both hydrodynamics and sediment processes to study a water intake from Mechraa Hammadi reservoir dam located designed to supply Oujda city water needs. The objective is to examine the natural conditions sur- rounding a water intake and their possible repercussions on its operation. Several processes are considered in terms of sedimentary deposits, resuspension and suspended transport of sediments. The mathematical model proposed is based on two-dimensional horizontal approach, integrating the hydrodynamics and sedimentary processes of the reservoir lake. The developed model consists of hydrodynamic module based on the Saint–Venant equations and sediment transport module based on the mass-balance equation, where there are resolved by a finite differences numerical scheme .

Numerical modeling analysis allowed to study the water supply intake operation and the risks of production shut-down in relation to the concentration of turbidity variation and the treatment plant capacity. Three scenarios were considered to predict the probable shortages and their range of variation.

Recent Publications

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3. David H.Willis et al. 2004 Numerical modelling of cohesive sediment transport in rivers. Canadian Journal of Civil Engineering
4. Roman Gabl and al 2018, Adaptation of an existing intake structure caused by increased sediment level. Water journal
5. Charafi MM, A. Sadok, A. Kamal, A. Menai « Modélisation numérique des processus érosion/dépôt des sédiments : cas des écoulements à fond cohésif » Les cahiers de la Recherche, Université Hassan II- Ain Chok, série A- : Sciences et Techniques -Volume 5- Septembre 2003.

Biography

SADOK Abdelaziz est Ingénieur d'Etat en Génie Civil de l'école Mohammedia des ingénieurs de Rabat (EMI) en 1980. Diplomé d'un Master (MScA) 1984 et Doctorat (PhD) 1987; en ÈsSciences Appliquées en Génie Civil; certificat d'Enseignement supérieur (CES) 1996 de l'Ecole Polytechnique Fédérale de Lausanne (EPFL). Lauréat d'un MBA de l'Ecole des Ponts et Chaussées de Paris en 2009. Il a occupé plusieurs postes de responsabilités; Doyen de la faculté des Sciences Ain Chock de Casablanca (FSAC), de l'Université Hassan II en 2005, Président de l'Université Mohammed Premier de 2011 à 2015. Il a enseigné plus de vingt cours différents au: Maroc, France, Tunisie, Canada et Sénégal. Il a effectué plusieurs recherches dans le domaine dessystèmes fluviaux (barrages, aménagements hydrauliques, bassins versants, etc.) et leurs problématiques (érosion, envasement, qualité de l'eau, prise d'eau, affouillement, inondations, changements climatiques, impacts sur l'environnement etc.). Il est auteur de centaines de publications scientifiques (revues scientifiques, journaux, documents techniques...).

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My Mustafa CHARAFI est docteur ÈsSciences Physiques en 2001 de la Faculté des Sciences Ain Chock de Casablanca.Il est Professeur à la faculté Poly disciplinaire de Khouribga (Université Sultan My Slimane Il a effectué plusieurs recherches dans le domaine de la modélisation numérique des systèmes fluviaux (Transport de sédiments, envasement des barrages ..etc.). ; les problèmes liés aux transferts thermiques dans le écoulements fluides. Il est auteur de plusieurs publications scientifiques (revues scientifiques, journaux, documents techniques, etc.).

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El Assaoui Naima is 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. she is the author of several scientific publications (scientific journals, journals, technical documents). She is member of: the Moroccan Association for the Development of Research and Scientific Information (AMIS); the International Association of Hydrogeologists (IAH); scientific and organization committees for several scientific congresses and events.

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Effect of temperature on the Corrosion behavior of Lead-free Brass in Tap water

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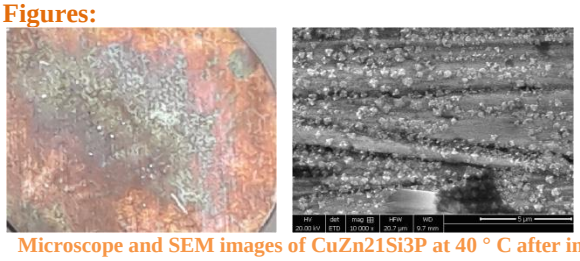
Abstract

Commercial brass CuZn21Si3P is often used for the drinking water distribution system. We studied the corrosion behavior after an initial rapid period of four days for this copper-zinc alloy in contact with drinking water at different temperatures. For the purpose of studying the effects of temperature on the degradation of this alloy in drinking water, we carried out exposure tests, at 5 °C, 40 °C and at room temperature. The Experimental results revealed that the alloy reacted differently by changing the temperature.

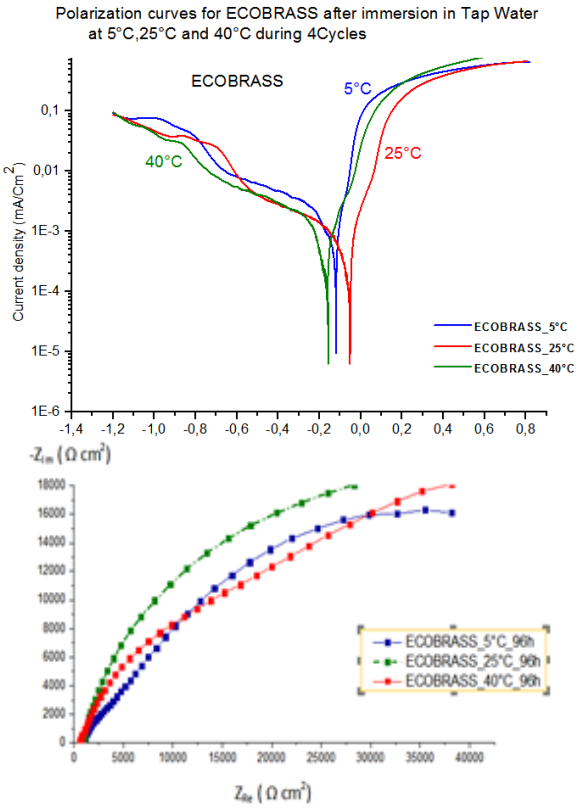
An integral study of the electrochemical analyzes was made. The results show that the potential experiences smaller values at low temperature 5 ° C rather than at high temperature 40 ° C. These electrochemical polarization and impedance tests also showed that the CuZn21Si3P alloy tends to resist given its remarkable values.

The degradation of the CuZn21Si3P alloy on an optical microscope was slightly exposed at maximum and minimum temperature, with moderate degradation rates at 25 ° C. The attacked surfaces were analyzed by the SEM, order to describe the morphology before and after the attack. It has been found that lead-free brass CuZn20Si3P has shown better resistance to critical temperatures of 5 ° C and 40 ° C.

Figures:



Microscope and SEM images of CuZn21Si3P at 40 ° C after immersion in tap water for 4 days



Biography

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Assessment of solar photovoltaic technical potential through GIS approach: a case study in Morocco

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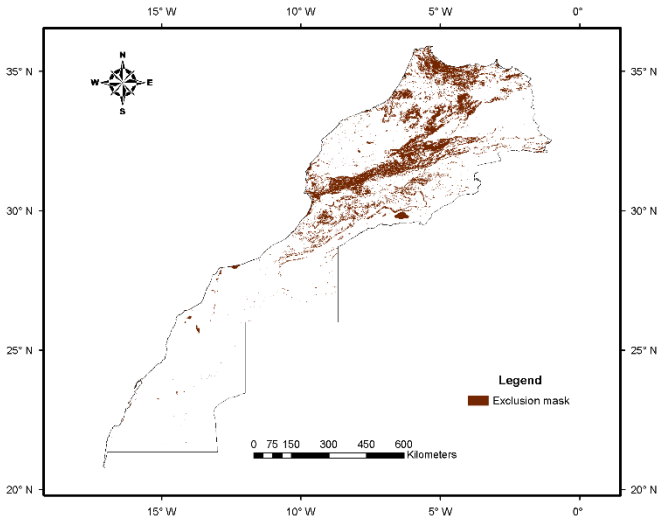
[2]*Modeling and cartography Department, Green Energy Park (IRESEN, UM6P), Benguerir, Morocco*

Abstract

As part of a policy aimed to minimize energy dependency and to meet growing local demand, Morocco is promoting the development of sustainable energies. The kingdom strives to increase the share of renewable energies within the country's energy mix to 52% by 2030 [1]. The aim of this study is to quantify the amount of Solar Photovoltaic (SPV) energy that could be technically exploited on the Moroccan territory. In line with the literature suitable zones were to be meticulously selected. We have chosen to exclude areas that hinders the technology, and also several others layers such as: water resources, military zones, protected areas, residential. These data were then processed using GIS tools to generate the exclusion mask. Using the formula mentioned in the IRENA study[2], a technical potential map will be generated using high-resolution Global Horizontal Irradiation (GHI) data of 1km² combined with the suitable predetermined area. Preliminary results (Fig. 1) mainly show that about 13.2% were discarded, which proves that the case study area has a large surface area favorable to the SPV. The upcoming results will present the Moroccan SPV technical potential map through the usage of GIS tools.

Figures: *SPV exclusion mask map: a case study in Morocco*



Recent Publications

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2. *Renewable Energy Agency, I. Estimating the Renewable Energy Potential in Africa: A GIS-based approach. (2014).*

Biography

The author has a master's degree in mechanics and energy. She is a PhD student at the Mohammadia School of Engineering Mohammed V University of Rabat, and a researcher at the Green Energy Park (IRESEN, UM6P) of Benguerir. Her focus is based on geographic information systems (GIS) and their applications in the field of renewable energies.

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Newly Fault-Tolerant Indirect Vector Control for Permanent Magnet Synchronous Motor drive

Sara ZERDANI [1], Mohamed Larbi El HAFYAN [1], Smail ZOUGGAR [1].

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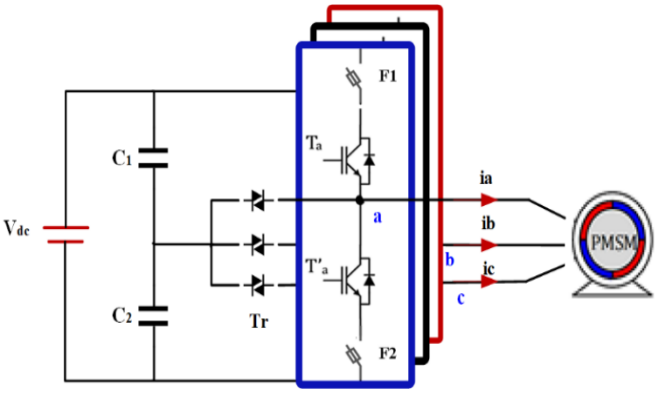
Abstract

The traction inverter integrated into electric vehicles is of the utmost importance, and its failure cannot be allowed, as it would significantly jeopardize safety. An efficient traction inverter that can cope with faults is imperative for a more reliable drive. Given its reduced number of switches and its moderate size, the three-phase inverter with four switches has been proposed as a redundant fault topology. However, this inverter scheme is recognized to have many performance limits specified in the low-frequency region. In this paper, a newly, fault-tolerant indirect vector control is proposed to compensate both the open/short circuit switch failures that constitute the traction inverter. The predictive current controller is picked as a fault compensator, where the function cost is optimized to remedy the DC voltage fluctuation that occurs between the capacitors of the three-phase four-switch inverter.

In addition, the proposed controller is employed to minimize the error between the measured currents and those filtered. Fault-tolerant control is only completed with the construction of an accurate fault detector. In this respect, we suggest a simple fault diagnosis based on current spectral analysis. The proficiency of the submitted controller is verified using a MATLAB simulation.

Figures: *Fault tolerant control topology of Traction inverter*



Recent Publications

1. *Sara Zerdani, Mohamed Larbi Elhafyani, Hicham Fadil and Smail Zouggar, IEEE Xplore, 2019, pp. 1-7.*
2. *Sara Zerdani, Mohamed Larbi Elhafyani, and Smail Zouggar, Springer Nature Singapore, 2020, vol. 44, pp. xxx.*

Biography

Sara Zerdani has received her degree in Electrical Engineering in 2016 from the National School of Applied Sciences in Oujda, Morocco. She is currently preparing her PhD at the Laboratory of Electrical Engineering and Maintenance at Mohammed First University, Morocco. She has her expertise in evaluation and a passion for powertrain improvement of Electric vehicles against failures. Her research interests focus on fault-tolerant control and the diagnosis of both traction inverter and motor failures.

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Sharp Fano resonance induced by sub-wavelength dielectric gratings

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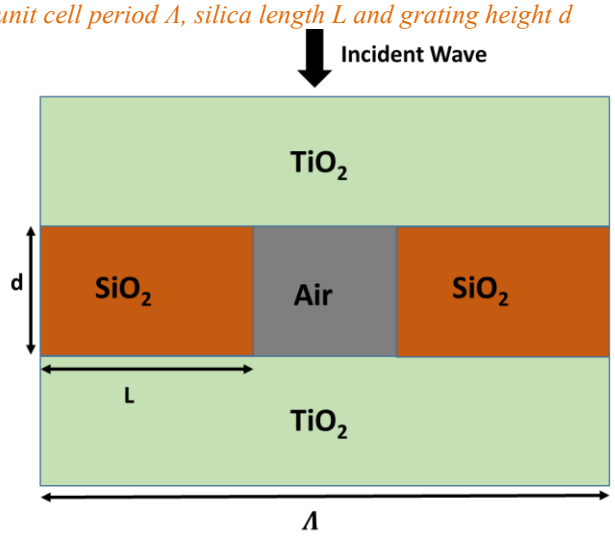
[2]*IEMN, UMR CNRS 8520, Département de Physique, Université de Lille 1, 59655 Villeneuve d'Ascq, France.*

Abstract

Fano resonances have been the subject of considerable interest in classical systems such as photonic crystals, acoustic slender tube waveguides and solid-liquid multilayers as well as plasmonic nanostructures [1-3]. An asymmetric spectral line shape as opposed to the conventional one, characterizes these resonances. Typically, the corresponding transmission spectra exhibit a sharp transition from peak to dip within a narrow band, and this interesting phenomenon has been explored extensively in a variety of wave structures since first discovered by Ugo Fano [4]. In general, Fano resonance is defined as the result of constructive and destructive interferences of a discrete state with a continuum background. Moreover, the asymmetric sharp lineshape of a Fano resonance provides several promising photonic device applications including filters, modulators, sensors, broadband reflectors and lasers. However, this kind of resonances can be also obtained by using a single layer grating structures and photonic slabs [5]. In this context, the asymmetry of Fano originates from the interaction of a guided-mode in the slab waveguides (discrete state) with external radiation of the incident light. These systems have been known as promising designs for many optical applications. In this work, we show numerically the possibility of existence of Fano resonance in a simple realistic device composed of three layers (Fig.1). The middle layer is a silica-air grating sandwiched between two continuous TiO_2 films. The mechanism behind Fano resonance in the structure is established, and we show the influence of the structural parameters on the Fano resonance through a numerical simulation based on the finite element method. Also, we show the possibility to use such resonances for sensing applications.

Figures: *Schematic illustration of 2D photonic structure composed of silica-air grating layer sandwiched by two continuous TiO2 films. Structural parameters are denoted as unit cell period Λ, silica length L and grating height d*



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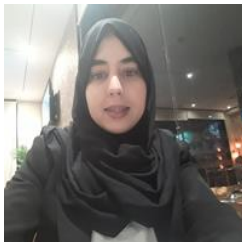
2. [2] I. Quotane, E.H. El Boudouti, B. Djafari-Rouhani, Phys. Rev. B 97, 024304 (2018).
3. [3] T. Huang, S. Zeng, X. Zhao, Z. Cheng, P.P. Shum, Photonics 5, 23 (2018).
4. [4] U. Fano, Phys. Rev. 124, 1866 (1961).
5. [5] Ngo, Q. M., Le, K. Q., Vu, D. L. & Pham, V. H, J. Opt. Soc. Am. B 31, 1054 (2014).

Biography



The Author has an expertise in modeling and simulating (numerically) phononic and photonic structures. She is PhD student in the Faculty of science Oujda (Morocco).

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Behavior Study of RC Structures Confined by Composites Materials

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Abstract

Nowadays, several civil engineering structures designed in reinforced concrete, require maintenance and structural rehabilitation to guarantee the safety of its users. it is a question of protecting them by limiting the corrosion of the reinforcements or by ensuring a good seal, to repair them exploring to compensate the losses of resistance due to cracking, and to reinforce them by increasing the durability and the performances of the structural elements (column, beam, wall, ...) .

These last years, a new option is applied: it is about repairing or strengthening concrete structures using composite materials bonded externally to damaged structures [1,2]. The composites materials, especially which are based on carbon fiber, have a great advantage for repair. In addition, despite the high price of these materials, they have an economic advantage thanks to the ease of its installation which is done directly on the elements of the structure by contact molding (direct lamination).

In this research work we will evaluate the factors which influence the confinement of columns with composite materials and in particular composite materials based on carbon fibers (fig 1). This study is based on the improvement of the compressive strength and the ultimate strain before failure of the confined concrete. a parametric comparison of experimental, theoretical and numerical results will be studied and discussed.

Figures: *Unidirectional carbon fiber, type SikaWrap-230 C / 45[3]*

Recent Publications

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2. Rousakis TC, J .Mater.Civ.Eng .26 (2014) , 34–44.
3. Benzaid R.,Mesbah H.A.,Chikh N., Editions Universitaires Européennes, pp.264, 2010, 978-613-1-55146-8.

Biography

Is currently Professor at the higher School of Technologies EST, Laboratory of Advanced Materials Studies and Applications, Moulay Ismail University of Meknes, Morocco. He was awarded her PhD Civil Engineering in 2017 from Mohammadia School of Engineers ,University Mohammed V of Rabat, Morocco, The author has his expertise in evaluation and his passion for improving the durability of structures and materials in the field of civil engineering, its research work focused on the insertion of innovative materials for sustainable construction and development of the building sector.

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The technologization of waste management system: Case of a landfill in rehabilitation

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[2] *Optimization of Industrial and Logistics Systems Team (OSIL), Laboratory of Research and Engineering (LRI), Hassan II University, ENSEM, Casablanca, Morocco, r.benabbou@ensem.ac.ma*
[3] *Optimization of Industrial and Logistics Systems Team (OSIL), Laboratory of Research and Engineering (LRI), Hassan II University, ENSEM, Casablanca, Morocco, m.elhaji@ensem.ac.ma*
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Abstract

The objectives of the Moroccan national household waste management program include the closure and rehabilitation of uncontrolled landfills. In view of the alarming increase in the waste deposit, the planned construction of a controlled landfill has become essential [1]. This solution meets the latest health criteria [2] but the support of technologies remains primordial.

In this paper, we propose a general framework on waste treatment and valorization. The optimization of waste transport and logistics will have a remarkable impact on the green chain, in addition to the possibility of using sensors to detect the filling level of the bins that can communicate with analysis platforms [3] to optimize routing and reduce collection trips.

The role that transport takes in the life cycle of waste is important, reason why the positive impact of its optimization is quite evident. However, the challenge is that this should not lead to a reduction in recycling and valorization capacities and performance. [4] The figures 1 and 2 illustrate an optimization of the waste collection process and the support of technologies in landfill rehabilitation by ensuring intercommunication between the different involved parties.

The waste processing will also require the use of artificial intelligence algorithms and models to predict the quantities, the type of waste and their recoverable portion [5]. There are many factors that can be used to derive the waste model in order to minimize divergence rate waste deposits of previous years, weights of trucks at the entrance and exit of a landfill, households size and type, number of inhabitants, consumption and income profiles. The idea is to ensure the support of these drivers of innovation to the landfills rehabilitation. This will improve recycling and valorization, thus promoting a reduction in the amount of waste in landfills for a longer life for these rehabilitated sites.

Figures:

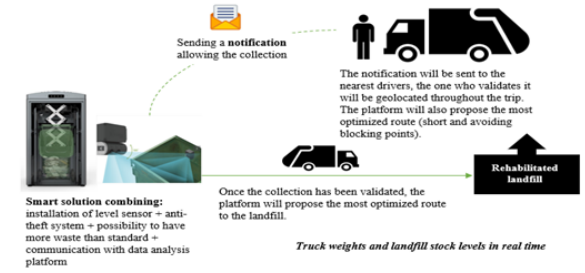

Figure 5: Smart waste collection process using IOT

Figure 2: The rehabilitation of a landfill supported by technology

Recent Publications

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2. LibanConsult, Ingénieurs Conseils, Impact study of the controlled landfill De HBALINE (JBEIL), 1 , (2002).
3. Ecubelabs,CleanCube & CleanFlex : https://www.ecubelabs.com/.
4. ADEME, Waste transport & logistics towards more virtuous logistics, Réf. 7696 (2010).
5. Hoque M. , Tauhid Ur R., Landfill area estimation based on solid waste collection prediction using ANN model and final waste disposal options J. of cleaner Prod. 256 (2020).

Biography

Aya IDRISSI has an engineering degree in Computer Science and Systems Management. She is currently a PhD student at the Hassan II University and her thesis is on "Development of an integrated approach for sustainable waste valorisation in an industrial zone". She is working for a multinational company as an advanced developer in Robotic Process Automation on several projects including one on waste treatment.

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Effect of accelerated ageing by temperature variation cycles and heat cure on the dimensional variation of concrete made by reactive aggregate

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2 Laboratoire Public d'essais et d'études (LPEE), Casablanca, Morocco

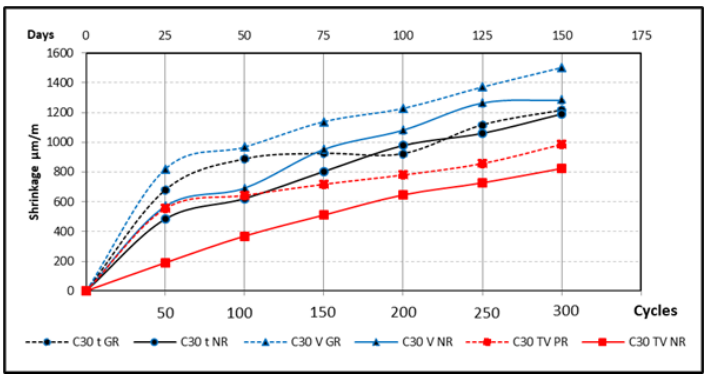
Abstract

Periodic, daily and seasonal temperature variations were identified as factors affecting concrete performance [1] [2]. Morocco is under the influence of climate change, as shown by national studies. In fact, over the past 45 years, the regions classified as humid and sub humid climate have declined in favor of the regions with a semi-arid and arid climate; this is evidenced by the increase in the average annual temperature estimated at 0,16°C per decade and a 47% decline in spring precipitation nationally. [3].: The objective of our research on one hand is to determine the effect of climate change and the variation of temperature and humidity on the dimensional variation of the concrete. In the other hand is to see the effect of the interaction between heat cure and temperature variation cycles on the dimensional variation of concretes made with reactive aggregates. For this purpose, four types of concrete C30 were manufactured with two types of aggregate (NR= non-reactive, and PR= reactive potential) and two types of cement (with and without silica smoke (10%)).

The concrete specimens were subjected to three types of conditioning prior to the tests. The control concretes (Ct) unmolded after 24 hours and kept under stable temperature and humidity conditions at 20 2°C and 80 ± 5% RH. Treated concretes (Cv) unmolded after 24 h and exposed to temperature and humidity variation in a climate chamber for 300 cycles of 12 hours. And the concrete with heat cure (C_{TV}) for 4 hours at 90°C then unmolded and exposed to cycles of temperature and humidity variations identical to the treated concrete (C_V).

From the results obtained it can be concluded that, despite the use of reactive aggregates, the dimensional variation is manifested in the form of shrinkage. The shrinkage of C_{TV} concretes (heat-cured concrete and exposure to temperature variation cycles) show a less significant shrinkage than Ct and C_V concrete. The C_V concretes show a similar behavior (vis-à-vis the shrinkage) to the Ct concretes regardless of the type of cement (with or without SF).

Figures: *Comparison of the evolution of the shrinkage of C30 concretes with NR and PR aggregate*



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3. Ellinor zeino-mahmalat, abdelhadi bennis. Environnement et ChangementClimatique au MarocDiagnostic et Perspectives ; 1ère édition 2012.

Biography

The Author has a passion for the study of building materials (Concrete) and the phenomena involved in their degradation. The objective is to study the accelerated aging of concrete by interaction between heat treatment and exposure to temperature variation, this study is based on the examination of the physical, chemical and mechanical parameters of concrete. The results of the research are being published.

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Numerical Investigation of Two Temperature Superthermal Electrons Effect on the Sheath of Dusty Plasmas with Dynamic Dust Charge

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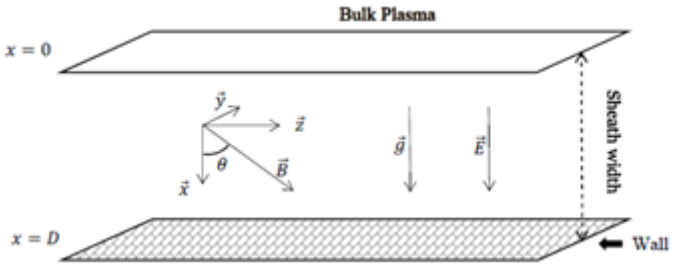
Abstract

The sheath structure is investigated using the multi-fluid model consisting of cold fluid ions, cold fluid dust grains and two groups of the electrons with different temperatures,low temperature electrons (LTEs) and hight temperature electrons (HTEs). These two groups of electrons are both assumed to be

a sum of two superthermal electrons which are related at superextensive electrons distribution .q < 1/.

The fluid model is then used to analyse numerically the sheath structure under the different temperature and population ratios of HTEs and LTEs. The results show that the increase of the temperature or/and the population of HTEs, the dust charge becomes more negative which leads to modify significantlythe quantities characterizing the sheath.

Figures:



Recent Publications

1. O. E. Ghani, I. Driouch, H. Chatei, Contributions to Plasma Physics (2019) e201900030.
2. *O. E. Ghani, I. Driouch, H. Chatei, Materials Today: Proceedings(2019) 2214–7853.*

Biography

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Design of a single-phase inverter controlled by a digital PWM for the optimization of photovoltaic energy

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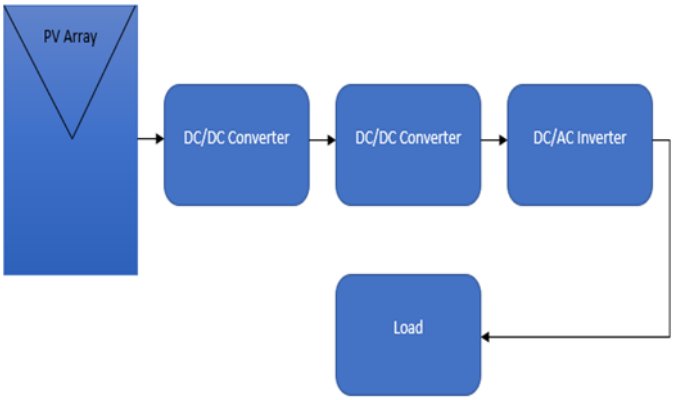
Abstract

The study conducted in this article aims to set up a system for the proper control of power production from a photovoltaic source. The system consists of a PV panel, two DC / DC converters, one controlled by a PWM which ensures the extraction of the maximum power from the panel (MPPT), the second converter will regulate the voltage across the output load. After the DC / DC adaptation stage, a conversion from direct current to alternating current takes place using a single-phased inverter which will be controlled by a unipolar digital PWM to ensure the correct switching of the four transistors.

Figures: *Block diagram of the studied system*



Recent Publications

1. Bhunia M., Gupta R., Students Conference on Engineering and Systems (SCES), (2013) 1-6.
2. J.L. Duran-Gomez., E. García-Cervantes., D.R. López-Flores Applied Power Electronics Conference and Exposition, (2006) 979- 985.

Biography

Graduated from Lorraine university, France in 2016 with a master's degree in electrical engineering, electronics and industrial data. At this moment I'm a second year PhD Student, my biggest focus is to comprehend photovoltaic / microgrid systems and contribute in the progress of this technologies.

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Influence of raw meal composition on clinker activity and cement proprieties

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[2]*Laboratory of Agroressources, Polymers and Process Engineering , Department of Chemistry, Faculty of Sciences Ibn Tofail University B.P133, 14000, Kenitra, Morocco*

Abstract

In cement industry process control, extended efforts have been dedicated to raw meal homogeneity as it is the main factor affecting clinker activity. Instabilities in raw mix composition not only have impact on the clinker quality but also affect kiln operations and thermal consumption. So, due to the great variety of factors involved, it is difficult to describe precisely the relationship between the raw meal components and the cement properties. In this study we have chosen raw meal samplers with variable levels of lime saturation factor LSF in order to evaluate possible interactions between LSF of the raw meal and clinker activity. X-ray fluorescence spectroscopy was used to determine the chemical composition of these raw meals and its clinkers. Physical and mechanical properties of these clinker cements were determined (grindability of clinker, water requirement of standard paste and consistency of cement, setting time, expansion and strength of mortar). The results showed that the increase of LSF of raw meal improved the grinding of the clinker and reduce the setting time of standard paste of cement. More over high LS values caused an undesired expansion, which affected negatively the mechanical performance of these cements.

Figures: *test of water requirement of standard paste and consistency of cement*

Recent Publications

1. EL Mrabet R., Elyoubi M.S., Elharfi A., Materials Today: Proceedings (2020) 1 – 4.
2. EL Mrabet R., Elyoubi M.S., Elharfi A., Materials Today: Proceedings (2019) 1 –7.
3. EL Mrabet R., Elyoubi M.S., Belfaquir M.; Int. J. ChemTech Research. 10 (6) (2017) 995-1002
4. EL Mrabet R., Elyoubi M.S., Elharfi. A.; Int. J. ChemTech Research. 9 (6) (2016) 392-399
5. EL Mrabet, R., Elyoubi M.S., Elharfi. A., J. Mater. Environ. Sci.6 (2015) 3676-3682.

Biography

Author has her expertise in chemistry of cement and concrete. His focus is based on the effect of raw meal composition on clinker activity and cement proprieties. He was warded his PhD in 2019 from the University of Ibn Tofail in Kenitra, Morocco. He published more than 10 papers. Her H-index is X on Scopus.

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New Ligands Based of Pyrazol: Synthesis, Characterization and Evaluation of the Catecholase-Like Activity

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[2] *Laboratoire d'Innovation en Sciences, Technologie et Education (LISTE), CRMEF, Oujda, Morocco.*
[3]*Eurofins Villapharma Research, Parque Tecnológico De Ctra. El Estrecho-Lobosillo, Km. 2,5-Av. Azul, 30320 Fuente Alamo, Murcia, Spain.*

Abstract

Copper can be considered as a modern bioelement; copper complexes participate in many biochemical processes and can be used as catalysts in many oxidation reactions [1]. The development of biomimetic oxidation catalysts, involving the Cu(II) as an active metal center [2, 3], and numerous biomimetic approaches have been devoted to the synthesis of complexes of Cu(II) with various ligands to reproduce the catalytic activity of biological systems containing in their active sites the Cu(II) [4]. Catechol oxidase (CO) is an enzyme active site that catalyzes the oxidation of a wide range of catechol to corresponding o-quinones in a process known as catecholase activity [5].

In this paper, four ligands L1-L4 have prepared by condensation of (3, 5-dimethyl-1Hpyrazol-1-yl) methanol A with appropriate primary amines. These ligands provide two pyrazole and pyridine nitrogen sp2 and one amine nitrogen sp3 capable of coordinating of metal. Catecholase-like activity of complexes formed in situ by this ligands with some metals salt via oxidation of catechol to o-quinone was performed.

Recent Publications

1. N. Boussalah, R. Touzani, I. Bouabdallah, S. El Kadiri, S. Ghalem, J Mol Catal A: Chem. (2009).
2. A. Zerrouki, R. Touzani, S. El Kadiri, Arab J of chem. (2011).
3. I. Bouabdallah, R. Touzani, I. Zidane, A. Ramdani, Catal Commun. (2007).
4. M. El Kodadi, F. Malek, R. Touzani, A. Ramdani, Catal Commun. (2008).
5. M. Khoutoul, F.Abrigach, A. Zarrouk, N. Benchat, M. Lamsayah, R. Touzani, Res Chem Intermed..(2015).

Biography

Author has his expertise in the synthesis of mixed oxides based on bismuth and in synthesis of heterocyclic ligands based of Pyrazole, Triazole and their theoretical investigations. She is a third year PhD student from the University of Mohammed premier, Oujda Morocco.

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The influence of electron recombination rate on the plasma characteristics in rf argon capacitive discharge

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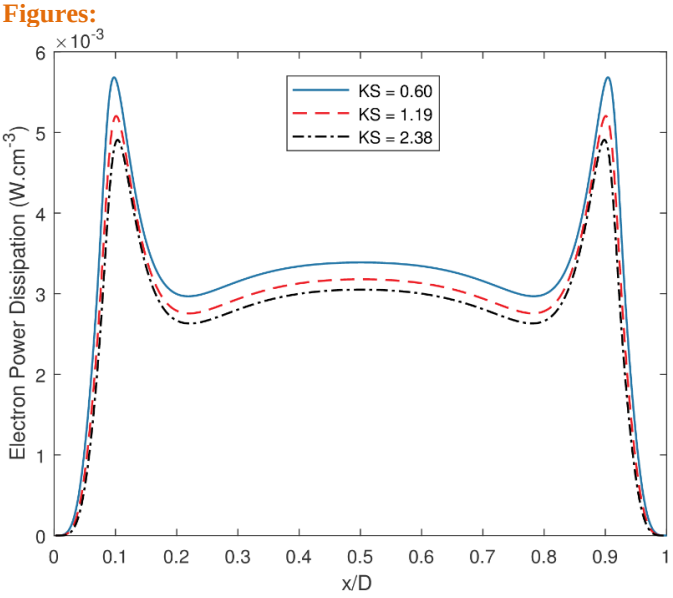
Abstract

This work investigates the effect of the electron surface recombination coefficient (KS) on radio-frequency discharge characteristics. This investigation is performed by a fluid model with drift-diffusion approximation. The simulation results show that when the electron recombination rate is larger, the plasma density is lower in the bulk region. It is found that the cycle-averaged electron and ion fluxes decrease adjacent to the electrode, while the electric potential increases in the bulk plasma region as KS increases from 0.60 to 2.38. Moreover, the reduction in the electron density in the bulk region leads to decreasing the electron power dissipation in this region. The results also show that the electron ohmic heating and pressure heating, which play a crucial role in sustaining the discharge, can be both reduced in the sheath regions with a higher electrons recombination rate. Finally, it is observed that the plasma characteristics can significantly be changed depending on the electrode surface proprieties.

Figures:



Recent Publications

1. *Greb A., Gibson A. R., Niemi K., O'Connell D., Gans T.,* Plasma Sources Sci. Technol. *24 (2015) 044003 -1 - 044003 -14*
2. *Daksha M., Derzsi A., Mujahid Z., Schulenberg S., Berger B., Donko Z., Schulze J.,* Plasma Sources Sci. Technol. *28 (2019) 034002-1 - 034002-26*
3. *Liu R., Liu Y., Jia W., Zhou Y.,* Physics of Plasmas. *24 (2017) 083515-1 - 083515-12.*

Biography

Author received the master degree in physics of matter and radiation from Mohammed first university, faculty of sciences, where he is currently pursuing the PhD degree in the laboratory of physics of matter and radiation (LPMR). His current research focus is the numerical modeling of radiofrequency dusty plasma discharges.

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Elaboration of a new Au-Sn-In-Zn quaternary alloys relevant for Pb-free soldering: Experimental and computational approaches of mixing enthalpies

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Abstract

Due to the combination of low cost and convenient material properties, Pb-Sn eutectic solder has been used in the electronics industry as a primary method for interconnecting electronic components for several decades. But, because of the toxic nature of lead, its use is restricted in many applications [1]. So, new lead free solders are required and tin-based multicomponent materials with alloying elements as Ag, Au, In, Zn, Bi…are likely to be most promising.

Enthalpies of formation data for multicomponent systems provide important thermodynamic information for industry and for theoretical studies in physics, chemistry and metallurgy. In general, thermodynamic properties of alloys can be obtained by experimental measurements

However, it is not always possible to perform experimental measurement for multicomponent alloys due to not only technological difficulties but also the expenses and time consume. So, theoretical prediction is a significant and effective approach to obtain thermodynamic properties of alloys, especially for multicomponent ones.

In this work, the partial and the integral enthalpies of mixing of liquid Au-In-Sn-Zn quaternary alloys have been measured and calculated at 500°C [2] along five ternary sections: $In_{0.8}Sn_{0.1}Zn_{0.1}$, $In_{0.55}Sn_{0.225}Zn_{0.225}$, $In_{0.1}Sn_{0.8}Zn_{0.1}$, $In_{0.45}Sn_{0.45}Zn_{0.1}$, and $In_{0.225}Sn_{0.55}Zn_{0.225}$. Several geometrical models such as Kohler, Muggianu and Toop have been used. In addition, the enthalpies of mixing of sub-ternary systems of Au-In-Sn-Zn have been calculated [3] and compared to the experimental data available in the literature.

Acknowledgment

The authors are grateful to Mr. Abdelaziz. SABBAR, Professor of Chemistry at University Mohammed V-Agdal, Faculty of Sciences, Rabat-Morocco, for his assistance for the calculations

Figures:

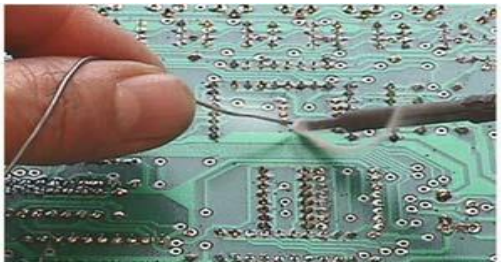

Figure 1 : Soldering an electronic circuit

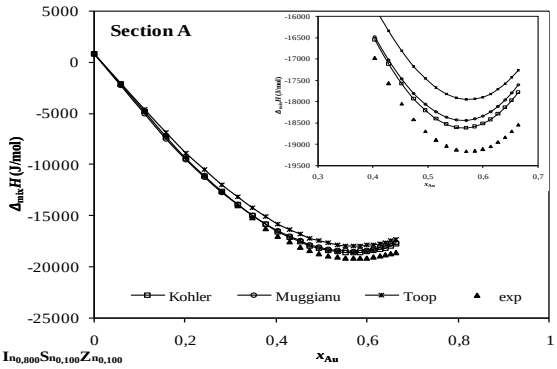

Figure 2: Experimental and calculated integral enthalpy of mixing at 500°C using the three geometric models (Kohler, Muggianu and Toop)

Recent Publications

1. [1] Directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003on waste electrical and electronic equipment (WEEE).
2. [2] A. Boulouiz, A. Sabbar, Thermochim. Acta 575 (2014) 151-158
3. [3] A. Boulouiz, M. El Moudane, M. Mekkaoui, A. Sabbar, J. Mater. Environ. Sc. 5 (3) (2014) 815-822.

Biography

Aziz BOULOUIZ, Professor of Chemistry at Mohammed Premier University, Faculty of Sciences, Laboratory of Environment and Applied Chemistry (LCAE), Oujda-Morocco

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Ethnobotanical study of medicinal and aromatic plants of the National Park of Al Hoceima

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[2]*Faculté Pluridisciplinaire de Nador, Université Mohamed Premier*

Abstract

The Al Hoceima region possesses an important floristic diversity especially in terms of medicinal and aromatic plants. The aim of this work was to identify the medicinal and aromatic plants (MAPs) used by the population in order to enhance their value. To identify the MAPs used in the Al Hoceima National Park, ethnobotanical investigation questionnaires were carried out among herbalists, healers and inhabitants, including specific questions on: the informant, the botanical characteristics (scientific name, vernacular name...) and the ethnobotanical characteristics of the plant. In this study, 46 species were identified, divided into 28 families, of which three of the most dominant, notably the Lamiaceaes, and the Fabaceaes, are the most represented. It shows that the foliage and the leafy stem are the most commonly used parts and the majority of remedies are prepared in the form of decoctions. Regarding the diseases treated, digestive diseases are in first place, followed by respiratory and dermatological diseases. The results obtained are a very valuable source of information for the region studied and for the national medicinal flora.

***Keywords**: Medicinal and aromatic plants, Ethnobotany, Al Hoceima National Park.*

Tables: *Les PMA utilisé par la population*

Famille	Nom Scientifique	Nom vernaculaire
Lamiaceae	Rosmarinus officinaliste	أزير (زوي)
	Mentha puleguim	فليو
	Salvia	السالمية
	Lavandula dentata	الخزامة
	Thymus Vulgaris	الزعتر
Cupressacées	Tetraclinis Articulata	العرعار
Oleaceae	Olea oleaster	**الزيتون البري**

Recent Publications

1. Hicham RIYAHA."Valorisation des plantes aromatiques et médicinales: étude du potentiel chimique et antibactérien des huiles essentielles de Rosmarinus officinalis (sauvage et domestiqué)",2013.
2. Ouafae Benkhnigue and all,Etude ethnobotanique des plantes médicinales dans la région de Mechraâ Bel Ksiri (Région du Gharb du Maroc), Barcelona, 2010-2011.
3. Souad Salhi, Etudes floristique et ethnobotanique des plantes médicinales de la ville de Kénitra (Maroc), LAZAROA 31: 133-146. 2010.
4. C.Younos and all, Étude ethnobotanique et historique des tamaris (Tamarixsp.,tamaricaceae) et leurs usages actuels en Afghanistan, Phytothérapie (2005) Numéro 6: 248-251.

Biography

The Author has her expertise in plants Aromatic and medicinal Her focus is based on the domestication of plants, aromatic and medicinal. She started his PhD in 2020 at the faculty of sciences and technology of AL HOCEIMA, MOROCCO

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Study of the inhibition of steel corrosion in an acid medium by a synthesized organic molecule

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[2]*Laboratory of Electrochemistry and Environment Materials, Faculty of Science, Kénitra, Morocco*
[3]*University of Technology and Humanities Department of Physics, Faculty of Mechanical Engineering, Radom, Poland.*

Abstract

Corrosion of steel materials in acidic solution leads to undesirable consequences ranging from leaks and waste, pollution and reduction of the service life of these materials in industries and the environment in general.

In this study, the inhibition effect of a triazole-type organic molecule on the corrosion of mild steel in a 1.0 M HCl solution was investigated. For this purpose, electrochemical techniques such as potentiodynamic polarization curves, electrochemical impedance spectroscopy and weight loss were used. This molecule has been shown to have remarkable inhibition efficiency on mild steel corrosion in a 1.0 M HCl solution. Potentiodynamic polarization studies clearly show that the presence of the inhibitor does not alter the hydrogen evolution mechanism and that it acts essentially as a mixed type corrosion inhibitor. The effectiveness of the inhibition depends on the concentration of the inhibitor and reaches a maximum value. The remarkable inhibition efficiency of this tested inhibitor was discussed in terms of blocking the electrode surface by adsorption of inhibitor molecules by the active centres. The adsorption of the molecule on the mild steel surface follows the Langmuir adsorption isotherm. The thermodynamic parameters were estimated and discussed, and the morphology of the surface of the steel has been studied by Scanning Electron Microscope. The results of the gravimeter method are in good shape agreement with the electrochemical results.

Figures:

Recent Publications

1. Chahul, H.F., Ndukwe, G.I., Ogwu, D.O., OUAC 29 (2) (2018) 103-109.
2. Ngobiri, N.C., Okorosaye-Orubite, K., Chemistry Intl., 2 (2017)185-194.
3. G. A. Ijuo, N. Surma, S. O. Oloruntoba, WSN 102 (2018) 1-16.
4. I. Merimi, R. Benkaddour , H. Lgaz , N. Rezki , M. Messali , F. Jeffali, H.Oudda , B. Hammouti, Materials Today: Proceedings 13 (2019) 1008–1022.

Biography

Author has expertise in the field of materials engineering, characterization processing, quality control and surface treatment. She studied at Ibn Tofail University, Faculty of Science, in Kenitra, Morocco. Her graduation project was carried out at the Laboratoire Tests Publics et Etudes LPEE-CEMGI in Casablanca,
Service paints and coatings, under the title of characterization of a material while mastering the quality and accreditation of paint construction tests and routers. Currently a doctoral student in his first year at the Faculty of Science in Oujda at Mohamed Premier University. His expertise in evaluation and his passion for the use of inhibitors to protect metals against corrosion, especially in acidic environments.
His objective is based on the use of his organic molecules to have applications in industries.
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Delineation of marine intrusion by electrical tomography at Sahel-Doukkala

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Abstract

The coastal aquifer of the Sahel Doukkala, which is part of the Moroccan Atlantic coast, is affected by ocean water intrusions. Excessive exploitation of fresh groundwater is the main cause of this problem. A campaign of 6 lines of electrical resistivity tomography was conducted in the study area. The interpretation of the results made it possible to delimit the vertical extension of marine invasion in the most exploited aquifers in the Sahel. Laterally, the marine invasion extends towards 2 km of the coast. This study shows the importance of ETR tomography in the tracing of the freshwater-salt water interface.

Recent Publications

1. *Soussi H., Bahi L., Ouadif L., Aghazzaf B., El kasri J., Bahi A.,* Int. J. of civil engineering and technology. *9 (2018) 1111-1120.*
2. *Ouadif L., Bahi L., Baba K.,* Matec web of conference. *11 (2014) 1-4.*
3. *Comte J.C., Banton O.,* Geophysical research letters, *54 (2007) 1-4.*

Biography

My area of expertise is the environment. My goal is based on the use of geophysical methods in the field of Hydrogeology. I'm a PhD student at Mohammadia Engineering School. My H is 1 on Scopus.

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Study of odors phenomenon in a wastewater treatment plant in agrifood industry

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[3]*Envirchemie Maghreb s.a.r.l*

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Abstract

Amongst the major industrial phenomena that could encounter a wastewater treatment plant is the malodor phenomenon. Actually, wastewater treatment as well as its recirculation in the sanitation network entail systematically malodors. The present work is an analysis study of a concrete case of malodors problem in a waste treatment plant in a food industry, where the root cause of the problem, the remedy to address it and the environmental impact of the plant in question are represented. The rationales behind this nightmare that industrials encounter particularly those approximately populations are plentiful, notably pumping station, sludge storage as well as their filtration. In this case, study, the major source of strong odors emanates from treatment phase filtrate of resulting sludge from sewage treatment as shown in Fig. 1.
Generally, the source of odors arises from the decay of organic matter that is present in treated effluents. In order to eliminate those odors, a huge number of opportunities is provided as well as preventive and curative solutions. Plants whose processing capacity is significant, whilst they remain hard to handle for small stations, albeit expensive, have adopted those technologies, expeditiously. In this case, the treatment process was improved in order to decrease if not eliminate at once those odors.

For sewage treatment stations, odors are comprised mainly of sulphur compounds (hydrogen, sulphur, mercaptans), of nitrogen products (ammoniac, amines) and oxygenated molecules (aldehyde, ketone, volatile fatty acids) that can be further developed all the more so as the storage time in the different treatment phase is important. Furthermore, with a view of addressing this, we have changed the path of odors source and we have studied the impact overall process. For the industry in question, the impact was significant given that the plant location approximately inhabitants could have led to drastic consequences for the company.
Indeed, the problem has been contained and odors have disappeared, however, some olfactory fragrances remain in time and space that we are still examining it in order to know the root cause and thus contain it.

Figures:

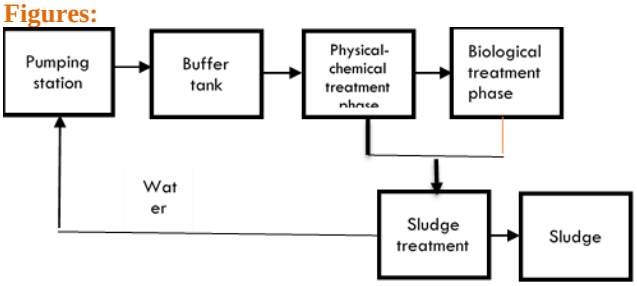

Figure 1: Diagram of process of WWTP

Biography

Moulkaf Safae, Ingénieur d'état en génie des procédés industriels, lauréate de l'école Mohammedia des ingénieurs, promotion 2015. Actuellement étudiante doctorante dans le domaine de l'environnement et Responsable de département technique au sein d'une industrie agroalimentaire.

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Phytochemical study and antioxidant activity of Globularia alypum extracts

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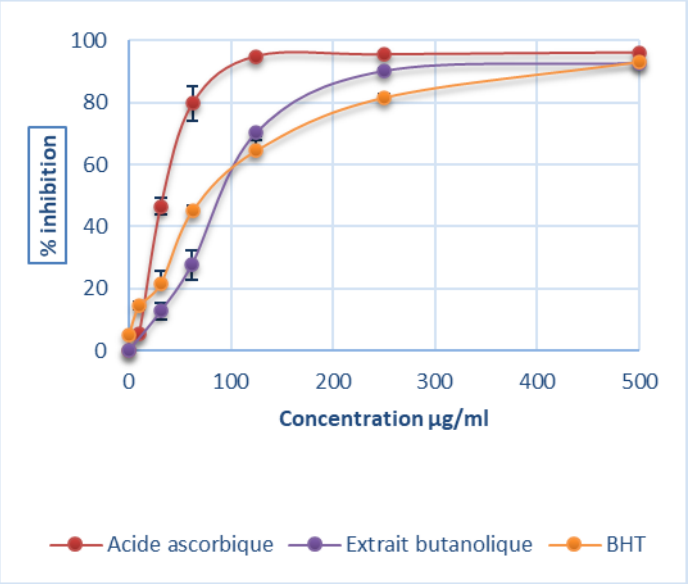
Abstract

This work aimed to enhance the medicinal plants used in traditional phytotherapy by highlighting the biological effects of Globularia alypum.

Globularia alypum is a plant widely used in herbal medicine in Morocco the extracts were obtained by maceration of the leaves in solvents of increasing polarity methanol, ethyl acetate, butanol, and water. The yield was: 20, 0.48, 18.66 and 7.76%. The content of total polyphenols was determined using the Folin-Ciocalteu reagent, it is 183.33, 264, 201 and 198 mg EAG / g of MF in the methanolic, ethyl acetate, butanolic and aquex extracts respectively. The flavonoids were evaluated by the method using aluminum chlorides AlCl3, the content is estimated at 43.04, 30.42, 41.90 and 36.71 mg EQ / g MF in methanolic extracts, acetate ethyl, butanolic and aqueous respectively. The antioxidant activity was carried out by the anti-free radical method using 2,2-diphenyl-1-picrylhydrazyle (DPPH), the IC50 are estimated at 90.53, 97.61, 93.61, 83.48 µg / ml for methanolic, ethyl acetate, butanolic and aqueous extracts while that of BHT is 174.26 µg / ml of ascorbic acid 34.57 µg / ml. The high phenolic, flavonoid, and the antioxidant activity of the extracts indicated that the Globularia alypum could be exploited as an antioxidant supplement.

Figures:



Biography

The author has the experience in pharmacology and ethnobotanic

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Concrete damage plasticity model for fiber reinforced concrete

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Abstract

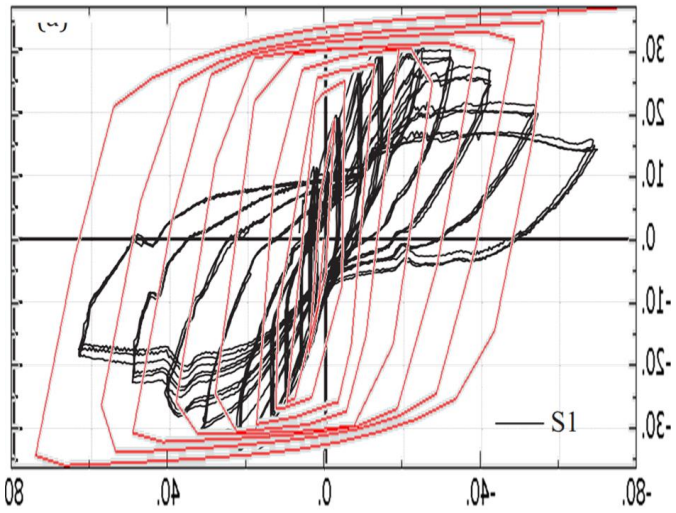
During the last few decades, several experimental and analytical works have been carried out for evaluating the seismic behavior of fiber reinforced concrete (FRC) structures. Those researches are highly by the great impact of the addition of fibers to concrete.

Therefore, the need to have an accurate prediction for the behavior of the composite mixture is gaining more interest in the last studies.

This paper presents the modifications that have been brought to the original parameters of the concrete damage plasticity model (CDPM) available in the commercial Finite elements software Abaqus in order to capture the behavior of FRC structures.

Needless to say that bond-slip between reinforcing steel bars and concrete should be accounted for large displacements.

Figures: *Load-displacement hysteretic curve for a concrete column: experimental vs. theoretical*



Recent Publications

1. Seismic behavior of different fibers reinforced concrete columns using incremental dynamic analysis in Abaqus., ICAMANA 2019.

Biography

Majored in Civil Engineering from Hassania School of Civil Engineering, Casablanca, Moroco in 2011. He worked in Health Ministry, and preparing his PhD on modeling the seismic behavior under the supervision of Pr. Abdelouafi El Ghoulbzouri in the National School of Applied Sciences, Al Hoceima, Morocco..

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Inhibition of corrosion of C38 steel in HCl medium by Imidazole derivatives

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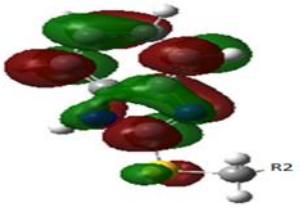
Abstract

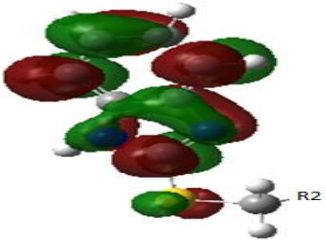
In this work, we studied the inhibitory action of the three imidazole derivatives: OSBZ, OSMBZ, and OSNBZ on the corrosion of C38 steel in 1M HCl medium by theorical calculation, these latter were completed by electrochemical impedance spectroscopy techniques and analyzes of polarization curves as well as by gravimetric studies. The results obtained have shown that the effectiveness of these three compounds increases with increasing concentration (between 5.10^{-5} and 10^{-3} mol L^{-1}), and decreases with increasing temperature (between 25° and 45°C).

The compounds studied have the same skeleton, and change only by substituent, we noticed that the inhibitory efficacy is influenced by the type of substituent.

Figures:



OSBZ LUMO



OSBZ HUMO

Keywords: Imidazole, corrosion, electrochemistry, DFT.

Biography

The author work on the study of thebehavior of steel in acid medium. Her focus is based on the valorization and use of organic compounds in order to inhibit corrosion. She is currently preparing her PhD at ChouaibDoukkali University, Faculty of El Jadida, Morocco.

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Comparative study between three-field and four-field conformal radiation therapy [3D-CRT] ballistics for rectal cancer treatment

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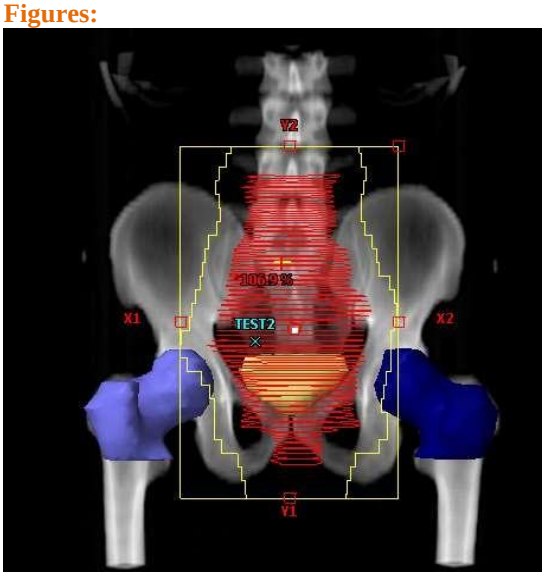
[2]*National School of Applied Sciences, Mohammed First University, Oujda, Morocco.*
[3] *Radiotherapy Department, HASSAN II Oncology Center, University Hospital Mohammed VI, Oujda, Morocco.*

Abstract

The tremendous improvement made over the last ten years in radiotherapy has been achieved mainly through the development of particle acceleration techniques. Three-dimensional conformal radiation therapy [3D-CRT] crucially applied for decreasing the shape of advanced rectal tumours yet has several side consequences. Our investigation examined the dose distribution of target volumes (PTV), protection of healthy organs at risk (OAR), and the quality of therapy for the two strategies based on the three fields and four fields ballistic used in the treatment of rectal cancers. Applying Varian Linear Accelerator system (Varian Medical Systems, Inc., Palo Alto, CA, USA) integrated into COH II with an Eclipse MLC 2100 planning system including Pencil Beam Convolution PBC dose calculation algorithm. Two postoperative patients with rectal tumours registered—the two radiotherapy plans mentioned above designed for every patient. Moreover, a comparison of the dosimetric parameters made to evaluate the feasibility of each approach. These parameters, including the target volume coverage indicators, included average dose, conformity index (CI), and homogeneity index (HI) of planning tumour volume, OAR included the bladder and bilateral proximal femurs. The results achieved in this comparative study advocate for the clinical application of three fields ballistic in all specialities already compared, except for the target volume PTV dose distribution.

Figures:



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2. Krim D., Rrhioua A., Zerfaoui M., Bakari D., Oulhouq Y., Bouta M., 2019 International Conference on Intelligent Systems and Advanced Computing Sciences (ISACS), 2019, pp. 1-6.
3. Krim D., Rrhioua A., Zerfaoui M., Bakari D., Oulhouq Y., SmartICT 2019, LNEE 684, pp. 1–10, 2021. (In press).
4. Krim D., Rrhioua A., Zerfaoui M., Bakari D., Hanouf N., Proceedings of the 2nd International Conference on Electronic Engineering and Renewable Energy Systems, (In press).
5. Warkentin B, Stavrev P, Stavreva N, Field C, Fallone BG. J Appl Clin Med Phys 2004 ; 5(1) : 50e63.

Biography

The author received a master's degree in physics of matter and radiation from Mohammed's first university, faculty of sciences, where he is currently pursuing a Ph. D. degree in the laboratory of physics of matter and radiation (LPMR). His current research focus is the simulation Monte Carlo GATE, GAMOS, and TOPAS in radiotherapy and hadrontherapy.

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Seismic behavior of a reinforced concrete portal frame treated by carbon fiber reinforced polymer

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Abstract

Until now the structural reinforcement against seismic impact on buildings is mainly known by the increase of the ductility of the structure.

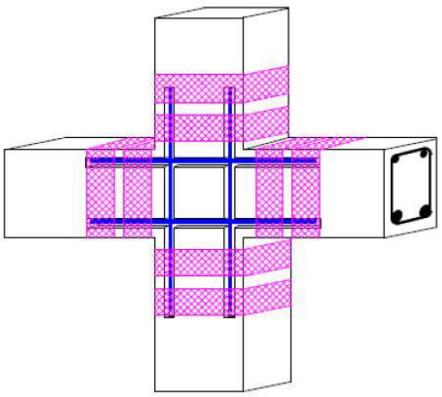
The object of this publication is to know the impact of carbon fiber reinforced polymers on the increase of the ductility of structures.

A digital modeling of a building was carried out by also introducing a modeling of the fiber-reinforced polymers glued to reinforced concrete structures (column, beams)

the results of numerical modeling clearly show us the impact of fiber-reinforced polymers on increasing the ductility of the structure.

Modeling allowed us to assimilate the real behavior of a building subjected to seismic forces and to deduce the impact of polymers reinforced with carbon fibers on the strength of the structure.

Figures: *The continuity of the reinforcement in a node ensured by CFRP rods*



Recent Publications

1. Jamal Eddine HAMOUTAMI, Oum El Khaiat MOUSTACHI, International Journal of Engineering Research and Technology. ISSN 0974-3154, Volume 12, Number 12 (2019), pp. 2495-2501.

Biography

Author has a basic training as a civil engineer in Mohammedia School of Engineers and was able to spend a great deal of experience in the field of engineering and face several technical problems.

The author does research within the EMI to study fiber reinforced polymers and was able to make a first publication in the International Journal of Engineering Research and Technology.

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Analysis of structural and surface degradations of a flexible pavement, based on auscultation results using the MCA method

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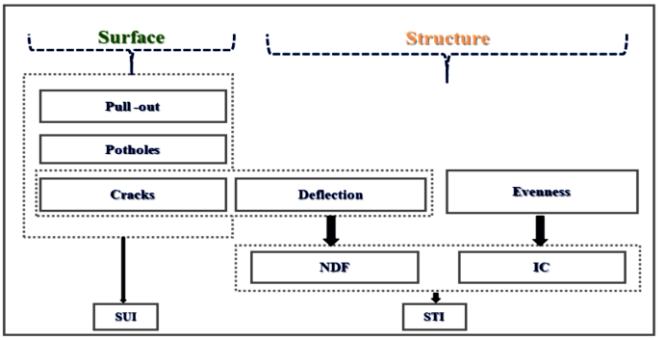
2 National Center for Road Studies, Ministry of Equipement, Transport, Logistics and Water

Abstract

For several years, the behavior of layers's interfaces has appeared as an important element that can be dimensioned for civil engineering structures, in particular for road pavements. As technologies have evolved, both for surface layers and rolling loads (tyres), new damage pathologies have appeared (rutting, tearing, slipping, potholes, top down cracking..). The basis of any maintenance strategy is usually a study of surface deterioration and an associated interpretation. In most cases, surface deterioration is one of the earliest and most sensitive indicators of changes which impact the structural and surface characteristics of pavements. The pavements is subjected to several types of stress during its lifetime. Heavy vehicle traffic and thermal variations are the main causes of road deterioration. Within the framework of our collaboration with the National Centre For Road Studies, we present in this abstract a descriptive statistical analysis of the results of the auscultation carried out in 2018 on the section of the national road number 06, linking the city of Meknes and Khemissat over a length of 50 kilometers which consists in assessing the interaction between different types of structural (STI) and surface (SUI) degradations.

Figures:



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2. Modeling of urban transport, Transport Research APAS Urban Transport European Comission, DG transport, 1996.
3. Jyda Mint Moustapha. Mathematical modeling and plot simulation road : statistical analysis of insertion models and probabilistic simulation of a kinetic model. Modelin and simulation.
4. Standart Nomenclature and Definitions for Pavement and Deficiencies, HRB, USA, 1970.
5. Lebart al., Dunod, Multidimensional exploratory statistics.

Biography

The author has expertise in the field of materials engineering, soil treatment, quality control and surface treatment. She studied at Mohammed Premier University, Faculty of Sciences of Oujda in Morocco. His end-of-studies project was carried out within the company Bioui Travaux where he exercised the quality control of civil engineering materials and the monitoring of laboratory tests on a construction project of an engineer passage with open gantry in Rabat, as well as a three-year experience in the civil engineering and environment laboratory LABOTEST where he was in charge of the geotechnical laboratory for the control tests of building and public works. Currently a doctoral student in his fourth year at Mohammadia School of Engineers at Mohamed V University. In collaboration with the CNER (National Center for Road Studies) consists in the assessment of degradation and deterioration of materials that make up flexible road pavements and its evaluation in the medium and short term. Its objective is based on the use of the results of road monitoring carried out on a road section to predict future degradation and new maintenance actions.

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Impacts of climate change on Moroccan's groundwater resources: State of art and development prospects

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[5]*Laboratory of Separation Processes, Faculté des Sciences, Université Ibn Tofail, B.P 242, Kenitra, Morocco*

Abstract

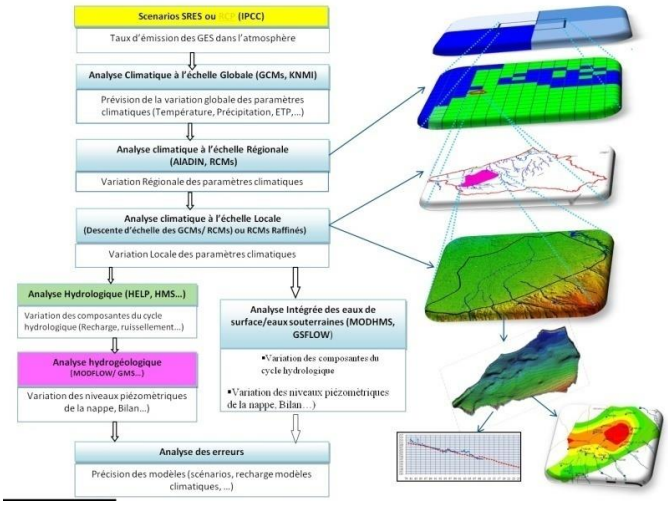
The scientific knowledge of processes related to climate change impact on groundwater resources remains insufficient both at the national, and international levels. This is particularly due to:

- *The inadequacy of databases, both quantitatively and qualitatively;*
- *Insufficient accuracy of predictions by climate models, especially rainfall, and their sensitivity to the choice of climate scenarios;*
- *Insufficient accuracy of methods for estimating groundwater recharge;*
- *the difficulty of modelling surface water/groundwater interaction over large areas.*

The assessment of climate change impacts on groundwater resources requires reliable predictions of climate variables; a good estimation of groundwater recharge and its spatial and temporal variability; and the hydrodynamic response of the aquifer to different climate change scenarios.
Several research studies have shown that climate change has accentuated negative repercussions on groundwater resources in Morocco. These studies were using different approaches: experimental, numerical and statistical modelling, etc. Many aquifer problems were investigated: saline intrusion; water resources quality; recharge, shortage of water reserves. These research works were rarely treating the different process aspects involved with integrated approach.

Therefore, this paper focuses on the analysis of climate change effectson groundwater resources using an integrated approach that would take into account the multidisciplinary nature of the process: Climatic, hydrological and hydrogeological (Fig. 1).

Figures:



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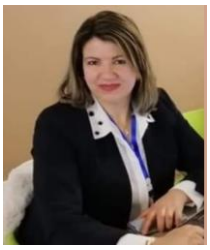
2. Sbaa M.., Vanclooster M., Annale des sciences de la santé , 32 14(2017) 1; 24-53.
3. El Assaoui N., Amraoui F., J. International Journal of Innovation in Science, Engineering and Tecnmologiy. Sci. 5 (2016) 11.
4. Pitz C.F., EcologyDepartment, Publication (2016) 16-03-006.
5. El Assaoui N., Amraoui F., R. Géologue. Sci.N° 187 (2015).

Biography



Prof. Naima EL ASSAOUI holds Hydrogeology Engineer degree from the Moscow Academy of Geological Prospecting. She earned a Master's degree in GIS and Land Management and a PhD in Geosciences from Ain Chock Science School .Her Doctorate Dissertation was chosen Best university's 2017Thesis, in Geosciences from Hassan II University. She carried out several researches in the field of geosciences and especially groundwater management planning and numerical modelling, water erosion, remote sensing applied to water systems, as well as the impact of climate change on surface and groundwater resources. She is Professor at the Geology Department of Rabat Science school, member of the Water and Environment Geosciences Laboratory (GEE) ; the Moroccan Association for the Development of Research and Scientific Information (AMIS); the International Association of Hydrogeologists (IAH); and the scientific committee and of the organizing committee of several conferences and scientific events.
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Study of the energetic, exergetic and thermal balances of a solar system during the distillation of Rosemary Leaves

KAMAL EZZARROUQY [1], ABDESSAMED HEJJAJ [2], LAILA MANDI [3]

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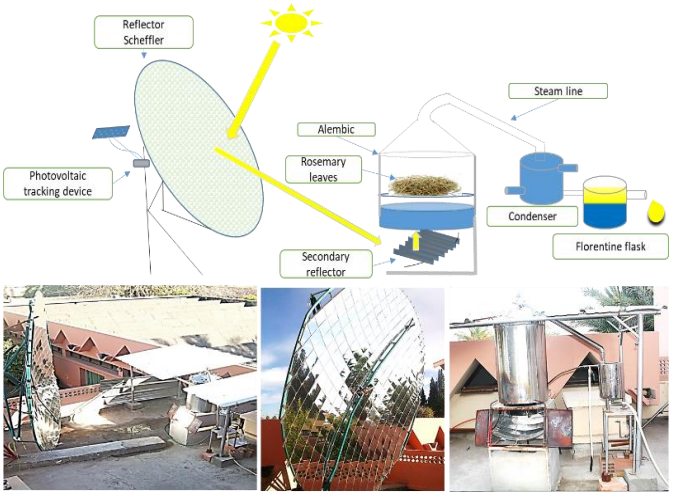
Abstract

The solar energy produced by the Scheffler parabola (10 m^2), is not fully exploited by the solar system for distillation of Aromatic and Medicinal Plants. In this work, the optical losses at the primary and secondary reflectors, and the thermal losses at the level of each part of the system (distillation still, steam line and the condenser) is determined, a thermal analysis energetic and exergetec was also performed for a solar system distillation of rosemary leaves. For an average intensity radiation of 849.1W/m^2 and for 6 Kg of rosemary leaves during 4 hours of distillation; it is studied that, the exergy efficiency and the optical efficiency of the system is achieved up to 26.62%, 50.97% successively, and the thermal efficiency of the still, the steam line and the condenser is about **94.8** %, 84.05% and **8**7.76% successively. The total efficiency of the solar distillation system taking into account the heat losses at the still, the steam line and the condenser; and optical losses at the level of the two reflectors is 35.65%, and if we think about isolating the steam line we will have an efficiency of 42.42%.

Figures: *Solar distillation apparatus. (A) Schema of the Useful and lost energies of the distillation system; (B) solar apparatus; (C) solar reflector; (D) distillation unit*



Recent Publications

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2. *Ezzarrouqy. K., Hejjaj. A., Idlimam. A., Mandi. L.,* The 4th edition of the Doctoral Students' Day - JDC2019- July 11, 2019 Faculty of Sciences and Techniques of Marrakech. Poster presentation.

Biography

The author works on the distillation of PAM with decentralized systems such as the solar system using the Sheffler dish as a heating source. He started preparing his doctorate in January 2019 at the semlalia science faculty, cadi ayyad university in Marrakech, also the author is a professor of physics and chemistry in a qualified public high school in Marrakech

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Study of the effect of the choice of bitumen on the resistance of hot mix asphalt to temperature

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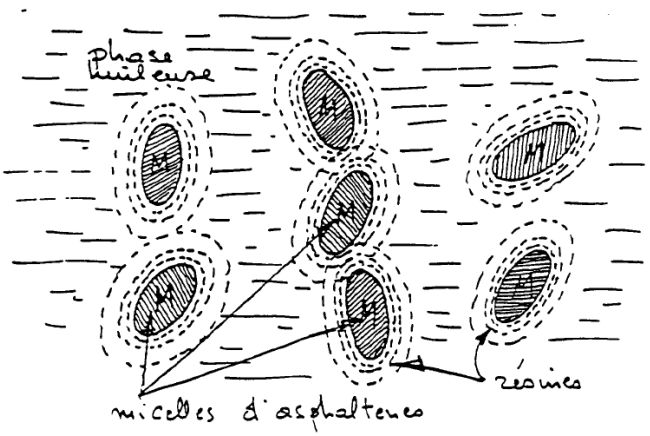
Abstract

Bitumens are materials that bind the aggregates of roadways to allow vehicles to travel in the best conditions of safety and comfort. The bitumens currently used in pavements in Morocco are pure bitumens of 20/30 and 35/50 classes and polymer-modified bitumens. The multitude of bitumen types leads to the question of the effect of the type of bitumen on the temperature resistance of asphalt mixes. The objective of this study was to examine the intrinsic characteristics of the different types of bitumen and to propose the type that best adapts to the meteorological conditions of the kingdom. Bitumen identification, including penetrability at 25 °C, softening temperature, and Dynamic Shear Rheometer tests were carried out in the laboratory in order to study the adaptation of these materials to the Kingdom's temperatures. Rutting tests was also executed on the asphalt mixture. According to the results of the tests, the modified bitumens make it possible to improve the resistance of bituminous materials to high temperatures and prevent the rutting phenomenon.

Figures: *Structure du bitume*



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2. *Si, W., Ma, B., Zhou, X., Ren, J., Tian, Y., Li, Y., 2018. Construction and Building Materials 178, 529–541.*
3. *Wang, H., Liu, C., Ge, D., You, Z., Yu, M., 2020. Construction and Building Materials 230, 117063.*
4. *Chen, J., Yin, X., Wang, H., Ding, Y., 2018. Journal of Cleaner Production 188, 12–19.*
5. *Luo, W., Zhang, Y., Cong, P., 2017. Construction and Building Materials 144, 13–24.*

Biography

The author is a state engineer in civil engineering, laureate of the EHTP, he has seven years of experience in a nationally renowned civil engineering laboratory. He has worked on bitumen and asphalt mixes during major road and motorway works in Morocco and Africa. He is currently a PhD student in his second year at EHTP at the Civil, Hydraulic, Environmental and Climate Engineering Laboratory (LaGCHEC).

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Kinetic and thermodynamic study of adsorption of the cationic dyes by the artificial exchange resin Amberlite-IRC®50

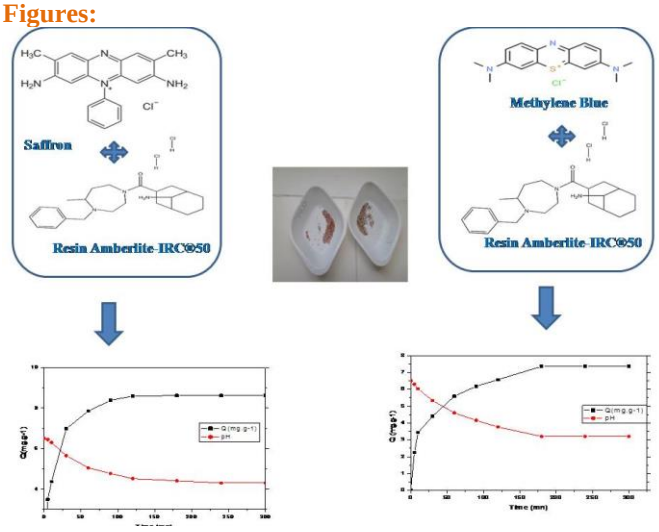
J. Bensalah *[,1], M. Berradi [2, 3], H. Ouaddari [1], M. Allaoui [4], A. Habsaoui [1], A. Lebkiri [1], E.H. Rifi [1]

[1] *Laboratory of Organic Synthesis and Extraction Process (LSOPE), Department of Chemistry, Faculty of Science, Ibn Tofaïl University, B.P. 133, 14000 Kenitra, Morocco*
[2] *Laboratory of Industrial Technologies and Services (LITS), Department of Process Engineering, Height School of Technology, Sidi Mohammed Ben Abdallah University, P.O. Box 2427, 30000, Fez, Morocco*
[3] *Laboratory of Advanced Materials and Process Engineering, Department of Chemistry, Faculty of Sciences, Ibn Tofaïl University, B.P. 133, 14000 Kenitra, Morocco*
[4] *Laboratory of Material, Electrochemistry and Environment (LMEE), Department of Chemistry, Faculty of Sciences, Ibn Tofaïl University B.P. 133, 14000 Kenitra,Morocco.*

Abstract

The direct or indirect discharge of effluents from the textile finishing industry, which are heavily loaded with micropollutants, such as dyes and additives, impact on the environment. Indeed methylene blue (MB) and the Saffron (SF) are textile dyes widely used in the laboratory of textile dyeing. The aim of this study is in the context of the elimination of these textile dyes contained in model effluents by ion exchange resins of the Amberlite-IRC®50 type. The results of studies of the effect of several parameters on the performance of adsorption such as contact time, mass of support, pH of effluents and etc. were obtained at an adsorption equilibrium after 180 min of contact at a low mass of 0.1 g for the Amberlite-IRC®50 resin and at a pH = 6.5 with respect to the two cationic dyes (SF and MB). This was done at a gradual increase in temperature up to 55 °C with an evolution of the adsorption capacity Q_{max} (SF) = 7.15 mg/g for the SF dye and Q_{max} (MB) = 7.36 mg/g for MB dye. The study of kinetic models shows that the adsorption of dyes (SF) and (MB) by Amberlite- IRC®50 followed the pseudo-second order model and that the Langmuir isotherm is the most appropriate model to explain the process of this adsorption.

Figures:



Recent Publications

1. Bensalah, J., Habsaoui, A., Abbou, B., Kadiri, L., & Lebkiri, I. Mediterranean Journal of Chemistry, 9(4), (2019), 311-316.
2. Allaoui, M., Berradi, M., Taouil, H., Es-sahbany, H., Kadiri, L., Ouass, A., ... & Ahmed, S. I. Analytical &, 11,(2019),1547-1558.
3. Lebkiri, I., Abbou, B., Kadiri, L., Ouass, A., Essaadaoui, Y., Habssaoui, A., & Lebkiri, A,Mediterranean Journal of Chemistry, 9(5), (2019). 337-346.

Biography

Author he has expertise in study, characterization, evaluation and application of resins used in environment. He was warded her PhD in 2019 from the University of Kenitra., Morocco. He published 2 papers.

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Advanced speed sensorless control strategy for induction machine based on neuro-MRAS Observer

Weam EL MERRASSI [1], Abdelouahed ABOUNADA[1], Mohamed RAMZI[1]

[1]*Laboratory of Automatic, Energy Conversion and Microelectronics (LACEM), department of electrical engineering. Faculty of Science and Technology, University of Sultan Moulay Slimane. Beni Mellal, Morocco.*

Abstract

Speed information is mandatory for the control operation of the induction motor (IM) drive. The rotor speed can be measured through a sensor or may be estimated using voltage, current signals, and machine parameters. The use of speed sensors is associated with problems, such as, reduction of mechanical robustness of the drive, need of shaft extension, reliability reduction, and cost increase. Therefore, a speed sensorless drive has a clear edge over the traditional sensor control drive. Owing to, his numerous advantages from the cost, consistency, compatibility, and environmental issues. So far, Speed sensorless control of induction motors has been faced with various techniques of speed estimation, such as Luemberger observer, Extended Kalman Filter, auxiliary signal injection and model reference adaptive control (MRAS). The MRAS has the enticing advantages of a hyperstable system, easy implementation, and offer less computational effort. For this reason, the MRAS is more commonly used. However, the main drawbacks of these models are their insufficient performance at low speeds notably around the zero speed regions of operation where the ability of the torque declines, which engenders an erroneous speed control and unsteady drive system, along with sensitivity of parameters machine. The union of artificial intelligence to an adaptive model can overwhelmed these drawbacks. In this order, the proposed paper intends to upgrade the speed sensorless model based upon the fusion of an artificial neural network observer to the model reference adaptive system. This union is endeavor to achieve lowest mechanical stress, improve the control performance by enhancing the feedback information, and reduce the classical observer sensitivity. The effectiveness of the proposed control algorithm has been verified through simulation using a Matlab / Simulink environment.

Figures:

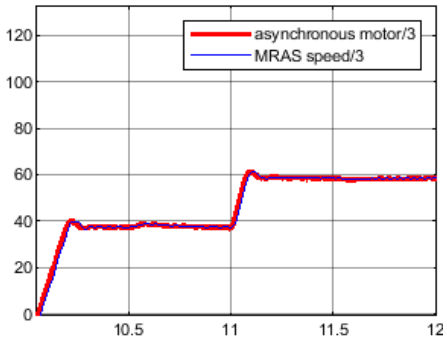

Fig.1: Measured and estimated sensorless speed of an induction machine for different references speed.

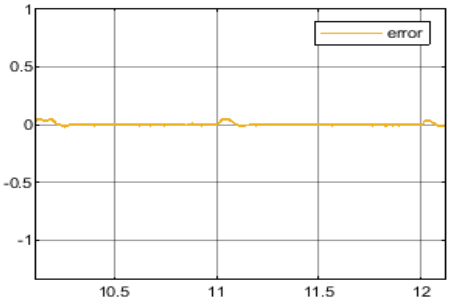

Fig.2: Speed estimation Error.

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2. Fereka D., Zerikat M., Belaidi A., 7th International Conference on Systems and Control (ICSC). (2018).
3. Benlaloui I., Drid S., Chrifi-Alaoui L., Ouriagli M., IEEE Transactions on Energy Conversion, 30(2), (2015). 588–595.

Biography

Weam EL MERRASSI was born in Beni-Mellal, Morocco. She received her Engineer Magister from S.M.S University in 2015. Her research intersts include numeric control of electrical drives, conversion and power control, practical High power electronics and Drives.

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Abdelouahed ABOUNADA was born in Sidi Slimane, Morocco. He received his M.Sc. from Cadi Ayyad University in 1992. His research interests include advanced methods for numerical automatic and renewable energy.

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Mohamed RAMZI was born in Beni-Mellal, Morocco. He received his Engineer Master from E.M.I University of Mohamed V in 1981. In addition, he received the Phd degree in 1994 from polytechnic of Mons, Belgium. His research interests include power control and high power electronics

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Soil Metallic Contamination by (Pb/Zn) at the abandoned mining waste site of Touissit region, Eastern Morocco

Khalida BOUALI [1], Mourad ARABI [1], Abdelhafid CHAFI [1]

Laboratory for the Improvement of Agricultural Production, Biotechnology and the Environment (LAPABE), Faculty of Science, Mohammed Premier Oujda University.

Abstract

Morocco has an important mining activity and is known for its many mining sites, in particular for Cu, Zn, Pb, and Fe. Their overexploitation for many decades led to the strong accumulation of a hundred tons of tailings waste mostly abandoned without treatment. The present study aims to investigate heavy metals tolerance and concentration in soil collected from different location around these mining sites in the eastern of Morocco, with the objective to forecast the potential accumulation following time. Soils were sampled at several sites in the studied mines, then, analysed for Zn and Pb concentrations. Soils in the studied mines proved to be deficient in major macronutrients and to contain toxic levels of Zn and Pb. Results showed that the concentrations of heavy metals were different between the sampling soil points and from layer to another. 27 soil samples collected from 9 different soil sampling points with 3 different depth layers were analysed. While a maximal concentration (74100 ppm and 2910 ppm), with an average of (40477 ppm; 2091 ppm), were determined for Zn and Pb metals, successively. In summary, the survey of mining site soil allows the prediction of the geochemical behaviour of polluting metallic species and their migration towards receptors fields with low tolerance, thus, it will supply the intervention and rehabilitation approach to decision-makers, while meeting economic requirements.

Recent Publications

1. **Arabi M**, Sbaa M, Vanclooster M, Darmous A., J. Eco. Eng. 21(6) (**2020**), 94-101.
2. Kadaoui, M., Bouali, A., & **Arabi, M**., J. Wat. Land Dev., 42(1), (**2019**), 100-109.
3. Nouayti, A., Khattach, D., Hilali, M., Nouayti, N., & **Arabi, M.**, Materials Today: Proceedings 13, (**2019**), 1084-1091.
4. Bensaad, H., Mabrouki, Y., Taybi, A.F., **Chafi, A**., J. Mat & Envi. Sci., 8(7), (**2017**), 2365-2371.
5. Zerrouqi Z., Sbaa M., **Chafi A**., Elhafid D., J. Wat. Sci., 24(4), (**2011**) 329-448.

Biography

Author is currently a PhD candidate in Life and Environmental Science. Registered in the doctoral cycle in 2017 at the Faculty of Sciences Oujda.

Mine waste is a problem that disturbs the environment. Its action is based on taking stock of the impact of these discharges on our environment such as the soil to get an idea of the huge quantities of mining waste left behind without a management plan.

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Reliability analysis of an eco-designed mechatronic system using Coloured Petri Net

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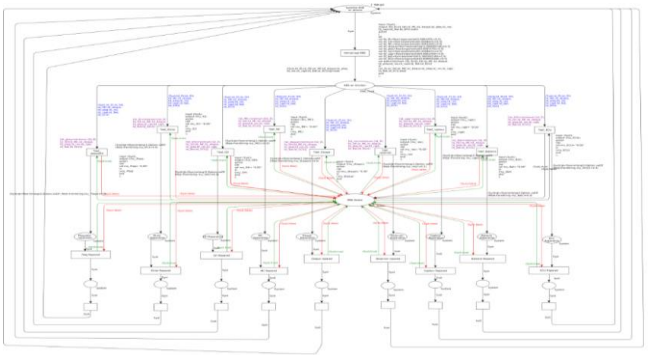
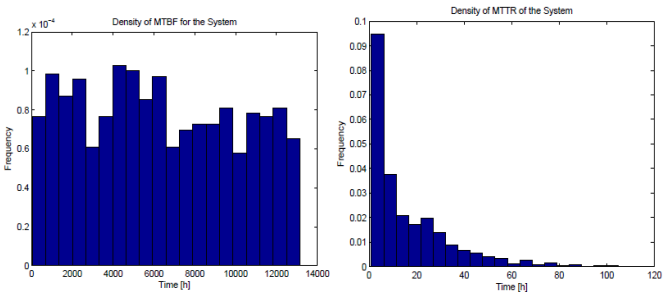
Abstract

As it was the backbone of industrial growth and revolution, mechatronics use synergies coming from the interaction of electronics, mechanics and information technology, they are spreading rapidly and are now influencing all sectors. In fact, they cover a wide range of components, interconnection technologies, and application specific software. But in another sense, they are accounted responsible for serious damages and several impacts to the environment at local and global levels. Consequently, the planetary boundaries are permanently threatened .Following this unsustainable production, companies have a responsibility to uphold the environmental and sustainable values of society as part of circular economy. Against this background, industries are faced with large technical systems of great complexity and therefore prone to frequent failures, legislative regulations, environmental procurement requirements, and eco-conscious customers. As a matter of fact, a new approach which is in tune with reliability and environment is needed in order to meet new market requirements. In this regard, we propose to estimate an eco-designed mechatronic system reliability using Coloured Petri Nets(CPN). A study of system reliability is generally preceded by a functional analysis, on one side, which consists of defining the material limits, the various functions, operations realized by the system , the various configurations and on the other side by dysfunctional analysis , in regards to obtain all needed information about failure modes and their effects. We propose to evaluate an eco-designed mechatronic systems reliability using SADT, FMEA, SEEA and Coloured Petri Nets. We work on the analysis of the reliability of a complex eco-designed embedded system, which is the Regenerative braking system (RBS).

Figures:





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1. *Kanoun, K., M. Ortalo-Borrel IEEE Transaction on Reliability, vol. 49, n 4, 2000.*
2. *D. Shetty, R. Kolk, "Mechatronics System Design", PWS Publishing Company, USA, 1997.*
3. *A. Desroches Concepts et méthodes probabilistes de base de la sécurité, Lavoisier, 1995.*
4. *P. Lyonnet, Ingénierie de la fiabilité, Lavoisier, 2006.*
5. *Jensen, K. (1997). Analysis Methods and Practical Use (Volume 1), Volume 1. Springer Verlag.*

Biography

Author has her expertise in the filed of quality and reliability engineering. She studied at the National School of Applied Sciences in Oujda ,Morocco.Her graduation project was about the eco-conception of a new plant for Safran Enginnering in Casablanca, she has experience as quality and environmental audits responsible and as quality and reliability manager in automotive and aeronautic industries .She is now a PhD student at Mohammadia School of Engineers in Rabat , Morocco.

Her objective is to suggest a new methodology for estimating the reliability of complex eco-designed mechatronic systems for industries.

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The Effect of the type of water on the physico-mechanical properties of concrete B25

F. Z. Bouaich[1], W. Maherzi[2], S. Naamane[1], F. El-hajjaji[1], N. Abriak[2], M. Ben Zarzour[2], M. Taleb[1], Z. Rais[1]

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[2]*IMT-Lille-Douai, ULR 4515, Laboratoire de Génie Civil et géo-Environnement (LGCgE), Douai, F59500, France*

Abstract

Concrete is the second most consumed product in the world after water. Its manufacture, however, requires a large amount of water, which poses a problem regarding the management of water resources. The quality of the mixing water plays a key role in the preparation of concrete. Drinking water is currently used as mixing water for concrete production. In addition, certain types of water that are not conducive to consumption may be suitable for concrete. In this context, various lines of research have been developed to address the issue of conservation of drinking water. One of the alternatives is to recycle treated wastewater. The obtained results show that the treated wastewater does not have any adverse effect upon the quality of the concrete. Indeed, it has shown an improvement of the mechanical resistance from the first stage as well as a similar density with the control concretes. Not only does it evince a slight decrease of the workability, roughly 4 %, but also the setting time and the porosity have been in the same range. This advocates its usage for hot weather concreting, long transport times and implementation.

Keywords: Concrete, purified wastewater, groundwater, drinking water, valorization

Recent Publications

1. Maherzi, W., Ennahal, I., Benzerzour, M., Mammindy-Pajany, Y., Abriak, N.-E., 2020. Powder Technology 361, 968–982.
2. Naamane S., Rais Z., Lachquar M., Taleb M., J. Mater. Environ. Sci. 5 (S1) (2014) 2212-2216.
3. Naamane S., Rais Z., Mtarfi N.H., El Haji M., Taleb M., Phys. Chem. News 74 (2014) 44-50.
4. ElHajjaji F., Greche H., Taleb M., Chetouani A., Aouniti A., Hammouti B., J. Mater. Environ. Sci. 7 (2) (2016) 566-578.

Biography

Mrs BOUAICH Fatima Zahra enrolled in her fourth year doctorate. My goal is based on using the different types of treated wastewater in the manufacture of concrete to reduce the overuse of groundwater and the cost of using potable water in concrete. The first year of registration for the 2016/2017 doctorate at Sidi Mohamed Ben Abdellah University, Faculty of Sciences Dhar El Mehraz, Fez, Morocco.

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Biological and Pharmaceutical use of essential oils of Lavandula officinalis L. and Rosmanirus officinalis L. produced at Jerada-Morocco

Khaoula Diass*, Ouafae Mokhtari, Souade Bouabdalaoui and Rachid Touzani

University Mohammed Premier, Oujda, Morocco, Faculty of Sciences, Department of Chemistry, Laboratory of Applied Chemistry and Environment (LCAE)

Abstract

Essential oils extracted from aromatic and medicinal plants have been known since antiquity for their biological, antibacterial, antifungal [1-2] and cosmetic properties [3]. Most essential oils consist in their majority of complex mixture of monoterpenes, sesquiterpenes, alcohols, esters, aldehydes, oxides, etc...[4]. Essential oils generally manifest pharmaceutical properties: they are antiseptic, digestive stimulator, antispasmodic or neuro-sedative [4]. The essential oils of *Lavandula multifidaL.* and *Rosmanirus officinalis* L. (Figure 1) are widely used in the cosmetics and perfumery industry and also aromatherapy, in particular by therapeutic techniques such as massage, inhalation or bath. They are also used as ingredients in the pharmaceutical industry to flavour oral forms, to parfum dermo-pharmaceutical preparations and to ensure the preservation of pharmaceutical forms.

Acknowledgment

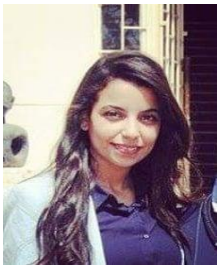
This work enters in Valorization PAM Project (CNRTS 2020-2023).

Figures: *Essential oils of rosemary and lavender produced at Jerada-Morocco*

Recent Publications

1. Chanegriha N., Foudil-cherif Y., Baaliouamer A., Meklati B.Y., 1998, Rivista Italiana E.P.P.O.,2511-16,
2. Massouti V., Viano J., Gaydou E.M., 1998, Fitoterapia volume LXIX, 5.
3. Stassi V., Verykokidou E., Loukis A., Harvala C., Philianos S., 1996, Flavour and Fragrance Journal, 11,71-74.
4. Lis-BalchimM., Deans S.G., Ealglesham E., 1998, Flavour and Fragrance Journal, vol 13, 98-104.

Biography



Khaoula DIASS has experience in pharmaceutical field like serving patients by dispensing medications, giving pharmacological information to multidisciplinary health care team. She monitoring patient drug therapies, she prepares medications by reviewing and interpreting physician orders and detecting therapeutic incompatibilities, she completes pharmacy operational requirements by organizing and directing technicians, verifying their preparation and labeling of pharmaceuticals, and verifying order entries, and charges. She has a doctorate in Pharmacy from the Faculty of Medicine, Pharmacy and Odontology of the University Cheikh Anta Diop (UCAD) of Dakar – Senegal, in 2017. Now she is under the supervision of Prof. Rachid TOUZANI.

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COVID-19: Analysis of the chemical risk due to the use of disinfectants in the agro-food industry in Morocco

H. RACHIDI, S. HAMDAOUI, H. LATRACHE

Research team: Laboratory of "Bioprocesses and Biointerfaces", Faculty of Science and Technology, Sultan Moulay Slimane University, Béni Mellal, Morocco

Abstract

The spread of the COVID-19 pandemic in Morocco is a heavy burden on the industry. As a result, Moroccan employers have a strong responsibility for the safety and health of their employees in the workplace and for preventing the risk of VIDOC-19 and any occupational hazards, as required by Moroccan law. Accordingly, industries, including the food and beverage sector, have put in place several proactive and preventive measures to address the pandemic on several fronts, including the use of hydro-alcoholic products and bleach for personal and surface disinfection. While these disinfection actions may effectively eliminate or reduce CORONA virus infection, the increased use of these products by employees is likely to result in serious health risks [occupational accidents and illnesses] and increase the occupational chemical risk in the event of uncontrolled exposure. In order to analyze this risk in a dairy industry in Morocco, we have launched a qualitative and quantitative study to identify and assess the severity of the chemical risk to which its employees are exposed. This involves an analysis of the safety data sheets [SDS] of the disinfectants used and a health and safety survey of the users of these products, in particular for hand disinfection. This makes it possible to gather information on the exact effects of exposure to this risk and to assess knowledge and practices in terms of prevention. This analysis showed that this chemical risk, linked to the use of disinfectants for hand disinfection, is omnipresent and prevention measures are partially adopted. Indeed, the strengthening of health safety measures to combat COVID-19 has significantly increased this risk, which has led to a remarkable imbalance in the assessment and management of occupational risks in this business.

These results have led us to propose corrective and preventive measures against this risk to interested parties and to adopt an integrated management of food and occupational health risks in a single system. This is the use of the HACCP*-OPERA** approach, which we developed and proposed in a previous study, for a simplified management of chemical risk in the food industry. These proposed actions allow us to contribute to the improvement of working and production conditions and certainly to control the application of normative texts in terms of prevention of professional risks.

*HACCP: Hazard Analysis Critical Control Point.

**OPERA: A tool for initial risk assessment by analysis of activities.

Recent Publications

1. Ki Ho Hong M.D. and coll. Ann Lab Med. [2020]; 40:351-360
2. Liu J and coll. Emerg Infect Dis. [2020].
3. Van Doremalen N. and coll. J. Med. [2020].
4. INRS.[2020].http://www.inrs.fr/risques/chimiques/effets-sante-securite.html
5. Rachidi H. and coll, Mor. J. Chem. 4 N°2 (2016) 613-628.

Biography

The main author is a specialist in occupational safety and health, PhD in quality management and risk analysis in agri-food, national doctorate obtained in 2011, from the University Sultan Moulay Slimane, Béni Mellal. She has published more than 12 articles in this field, including articles published on indexed journals SCOPUS and by ELSEVIER MASSON.

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Determination of the vacancies migration Enthalpy in a series of ternary Fe-Cr-Ni alloys, by Monte Carlo simulation of ordering kinetics, using a vacancy diffusion mechanism

M. Benkaddour[1], D. Bahia[1], Y. BELKADI[2], J. Barkani[3], A. Benkaddour[2]

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[2]*Faculté des Sciences, Département de Physique, Université Mohamed Ier, 60000 Oujda, Maroc.*
[3]*Faculté polydisciplinaire de Taza, Université Sidi Mohamed Ben Abdallah*

Abstract

We have calculated isothermal curves of electrical resistivity variation as a function of time, at two different temperatures T1=700K and T2=800K, by Monte Carlo simulation of the kinetics ordering by a vacancy diffusion mechanism, in a Fe-Cr-Ni stainless steel of cubic face-centered structure ($Fe_{54}Cr_{16}Ni_{30}$). It should be noted that Fe-Cr-Ni alloys exhibit a short-range order [1] that reversibly changes with temperature and contributes to electrical resistivity [2]. The analysis of the isothermal curves allows us to determine the vacancies migration enthalpy in this alloy by applying the slope change method [3, 4].

Keywords: Stainless steels; vacancy; short-range order; Atomic mobility; Monte Carlo simulation; Electrical resistivity.

Résumé :

Nous avons calculé les courbes isothermes de variation de résistivité électrique en fonction du temps, à deux températures différentes T_1=700K et T_2=800K, par simulation Monté Carlo de la cinétique de mise en ordre par un mécanisme lacunaire, dans un acier inoxydable Fe-Cr-Ni de structure cubique à faces centrées ($Fe_{54}Cr_{16}Ni_{30}$). On note que les alliages Fe-Cr-Ni présente un ordre à courte distance [1] qui évolue réversiblement avec la température et contribue à la résistivité électrique [2]. L'analyse des courbes isothermes nous permet la détermination de l'enthalpie de migration des lacunes dans cet alliage considéré, par application de la méthode de changement de pente [3,4].

Mots clés : Aciers inoxydables ; lacunes ; Ordre à courte distance ; Mobilité atomique ; Simulation Monté Carlo ; Résistivité électrique.

Figures:

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2. C. Dimitrov, D. Huguenin, P. Moser and O.Dimitrov.Journal of NuclearMaterials 174 (1990) 22-34.
3. J.Barkani, A.Benkaddour, S.Ramdani, M.Elhammouti, L.Roubi, Phys.Chem.News33(2007)72-79.
4. J. Y. BELKADI, M.Benkaddour, J. Barkani, D.Bahia, A. Benkaddour, S. Ramdani, Mor. J. Chem. 7 N°2(2019) 224-229.

Biography

Meryem Benkaddour, PHD student, University Mohammed 1st, Faculty of sciences Oujda

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Valorization of olive oil wastewater in handmade bio soap produced in Al-Hoceima province (north Morocco)

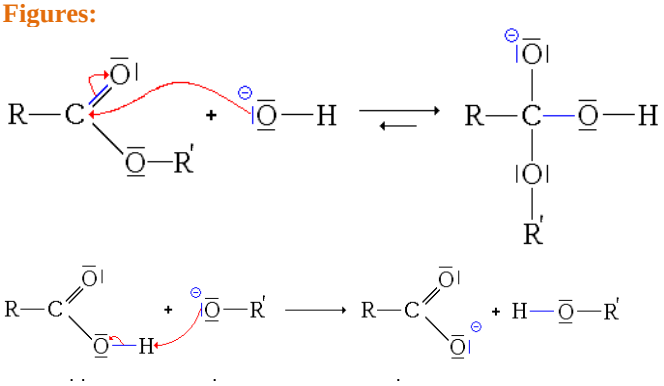
A. El Abdouni [1-2], K. Haboubi [2], I. MERIMI[3,4], M. S. El Youbi[1]

[1] *Department of Chemistry, University Ibn Tofail, Faculty of Sciences, Kenitra, Morocco.*
[2] *Laboratory of engineering sciences and applications, University Abdelmalek Essaadi, National school of Applied Science, Hoceima, Morocco.*
[3]*Laboratory of Applied Analytical Chemistry, Materials and Environment, Faculty of Science, University of Mohammed First, Oujda, Morocco*
[4]*Laboratory of Separation Processes, Faculté des Sciences, Université Ibn Tofail, B.P 242, Kenitra, Morocco*

Abstract

Urban and industrial dust emitted from different sources to the atmosphere and finally deposited on the soil surface contain particles with magnetic properties. They are called "technogenic magnetic particles" (TMPs) and their presence is usually correlated with significant concentration of heavy metals. These particles are iron minerals (mainly oxides) formed during high-temperature processes, from various iron forms initially present in raw materials, additives or fuel used by different branches of industry. The investigated soil samples were collected from the areas close to the specific (still operating or historical) pollution sources as: iron and nickel smelters, iron foundry, glassworks, coking and cement plants, dumps of industrial wastes and big railway junctions. The Mössbauer spectrometry analysis (Fig. 1, [1,2]) has been utilized in order to differentiate the iron-bearing mineralogy of magnetic separates of soils depending on the proximity of definite TMPs emitter. Contrary to the soils affected be industrial activity, the indoor-dusts [3] are expected to contain metallic iron except iron oxides (magnetite, hematite). Preliminary Mössbauer measurements (among others in the case of dusts from ventilation and air-conditioning systems) confirm such hypothesis, whereas first attempts to see the influence of metallic iron on hysteresis loops are not conclusive. That is why the simulation of "wasp-waists" shaped magnetization curves for the mixture of magnetite and iron have been performed (Fig. 2) within Langevin model [4].

Figures:



Recent Publications

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2. Martial Gervais Oden Bella, Technique améliorée de fabrication artisanale de savons et de détergents, Wageningen, Pays-Bas, ISF Cameroun et CTA, coll. « PRO-AGRO", 44 p,2014.
3. H. El Herradi, C. El Adlouni, M. Naman, I. Rochdi, A. Aafrane, et F.Naman, "Effet de margines traitées par infiltration-percolation sur la germination et la croissance de quatre espèces végétales", Revue des sciences de l'eau, p.89-101,30 (2),2017.

Biography

Aouatif ELABDOUNI is a Ph.D. student in the chemical environment at Ibn Tofail University. Her research revolves around the treatment and valorization of olive mills wastewaters. Recently she published two articles about that. She is currently involved in research/creation projects related to her Ph.D.'s subject with Dr.KHadija haboubi. She holds a diploma in environmental engineering from the National School of Applied Sciences of Al Hoceima.

She believes that the environment and the development of any country are both two sides of the same coin, if we cannot sustain the environment, we cannot sustain ourselves.

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Hydrogen sulfide removal from sewage wastewater using hydrogen peroxide in-situ treatment: case study of Moroccan urban sewers

Asmae El Brahmi [1], Souad Abderafi [1]

Mohammadia Engineering School, Mohammed V University in Rabat, Av. Ibn Sina, BP. 765 Rabat, Agdal, Morocco

Abstract

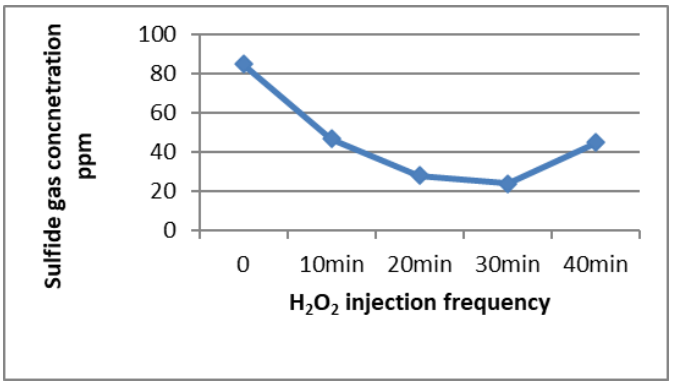
Problems of sewers corrosion and odor release are always associated to sulfide presence in waste water. This inorganic compound can occur under different oxidative states such as HS^-, S^{2-} SO_4^{2-} and $H_2S_{liq.}$ However, the emission of hydrogen sulfide is due to the presence of H_2S_{Liq} only. Multiple removal process of sulfide was studied and prove efficiency such as chemical precipitation, nitrates dosing, Air injection and oxidation. H_2O_2 has been used as a strong oxidant to reduce BOD_5 , COD and to enhance the waste water quality.

A field study was carried out to evaluate the oxidation of hydrogen sulfide by adding hydrogen peroxide under different concentrations (35%, 50%) in different sites. The purpose of this paper is to study the effect of hydrogen peroxide on sulfide abatement in Moroccan sewage of the city of Casablanca.

The treatment essay took place in dry weather days, in two main locations known for the emission of malodorous compounds. The first one is the pump station ILHAM with a wet well of $50m^3$ capacity, the second ones are two connected manholes in gravity main of 1.5km length. The dosage was intermittent, sulfide concentration in both gaseous and aqueous form was monitored as well as ORP, COD and pH.

The main findings report that hydrogen peroxide decrease remarkably the hydrogen sulfide emission. Also, it reduces sulfide content in wastewater. The pH remains in neutral interval, and COD removal efficiency is around 60%. However, its application needs precautions during long time storage.

Figures: *hydrogen sulfide emission decreasing*



Recent Publications

1. El Brahmi A, Abderafi S (2020) Hydrogen sulfide production assessment based on sewage physicochemical properties using artificial neural network. Mater Today Proc.

Biography

Asmae El brahmi is a final year PhD student at MOHAMMADIA SCHOOL OF ENGINEERS in Rabat Morocco. She works on sulfide production and emission inside sewers networks, and try to apply a treatment respecting both local conditions and restricted budget. Her career as a researcher is just about to begin.

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Comparative suitability for processing into powder of prickly pear cladodes at four ages of growth

Hasnaâ Harrak

Food Technology and Quality Laboratory, Regional Centre for Agricultural Research in Marrakesh, National Institute for Agricultural Research, INRA, P.O. Box 533, Marrakesh 40000, Morocco

Abstract

Rich in bioactive and nutritional phytochemicals, the cladode is an important part of prickly pear plant. Its processing into powder is a way of adding value allowing its use as a food, dietary supplement and cosmetic ingredient. This work aims to assess the suitability for processing into powder of prickly pear cladodes at four ages of growth and to determine technological and nutritional qualities of the obtained powders. The cladodes belonging to the *Opuntia ficus-indica* species, aged less than one year, one year, from 1.5 to 2 years and from 3 to 3.5 years, were harvested in Skhour Rhamna (Centre of Morocco). The quality of the fresh cladodes and the cladodes powder was evaluated by studying powder yield, humidity, water absorption index (WAI), water activity (a_w), sorption curves, color, total titratable acidity, pH, soluble solids, cellulose and ash contents. This work has highlighted the suitability of the cladodes of different ages for processing into powder. The obtained powders were characterized by distinct and interesting characteristics in terms of technological and nutritional qualities allowing their orientation towards different uses. WAI values, which increased with age, provided information on distinct rheological properties of powders when using as an ingredient in liquid or semi-solid formulations and on different saturation effects when using in food preparations. Moreover, a_w values, lower than 0.29, can ensure a good biochemical and microbial stability. The sorption behaviors of cladodes powder, almost similar for the 4 studied ages, are moderately hygroscopic. The appreciation of the color using the Hunter Lab scale, showed an opposite trend of a* and L* parameters, with age, between fresh cladodes and their powders indicating that the smaller the cladodes age, the greenest the resulting powder. Having an acidic pH, powders recorded also increases of cellulose and ash contents with the cladodes age.

Figures: *Prickly pear cladodes at different ages of growth*

Recent Publications

1. Andreu L., Nuncio-Jáuregui N., Carbonell-Barrachina A. A., Legua P., Hernández F., J Sci Food Agr 98 (2017) 1566-1573.
2. Ettalibi F., Elmahdaoui H., Gadhi C., Harrak H., Materials Today: Proceeding 27 (2020) 3245-3250.
3. García-Cayuela T., Gómez-Maqueo A., Guajardo-Flores D., Welti-Chanes J., Canob M. P., J Food Compost Anal 76 (2019) 1-13.
4. Melgar B., Dias M. I., Ciric A., Sokovic M., Garcia-Castello E. M., Rodriguez-López A. D., Barros L., Ferreira I., Ind Crop Prod 107 (2017) 353-359.
5. Mena P., Tassottia M., Andreu L., Nuncio-Jáuregui N., Legua P., Del Rio D., Hernández F., Food Res Intern 108 (2018) 301-308.

Biography

Dr. Hasnaâ Harrak has her expertise in quality and technological valorisation of Moroccan *terroir* products. Her focus is based on fruits quality characterization, development of new products, processing, preservation and labeling. She is senior researcher and currently holds the position of Research Director at the National Institute for Agricultural Research (INRA), Regional Centre for Agricultural Research in Marrakesh. Dr. Harrak has graduated as State Engineer in Food and Agricultural Industries from the Hassan II Institute of Agronomy and Veterinary Medicine in Rabat, Morocco. She has also earned her PhD in 2007 in Agronomic Sciences (Technologies of Agricultural Industries) jointly from the same institute and the Agricultural Research Centre for International Development (CIRAD) in Montpellier, France. She published more than 30 papers. Her H-index is 4 on Scopus.

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Anti-corrosion effect of a novel hydrazide derivative for mild steel in 1 M HCl medium: Experimental measurements and quantum chemical evaluation

M. Chafiq[1], A. Chaouiki[1], H. Lgaz[2], R. Salghi[1], Mustafa R. Albayati[3]

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[2]*Department of Crop Science, College of Sanghur Life Science, Konkuk University, Seoul 05029, South Korea*
[3]*Department of Chemistry, College of Education, Kirkuk University, Kirkuk, Iraq*

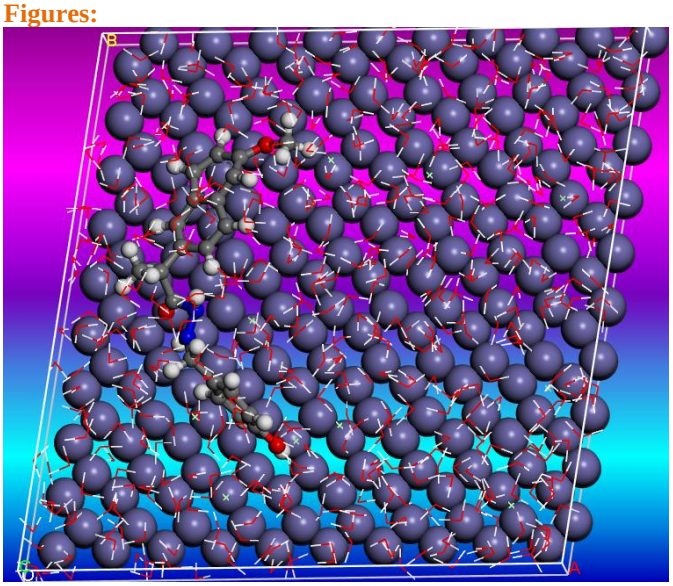
Abstract

The present study is designed to determine the corrosion inhibitive action of new hydrazide compound namely, (E)-N'-(4-hydroxybenzylidene)-2-(6-methoxynaphthalen-2-yl) propanehydrazide (HYD) as corrosion inhibitor of mild steel in 1 M HCl solution. For this purpose, the corrosion inhibitory activity of new studied inhibitor was evaluated using gravimetric, electrochemical and computational methods. Scanning electron microscope (SEM) analysis was also performed to confirm the adsorption of studied compound on mild steel surface. Overall, the results of this investigation show that an increase of the inhibitors concentration up to an optimized level of $5x10^{-3}$ M has significantly improved the corrosion rate values. Electrochemical data indicate that the corrosion inhibition behavior was afforded by the adsorption of HYD compound onto the mild steel following the Langmuir adsorption isotherm model via mixed physical and chemical adsorption. Electrochemical impedance spectroscopy (EIS) revealed that the studied inhibitor protects the metal from corrosion by forming the protective film on the metal surface. Furthermore, density Functional Theory (DFT) calculations and Molecular dynamic (MD) simulations study were carried out to elucidate the mechanism of corrosion inhibition process. Theoretical approach demonstrates that HYD interacts with mild surface with the aid of donor-acceptor interactions through electron rich centers of the molecule. The theoretical results are in good agreement with experimental measurements.

These results and more will be shown and explained in detail during the ICMES.

Keywords: Corrosion inhibition; Hydrazide; SEM; DFT; MD simulation.

Figures:



Recent Publications

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2. A. Fouda, K. Shalabi, G. Elewady, H. Merayyed, Int J Electrochem Sci. 9 (2014) 7038–7058.
3. C. Verma, E. Ebenso, I. Bahadur, I. Obot, M. Quraishi, J. Mol. Liq. 212 (2015) 209–218.
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5. M.E. Belghiti, S. Tighadouini, Y. Karzazi, A. Dafali, B. Hammouti, S. Radi, R. Solmaz, J Mater Env. Sci 2016a. 7 (2007) 337–346.

Biography

Author is currently a Ph. D student at National School of Applied Science, IBN ZOHR University, Agadir-Morocco. His main research interests are in the field of corrosion and corrosion inhibition of metals and alloys using chemical, electrochemical techniques and quantum chemical calculations.

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Implementation of geospatial interpolation methods in flood hazard mapping

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Abstract

The aim of this research work is to model the flooding phenomenon in the city of Figuig (East Morocco). A hydrological study will be carried out in this direction to determine the input parameters of the hydraulic simulation of the phenomenon, in particular the flood flow. Given the lack of a reliable rainfall record history in the study area and in order to estimate the flow, we will use rainfall data gotten from a network made up of several rainfall measurement stations in neighbor areas. For that, we will apply deterministic and geostatistical methods for the interpolation of the time series of maximum daily rain in order to achieve an estimated time series of maximum daily rainfall in the study area.

The interpolation will be carried out using ordinary kriging and ordinary co-kriging with a test of the correlation with other parameters in which actual observations are available such as the terrain altitude. The results will show the performance of estimating by comparing the variance obtained by application of geostatistical methods and other deterministic methods such as inverse of distance weighting (IDW) and Thiessen polygons.

Since deterministic methods assess only the distance between the different rain gauges, any difference in geomorphological or topographical aspects between these measurement points will reduce the accuracy of the estimation and increase variance. This means geostatistical methods allow the estimator to have more accuracy by studying the experimental variograms and choose the relevant model to calculate the estimated value of precipitation with the least variance possible.

The estimated rainfall time series will be used to apply empirical and statistical method of transformation rain-flow to calculate the flow parameter and establish flow hydrographs.

Figures:

Recent Publications

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2. Grari A., Chourak M., Boushaba F., Cherif S and Eduardo Garcia Alonso. 2019. Numerical characterization of torrential floods in the plain of Saïdia (North-East of Morocco). Arabian Journal of Geosciences (2019) 12:321.
3. Abdou, Z. Garba. Flood Risks and Suggestion of Rain Water Draining Map in the Town of Kantche, Region of Zinder in Niger. European Scientific Journal December 2019 edition Vol.15, No.35 ISSN: 1857 – 7881.
4. P.d.A. Borges, J. Franke, Y.M.T.d. Anunciação, H.Weiss, C. Bernhofer. Comparison of spatial interpolation methods for the estimation of precipitation distribution in Distrito Federal, Brazil. Theor Appl Climatol (2016) 123:335–348
5. Stein, A. and Corsten, L.C.A. (1991). Universal Kriging and Cokriging as a Regression Procedure. Biometrics 47, 575-587.

Biography

The author is interested in research on the axis of flood hazard mapping. Its objective is based on the use of hydrological and hydraulic modeling to improve the resolution of flood hazard mapping in the oasis of Figuig with the use of GIS software and geostatistical techniques applied to weather data. He started his doctorate in 2019 at the Mohammed First University, Morocco.

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Theoretical comparison between graphene-on-silver and gold-on-silver based surface plasmon resonance sensor

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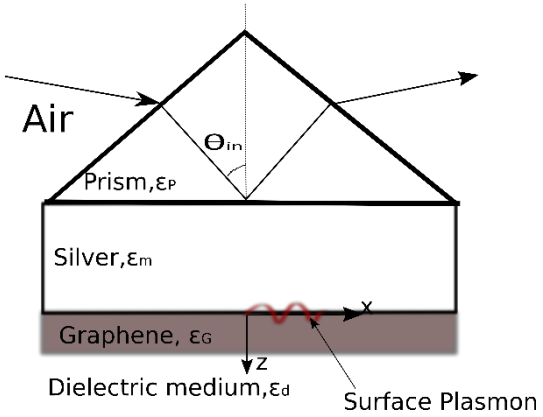
Abstract

Surface plasmon resonance (SPR) is an optical sensing technique that uses evanescence waves to detect refractive index changes in the very near vicinity of the sensor surface. In the last two decades, SPR attracted a great deal of attention as one of the most powerful methods applied in chemical and biological sensors with high sensitivity, accuracy, and limit of detection.

In this paper, we present a detailed theoretical analysis of a Kretschmann configuration based graphene-on-silver thin film. The advantage of silver is the better evanescent field enhancement and it possesses a narrow full width at half maximum of the plasmon resonance, hence silver providing higher resolution. On the other hand, the high impermeability property of graphene and the extremely low thickness make it a very good candidate to protect silver against oxidation without loss of resolution. The obtained results from numerical calculations clearly exhibit sharp reflectivity curve for graphene as protective layer in comparison with gold. Our results also demonstrate that graphene-on-silver based biosensor sensitivity can be enhanced by more than two orders of magnitudes compared to that of gold-on-silver configuration.

Figures:



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2. Dyankov. G, Zekriti. M, Saidi. H., Bousmina. M., Plasmonics, (2012)7-479-485
3. Ong B. H., Yuan. X., Tjin. S. C., Zhang J., Sensors and Actuators B, (2006)114-1028–1034.
4. Filho. C. A. S., Lima A. M. N., Moreira C. S., Thirstrup. C., and Thirstrup H.,"Line shape analysis and extended instrumental operation of surface plasmon resonance sensors,"Plasmonics (2010) 5, 259–266.

Biography

Pr. ZEKRITI Mohssin : is working as a professor in Euromed University of Fes, Morocco. His research field includes: Optics and photonics, Plasmonics, SPR biosensors. He was awarded his PhD in 2013 from Mohamed V University in collaboration with Moroccan Foundation of Advanced Science, Research and Innovation (MAScIR).

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Groundwater contamination of Triffa plain by Nitrates and its impact on Moulouya water and Mediterranean Sea

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[2]*Matérials, Energy, Civil Engineering and Environnement Team, Higher School of Technology, University of Mohammed First, Oujda, Morocco*
[3]*Laboratory of Applied Analytical Chemistry, Materials and Environment, Faculty of Science, University of Mohammed First, Oujda, Morocco*
[4]*MATSI Laboratory, High School of Technology, Mohammed First University, Oujda, Morocco*

Abstract

In recent years, groundwater has been subjected to various causes of pollution from agricultural sources through unconciousness of actors or non-compliance with regulations when they exist.

The nitrate contents constitute good indicators of this pollution. It is with that aim that we are interested in quantitatively and qualitatively assessing the degree of pollution caused by nitrates. Hence, dosages of NO3-, NH4+ and NO2-, were carried out on samples taken from wells distributed throughout Triffa plain, Oued Moulouya and the Mediterranean coast.

The results of this study have highlighted the state of water degradation by Nitrates. The distribution map of Nitrates in groundwater has shown a content between 2,32 mg/l et 174,70 mg/l.

The origin of the contamination is primarily due to the excessive use of nitrogen-based chemical fertilizers. The groundwater located at the level of the plots occupied by citrus fruits has the highest Nitrates contents. Oued Moulouya communicating with the Triffa Phreatic zone and the Mediterranean Sea has variable Nitrates values between 70 mg/l and 2,50 mg/l going from the source of emergence of Oued water table to the sea.

The contamination of three receiving environments (groundwater, Oued and sea) has as main source all agricultural activities using chemical fertilizers and nitrogen-based phytosanitary products in an excessive and uncontrolled manner.

Recent Publications

1. R. Benkaddour, I. Merimi, T. Szumiata, B. Hammouti "Nitrates in the groundwater of the Triffa Plain -Eastern Morocco-" ScienceDirect Materials Today: Proceedings, Volume 27, Part 4, 2020, Page 3171-3174;
2. Office Régional de la Mise en Valeur Agricole de la Moulouya (ORMVAM).
3. N. Burnley-Hall, The Effect of Inorganic Nitrate and Nitrite on the Production and Function of Extracellular Vesicles, Item availability restricted PhD Thesis, Cardiff University, 2017, pp. 1–301
4. D. Khadka, Kinematic storage model (KSM) for groundwater development in highly permeable hill slope-laboratory study, Open J. Civ. Eng. 9 (2019) 195–210.

Biography

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Assisted extraction of rosemary antioxidants with green solvents

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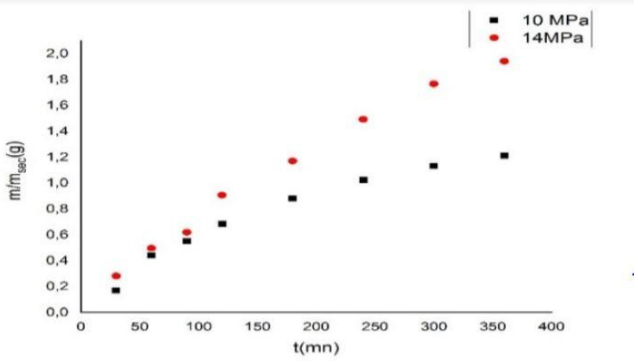
Abstract

Supercritical fluid extraction is a technique which takes advantage of the enhanced solvent power of supercritical fluids (SCFs). The great solvent power of these fluids is due to the properties of density and viscosity, which are intermediate between those of a gas and a liquid. The objectives of this work were: The determination of optimal values of pressure leading to the best yield of a supercritical CO_2 extraction, in order to investigate the best operation parameter for better result in the stage of encapsulation. In the present study, supercritical fluid extraction, is applied to the leaves of Rosemary (Rosmarinus officinalis), grounded and compared for the extraction duration, and the extraction yield and Chemical composition of the essential oils obtained.

The yield obtained using SFE extractions for two high pressures 10 and 14 MPa, 1.1% and 1.9% respectively. The maximum of essential oil recovery percentage relative to the initial mass of rosemary powder was 1.9% and was obtained at 40°C and 14 MPa.

The chemical composition of rosemary oil under the obtained optimal conditions (40°C and 14 MPa),determined by GC–MS analysis, revealed the presence of 1,8-cineole (major compound) (35.86%), camphor (13.98 %), camphene (7.55%), α-pinene (7.74%), caryophyllene (9.15%), and others.

Figures: *Kinetics of essential oil extraction by supercritical extraction of rosemary*



Key word: CO_2 extraction, green chemistry, eco-friendly extraction, Rosemary.

Biography

The author has an expertise in evaluation and a passion for research in green chemistry. He focuses on the use of supercritical CO_2 for the extraction of natural compounds from plants. He obtained his doctorate in 2018 from the University Mohamed 1 Morocco.

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Localized defects States Based on Defective Multi-Quantum-Wells

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[2]*Laboratoire des Matériaux, Ondes, Energie et Environnement, Equipe des Ondes, Acoustique, Photonique et Matériaux, Faculté des Sciences, Université Mohamed Premier, Oujda, Maroc.*
[3]*PLMC, Faculté des Sciences et Technologie, Université Paris Est (Créteil).*

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Abstract

The aim of this paper is to present a theoretical study of the transmission and the electronic band structure for multi-quantum wells (MQWs), composed of two periodic semiconductor materials, and containing a geometrical and material defect layer. The dynamic tuning of this defect layer, inserted into the structure, is carefully investigated, using the transfer matrix for theoretical calculations. The defect thickness shows a strong impact on the insertion of electronic localized states in the band gaps. Hence, the transfer of electrons is possible, without using higher energy. The transmission rates of these defect states have maximum values when the defect layer is placed at the center of the structure; this is due to constructive interference caused by the symmetry of the system. The characteristics of the defect states which situated in the gaps are highly dependent of the different physical parameters characterizing the defect layer.

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1. *A. Sali and H. Satori, J. Superlattice and Microstructure 69 (2014) 38-52.*
2. *A. Sali, J. Kharbach, A. Rezzouk and M. Ouazzani Jamil, J. Superlattice and Microstructure, 104 (2017) 93-103.*
3. *Iqraoun, A. Sali, A. Rezzouk, E. Feddi, F. Dujardin, ME. Mora-Ramos and CA. Duque, J. Philosophical Magazine, 97 (2017) 1445-1463.*
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5. *Elamri, F. Z., Falyouni, F., Bria, D., Materials Today: Proceedings, 34 (2020) 1-5.*

Biography

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Assessment of soils liquefaction hazard on the Marchica lagoon zone, NE of Morocco

Abdellah AZOUGAY[1,*], Halima REZQI[1], Mostafa OUJIDI[1] , Najat AMARJOUF[2]

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Abstract

The aim of this work is to present the approach taken to analyze the liquefaction risk related to the sand soil in the Marchica area located Northeastern Morocco. Liquefaction is a natural phenomenon that may occur in seismically active areas, and where the water table is near the earth's surface. This phenomenon affects mainly sandy soils rather than clayey ones. The interest of this study lies in an integral analysis of liquefaction risk in the land that will serve as a platform for the touristic project so-called "The city of two seas". This site takes the form of a peninsula, Indeed it is isolated between the new and old channel and it is limited Northeastward by the Mediterranean Sea, and Southwestward by the Marchica Lagoon. The assessment of the susceptibility to liquefaction is made based on Cramer's four criteria. Furthermore, in order to assess the risk of liquefaction, we have used the results of the in-situ tests, by a correlation between the Menard pressure meter test and the SPT Standard Penetration Test. The results of this work will warn the Marchica lagoon development agency of the eminent risk of liquefaction that will occur after the infrastructure and buildings construction in the lands of the touristic project so-called "The city of two seas".

Recent Publications

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2. *Idriss, I. M. and Boulanger, R. W. (2006) 'Semi-empirical procedures for evaluating liquefaction potential during earthquakes', 26, pp. 115–130. doi: 10.1016/j.soildyn.2004.11.023.*
3. *Rosa-Cintas, S. et al. (2017) 'Characterization of the shear wave velocity in the metropolitan area of Malaga (S Spain) using the H/V technique', Soil Dynamics and Earthquake Engineering. Elsevier, 92(April 2015), pp. 433–442. doi: 10.1016/j.soildyn.2016.10.016.*
4. *Youd, T. L. et al. (2001) 'Liquefaction resistance of soils: summary report from the 1996 NCEER and 1998 NCEER/NSF workshops on evaluation of liquefaction resistance of soils', Journal of Geotechnical and Geoenvironmental Engineering, 127, pp. 297–313.*

Biography

I am a PhD student enrolled in the fifth year of doctoral thesis, in the laboratory of applied geosciences of the faculty of sciences of oujda.

I am working on geotechnical problems related to the project of development of the Marsica lagoon site.

I recently published two articles related to my doctoral thesis.

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Numerical study of the milling of composite honeycomb structures Nomex

Tarik Zarrouk [*,1], Jamal-Eddine Salhi [2], Khalid Nasri [3, 4], Samir Atlati [4], Merzouki Salhi [1], Mohammed Nouari [2], Salhi Najim[1]

[1]*Laboratory of Mechanics and Energy, Faculty of Sciences, First Mohammed University, Oujda/60000, Morocco.*
[2]*LEMTA, Mines Nancy ET Albi, GIP-InSIC, France*
[3]*SCD laboratory, faculty of sciences, University Abdelmalek- Essaadi, 93030 Tetouan, Morocco.*
[4]*EMCS, ENSAO, BP 696, Oujda, Maroc*

Abstract

The machining of Nomex honeycomb structures represents a technical and scientific barrier for aeronautical applications. The difficulties encountered during the machining of this type of material are linked to the small thickness of the walls constituting the alveolar cells, the composite nature of the paper forming the Nomex® and the low density of this type of structure. In this work, a finite element calculation code "ABAQUS`-EXPLICIT" was used to optimize and analyze the machining by milling of Nomex® honeycomb structures. The main objective of this work is to study the influence of the machining conditions on the cutting forces and the surface quality.

Figures:

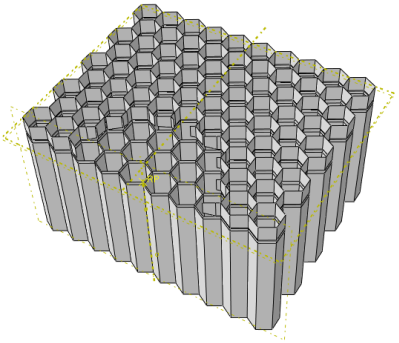
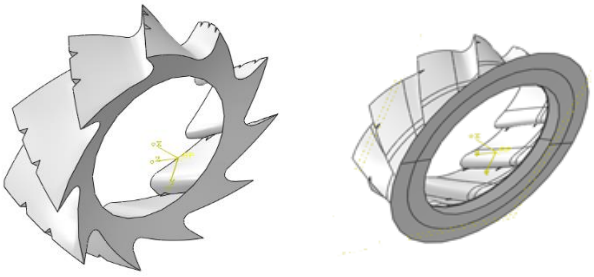


Figure 1: Diagram of the honeycomb structure



(a) ***(b)***

Figure 2: (a) The monobloc tool with MABC ten-tooth chip breaker, (b) The combination tool, smooth circular blade and ten-helix shredder with CZ10 chip breaker

Recent Publications

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3. Hirayama A., "Methode for cutting honeycomb core", U S Patent, N° 6,740,268 B2, 2004.
4. Foo C.C., G.B. Chai, L.K. Seah, A model to predict low-velocity impact response and damage in sandwich composites, Vol 68, pp 1348–1356. 2008.

Biography

I am student in solid mechanics. His focus is based on materials machining. I am preparing my PhD at the university of Mohamed first university Oujda Morocco.

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Embedded Generation Using Shared Solar Energy to mitigate Carbon dioxide emissions and Transmission losses in the Power Sector

Eric Akpoviroro OBAR [1], Abdelwahed TOUATI[1], Nabila RABBAH[1]

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Abstract

The socio-economic development of a country (especially a developing one) is inextricably linked with the availability and affordability of electricity in that country. However most African countries have failed to bridge the gap between the demand and supply of electricity in their country owing either to the non-availability of power or the lack of synergy between the various disciplines that make up the power sector. Bedevilled with the current Covid-19 pandemic which ushers in the digital era of E-learning and virtual trade activities, Africa cannot afford to be left out as a result of poor electricity supply.

Our case study in this paper will be Africa's most populous country; Nigeria. We would look at the aged long practice of a centralized system of energy production which generates and transmits electricity over long distances (thereby incurring colossal losses), the limitations of the National grid which covers only some parts of the country, the legal constraints, the resort to self-help by Nigerians who seek to produce their own electricity using generators that emit **GHG** which pollute the atmosphere and the economic implication of running an economy on generators, while proffering an eco-friendly solution in Embedded generation using Shared Solar Energy aimed at resolving the disparity between the demand and supply of Electricity. A solution which will invariably unlock economic growth especially during this Covid-19 pandemic.

Figure 6: Energy and Environment

Table 3: The economic implications of using generators for households according to data from the HNLSS 2009/2010

Type of fuel	Number of liters	Price per liter ($)	Total price ($)
Diesel	60,636,035	0.582	35,290,172.37
Gasoline	2,978,840	0.393	1,170,684.12

Recent Publications

1. *Adekanle O. S., Makhad M., Bahri H., Obar A. E., J. IEEE (2020) DOI: 10.1109/ICEIT48248.2020.9113224*

Biography

Author has his expertise and passion in the production, transportation and distribution of green energy. His focus is based on the Multi-scale modelling and optimal configuration of future grid networks. He was awarded his MSc in 2019 from Hassan II University. He is currently a doctoral student in Hassan II University and has published a research paper.

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Monte Carlo study of Magnetic, Magnetocaloric and Hysteresis behaviors of Cd^{2+} doped $Nd_{1-x}Cd_xMnO_3$

Othmane Amhoud, Mohamed Kerouad and Ahmed Zaim

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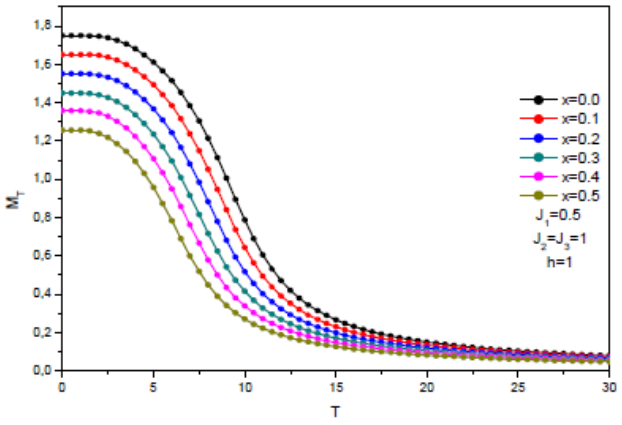
Abstract

In the present work, we use Monte Carlo simulations (MCS) based on heath bath algorithm to study the magnetic properties, the magnetocaloric effect (MCE) and the hysteresis behavior of Cd^{2+} doped $Nd_{1-x}Cd_xMnO_3$ simple perovskite. The variation of the total magnetization with the external magnetic field h is given for different values of x (x= 0.0, 0.1, 0.2, 0.3, 0.4 and 0.5). From the variation of the magnetization as a function of temperature, the transition temperature T_c of the compound $NdMnO_3$ from the ferromagnetic phase to the paramagnetic one has been deduced. The magnetic entropy change and the adiabatic temperature change are obtained for different values of the external magnetic field. The isothermal magnetizations versus magnetic field are obtained at different temperatures. Finally, the magnetic hysteresis cycles have been obtained for different values of x and temperature.

Figure:



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2. R. Masrour, A. Jabar, A. Benyoussef, M. Hamedoun, E.K.Hlil, Journal of Magnetism and Magnetic Materials 401 (2016) 91-95.
3. A. Jabar and R. Masrour (2017), Phase Transitions, DOI: 10.1080/01411594.2017.1378879.

Biography

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Experimental and theoretical investigation on anticorrosion potential of trans-cinnamaldehyde as eco-friendly compound of mild steel in 1 M HCl

J. Lazrak[1], El H. El Assiri[2], S. Alaoui mrani[1], A. Saady[1], N. Arrousse[1], F. El-Hajjaji[1], M. Taleb[1], T. Saffaj[3]

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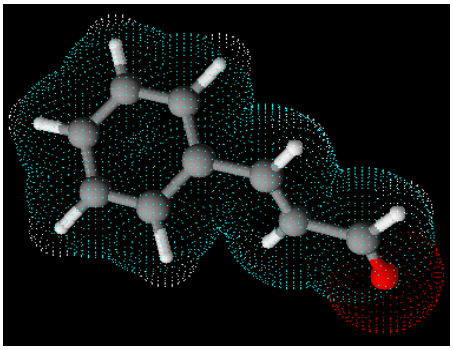
[3]*Laboratory of Applied Organic Chemistry, Faculty of Science and Technology, Fez, Morocco.*

Abstract

Metallic materials used in industry, in particular mild steel, are exposed to more or less aggressive environments; which results in many problems including corrosion, as well as shutting down or even taking out of service a number of machines. For this reason, the development of eco-compatible and biodegradable corrosion inhibitors is becoming a major issue today. In this context, the Trans-cinnamaldehyde (TCA) molecule, (Fig.1), has been shown to be a good inhibitor of mild steel corrosion in hydrochloric acid environments. Which prompted us to conduct an experimental study, by the means of the Tafel polarization, the electrochemical impedance spectroscopy (EIS) and the surface morphology; accompanied by a complementary quantum approach, using the DFT/B3LYB method, at the 6-31G base level (d, p), in order to investigate the inhibitory effect and to understand the mechanism of inhibitor/metal interaction of this compound. The obtained results indicate that the molecule used is a good candidate for corrosion inhibition in hydrochloric acid. Moreover, the comparison between experimental and quantum results demonstrates a satisfactory agreement between them.

Figure:



Recent Publications

1. Kalaiselvi K, Chung I-M, Kim S-H, Prabakaran M., Anti Corros. Methods Mater., 65(4) (2019) 408-416.

Biography

Jamila Lazrak is a professor of physics and chemistry in secondary school. Her focus is based on the use of organic molecules eco-friendly to have application in anticorrosion field. She will prepare her PhD in Engineering Laboratory of Organometallic, Molecular Materials and Environment, in Faculty of Science, Sidi Mohamed Ben Abdellah University, Fez, Morocco.

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Efficient procedure for phosphogypsum convertion into portlandite and lithium sulfate monohydrate

I. ZDAH [1], H. EL ALAOUI-BELGHITI [1], Y. ENNACIRI [1] and M. BETTACH [1]

[1] *Laboratory of Physical Chemistry of Materials (LPCM), Faculty of Science, Couaib Doukkali University, El Jadida, Morocco*
.

Abstract

The main objective of this research is to propose an economic and ecological process of phosphogypsum transformation. The use of soft chemistry is very interesting because it is less expensive and makes it possible to recover this industrial waste to marketable products.

This work focuses on phosphogypsum decomposition using LiOH solution, lading to $Ca(OH)_2$ and $Li_2SO_4.H_2O$ products, which find their applications in several industrial fields. $Ca(OH)_2$ can be used as material for thermal energy storage, as adsorbent for wastewater including radioactive elements and CO_2 or in the cement industry, while $Li_2SO_4.H_2O$ is widely used applied in fuel cells and solid state batteries [1-3] and other areas.

We varied the duration of the attack and the concentration of LiOH in order to find the optimal conditions for carrying out this evaluation method.

The best results were obtained for 2M stoichiometric mixture of PG and 4M with a 20% excess of $LiOH.H_2O$ during 24 hours at 25 °C. The characterization by X-ray diffraction of obtained powders and salts shows that the reaction is complete. The infrared IR gives information on the existing phases. The ATG-ATD analysis informed us of the influence of impurities on the thermal behavior of the reaction products. Finally, the chemical analysis was carried out by different methods (fluorescence X-rays, ICP and gravimetry).

Figure:

Recent Publications

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3. Ennaciri Y., Bettach M., Materials and Manufacturing Processes 33(16) (2018) 1727.

Biography

Ilham ZDAH is a PhD student in University of Chouaib Doukkali. El Jadida, Morocco. She is.preparing. her thesis in the laboratory of Physical Chemistry of Materials (LPCM), on the Wet conversion of phosphogypsum into marketable product.

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Synthesis of MOFs based on imidazole and triazole derivatives for gas sensing

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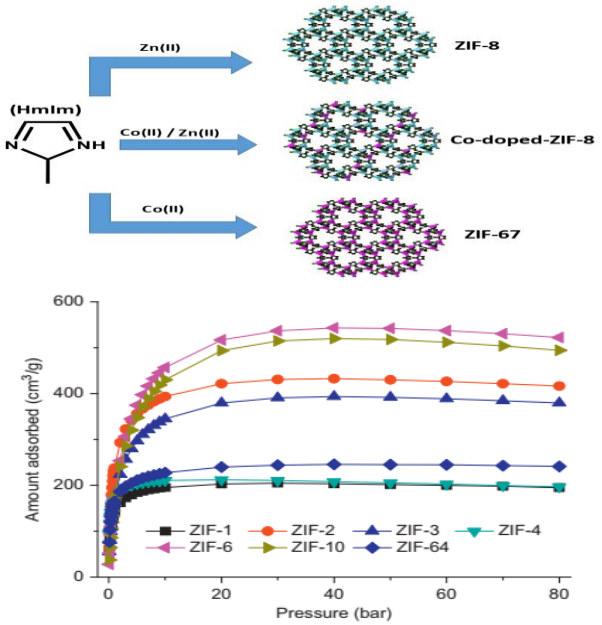
Abstract

Gas sensing is of crucial importance to environmental monitoring, control of chemical processes, agricultural, and medical applications. Particularly, the detection of harmful and toxic gases such as H_2S, NH_3, CO, and volatile organic chemicals (VOCs) released from various industries is very necessary to avoid serious threat to human health. Sensing materials, which can concentrate and adsorb gases onto the surface of the sensors, and then generate a signal for detection play a vital role in the sensing identification of gases. Among various sensing materials, metal–organic frameworks (MOFs). Zeolitic imidazolate frameworks (ZIFs) are a new class of metal–organic frameworks (MOFs), which have ordered porous structures with hybrid frameworks consisting of inorganic metal ions or metal clusters coordinated with organic imidazole/imidazolate ligands. Similar to other ordered porous materials like zeolites, the regular ZIF structure can be potentially utilized in membrane related applications such as separations, and chemical sensors. Whereas ZIFs have more attractive properties such as high specific surface area and chemically flexible framework that can be modified with functional groups by post-synthesis methods. The framework structure can be rationally designed to achieve a large spectrum of pore size and 3D pore structures.

Researches on syntheses, structures and properties of MOFs have indicated that they are promising materials for various types of gas sensors. In addition to direct use, MOFs also have been used as sacrificial templates/precursors for preparation of various functional gas-sensing nanomaterials, which showed high gas-sensing response, stable repeatability and so on.

Figure:



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5. Saliba, Daniel, et al. Journal of the American Chemical Society 140.5 (2018): 1812-1823.

Biography

Mohamed EL OUAHCHI is a second year Phd student; joint supervised by Professor Zahra BAHARI and Professor Rachid TOUZANI, his main subject is the synthesis and characterization of metal organic frameworks (MOF) and their applications. He was awarded his master in 2018 from the University of Sidi Mohamed Ben Abdella, Fes, Morocco

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3D-QSAR modeling, Molecular docking and ADMET properties of benzothiazole derivatives as α-glucosidase inhibitors

Ayoub Khaldan[1], Soukaina Bouamrane[1], Reda El-mernissi[1]. Khalil El khatabi[1], Hamid Maghat[1], Mohammed Aziz Ajana[1], Abdelouahid Sbai[1]*, Mohammed Bouachrine[1,2] and Tahar Lakhlifi[1]

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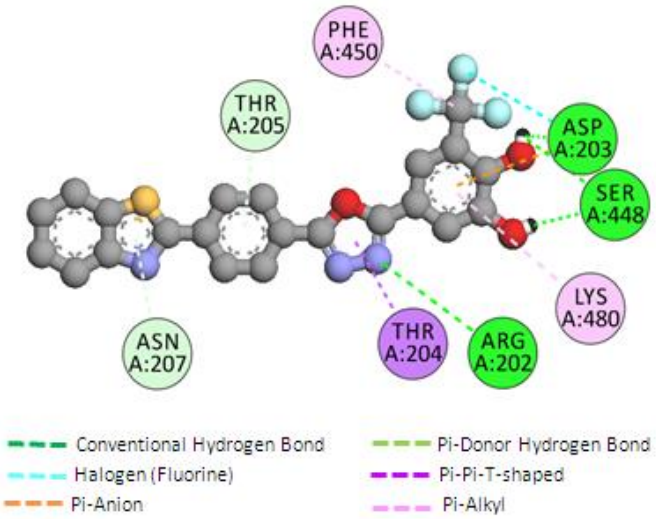
Abstract

Acarbose and voglibose are α -glucosidase inhibitors that have been used for controlling of diabetes mellitus. Unfortunately, these drugs have many side effects. Consequently, the discovery of new agents with high α -glucosidase inhibitory activity and weak side effects becomes of great importance. For this purpose, a series of twenty three benzothiazole derivatives were studied using 3D-QSAR (CoMFA and CoMSIA) and molecular docking in order to predict new α -glucosidase with high inhibitory activity. CoMFA and CoMSIA models using eighteen compounds at the training set give significant Q^2 values of 0.553 and 0.75, and high R^2 values of 0.93 and 0.942, respectively. The five remaining molecules are used to test the performance of these models and the predicted determination coefficients R^2test values are 0.74 and 0.87 for CoMFA and CoMSIA models, respectively. CoMFA and CoMSIA models were able to identify the structural requirements that influence the activity and consequently we propose new benzothiazole derivatives with high predicted activities. Moreover, surflex-docking was applied to investigate the interaction between a newly designed molecule and the most active compound (molecule **2**) with the α-glucosidase receptor (PDB ID: 3L4T). Additionally, the proposed α-glucosidase inhibitors were analyzed for their ADMET properties and drug likeness. These results would be of great aid in leading optimization for new drug discovery that can resolve the problem related of diabetes mellitus.

Figure: *Docking interactions of the proposed compound X1*



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2. Khaldan A., El khatabi K., El-mernissi R., Sbai A., Bouachrine M., Lakhlifi T., J. Mater. Environ. Sci.. 11 (3) (2020) 429-443.
3. Khaldan A., Agorram K., Ghaleb A., Aouidate A., Sbai A., Bouachrine M., Lakhlifi T., Rhazes. 6 (2019) 11-26.

Biography

Ayoub KHALDAN is a PhD-candidate at the Molecular Chemistry and Natural Substances Laboratory at the Faculty of Sciences, Moulay Ismail University of Meknes. He Is interested in design of new drugs by the modeling of organic heterocyclic molecules using 3D-QSAR study, Molecular docking and reactions of 1,3-dipolar cyclo-additions. He published more than 3 papers; one of them is in Scopus.

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Purification and extraction of acid Lactic compound by oriented processes through affinity polymer membranes

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[2]*Laboratoire Polymères, Biopolymères, Surfaces (PBS), UMR 6270 du CNRS, Faculté des Sciences et Techniques, F-76821 Mont-Saint-Aignan, France.*
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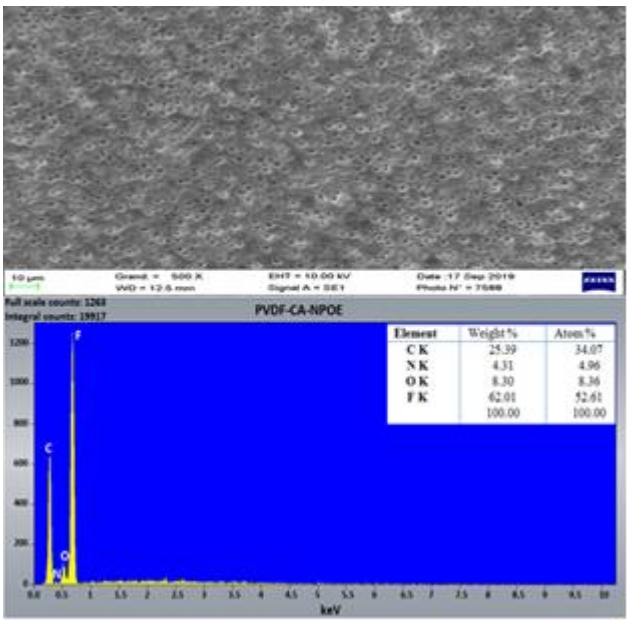
PPR2 and ERANETMED3 projects (MESRSFC / CNRST)

Abstract

The use of membrane technologies has grown considerably in recent years, due to the multiplication of applications in several fields and the advantages offered compared to other conventional techniques. Currently, these processes represent a very diverse essential field of research, in particular affinity polymer membranes, very useful for oriented processes in ***green and sustainable chemistry***. In this study, two polymer membrane types based on PVDF polymer support were developed using specific techniques, an polymer inclusion membrane (**PIM**) and a supported liquid membrane (**SLM**) containing respectively, the lipophilic molecules, cholic acid (**CA**) and methyl cholate (MC), as extractive agents. SEM-EDS and FTIR techniques have been adopted to identify morphology, porosity and composition of these membranes before their use for the extraction and recovery oriented processes of lactic acid (**LA**) from dilute aqueous solutions. The membranes were adopted to perform experiments on a facilitated extraction process of **LA** at different initial concentrations C_0 (1, 0.8, 0.5 and 0.4M) and temperatures **T** (298, 303 et 308 °K). Experimental kinetic studies allow determining macroscopic parameters, permeability (***P***) and initial flux (J_0), in order to quantify the performance of developed membranes. Similarly, the microscopic parameters, association constant (K_{ass}) and apparent diffusion coefficient (***D****), relating to the diffusion of **LA** substrate through the membrane phase by interaction with extractive agent, were determined. Also, thermodynamic and activation parameters (enthalpy ΔH_{th}, energy E_a, enthalpy $\Delta H^{\neq}$, and entropy $\Delta S^{\neq}$) were calculated. All parameters allow to elucidate the diffusion movement nature of the substrate through the membrane phase and to specify the ***kinetic or energetic*** aspect that controls the mechanism of these studied oriented processes.

Figure: *SEM-EDS micrographs of PIM (PVDF-CA-NPOE)*



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2. E.H. El Atmani, A. Benelyamani, H. Mouadili, S. Tarhouchi, S. Majid, K. Touaj, L. Lebrun, M. Hlaïbi, E.J of pharmaceutics and Biopharmaceutics.
3. Imane Touarssi, I. Mourtah, Y. Chaouqi, O. Kamal,N.Sefiani, L. Lebrun, M. Hlaïbi. Journal of Environmental Chemical Engineering 7 (2019) 103182.

Biography

Rkia Louafy is a fifth-year PhD student "**chemistry and valorization**". Her main research interest membrane technologies, more specifically affinity membranes and their application for the treatment of pharmaceutical effluents while protecting the environment. She has participated in several national and international conferences.

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Characterization of sludge from the treatment of drinking water

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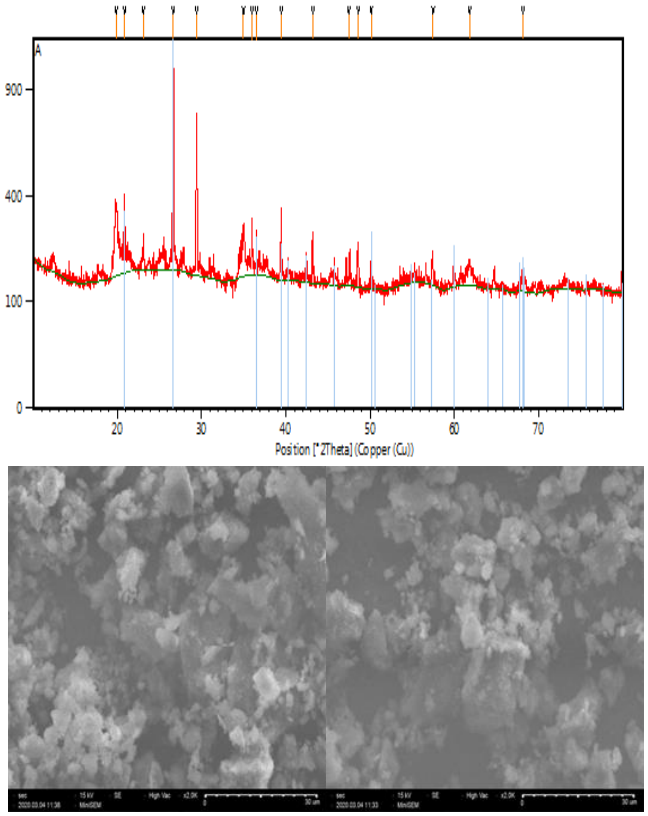
Abstract

The sharp increase in the world's population is leading to a growing demand for drinking water, which is produced in several stages: Screening, Sieving, Coagulation-Flocculation, Settling, Sand Filtration, Ozonation, Activated Carbon Filtration, Chlorination (Disinfection). Coagulation-Flocculation is one of the most important steps in this surface water treatment process, It consists of the addition of iron- or aluminium-based reagents to cause the agglomeration of dissolved or suspended particles into flocculating aggregates, which accumulate as solid waste during the settling stage, causing a serious problem to get rid of them. The quality and quantity of the sludge depends mainly on the quality of the water, the type of treatment and the reagents used in the drinking water treatment process.

This study selectively examines the sludge obtained at the settling stage for its physico-chemical characteristics. XRF, SEM, XRD, FTIR and TG DTA analysis techniques were used to characterize the sludge sample. The results of the measurements revealed that SiO_2, Al_2O_3, Fe_2O_3 and CaO constitute the maximum percentage of chemical compounds present in the sludge and quartz is the main crystal phase of the sludge.

Figure:



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3. Ennaciri Y., Bettach M., Materials and Manufacturing Processes 33(16) (2018) 1727.

Biography

Phd student in water and waste water treatment. In our modern society, wastewater needs to be treated before discharge into natural water bodies to protect environment and human health and to recycle minerals such as aluminum and iron high value-added products. This project offers a unique opportunity to make a real difference evidence base for waste management and to develop highly transferable skills for a rewarding future career in the academic and environmental sectors.

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Acoustic filters based on defect modes in One-Dimensional phononic star waveguide Structure

Ilyass El kadmiri [a,*], Youssef Ben-Ali [a], Younes Errouas [a], Aissam Khaled [a,b], Driss Bria

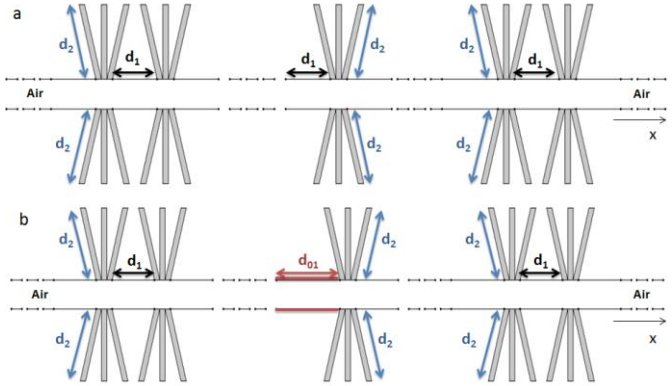
[a] *Laboratoire des Matériaux, Ondes, Energie et Environnement, Equipe des Ondes, Acoustique, Photonique et Matériaux, Faculté des Sciences, Université Mohamed Premier, Oujda, Morocco.*
[b] *Laboratoire des Sciences Appliquées, Ecole Nationale des Sciences appliquées d'Al Hoceima, Morocco.*

Abstract

We investigate in this paper the existence of one or two defect modes in the phononic band structure in a one-dimensional phononic star waveguide (SWG) structure. This structure exhibits large forbidden bands (gaps) that originate both from the periodicity of the system and the resonance states of the grafted lateral branches (resonators). The defect modes result from the presence of defective backbone (segment) in the star waveguide structure and may occur in these gaps. We show that there is a dual frequency acoustic filtering based on two defect modes in a wide gap by creating a defect at the backbone level in a one-dimensional star waveguide structure when pumped by an acoustic wave under normal incidence. The defect modes are sensitive to the defect length d_{01}, the number of N cellules, and the position of defect J. The color map of the transmission rate is discussed as a function of the lengths d_1 (finite segment), d_{01} (segment defect), and the height d_2 (resonator). The transmission spectrum and the band structure are theoretically presented using the Green functions approach based on the formalism of the interface response theory for acoustic waves propagating in a star waveguide structure.

This structure has potential applications as acoustic filter, guiding, and demultiplexing.

Figure: *(a) One-dimensional star waveguide phononic structure containing N period (cellule), each period contains by the segment of length d1 and grafted in each site by one resonator of height d2. (b) Same as (a) except that there is a segment defect of the length d01 located in the center of the periodic structure*



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1. Ben-Ali Y., Tahri Z., Ouariach A., Bria D., In: International Symposium on Advanced Electrical and Communication Technologies, pp. 1–6, IEEE, Rabat-Morocco (2018).
2. Antraoui I., Khettabi A., Materials Today: Proceedings. (2020) 1-7.
3. Ben-Ali Y., Tahri Z., Bria D., Materials Today: Proceedings. (2020) 1-9.
4. Farooqui M., Elnady T., Akl W., In Proceedings of Euro Noise. (2015) 2255-2260.
5. Farooqui M., Elnady T., Akl W., JASA. 139 (2016) 3267-3276.

Biography

Ilyass El Kadmiri has expertise in the propagation of acoustic and electromagnetic waves in one dimensional periodic structure containing the defects for large gamme of applications, in particular the filtering, the demultiplexing and the detection. He is a doctoral student in 2nd year from the University Mohammed First Oujda. He published 3 papers.

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Three frequency filtering and guiding by the presence of defects in one-dimensional photonic star waveguide structure

Younes Errouas[1], Ilyass El kadmiri[1], Youssef Ben-Ali[1], Zakaria Tahri[2], Bria Driss[1]

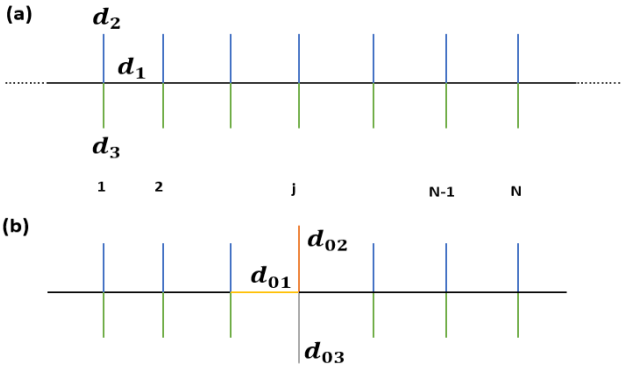
[1]*Laboratoire des Matériaux, Ondes, Energie et Environnement, Equipe des Ondes, Acoustique, Photonique et Matériaux, Faculté des Sciences, Université Mohamed Premier, Oujda, Maroc.*
[2]*Laboratoire des Sciences Appliquées, Ecole Nationale des Sciences Appliquées d'Al Hoceima, Université Abdelmalek Essaadi, Maroc.*

Abstract

In this work, the propagation of electromagnetic waves in one-dimensional star waveguide structure is shown to present a novel physical phenomenon. This system contains a periodicity of segments of length d_1 along which two asymmetric resonators of lengths d_2 and d_3 are grafted in each site. This structure exhibits allowed bands separated by large photonic band gaps (the propagation of electromagnetic waves cannot propagate inside these regions). Due to the presence of these gaps, the electromagnetic waves can be controlled for a wide range of applications. These gaps originate from the periodicity of the system and from the grafted lateral branches. The presence of defects, either on the guide, or on the asymmetric resonators, or on the two components of the cell (guide-resonators) inside this structure, give rise to two or three localized states (defect modes) inside this system. We show that these states depend strongly on the lengths of defects (d_{01}, d_{02}, d_{03}). The band structure and the transmission spectra are found out using the continuous medium interface response theory, which makes it possible to calculate the Green function of any composite material. This structure provides good support for applications of filtering and guiding the defect modes inside the band gaps.

Keywords: Star waveguide, Defect modes, Asymmetric, Filtering.

Figure: *(a) Schematic of the 1D star waveguide structure composed by the periodicity of cells. Each cell consisting by the segments of lengths d1 grafted in each site by two resonators of lengths d2 and d3. (b) Finite star waveguide structure containing three defectives of lengths d01, d02, and d03 located in site j*



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1. Errouas Y., Ben-Ali Y., Ouariach A., Tahri Z., Bria D., Journal materialstoday proceedings. (2020) 1-7.
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5. Bouknana D., Hammouti B., Messali M., Aouniti A., Sbaa M., Port. Electrochim. Acta, 32 (2014) 1-19.

Biography

YOUNES ERROUAS, is Ph.D. student in laboratory of Materials, Waves, Energy and Environment Team of Waves, Acoustic, Photonic and Materials Faculty of sciences, Mohamed Premier University, Oujda, Morocco. 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. He published 2 papers on IEEE and Elsevier.

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Simulation studies on a new innovative design of a hybrid solar distiller MSDH alimented with a thermal and photovoltaic energy

N. El Moussaoui[1], I. Atmane[1], K. Kassmi[1,4], S. Alexopoulos[2], K. Schwarzer[3], H. Chayeb[2], N. Bachiri[4]

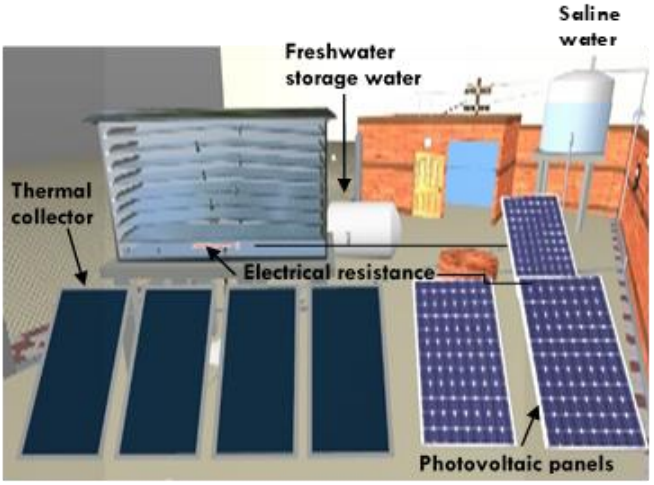
[1]*Mohamed First University, Faculty of Science, Department of Physics, Laboratory of Electromagnetic, Signal Processing & Renewable Energy LESPRE, Team Electronic Materials & Renewable Energy EMRE, Oujda, Morocco.*
[2] *Solar-Institut Jülich (SIJ), FH Aachen, Germany.*
[3] *Engineering Office of Energy and Environmental Technology (IBEU), Jülich, Germany.*
[4]*Association Humain and Environnement of Berkane (AHEB), Berkane, Morocco*

Abstract

The increase in population in the world leads to a high demand for fresh water, and the supply of drinking water from traditional resources is becoming severely insufficient [1-4]. In this context and in collaboration with the Solar Institute of Jülich and Company IBEU (Germany), and the Human and Environment Association of Berkane (Morocco), we propose to design and build a hybrid multi-stage solar desalination station (MSDH) (**Figure 1**), powered by solar thermal and photovoltaic energy. The expected goal is to improve the performance of a multi-stage MSD station, built in collaboration with German partners, as part of the PMARSIII 2015-64 project, running on solar thermal energy, in order to supply fresh water to inhabitants of Douar Al Hamri in the province of Berkane (Morocco).

In this work, we present the design, thermal modelling, taking into account photovoltaic energy, and simulation results of the proposed hybrid MSDH system. Particular attention is paid to the temperature of each stage and their produced water flow rates and to the distillation and overall yields of the MSDH system.

Figure: *synoptic diagrams of MSDH hybrid still*



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3. Feilizadeh, Mansoor, M.R. Karimi Estahbanati, Khosrow Jafarpur, Reza Roostaazad, Mehrzad Feilizadeh, and Hamed Taghvaei. Applied Energy 152 (August 2015): 39–46.
4. Chen, Zhili, Jingtang Peng, Guanyi Chen, Lian Hou, Tao Yu, Yang Yao, and Hongfei Zheng. Solar Energy 142 (January 2017).

Biography

Auteur correspondant :

K. Kassmi, Professor at Mohamed Premier University and responsible for the project (PMARSIII 2015-64).

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Assessment of the water quality of Oued El Khell by physicochemical and bacteriological approach

Abba EL Hassan [1], Ajiyel Halim [2], Zine Nasser Eddine[2], Tarik Ainane[1]. El Yaacoubi Adnane[1], Ben Kaddour Rachid [3]

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[2] *Sciences Facultie, University of Moulay Ismail. Meknès. Morocco*
[3]*Materials, Energy, Civil Engineering and Environment team. Higher School of Technology. United. Mohamed first. Oujda. Morocco*

Abstract

Aquatic ecosystems continue to be threatened and the impacts of anthropization on biodiversity and human health are unprecedented following untreated wastewater discharges. Our study consists of the analysis of organic pollution parameters (dissolved oxygen, forms of nitrogen, ortho phosphates, and COD) and microbiological indicators of faecal pollution of the waters of the Oued El Khell. The latter receives municipal and domestic wastewater from the Ain Salma tourist complex which is poured directly onto the bed of Oued Bou-iddar tributary of Oued el Kell used for the irrigation of vegetable crops. The results obtained show that the water from the study stations is classified as municipal wastewater after biological purification since the COD value varies between 80 and 100 mg of O2 / L. The Organic Pollution Index (IPO) shows that the water quality of the stations sampled during the low water period is average. From a bacteriological point of view, the ratio (R: CF / SF) total coliforms (CF) and faecal streptococci (SF) shows that the origin of faecal contamination is animal and human with a human predominance for S1 and S3 and human origin for station S2. According to Moroccan standards, the waters of the study area are not suitable for irrigation and can impact human health.

Keywords: Aquatic ecosystem, organic pollution, bacteriological pollution, Oued El Khéll, human health
.

Recent Publications

1. Tarik Ainane,1 Fatima Khammour,2 Nawal Merghoub,3 Meriem Elabboubi, Sanaa Charaf, Ayoub Ainane, M'hamed Elkouali, Mohammed Talbi, El Hassan Abba, SanaaCherroud. (2019). MOJ Toxicology.
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6. -N.Lamhasni,L. Chillasse, H. Abba. International Journal of Environment, Agriculture and Biotechnology Journal Materiel. Environment Sciences. ISSN 20282508.2017.

Biography

Pr. ABBA El Hassan, holder of a Doctorate in environmental sciences at the Faculty of Sciences, Ibn Tofail University/ Khénitra since 2011. Researcher professor at *Higher School of Technology / Khénifra* /Sultan Moulay Slimane University since 2014. Acquired expertise in the field of the environment through all of the environment modules taught and participation in the various international and national scientific events and the supervision and co-supervision of some research works. Since 2011, the number of articles published has exceeded 30 as the first author or co-author in the field of the environment, management and recovery of natural substances.

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Effect of substitution on corrosion inhibition properties of Imidazole derivatives on mild steel in 1M HCl, and DFT calculations

Mohammed BOUKLAH[1], Naoufal ATAIBI[1], Mohamed ELMHAMDI[1], Belkhir HAMMOUTI[1]

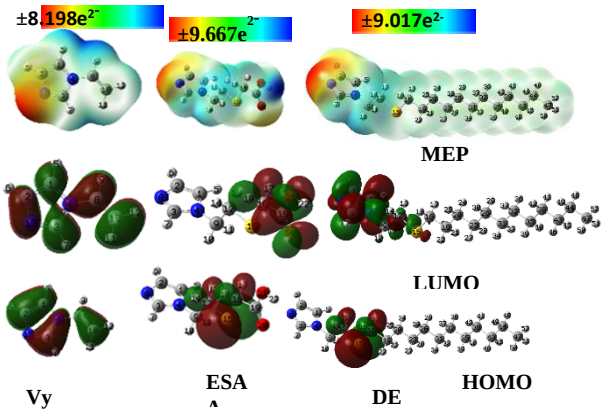
[1]*Laboratory of Applieid Chemistry and Environment, Faculty of Sciences, University Mhamed the First, Oujda,Morocco*.

Abstract

In this paper, we study the effect of substitution of three imidazoles: 1-(2-Dodecylsulfanyl-ethyl)-1H-imidazole (DEE) and 2-Imidazol-1-yl-ethylsulfanyl)-acetic acid (ESAA) on adsorption properties on the steel surface in molar HCl solution. The investigation was performed using weight loss data combined to theoretical parameters deduced from dynamic simulation. Various kind of Langmuir, Temkin, Frumkin, Freundlich, Flory-Huggins and El-Awady were investigated and discussed. The DFT calculations were performed to estimate the chemical reactivity of the Vy, ESAA, and DEE compounds at B3LYP/6-311++G (df,pd) level.

Keywords: Imidazole; Corrosion; inhibitors; Adsorption; DFT; Dynamic Simulation spectroscopy.

Figure:



Recent Publications

1. New Heterocyclic Compounds Based on Pyridazinones Scaffold as Efficient Inhibitor of Corrosion of Mild Steel in Acidic Solution 1 M HCl Fouad El kalai1, Tarik Chelfi, Noureddine Benchat, Mohammed Bouklah, Said Daoui, Khalid Karrouchi, Mustapha Allali, Mustapha Taleb, Elhachmia Echachihbi, Faisal A. Almalki, Taibi Ben Hadda. Journal of Bio- and Tribo-Corrosion, June (2020)
2. Inhibitor adsorption processes in mild steel/new bipyrazole derivatives/hydrochloric acid systemM.Bouklah , W.Daoudi, B.Hammouti, R.Touzani, S.Radi, M.Ramdani, A.Bouyanzer, A.Aouniti, R.Salghi, Materialstoday:PROCEEDING, Vol. 27, Part 4 (2020) 3209-3216.

Biography

Born in 1972 in Tiouli, **Dr Mohamed Bouklah** is actually professor at Regional Center of the Education and Training Trades; He received PhD in 2005 from the University of Mohammed first in Physic field.

Dr Mohamed Bouklah is professors agree in Physic, he is a specialist in calculating electrochemical impedance spectroscopy and he masters very well the software of the theoretical calculations, he is the author of several books in science and didactics. Author of over 40 publications involving Mössbauer spectroscopy since 2004. Fields of interest scan from Physical Metallurgy (Fe-C, Fe-N martensites and retained austenites, clustering and ordering of interstitials, iron carbides and nitrides, alloyed steels ...), Magnetism (Fe-rare earths systems), Corrosion of iron based materials and steels (green rusts), Mineralogy of iron oxides and their role in soil and environmental science, discovery of the minerals fougèrite, trébeurdenite, mössbauerite in gley soils (1996 & 2010). H index: 18.

Defects observation in CdTe/(001)GaAs thin film. A kinetic Monte Carlo simulation

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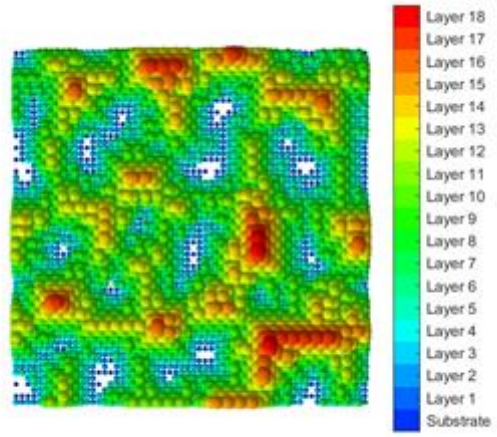
Abstract

We have simulated the growth of CdTe/(00l)GaAs, and we have focused our study on the defects creation. A Monte Carlo (MC) scheme associated with a Valence Force Field (VFF) approximation is used to describe, respectively, the kinetic and the strain and stress effects in the deposited film. As a result of these simulations, we have observed the formation of defects (point and extended defects), in agreement with various experimental observations. Point and extended defects are inherently absent in Solid On Solid (SOS) model. This is due to its basic principle which excludes vacancies and overhangs (atoms in hanging positions) from the beginning. Our simulation model goes beyond the Solid On Solid (SOS) model in the sense that it contains mechanisms (events) leading to vacancies and overhangs. These mechanisms will be described in details in this paper. Our simulation model uses the real diamond-cubic crystallographic structure (zinc-blende).

Figure: *Top view of the deposited CdTe/(001)GaAs film (14.7% lattice mismatch)*



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4. X. Li, Y. Zhao, Q. Wu, Y. Teng, X. Hao, et Y. Huang, J. Cryst. Growth, vol. 502, p. 71-75, nov. 2018.

Biography

Dr. Rachid MALEK is a Full Professor at Mohammed Premier University (Oujda/Morocco) - National School of Applied Sciences. His current projects are Photovoltaic Cells and Systems & Nanotechnologies.

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Comparative study of two types of slag in the manufacture of paving stones

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[b]*Laboratory of Engineering Sciences and Applications, National School of Applied Sciences of Al-Hoceima, Morocco*
[c]*Higher School of Technology - Sultan Moulay Slimane-Khenifra University*
[d]*Civil and Geo-Environmental Engineering Laboratory - GCGE-GCE. Mines Telecom Institute, Douai, France*

Abstract

The steel-works, transform great quantities of scrap to produce more than 60 miles tons of wire machines and different standard from reinforcing bars from steels, generating approximately 8000 miles tons of slags per year. This waste is stored or used for embankments. With this quasi inexhaustible slag layer, Morocco thus has a resource which may undergo beneficiation thanks to its strong content silicates and metallic oxides. That implied us to try his valorization in the manufacture of the paving stones. The tests were carried out with old and recent slags.

After the physico-chemical characterization of the two types of slags, paving stones were made, by formulations established according to the method of Dreux Gorisse, in substituent the gravels by slags and optimizing volumes of mixing water and slags.

The results show that old slags are characterized by a density, angularity, porosity, roughness, resistance to fragmentation and a composition out of oxides higher than recent slags except for the element iron.

The incorporation of old slags in the form of coarse aggregates under the above-mentioned conditions conferred on the concrete mechanical properties and of durability better than recent slags. Their tensile strength by splitting and the breaking load are in conformity with standard NF IN 1338.

Key words: Steel-works, Slags old, recent Slags, Paving stones, physico-chemical and mechanical Characterization.

Biography

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Study of the inhibition effect of a new cationic surfactant on carbon steel corrosion in a 1M HCl solution

O. Abdellaoui[1], M.K. Skalli[1], A. Haoudi[1], Y. Kandri Rodi[1], M. Zouhairi[2], M. Taleb[3], O. Senhaji[4]

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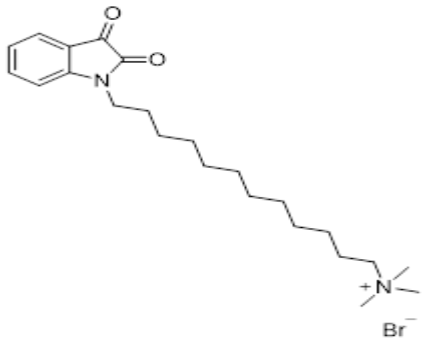
[4]*Team of Biomolecular and Macromolecular Chemistry, Faculty of Sciences, My Ismail University, Meknes, Morroco.*

Abstract

Corrosion problems may occur in numerous systems within the petroleum industry. Mineral acids, particularly hydrochloric acid is frequently used in industrial processes, including acid cleaning, acid pickling, acid descaling, and oil well acidizing. Since HCl is a strong, aggressive medium for oil and gas well equipment. Thus, the effective way to protect these oil well tubular materials is to inject a suitable corrosion inhibitor [1].

The use of organic molecules as a corrosion inhibitor is one of the most practical methods for protecting against the corrosion, and they are becoming more usual. There are several isatin derivatives, which have been reported as inhibitors in 1M HCl [2]. Thus, several quaternary ammoniums, characterized as cationic surfactants, are molecules with high water solubility and are considered as effective inhibitors of mild corrosion of steel in acidic environments [3, 4]. In order to assess the inhibitory corrosion efficiency of the new heterocyclic molecule on mild steel, we aimed to determine weight loss, potentiodynamic polarization techniques, and electrochemical impedance spectroscopy as the major effective methods. As a result, we synthesized, as new cationic surfactants, a quaternary ammonium isatin-based, which exhibited high inhibitory corrosion on mild steel in 1M HCl. It has an excellent corrosion inhibition property with an inhibition rate of 95.9% at a concentration of 10-3 M for 6 hours of immersion under 298K.

Figure:



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2. *Y. Kharbach, F. Z. Qachchachi, A. Haoudi, M. Tourabi, A. Zarrouk, C. Jama, L. O. Olasunkanmi, E. E. Ebenso, and F. Bentiss., "Anticorrosion performance of three newly synthesized isatin derivatives on carbon steel in hydrochloric acid pickling environment: Electrochemical, surface and theoretical studies" J. Mol. Liq., 246 (2017) 302–316.*
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Biography

Omar Abdellaoui Ph.D. student in the laboratory of applied chemistry in the Faculty of Sciences and Technology (F.S.T.F), from the University of Sidi Mohamed Ben Abdellah (U.S.M.B.A). I'm working on the synthesis and properties of new surfactants derived from isatin.

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Additive manufacturing of polyetheretherketone/polyetherimide (PEEK/PEI) blend using Fused Filament Fabrication process

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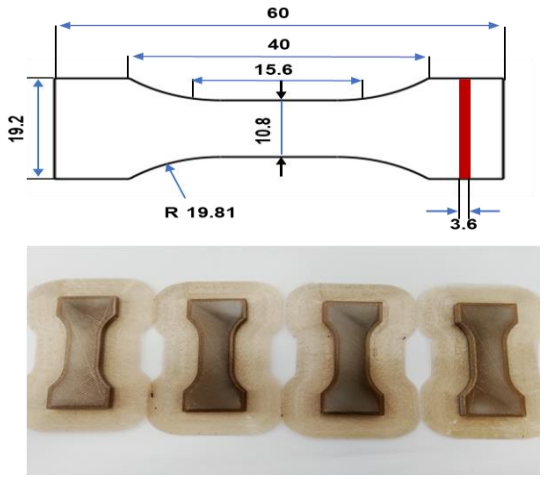
Abstract

High performance thermoplastics (HPT) have recently attracted interest in the most challenging areas as aerospace, biomedical, energy and automotive comparing to the commodity thermoplastics. These polymers and corresponding composites exhibit the advantage that even at high temperatures and severs conditions maintain its properties (e.g higher service-temperatures, good tensile properties, thermal degradation resistance, chemical resistance and gas barrier). Polyetheretherketone (PEEK) and polyetherimide (PEI) materials exhibit good thermal properties with a high melting temperature (T_m) and glass transition temperature (T_g). It was known that PEEK/PEI blends are molecularly miscible in the amorphous state over the whole composition range. The blending of these two engineering polymers has been considered an interesting route to offer a chance to balance properties of both polymers to obtain thermoplastic matrix with high properties.

During 3D printing, multiple controllable parameters such as raster angle, infill, and layer thickness are accounted to produce highly qualify material parts. Most studies reported that the mechanical properties depend strongly on the choice of printing parameters. The aim of this work is to evaluate the influence of nozzle temperature and infill line orientations on mechanical properties of PEEK and PEEK/PEI blend parts manufactured by Fused Filament Fabrication (FFF) process.

Figure:



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2. A. El Magri, K. El Mabrouk, S. Vaudreuil, M. Ebn Touhami, J. applied poly. sci. (2020)
3. A. El Magri, K. El Mabrouk, S. Vaudreuil, M. Ebn Touhami, J. IOP conf. series (2020).

Biography

Anouar El Magri currently work as Postdoctoral Researcher at the Euromed University of Fés. Their current project is the additive manufacturing of high-performance materials and their composites.

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CPV tracking system requirement and investigation

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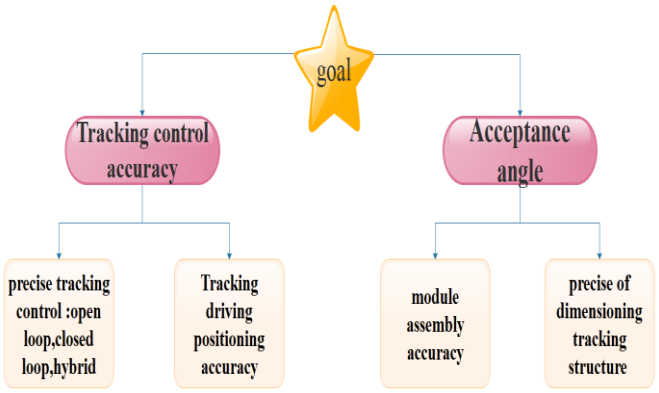
Abstract

Morocco is experiencing a huge increase in the use of renewable energies. Among these energy sources the most used one is solar energy due to the high duration of sunshine(3000h/y). The electricity produced from solar energy can be obtain through two ways. On the first hand Photovoltaics based on solar panels made of silicon, whose yields are around 20% for the best technologies which can be increased by 5 or 6% by tracking sun movement in regions where the ambient temperature of the panels remains below 30 °C. On the other hand, Concentrated Photovoltaics (CPV), based on the use of lenses or mirrors to concentrate the sun rays into a small multi-junction PV cells. These systems yield is around 47% [1]. However, this technology uses of only direct solar radiation, that require a very precise and strict monitoring of the sun movement during the whole day. Indeed, when we look at the solutions that exist and that are industrialized, they are not very precise and do not correspond to the desired monitoring in the case of the CPV [2]–[4]. The challenge is to develop a CPV tracker with great sun movement tracking precision. While taking into consideration the architectural design and CPV control tracker.

In this paper, we will provide a study of the requirement of sun tracking. This needs a precise knowledge of the design of a CPV tracker and requires a stiffness structure able not to induce acceptance angle losses, account the module weight and maximum service wind loads .A deep research is performed to fix once at time this issue, generally considered as resolved by the well known algorithms for sun tracking but they are not well adapted.

Figure:



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Biography

I am Ourraoui imane a first year PhD student in the intelligent Systems, Geo-resources and Renewable energies of the faculty of science and technology of Fez. I am working on "CPV Sun Trackers "under the supervision of Pr Ali Ahaitouf.

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Design and realization of an autonomous solar cooker with photovoltaic energy

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[2] *University of Mons, Polytech. Mons - Electrical Power Engineering Unit, Mons, Belgium*
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Abstract

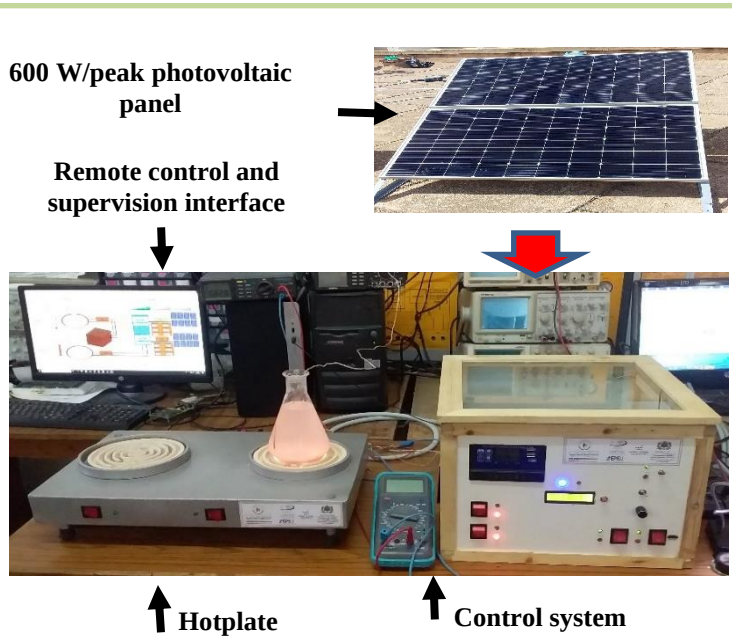
Currently, the problem of deforestation and environmental degradation is very worrying. To mitigate and limit the resulting effects, governments and NGOs, which fight for the protection of the environment, have set up awareness and promotion programs to use green solar energy (photovoltaic and thermal) in homes and activities requiring cooking at temperatures ranging from 60 °C to 300 °C [1-3]. In this context, the work presented in this paper shows the feasibility of an innovative autonomous solar cooker (hotplate) running on renewable photovoltaic (PV) energy. The proposed equipment (Figure 1) is designed and produced to meet the needs of the inhabitants, in terms of cooking with PV solar energy, in households in the rural world of the rural commune of Tafoghalt in the province of Berkane, within the framework of projects: INDH 29/2017, Wallonie-Bruxelles International WBI, 2018-2022, N ° 4.2.

As shown in figure 1, this cooker is formed by PV panels, DC/DC energy converters, thermal resistors and a digital control block. The role of the digital block is to manage the operation of the cooker locally and remotely, according to user needs, and to acquire and display meteorological (irradiance and ambient temperature), thermal (heating and cooking temperatures) and electrical system (currents, voltages, powers, yields,…).

Experimentation the system for whole days shows, for an intensity of illumination varying 300 W/m^2 to 820 W/m^2 and an ambient temperature of around 34°C, the overall electrical power supplied by the panels PV attains 500 W/peak, the temperature of the thermal resistance reaches after 10 s, the value of 700°C (ie 70 °C/s). For an irradiation of 750W/m^2 and a power of the PV panels of 420W, the efficiency of the converters is 86.6%, the boiling of the water (temperature of 90°C) and the heating of the oil (temperature of 300°C) took place after 10 mn and 30 mn respectively.

These results show that the proposed cooker can be integrated into rural households for cooking during sunny days.

Figure: ***Photovoltaic solar energy cooker (hotplate) proposed in this work***



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3. Osei, E. Y., & Amo-Aidoo, A. 2018. Design, Fabrication, and Testing of a Solar Photovoltaic Cooker in Ghana. In International Conference on Applied Science and Technology Conference Proceedings (Vol. 4, No. 1, pp. 182-188)

Biography

Auteur correspondant :

K. Kassmi, Professor at Mohamed Premier University and responsible for the projects (INDH 29/2017, WBI n°4.2).

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Rosemary Essential Oils: Extraction, Identification and Biocidal Applications

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[b] *University Mohammed Premier, Faculty of Sciences, Department of Biology, Oujda-Morocco.*

Abstract

Essential oils from medicinal and aromatic plants have very interesting biological properties, which find application in various fields such as medicine, pharmacy, cosmetics and biocide. the essential oil of rosemary harvested in October (2018) in the region of Taourirt (Morocco). It was extracted by the steam distillation method and the chemical composition was determined by gas chromatography coupled with mass spectrometry (GC/MS). The main products are 1,*8-cineole* 43.98% *alpha-Pinene* 12.76% and camphor 9.17%. Rosemary essential oil rich in *cineole* is the most widely used and most common oil. It is mainly used on the respiratory, digestive and blood circulation systems and anti COVID19. Rosemary essential oil is used as natural pesticides, it is effective in eliminating certain insect pests [1-2].

Figure:

Figure 1: Rosemary (Rosmarinus officinalis)

Figure 2: 1,8 cineole (Eucalyptol)

Recent Publications

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Acknowledgment
This work enters in Valorization PAM Project (CNRTS 2020-2023).

Biography

Imane OUALDI is a second-year student in the Master of Applied Chemistry at University Mohammed Premier, Faculty of Sciences, (LCAE) Oujda-Morocco. Under the supervision of Prof. Rachid TOUZANI.

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Double-diffusive convection study in a shallow horizontal porous layer filled with a binary fluid and submitted to destabilized conditions in the presence of Soret and Dufour effects

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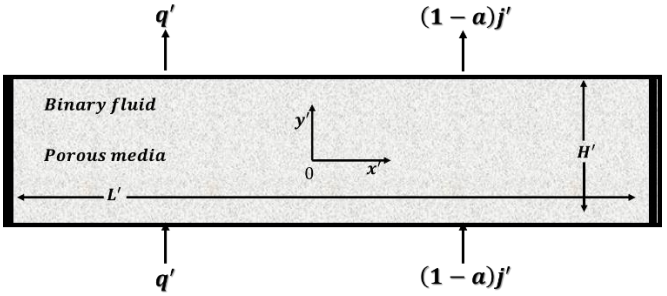
[2]*National School of Applied Sciences, University Cadi Ayyad, Marrakech, Morocco*

Abstract

The problem of thermosolutal convection of binary fluid within a porous medium has been motivated by many engineering applications in various areas including hydrology, petrology and geophysics [1]. The second order additional coupling (Soret and Dufour effects) added to those habitually existing and the nature of the strong coupling may mainly between temperature and concentration fields may give rise to a large variety of flow behaviors that cannot occur in a single component fluid. This type of convection caused by the combined influence of thermal and solutal buoyancy forces in addition to the additional thermal and solutal gradients generated by thermo-diffusion and diffusion-thermo offers new perspectives of investigation. The present study, conducted analytically and validated numerically, aims to determine the onset of thermosolutal convection in a Brinkman horizontal porous layer saturated with a binary mixture (Fig. 1) destabilized by submitting it either to both heat and mass fluxes ($a = 0$) or to a heat flux to recover the case of pure Soret effect ($a = 1$). The analytical solution is derived based on the parallel flow approximation [2-4] and validated numerically using a finite difference method. In the buoyancy ratio-Dufour number plane, different specific regions describing different flow behaviours are delineated. The supercritical and subcritical Rayleigh numbers corresponding to the onset of the parallel flow convection are also determined. Pure Soret effect and hidden Soret effect in the mass flow on the thresholds for the onset of stationary and finite amplitude convection and the generated heat and mass transfer rates are examined for both studied cases.

Figure: *Schematic diagram of the studied configuration*



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2. Cormack D. E., Leal L. G., and Seinfeld J. H., "Natural convection in a shallow cavity with differentially heated end walls . Part 3 . Experimental results," J. Fluid Mech. 65 2 (1974) 231–246.
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Biography

Ismail Filahi received the Bachelor and Master degrees from Cadi Ayyad University, Marrakesh, Morocco, in 2013, and 2015, respectively. He is currently a Ph.D student in Cadi Ayyad University. His main areas of research interest are computational fluid dynamics, heat transfer, and renewable energy.

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QSAR Studies of New Compounds Based on Thiazole Derivatives as PIN1 Inhibitors via Statistical Methods

K. TABTI[1], L. El Mchichi [1], A. SBAI[1*] H. MAGHAT[1], M. BOUACHRINE[1,2], and T. LAKHLIFI[1]

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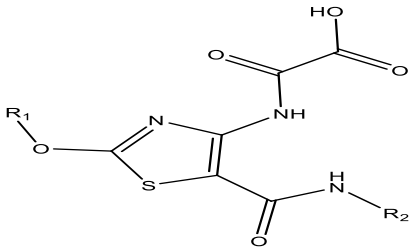
[2]*EST Khenifra, Sultan Moulay Sliman University, Benimellal, Morocco*

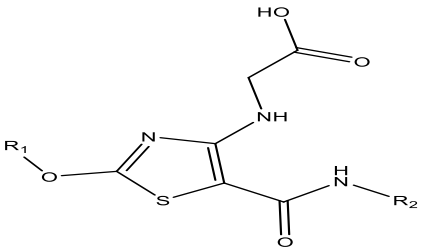
Abstract

In this study, mathematical and statistical approaches to QSAR-2D modeling were used to predict biological activity against PIN1 and to explain the origin of the activity of these studied compounds, to design new thiazole derivatives with high predicted values against PIN1. In this regard, a series of thiazole derivatives of 25 compounds were analyzed by principal component analysis, linear regression, partial least squares analysis, and artificial neural network. The descriptors studied were selected from a set of descriptors (topological, electronic geometric and physicochemical), having a chemical explanatory meaning of molecular bioactive. The model predictive was validated by different methods of internal validation, external validation, and randomized Y-test. Moreover, the statistical indicators R^2, MSE were used to evaluate the predicted responses of the models compared to the observed data. A leveraged approach was used using the Williams plot to detect outliers and verify that such a chemical compound is included in the applicability of the models developed or not. Thus, the model developed by the MLR method showed satisfactory performance during the learning and validation and test phase with four descriptors: MR, LogP, E_{LUMO}, and J; the exception of the PLS method which did not pass certain external validation criteria. Therefore, the best model is RLM with R^2 = 0.76, MSE = 0.039, a cross-validation coefficient (R^2cv = 0.63) and an external predictive power (R^2_{test} = 0.78). The result of the ANN model with the Levenberg-Marquart algorithms showed us better performance with the architecture [4-10-1]: R^2 = 0.98, R^2cv = 0.99, R^2_{test} = 0.98, MSE = 0.013.

Figure 1: The chemical structure of the studied compounds



Compound-A



Compound-B

Recent Publications

1. K. TABTI, "QSAR Studies of New Compounds Based on Thiazole Derivatives as PIN1 Inhibitors via statistical methods," RHAZES Green Appl. Chem., vol. 9, pp. 70–91, 2020.

Biography

Collegial secondary school teacher 2ere grade speciality physic and chemistry. Molecular and Computational Chemistry, NSMC Laboratory University Moulay Ismail, BP 11202-Zitoune, Meknes, 50070, Morocco.

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Inhibition of corrosion of C38 steel in HCl medium by Indazole derivatives

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Faculty of Science, University Chouaib Doukkali El Jadida.
[2]Analytical Chemistry and Environmental Sciences (C.A.S.E).
[3]Environmental engineering and biotechnology laboratory, ENSA, University Ibn Zohr, POBox 1136, 80000 Agadir.

Abstract

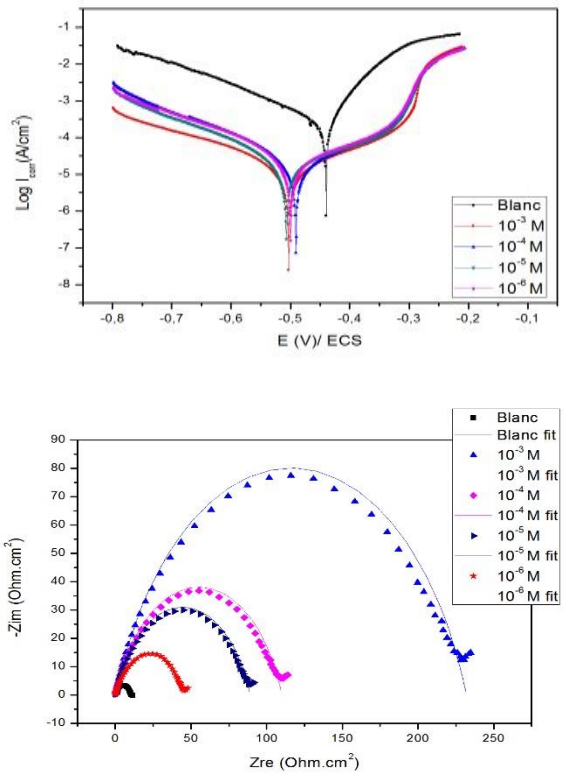
The inhibition of corrosion of C38 steel in a 1M HCl solution by three compounds derived from indazole, named 6NI2, 6NE1 and 6NE2 was studied by weight loss measures, and electrochemical techniques (analysis potentiodynamic polarization curves, and by electrochemical impedance measurements (EIS)).

The experimental results showed that these compounds reduce the rate of corrosion of steel in HCl 1M.

In this work, we have studied the effect of the inhibitor concentration, and the effect of temperature on the speed of corrosion of steel. The influence of temperature has been studied over an interval of 25 to 55 °C.

We also carried out a theoretical study using Gaussian 09w software to determine quantum chemical descriptors (QCD) using functional density theory (FDT).

Figure:



Biography

The author work on the study of the phenomenon of corrosion and its effects on steel and other metals. His objectives are based on the valorization and use of organic compounds to inhibit corrosion. He is currently preparing his PhD at Chouaib Doukkali University, Faculty of El Jadida, Morocco.

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Infrared thermography for pipeline's leakage detection: modeling and finite element numerical simulation

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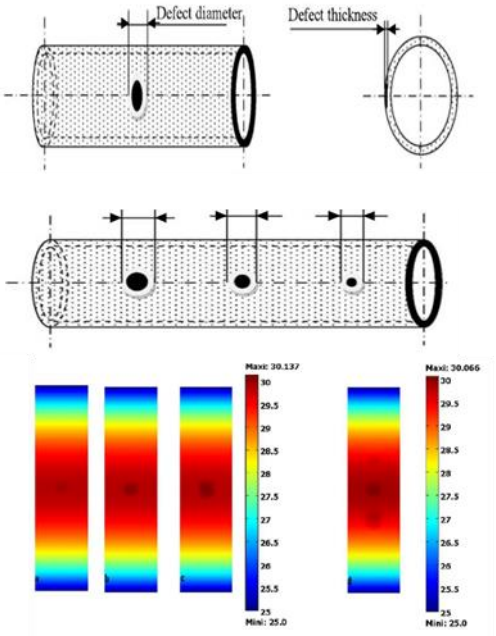
Abstract

Degradations and defects in pipelines are critically important, and might lead to serious fluid wastage, and pipeline network damages, hence the necessity of opting for an efficient monitoring tool. Literature has proven that Infrared Thermography is a powerful non-destructive auscultation technique in different civil-engineering fields, and our work aims to pinpoint the different benefits of this technique for the pipeline leakage detection and to provide insight into it. Furthermore, in order to ameliorate the control process and help master experimental analysis, numerical simulations are of great importance. This paper presents a study that investigates the many factors influencing the thermal images of a defected pipeline, and it consists on conducting a series of IRT simulations using 3D numerical modeling software based on Finite Elements for pipelines of different materials containing different fluids and carried out under various conditions. These pipes were drilled with different sizes and types of defects. The objective of this study is to confirm that the numerical simulation can be used to predict, visualize and understand the defected pipeline's behaviors. These results will be forwards used to validate the laboratory or real site experimental measurements.

Key words: Infrared thermography, pipeline, leakage detection, thermal images, defects, process, finite elements, 3D numerical simulation.

Figure: *Example of a simulation of pipe specimen containing artificial defects [1]*



Recent Publications

1. Pipeline corrosion, modeling and analysis- NAOUAR LAAIDI, SOUGRATI BELATTAR ABDESSAMAD ELBALLOUTI.

Biography

Laila Hfa is a civil engineer and Phd student, interested in non-destructive auscultation techniques used in civil engineering especially the Infrared thermography, and actually working on the use of Infrared thermography for the pipeline's leakage detection.

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Novel synthesized hybrid pigment using phosphate for corrosion application

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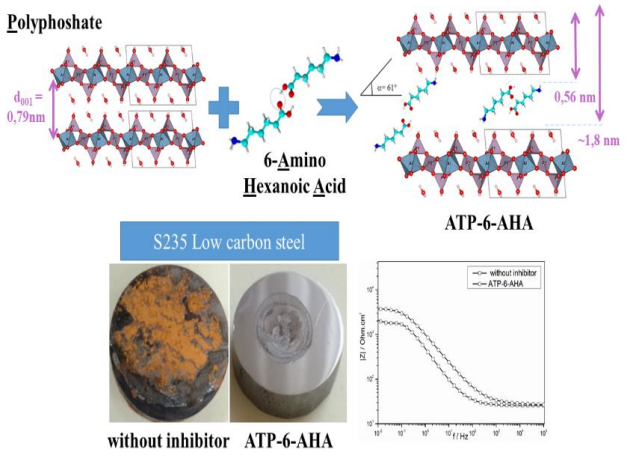
[3] Laboratoire des Sciences Appliquées et Didactique (LaSAD), Ecole Normale Supérieure, Université Abdelmalek, Tetouan, Morocco.
[4] Department of Physics, University Koblenz-Landau, 56070, Koblenz, Germany

Abstract

The development of environmentally sustainable and eco-friendly compounds for steel protection is of crucial importance for industry but also for the preservation of metallic components. This investigation reports the synthesis and characterization of a new hybrid inhibitor based on the intercalation of amino acid (6-AHA) in layered polyphosphate and its application for corrosion protection of S235 low carbon steel. The microstructure and morphology of the inorganic-organic hybrid inhibitor system are characterized by X-ray diffraction (XRD), thermal gravimetric analysis (TGA), infrared spectroscopy (IR), Raman spectroscopy, and scanning electron microscope
(SEM). The results clearly show that the host material and the hybrid compound were successfully synthesized. The interlayer space of layered polyphosphate is expanded by 10.1 Å, with 6-AHA planes arranged in bilayers (head-to-head) in the gallery space. The corrosion efficiency of new hybrid phosphate material was evaluated both as inhibitor and as pigment in alkyd resin in sodium chloride electrolyte solution using electrochemical impedance spectroscopy (EIS). The overall results demonstrated that the hybrid inhibitor system significantly decreases the corrosion behavior of S235 steel.

Figure:



Biography

Chaymae Hejjaj is a third year PhD student at Mohamed VI Polytechnique university in Benguerir and Cadi ayyad university in Marrakech. Her research focus is based on the use of phosphate as friendly alternatives of heavy chromate containing pigments for corrosion application.

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Analysis of survey data on corrosion in the automotive industry

A. CHAMI [1], R. BENABBOU [2], M. TALEB [3], Z. RAIS [4], M. EL HAJI [5]

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[2]*Laboratory of Research and Engineering (LRI), Hassan II University, ENSEM, Casablanca, Morocco, r.benabbou@ensem.ac.ma*
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Abstract

Automotive history and corrosion on a car go hand in hand. Research in all aspects of this field including protection, prevention measures and attempts to control corrosion could not solve the problem. Sooner or later, all the steel parts of the car start to corrode.

Corrosion may not have an immediate effect on a material, but it does affect the strength, physical appearance, and can cause operating problems. Although automakers have made great strides in protecting bodywork and paintwork from this phenomenon through surface treatment and material selection, cars remain exposed to corrosion. In order to understand the phenomenon of corrosion, it is important to identify the types of corrosion, the mechanism and the prevention methods [1, 2, 3].

The objective of this study is the statistical analysis of the phenomenon of corrosion in the automotive industry. The data come from a survey using a total number of 100 questionnaires, which were completed by specialists in this field (Manufacturer services, laboratories, freelancers, expert in the automotive industry experts and researchers). These same specialists belong to 52% of all 121 companies which are affiliated to the Moroccan Association for the Industry of Automotive Construction (MAIAC) [4]. The investigation was spread over a period of 6 months. Survey enabled us to identify the areas of the vehicle affected by corrosion (Figure 1), the most frequent types of corrosion (Figure 2), the causes of this phenomenon and the parameters influencing corrosion of the materials composing a vehicle.

Our research perspectives are the realization of an experimental and numerical study [5], in order to describe the corrosion phenomenon by taking into account the parameters influencing it like the pH, the temperature and the humidity. Then propose the improvement of existing coating processes to increase the duration of corrosion resistance in the automotive industry.

Figures:

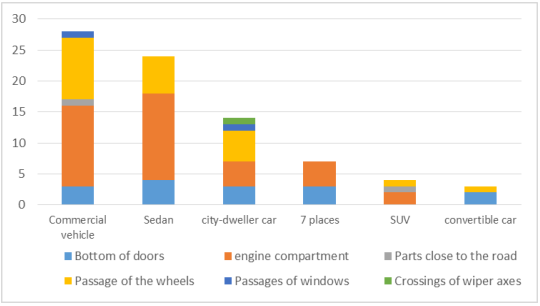

Figure 1: Vehicle type and the areas affected by corrosion

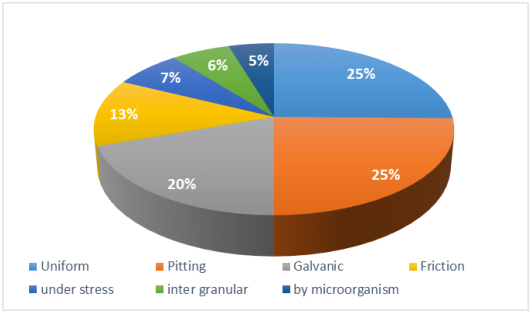

Figure 2: Distribution of corrosion types in the cars

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3. A. Saeed et al. / Materials Chemistry and Physics 178 (2016) 65e73
4. MAIAC-Edition [online]. Available on: http:// www.amica.org.ma
5. D. Mizuno et al Corrosion monitoring and materials selection for automotive environments by using Atmospheric Corrosion Monitor (ACM) sensor. Corrosion Science 83 (2014) 217–225.

Biography

Author has his expertise in automotive industry with 20 years' experience and passion in improving existing coating processes. His focus is to increase the duration of corrosion resistance in the automotive industry. He was engineer form The Mohammadia School of Engineers, actually he is PhD student in the Hassan II University, ENSEM, Casablanca, Morocco.

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Impact of hemi-cylindrical geometry on diamagnetic susceptibility of a donor impurity confined in quantum dot

L. Belamkadem[1], A. El Moussaouy[1, 2], O. Mommadi[1,*], M. Chnafi[1], C. A. Duque[3], J. A. Vinasco[3], A. Kerkour Elmiad[4]

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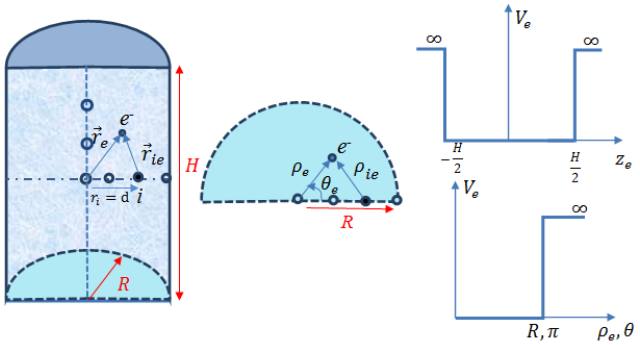
[4]*Higher School of Technology, University Mohamed I, 60000 Oujda, Morocco.*

Abstract

The diamagnetic susceptibility of a donor impurity confined in hemi-cylindrical quantum dot is investigated. In particular, the effect of the impurity position on diamagnetic susceptibility is evaluated. Within the effective mass approximation, the resolution of the 3D Schrödinger equation in hemi-cylindrical QD was realized by using the finite difference method. To this end, the Hamiltonian of our system in hemi-cylindrical geometry is performed. We have shown that the diamagnetic susceptibility depends strongly on the hemi-cylindrical geometrical shape and impurity position. For the hemi-cylindrical QD, when the impurity is localized at the center of the nanostructure, the diamagnetic susceptibility takes the maximum value.

Figure *of our system*



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4. A. Mmadi, K. Rahmani, I. Zorkani, A. Jorio, Superlattice. Microst. 57 (2013) 27.
5. M. Chnafi, A. El Moussaouy,O. Mommadi, L. Belamkadem, Physica B 594 (2020) 412333.

Biography

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Diamagnetic susceptibility of an off-center hydrogenic donor impurity in hemi-spherical quantum dot

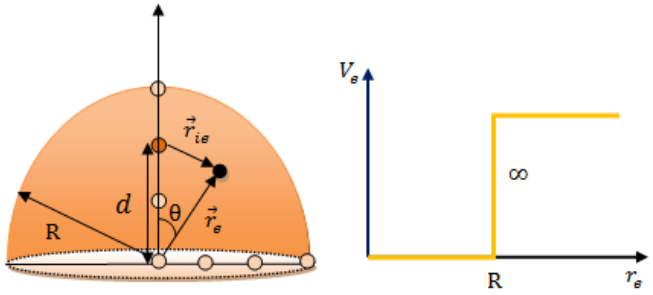
O. Mommadi[1,*], L. Belamkadem[1], A. El Moussaouy[1, 2], M. Chnafi[1], M. El Hadi[1], C. A. Duque[3], J. A. Vinasco[3]

[1]OAPM group, Laboratory of Materials, Waves, Energy and Environment, Department of Physics, Faculty of Sciences, University Mohamed I, 60000 Oujda, Morocco.
[2]The Regional Centre for the Professions of Education and Training, Oujda, 60000, Morocco.
[3]Grupo de Materia Condensada-UdeA, Instituto de Física, Facultad de Ciencias Exactas y Naturales, Universidad de Antioquia UdeA, Calle 70 No. 52-21, Medellín, Colombia.

Abstract

The effects of geometrical confinement and hydrogenic impurity position on the diamagnetic susceptibility in hemi-spherical quantum dot with an infinite confinement potential are studied by using the Langevin theory of diamagnetism. The Schrödinger equations of electron-donor are calculated within the effective mass approximation and the finite difference method. The mean value of the electron to ionized donor distance and electron position are studied as a function of the size of hemi-spherical quantum dot taking into account the different impurity positions. According to the findings, the reduction of the size of the hemi-spherical quantum dot results a diminution of the electron-donor distance and an improvement of diamagnetic susceptibility. The main results indicate that the diamagnetic susceptibility depends strongly on the donor impurity position. We think that our results based on the investigation of the diamagnetic susceptibility of quantum dot will play an important role to estimate the performance of optoelectronic devices.

Figure of the present work



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Biography

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Optimization of Water Utilization in Industrial Processes: Methodological Approach

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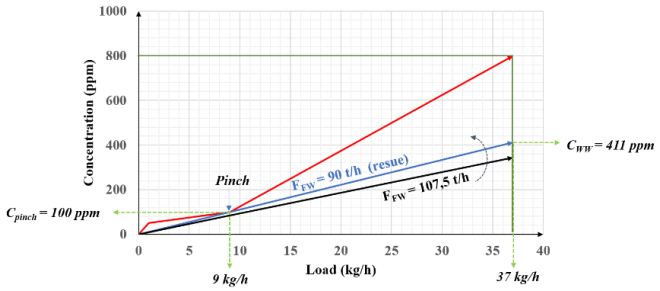
[1] *Department of Processes Engineering, Mohammed V University, Mohammadia School of Engineers, Ibn Sina Avenue, B.P.765, Agdal, Rabat, Morocco*

Abstract

The current trend towards a sustainable environment and the rising costs of raw materials and waste treatment have encouraged the process industry to find new ways to reduce resources use and wastes generation. In this context, the advent of the Pinch analysis-based process integration approach as a tool for synthesizing optimal networks for water conservation has been one of the most significant advances in pollution prevention over the past decade. In this paper, a methodological development will be carried out with the aim of standardizing the approach to be followed in order to rigorously conduct a pinch analysis study for the design of water allocation networks. Firstly, the general formulation of the problem of flow allocation in a water reuse superstructure using the source-demand concept will lead to the formulation of the rules that can govern a Pinch analysis by studying the correlations that exist between the feed flow and the other system parameters, notably the discharge flow and concentration as well as the recovery flow. Secondly, *Minimum Resource Targeting Algorithm* (MRTA) will be used to minimize the feed rate and determine the pinch concentration. The graphical visualization of the system is done by generating a composite curve representing the overall system. Thirdly, the MRTA technique will be extended to identify the composition of the discharge. Each wastewater stream will be identified by its flow rate and concentration prior to the synthesis stage. This identification can be used to select the streams that can be regenerated for eventual reuse. Fourthly, the procedure relating to the *Nearest Neighbors Algorithm* will be outlined in order to easily synthesize the water network configurations. Finally, this approach will be tested and validated for three applications: *fixed flow*, *fixed load* and *hybrid* networks.

Figure:



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4. Souifi M, Souissi A., Materials Today: Proceedings 13 (2019) 1115–1124.
5. Souifi M, Souissi A., IEEE 5 (2019) 1-6.

Biography

The author has experience in the rationalization of water and energy. His focus is based on the use of Pinch technology to minimize the use of water and energy in industrial processes. The author is currently PhD student in engineering sciences and techniques from the Department of Processes Engineering, Mohammed V University, Mohammadia School of Engineers, Morocco. he has two papers being published.

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Numerical four-point bending study of sandwich structures

I. Abdellaoui [1], A. Abbadi [1], R. Kouddane [1], J. Cappelle[2], A. Azari[2]

[1]*LSI, National school of Applied sciences Oujda, Mohamed Premier University, Oujda*
[2]*LEM3, 1Route d'Ars Laquenexy, 57050Metz*

Abstract

As part of our work on sandwich structures, different core shapes strength has been studied: hexagonal shape (reference case), Square shape, triangle shape, and hexagonal and triangle shape. Numerical (finite element) homogenization approaches are used to calculate the effective properties of the different shapes core. Numerical simulation is performed by using the finite element calculation code "Ansys". Finally a comparison of the mechanical properties between the three core shapes (hexagonal hexagonal and rectangle and hexagonal and triangle) was carried out.

Figures:

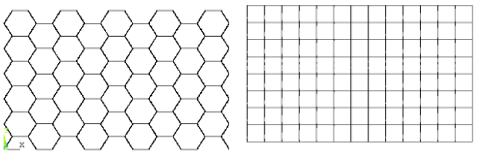

Figure 1: hexagonal shape. Figure 2: Square shape.

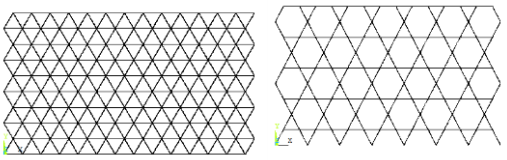

Figure 3: Triangle shape. Figure 4: hexagonal and triangle shape.

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3. Gay D, Matériaux Composites, édition Hermès, 1997.
4. G. Shi.P.Tong. ''Equivalent transverse shear stiffness of honeycomb cores'', International Journal of Solids and Structures, 1995.

Biography

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New imidazolium ionic liquids as ecofriendly corrosion inhibitors for mild steel in hydrochloric acid (1M): Experimental and theoretical approach

F. El-Hajjaji[1*] R. Salim[1], E. Ech-chihbi[1], B. Hammouti[2], M. Taleb[1]

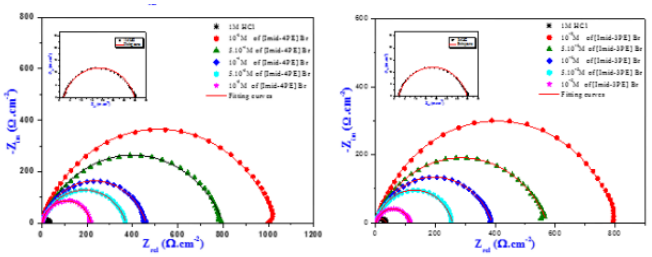
[1]*Laboratory of Engineering, organometallic, Molecular and Environment (LIMMOME), Faculty of sciences, University Sidi Mohamed Ben Abdellah, Fez, Morocco.*
[2]*Laboratory of Applied Chemistry and Environment (LCAE), Faculty of Sciences, University Mohammed Premier Oujda, Morocco*

Abstract

The present study was designed to investigate an original synthesizedimidazolium ionic liquids (ILs) as corrosion inhibitors. These inhibitors were evaluated against mild steel corrosion in 1 M hydrochloric acid medium using electrochemical techniques. PDP experiments revealed that the [Imid-3PE] Br and [Imid-4PE] Br behaved as mixte type inhibitors. Electrochemical impedance spectroscopy (EIS) results indicated that the both compounds showed a good inhibition of the steel surface with an inhibition efficiency of 95.8% for [Imid-3PE] Br and 96.7% for [Imid-4PE] Br at the optimum concentration. According to Langmuir isotherm model and the activation parameters, these ILs can be adsorbed onto the mild steel surface through physical and chemical bonds.

Keywords: Imidazolium ionic liquids; Adsorption; EIS,Mild steel; Langmuir isotherm.

Figure:



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2. El Hajjaji F, Ech-chihbi E, Rezki N, Benhiba F, Taleb M, Chauhan DS, Quraishi MA, Journal of Molecular Liquids, 314(2020) 113737.
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Biography

El Hajjaj Fadoua is Professor at university Sidi Mohamed Ben Abdellah in the department of chemistry. She did a PhD at the same university in corrosion inhibition performance topic. Her research activities aim at understanding the adsorption mechanism process of inhibitors on to the various materials.She published 51papers. Her H-index is 15 on Scopus.

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Adsorption of heavy metals (Cadmium) by the clay of the Tangier region – Morocco

H. Es-sahbany[1*], M. Belfaquir[1], K. Moussa[2], M. L. El Hachimi[2], M. S. Elyoubi[1]

[1]*Laboratory of Materials Engineering and Environment: Modeling and Application, Faculty of Sciences, IbnTofail University – Kenitra – Morocco*
[2]*Geology laboratory, Geosciences and Environment team, CRMEF, Rabat, Morocco.*

Abstract

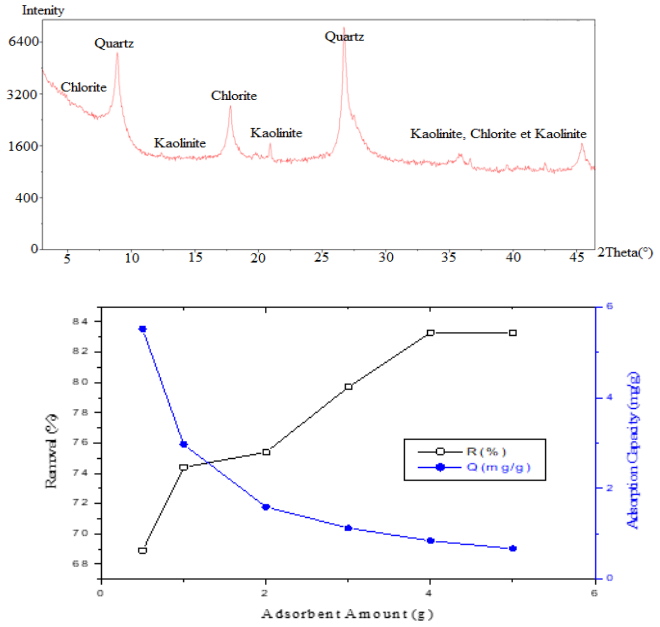
The presence of heavy metals in the environment, resulting from discharges of industrial wastewater, causes considerable damage to the natural balance of the aquatic ecosystem when they exceed certain concentrations.

During this study, we were able to eliminate the content of Cd(II) ions contained in the samples of synthetic wastewater by the adsorption technique on natural clay like chlorite and Moroccan kaolinite (CKM), taken from the region Tangier-Tetouan-Al Hoceima - Morocco.

Our adsorbent (Clay) was characterized by X-ray diffraction (XRD) and X-ray fluorescence (FRX).Other, we studied the different effects and experimental parameters influencing the adsorption of the heavy metals studied such as mass of the adsorbent, the initial concentration of cadmium, the contact time, effect of the pH of the solution and the speed of agitation.

The results obtained at the optimum parameters for the adsorption of heavy metals studied were recorded successively in the values of 92% of Cd(II) elimination yield. The experimental data were analyzed by the linear form of the Langmuir and the Freundlich models.

Figure:



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Biography

I have my expertise in evaluation and my passion for improving wastewater treatment with different types of natural adsorbents. My goal is based on the use of natural clay to remove micropolluants from wastewater. The discussion of my thesis will be in 2020 at the University of IBN Tofail Kenitra Morocco. I have published more than 5 articles on Google Scholar and 3articles on Scopus.

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Removal of Nickel from aqueous solutions using natural clay from northern Morocco

M. Loutfi[1*], M. FARAH[1], M. Belfaquir[1], M. S. ElYoubi[1]

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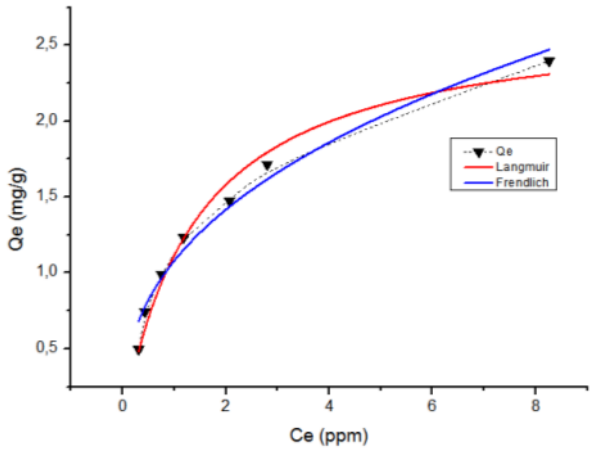
Abstract

In the present study, a natural Moroccan clay from the northern region was used for the removal of Ni (II) from aqueous solutions. Batch adsorption studies were performed with various initial concentrations of Ni (II), adsorbent dosages, pH and contact time. The adsorption capacity of Ni (II) increased with the initial concentration of metal ions, the contact time and the pH of the solution, but decreased with an increase in the amount of clay adsorbent. Overall, kinetic studies have shown that the nickel adsorption process follows pseudo-second order kinetics. The equilibrium adsorption results are better fitted with the Langmuir isotherm compared to models of Freundlich. The value of the separation factor, R_L of the Langmuir equation and the Freundlich constant, n both give an indication of favorable adsorption. Finally, from thermodynamic studies, it was found that the adsorption process is exothermic due to negative ΔH accompanied by a decrease in the change of entropy and a change in Gibbs free energy ΔG. In summary, the results obtained established a high yield for natural clay to remove Ni (II) from the aqueous medium.

Figure:



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Biography

2017 started my doctorate in chemistry at the age of 28 at ibn tofail university kenitra Morocco and postdoctoral studies at sultan molay sliman bani mellal university of sciences and I was a member of the chemistry laboratory research committee.

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Ab-initio investigation of structural and electronic properties of VSi2 compound

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Abstract

In this work, we use ab-initio calculations based on density functional theory "DFT" to determine structural and electronic properties of the vanadium silicide VSi_2. This compound which crystallizes in the hexagonal structure was investigated using the full-potential linearized-augmented plane wave (FP-LAPW) method as implemented in Wien2k code [1]. We employed the local density approximation (LDA) for the exchange correlation potential.

By fitting the total energy as a function of volume to the Brich-Murnaghan's equation of states [2], we were able to get 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.

The calculation of the band structure and density of states confirm the metallic character of VSi_2 compound.

We were interested in studying this type of material since, it is considered as a silicide anode can promise a new battery family with ultra-high anode capacity [3] and the several recent studies have been reported its properties [4-7].

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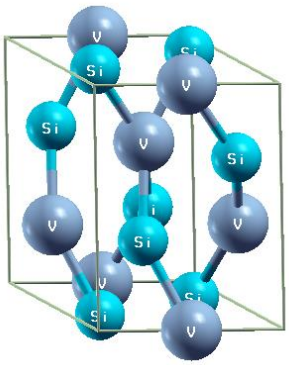
Figure:



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7. Nguyen M.T., Tran Q.T. Chem. Phys. Let. 721(2019) 111-116.

Biography

Author is Mohammed 1st University PhD student, in physical and engineering formation, specializing in 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 seven articles.

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Kinetics of phosphogypsum decomposition by acid attack in the presence of iron

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[b] *Laboratory of Solid Minerals and Analytical Chemistry, Faculty of Sciences, Mohammed first University, Oujda, Morocco*

Abstract

The synthesis of phosphoric acid from natural phosphates by the wet process generates a very large quantity of phosphogypsum $CaSO_4.2H_2O$ (*PG*) (5 tonnes of *PG* for 1 tonne of *H3PO4* produced).

The recovery by acid attack of *PG* in the production of SO_2 gas can present a solution to the problem produced by the storage of *PG* rich in toxic and radioactive elements [1-3].
Our work consists in studying the decomposition of the *PG*, according to several parameters, according to the reaction:

$$1.5CaSO_4.2H_2O + 6HCl + 1.5Fe \leftrightarrow$$
$$1.5Ca^{2+} + 6Cl^{-} + 1.5Fe^{2+} + 6H_2O + 1.5\ SO_2\ (g)$$

Several parameters were varied (the duration of the attack (0-4h, the attack temperature (10 - 90°C), the weight percentage of iron (3-8%), and the weight percentage of *HCl* (80-95%)).
We followed the quantity of gas released from the reaction vessel by measuring the mass of the mixture. After the end of the attack and drying at *100°C* in the oven, we determined the mass of the solid residue not attacked for the various tests.
We have shown that the breakdown of *PG* is very rapid at the start and slows down after 3 hours. The amounts of acid or metal added promote the breakdown of *PG*. The effect of *HCl* is more important than the effect than that of iron. We used the experimental design approach to assess the effect of the different parameters studied on the decomposition of *PG*.
Raising the temperature or the duration of the attack increases the kinetics of decomposition. The temperature acts more favorably on the release of volatile gases. The loss, due to the departure of the volatile gas, is around 20% under the best conditions of the total mass put in the reaction medium.

We have shown that the mass of the dry solid residue exceeds, at a very high dose of *HCl* added, the mass of the solid (*PG* + *Fe*) put in the reactor, this non-soluble quantity is approximately 20% of the mass initially put.

Keywords: Phosphogypsum, SO_2, Valorization, Experimental design, Kinetics.

Figure:

Recent Publications

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Biography

Author has his expertise in evaluation and passion in the valuation of phosphogypsum which is often used in chemistry. Its objective is based on the use of phosphogypsum to have an application in the field of energy. She started her doctorate in 2015 at Mohammed Premier University in Oujda

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Potential of sulfonamide derivatives in medicinal chemistry derivatives

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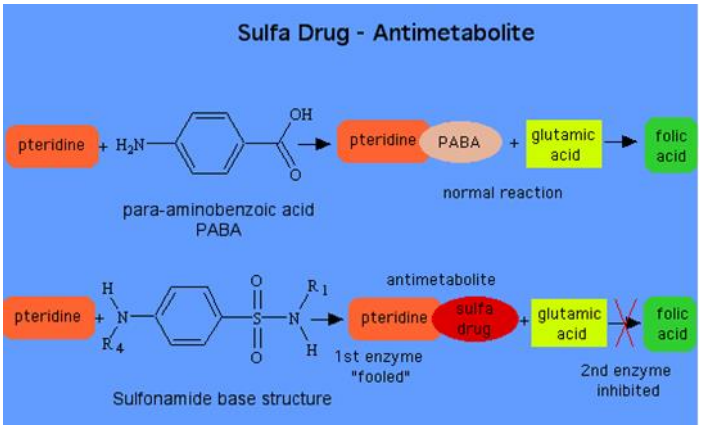
Abstract

Sulfonamides are beneficial organic compounds in medicinal chemistry, they represent a considerable class of drugs and exhibit a broad spectrum of biological activity, Numerous sulfonamide-based molecules can be used to develop potent compounds with better efficacy and less toxicity. This review focuses on the latest information pertaining to sulfonamide derivatives having different pharmacological properties including anticancer, antiviral, antimicrobial, antibacterial, antifungal, anti-inflammatory, antituberculosis, antimalarial, antiparasitic, anticonvulsant, and antidepressant activities, as well as carbonic anhydrase inhibitors. Other activities using sulfonamide derivatives are also to be noted as herbicide and antifungal agents for their potential agricultural applications.

Figure: *Mechanism of action of sulfa drugs*



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5. S. Göksu et al, Bioorg. Chem., vol. 56, pp. 75–82, 2014, doi: 10.1016/j.bioorg.2014.07.009.

Biography

Rafika EL ATI holds a master's degree in Organic chemistry from the University of Sidi Mohammed Ben Abdellah, Fes, Morroco. She is currently a PhD student at the University of Mohammed the First, Oujda, Morocco. She has her expertise in organic chemistry and catalytic activity. Her main research interest centres on the use of novel sulfonamides ligands to have application in many fields. She published more than 6 papers.

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The use of glutamic acid and its derivatives as corrosion inhibitors for metals in different aggressive solutions

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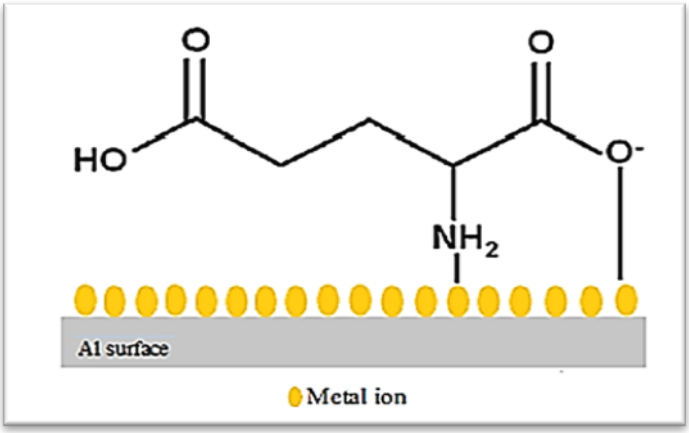
Abstract

The aim of the review is to present and discuss the research work reported in the literature on the use of glutamic acid and its derivatives as corrosion inhibitors for metals in different aggressive solutions. Mass loss and electrochemical techniques were among the most often used techniques to evaluate the corrosion inhibition efficiency of the used inhibitor. Glutamic acid can act as an efficient corrosion inhibitor, but it can in other cases show an opposite effect, which accelerates the corrosion process; all depend on the experimental conditions. Highest values of inhibition efficiency were obtained in the presence of ions as $Zn^{2+}$and ions halides. Glutamic acid derivatives have shown a good ability to use it as an effective corrosion inhibitor for metal in an acidic solution. The development of computational modeling helps to design new glutamic acid derivatives and to understand the inhibition mechanism of those compounds.

Figure:



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1. M.Bouklah,W.Daoudi,B.Hammouti,R.Touzani,S.Radi,M.Ramdani,A.Bouyanzer,A.Aouniti,R.Salghi, J.Mater.tod:prooced. 27(4) (2020) 3209-3216
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4. L. Hamadi et al., Egyptian Journal of Petroleum, 27 (2018) 1157–1165.

Biography

Kaoutar Zaidi has expertise in preparation of new catalysts for catecholase and in synthesis of compounds with pyrazole unit. She was awarded his master's degree applied chemistry in 2019 from department of chemistry, faculty of sciences the University Mohamed first, Oujda, Morocco. She registered for doctorate in the same department of chemistry, and she is interested in organic synthesis and electrochemical applications. She has communication skills, covering both written and oral communication, in two European languages: English and French.

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A theoretical structural and reactivity study of Alginic acid saccharide with trivalent/bivalent metal cations (Cu^{2+}, Ce^{3+})

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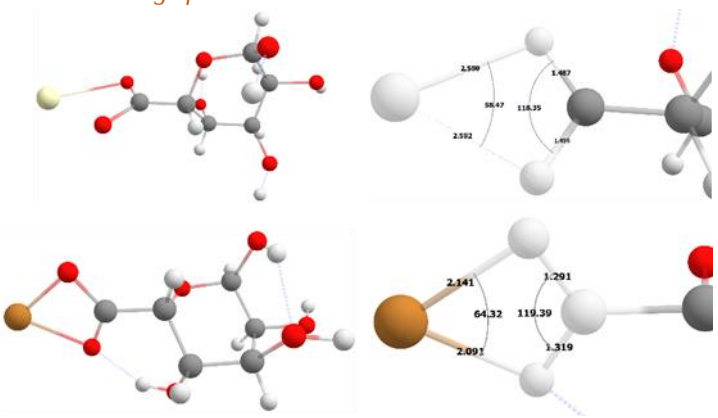
Abstract

Water pollution has and still receiving significant attention from researchers and scientists around the world.

The binding of metal cations to the uronate residues of natural anionic biopolymers (e.g. alginates) is the process that is known as biosorption and is applied to form gels or to remove heavy metal ions from aqueous solution [1]. Extracted from brown seaweeds, alginates are polysaccharides composed of a succession of random comonomers of α−L−Guluronic acid units (G) and β−D−Mannuronic units (M) linked by a 1−4 glycosidic bridge [2]. Biodegradable and biocompatible, inexpensive and locally available. We have studied the complexation of (1→2) linked α-Lguluronate (G) saccharide with (Cu^{2+},Ce^{3+}) cations with quantum chemical density functional theory (DFT)-based method. A large number of possible cation−diuronate complexes, with one and two G or M disaccharide units and with or without water molecules in the inner coordination shells have been considered. We compute bond distances Cation interaction energies. And molecular orbital composition and after our analysis of preliminary data we revealed that the complexation of the transition metal (TM) ions to the saccharide occurs via the formation of strong coordination-covalent bonds, and the coordination bond lengths are found to be specific to each cation and to depend very little on the water in the coordination sphere. A comparison between the structural features of alginate complexation to trivalent and divalent cations will provide and discuss.

Figure: *Optimized structures of Cu^{2+} disaccharide complexes. The atoms are represented with balls colored by atom type as follows: red for oxygen, gray for carbon, white for hydrogen, and dark orange for cuivre*



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Biography

Author has an interest in computational chemistry for the environment, her focus in study of divers component like complexation of pesticides and the way their interact with soil and water using quantum mechanics tools.

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Theoretical investigation of electronic structure of single MoS2 monolayer

Hajar Abbadi, Siham Malki, Larbi El Farh

LPTPME, Faculty of science, Mohammed Premier University, Oujda, Morocco

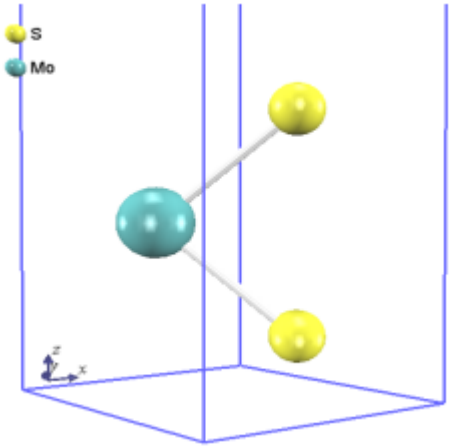
Abstract

As inorganic cousin of graphene, MoS_2 monolayer has attracted considerable attention due to its important role in: lithium ion batteries (LIB), flexible electronic devices, field effect transistors and in the photoluminescence.

The structural properties of 1H-MoS_2 are studied by using ab-initio calculation within the frame of density functional theory ″DFT″, implemented in the Wien2k code. A linearized and augmented plane wave basis set with the gradient generalized approximation ″GGA″ as proposed by Perdew et al. is used for energy exchange correlation. Structural parameters of 1H-MoS_2 are found close to its bulk 2H-MoS_2.

The electronic properties were obtained by calculating the band structure and the partial density of state (PDOS) by using three approaches: the Local Density Approximation (LDA), the Generalized Gradient Approximation (GGA) and the modified Becke-Johnson (mBJ) exchange potential. They show that the compound keeps its semiconductor nature with a transition from an indirect gap in its bulk form to a direct gap at the K direction in its monolayer form.

Figure: *The crystal structure of monolayer MoS_2*



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2. Eugene S. Kadantsev and Pawel Hawrylak 2012 Solid State Communication 152 909-913
3. Eda, G.; Yamaguchi, H.; Voiry, D.; Fujita, T.; Chen, M.;Chhowalla, M. Photoluminescence from Chemically Exfoliated MoS2.Nano Lett. 2012, 11, 5111−5116.
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Biography

The Author has expertise in ab-initio calculation for determining the different properties of materials. She is PhD student in faculty of sciences Oujda, Morocco.

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Adsorption and kinetics studies of Thymol on organic modified bentonite by cetyl-pyridinium chloride (CPC) from aqueous solution

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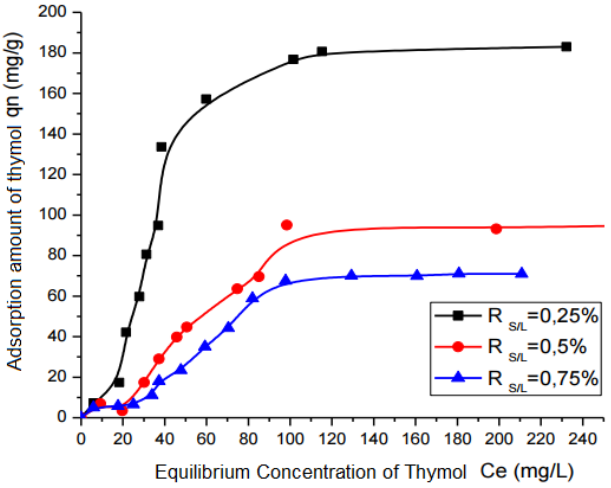
[2]*Physical Chemistry of Natural Substances and Process Team, Laboratory of Applied Chemistry and Environment (LCAE-CPSUNAP), Department of Chemistry, Faculty of Sciences, University Mohamed I, Po. Box 717, 60000 Oujda, Morocco.*

Abstract

In this study, thymol Adsorption tests in an organoclay (CPC-bentonite) were carried out, and the control of the adsorption quantities of thymol goes through the determination of the isotherm and the kinetics of adsorption on organoclay.

The clay used in this study was collected from the Nador region (North East Morocco, North Africa) which is sodium changed and purified. The homo-ionic sodium clay was then used to prepare an organoclay (CPC-bentonite) by intercalation of cetyl-pyridinium chloride (CPC) before use.
The adsorption isotherm obtained exhibits a Langmuir-type appearance for low equilibrium concentration values with an increase in the isotherm, which shows a certain affinity of thymol for the active sites of the organoclay. The adsorbed quantity of thymol determined at the isothermal plateau is 180 mg per gram of organoclay, with a saturation curve of thymol in equilibrium solution, from a concentration of Ce = 230 mg/L of Thymol solution.
Pseudo-first and pseudo-second-order kinetic models were tested with the experimental data. Thymol adsorption kinetics show a contact time less than 10 min, is characterized by a rapid increase in the adsorbed amount for such contact times, the retention process is relatively fast. As well as the pseudo-second order model presents the best results (in terms of linear regression coefficient).

Figure: *Equilibrium adsorption of thymol on organoclay at different solid/liquid ratio*



Recent Publications

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2. El miz M., Akichoh H., Berraaouan D., Salhi S., Tahani A. American J of Chemistry. 7(4) (2017) 105-112
3. El miz M., Essifi K., Berraaouan D., Salhi S., Tahani A., Mediterranean Journal of Chemistry. 8(6) (2019) 494-504.

Biography

Author has his expertise in 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, agrifood, etc.

He was warded 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. on Scopus.

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Optimal sizing of an autonomous water pumping system powered by a parabolic trough power plant using the Modified Electric Systems Cascade Analysis

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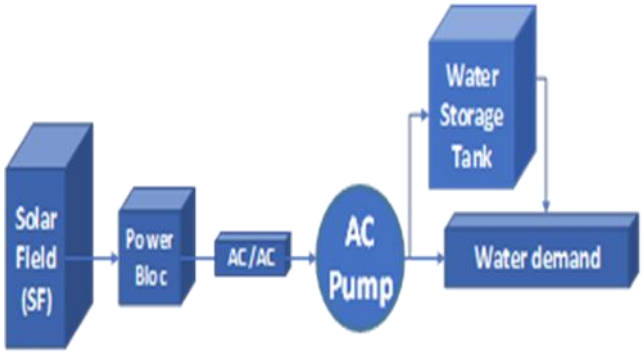
Abstract

The optimal sizing by the Modified Electric Systems Cascade Analysis method (MESCA) of an autonomous water pumping system powered by the electrical energy produced by a parabolic trough power plant is the main objective of this work. The desired pumping system consists of pumps powered by the CSP system without thermal energy storage. Also, a water storage tank is used to guarantees the autonomy of the system. The climatic data of the Oujda city (our case study) and the technical and economic data of the system components are used as inputs for the MESCA algorithm, To obtain the size of the parabolic trough power plant and the capacity of the various system components corresponding to the optimal configuration with the minimum Life Cycle Cost as economic criteria.

Figure: *Schematic of the autonomous CSP water pumping system*



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2. H. Zahboune et al., "Modified Electric System Cascade Analysis for optimal sizing of an autonomous Hybrid Energy System," Energy, vol. 116, pp. 1374–1384, 2016, doi: 10.1016/j.energy.2016.
3. O. Achkari and A. El Fadar, "Latest developments on TES and CSP technologies – Energy and environmental issues, applications and research trends," Appl. Therm. Eng., vol. 167, p. 114806, 2020.

Biography

The author is a Ph.D. student in the second year working on the subject of the development of new sizing and optimization algorithms of hybrid autonomous electric systems for water pumping.

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Posters

Laminar and turbulent natural convection in tall cavities with sinusoidal heating

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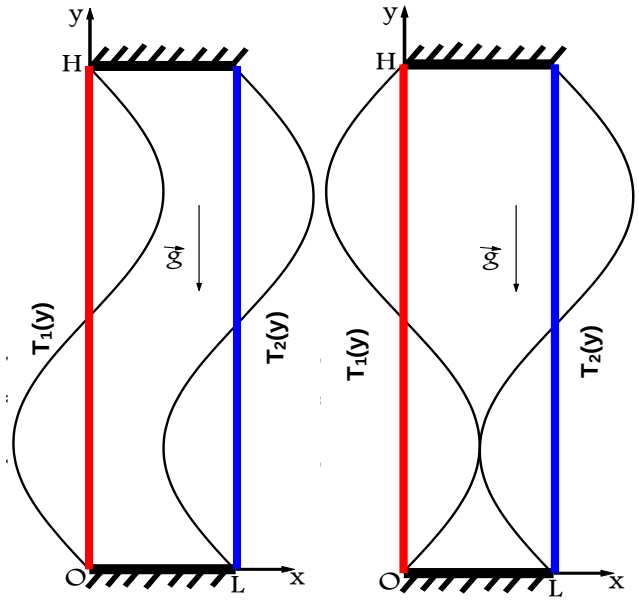
Abstract

Due to the fact that in many practical situations the model of isothermal walls with uniform temperatures is not valid (solar collectors, cooling of nuclear reactors, heat exchangers and heating by direct combustion). A large number of papers dealing with natural laminar flows induced by non-uniform temperatures in rectangular cavities have been published recently [1,4].

The literature review on this topic has shown that natural convection induced by non-uniform thermal boundary conditions (sinusoidal or other) in cavities has been the subject of many studies in the past. However, the majority of the works cited only concern laminar flows, and despite the practical interest of sinusoidal heating, its case has not been treated in cavities that are too elongated. To this end, the present study is dedicated to natural laminar and turbulent flows in cavities with too high aspect ratio (A≥20) and maintained at sinusoidal temperatures with amplitudes η_1 (hot wall) and η_2 (cold wall). Two situations corresponding to $\eta_1 = \eta_2 = \eta$ (case I) and $\eta_1 = -\eta_2 = \eta$ (case II) are studied. For the two treated cases, the temperatures imposed on the active wall media are set at values independent of the amplitudes of the imposed sinusoidal profiles. The current lines, the contours of the turbulent kinetic energy, the isotherms, the local and mean heat transfers are determined as a function of η ($-0.5 \leq \eta \leq 0.5$), the cavity shape ratio ($20 \leq A \leq 80$) and the mean Rayleigh number ($10^3 \leq Ra_m \leq 10^6$). The obtained results showed that the effects of these parameters on the dynamic and thermal fields and heat transfers in the cavity depend strongly on the considered case.

Figure: Studied configurations



(a) Cas I : $\eta_2 = \eta_1 > 0$ *(b) Cas II : $\eta_2 = -\eta_1 > 0$*

$$T_1(y) = T_h + \eta_1 \Delta T \sin\left(2\pi\left(\frac{y}{H} - 0.5\right)\right)$$

$$T_2(y) = T_C + \eta_2 \Delta T \sin\left(2\pi\left(\frac{y}{H} - 0.5\right)\right)$$

Recent Publications

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2. *Sheremet M.A., Grosan T., Pop I., Entropy, 19 (2017) 1–16.*
3. *Cheong H.T., Sivasankaran S., Bhuvaneswari M., Int. J. Numer. Method. H., 27 (2017) 287–309.*
4. *El Moutaouakil L., Zrikem Z., Abdelbaki A., Numer. Heat Transfer, 66 (2014) 449–470.*

Biography

Lahcen El Moutaouakil is a professor at the Cadi Ayyad University, Faculty of Sciences Semlalia, Department of Physics, Fluid Mechanics and Energetics Laboratory, Marrakech, Morocco.The main range of scientific interests are the study of the coupled heat transfer by natural convection, conduction and radiation in different configurations; the heat transfer between soil and buildings, solar systems, the development of the heat transfer functions for the building elements,… He has published about 15 research papers in international journals and more than 30 papers in conference proceedings. Her H-index is 2 on Scopus.

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Coupled thermal radiation and natural convection heat transfer in an insulated annular space

L. El Moutaouakil, M. Boukendil, Z. Zrikem, A. Abdelbaki

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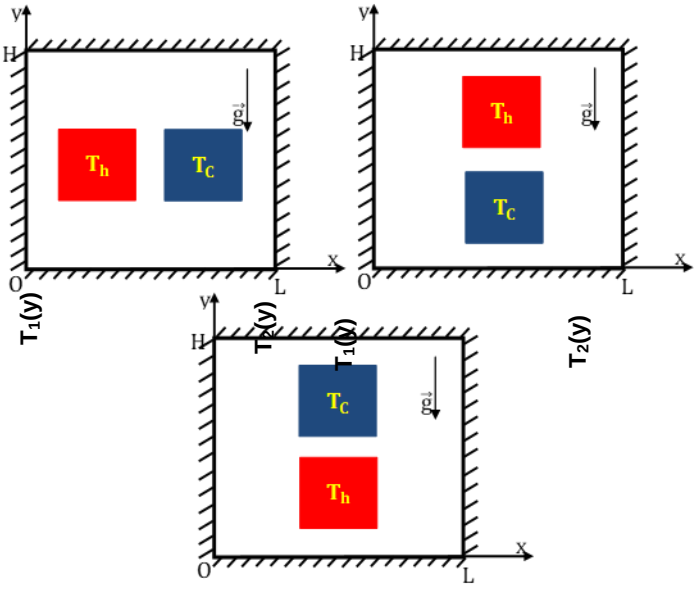
Abstract

The cavity with active or inactive square blocks can find applications in several engineering fields. Consequently, a good estimate of the heat transfer inside this type of configuration is important. Many researchers have focused on this problem [1-4]; either from the point of view of the numerical accuracy of the calculation, or from the point of view to improve the thermal behavior.

In this study, the finite volume method is combined with the discrete ordinate method in order to numerically analyze the effect of surface radiation on natural flow in a perfectly isolated square annular space containing two square blocks maintained at different temperatures T_H and T_C. The effect of emissivity (common to all active and passive walls) on the flow structure and heat transfer characteristics by convection and radiation is analyzed for Rayleigh numbers ranging from 10^3 (conductive regime) to 10^6 (fully convective regime). Depending on the relative positions of the two active blocks inside the cavity, three different configurations are analyzed and discussed. The M-M (middle-middle) configuration for which, the blocks are aligned on the horizontal median of the cavity. The configurations BH-TC (hot block below the cold one) and BC-TH (cold block below the hot one) for which, the active elements are aligned on the vertical median of the cavity. The obtained results showed that the flow structure and heat transfers vary considerably depending on the considered configuration. Also, the present study demonstrates that any model representing a situation of this kind that ignores surface radiation leads to erroneous predictions.

Figure: Studied configurations



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1. *Lima T. P., Ganzarolli M. M., Int. J. Therm. Sci. 105 (2016) 45-56.*
2. *Sheikholeslami M., Vajravelu K., Chinese J. Phys. 56 (2018) 1578–1587.*
3. *Dash S. M., Lee T. S., Numer. Heat Transf. A, 68 (2015) 686–710.*
4. *Garoosi F., Jahanshaloo L., Rashidi M. M., Badakhsh A., Ali M. E., Appl. Math. Comput., 254 (2015) 183–203.*

Biography

Lahcen El Moutaouakil is a professor at the Cadi Ayyad University, Faculty of Sciences Semlalia, Department of Physics, Fluid Mechanics and Energetics Laboratory, Marrakech, Morocco.The main range of scientific interests are the study of the coupled heat transfer by natural convection, conduction and radiation in different configurations; the heat transfer between soil and buildings, solar systems, the development of the heat transfer functions for the building elements,… He has published about 15 research papers in international journals and more than 30 papers in conference proceedings. Her H-index is 2 on Scopus.

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Anodic oxidation of a water-soluble copper phthalocyanine dye with different operating parameters

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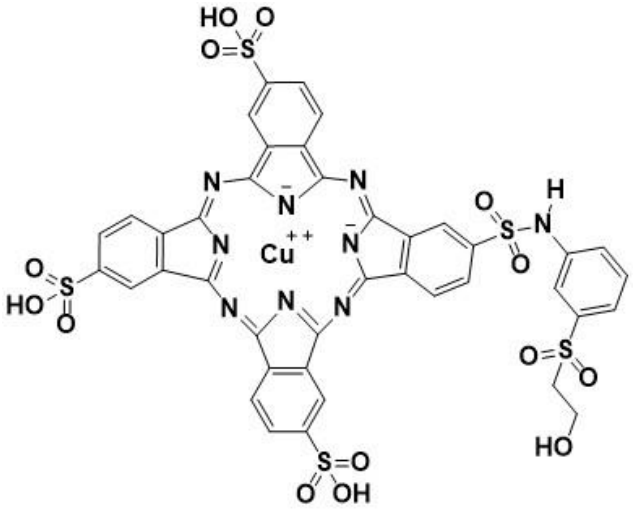
Abstract

An important category of reactive dyes are phthalocyanine dyes [1]. They are water-soluble metal complexes, mostly containing copper. It has inherent characteristics such as color fastness, chemical and photolytic stability, and resistance to oxidative degradation [2]. However, the explicit characteristics of phthalocyanine dyes make it particularly difficult to remove them from textile wastewater [3]. This study focused mainly on the electrochemical decolorization of Reactive Blue 21 (RB21) textile phthalocyanine in aqueous solution. The influence of operating variables on the efficiency of the decolorization was investigated, including anode material, supporting electrolyte, current density and initial pH. The chronopotentiometry technique was used to perform the electrooxidation of the studied dye at room temperature (20°C).

Figure:



Recent Publications

1. *Kenzom T., Srivastava P., Mishra S., Appl. Environ. Microbiol. 80 (2014) 7484–7495.*
2. *Gangwar R., Rasool S., Mishra S., Biotechnol. Reports 12 (2016) 52–61.*
3. *Li Q., Fan Z. L., Xue D. X., Zhang Y. F., Zhang Z. H., Wang Q., Sun H. M., Gao Z., Bai J., J. Mater. Chem. A 6 (2018) 2148–2156.*

Biography

Sanaa El Aggadi is a PhD student in electrochemistry from Mohammed V University in Rabat and is currently applying anodic oxidation to decolorize textile wastewater. She has published two articles in this field.

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Electrochemical determination of phenol in river water of Oum Erbia and in medicines by electrodes based on natural phosphate

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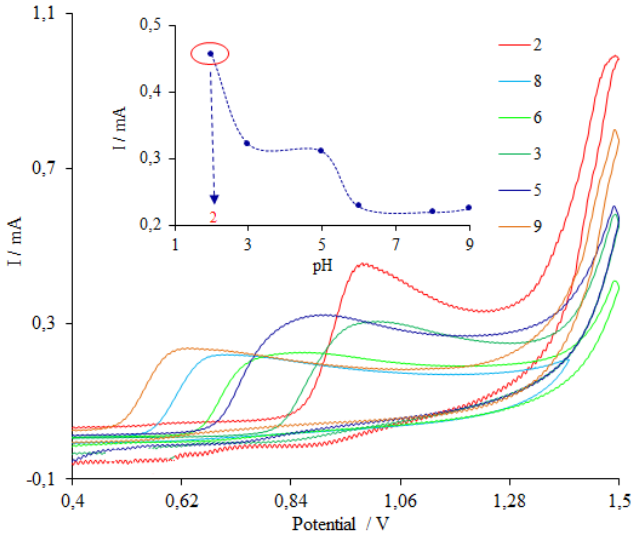
[2] *Laboratory of Organic and Analytical Chemistry, Sultan Moulay Slimane University, Polydisciplinary Faculty, Khouribga, Morocco*

Abstract

An electro-analytical technique has been developed to evaluate the concentration of phenol in a buffer solution and the river water of Oum Erbia by cyclic voltammetry and pulsed differential voltammetry. The phenol oxidation peak occurs at around 0.95 V on a carbon paste working electrode modified with natural phosphate particles. The influence of the scanning speed on the height of the peak has been studied. The calibration curve obtained shows an excellent linear dependence between the height of the peak and the concentration of ascorbic acid in the range of 10^{-6} mol L^{-1} to 10^{-3} mol L^{-1}. The equation of the calibration graph was y = 0.2922 x + 0.293 (where y represents the value of the intensity measured for the height of the anode peak, expressed in mA and x the concentration of the analyte, in mol L-1, R2 = 0.9935, RSD = 3.29%). The developed method was applied to the evaluation of phenol in the river water of Oum Erbia. The calculated detection and quantification limits are 1.44 × 10^{-9} mol L^{-1} and 4.8 × 10^{-8} mol L^{-1} respectively. To confirm the results, the applicability of the method was carried out in the river water of Oum Erbia and in pharmaceutical products with good results.

Keywords: Phenol; river water; Cyclic voltammetry; Natural phosphate.

Figure:



Recent Publications

1. K. Kummerer, Pharmaceuticals in the Environment. Sources, Fate, Effects and Risks. Springer, Berlin, Germany (Ed.), 2001, 521 p.R.
2. C. G. Daughton, T. Jones-Lepp, Pharmaceuticals and Personal Care Products in the Environment: Scientific and Regulatory Issues. American Chemical Society, Washington, DC. (Eds.), 2001, 463–495

Biography

I have experience in using the quantum density theory functional method (DFT) B3LYP / 6-311G (d, p) to determine the optimization of interatomic distances of molecules such as salicylic acid, and the energies, the electron density of certain atoms of the molecules, This method is implemented in the Gaussian 09 program. My objective is based on the determination of the stability and the electrophilic and nucleophilic character of the molecule. I graduated in 2018 at Sultane Moulay Sliman University, Faculty of Science and Technology in Beni Mellal, Morocco.

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Influence of soil structure interaction SSI on the seismic response of the buildings case of Moroccan seismic record and local type of soil

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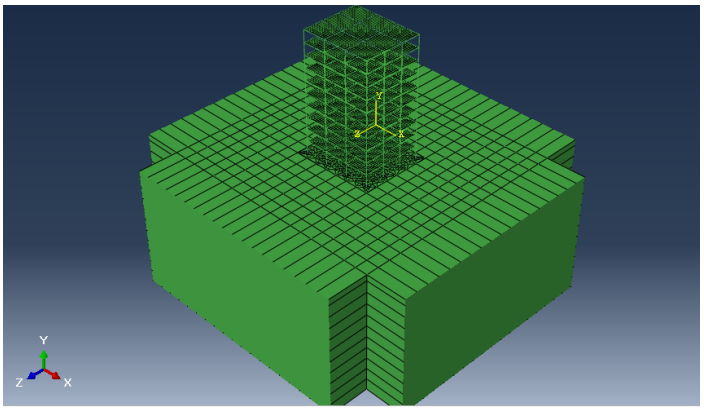
Abstract

In this study, a 3D model was developed to analyze the influence of soil-structure interaction SSI, on the seismic response of buildings, adopting the finite element software ABAQUS, to simulate the dynamic interaction between soil and structure, to treat the impact on the lateral Deflection, Inter-storey Drift, and stresses.

To ensure a compact analysis, different models have been realized of with an infinite soil model, and others with a simple embedding, the infinite soil model with many types of soils, which characterize 3 classes of soil in Morocco in a different area, varying the number of floors of 2 to 10 floors, with seismic load based on the recording of local earthquakes in different stations in Morocco.

The results show that the soil-structure interaction is an unpredictable phenomenon, which must be taken into account in all risky projects (high-rise buildings, high-seismicity zones, etc.).

Figure: Abaqus CA Model with Infinte Soil Element



Recent Publications

1. *Edip, K., Garevski, M., Sheshov, V., & Bojadjieva, J. Boundary Effects in Simulation of Soil-Structure Interaction Problems. Soil Mechanics and Foundation Engineering, 54(4), 239–243. 2017.*
2. *Janardhan Shanmugam, P. A. Dode, & H. S. Chore. Analysis of Soil Structure Interaction in Framed Structure. International Journal of Computer Applications (0975 – 8887). 2015.*
3. *Kwag, S., Ju, B., & Jung, W. (2018). Beneficial and Detrimental Effects of Soil-Structure Interaction on Probabilistic Seismic Hazard and Risk of Nuclear Power Plant. Advances in Civil Engineering. 1–18. 2018.*

Biography

The author is interested in research on the axis of the impact of the soil structure interaction during a seismic load taking into account the different design of the structures and many types of soils. Its objective is based on the use of FE software to study the impact of the SSI in different areas of Morocco, based on local earthquakes recording. He started his doctorate in 2015 at the University of Mohamed V, MOROCCO. She published an article and contributed to several.

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Heat Treatment and Energetic Valorization by Drying with a Solar Greenhouse of Sludge from Drinking Water Treatment Stations

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[2]*Laboratory of Solar Energy and Aromatic and Medicinal Plants, Cadi Ayyad University, Marrakech Morocco*

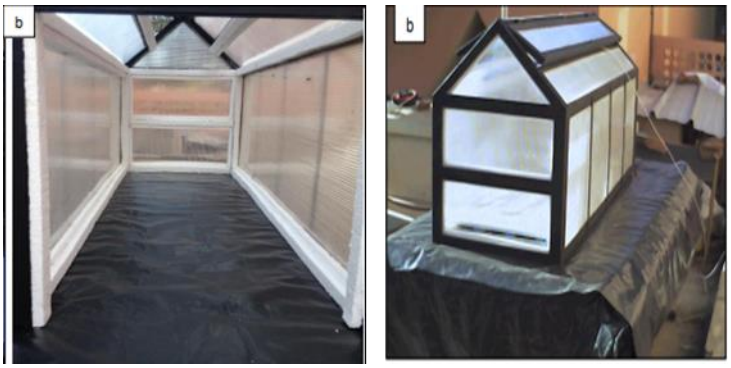
Abstract

In the natural convection greenhouse dryer, incident solar radiation is transmitted through the canopy and is further used to heat crops. Due to the absorption of solar radiation, the temperature of the crop increases. The natural convection greenhouse dryer operates on the principle of thermo physic effect.
Moist air escapes through an outlet on the top or vented through the dryer chimney and the heated air circulates through the crop through the buoyancy forces.
Such a type of air movement inside the drying chamber is known as the natural convection mode and a dryer that operates under the action of natural convection is known as a blow dryer natural convection greenhouse.

This paper evaluates the thermal modeling and drying of hydroxide sludge from drinking water treatment plants with greenhouse drying.

The air temperature of the greenhouse and the greenhouse, the relative humidity inside the greenhouse, the rate of drying, the drying kinetics and the drying potential can be estimated precisely from thermal modelling.

Figure: The experimental pilot for drying hydroxide sludge in indoor (a) and outdoor (b) views



Biography

Azeddine Fantasse

PhD student at the Faculty of Science Semlalia Marrakech, Morocco, specializing in physical engineering and thermal transfer, I published an article in the journal Materiels Today: Proceeding, and also, I have two articles under review.

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Experimental study of shrinkage and density of clonal Eucalyptus wood

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[1]*Laboratory of Condensed Matter and Interdisciplinary Sciences, Faculty of Sciences, Mohammed V University in Rabat, Morocco*
[2]*Center of Plant and Microbial Biotechnologies, Biodiversity and Environment, Faculty of Sciences, Mohammed V University in Rabat, Morocco*
[3]*Physics and Mechanics of Wood Laboratory, Research Center of Forestry in Rabat, Morocco*

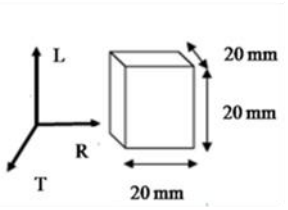
Abstract

Wood is an anisotropic material: that is, its properties, including shrinkage rates, differ in tangential, radial and longitudinal directions. The shrinkage is one of the most important properties for the dimensional stability of wood. Excessive shrinkage during drying causes warping (bow, cup, twist and spring), cracking and angular deformation in wood. Dimensional stability is an import characteristic for employing wood as a structural material, furniture, flooring, etc. The objective of this work is to study the linear and volumetric shrinkage and density of tow clones of eucalyptus wood (*E. grandis* and *E. camaldulensis*) that originated from Gharb Maâmora plantations. For this purpose, the physical properties tests were carried out on standardized specimens its dimensions are 20×20×20 mm^3, with 180 samples for each clone.

The obtained results allow the classification of the clonal eucalyptus wood as a medium-density wood and nervous. The woods of two clones (*E. camaldulensis* and *E. grandis*) have high average values of the volumetric, tangential and radial shrinkages. Also, the wood of *E. camaldulensis* possesses volumetric and transversal shrinkages and anisotropy higher than those of *E. grandis*. Therefore, more tests on the mechanical and anatomical properties and treatment of this wood species are necessary to reveal the possibility of its use in construction, carpentry and other works.

This difference between dimensional shrinkage of the woods from the two clones can be attributed to the density of wood, the anatomical structure and the combination of silvicultural factors.

Figure:



Balance Micrometer Oven

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1. *Hai P. H., Jansson G., Hannrup B., Harwood C., Thinh H. H., Annals of Forest Sci., 66(2009) 1-9.*
2. *Chauhan S. S., Aggarwal P., Annals of Forest Sci., 68(2011) 511*
3. *Schulgasser K., Witztum A., Wood Science and Technology, 49(2015) 389–401.*
4. *Sadegh A. N., Kiaei M., Samariha A., Cellulose Chemistry and Technology, 46(2012) 369–373.*
5. *Amer M., Kabouchi B., Rahouti M., Famiri A., Fidah A., Journal of the Indian Academy of Wood Science, 14(2017) 91–98.*

Biography

Mahyoub Sanhan Khalid AMER, I was born at 20/12/1973 in Taiz-Yemen, I work as a teacher of physics at the Higher Institute in Taiz. I had a Master degree in Physics; Energy and Materials Technology from the Faculty of Science Mohammed V University. Currently, I am Ph.D. student in the physics department, Laboratory of Condensed Matter and Interdisciplinary Sciences, Faculty of Science, Mohammed V University.

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Study of the white cochineal Parlatoria blanchardi Targ of the date palm in the traditional palm groves of Figuig (Morocoo)

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[2]*Laboratoire de Biochimie et Biotechnologies, Faculté des Sciences, Université Mohammed Premier, Oujda.*
[3]*Laboratoire de Biochimie et Biotechnologies, Faculté des Sciences, Université Mohammed Premier, Oujda*

Abstract

The white cochineal Parlatoria blanchardi is one of the most dangerous pests of the date palm in the traditional palm groves of Figuig.This predator reduce considerably palms, attacks fruits and depreciates the value and commercial quality of infested dates. The development of an effective control method against this insect is based on the prior knowledge of its bioecology and the optimal conditions of its prolific activity. This preliminary study aims to characterize the degree of infestation of three main cultivars "Assiane", "Boufeggous" and "Aziza bouzid" by the white cochineal. The cultivars studied show high infestation rates during the months of October and November. Three species of entomophagous predators of Parlatoria blanchardi have been inventoried. These are Pharoscymnus ovoïdeus, Pharoscymnus numidicus and Cybocephalus palmarum.This study, although preliminary, allowed us to obtain very useful information on the ecology of the white scale that must be completed by the study of the prolific activity according to the vegetative state of the palm tree and the conditions of the biotopes, to preconize an effective and sustainable fight against this predator.

Figure: Leaves of cultivar Mejhoul infested by Parlatoria blanchardi

Recent Publications:

1. *Saigui S, Doumandji S, Belhamra M* . Courier du savoir.N° 19.*(2015) pp.41-48.*

Biography

Author, Khalid KASSOU, has his expertise in environmental sciences and passion in studying emigration-development issues and study of the impact of international emigration on oasis agriculture. He considers that the oasis is a living space and a natural setting invaluable in the desert areas; scarcity of irrigation water, desertification, fragmentation and smallness of farms are constraints natural and socio-economic conditions which constitute a handicap for the development of oasis agriculture.
In another field he is a collective actor (Member of several development organizations) and coordinator of many local development projects. His focus is based on the use of organic products and saving natural resources. He was awarded his PhD in 2019 from the University of Mohamed first -Oujda Morocco. He published 4 papers and others are being submitted. He is a painter who presented several national and international exhibitions on various topics.

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Evolution of localized surface plasmon resonance made of gold nanowire chain embedded in WS_2 multilayers

Z. Oumekloul[1], Y. Achaoui[1], A. Mir[1] and A. Akjouj[2]

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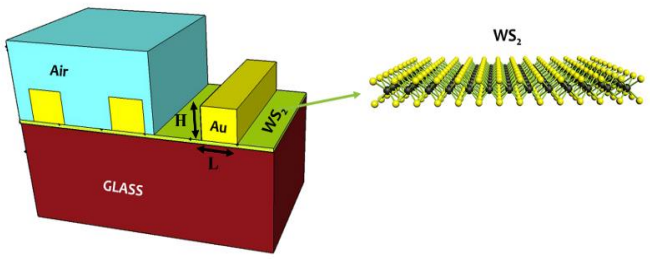
Abstract

Transition metal dichalcogenides (TMDs) (MoS2, WS2, $MoSe_2$...) are a family of two-dimensional materials that have recently attracted much attention due to their exceptional optical, electronic and spintronic properties. The keen interest for these materials is largely due to advances in synthesis by chemical vapor deposition techniques on substrates compatible with the microelectronics industry. As in graphene, the metal and chalcogen of a TMD monolayer are distributed over a crystal lattice of hexagonal structure. However, due to the presence of two different atoms, the symmetry group of the TMD layers does not have an inversion center. This property is at the origin of a band gap for optical transitions between electronic states of valence and conduction bands, which gives these materials a particular interest not only for fundamental studies but also for applications in optoelectronics, photocatalysis and the field of sensors. In this work, we demonstrate the effect of coupling between metallic gold nanowires with a WS2 multi-layer. The novelty of this work lies in the drastic stability of the effect of the thickness layer variation on both, the sensivity performances and the electric field distribution in the visible and near-infrared spectra. Accordingly, this new design may be considered of prime importance in sensing.

Figure: 3D nanostructure with multilayer WS_2



Recent Publications:

1. *Z. Oumekloul, S. Lahlali, A. Mir, and A. Akjouj, Evolution of LSPR of gold nanowire chain embedded in dielectric multilayers, Opt. Mater., vol. 86, pp. 343–351, Dec. 2018.Mohd H. H., Mohammed J. K.,* J Phy. Sci. *21 (2010) 1.*
2. *S. Zeng et al., Graphene-MoS2 hybrid nanostructures enhanced surface plasmon resonance biosensors, Sens. ACTUATORS B, vol. 207, pp. 801–810, 2015.Bouknana D., Hammouti B., Messali M., Aouniti A., Sbaa M.,* Port. Electrochim. Acta, *32 (2014) 1-19.*
3. *S.A. Maier, Plasmonics : fundamentals and applications. Springer, (2007).*
4. *Q. Ouyang et al., Sensitivity Enhancement of Transition Metal Dichalcogenides/Silicon Nanostructure-based Surface Plasmon Resonance Biosensor, Sci. Rep., vol. 6, p. 28190 16, (2016).*

Biography

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Quantification of secondary metabolites and the evaluation of the in vitro antioxidant activity of the argan tree of eastern Morocco

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[2]*Laboratoire d'amélioration de la production agricole, Biotechnologie et environnement, Université Mohamed Premier, Faculté des Sciences, B.P. 717, Oujda 60.000 –Maroc.*

Abstract

Argania Spinosa L. Skeels is an endemic specie of Morocco that belongs to the Sapotaceae family[1] that recommends a warm climate and most of them live in tropical regions. This population is highly concentrated in the southwest of Morocco[2] but is also found as a relic in the eastern region of the country[3].

This work aims to valorize the different parts of the Argan plant (Leaves, branches, and for the first-time flowers-buds) of Oujda and Chouihiya, and this by the quantification of different secondary metabolites such as polyphenols, flavonoids, and tannins. The investigation of their antioxidant activity was assessed using two different technics, the free radical scavenging activity against 1,1-diphenyl-2-picrylhydrazyl (DPPH) and the ferric reducing power (FRAP). The crude extracts were obtained by soaking the different parts of *Argania Spinosa* L. in a hydroalcoholic solution (70%) for 48h.

The quantitative evaluation of the different secondary metabolites of the different parts studied showed that flowers-Buds and leaves from Oujda are the highly rich with polyphenols, and flavonoids respectively Fb-O :498,9 ± 20,08 µg Eq AG/mg DW; Le-O :71,2 ± 0,8 µg Eq QE/mg DW. On the other hand, the results obtained reveals that the tannins are very concentrated in flowers-Buds from Chouihya 212,4 ± 5,8 µg Eq CA/mg MS. It was also found that the different secondary metabolites vary between the two regions studied and different organs. All the extracts for the two regions showed interesting antioxidant activities compared to the Ascorbic acid used as a standard for the DPPH and the FRAP.

The antiradical activity of the crude extract of the flowers-buds from Oujda showed the best IC50 with a value of 64,68 ± 3,5 µg/ml, while the leaves from Oujda showed the smallest IC50 value 208,33 ± 5,08 µg/ml in the ferric reducing power test and this compared to the other parts of the plant. The antioxidant activities vary according to regions and organs.

Keywords: Argania Spinosa L., secondary metabolism, antioxidant activity, 2,2-diphenyl-1-picrylhydrazyl, Ferric Reducing Power Assay

Recent Publications

1. Jean-Paul Peltier. Écologie de quelques espèces climaciques dans le sous (Maroc occidental). Grenoble; 1983. (DOCUMENTS DE CARTOGRAPHIE ECOLOGIQUE).
2. Emberger L. Le domaine naturel de l'Arganier. Bull Société Bot Fr. janv 1925;72(4):770-4.
3. Tazi MR, Berrichi A, Haloui B. Esquisse cartographique de l'aire de l'arganier Argania spinosa (L.) Skeels au Maroc nord-oriental. Bull Inst Sci Rabat Sect Sci Vie. 2003;(n°25, 53-55):3.

Biography

The author is a young Ph D. student at the faculty of sciences Oujda. His field of research focuses on the ecological, biological, and phytochemical studies of the argan tree in eastern Morocco. Currently, he is interested in the development of the argan tree in the agronomic and pharmaceutical side.

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2D-QSAR study by using Molecular Operating Environment (MOE) of isoxazoline-containing podophyllotoxin/2′(2′,6′)-(di)halogenopodophyllotoxin derivatives as acaricidal activities against Tetranychuscinnabarinus

Fatima En-nahli[1], Hanane Zaki[1], Abdellah EL AISSOUQ[3], Abdelkarim Ouammou[3], Tahar Lakhlifi[1], Mohammed Bouachrine[1, 2*]

[1] *MCNS Laboratory, Faculty of sciences, Moulay Ismail University, Meknes, Morocco.*
[2] *EST Khenifra, Sultan Moulay Sliman University, Morocco*
[3] *LIMOME Laboratory, Faculty of Sciences Dhar El Mahraz, Sidi Mohamed Ben Abdellah University, Fez, Morocco*

Abstract

The carmine spider mite, Tetranychuscinnabarinus, is one of the most serious mite pests on crops. It is capable to rapidly develop resistance to pesticides and the control methods still difficult. Thus, make the development of new natural-product-based insecticidal agents a very desirable method for sustainable pest control. The present study was carried out to explain the relationships between chemical structure and experimental observations. In which we have employed the Molecular Operating Environment (MOE), powerful molecular visualization software that can be implemented on a variety of operating platforms. A total of 29 molecules of isoxazoline-containing podophyllotoxin/2′(2′,6′)-(di)halogenopodophyllotoxin derivatives were subjected to quantitative structure-activity relationship (2D-QSAR) analysis, based on their acaricidal activity, to find two models at 48h and 72h. The two 2D-QSAR models demonstrated that two descriptors lip-don and PEOE-VSA-FNEG are likely to influence the acaricidal activity of these compounds.

Statistically robust 2D-QSAR models were developed for all studied compounds with (R2= 0.83, Q2 = 0.79, R2test = 0.64 and RMSE =0.06) for the first model at 48h, moreover, the second model at 72h showed better performance with the (R2= 0.92, Q2 = 0.83, R2test = 0.67 and RMSE = 0.16).

Recent Publications

1. Yang, R., Zhang, Y. & Xu, H. (2018). Synthesis of Novel Isoxazoline-Containing Podophyllotoxin/2′(2′,6′)-(Di)Halogenopodophyllotoxin Derivatives and Their Insecticidal/Acaricidal Activities. Bioorganic and Medicinal Chemistry Letters, 28(8), 1410–1416.

Biography

Fatima EN-NAHLI is currently a Ph.D student at MCNS Laboratory, Faculty of sciences, Moulay Ismail University, Meknes, Morocco.

Publications:

- **Fatima En-nahli, Assia Belhassan, Tahar Lakhlifi, Mohammed Bouachrine « DFT study of the retention/release of odorant molecules in water using statistical methods » RHAZES: Green and Applied Chemistry, 2020.**

Email: ennahli.fatima@gmail.com

Contribution to The Study of Corrosion Inhibition of XC_{48} Steel Reinforcements by Organic Compounds in HCl 1M Environment

C. Merimi [1], B. Hammouti [1], K. Zaidi [1], I. Merimi[1,2] ,T. Szumiata[3]

[1] *Laboratory of Applied Analytical Chemistry, Materials and Environment (LC2AME), Faculty of Sciences, University Mohammed First, Oujda, Morocco*
[2] *Laboratory of Electrochemistry and Environment Materials, Faculty of Science, Kénitra, Morocco*
[3] *University of Technology and Humanities Department of Physics, Faculty of Mechanical Engineering, Radom, Poland.*

Abstract

Preserving the environment is a challenge facing scientists. Concrete is generally associated with reinforcement (carbon steel), which increases its tensile and flexural strength, hence the term reinforced concrete. In healthy concrete with a basic environment, the reinforcements are naturally passivated. With this in mind, our objective is to upgrade the green corrosion inhibitor of XC48 carbon steel in a 1 M HCl solution. The corrosion inhibitors are applied to the surface of the concrete to be treated. They will migrate in the coating zone towards the reinforcements thus ensuring their protection against corrosion by lowering the corrosion rate of the steel.

The influence of concentration, immersion time and temperature on the corrosion processes of XC48 steel in 1M HCl in the presence of inhibitor was studied by gravimetric measurements. The monitoring of the inhibition mechanism is ensured by the electrochemical method (polarization curves and electrochemical impedance spectroscopy). From these tests, the corrosion rate was calculated for the different experimental conditions. These results confirm the formation of a protective film on the surface of the carbon steel, which provides significant inhibitory effectiveness**.**

Figure:

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3. *H. Lgaz, K. Subrahmanya Bhat, R. Salghi, Shubhalaxmi, S. Jodeh, M. Algarra, B. Hammouti, I.H. Ali, A. Essamri,J. Mol. Liq. 238 (2017) 71–83. doi:10.1016/j.molliq.2017.04.124.*
4. *I. Milošev, J. Pavlinac, M. Hodošček, A. Lesar, J. Serbian Chem. Soc. 78 (2013) 2069–2086. doi:10.2298/JSC131126146M.*
5. *Z. Cao, Y. Tang, H. Cang, J. Xu, G. Lu, W. Jing, Corros. Sci. 83 (2014) 292–298.*

Biography

Author has expertise in the field of materials engineering, characterization processing, quality control and surface treatment.

She studied at Ibn Tofail University, Faculty of Science, in Kenitra, Morocco. Her graduation project was carried out at the Laboratoire Tests Publics et Etudes LPEE-CEMGI in Casablanca,

Service paints and coatings, under the title of characterization of a material while mastering the quality and accreditation of paint construction tests and routers. Currently a doctoral student in his first year at the Faculty of Science in Oujda at Mohamed Premier University. His expertise in evaluation and his passion for the use of inhibitors to protect metals against corrosion, especially in acidic environments.

His objective is based on the use of his organic molecules to have applications in industries.

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Fly Ash based geopolymers: Influence of synthesis parameters on structural and mechanical properties

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[2] *Laboratory of Coordination and Analytical Chemistry (LCCA) Department of Chemistry, Faculty of Sciences, University of Chouaïb Doukkali, El Jadida, Morocco*
[3] *Environmental and Chemical Engineering, Faculty of Technology, , University of Oulu, Oulu, Finland*

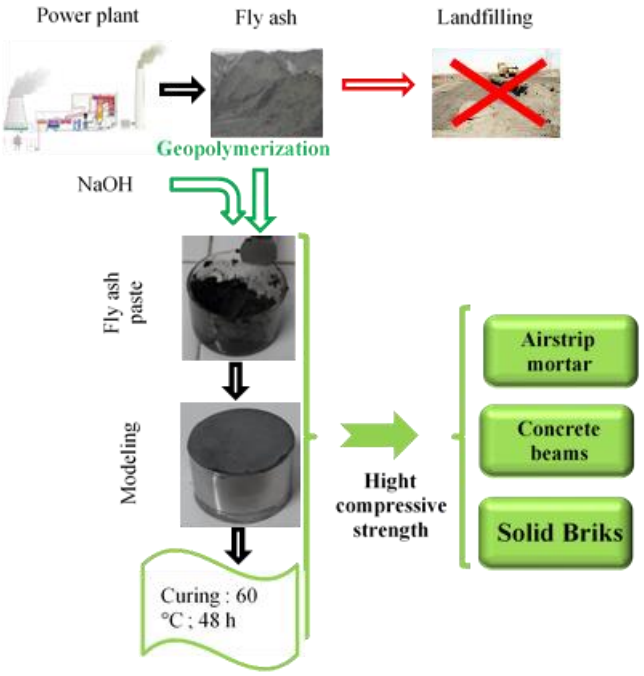
Abstract

Due to their preparation at low temperature (below 100 °C), easy shaping, high thermal and mechanical resistance, geopolymers are a promising alternative to conventional hydraulic binders. All aluminosilicates, natural as clays, kaolin, metakaolin or industrial waste can be used to prepare geopolymers. This study consists in valorization of the fly ashes, waste from thermal power plant, by alkaline activation with different concentrations of NaOH at 60 °C during 48 h.

Structural properties of raw material and prepared geopolymers were carried out using different techniques. X-ray diffraction has shown that fly ash is mainly composed of quartz, mullite, hematite and calcite. These phases coexist with sodalite in geopolymers. FTIR analysis reveals a structural changing including the incorporation of aluminum into the silicate network leading to their crosslinking. The chemical composition given by XRF analysis allowed to classify the fly ash in F Class according to ASTM C618-05. On the other hand, the mechanical resistance characterizations highlight the fact that the prepared geopolymer materials prepared under optimum synthesis conditions exhibit an interesting compressive strength.

The obtained results showed that the fly ash is an excellent raw material for production of inorganic polymers using the geopolymerization technology.

Figure:



Biography

Author has his expertise in valorization of industrial waste, preparation and characterization of materials for catalysis, adsorption and water treatment. He works in the faculty of sciences, University Chouaïb Doukkali. He was warded his PhD in 2003 from the University of Cadi Ayyad Marakech/Morocco, and Bordeaux 1 University / France.

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Adsorption of heavy metals by natural Moroccan material

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Abstract

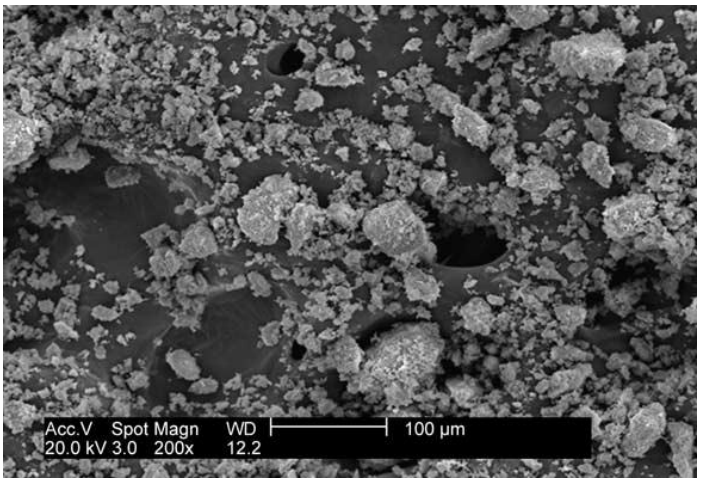
Wastewater posed a serious threat to human health, animals and ecological systems. This was because industrial wastewater contained heavy metals contaminants, such as Cu, Zn, Cu…, which are not biodegradable and thus tend to accumulate in living organisms, causing various diseases and disorders.

The optimization of wastewater purification processes required a development of new operation based on low cost raw materials with high pollutant-removal efficiency. Adsorption was a popular method for the removal of heavy metals from the wastewater particularly when natural materials that are available in large quantities or certain waste products from industrial or agricultural activities may have potential as inexpensive sorbents, examples included dead biomass, blast furnace slag, fly ash, clay, tree bark, and natural zeolite.

The use of natural zeolites for environmental applications was became new researchers interests mainly du to their properties and significant worldwide occurrence.

The objective of this work was to study the characterization through chemical, physical and mineralogical analyses of a natural moroccan zeolite and to present the interaction results between the natural adsorbent and some heavy metals in aqueous solutions. Effect of grain size, pH, and temperature on adsorption phenomenon was investigated.

Figure: Typical topographic image for the material by Scanning Electron Photomicrographs (SEM). Bar length is 100µm and the magnification 200x



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2. *ISAWI, Heba. Using Zeolite/Polyvinyl alcohol/sodium alginate nanocomposite beads for removal of some heavy metals from wastewater.* Arabian Journal of Chemistry, *2020.*
3. *CASTALDI, Paola, SANTONA, Laura, ENZO, Stefano,* et al. *Sorption processes and XRD analysis of a natural zeolite exchanged with Pb2+, Cd^{2+} and Zn^{2+} cations.* Journal of Hazardous Materials, *2008, vol. 156, no 1-3, p. 428-434.*
4. *BAKER, Hutaf et KHALILI, Fawwaz. EFFECTS OF pH AND TEMPERATURE ON THE INTERACTION OF Pb (II) WITH AZRAQ HUMIC ACID STUDIED WITH SCHUBERT'S ION EXCHANGE METHOD.* Annals of Environmental Science, *2007.*

Biography

MERYEM EL RHARIB, received his Master's degree in management and valorization of waste at Hassan II University, faculty of science Ain Chok-Casablanca. She is currently a PhD student in chemistry and valorization at Hassan II University since 2019 at the laboratory of Materials Environment Interface, under the direction of Pr. Zaina ZAROUAL and Pr. Mohammed Azzi. She is working on the characterization of new naturel material and the use of this later as adsorbent for heavy metals removal from wastewater.

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Analysis of structural and surface degradations of a flexible pavement, based on auscultation results using the MCA method

M. A. Mehdi [1], T. Cherradi [2], M. Qachar [2], A. Chigr[2]

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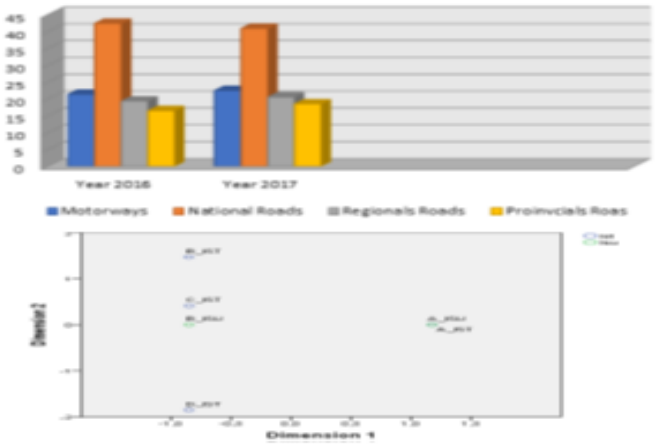
[2]*National Center for Road Studies, Ministry of Equipement, Transport, Logistics and Water*

Abstract

Accoring to the Ministry, road traffic on the entire road and highway network was estimated in 2017 at 102.33 million vehicle-km /day, which leads to an increase of 3.00 per cent over 2016.the importance of this road link. All these statistics are taken into account by the National Centre for Road Studies (CNER), which is the main state body responsible for monitoring roads, applying auscultation techniques that are used to deduce and predict preventive actions facing the issues that directly and indirectly affect the rigidity and quality of roads. In the same optic, the choice in this article has been made for a road section witha very important annual traffic estimated in 2017 at 3639207vehicle.km/day and an average annual daily traffic of 1291Average Annual Daily Traffic (AADT). The section under study is 50 km in length , starting at the kilometre point KP 0+081 and ending at KP 0+130 linking the town of Meknesand Khemissat, which belongs to the national road number 6 linking the town of Sal´e to Oujda. The choice of the section is based on the high traffic rate and on the annual traffic estimation in 2017 at 3639207 vehicle.km/day which reflects the importance of this road link. This study presents a deep analysis In this study wepresents a deep analysis of pavement degradations, analyzing the results of the auscultation carried out by the CNER in 2018, in order to prepare a road database (RDB) which will be used to predict maintenance strategies and maintenance measures for this section thereafter.

Figure :



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1. *Sayes, M.W Karamihas, SM. (1998) the little book of profiling: basic measuring and interpreting road profiles. Ann Arbor (USA): University of Michigan.*
2. *Modeling of urban transport, Transport Research APAS Urban Transport European Comission, DG transport, 1996.*
3. *Jyda Mint Moustapha. Mathematical modeling and plot simulation road : statistical analysis of insertion models and probabilistic simulation of a kinetic model. Modelin and simulation.*
4. *Standart Nomenclature and Definitions for Pavement and Deficiencies, HRB, USA, 1970.*
5. *Lebart al., Dunod, Multidimensional exploratory statistics.*

Biography

The author has expertise in the field of materials engineering, soil treatment, quality control and surface treatment. She studied at Mohammed Premier University, Faculty of Sciences of Oujda in Morocco. His end-of-studies project was carried out within the company Bioui Travaux where he exercised the quality control of civil engineering materials and the monitoring of laboratory tests on a construction project of an engineer passage with open gantry in Rabat, as well as a three-year experience in the civil engineering and environment laboratory LABOTEST where he was in charge of the geotechnical laboratory for the control tests of building and public works. Currently a doctoral student in his fourth year at Mohammadia School of Engineers at Mohamed V University. In collaboration with the CNER (National Center for Road Studies) consists in the assessment of degradation and deterioration of materials that make up flexible road pavements and its evaluation in the medium and short term. Its objective is based on the use of the results of road monitoring carried out on a road section to predict future degradation and new maintenance actions.

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Numerical study of the Thermo-energy of a tubular Heat Exchanger with longitudinal baffles

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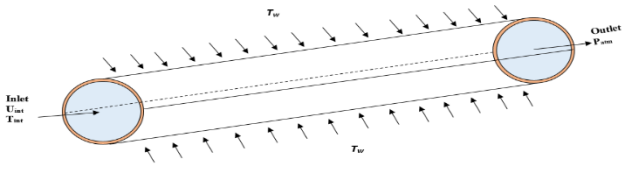
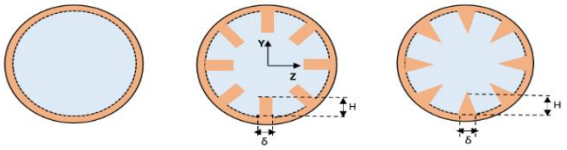
Abstract

The work undertaken in this paper presents a computational study of the flow and heat transfer characteristics in a tubular heat exchanger with longitudinal baffles attached to its inner wall, which is maintained at a constant temperature T_w = 343 k. This study is carried out for a Reynolds number, Re ranging from 20,000 to 30,000, and was devoted first to the case of a smooth tube (without baffles), then to the case of a tube provided with longitudinal baffles of rectangular cross-section, and finally to the case of a tube provided with longitudinal baffles of triangular cross-section. The system of equations governing the thermohydraulic phenomenon consists of the continuity equation (for mass conservation), the Navier-Stokes equations (for momentum conservation), and the first principle equation (for energy conservation). The system of equations thus formulated is a hyperbolic system, which has been solved numerically over the entire domain, using the finite volume approach for its discretization, and the two-equation model (K-ε) for the modeling of turbulence terms. The SIMPLE algorithm is thus used to overcome the problem of speed-pressure coupling. To meet the needs of aerothermal users. The two fields, thermal and aerodynamic, were analyzed, the coefficient of friction, the Nusselt number, and the thermal efficiency. Finally, the study undertaken was finalized by comparative analysis to identify the relevant parameters in the aerothermal phenomenon and deduce the optimal form to be proposed to aerothermal energy users. The results obtained show that the longitudinal inclusion of the rectangular section baffles improves the thermal performance by 32.37% for the triangular section, and by 44.37% for the case of rectangular section baffles.

Figure: The shape of the baffle section, (a) smooth tube (b) rectangular section triangular section



Computational Domain



(a) (b) (c)

Figure: Mesh of the studied geometry

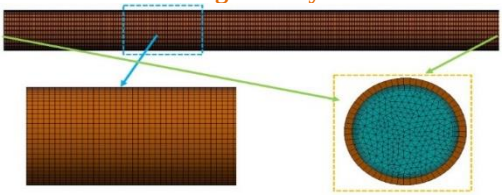
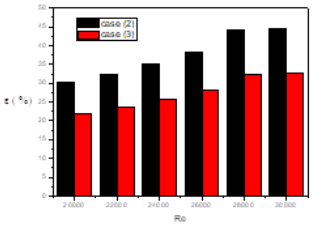


Figure : Variation in the efficiency of the baffles



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2. Sriromreun P, Thianpong C, Promvonge P. Experimental and numerical study on heat transfer enhancement in a channel with Z-shaped baffles. Inter Commun in Heat and Mass Transfer, 39 (2012) 945–952.
3. Raj, R. T. K., Ganne, S., Shell Side Numerical Analysis of a Shell and Tube Heat Exchanger Considering the Effects of Baffle Inclination on Fluid Flow, Thermal Science, 16 (4) (2012) 1165-1174.
4. J-E, Salhi and K. Amghar, H. Bouali and N. Salhi, Combined Heat and Mass Transfer of Fluid Flowing through Horizontal Channel by Turbulent Forced Convection, Modeling and Simulation in Engineering, 2 (2020) 1–11.
5. S. V. Patankar, Numerical Heat Transfer and Fluid Flow, New York: Hemisphere, (1980)

Biography

Jamal-Eddine SALHI, preparing a Ph.D. student in Physics & Engineering at the Mechanics & Energetics Laboratory attached to the Faculty of Sciences of Oujda.

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Metal-organic frameworks based on Pyrazole ligands and their applications

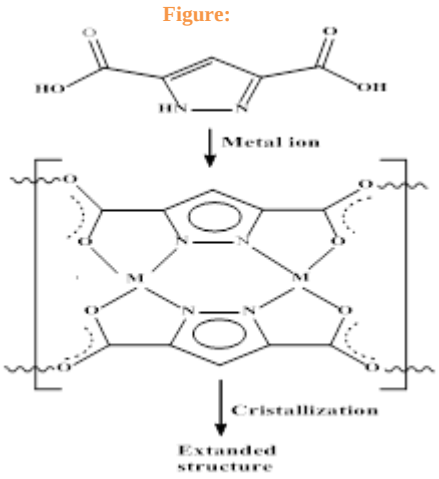
EL BOUTAYBI Mohamed[1], TALEB Abdelhafed[2], TOUZANI Rachid[3], BAHARI Zahra[1].

[1]University Mohammed Premier, Multidisciplinary Faculty of Nador, Laboratory of Molecular Chemistry, Materials and Environment (LMCME), Nador-Morocco
[2]PSL Research University, Chimie ParisTech-CNRS. Paris Chemistry Research Institute, Paris 75005, France
[3]University Mohammed Premier, Faculty of Sciences, Laboratory of Environment and Applied Chemistry (LCAE), Oujda-Morocco

Abstract

Metal–organic frameworks (MOFs) represent a large category of 3-dimensional (3D) porous materials by linkage of inorganic transition metal clusters and organic ligands, featuring unlimited structure versatility, high surface area, tunable functions, facile synthesis and good stability, and thus have been demonstrated for gas adsorption, selective separation, catalysis, drug delivery, sensing, and energy applications. Among them, the potentials of developing MOF-based energy storage materials such as lithium-ion batteries (LIBs) have been driving substantial research interest recently. Pyrazole is a very versatile ligand and can play many different roles in chemical systems. Different pyrazole compounds were used to synthesize MOFs for many applications. For instance, The MOFs based on 1-H-pyrazole-3,5-dicarboxylic acid, were used for water adsorption and it was demonstrated to be a crucial material for many applications such as dehumidification, thermal batteries, and delivery of drinking water in remote areas. Some pyrazole are the most promising compounds used as a subunit to prepare MOFs for electrochemical energy storage devices.

Figure:



Recent Publications

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2. D.Y. Lee, D.V. Shinde, S.J. Yoon, K.N. Cho, W. Lee, N.K. Shrestha, S.-H. Han, J. Phys. Chem. C 118 (2013) 16328.
3. L. Zhang, H.B. Wu, X.W. Lou, J. Am. Chem. Soc. 135 (2013) 10664.
4. Y. Bai, Y. Dou, L.-H. Xie, W. Rutledge, J.-R. Li, H.-C. Zhoub, Chem. Soc. Rev., 45 (2016) 2327-2367.
5. S. Barman, H. Furukawa, O. Blacque, K. Venkatesan, O. M. Yaghi, G.-X. Jinc and H. Berke, Chem. Commun., 47 (2011) 11882–11884

Biography

Mohamed EL BOUTAYBI is a first year PhD student; joint supervised by Professor Zahra BAHARI and Professor Rachid TOUZANI, his main subject is the synthesis and characterization of metal organic frameworks (MOFs) and their applications. He was awarded his master in 2019 from the University of Abdelmalek ESSAADI, Tetouan, Morocco.

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Natural convection in a partially open cavity with heated conducting body

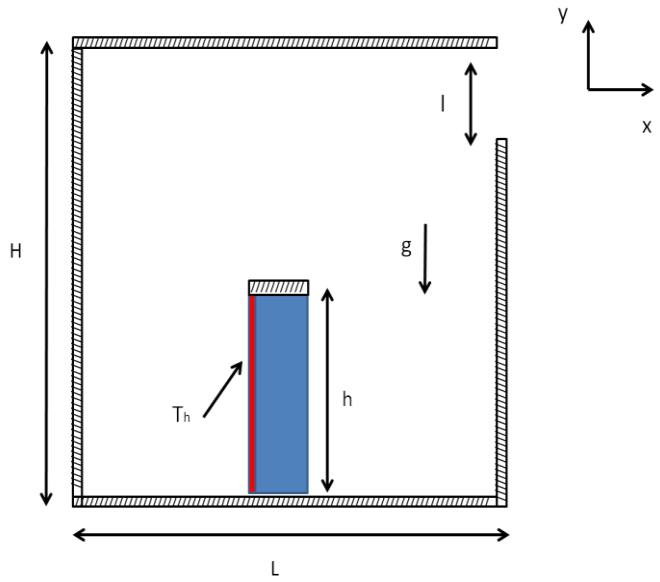
K. Azagar, L. El Moutaouakil, M. Boukendil, A. Abdelbaki, Z. Zrikem.

LMFE, Department of Physics, Cadi Ayyad University, Faculty of Sciences Semlalia B.P. 2390 Marrakesh, Morocco

Abstract

Several experimental results and numerical calculations have been presented to describe the phenomenon of natural convection in closed cavities [1-2]. Heat transfer by natural convection in closed cavities has a wide range of applications in engineering. However, the heat transfer in open cavities has not been studied as intensively although this type of cavity is encountered in reality [3], and also encountered in various engineering systems, such as solar thermal receivers, in buildings, electronic cooling devices, etc. A numerical study has been out on natural laminar convection coupled by conduction in a partially open cavity containing a vertical conducting body. The cavity has a partial opening on the top of the vertical wall. All the walls are assumed to be adiabatic. A conductive block was placed in the middle of the lower wall, in which a vertical heat generation is integrated. The results of this study were obtained for several parameters, namely: the Prandtl number fixed at 0.71, the Rayleigh number varying from 10^3 to 10^6 and the conductivity ratio ranging from 1 to 40. The conservation equations, in two dimensional forms, are solved by the control volume method. The results are presented in terms of streamlines, isotherms, Nusselt number and the volume flow rate of air through the opening. The obtained results indicate that the heat transfer and the volume flow rate are strongly influenced by the selected parameters.

Figure: Studied configuration



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3. Kishora V., Singha S., Srivastavab A., Exper. Therm. and Fluid Sci. 99 (2018) 71-84.
4. El-Gendi M.M., Int. J. of Therm. Sci. 127 (2018) 373-383.

Biography

Mohammed Boukendil is a professor at the Cadi Ayyad University, Faculty of Sciences Semlalia, Department of Physics, Fluid Mechanics and Energetics Laboratory, Marrakech, Morocco. He is a member of the Laboratory of Fluid Mechanics and Energetic (LMFE). The main range of scientific interests are the study of the coupled heat transfer by natural convection, conduction and radiation in different configurations; the heat transfer between soil and buildings, solar systems, the development of the heat transfer functions for the building elements,… He has published about 13 research papers in international journals and more than 30 papers in conference proceedings. Her H-index is 3 on Scopus.

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Study inhibition corrosion of steel Carbone in HCl bay using of new molecule derived from Quinoline

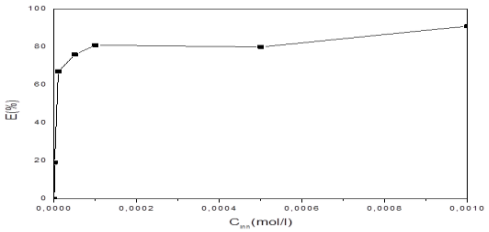
H. fakhry[1], M. El Faydy[2], A. Zarrouk[3], A. Aouniti[3], B. Lakhrissi[2], B. Hammouti[3], H. Oudda[1]

[1]*Laboratoire de procédé de séparation, Faculté des Sciences, Université Ibn Tofail, 133, 1400 Kénitra, Maroc,*
[2]*Laboratoire d'agro ressource et génie des procédés LAGP, qui a synthétisé le composés organique, Faculté des Sciences de Kenitra. Université Ibn Tofail, BP 242, 14000 Kénitra, Morocoo.*
[3]*LCAE-URAC 18, Faculté des sciences, Université Mohamed Premier, BP 717-60000, Oujda, Morocco.*

Abstract

Acid solutions are generally used for the removal of undesirable scale and rust in several industrial process. Corrosion inhibitors are widely employed to reduce the metal degradation by acting through the use of new organic inhibitors. the use of organic inhibitors is one of the best options. In most cases, the presence of heteroatoms such as N, S, O, P as well as aromatic ring(s) facilitates the adsorption of the inhibitor onto the metal surface. In present study of the inhibition of the corrosion is made by an organic molecule derived from Quinoline in 1.0 M HCl using gravimetric, electrochemical impedance spectroscopy and potentiodynamic polarization. The study was carried out by UV. From electrochemical impedance measurements it is observed that inhibition efficiency increases with concentration of this molecule and maximum efficiency reached is 93.11 % at 10^{-3} M HCl an. The potentiodynamic study reveals that molecule is mixed type inhibitor with predominate anodic action. EIS plot indicates that the addition of inhibitor increases the charge transfer resistance and decreases the double-layer capacitance Cdl of the corrosion process, these observation reveal that investigated quinoline derivative inhibits carbon steel corrosion by adsorption mechanism. The results obtained from the different methods are in good agreement.. Quantum chemical calculations were carried out to investigate the corrosion-inhibiting property of Quinoline. The results obtained from the different methods are in good agreement. Arrhenius law and its transition equation lead to estimate the thermodynamic parameters and to conclude that adsorption is predominantly chemisorption, exothermic and support the mechanism of chemical adsorption of the corrosion process Adsorption of this molecule on carbon steel surface obeys the Langmuir adsorption isotherm.

Figures:



Recent Publications:

1. M. Rbaa, F. Benhiba, I.B. Obot, H. Oudda, I. Warad, B. Lakhrissi, A. Zarrouk , Two new 8-hydroxyquinoline *derivatives as an efficient corrosion inhibitors for mild steel in hydrochloric acid: Synthesis, electrochemical, surface morphological, UV– visible and theoretical studies, Journal of Molecular Liquids, 276 (2019) 120 –133*
2. Z. Rouifi , F. Benhiba, M. El Faydy , T. Laabaissi , H. About , H. Oudda , I. Warad , A. Guenbour , B. Lakhrissi ,A. *Zarrouk , Performance and computational studies of new soluble triazole as corrosion inhibitor for carbon steel in HCl, Chemical Data Collections, 22(2019) 100242.*
3. Materials Studio, Revision 2016, Accelrys Inc., San Diego, USA (2016).

Biography

PhD student at Ibn Tofail University. We are working on the study of the inhibition performance of the newly synthesized quinoline on carbon steel corrosion in hydrochloric acid, by Gravemitric and the electrochemical techniques such as, electrochemical impedance spectroscopy, potentiodynamic polarization and Quantum chemical calculations.

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Reliability analysis of an eco-designed mechatronic system using Coloured Petri Net

Imane Mehdi, El Mostapha Boudi

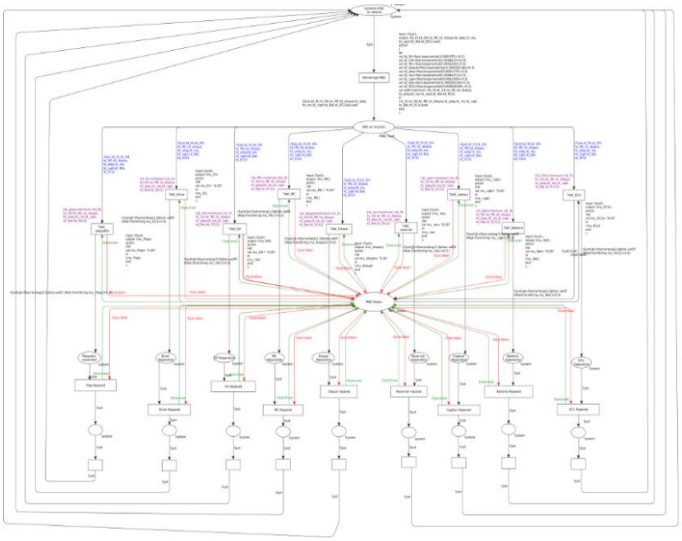
Laboratory of Quality, Security and Maintenance (LQSM) , Mohammadia School of Engineers ,Rabat ,Morocco.

Abstract

Nowadays, mechatronic systems have a potential impact on people's safety and technological progress increases not only their performance but also their importance. Therefore ,the reliability analysis is a very important engineering issue, in order to guarantee their functional behavior. Since these systems are very complex to study, the evaluation of their reliability is extremely difficult. The complexity of mecha-tronic systems is inherent to their structural heterogeneity: their implementation involves an increasing variety of tech-nologies, e. g. mechanical, electronic and software components, the latter frequently controlling the system itself

Reliability estimation is becoming established as an important issue of the design process of mechatronic systems.We propose to estimate the mechatronic system reliability using coloured Petri Nets. A study of system reliability is generally preceded by a functional analysis,on one side, which consists of defining the material limits, the various functions andoperations realized by the system and the various configurationsand on the other side by dysfunctional analysis , in regards toobtain all needed information about failure modes and theireffects. We propose to evaluate mechatronic systems reliability using SADT, FMEA, SEEA and Coloured Petri.

Figure:



Component	Distribution	Parameters
Electronic	Exponential	$\lambda=3.10^{-4}h^{-1}$
Mechanical	Weibull	$\beta=1.5$, $\eta=3700h$
Software	Jelinski-Moranda model	$N_0=70$, $\Phi=3.10^{-6}h^{-1}$

Recent Publications:

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3. A. *Desroches Concepts et méthodes probabilistes de base de la sécurité, Lavoisier, 1995.*
4. P. Lyonnet, Ingénierie de la fiabilité, Lavoisier, 2006.
5. Jensen, K. (1997). Coloured Petri Nets: Basic Concepts, Analysis Methods and Practical Use (Volume 1), Volume 1. Springer Verlag.

Biography

Author has her expertise in the filed of quality and reliability engineering. She studied at the National School of Applied Sciences in Oujda ,Morocco.Her graduation project was about the eco-conception of a new plant for Safran Enginnering in Casablanca, she has experience as quality and environmental audits responsible and as quality and reliability manager in automotive and aeronautic industries .She is now a PhD student at Mohammadia School of Engineers in Rabat , Morocco.

Her objective is to suggest a new methodology for estimating the reliability of complex eco-designed mechatronic systems for industries.

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Treatment of olive oil mill wastewater produced in the province of Al-Hoceima (northern Morocco) by electrocoagulation with aluminum electrodes

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[2] *Laboratory of engineering sciences and applications, University Abdelmalek Essaadi, National school of Applied Science, Hoceima, Morocco.*
[3] *Laboratory of Applied Analytical Chemistry, Materials and Environment, Faculty of Science, University of Mohammed First, Oujda, Morocco*
[4] *Laboratory of Separation Processes, Faculté des Sciences, Université Ibn Tofail, B.P 242, Kenitra, Morocco*

Abstract

The process of extraction of olive oil produced liquid waste (the olive oil mill wastewater (OOWM)) harmful to the environment. The purpose of this work is to apply electrocoagulation technology to treat two types of these effluents; Untreated OOMW having a pH of 4.7, a DCO of 78.5 g of O2/l, a DBO5 of 43.6, an MES of 23.27 g/l and a 1.2 g/l of polyphenols and the OOMW treated by coagulation technique using a combination of 1.7g/l aluminum sulfate and 20 g/l of lime as a coagulant. The results show that the reduction rate for untreated OOMW is 55% DCO, 58% MES, and 60% polyphenols. While the rate of reduction of the combination of two techniques is very high, the percentage of elimination of DCO is 86%, 78% of the MES, and 70% of the polyphenols. Liquid releases can be released to streams or sewer systems without the risk of disrupting the operation of the treatment plant.

Recent Publications:

1. KASHEFIALASI M., M. KHOSRAVI, R. MARANDA et K. SEYYEDI (2006). Treatement of dye solution containing colored index acid yellow 36 by electrocoagulation using iron electrodes. Inter. J. Envir. Sci. Technol., 2, 365-371
2. HEIDMANN I. Et W. CALMANO (2007). Removal of Zn(II), Cu(II), Ni(II), Ag(I) and Cr(VI) present in aqueous solutions by aluminium electrocoagulation. J. Hazard. Mater., 152, 934-941.
3. ADHOUM N., L. MONSER, N. BELLAKHAL et J. BELGAIED (2004). Treatment of electroplating wastewater containing Cu2+, Zn2+ and Cr (VI) by electrocoagulation. J. Hazard. Mater., 112, 207-213.

Biography

Aouatif ELABDOUNI is a Ph.D. student in the chemical environment at Ibn Tofail University. Her research revolves around the treatment and valorization of olive mills wastewaters. Recently she published two articles about that. She is currently involved in research/creation projects related to her Ph.D.'s subject with Dr.KHadija haboubi. She holds a diploma in environmental engineering from the National School of Applied Sciences of Al Hoceima.

She believes that the environment and the development of any country are both two sides of the same coin, if we cannot sustain the environment, we cannot sustain ourselves.

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Quality and maintenance of solar PV installations

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[1]*Laboratory of Structural Engineering, Intelligent Systems and Electrical Energy, ENSAM, Hassan II University, Casablanca, Morocco.*
[2]*Institut de Recherche en Énergie Solaire et en Énergies Nouvelles (IRESEN)*

Abstract

While the stone age ended because of man's quest for progress and not the lack of stones, studies have shown that the oil age may indeed come to an end when we run out of oil. And this has further strengthened the resolve of man to look for other sources of electricity production that are renewable and sustainable. One of such sources is the energy from the sun popularly referred to as solar energy. While solar energy is renewable and sustainable, the life span of solar PV panels according to researchers is 25-30 years.

And so solar PV installations must be made up of components of premium material quality and be maintained for them to be sustainable. As we continue to reflect on innovative methods for recycling or landfilling solar PV panels and deep cycle batteries in an economic and eco-friendly manner after their lifespan, it our duty to make assurances double sure that solar PV installations are installed and maintained in the best possible manner to enjoy optimal yield in electricity production during their lifespan.

Figure: *Green Energy Park Benguerir Morocco*

Recent Publications

1. *Adekanle O. S., Makhad M., Bahri H., Obar A. E., J. IEEE (2020) DOI: 10.1109/ICEIT48248.2020.9113224*

Biography

Author has his expertise and passion in the production, transportation and distribution of green energy. His focus is based on the Multi-scale modelling and optimal configuration of future grid networks. He was awarded his MSc in 2019 from Hassan II University. He is currently a doctoral student in Hassan II University and has published a research paper.

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Weight loss, electrochemical, EDX and SEM studies on the inhibition performance of Trans- Cinnamaldehyde as corrosion inhibitor of mild steel in molar hydrochloric acid

J. Lazrak[1], El H. El Assiri[2], S. Alaoui mrani[1], E. Ech-chihbi[1], F. El-Hajjaji[1], A. Saady[1], M. Taleb[1], T. Saffaj[3]

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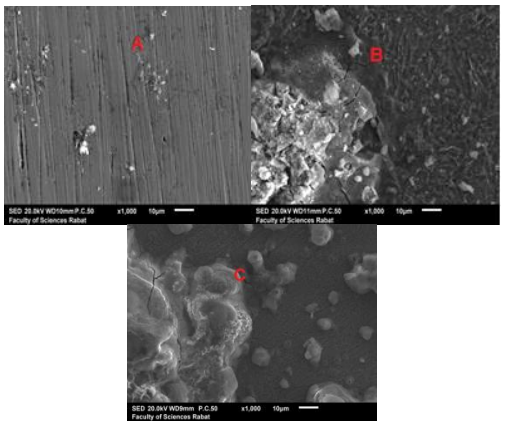
Abstract

Over the last decades, iron and mild steel have been widely used in a variety of environments services containing acidic solutions. Because of these more or less aggressive environments, the surfaces of these materials are easily degraded. To protect them, inhibitors are added as an original means of anticorrosion.

The objective of this work is to study the effect of Trans-cinnamaldehyde, namely (2E)-3-phenylprop-2-enal (TCA) as corrosion inhibitor of mild steel in molar hydrochloric acid solution, by using, the weight loss, the Tafel polarisation and the electrochemical impedance spectroscopy (EIS). The experimental results have showed that TCA revealed a good inhibition potential and that the inhibition efficiency is increased with the inhibitor concentration. Potentiodynamic polarisation suggested that it is a mixed type of inhibitor, and the adsorption of TCA on the mild steel surface, in 1 M HCl solution, obeyed to the Temkin, Al-Awady and Florry-Huggins isotherms.

Moreover, the scanning electron microscopy (SEM) and the EDX analyzes were used to characterize the chemical composition of the formed film on the mild steel surface.

Figure:



Recent Publications

1. El Hajjaji, F., Abrigach, F., Hamed, O., Hasan, A.R., Taleb, M., Jodeh, S., Rodríguez-Castellón, E., del Valle Martínez de Yuso, M., and Algarra, M., Coatings, 8 (2018) 330.
2. Kalaiselvi K, Chung I-M, Kim S-H, Prabakaran M., Anti Corros. Methods Mater., 65(4) (2019) 408-416.

Biography

Jamila Lazrak is a professor of physics and chemistry in secondary school. Her focus is based on the use of organic molecules eco-friendly to have application in anticorrosion field. She will prepare her PhD in Engineering Laboratory of Organometallic, Molecular Materials and Environment, in Faculty of Science, Sidi Mohamed Ben Abdellah University, Fez, Morocco.

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Characterization of river and marine sediments for a possible valorization in road engineering

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[3]*Civil Engineering And Geo-Environment Laboratory (LGCGE). Institut Mines Telecom, Douai, France*

Abstract

Sediment dredging is a required operation in order to maintain transport and maritime activities. On one hand, the sediments extracted are often polluted with heavy metals and organic compounds. On the other hand, their valorization in civil engineering is an effectivesolution and in accordance with the challenges of sustainable development.

This investigation focuses on the characterization of dredged sediments extracted from a French commune located in Noyelles sous Lens, for their use in the formation of road sub-layers.This material was characterized in its raw state by physico-chemical, mechanical and environmental tests in order to be able to validate its exploitation in road engineering.

The results showed that the dredged sediments of Noyelles sous Lens are silty according to the triangular classification and are located precisely in class A2 of the GTR. They are characterized by a high water content in the raw state,a small fraction of organic matter and a large load of heavy metals.In addition,this materials containmainly oxygen, silicon and calcium, and lesser contents of aluminum, iron, potassium, sulfur and phosphate.The physicochemical and mineralogical characterization of dredged sediments of Noyelles sous Lens is promising,however it is essential to study the advantages and limits of these materials from the point of view of mechanical performancebefore any use in road techniques.

Keywords: Dredging sediments, valorization, Road engineering, Physicochemical and mineralogical characterization, leaching.

Biography

Effect of the temperature on corrosion of Lead-rich brass Submerged in tap water at different temperature

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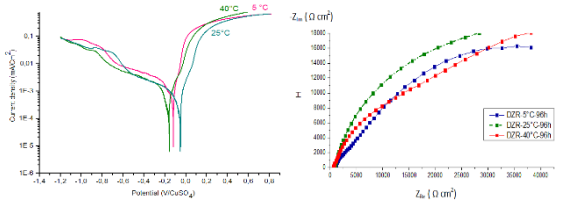
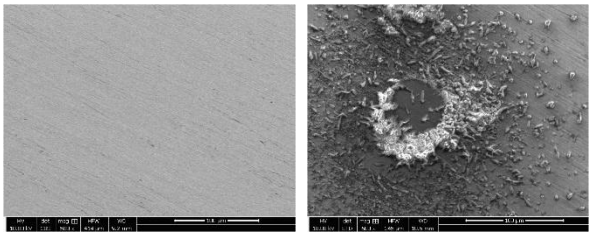
Abstract

CuZn36Pb2As commercial brass is often used for tap water distribution system. We studied the corrosion behavior after a rapid initial period of days for this copper-zinc alloy in contact with drinking water at different temperatures. To study the effects of temperature on the degradation of this alloy in drinking water, we carried out exposure tests, at 5 ° C, 40 ° C and at room temperature. The experimental results revealed that the alloy reacted differently by changing the temperature. An integral study of the electrochemical analyzes was carried out. The results show that the potential experiences lower values at low temperature 5 ° C rather than at high temperature 40°C. These electrochemical polarization and impedance tests also showed that the CuZn36Pb2As alloy tends to resist remarkably at room temperature. Degradation of the CuZn36Pb2As alloy under the light microscope was also slightly exposed at room temperature, with moderate degradation rates. The attacked surfaces were analyzed by the SEM, to describe the morphology before and after the attack. CuZn36Pb2As lead rich brass was found to show poor resistance at critical temperatures.

Figures:



Polarization curves and Nyquist plots recorded for CuZn36Pb2As in tap water after 4 days of immersion at different temperatures



Scanning electron microscopy observations of the corroded surface befor and after 4 days of immersion in tap water at 40°C for CuZn36Pb2As

Recent Publications

1. J. Choucri, Corrosion Behavior of Different Brass Alloys for Drinking Water Distribution Systems. Corr. and Protection of Metals, 2019
2. M. Galai, a-Brass and (a + b) Brass Degradation Processes in Azrou Soil Medium Used in Plumbing Devices, J Bio Tribo Corros, 2017
3. F. Seuss, Corrosion mechanism of CuZn21Si3P in aggressive tap water. Materials and Corrosion, 2016

Biography

PhD student, I work on the characterization of materials and especially on the different types of brass by changing the environmental conditions.

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Evaluation of the in Vitro antioxidant activity of different extracts of Nigella sativa L. seeds, and the quantification of their bioactive compounds

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Abstract

Nigella sativa or Black cumin belongs to the Ranunculaceae family, largely distributed in the Mediterranean region and considered as medicinal spice worldwide for its good potential as a natural antioxidant because of the existence of terpenoids, flavonoids, tannins, alkaloids, and polyphenols [1].

Oxidative stress is due to free radicals and is considered as one of the major risk factors of different diseases such as cardiovascular diseases mainly atherosclerosis, diabetes, hypertension, and cancer [2]. Black cumin was used as a remedy in traditional medicine so, it was logical to investigate its antioxidant activity and this for the different extracts obtained by Soxhlet apparatus, and this was assessed based on two methods: Radical scavenging activity test (DPPH) and Reducing power assay (FRAP).

Among the objectives of our study is to Determine Total phenolic, flavonoids content, and condensed tannins of different *Nigella sativa* seed extracts. The determination of total phenolic content was assessed according to the Folin-Ciocalteu method. The flavonoids were determined spectrophotometrically by a method that depends on the formation of flavonoid-aluminum complex. While the tannins were determined by the vanillin method.

The results obtained showed that the aqueous extract was characterized by the presence of highest amount of total polyphenols (51,17 ± 1,95) μg GAE/mg dry weight. The flavonoids were highly concentrated in the ethanolic extract (43,06 ± 1,25) µg QE/mg dry weight. While tannins were condensed in the dichloromethane extract (43,06 ± 1,25) µg CA/mg dry weight.

The antiradical activity showed that the aqueous extract has registered the smallest value among all extracts tested with an Ic50 = 1489,34 ± 28,64 µg/ml, with no activity observed in chloroform and dichloromethane extracts. Concerning, the ferric reducing power test, the methanolic extract has the lowest value with an Ic50 = 1026,437 ± 3,61 µg/ml

Keywords: *Nigella sativa* L., Polyphenol content Flavonoids content, Condensed tannins, 2,2-diphenyl-1-picrylhydrazyl, Ferric Reducing Power Assay.

Recent Publications

1. Navaratne, "Phytochemical Analysis of Indian and Ethiopian Black Cumin Seeds (Nigella Sativa) Analysis of Indian and Sri Lankan Turmeric View project Statistical Evaluation of Process Variability on Vanilla and Chocolate Ice Cream Manufacturing Process View project P," Agri Res Tech Open Access J, vol. 17, no. 1, 2018.
2. M. Burits and F. Bucar, "Antioxidant activity of Nigella sativa essential oil," Phyther. Res., vol. 14, no. 5, pp. 323–328, 2000

Biography

Young Ph.D. student at the Faculty of Sciences, Oujda. My field of research is focused on phytochemistry and the pharmacological activities of medicinal and aromatic plants. Currently, I'm interested in the extraction of new alkaloids of biological interest.

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Mentha viridis oil as a new eco-friendly corrosion inhibitor for mild steel in 1 M HCl medium

J. Lazrak[1], El H. El Assiri[2], F. El-Hajjaji[1], A. Ramzi [3], M. Taleb[1], T. Saffaj[3], A. Farah[3]

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[3]*Laboratory of Applied Organic Chemistry, Faculty of Science and Technology, Fez, Morocco.*

Abstract

Mild steel is a widely used engineering material because of its high fatigue strength, good cost, ease of construction and availability. However, its corrosion in an aggressive environment, especially in acidic medium, is a challenge that must be considered to protect this material and its alloys from such degradation. Thus, the use of organic inhibitors is a practical technique to protect against this phenomenon. A large number of organic compounds containing heteroatoms, such as: N, S and O could be effective inhibitors. Indeed, most of these compounds are generally obtained by chemical synthesis and therefore have a negative impact on the environment. In this context, extracts or oils from natural plants can play a major role in respecting the environment and combating the degradation phenomenon of steel materials, especially in an acid environment.

This work is an attempt to evaluate the inhibition action of the mentha spicata var. viridis L. essential oil (MVEO) (Fig.1) as an eco-friendly and non-toxic corrosion inhibitor, on the corrosion of mild steel in 1M HCl medium, by using the weight loss (WL), the potentiodynamic polarization (PP) and the electrochemical impedance spectroscopy (EIS). The obtained results showed that MVEO is a good corrosion inhibitor in the studied solution. As well, the polarization measurements revealed that the essential oil of the studied compound acted as a mixed type inhibitor with anodic prevalence inhibition. The Nyquist plots showed that increasing the concentration of this inhibitor leads to an improvement in charge transfer resistance and a decrease in the capacity of the double layer. Also, the experimental results demonstrated that the adsorption of the oil components of the investigated plant on the metalic surface follows the Temkin adsorption isotherm and the E_a and ΔG_{ads} values confirmed a physical adsorption processes of this inhibitor.

Keywords: Mentha spicata var. viridis L., corrosion inhibition, EIS, Adsorption, mild steel, Temkin isotherm.

Figure: *Mentha spicata var. viridis L. plant*

Biography

Jamila Lazrak is a professor of physics and chemistry in secondary school. Her focus is based on the use of organic molecules eco-friendly to have application in anticorrosion field. She will prepare her PhD in Engineering Laboratory of Organometallic, Molecular Materials and Environment, in Faculty of Science, Sidi Mohamed Ben Abdellah University, Fez, Morocco.

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Focus on the predictive management of COVID-19 risk in educational Institutions in Morocco

H. RACHIDI [ab], S. DADI[a], H. ZAHIR[a] and H. LATRACHE [a]

[a] *Research team: Laboratory of "Bioprocesses and Biointerfaces", Faculty of Science and Technology, Sultan Moulay Slimane University, Béni Mellal, Morocco.*
[b] *Directorate of Human Resources and Executive Training, Ministry of National Education, Vocational Training, Higher Education and Scientific Research*

Abstract

The pandemic of coronavirus at the international and national levels constitutes a real problem for health, economy, trade and certainly education.

In Morocco, general confinement, since March 20, 2020, is an obligation to limit the spread of this virus. The Ministry of National Education decided to close education and training institutions on March 16, 2020. It adopted, in parallel, several proactive and preventive measures to deal with this pandemic on several levels, including distance education.

Certainly these measures taken in the field of education are highly important, but require reinforcement for a continuous improvement of the safety and health of learners and the professional body. Continuous prevention measures are proposed in this study, acting on legal, human resources and educational content aspects, as well as on the preventive aspect on which we offer simplified methods and tools for the effective management of COVID-19 risk. In particular, we offer a checklist, adapted to the school context, used to conduct periodical internal audits for regular control and monitoring of the health situation in the school institution and the implementation of corrective and preventive actions.

Recent Publications

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2.Van Doremalen N. and coll. J. Med. [2020]. Doi: 10.1056/NEJMc2004973.
3.Bayham J, Fenichel Eli P. Lancet Public Health. [2020]; https://doi.org/10.1016/ S2468-2667(20)30082-7
4.Zhou L. and coll. [2020]; Best Evidence, vol. 4, n° 2, pp. 501-519.
5.Ministry of National Education, Vocational Training, Higher Education and Scientific Research [2020]. www.men.gov.ma

Biography

The main author is a specialist in occupational safety and health, PhD in quality management and risk analysis in agri-food, national doctorate obtained in 2011, from the University Sultan Moulay Slimane, Béni Mellal. She has published more than 12 articles in this field, including articles published on indexed journals SCOPUS and by ELSEVIER MASSON

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Comparative study of the adsorption of heavy metals (Cu (II), Co (II), Pb (II) and Ni (II)) by the clay of Sale-Morocco: Tests for recovery for treatment polluted industrial effluents

H. Es-sahbany[1*], M. L. El Hachimi[2], M. Allaoui[3], M. S. Elyoubi[1]

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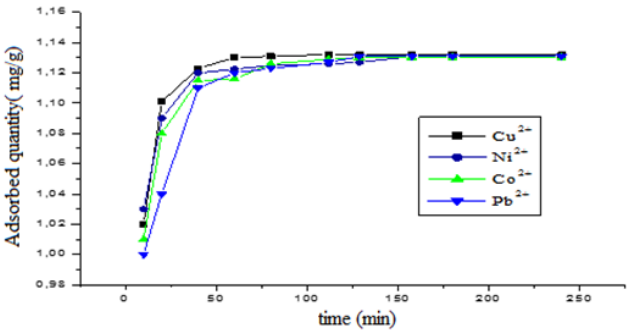
[2]*Geology laboratory, Geosciences and Environment team, CRMEF, Rabat, Morocco.*
[3] *Laboratory of Materials, Electrochemistry and Environment, Team of Corrosion, Protection and Environment, Department of Chemistry, Faculty of Sciences, Ibn Tofaïl University, B.P. 133, 14000, Kenitra, Morocco*

Abstract

The presence of heavy metals in industrial wastewater is a major problem for the environment because of the harmful impact of these elements as toxic contaminants for living beings fauna and flora) of aquatic and terrestrial ecosystems and also for heath human. This work concerns et comparative study of the adsorption of heavy metals (Cu, Co, Ni and Pb) by Sale- Morocco clay. For this purpose, adsorption testes of four heavy metals in solution (in the form of copper, cobalt, nickel and lead nitrate of hydrated of different concentrations on the clay used are carried out. The mass of the adsorbent (clay), the initial content of the ions used, the pH of the solution, the stirring speed and the stirring time were measured. Indeed, these variables considerably influence the kinetics. The adsorption of heavy metals on the clay studied. The results pf our study has shown that the adsorption of heavy metals by the clay used are well suited to the Freundlich/ Langmuir models. According to these present results, it is proves that the adsorption of Cu(II) by the clay exploited during this work is better than Co(II), Ni(II) and Pb(II), this can be explained by the specified valance layer of each metals and also the specific surface of this clay.

Keywords: Comparative, study, adsorption, heavy metals, clay, elimination, industrial wastewater treatment.

Figure:



Recent Publications

1. Es-sahbany H., Berradi M., Nkhili S., Hsissou R., Allaoui M., Loutfi M.,Bassir M., Belfaquir M., Elyoubi M.S., J. Materials Today: Proceedings 13(2019) 866-875.
2. Allaoui M., Berradi M., Taouil M., Es-sahbany H., Kadiri L., Ouass A., Bensalah J., Ibn Ahmed S., J. Anal & Bioanaytical Electrochem 11(2019) 1547-1558.
3. Hsissou R., Berradi M., Grich M., Bahaj H., ElBouchti M., Khudhair M., Es-sahbany H., Rafik M., Elharfi A., J. Chem Techno & Meta. 45(2019) 893-901.
4. Es-sahbany H., Berradi M., Nkhili S., Bassir D., Belfaquir M., Elyoubi M S., Moroccan J. Chemistry 6(2018) 173-179.
5. Es-sahbany H., Nkhili S., Berradi M., Nassali H., Aziane N., Belfaquir M., Elyoubi M., Applied J. of Envi Engin Sci 3(2017) 1-6

Biography

I have my expertise in evaluation and my passion for improving wastewater treatment with different types of natural adsorbents. My goal is based on the use of natural clay to remove micropollutants from wastewater. The discussion of my thesis will be in 2020 at the University of IBN Tofail Kenitra Morocco. I have published more than 5 articles on Google Scholar and 3articles on Scopus.

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Characterization of post-consumer recycled High Impact Polystyrene from disposable cups

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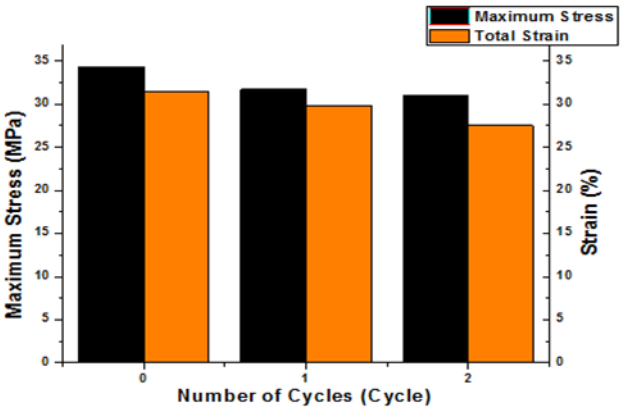
[2]*Institute of Maritims Studies, Laboratory of Materials and Structures, Casablanca, 20232, Morocco*

Abstract

The aim of this work is to characterize high impact polystyrene (HIPS) from disposable cups of different shapes and colors, these post-costumer cups were first crushed using a shredder, giving small particles of about 5 mm in characteristic size. A small portion of these granules was dedicated to the MFI, DSC, IRFT and TGA test, while the rest was molded using a SINTESI injection press with a 40-ton compression force. Cylinder and nozzle temperatures were set at 200 ° C and 180 ° C, respectively, while the mold was held at 45 ° C. The dimensions of the molded samples were for tensile samples. In order to simulate the recycling process as accurately as possible, the disposable cups underwent 2 successive grinding / injection cycles, and during each cycle the tensile, flexural strength, DSC, IRFT, TGA and MFI tests were performed to evaluate the evolution of the thermos-mechanical properties of the material. The results suggested a mild damage due to thermomechanical processing during mechanical recycling, through chain scission mechanisms.The FTIR test confirmed the material purity, as the specter matches the virgin material's, except peaks of different nature, those turned out to be mineral charges and soot validated by the TGA test. The ATG also indicates a slight improvement in thermal degradation, which indicates that high impact polystyrene recycled twice still falls in rigid thermoplastics as its mechanical and thermal properties barely changed. The material is considered to be reintegrated in the industries.

Figure: *Results of maximum stress and strain for virgin and recycled HIPS*



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2. Kalargaris, I.; Tian, G.; Gu, S. The utilisation of oils produced from plastic waste at different pyrolysis temperatures in a DI diesel engine. Energy 2017, 131, 179–185.
3. Zander, A.N.E.; Gillan, M.; Gardea, F. Recycled polypropylene blends as novel 3D printing materials. Addit. Manuf. 2019, 25, 122–130.
4. Mourad, A.I. Thermo-mechanical characteristics of thermally aged polyethylene/polypropylene blends. Mater. Des. 2010, 31, 918–929

Biography

Author is a PhD student and an engineer at the National School of Electricity and Mechanics of Casablanca, the main focus of her work is : Characterization of post-consumer plastic materials.

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