EURASIA CONFERENCES

Book of Abstracts

5th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

5th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

MAY 20-21, 2024 | ROME, ITALY

Hosting Organization:
Eurasia Conferences, 124 City Road, London, EC1V 2NX.

EURASIA CONFERENCES

5th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

5th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 20-21, 2024 | Rome, Italy

BOOK OF ABSTRACTS

Abstracts of the 5th World Conference on Chemistry and Chemical Engineering and 5th World Conference on Advanced Materials, Nanoscience and Nanotechnology

Conference Dates:
May 20-21, 2024

Organized by:
Eurasia Conferences
124 City Road, London, EC1V 2NX
United Kingdom
Website: www.eurasiaconferences.com
Email: info@eurasiaconferences.com

ISBN for Conference Abstracts Proceedings:
978-81-970328-7-5

TABLE OF CONTENTS

TABLE OF CONTENTS

ABOUT EURASIA CONFERENCES

Established in 2022, Eurasia Conferences has rapidly gained recognition for organizing high-quality conferences across a diverse range of fields including science, technology, social sciences, humanities, business and economics, life sciences, medicine, and healthcare. Our mission is to drive progress and innovation through dialogue and collaboration among professionals worldwide.

Since our inception, we have successfully hosted over 50 conferences, providing platforms for scholars, researchers, professionals, and students to exchange knowledge and cultivate new ideas. Our events are strategically designed to foster networking, stimulate in-depth discussions, and facilitate the sharing of cutting-edge research and practical solutions to address contemporary challenges.

At Eurasia Conferences, we are dedicated to delivering an exceptional conference experience, with a focus on inclusivity and the broad dissemination of knowledge. Participants at our events become part of a community committed to making a positive impact on global society. We invite you to join us at our conferences, where we continually strive for excellence in promoting academic and professional development.

EURASIA CONFERENCES

5th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

5th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 20-21, 2024 | Rome, Italy

SCIENTIFIC PROGRAM

08:50-09:00 @ **Introduction, Welcome note and Conference Inauguration**
Conference Room: "Tramontana"

DAY 1

May 20, 2024

Speaker Sessions

09:00-09:30

Title: Al, Fe, and Zr-Based Trimetallic Pillaring of Bentonite Clay for Gas Adsorption

Nezihe Ayas, Department of Chemical Engineering, Faculty of Engineering, Eskisehir Technical University, Eskisehir, Turkey

09:30-10:00

Title: Effectively Utilizing Safety Datasheet Information in Developing a Risk-Based and Fit-For-Purpose Facility Design

Veronica Christine B. Luna, HSE Engineering and Design Department, Fluor, Muntinlupa City, Philippines

10:00-10:30

Title: Innovative Approach for BPCS Reliability Calculation in Risk Analysis

Florin Omota, Process Engineering Department, Fluor Amsterdam, Hoofddorp, The Netherlands

10:30-11:00

Title: Amine-functionalization of silica using supercritical CO2

Marta Gallo, Politecnico di Torino, Department of Applied Science and Technology, Turin, Italy

Tea and Refreshments Break 11:00-11:30

11:30-12:00

Title: Complex Evaluation of Moisture Management Properties of Cotton-Antistatic Polyester Knitted Fabric

Virginija Daukantienė, Department of Production Engineering, Kaunas University of Technology, Kaunas, Lithuania

12:00-12:30

Title: A Numerical Thermo-Chemo-Flow Analysis of Thermoset Resin Impregnation in LCM Processes

Hatim Alotaibi, Institute of Earth and Space Science, King Abdulaziz City for Science and Technology, Riyadh 12354, Saudi Arabia. Department of Mechanical, Aerospace and Civil Engineering, The University of Manchester, Manchester, UK

12:30-13:00

Title: Developing Functional Carbon-Dots Based Nanomaterials for Bacterial Inhibition

Siqi Wang, School of Pharmacy, Queen's University Belfast, UK

Lunch Break 13:00-14:00

Poster Session-1

Poster-1

Title: Determination of Polyethoxylated (POE) Compounds and Cationic Surfactants in Mixture Respecting Principles of Green Analytical Chemistry

Dubravka Madunić-Čačić, SAPONIA, Chemical, Pharmaceutical & Foodstuff Industry / HR-31000 Osijek, Croatia

Poster-2

Title: Stabilization of Color Of Heavy-Duty Liquid Detergent by Simultaneously Working on Two Problematic Reactions: Rection of Product Base With Colorant and Reaction of the Product Base With Fragrance Composition

Maja Aničić, Valentina Novački, R&D Liquid Detergents, Saponia d.d./ Osijek, Croatia

Poster-3

Title: Direct Laser-written on PDMS Enables Efficient Antifouling Ability

Wanqing Dai, Department of Applied Science, School of Science and Technology, Hong Kong Metropolitan University, Kowloon, Hong Kong SAR, China

Poster-4

Title: A Self-Powered Wearable Flexible Sensor Based on the Conductive Polymer PEDOT:PSS Hydrogel That can Monitor Lactic Acid Concentration in Human Sweat Using a Smartphone

Jing Sun, Science & Technology School, Hong Kong Metropolitan University, Kowloon, Hong Kong SAR, China

Poster-5

Title: In vitro evaluation of adjuvant therapy with hyperthermia induced by irradiation (NIR) of AuNPs and ICG in tumor cells

Alfredo Pineda-Medina, Laboratorio de Investigación Traslacional de Terapias contra el Cáncer, Unidad de Biotecnología Medica y Farmacéutica, Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco, Concejo Nacional de Tecnología y Ciencia, Guadalajara, Jalisco, México

Tea and Refreshments Break 15:00-15:30

Poster Session-2

Poster-6

Title: Explosive Percolation Phenomenon Of High Conductive Polyethylene Oxide/Titanium Nanocomposite Films

Ahmad A. Ahmad, Department of Physics, Faculty of Science and Arts, Jordan University of Science and Technology, Jordan

Poster-7

Title: Physicochemical modification of natural and synthetic zeolites as a way to obtain advanced Hg0 sorbents

Piotr Kunecki, Division of Applied Geochemistry and Environmental Engineering, Mineral and Energy Economy Research Institute of the Polish Academy of Sciences, Krakow, Lesser Poland, Poland

Poster-8

Title: Features of the Periodic structure on the Surface of 12Cr18Ni10Ti Steel Formed Under the Action of Femtosecond Laser Irradiation

Tetiana Tepla, Department of Materials Science and Engineering, Lviv Polytechnic National University, 79040, Lviv, Ukraine

Poster-9

Title: Determination of the Geopolymer Binders Setting Time for 3D Printing Technology

Dariusz Mierzwiński, Department of Materials Science and Engineering, Cracow University of Technology, Warszawska 24, 31-155 Cracow, Poland

Poster-10

Title: Utilization of Fly Ash from Co-Combusting Coal and Waste-Derived Fuel in Blended Cement

Wei-Hsing Huang, Department of Civil Engineering, National Central University, Taoyuan, Taiwan

Poster-11

Title: Development of Antibacterial Carbon Dots by Using a One-Pot Microwave-Assisted Approach

Siqi Wang, School of Pharmacy, Queen's University Belfast, UK

Day-1 Closing Cermony 17:00-17:30

DAY 2

May 21, 2024

09:50-10:00 @ Introduction and Welcome Note

(Virtual Session via Zoom) UTC/GMT +2

Keynote Session

10:00-10:30

Title: Nanocellulose for sustainable future materials

R.A. Ilyas, Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia, Malaysia

Speaker Sessions

10:30-11:00

Title: Bulk and monolayer WSe2 and the effect of the V doping

Eleonora Pavoni, Department of Matter, Environmental Sciences, and Urban Planning, Marche Polytechnic University, 60131 Ancona, Italy

11:00-11:30

Title: Chitosan Functionalized Intranasal Nanoemulsions of Iloperidone for Improved Brain Delivery–Development, in Vitro and in Vivo Studies

Niserga D. Sawant, C. U. Shah College of Pharmacy, SNDT Women's University, Mumbai 400049, Maharashtra, India

Tea and Refreshments Break 11:30-11:50

11:50-12:20

Title: Advanced and Critical Applications with Developments of Clay Species in Waste Water Treatments

Suresh Aluvihara, Department of Chemical and Process Engineering, University of Peradeniya, Peradeniya, Sri Lanka

12:20-12:50

Title: Ethylene Design Considerations in the Polymer Industries

Pierree Angeli Gilbuena, Process Engineering Department, Fluor Inc., Muntinlupa City, Philippines

Lunch Break 13:00-14:00

14:00-14:30

Title: Structure and Properties of Stacking-type Complexes of Triazin at Graphene Surface: A Theoretical Assessment

Keshab Kumar Adhikary, Center for Environmental and Energy Research (CEER) – Engineering of Materials via Catalysis and Characterization, Ghent University Global Campus, South Korea

14:30-15:00

Title: Gas phase hydroxylation of benzene to phenol by using CO2 as an oxidant over Cu-exchanged ZSM-5 catalysts

Sheikh Tareq Rahman, Center for Environmental and Energy Research (CEER), Ghent University Global Campus, Republic of Korea

15:00-15:30

Title: Synthesis of Novel 1,3-Indandione Derivatives and Investigation Their Anti-Microbial and Anti-Fungal Activity

Hossein Mostafavi, Department of Organic chemistry & Biochemistry, Faculty of Chemistry, University of Tabriz, Tabriz, Iran

Tea and Refreshments Break 15:30-15:50

15:50-16:20

Title: The Advanced Applications of Earth Materials based upon the Adsorption and Absorption Processes

Suresh Aluvihara, Department of Chemical and Process Engineering, University of Peradeniya, Peradeniya, Sri Lanka

16:20-16:50

Title: The Development and Validation of a GC-MS Method to Quantify Short and Branched Chain Fatty Acids in Human Stool and Applied to Patients with Inflammatory Bowel Disease and Healthy Controls

Justin Gray, Department of Chemistry, Cleveland State University, Cleveland, OH USA

16:50-17:20

Title: Nanotech Application for Vector Control

Latika Bhatt, Department of Textile Design, NIFT, Bhopal, Madhya Pradesh, India

Day-2 Closing Cermony 17:20-17:30

EURASIA CONFERENCES

5th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

5th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 20-21, 2024 | Rome, Italy

SPEAKER PRESENTATIONS | DAY 1

5th World Conference on Chemistry and Chemical Engineering
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-001

Al, Fe, and Zr-Based Trimetallic Pillaring of Bentonite Clay for Gas Adsorption

Nezihe Ayas[1,*], Nasrin Pourmoghadam [2], Tolga Kaan Kanatlı [3]
[1, 2, 3] Department of Chemical Engineering, Faculty of Engineering, Eskisehir Technical University, Eskisehir, Turkey.

Structural pillaring is a widely used technique that improves the adsorbent's surface area and interplanar spacing. Aluminum is a frequently utilized pillaring metal due to its unique ability to create Al13 polymer structures in montmorillonite materials. Iron and zirconium are also often used pillaring metals; however, when employed as stand-alone pillaring agents, they are known to be less effective; so, they are typically utilized in combination with Al in bimetallic form and are reported to improve the pillaring action on bentonite clay. However, there are no instances in the literature of them being used in trimetallic form on bentonite clay. In this work, monometallic Al/Bentonite, Fe/Bentonite, Zr/Bentonite and the trimetallic Al-Fe-Zr/Bentonite pillared clays were synthesized and characterized. An OH/metal ratio of 2:1 was used. The adsorbents were analyzed through X-ray diffraction (XRD) and their interplanar distances were calculated. They were further analyzed through scanning electron microscopy (SEM), and N2 Adsorption/Desorption analysis via Bruner, Emmett, Teller method (BET). Using the Bragg equation on XRD patterns, the interplanar layers of the Al, Fe and Zr pillared bentonite materials were calculated as 19.0, 16.9 and 4.0 Å respectively. Al/Bentonite was used in the gasification of sugar beet pulp to determine if the adsorbent has catalytic activity as well. The H2 and CO2 concentrations of the gas product were observed as 51 and 36% respectively, which is a promising result. Adsorption tests are being continued.

Keywords: Adsorbent, Hydrogen, Pillaring, Bentonite, Trimetallic

Biography:

Nezihe Ayas is a full professor of Chemical Engineering at Eskisehir Technical University. Her research interests include gasification technology, energy conservation, hydrogen energy and fuel cells, bioenergy, biodiesel and catalyst preparation via different synthesis methods. She is the author of 100+ national and international journal papers along with a similar number of conference papers on the different aspects of her areas of expertise. She has been involved as a project manager in 25+ international and national funded projects. Her research team is actively working in the areas of biofuel production, hydrogen, gasification and fuel cell technologies, process modelling and simulation.

5th World Conference on Chemistry and Chemical Engineering
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-002

Effectively Utilizing Safety Datasheet Information in Developing a Risk-Based and Fit-For-Purpose Facility Design

Veronica Christine B. Luna
HSE Engineering and Design Department, Fluor, Muntinlupa City, Philippines

It is a common knowledge that chemical and petrochemical facilities handle substances which are considered hazardous. The level of harm associated with these substances varies from being lethal to harmful to personnel and environment or from being highly flammable to combustible. The facility design process can be simplified by incorporating overly conservative protection measures in the design even for hazards which are considered to pose relatively lower risk and can be effectively controlled by other means than engineered controls. Doing this does not prove to be an effective way in managing the hazards associated with the plant as it could lead to an unsafe operating practices due to the potential for focus to be diverted away from the major hazards which need more attention, time and resources.

This presentation will share best practices how safety datasheet information can be effectively utilized to provide guidance in developing a fit-for-purpose design based on numerous project experiences. It also presents how SDS can enable employing a risk-based approach in incorporating safety during the plant design process.

SDS provides recommendations for protection measures, albiet may not be all inclusive, but a good starting point. It is considered to be one of a valuable reference, especially for emerging novel technologies to support global thrust for clean energy wherein no industry guidance or codes and standards are currently available. Collectively utilizing information from hazard identification results, SDS, and risk assessments, paired with expert engineering judgement, a fit-for-purpose and safe plant design can be developed.

Biography:

Veronica has more than twenty years of industry experience. Experienced in several phases of design work and Project Management Consultancy services.

Fluor Fellow in Technical Safety and HSE Verification/Compliance, specializes in technical safety field which includes the identification, assessment, and management of HSE risk associated with the facility Fluor designs. It includes performance of risk assessments which enables the project to make the right decisions to provide a safe and fit for purpose design solutions to our clients.

Certified Functional Safety Engineer, also recognized as one of the Company's Global SME in HSE in Design and Hazard/and Risk Analysis.

EURASIA CONFERENCES

5th World Conference on Chemistry and Chemical Engineering

May 20-21, 2024 | Rome, Italy

https://doi.org/10.62422/978-81-970328-7-5-003

Innovative Approach for BPCS Reliability Calculation in Risk Analysis

Florin Omota

Process Engineering Department, Fluor Amsterdam, Hoofddorp, The Netherlands

The Basic Process Control System (BPCS) is dedicated to monitor and control chemical process automatically with the operator intervention, while the Safety Instrumented System (SIS) is providing mainly automatic actions, to protect the people, assets, and environment against potential hazards.

Sharing of a single sensor in BPCS and SIS is unacceptable in risk analysis studies like HAZOP and LOPA. The control and safety functions are not independent, both fail when the sensor fails. When sharing more than a single instrument, BPCS can be treated as a partial protection layer in addition to the risk reduction provided by SIS.

The risk reduction provided by SIS can be assessed by risk analysis and verified based on instrument reliability data, while BPCS contribution is normally neglected. International standard IEC 61511:2016 allows shared elements without being specific regarding conditions and methodology. Therefore, previous studies and recommendations were conservative, discouraging the use of shared instrumentation.

Sharing instrumentation may provide the same functionality for BPCS and SIS but at lower cost. Without considering the real contribution of BPCS, the safety studies may result in SIS overdesign and extra cost.

This study supported by several case studies, demonstrates how BPCS can improve overall safety when sharing the instrumentation with SIS. The methodology is based on fault tree analysis and simple probabilistic calculations (AND/OR functions). The calculations demonstrate the impact of BPCS on safety reliability and plant availability with up to an order of magnitude higher. Overall, the plant availability is increased while reducing both CAPEX and OPEX.

Biography:

Florin is Fluor Fellow in Process Control and Functional Safety working as Process Engineering Manager in Amsterdam office. He joined Fluor in 2005 later becoming a subject matter expert in process control. In 2018 he was certified as Functional Safety Expert by Exida. He also worked as Chief Engineer in an ether glycol and derivatives plant at Chimopar SA in Bucharest, Romania. In 1999, he joined the Chemical Engineering Department at the University of Amsterdam as a researcher in process simulation and reactive distillation of fatty acids. He holds a PhD in catalyst modification, slurry reactor performance and scale-up.

5th World Conference on Chemistry and Chemical Engineering
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-004

Amine-functionalization of silica using supercritical CO_2

Marta Gallo[1]*, Silvia Ronchetti[1], Luigi Manna[1], Mauro Banchero[1] and Barbara Onida[1]
[1]Politecnico di Torino, Department of Applied Science and Technology, corso Duca degli Abruzzi 24, 10129, Turin, Italy

Capture and storage of CO2 is a topic of great scientific and public interest. At present, the most diffused process for CO2 capture is wet scrubbing, where CO2 is absorbed by liquid amines. However, this system is highly energy-demanding due to the solvent regeneration step; moreover, liquid amines can quickly corrode the employed equipment. As an alternative, solid adsorbents present appealing properties, since they are easier to regenerate and manipulate. In this perspective, the functionalization of mesoporous silica (which offers the advantage of a high specific surface area) with different amines has been explored by using a green solvent, supercritical CO2 (scCO2), in place of the conventional organic ones. Therefore, two amines were loaded on a SBA-15 silica through scCO2 impregnation: the most-commonly-used (3-aminopropyl)triethoxysilane (APTES) and the higher-molecular-weight, 1,6-diaminohexane (DH). The resulting materials were physico-chemically characterized and their capacity of capturing CO2 was evaluated through volumetric tests (CO2 adsorption isotherms at 25 °C) while Fourier Infrared Spectroscopy was employed to characterize in-situ the surface species formed by CO2 adsorption at room temperature. Results show that the amines were successfully loaded on the silica support. Even when these molecules are not anchored through covalent bonds to the surface (as in the case of DH), they are, nevertheless, stable at temperatures compatible with those of the thermal regeneration of the support (120 °C). Interestingly, the so-obtained adsorbents result to be particularly effective in capturing CO2 at low partial pressure.

Biography:

Marta Gallo is a biomedical engineer holding a Ph.D. in Material Science. She first worked on ceramics for bone replacement. Lately, she broadened her expertise getting involved in the development of silica-based porous systems for the adsorption or the release of molecules in the environmental and pharmaceutical sectors, respectively. Her know-how encompasses the development of these systems from their synthesis up to the evaluation of their performances. Marta Gallo carried out her Ph.D. and worked as a post-doc in France (INSA, Lyon) and in Germany (FAU University, Erlangen); now she works in Italy at Politecnico di Torino.

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-005

Complex Evaluation of Moisture Management Properties of Cotton-Antistatic Polyester Knitted Fabrics

Virginija Daukantiene[1], Norina Asfand[2], and Stase Petraitiene[3]
[1, 2, 3] Department of Production Engineering, Kaunas University of Technology, Kaunas, Lithuania

The comfort of cotton-polyester knitted fabrics can be improved by adding polyester fibres to the fabric content. But the presence of synthetic fibres increases the accumulation of electrical charging on the fabric surface. Thus, the addition of carbon black to the fabric may influence the antistatic behaviour of synthetic textiles. Therefore, for this investigation, knitted materials of two knit patterns, such as 1×1 rib and half-Milano, were developed from yarns having different fiber blend ratios of cotton and polyester containing 0.6 wt. % carbon black. Subsequently, these fabrics were dyed, treated with hydrophilic softener, and antibacterial Polygiene VO-600 finish to increase fabric functionality. SEM analysis and standard test methods were applied to characterise the structure, mechanical, electrical, antibacterial, and air permeability behaviour of the fabrics. For the analysis of the moisture management properties of the investigated fabrics, the water absorption capacity, water absorption time, the relative water vapour permeability, and the relative water vapour resistivity were examined. MATLAB software was applied for linear regression analysis between the overall moisture management capability (OMMC) estimated using the M259 device and individual standard parameters, such as resistance and permeability, water absorption, and air permeability. The linear regression equation OMMC = a + b× X1 + c× X3, where X1 - relative water vapour permeability; X3 - air permeability, was found to be suitable for predicting complex moisture management strongly related to the thermophysical comfort of a particular garment.

Biography:

Professor Virginija Daukantienė, Ph.D in Technological Sciences, Materials Engineering (T008) (Textiles) since 2001. Member of the KTU University Study Quality Committee and the T21 Textile Standardisation Committee on the Lithuanian Standards Board, and expert at the Centre for Quality Assessment in Higher Education. The most significant published scientific articles are available at: ORCID ID 0000-0002-6800-1304.

Research interests: sustainability; fashion industry; textiles; garment technology; clothing manufacture; research design; material testing; material characterisation; functional textiles; textile finishing; microfibers release; new materials; new textile joining methods; modelling of exploitation.

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-006

A Numerical Thermo-Chemo-Flow Analysis of Thermoset Resin Impregnation in LCM Processes

Hatim Alotaibi[1,2] and Chamil Abeykoon[3,4] , Constantinos Soutis[3,4] , Masoud Jabbari[5]

[1]Department of Mechanical, Aerospace and Civil Engineering, The University of Manchester, Manchester M13 9PL, UK
[2]Institute of Earth and Space Science, King Abdulaziz City for Science and Technology, Riyadh 12354, Saudi Arabia
[3]Department of Materials, The University of Manchester, Manchester M13 9PL, UK
[4]Aerospace Research Institute, The University of Manchester, Manchester M13 9PL, UK
[5]School of Mechanical Engineering, University of Leeds, Leeds LS2 9JT, UK

This paper presents a numerical framework for modelling and simulating convection–diffusion–reaction flows in liquid composite moulding (LCM). The model is developed in ANSYS Fluent with customised user-defined-functions (UDFs), user-defined-scalar (UDS), and user-defined memory (UDM) codes to incorporate the cure kinetics and rheological characteristics of thermoset resin impregnation. The simulations were performed adopting volume-of-fluid (VOF)—a multiphase flow solution—based on finite volume method (FVM). The developed numerical approach solves Darcy's law, heat transfer, and chemical reactions in LCM process simultaneously. Thereby, the solution scheme shows its ability to provide information on flow-front, viscosity development, degree of cure, and rate of reaction at once unlike existing literature that commonly focuses on impregnation stage and cure stage in isolation. Furthermore, it allows online monitoring, controlled boundary conditions, and injection techniques (for design of manufacturing) during the mould filling and curing stages. To examine the validity of the model, a comparative analysis was carried out for a simple geometry, in that the numerical results indicate good agreement—3.4% difference in the degree of cure compared with previous research findings.

Biography:

Dr Hatim Alotaibi is currently a Research Assistant Professor in Aerospace Engineering (Specialised in Computational Fluid Dynamics (CFD)) at King Abdulaziz City for Science and Technology (KACST). Alotaibi received his B.A.Sc. (2016) in Industrial Systems Engineering from University of Regina (Canada), MSc (2019) in Aeronautical Engineering from The Hong Kong University of Science and Technology (Hong Kong), and PhD (2023) in Aerospace Engineering from the University of Manchester (United Kingdom). Alotaibi's research focuses at using a combination of modelling, theory and simulation to study " advanced materials and manufacturing processes " that are complex due to multiscale nature of materials, the rheology of fluid, and multiphysics phenomena in which the interactions of various effects (thermal, chemical, electric or mechanical) lead to complex dynamics. His research is motivated by processing and manufacturing of different materials for aerospace structures and energy storage materials.)

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-007

Developing Functional Carbon-Dots Based Nanomaterials for Bacterial Inhibition

Siqi Wang, Colin P. McCoy, Gavin P. Andrews, Matthew Wylie, Yi Ge*
School of Pharmacy, Queen's University Belfast, 97 Lisburn Road, Belfast, BT9 7BL, UK

Carbon dots (CDs) are emerging nanomaterials, attracting increasing attention due to their exceptional properties, such as good biocompatibility, environmental friendliness, versatile functionalization capabilities, and cost-effectiveness. These attributes position CDs and CD-based nanomaterials as promising candidates for various biomedical applications. This study focuses on the development of functional CD-based nanomaterials conjugated with a photosensitizer Chlorin E6 to enhance bacterial inhibition. By employing a novel microwave-assisted approach, we successfully fabricated N-doped CDs from diverse carbon sources various carbon sources (e.g. citric acid, ascorbic acid, tetraethylenepentamine (TEPA), spermidine and urea). Characterized through various analytical techniques including UV, fluorescence, FT-IR, TEM, DLS, and XRD, the resulting CDs demonstrated broad-spectrum antibacterial activities against E. coli, S. aureus, and MRSA. Remarkably, upon conjugation with Chlorin E6, these functional nanomaterials exhibited significantly enhanced antimicrobial efficacy under light exposure. At a concentration of merely 10 μg/mL, the conjugated CDs completely eradicated S. aureus and showed a substantial increase in inhibitory action against E. coli. Cytotoxicity assays on HaCaT cells indicated low toxicity, with cell viability above 80% for concentrations below 200 mg/mL. Our findings have revealed the great potential of these microwave-synthesized and photosensitizer-conjugated CDs in biomedicine, highlighting their applicability in photodynamic therapy and bioimaging. The profound antibacterial activity under light exposure opens new avenues for developing more efficient and cost-effective antimicrobial nanomaterials.

Biography:

Miss Siqi Wang obtained her bachelor's and master's degrees in pharmacy from Jiangsu University in China, where she was the recipient of several scholarships and awards. She has extensive research experience in molecular modelling, small anti-tumor molecule development, and cytotoxicity study. She also gained practical experience as an assistant pharmacist and teaching assistant. Presently, she is a third-year PhD student at Queen's University Belfast in the UK, specializing in nanomedicine and pharmaceutical nanotechnology. Her current research focuses on the development of carbon-based functional nanomaterials for diverse biomedical applications.

EURASIA CONFERENCES

5th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

5th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 20-21, 2024 | Rome, Italy

POSTER PRESENTATIONS | DAY 1

EURASIA CONFERENCES

5th World Conference on Chemistry and Chemical Engineering

May 20-21, 2024 | Rome, Italy

https://doi.org/10.62422/978-81-970328-7-5-008

Determination of Polyethoxylated (POE) Compounds and Cationic Surfactants in Mixture Respecting Principles of Green Analytical Chemistry

Dubravka Madunic-Cacic[1], Maja Anicic[1]

[1]SAPONIA, Chemical, Pharmaceutical & Foodstuff Industry / HR-31000 Osijek, Croatia

Polyethoxylate nonionic surfactants (POE-NS) and polyethylene glycols (PEG) are neutral molecules that do not dissociate in water and from the analytical point of view not easy to determine. They are often present in detergent formulations that also contain cationic surfactants. The goal of this research is the development of analytical methods that will enable their quick and simple determination and at the same time in harmony with the principles of green analytical chemistry (GAC). For this purpose, we investigated potentiometric titrations, instrumental methods fast and simple to perform, in which sodium tetraphenylborate was used as a titrant, and a homemade cationic surfactant selective electrode (HTA-TPB sensor) as an indicator. The experimental part was performed in 3 phases: on two-component model mixtures (1), on laboratory samples of known composition (2), and on commercial products from the market (3). Two series of two-component samples containing cationic surfactants (BAC and DDAC) and fatty alcohol polyethoxylated (POE-NS) with 7 EO groups (often present in cleaning and disinfecting agents) and another containing cationic surfactants of the esterquat type and PEG 400 as a POE compound (common in softener formulations) were analyzed. The results obtained in the developed procedure agree with the expected results and can be applied in practice. .

Biography:

Dubravka Madunic-Cacic has a doctorate in Analytical Chemistry and since 1995 has been working in Saponia (QC-Method development), whose main products are detergents and cleaning agents in general. She is dedicated to developing sensors for surfactant analysis and the R&D of surfactant analytics. Home-made sensors are successfully used in surfactant analysis in real systems and wastewater samples in Saponia laboratories.

Maja Anicic has a doctorate in Chemical Engineering and since 2009 has been working in Saponia (R&D department of liquid detergent), whose main products are detergents and cleaning agents in general. She is dedicated to the development of formulations of liquid detergents, with emphasis on interactions between raw materials, especially fabric softeners.

EURASIA CONFERENCES

5th World Conference on Chemistry and Chemical Engineering

May 20-21, 2024 | Rome, Italy

https://doi.org/10.62422/978-81-970328-7-5-009

Stabilization of Color Of Heavy-Duty Liquid Detergent by Simultaneously Working on Two Problematic Reactions: Rection of Product Base With Colorant and Reaction of the Product Base With Fragrance Composition

Maja Anicic[1], Valentina Novacki[2]

[1]R&D Liquid Detergents, Saponia d.d./Osijek, Croatia

[2]R&D & QC Perfumery, Saponia d.d./Osijek, Croatia

One of the biggest problems of formulating stable heavy duty liquid detergents is the change of product color. Interactions between product base, colorant and scent are common denominators. To provide solution to this problem without major changes in formulation by adding polymers and to keep formulation as sustainable as possible we approached the problem by conjoining solutions from the colorant and fragrance sides.

During testing process, it was observed that fragrance has far greater effect on the product color than colorant. By further inspection hypostasis on Schiff base formation was appointed and confirmed by different methods such as UV-Vis and IR-spectrophotometry.

Interaction of aldehydes in the fragrance, and the amines from the base formulation changes color of the product even if the colorant is not present.

To counteract the problem with the base product changing color, fragrance composition was reformulated to remove aldehydes and exchange them with less reactive fragrant compounds of a similar scent profile.

To provide the best possible results the colorant of the product was also exchanged for one of the greater stability in the given base.

Results provided HDLD of vivid, longer term stable blue color.

Biography:

Maja Anicic has a doctorate in Chemical Engineering and since 2009 has been working in Saponia (R&D department of liquid detergent), whose main products are detergents and cleaning agents in general. She is dedicated to the development of formulations of liquid detergents, with emphasis on interactions between raw materials, especially in heavy duty liquid detergent.

Valentina Novaėki has a MSc in Inorganic Chemistry and since 2021 has been working in Saponia (R&D/QC department of Perfumery). She is dedicated to the development of formulations of functional fragrances, with emphasis on interactions between fragrant raw materials and product bases.

EURASIA CONFERENCES

5th World Conference on Chemistry and Chemical Engineering

May 20-21, 2024 | Rome, Italy

https://doi.org/10.62422/978-81-970328-7-5-010

Direct Laser-written on PDMS Enables Efficient Antifouling Ability

Wanqing Dai[1] and Jian Lin Chen[2]

[1, 2] Department of Applied Science, School of Science and Technology, Hong Kong Metropolitan University, Kowloon, Hong Kong SAR, China

Fouling is a growing concern for the utilization of polydimethylsiloxane (PDMS) in various fields, particularly in microfluidics, due to its impact on surface properties. In this study, we demonstrated that using a CO2 infrared laser directly onto PDMS surfaces that formed a clustered multilayer structure comprising glassy carbon under ambient conditions. This structural configuration imparted PDMS surface with a fouling resistance property. Laser power, speed, frequency, and pulse density all contribute to the resistance of the laser to surface fouling. The surface antifouling ability exhibited an 89.8% improvement over that observed in pure PDMS under the optimized parameters. Augmenting the number of laser repetitions could effectively enhance the surface fouling resistance of PDMS. It was observed that a higher number of laser passes enhanced the fouling resistance of the surface by 94.5% when the number was increased to three times. However, a subsequent increment to four times led to a decline in surface fouling resistance. The results of Raman and XPS revealed a substantial increase in the carbon content on the PDMS surface after three laser repetitions, resulting in complete surface blackening. Subsequently, the determined optimal laser settings were applied to the microfluidic channel constructed with PDMS, yielding favorable long-term fouling resistance. In conclusion, this study showcases the favorable antifouling properties achieved through direct laser writing on PDMS surfaces, highlighting its potential for microfluidic applications.

Biography:

I obtained my MA degree from Wenzhou University in 2021 and I am currently pursuing a PhD at Hong Kong Metropolitan University. My research focuses on investigating antifouling strategies for microchannel interfaces. I have a keen interest in interdisciplinary fields that intersect microbiology, materials science, and microfluidics.

EURASIA CONFERENCES

5th World Conference on Chemistry and Chemical Engineering

May 20-21, 2024 | Rome, Italy

https://doi.org/10.62422/978-81-970328-7-5-011

A Self-Powered Wearable Flexible Sensor Based on the Conductive Polymer PEDOT:PSS Hydrogel That can Monitor Lactic Acid Concentration in Human Sweat Using a Smartphone

Jing Sun[1] and Jianlin Chen[2]

[1, 2]Science & Technology School, Hong Kong Metropolitan University, Kowloon, Hong Kong SAR, China

Lactate in human sweat can serve as a marker for various conditions in the body. Elevated levels of lactate in sweat can indicate the intensity of exercise or physical activity. In this study, we developed a smart-phone-enabled, self-powered wearable flexible sensor based on the conductive polymer PEDOT:PSS hydrogel, capable of monitoring lactate in sweat in real time, eliminating the need for invasive blood sampling. By using the conductive polymer hydrogel as the substrate, the internal resistance of the sensor was greatly reduced, and the current signal was nearly 10 times higher than that of the traditional electrolytic cell system. The linear range of detection is from 10nM to 50mM, and the detection limit is up to 4.38nM. After the sensor was connected to the smartphone via Bluetooth, the error of the result obtained by processing the signal using the APP on the smartphone was no more than 6%. This work provides a new idea for the use of wearable electrochemical sensors in human health monitoring.

Biography:

I obtained my MA degree from Shanghai Normal University in 2022 and I am currently pursuing a PhD at Hong Kong Metropolitan University. My research focuses on electrochemical biosensors. I have a keen interest in interdisciplinary fields that intersect microbiology, materials science, and electrochemistry.

5th World Conference on Chemistry and Chemical Engineering
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-012

In Vitro Evaluation of Adjuvant Therapy With Hyperthermia Induced by Irradiation (Nir) of AuNPs and Icg in Tumor Cells

[1]Alfredo Pineda-Medina, [1]Karla Valdivia-Aviña, [1]Sarah Eliuth Ochoa-Hugo, [2]Moisés Martínez-Velázquez, [2]Flor Yohana Flores-Hernández, [3]Zaira del Rocío López-López, [4]Antonio Topete-Camacho, [3]Mario Eduardo Cano-González, [5]Clara Lucía Guzmán Barba, [5]Manuel Román Aguirre, [5]Natanael Cuando Espitia, [1]Rodolfo Hernández-Gutiérrez.

[1]Laboratorio de Investigación Traslacional de Terapias contra el Cáncer, Unidad de Biotecnología Medica y Farmacéutica, Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco, Concejo Nacional de Tecnología y Ciencia, Guadalajara, Jalisco, México.
[2]Unidad de Biotecnología Medica y Farmacéutica, Centro de Investigación y Asistencia en Tecnología y Diseño del Estado de Jalisco, Concejo Nacional de Tecnología y Ciencia, Guadalajara, Jalisco, México
[3]Centro Universitario de la Ciénega, Universidad de Guadalajara, Ocotlán, Jalisco, México
[4]Centro Universitario de Ciencias de la Salud, Universidad de Guadalajara, Guadalajara, Jalisco, México
[5]Centro de Investigación de Materiales Avanzados, Chihuahua, Chihuahua, México

Hyperthermia (HT) is a novel alternative to cancer treatment based on the increase of temperature between 40-43°C inducing selective death in tumor cells, facing cancer treatment limitations such as drug resistance. HT employs nanomaterials such as gold nanoparticles (AuNPs) with the capacity to absorb light at a wavelength of 600-800nm by near-infrared region (NIR) producing heat, allowing efficient penetration of light into the tumor without damaging near tissue and improving cellular absorption. This work aimed to evaluate the effect on cell viability of HT combined with 5-FU on SW620-GFP colon cancer cells (CRC) and liposome-encapsulated indocyanine green (ICG) on glioblastoma U-87 cells (GBM). Cellular cytotoxicity was evaluated using the MTT assay. An IC50 of 5-FU at 76μM was obtained from the treatment of SW620-GFP cells administered together with a 1:10 dilution of AuNPs, reaching a cytotoxicity of 65%; treatment of U-87 cells by the liposome conjugate (L) together with ICG and AuNPs were applied at a 2:1 dilution, reaching a cytotoxicity of 97%. Both treatments irradiated at two watts of power for ten minutes induced a temperature of 43°C. Treatments without irradiation showed a cytotoxicity level of 59% in SW620-GFP cells whereas U-87 cells reached 49% of cytotoxicity. Results showed that HT irradiated with NIR light enhanced with AuNPs increases cell toxicity in CRC and GBM cells, improving the use of individual therapies. Likewise, the L-ICG-AuNPs + NIR method decreased cell viability the most, compared to chemo-photothermal treatment. The synergistic effect of in vivo tumor models remains to be demonstrated.

Biography:

Alfredo Pineda Medina

Graduated in Biology at the University of Guadalajara. Working as a thesis student at Research Center in Technology and Design Assistance of Jalisco State (CIATEJ) on a project focus on the cytotoxicity activity of Liposome conjugated with ICG and gold nanoparticles in human cancer cell lines. Co-author in the article “Panorama del Cáncer de Colon en México” published in “Horizontes Transdisciplinarios”.

Dr. Rodolfo Hernández Gutiérrez

Principal researcher at Research Center in Technology and Design Assistance of Jalisco State (CIATEJ). Graduated in Biology at the University of Guadalajara, master’s degree in Biological Science at the University of Guadalajara and PhD at CINVESTAV-IPN. The current investigation project is “In vivo evaluation of adjuvant anti-cancer therapy: Hyperthermia induced by photo-stimulation (NIR) and electromagnetism in fluorescent tumor xenograft models”.

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-013

Explosive Percolation Phenomenon Of High Conductive Polyethylene Oxide/Titanium Nanocomposite Films

Ahmad A. Ahmad[1]*, Qais M. Al-Bataineh[1], Lina A. Alakhras[1], Ahmad Telfah[2]

[1]Department of Physics, Faculty of Science and Arts, Jordan University of Science and Technology, P.O. Box 3030, Irbid 22110, Jordan

[2]Nanotechnology Center, The University of Jordan, 11942 Amman, Jordan

This work investigated the percolation phenomenon and its effect on the electrical conductivity and other physical properties of polyethylene oxide/titanium nanoparticles (PEO/TiNPs) nanocomposite films. The electrical conductivity increases abruptly from 1.92×10−3 S.cm−1 to 86.66 S.cm−1 after percolation threshold, followed by constant values at the conductive zone, indicating the formation of conductive pathways through the PEO/TiNPs nanocomposite film. In addition, the localized surface plasmon resonance effect on the percolation phenomenon was investigated accordingly. Scanning electron microscopy images revealed the distribution and morphology of TiNPs in the PEO matrix. Finite element method simulations were used to understand the percolation phenomenon of the nanocomposite films. Fourier-transform infrared spectroscopy confirms the absence of any chemical bonds between TiNPs and PEO. On the other hand, X-ray diffraction and differential scanning calorimetry show that increasing TiNPs in the PEO matrix increases the crystallinity degree of the nanocomposites. The thermal properties of the PEO/TiNPs nanocomposite films were investigated. This study provides valuable insights into the design and fabrication of nanocomposite materials for electronic and optoelectronic applications.

Biography:

I am a Professor of Physics and Chemical and Materials Engineering working at Jordan University of Science and Technology, in the Department of Physics since 1996. Graduated from the University of Nebraska at Lincoln, USA. I am enrolled with the department activities socially, teaching and research works. My research interest focuses recently on various subjects including, semiconductor thin films, polymers, metal oxides, nanocomposites and their applications including surface plasma, surface coatings, catalytic, water splitting, hydrogen storage and production from catalysts. I established my research laboratory of Thin Films and Nanotechnology at the Department of Physics, where a big group of researchers and graduate students are working. More details could be found on may google scholar profile. Please see: Ahmad Ali Ahmad (Omari) - Google Scholar

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-014

Physicochemical modification of natural and synthetic zeolites as a way to obtain advanced Hg0 sorbents

Piotr Kunecki[1] and Magdalena Wdowin[1]
[1]Division of Applied Geochemistry and Environmental Engineering, Mineral and Energy Economy Research Institute of the Polish Academy of Sciences, Krakow, Lesser Poland, Poland

The natural Clinoptilolite (HEU framework) as well as synthetic zeolites, mostly A and X (from LTA and FAU) frameworks were used in this study. Synthetic zeolites were derived using wastes as a source of silica and alumina. Both natural and synthetic zeolites were modified through a series of physicochemical treatments in order to create ability for elemental mercury (Hg0) removal from simulated gas stream. Mercury constitutes a hazardous threat, due to its high chemical and biological activity, durability, volatility and susceptibility to migrations over long distances from the source of pollution. According to the Agency for Toxic Substances and Disease Registry, mercury is placed third on the list of substances most hazardous to human health. The effect of zeolites modification on Hg0 removal from simulated gas stream was studied empirically using prototype installation designed to test the effectiveness of sorption by solid state sorbents. Part of the studied zeolites revealed significant mercury uptake during sorption experiment. The proposed hybrid synthesis method possesses the potential to be implemented for both waste utilization as well as the time and energy saving production of aluminosilicate, porous materials with high Hg0 removal efficiency.

Biography:

Piotr Kunecki completed his MSc studies in 2014 at AGH University of Science and Technology in Krakow, Poland. In 2015-2018, he worked as a research assistant at the Lublin University of Technology, taking part in two research projects. From 2017, he started working as a research assistant at the Mineral and Energy Economy Research Institute of the Polish Academy of Sciences, where in October 2021 he defended his doctorate and started working as an assistant professor. From January 2021, he is also prime investigator of the project supported by the National Science Center, Poland, grant no. 2021/41/N/ST5/03214.

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-015

Features of the Periodic structure on the Surface of 12Cr18Ni10Ti Steel Formed Under the Action of Femtosecond Laser Irradiation

T.Tepla[1], Z.Duriagina[1], D.Mierzwinski[2], M.Nykiel[2], L.Bohun[1]
[1]Department of Materials Science and Engineering, Lviv Polytechnic National University, 79040, Lviv, Ukraine
[2]Department of Materials Science and Engineering, Cracow University of Technology, Warszawska 24, 31-155 Cracow, Poland

The purpose of the work was to evaluate the peculiarities of the formation of a periodic structure on the surface of 12Cr18Ni10Yi steel under the action of a femtosecond laser. The surface structure was formed by a femtosecond titanium-sapphire TiAl2O3 complex as part of a Mira Optima 900-F femtosecond generator and a Legend F-1K-HE regenerative amplifier. It was established that the scanning speed of laser irradiation changes the microrelief of the surface layers of steel, the shape and dimensions of its individual fragments. In particular, low scanning speeds (0.4 mm/s) do not cause the formation of clearly oriented periodicity of the structure. At higher scanning speeds (10.0 mm/s), typical periodic surface structures oriented along the movement of the laser beam are formed. They are characterized by an alternation of almost continuous long convex grooves with elongated depressions covered with rounded structural fragments of various shapes and sizes. The formation of a peculiar microrelief of the surface can be explained by the complex effect of laser irradiation, which intensifies the processes of diffusion of steel alloying elements to the surface, initiates deformational phase transformations, promotes fragmentation and grinding of the microstructure. Adjusting the parameters of laser processing will make it possible to purposefully change the parameters of the microrelief of the surface, its structural and phase state and functional properties. Such layers with a certain ratio of nano- and microstructures, formed on small-sized products, can work as functional coatings or new materials in energy, microelectronics, and medicine.

Acknowledgement: Publication cost of this paper was covered with founds of the Polish National Agency for Academic Exchange, under the STARS EU program, grant number BNI-UE-2023-8, acronym STARS CUT-UA

Biography:

Associate professor, Ph.D, Department of Materials Science and Engineering, Lviv Polytechnic National University, Lviv, Ukraine. Research interests: Surface modification and treatment, titanium alloys, biocompatible materials, composite materials.

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-016

Determination of the Geopolymer Binders Setting Time for 3D Printing Technology

Szymon Gadek[1], Marek Nykiel[1], Tetiana Tepla[2], Lidia Bohun[2], Zoia Duriagina[2], Dariusz Mierzwinski[1]

[1]Department of Materials Science and Engineering, Cracow University of Technology, Warszawska 24, 31-155 Cracow, Poland

[2]Department of Materials Science and Engineering, Lviv Polytechnic National University, 79040, Lviv, Ukraine

Geopolymers, or other alkali-activated materials (AAMs), are a class of cementitious aluminosilicate binders with diverse and regulated material properties. They are synthesized by adding an alkaline solution, called an activator (often consisting of sodium hydroxide, NaOH, and sodium silicate, Na2SiO3, to aluminum- and silicon-rich raw materials. Examples of such materials include blast furnace slag, metakaolin or fly ash, which is a by-product of coal combustion.

Expanded geopolymers are a promising alternative to other expanded materials, especially in terms of their use as refractory partitions withstanding temperatures well in excess of 500ėC, which puts them above other foamed materials such as polymer composites or foam systems.

The ability to assess the setting time of foamed geopolymer mortar is an important factor influencing the economics of this process. In the case of alkaline-activated materials, special attention should also be paid to the effect of the activator and stabilizers on the setting rate of the geopolymer mortar.

Existing methods of testing the hydration of cement mortar in the case of AAM seem to be insufficient, so the paper focuses on determining the setting time of foamed geopolymers in order to use them in the process of 3D printing of semi-finished products with appropriate mechanical and physical properties. The duration and intensity of each of the heat release processes identified during the first hours of AAM setting depends on the type of activator used and the type of material used. Activation of geopolymers with a NaOH-containing solution leads to reduced heat release within the first 24 hours of the reaction compared to silicate-activated binders, which is associated with a slower reaction process A method based on a thermistor probe based on a standard thermistor with a negative temperature coefficient was used to determine the setting time.

Acknowledgement: Publication cost of this paper was covered with founds of the Polish National Agency for Academic Exchange, under the STARS EU program, grant number BNI-UE-2023-8, acronym STARS CUT-UA and the Polish National Centre for Research and Development in Poland, under the M-ERA.NET 3 program, grant number M-ERA.NET3/2021/115/3D-FOAM/2022, 3D-FOAM - Foamed Geopolymer Made by Additive Manufacturing for the Construction Technology Applications.

Biography:

Ph.D, Department of Materials Engineering and Physics, Cracow University of Technology, Poland. Research interests: thermal phenomena in alkaline-activated materials (AAM), apparent activation energy of AAM, influence of heat treatment on geopolymers, hydrothermal treatment of AAM, fire resistance of geopolymers, foamed geopolymers, electrical conductivity of AAM, 3D printing of geopolymers.

EURASIA CONFERENCES

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy

https://doi.org/10.62422/978-81-970328-7-5-017

Utilization of Fly Ash from Co-Combusting Coal and Waste-Derived Fuel in Blended Cement

Wei-Hsing Huang[1] and Min-Fu Wu[2]
[1]Department of Civil Engineering, National Central University, Taoyuan, Taiwan.
[2]Taiwan Cement Ltd., Taipei, Taiwan.

The use of waste-derived fuel in industrial boilers benefit the reduction in carbon emissions from industrial boilers. However, the fly ashes produced by the co-combustion of coal and paper mill wastes exhibit distinct characteristics that are different than traditional fly ash obtained from boilers burning coal only. In this study, the properties of co-combustion fly ash (CCFA) derived from boilers burning paper-making wastes were investigated, with emphasis on potential applications of CCFAs as a constituent in blended cement. The CCFAs were characterized considering their physical and chemical composition. And they were used in partial replacement of cement in proportioning concrete. Then, the effects of CCFA utilization on the fresh and hardened properties of the prepared concrete were assessed and compared with concrete prepared using ordinary portland cement. Test results indicate that using waste-derived fuel from paper mill alters the characteristics of boiler fly ash. Also, the compressive strength of mortar mixed with 20% CCFA replacement of cement was found to be approximately 75% of the control mix. These findings demonstrated that fly ash from co-combustion of paper mill wastes and coal has the potential to be utilized as cementitious materials in partial replacement of cement for making concrete.

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-018

Development of Antibacterial Carbon Dots by Using a One-Pot Microwave-Assisted Approach

Siqi Wang, Colin P. McCoy, Gavin P. Andrews, Matthew Wylie, Yi Ge
School of Pharmacy, Queen's University Belfast, 97 Lisburn Road, Belfast, BT9 7BL, UK

Carbon dots (CDs), as emerging nanomaterials, have garnered significant attention for their exceptional properties including high biocompatibility, environmental friendliness, and versatile functionalization capabilities. These characteristics make CDs and carbon-dot-based nanomaterials promising candidates for various biomedical applications. In this study, we developed a novel microwave-assisted method to produce broad-spectrum antibacterial CDs, offering a cost-effective and green alternative to traditional synthesis. Using citric acid, ascorbic acid, tetraethylenepentamine, spermidine, and urea as carbon sources, N-doped CDs were synthesized at 200°C with 800W power, followed by purification via centrifugation and size exclusion chromatography. The resulting CDs were characterized by UV, FL, FT-IR, TEM, DLS and XRD. The agar well diffusion method and broth dilution method were employed to test and determine their activities of bacterial growth inhibition via MIC and MBC assays against Escherichia coli (E. coli), Staphylococcus aureus (S. aureus) and methicillin-resistant Staphylococcus aureus (MRSA). The time-kill kinetics assays of CDs against those three strains were conducted to investigate their antibacterial effect upon time. The CDs demonstrated significant inhibition, with MIC values of 0.625mg/mL for S. aureus and MRSA, and 1.250mg/mL for E. coli. Cytotoxicity tests on HaCaT cells showed over 80% viability at concentrations below 200 mg/mL, indicating low toxicity. Our findings highlight the potential of microwave-synthesized CDs in biomedicine and pharmaceutical science, with future research to explore their antibacterial mechanisms and applications in bioimaging and photodynamic therapy.

Biography:

Siqi Wang is a third-year Ph.D. student at Queen's University Belfast, specializing in nanotechnology applications within the pharmaceutical sciences. Her research is focused on developing carbon-dot-based nanomaterials for enhanced bacterial inhibition, specifically through the innovative use of microwave-assisted synthesis. Siqi's work has demonstrated some effective advancements in the field, notably through the conjugation of carbon dots with Chlorin E6, achieving remarkable antibacterial efficacy under light exposure. Her dedication to exploring environmentally friendly and cost-effective antimicrobial solutions positions her at the forefront of her field. Siqi's contributions are paving the way for novel treatments in biomedicine and pharmaceutical science.

EURASIA CONFERENCES

5th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

5th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 20-21, 2024 | Rome, Italy

KEYNOTE PRESENTATION | DAY 2

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-019

Nanocellulose for Sustainable Future Materials

R.A. Ilyas[1,2,3,4]
[1]Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor, Malaysia
[2]Centre for Advanced Composite Materials (CACM), Universiti Teknologi Malaysia (UTM), Johor Bahru 81310, Johor, Malaysia
[3]Institute of Tropical Forest and Forest Products (INTROP), Universiti Putra Malaysia, Serdang 43400, Malaysia
[4]Centre of Excellence for Biomass Utilization, Universiti Malaysia Perlis, 02600, Arau, Perlis, Malaysia

In recent years, nanocellulose (NC) has emerged as a versatile and sustainable material with unique characteristics, derived from the common and abundant natural polymer, cellulose. This presentation examines the evolving landscape of NC, exploring its extraction processes, mechanical properties, and applications beyond conventional cellulose usage. The hierarchical structure of cellulose allows for the extraction of nanoparticles, offering properties like excellent mechanical strength, low density, biodegradability, and a substantial surface area. With a Young's modulus in the range of 100–130 GPa, NC presents promising properties for a wide range of applications, from eco-friendly materials in nanocomposites, reinforcing agents in packaging, and bioactive implants in medical devices. The presentation also distinguishes between cellulose "microfiber" and "nanofiber" and provides insights into potential applications, reinforcing NC's role as a transformative material in the sustainable materials and nanocomposites domain. This analysis encompasses recent advances in NC preparation, modification, and emerging applications, highlighting the breadth of possibilities for this green material, including its utilization in nanocomposites, wood adhesives, wastewater treatment, and novel biomedical applications, while also addressing the challenges and opportunities in the realm of emerging NC-based materials.

Biography:

R.A. Ilyas is a senior lecturer in the Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia, Malaysia. He is also a Fellow of International Association of Advanced Materials (IAAM), Sweden, Fellow of International Society for Development and Sustainability (ISDS), Japan, a member of Royal Society of Chemistry, UK and Institute of Chemical Engineers (IChemE), UK, Chair of Science Outreach for Young Scientists Network - Academy of Sciences Malaysia (YSN-ASM) 2023. He received his Diploma in Forestry at Universiti Putra Malaysia, Bintulu Campus (UPMKB), Sarawak, Malaysia from Mei 2009 to April 2012. In 2012, he was awarded the Public Service Department (JPA) scholarship to pursue his Bachelor's Degree (BSc) in Chemical Engineering at Universiti Putra Malaysia (UPM). Upon completing his BSc. programme in 2016, he was again awarded the Graduate Research Fellowship (GRF) by the Universiti Putra Malaysia (UPM) to undertake a Ph.D. degree in the field of Biocomposite Technology & Design at the Institute of Tropical Forestry and Forest Products (INTROP) UPM. R.A. Ilyas was the recipient of the MVP Doctor of Philosophy Gold Medal Award UPM 2019, for Best Ph.D. Thesis and Top Student Award, INTROP, UPM. He was awarded with Outstanding Reviewer by Carbohydrate Polymers, Elsevier United Kingdom, Top Cited Article 2020-2021 Journal Polymer Composite, Wiley, 2022, and Best Paper Award at various International Conferences. R.A. Ilyas also was listed and awarded among World's Top 2% Scientist (Career-Long Achievement) Year 2022, World's Top 2% Scientist (Subject-Wise) Citation Impact during the Single Calendar Year 2019, 2020, 2021, and 2022 by Stanford University, US, PERINTIS Publication Award 2021 and 2022 by Persatuan Saintis Muslim Malaysia, Emerging Scholar Award by Automotive and Autonomous Systems 2021, Belgium, Young Scientists Network - Academy of Sciences Malaysia (YSN-ASM) 2021, UTM Young Research Award 2021, UTM Publication Award 2021, and UTM Highly Cited Researcher Award 2021. In 2021, he won Gold Award and Special Award (Kreso Glavac (The Republic of Croatia) at the Malaysia Technology Expo (MTE2022), Gold Award dan Special Award at International Borneo Innovation, Exhibition & Competition 2022 (IBIEC2022), and, a Gold Award at New Academia Learning Innovation (NALI2022). His main research interests are (1) Polymer Engineering (Biodegradable Polymers, Biopolymers, Polymer composites, Polymer-gels) and (2) Material Engineering (Natural fiber reinforced polymer composites, Biocomposites, Cellulose materials, Nano-composites). To date he has authored or co-authored more than 485 publications (published/accepted): 241 Journals Indexed in JCR/ Scopus, 3 non-index Journal, 18 books, 104 book chapters, 78 conference proceedings/ seminars, 4 research bulletins, 10 conference papers (abstract published in the book of abstract), 17 Guest Editor of Journal special issues and 10 Editor/ Co-Editor of Conference/Seminar Proceedings on green materials related subjects.

EURASIA CONFERENCES

5th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

5th World Conference on

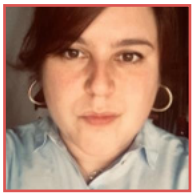
ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 20-21, 2024 | Rome, Italy

SPEAKER PRESENTATIONS | DAY 2

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-020

Bulk and Monolayer WSe_2 and the Effect of the V Doping



Eleonora Pavoni, Elaheh Mohebbi and Emiliano Laudadio
Department of Matter, Environmental Sciences, and Urban Planning, Marche Polytechnic University, 60131 Ancona, Italy.

Tungsten diselenide (WSe_2) is a material that has captured the attention of researchers due to its unique properties, the proposed study focuses on the optical and electronic characteristics of WSe_2, by making use of the density functional theory (DFT) and employing Perdew-Burke-Ernzerhof (PBE) Generalized Gradient Approximation (GGA) density function and PseudoDojo pseudopotential. The study investigates the properties of both bulk and a monolayer of WSe_2 to determine how the number of layers affects the properties of the material. To further examine the peculiarities of WSe2, four different systems based on Vanadium doped-WSe2 have been investigated from the optical and electronic points of view. The systems contain different percentages of V: (i) WSe_2:V 1.4%, (ii) WSe_2:V 2.8%, (iii) WSe_2:V 5.6%, and (iv) WSe_2:V 11.2%. The introduction of Vanadium results in a reduction in the bandgap and a global shift of the projected density of the states. The Valence Band Maximum (VBM) also crosses the Fermi level, which is consistent with the p-type nature of vanadium doping. Furthermore, the absorption spectra change in terms of the position and the intensity of the optical transition as a result of the Vanadium introduction.

Biography:

Eleonora Pavoni got a PhD in chemistry, from the University of Bologna. During her PhD, she worked as a research fellow at the Institute of Organic Synthesis and Photoreactivity of the CNR, and then, she was a post-doc at the Biomedical and Neuromotor Sciences Department, University of Bologna. She has worked in the optical, Raman/IR spectroscopies field and material characterization by SPM Techniques. Currently, she is working at the Department of Matter, Environmental Sciences, and Urban Planning, of the Polytechnic University of Marche and her research is focused on the modeling and simulation of materials at the atomistic scale.

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-021

Chitosan Functionalized Intranasal Nanoemulsions of Iloperidone for Improved Brain Delivery–Development, in Vitro and in Vivo Studies

Niserga Sawant*, Namita Desai, Pratima Tatke, Dr. Shashikant Joshi
C. U. Shah College of Pharmacy, SNDT Women's University, Mumbai 400049, Maharashtra, India.

This research work focuses on development of Iloperidone nanoemulsions; functionalized with chitosan for intranasal delivery for improving brain targeting efficiency. Iloperidone nanoemulsions were optimized by response surface methodology using DESIGN EXPERT software version 13. Iloperidone nasal nanoemulsions were prepared using spontaneous emulsification and ultrasonication method. These nanoemulsions could be surface functionalized with 0.4% w/v of chitosan. Iloperidone nasal nanoemulsions showed negative zeta potential (-22.5+0.1 mV) while chitosan functionalized Iloperidone nasal nanoemulsions presented positive zeta potential (+25.5+0.4 mV) confirming coating of nanoemulsion droplets by chitosan. The in vitro release of Iloperidone using dialysis membrane (molecular weight cut off 14kD) in 100 ml, Simulated Nasal Fluid, pH 6.4, 32+2°C, 75 rpm from the nasal nanoemulsions and chitosan functionalized nasal nanoemulsions was 90.41±2.34% and 72.02± 0.53 % respectively at the end of 8 hours. The ex vivo permeation of Iloperidone using excised sheep nasal mucosa in 12 ml, Simulated Nasal Fluid, pH 6.4, 32+2°C, 50 rpm from nasal nanoemulsions and chitosan functionalized nasal nanoemulsions was 70.84±0.21% and 47.25+0.12% respectively at the end of 8 hours. Results of in vivo pharmacodynamic studies performed on male Wistar rats showed that chitosan functionalized nasal nanoemulsions of Iloperiodone showed improved effects in Wistar rats (Fig. 1–3). This can be contributed to the nano size and improved mucoadhesive characteristics of the developed intranasal Iloperidone formulations.

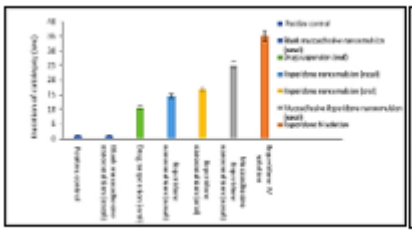


Fig 1: Catalepsy test

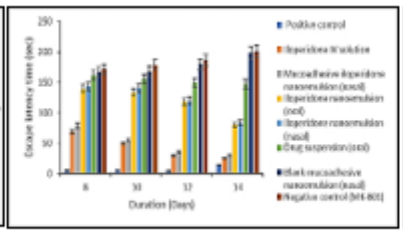


Fig 2: Morris water maze test

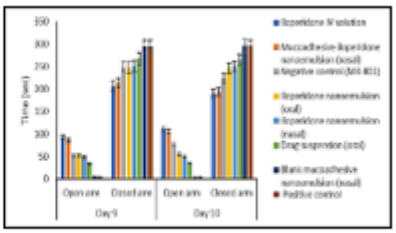


Fig 3: Elevated plus-maze model

These results indicate potential of developed formulations in improving brain delivery of Iloperidone for managing schizophrenia.

Biography:

Niserga Sawant is a second-year PhD student at C. U. Shah College of Pharmacy, SNDT Women's University. She received a bachelor's degree in Pharmacy and Master's degree in Pharmaceutics from C. U. Shah College of Pharmacy, SNDT Women's University, Mumbai, India. She received research fellowship from Rajiv Gandhi Science and Technology Commission. She is interested in designing and development of "nanodrug delivery systems".

EURASIA CONFERENCES

5th World Conference on Chemistry and Chemical Engineering

May 20-21, 2024 | Rome, Italy

https://doi.org/10.62422/978-81-970328-7-5-022

Advanced and Critical Applications with Developments of Clay Species in Waste Water Treatments

Suresh Aluvihara*, C.S. Kalpage

Department of Chemical and Process Engineering, University of Peradeniya, Peradeniya, 20400, Sri Lanka

Water pollution has been identified as an impact on the environmental equilibriums including the ecosystems. The waste water treatment has become an essential part of the handling of water. According to the nature of the pollutants, the treatment method is selected such as the chemical treatment, physical treatment or biological treatment. In most of chemical treatments, some chemical agents are externally added since having some demerits for the consumers of treated water because the chemical treatment methods must be performed with well established procedures and the physical treatment methods may have higher operational cost. Therefore, the investigation and development of some cost effective earth materials for the water treatment applications is becoming a huge chapter in the modern research world. Clay is a dominant earth material that having multi-purpose characteristics as the solutions for most of science and technological issues and currently different clays are being experimented for different water treatment uses. In the existing research, there were expected to chemically characterize three selected clay types based upon the disclosing of their important behaviors. The clay samples were collected from three different regions in Sri Lanka and those clays were named as anthill clay, brick clay and roof tile clay based upon their uses. The clay samples were chemically characterized using X-ray fluorescence (XRF) spectrometer, Fourier transform infrared (FT-IR) spectrometer and X-ray diffraction (XRD) spectrometer. As the outcomes of the research, there were found the presence of at least 75% of Fe contents in each clay, at most 6% of Ti in each clay, at most 5.30% of Ba in each clay, at most 13% of K only in both anthill and roof tile clays and only 7.5% of Ca in brick clay with respect to the X-ray fluorescence (XRF) spectroscopic results, presence of kaolinite, muscovite and quartz as the minerals in each of clay according to the available bonds with respect to the Fourier transform infrared (FT-IR) spectroscopic results and also that mineralogy was confirmed through the X-ray diffraction (XRD) spectroscopic results. According to the recent researches there were found kaolinite and muscovite as the strong adsorbing agents for some other metals such as heavy metals and also there were investigated the K+ and Ca2+ are strong exchangeable ions. Therefore, it is possible to recommend these clays for the experimentations and applications for the waste water treatments based upon the tasks of the removal of heavy metals, removal of some pathogens and removal of some unnecessary dissolved cations.

Biography:

Mr. Suresh Aluvihara obtained his first degree B.Sc. (Hon's) in the year 2017 from a recognized government university in Sri Lanka. Then he commenced his postgraduate studies at the department of Chemical and Process Engineering, University of Peradeniya, Sri Lanka. At present he is having an excellent research profile with about 45 journal papers, approximately 50 abstracts and a few of conference papers in highly reputed conferences around the world. In the consideration of his conference history he has been appointed as a keynote speaker, invited speaker and featured speaker in world recognized research conferences in various venues in the world. In addition that he has participated in a few of training workshops in the world. His research interests are Earth Engineering, Material Engineering, Environmental Engineering, Water Engineering, Agricultural Soil Science and relevant disciplines.

5th World Conference on Chemistry and Chemical Engineering
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-023

Ethylene Design Considerations in the Polymer Industries

Pierree Angeli Gilbuena and Lexter Gimenez, Jant Erbert Garboso
Process Engineering Department, Fluor Inc., Muntinlupa City, Philippines

Ethylene, a widely used compound in everyday products, takes center stage in this paper. The discussion includes benefits and applications, focusing on essential design factors for polymer industries. A thorough overview of ethylene's basics and its role in the industry while discussing its use in key applications like polymer polyethylene (PE) and ethylene dichloride (EDC), a precursor for making polyvinyl chloride (PVC). We also touch on market trends, including global production and consumption patterns. The core of the paper delves into key design considerations. This includes insights into some process engineering related activities such as line sizing, equipment sizing and design, process control, relief calculation and disposal strategies conforming to typical local regulations. Mitigation techniques against extreme conditions and the incorporation of auto-refrigeration mechanisms while maintaining a strong emphasis on safety. An example of this technique is shown using Aspen Hysys calculation based on a sample project. The paper concludes with pragmatic recommendations that aim to enhance the practical implementation of good engineering practice in polymer industries. By offering a bridge between theoretical understanding and practical application, this study aims to contribute to the industry's advancement while prioritizing safety.

Biography:

Angeli Gilbuena has twenty-one (21) years of Process Engineering experience in pre- FEED, FEED and detailed engineering in various units in petrochemicals, chemicals and utilities and offsites plants. She joined Fluor in 2005 as a Process Engineer. She is the local SME for hydraulics and in house PALS software and currently Process Engineering Department Manager in Fluor Manila office.

EURASIA CONFERENCES

5th World Conference on Chemistry and Chemical Engineering

May 20-21, 2024 | Rome, Italy

https://doi.org/10.62422/978-81-970328-7-5-024

Structure and Properties of Stacking-type Complexes of Triazin at Graphene Surface: A Theoretical Assessment

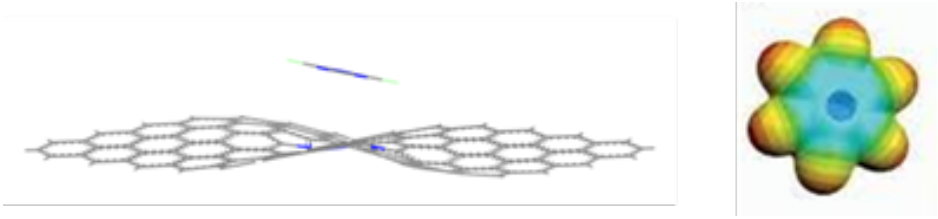
Keshab Kumar Adhikary[a,*], Philippe M. Heynderickx[a,b,*]

[a]Center for Environmental and Energy Research (CEER) – Engineering of Materials via Catalysis and Characterization, Ghent University Global Campus, 119-5 Songdomunhwa-Ro, Yeonsu-Gu, Incheon, 406-840 South Korea

[b]Department of Green Chemistry and Technology, Faculty of Bioscience Engineering, Ghent University, 653 Coupure Links, Ghent, B-9000, Belgium

In recent decades graphene immersed into the technology and industry with its various derivatives including with its immense functionality by making a complex, combination with other organic molecules, atoms and the combination of the both. Noncovalent functionalization creates a wide range of applications for these graphene complexes. Our intention was to characterize the stacking-like two-layered graphene nanoparticles. We selected triazin and its substituted derivatives ((1) 2,4,6-tris(dimethylamine)-1,3,5-triazine (TDA); (2) 2,4,6-triamino-1,3,5-triazine (TAM); (3) 2,4,6-trihydroxy-1,3,5-triazine (THO); (4) 1,3,5-triazine (TZN); (5) 2,4,6-trithiol-1,3,5-triazine (TTH); (6) 2,4,6-trichloro-1,3,5-triazine (TCL); and (7) 2,4,6-trifluoromethyl-1,3,5-triazine (TFM).) having donor-acceptor properties of the stacked layer on the graphene surface. We conducted cluster and crystal model calculations for the graphene surface to sketch the electronic and structural properties. We verified the stability of the formed complexes using Density Functional Theory (DFT) by quantification of the interaction energy and charge transfer.

Keywords: Cluster and Crystal model, Electron acceptors and Electron donors, Electrostatic potentials, Partial electron density, Band-gap, Electron holes.



The electrostatic potential including the magnitude of the π-hole, Vs.max, of the acceptors on a defective graphene surface.

Biography:

2000-2003 : Ph.D., Chemistry (Inha University, Korea)

2003 – 2005: Post Doctoral Fellow (Department of Chemistry, Inha University, Korea)

2005-2008 : Associate Professor (Biotechnology and Gentic Engineering, University of Development Alternative, Dhaka, Bangladesh)

2009 - 2019 : Associate Professor (Department of Chemistry, Inha University, Incheon, Korea)

2019 – Present : Lecturer and Teaching Assistant (Ghent University Global Campus, Incheon, Korea)

5th World Conference on Chemistry and Chemical Engineering
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-025

Gas phase hydroxylation of benzene to phenol by using CO_2 as an oxidant over Cu-exchanged ZSM-5 catalysts

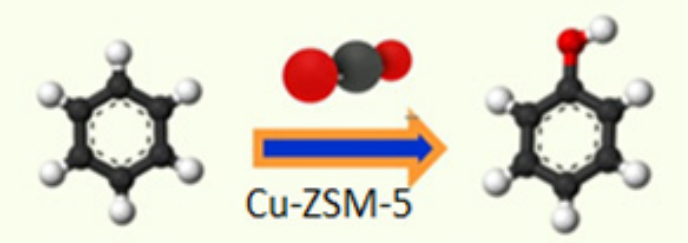
Sheikh Tareq Rahman[a,b], Keshab K. Adhikary[a], Philippe M. Heynderickx[a,b,*]

[a]Center for Environmental and Energy Research (CEER), Ghent University Global Campus, 119-5 Songdo munhwa-ro, Yeonsu-Gu, Incheon, 21985, Republic of Korea

[b]Department of Green Chemistry and Technology, Faculty of Bioscience Engineering, Ghent University, Coupure Links 653, Ghent, B-9000, Belgium

Direct hydroxylation of benzene is an assuring strategy to synthesize phenol. Formation of phenol was achieved under the continuous flow micro-reactor system by the concurrent feed of benzene and carbon dioxide over Cu loaded M+-ZSM-5 catalysts (M = Na^+, Cs^+, Mg^{2+} Ca^{2+} and Cr^{3+}). The formation of phenol was observed (9.5% at 450 ^{0}C) in the temperature range of 4250C–5250C with a co-feed of CO_2 (15 mL/min) and C6H6 (0.8 mL/min). When the catalyst was calcined at 450 ^{0}C, the activity peaked in the first hour and then slowly deactivated, but when the calcination temperature for the synthesized catalysts was increased to 7500C, the activity slowly increased until it reached a plateau. At high (750 ^{0}C) calcination temperatures, only a small fraction of the Cu undergoes the two-step reduction and most of the Cu remains in the +2 state. Weaker Bronsted acidity is helpful to obtain a higher phenol selectivity and less by-products. The obtained results indicated that the M+ assists in enriching surface active CO_2 in the form of carbonates and subsequently reacted with the homolytic activated C-H over Cu0-H-ZSM-5. The isolated square pyramidal Cu2+ species was suggested to be the active species for the phenol formation. The increase in the square-pyramidal Cu2+ species ensured when the CuH-ZSM-5 was calcined at higher temperatures and when HZSM-5 with lower Si/Al atomic ratios was used as a support.

Key words: CO_2 utilization, Cu-ZSM-5, hydroxylation, Nanoparticles



Biography:

2002-2008: B.Sc.(Hons) (Chemistry, Jagannath University, Bangladesh)

2008- 2010 : M.S (Chemistry, Jagannath University, Bangladesh)

2010-2017 : Lecturer, Chemistry(Milestone college, Bangladesh)

2017-2019: M.Sc. (Chemical Engineering & Chemistry, Inha University, South Korea)

2019- Present : Ph.D. (Chemical Engineering & Chemistry, Inha University, South Korea+ Bioscience Engineering, Ghent University, Belgium

5th World Conference on Chemistry and Chemical Engineering
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-026

Synthesis of Novel 1,3-Indandione Derivatives and Investigation Their Anti-Microbial and Anti-Fungal Activity

Hossein Mostafavi, Rasul Khandan Bejandi
Department of Organic chemistry & Biochemistry, Faculty of Chemistry, University of Tabriz, Tabriz, Iran

1,3 -Indanedione derivatives, which are of wide interest because of their diverse biological and chemical applications. A series of novel 1,3-Indanedione derivatives are synthesized via KNOEVENAGEL condensing reaction mechanism by condensing 1,3-Indanedione with diverse aryl aldehydes using2-hydroxyethyammonium formate as ionic liquid and catalyst. All the synthetic derivatives were fully characterized by spectral analysis data (FT-IR, 1H- 13C-NMR and elemental analysis).

This series of 7 compounds were tested for in vitro anti-bacterial activity against Gram- negative Escherichia coli ATCC 25922 and Proteus mirabilis ATCC 43071, Gram–positive Staphylococcus aureus ATCC 25952 and Enterococcus faecalis ATCC 29212. Anti-fungal activity of the newly synthesized derivatives was evaluated by Disc diffusion method with Candida albicans. The newly synthesized compounds are evaluated for their antimicrobial activity (by using Cup-Plate method against selected bacterial strains among total compounds, compounds 7 was found to have higher activity against selected strains and the results were found to be as moderate activity, for anti-fungal activity-compounds 2,5 are more potent .

Biography:

My study: Hannover university of Germany , Ph.D of Biochemistry, lower Saxony Institute for Peptide Research, Hannover , Germany

My research interest: Synthesis of biological active organic molecules and natural products and search for novel pharmacophores., synthesis of novel nanocatlysts.

EURASIA CONFERENCES

5th World Conference on Chemistry and Chemical Engineering

May 20-21, 2024 | Rome, Italy

https://doi.org/10.62422/978-81-970328-7-5-027

The Advanced Applications of Earth Materials based upon the Adsorption and Absorption Processes

Suresh Aluvihara[1,*], C.S. Kalpage[1], P.W.S.K. Bandaranayake[2]

[1]Department of Chemical and Process Engineering, University of Peradeniya, Peradeniya, 20400, Sri Lanka

[2]Department of Physics, University of Peradeniya, Peradeniya, 20400, Sri Lanka

Earth materials are unevenly distributed in the world in different forms and phases. Solid earth materials play an outstanding preface among earth materials in other phase because of the availabilities in their manifold forms both natural or manmade forms such as the bulky forms and powdered forms. Adsorption is an outstanding characteristic regarding some solid materials based upon the adsorption capacities of such materials with respect to some specific compounds that presence in liquids and gases. Clays and dolomites are predominantly having multi physic-chemical characteristics. As the general outcomes of most of recent researches regarding earth materials, there were observed some specific characteristics from clays, dolomites, feldspar and some other minerals including the adsorption character. In the existing research there were expected to characterize three different selected clay verities and a selected dolomite variety in microscopically and chemically. The clay samples and dolomite samples were collected from the relevant locations in Sri Lanka and a few of representative samples were characterized using X-ray fluorescence (XRF) spectrometer, Fourier transforms infrared (FT-IR) spectrometer and scanning electron microscope (SEM). Our results confirmed that the presence of Fe as the most abundant element in three different clay types and Ca as the most abundant element in dolomite according the XRF characterization, presence of kaolinite, montmorillonite and some other Fe minerals in all of clays such as muscovite and calcite as the major mineral in dolomite according to the FT-IR characterization and there were observed some porous structures in all of clays and some cleavage planes in dolomites according to the SEM micrographs. Based upon above results and literature reviews of them, it is possible to recommend some clay species and dolomites with similar compositions of these clays and dolomites for the developments in water treatment applications to remove some heavy metals, pathogens, organic pollutants and hardness from different types of waste water due to the adsorption capacities of such clays and dolomite which can also be enhanced with some possible alterations such as the nano-particles, nano-filters and pallets.

Biography:

Mr. Suresh Aluvihara obtained his first degree B.Sc. (Hon's) in the year 2017 from a recognized government university in Sri Lanka. Then he commenced his postgraduate studies at the department of Chemical and Process Engineering, University of Peradeniya, Sri Lanka. At present he is having an excellent research profile with about 45 journal papers, approximately 50 abstracts and a few of conference papers in highly reputed conferences around the world. In the consideration of his conference history he has been appointed as a keynote speaker, invited speaker and featured speaker in world recognized research conferences in various venues in the world. In addition that he has participated in a few of training workshops in the world. His research interests are Earth Engineering, Material Engineering, Environmental Engineering, Water Engineering, Agricultural Soil Science and relevant disciplines.

EURASIA CONFERENCES

5th World Conference on Chemistry and Chemical Engineering

May 20-21, 2024 | Rome, Italy

https://doi.org/10.62422/978-81-970328-7-5-028

The Development and Validation of a GC-MS Method to Quantify Short and Branched Chain Fatty Acids in Human Stool and Applied to Patients with Inflammatory Bowel Disease and Healthy Controls

Justin Gray[1], Baochuan Guo[2], Rebecca Bearden[3]

[1, 2, 3]Department of Chemistry, Cleveland State University, Cleveland, OH USA

The study of short (SCFAs) and branched chain fatty acids (BCFAs) in human stool related to gastrointestinal diseases, gut microbiota, metabolism and diet has dramatically increased. As a result, a fast, reliable method with minimal pretreatment is needed for quantification of these metabolites (acetic, propionic, isobutyric, butyric, isovaleric, valeric and caproic acid; µg/g stool) in stool. Therefore, a GC-MS method meeting this criterion was developed. Stool samples were homogenized, diluted with 80:20 water:methanol (v/v) and adjusted to a pH of 1.5 - 2.5. Samples were vortexed, centrifuged and directly injected into the GC-MS using pulsed splitless injection offering two-to-three-fold signal enhancement over a 10:1 split injection. DB-FATWAX Ultra Inert Polyethylene Glycol (PEG) Column showed no peak tailing, reduced responses or retention time shifts after 1476 stool injections while other columns failed before 361 injections. A case-control study was conducted using 53 remnant raw stool samples with a positive diagnosis of either ulcerative colitis (UC) or Crohn's Disease (CD) which comprised the Inflammatory Bowel Disease (IBD) group and were compared to a control group of 21 samples for SCFA and BCFA concentrations. Strong statistical differences were observed between groups whereas the IBD group contained less propionic, butyric and valeric acid ($p < 0.05$). A receiver operator curve was plotted using the sum of significantly different SCFAs normalized against acetic acid resulting in 96% AUC (95% CI: 0.89 – 0.98) demonstrating potential diagnostical application.

Biography:

My general research is focused on understanding the use of short (SCFAs) and branched chain fatty acids (BCFAs) as diagnostical biomarkers for those with IBD. The development and validation of a fast, fully validated GC-MS method has enabled reliable quantification of these analytes in stool which has lacked due to time-consuming pre-treatment methods. Understanding the role between SCFAs and BCFAs, the gut microbiota, probiotics and how indigestible fibers impact pathophysiology of IBD is of great interest.

5th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 20-21, 2024 | Rome, Italy
https://doi.org/10.62422/978-81-970328-7-5-029

Nanotech application for vector control

Dr Latika Bhatt[1] and Dr Ravindra D Kale[2]
[1]Assistant Professor, Department of Textile Design, NIFT, Bhopal, Madhya Pradesh, India
[2]Professor, Institute of Chemical Technology, Mumbai, India

A significant fraction of the global infectious disease burden is due to the vector-borne infectious diseases like malaria, dengue, yellow fever and chikungunya. Almost half of the world's population is infected with at least one type of vector-borne disease. We tried to develop a natural, low cost, safe and effective nano formulation using essential oils. . An experimental study of oil in water nanoemulsion preparation, process optimization and stability based on the required size distribution was performed with surfactant oil ratio (SOR), stirring time and speed as the variables for nanoemulsion preparation. The storage stability of the nanoemulsion was also studied in terms of particle size, pH, viscosity and zeta potential at room temperature and refrigeration temperature for a period of 6 months. The nanoemulsion was tested for its larvicidal activity against both susceptible and resistant strain of mosquito larvae's and their antibacterial activity was also tested.

Keywords: Nanao, nanoemaulsion, vector control, essential oil

Biography:

Dr. Latika Bhatt is an Assistant Professor and the Centre Coordinator in department of Textile Design, NIFT Bhopal. She holds a PhD in Textile Chemistry and specializes in Micro & Nanotechnology and its textiles applications. The topic of her Ph.D. was "Application of Essential Oils On Textiles". She has 9 years of industry and academic experience. She has worked in the industry as research and development merchandiser, research personal for government projects, and as an academician. She has several publications in the area of textile finishes, nanotechnology, medical textiles in national and international journals. She also has a patent to her credit in the area of nanotechnology.

Participants Index

Organized by:

Eurasia Conferences
124 City Road, London, EC1V 2NX
United Kingdom
Website: www.eurasiaconferences.com
Email: info@eurasiaconferences.com

ISBN 978-81-970328-7-5