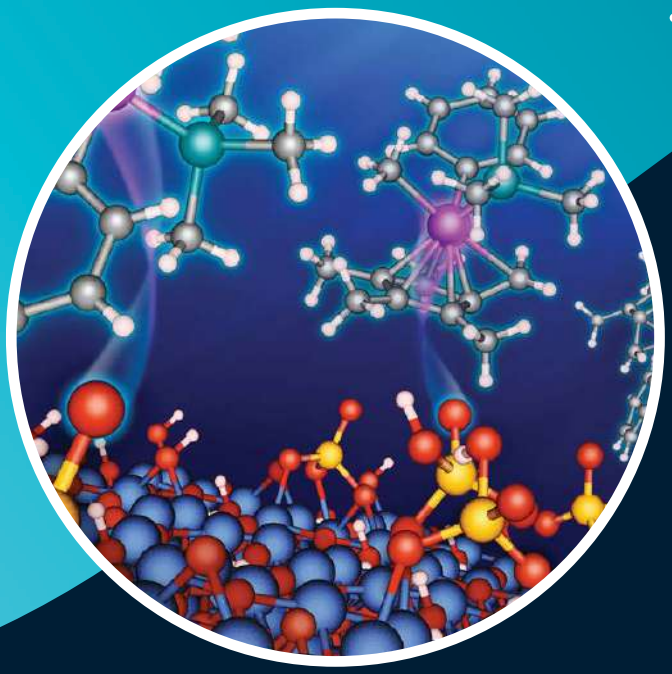
SCHOLARS CONFERENCES



5th Edition International Conference on

Catalysis Chemistry and Chemical Engineering

March 25-26, 2024 | Barcelona, Spain

Contact Us:
Jeri McMillan
Program Manager | CATCHEM 2024
catalysis@scmeetings.org
21 Clifton Road, Newcastle Upon Tyne, England | United Kingdom, NE4 6XH
+447426060443
https://scholarsconferences.com/catalysis-frontiers/

SCIENTIFIC PROGRAM

Day 01 | March 25, 2024 | Salon Volga

08:30-09:15 Registrations

09:15-09:30 Opening Ceremony

Keynote Forum

09:30-10:05 **Title: Challenges in Engineering Design for Biodiesel Processing**
Harry Ha, Fluor Canada Ltd, Canada

10:05-10:40 **Title: Sedimentary Facies Development and Stratigraphic Architecture of the Early Devonian Sediments in Western Libya**
Milad BenRahuma, National Oil Corporation, Libya

10:40-11:15 **Title: Improving Data Acquisition Optimization in Oil and Gas Production: A Machine Learning Solution with Orthogonal Decision Trees**
Alexander Tarakanov, National Research University Higher School of Economics, Russia

Refreshments Break @ 11:15-11:35

Speaker Session:

Session Chair: Milad BenRahuma, National Oil Corporation, Libya

11:35-12:00 **Title: Experimental Study on Stress and Corrosion Damage Detection in Casing with Defects**
Jing Sun, China University of Petroleum, China

12:00-12:25 **Title: Research on Stress Corrosion Simulation and Magnetic Memory Testing of Casing in CO_2 Medium**
Qian Chen, China University of Petroleum, China

12:25-12:50 **Title: Synthesis of Multi-metallic Nanocatalysts Using a Dendrimer Reactor**
Kimihisa Yamamoto, Tokyo Institute of Technology, Japan

12:50-13:15 **Title: Assessment of Contact Status of Seal Surface in Premium Connections Based on Phased Array Ultrasound Testing**
Chunmeng Tian, China University of Petroleum, China

Lunch and Networking Break @ 13:15-14:00

14:00-14:25 **Title:Flash Synthetic Chemistry Guided by Flow Microreactor Research**
Aiichiro Nagaki, Hokkaido University, Japan

14:25-14:50 **Title: Synergistic Solutions: Enhancing Visible Light Photocatalysis for Indoor Air Quality and Sustainable Energy Generation**
Stefania Porcu, Dipartimento Di Fisica Universita Degli studi Di Cagliari, Italy

14:50-15:15 **Title: Challenges and Recent Advancements in Motion Control of Oil Well Drilling Rig**
Amir Nobahar, Atilim University, Turkey

15:15-15:40 **Title: High Luminescent Multifunctional M-X (M=Cu(I), Mn(II), X=Br, I) Coordination Compounds as Stimuli-response Materials**
Ricardo Garsed, Autonomous University of Madrid, Spain

Refreshments Break @ 15:40-16:00

16:00-16:25 **Title: Platinum Promoted Honeycomb Catalysts for Sulphuric Acid Manufacturing and Tail Gas Treatment in Complex Environments**
Johannes Hofer, P&P Industries AG, Austria

16:25-16:50 **Title: Application of Adsorption-coagulation-ultrafiltration-UV/O^3/H_2O_2-distillation Process for Produced Water Discharge**
Jie Yang, Technology Supervision Research Institute of Petro, China

Panel Discussions & B2B Meetings

Day 01 End | Closing Ceremony

Day 02 | March 26, 2024 | Salon Volga

09:15-09:30 : Introduction

Keynote Forum

09:30-10:05
Title: Landfill Leachate as an Alternative Water Source for Alberta Oil and Gas Development
Roger Saint Fort, Mount Royal University, Canada

10:05-10:40
Title: Engineering Physics Solves the Problems of Quantum Mechanics
Bakhodir Tursunbaev, Tashkent State Transport University, Uzbekistan

Refreshments Break @ 10:40-11:00

Speaker Session

Session Chair: Milad BenRahuma, National Oil Corporation, Libya

11:00-11:25
Title: Polyacrylamide Hydrogel Modification for Enhanced Temporary Oil and Gas Well Abandonment: Preparing for Future CO_2 Storage
Hamed Movahedi, Technical University of Denmark, Denmark

11:25-11:50
Title: Investigation of the Cobalt Doping-Method on the Activity of Titanium Dioxide in the CO_2 Photoreduction Process
Konrad Sebastian Sobczuk, West Pomeranian University of Technology in Szczecin, Poland

11:50-12:15
Title: Novel Rigidochromic and Anti-Kasha Dual Emission Fluorophores Based on D-π-A Dyads as the Promising Materials for Potential Applications Ranging from Optoelectronics and Optical Sensing to Biophotonics and Medicine
Larisa Klapshina, Razuvaev Institute of Organometallic Chemistry of Russian Academy **of Sciences, Russia**

12:15-12:40
Title: Confinement and Dimerization of Cu_5 on Graphene
Lenard Carroll, IFF-CSIC, Spain

12:40-13:05
Title: An Evaluation of Metallic trace Elements by aerated Lagooning in an arid climate: The case of the Wastewater Treatment plant of the City of Errachidia, Morocco
Mohamed Ouhammi, Sidi Mohamed Ben Abdellah University, Morocco

Lunch and Networking Break @ 13:05-13:50

13:50-14:15
Title: Phytoremediation of Domestic-Sewage Followed by Phycoremediation is a Promising Tool for Remediation and Resources Recovery: A Case Study in India
Ajay Giri, Bundelkhand University, India

14:15-14:40
Title: Potential of Solar-sharing Smart Lighting Systems to Address the Sustainable Development Goals (SDGs) of the United Nations
Myrtel Bernardo, Bulacan Agricultural State College, Philippines

14:40-15:05
Title: Traditional Groundwater Exploration Method for Pastoralist Community Water Supply System in Semi-arid Region of Ethiopia: Case of Tula Sallan Borana, Southern Ethiopia
Jatani Bonaya Godana, Dilla University, Ethiopia

15:05-15:30
Title: Shape Reversibility and Multivariant Nature of Martensite in Shape Memory Alloys
Osman Adiguzel, Firat University, Turkey

15:30-15:55
Title: Equilibrium, Thermodynamic and Kinetic Studies of Palm Oil β-carotene Adsorption by Composites Based Silica-Smectite
Jean Marie Kepdieu, University of Yaounde I, Cameroon

Refreshments Break @ 15:55-16:15

Poster Presentation @ 16:15-17:00

P101
Title: Separation of Amino Acids in Ternary Solutions by Nanofiltration and Study of the permeation of nutrients by polymeric forward osmosis membranes
Shirin Shahgodari, University of Barcelona, Spain

P102
Title: Photo- and Photoelectrocatalytic Carbon Dioxide Reduction Using Titanium Dioxide Modified With D-Block Metal Salts
Konrad Sobczuk, West Pomeranian University of Technology in Szczecin, Poland

Panel Discussions & B2B Meetings

Day 02 End | Closing Ceremony

5th Edition International Conference on

Catalysis, Chemistry and Chemical Engineering

March 25-26, 2024 | Barcelona, Spain

KEYNOTE SPEAKERS Day 1

Harry Ha
Fluor Canada Ltd, Canada

Biography

Harry Ha is a Process Technology Director and a technical fellow at Fluor Canada Ltd. and has over 32 years of experience in oil and gas industries. He holds a master's degree in environmental engineering from the Hong Kong University of Science and Technology, and a PhD in chemical engineering from the University of Alberta. He joined Fluor in 2005 and has been working on many oil-sands projects like bitumen extraction and upgrading, petroleum refining, and Petro-chemical projects. In addition to the process design, he focuses on data and methods development to support process modeling and simulations. He has published more than 40 technical papers in his area.

Challenges in Engineering Design for Biodiesel Processing

Biodiesel is defined as a sustainable source of energy, composed of long-chain fatty acids derived from renewable vegetable oils or animal fats. These bio-feedstocks are mainly composed of TAGs, which are long-chain fatty acids chemically linked to glycerol (1,2,3-propanotriol). Biodiesel is produced by Hydro-Deoxygenation (HDO) and Hydro-Dewaxing (HDW) processes. Compared to the conventional diesel fuel processing from crude oil, biodiesel processing from vegetable oil/animal fat necessitates challenges in engineering design.

The high cost of refined vegetable oil represents about 70% of the total production costs. In order to reduce the cost of biodiesel, low-quality residues or oils/fats are being evaluated as raw materials. Modeling the process of biodiesel production is challenging. This work shows rigorous molecular model can offer accurate and reliable predictions for biodiesel processes, such as Feed Treatment, HDO and the Hydro-Dewaxing. Considerations are also given to address the challenges in design to mitigate the heat transfer and hydraulic issues associated with vegetable oil/animal fats, as well as the stripper ovhd corrosion issues associated with sour gases.

Milad BenRahuma
National Oil Corporation, Libya

Biography

Milad BenRahuma is working as senior geologist for NOC. He has worked at petroleum research Centre (PRC) as a Sedimentologist, years of 1986-2009. He has received his PhD from University of Rennes1, France in 2010, He has more than 37 years of experience in oil industry, authored and coauthored many published papers. He has led a technical team for petroleum systems assessment of Libya prepared for NOC (2013-2014). In addition to leading many excursions and field studies during several scientific events and projects. He experienced in the Paleozoic and Mesozoic rock in western Libya.

Sedimentary Facies Development and Stratigraphic Architecture of the Early Devonian Sediments in Western Libya

The Early Devonian sediments (Tadrart and Ouan Kasa Formations) in western Libya consist predominantly of thick siliciclastic sediments. The succession is Pragian to Emsian in age represent an important oil reservoir in Northern Africa and lies unconformably on the Llandoverian (Early Silurian) shale.

This study based on outcrop in Awaynat Wanin area and subsurface wells from the Ghadamis basin. The succession characterized by the intercalation of sandstones, claystones and shales. These sediments are including few carbonate beds in the subsurface of the Ghadamis Basin. 10 facies associations were identified in the outcrops deposited during transgressive systems tracts of 2 incomplete 3rd order sequences and representing an Estuarine environment developed upward into marine shelf sediments.

The lower part of the section (Pragian) exhibits mostly fluvial and tidal sediments and little shoreface and offshore marine deposits. The upper part (Emsian) of the section shows often tidally influenced shoreface and very little upper offshore marine deposits.

The Northwestward, along a dip section, correlation of the outcrop with the subsurface in Ghadamis Basin shows an overall thinning out of the sandstone units and thickening and deepening of the shaly units. Some important beds maybe used as guidelines for stratigraphic correlations between the subsurface in the north and the outcrops in the south. The Late Emsian sediments overlain by lower offshore shale referred to Emgayet (Early Eifelian) shales in the subsurface, which represents a major maximum flooding surface and an important seal rock for the Lower Devonian reservoirs, correlates with the lower shale unit of Awaynat Wanin-I formation on the outcrops.

Correlation of the local sea level changes in the Early Devonian with the global relative sea level clearly exhibited comparable mode.

Alexander Tarakanov
National Research University Higher School of Economics, Russia

Biography

Alexander recently joined the Higher School of Economics as an Associate Professor. He specializes in developing advanced Machine Learning methods to enhance solutions for engineering problems. His research areas encompass a wide range of applications, including hydrocarbon production forecasting, subsurface CO2 storage, and image processing. In addition to his work at HSE, he actively conducts research at Odnoklassniki, a social network, where he contributes to enhancing the existing Machine Learning solutions of the company by integrating cutting-edge research into practical applications. His research is driven by his industry experience, gained through working in companies like GazpromNeft-STC, Huawei, and Odnoklassniki. This background provides him with valuable insights into industry related challenges, allowing him to tackle relevant problems and contribute to advancements in the field.

Improving Data Acquisition Optimization in Oil and Gas Production: A Machine Learning Solution with Orthogonal Decision Trees

Oil and gas production from hydrocarbon reservoirs is associated with a high degree of uncertainty. The primary factors contributing to this uncertainty are the difficulty and expenses of the data acquisition process. Therefore, optimization of the data acquisition process is of critical role for uncertainty reduction within the constraints of a given budget.

There exists a variety of methods for data acquisition optimization. Optimal Bayesian Experimental Design (OBED) is one of such methods, which looks appealing due to its foundations on the fundamental principles of Mathematical Statistics. Unfortunately, direct utilization of OBED is not practical due to high computational costs, particularly due to the nested MCMC integration.

In the current work, a novel approach to enhance the speed of OBED via Machine-Learning techniques is proposed. Namely, a new algorithm for the construction of Decision Trees with orthogonality constraint has been developed. Moreover, it is shown how the novel Decision Trees can eliminated nested MCMC integration and reduce the computational cost of data acquisition optimization. To illustrate the practical application of this innovative approach, the study includes several numerical examples involving flow simulations.

5th Edition International Conference on

Catalysis, Chemistry and Chemical Engineering

March 25-26, 2024 | Barcelona, Spain

SPEAKERS
Day 1

Jing Sun
China University of Petroleum, China

Biography

Jianchun Fan is mainly engaged in scientific research on safety and integrity inspection and monitoring of oil and gas production facilities and intelligent early warning, drilling and completion risk assessment, machinery fault diagnosis and friction and wear mechanisms.

Experimental Study on Stress and Corrosion Damage Detection in Casing with Defects

In the process of oil and gas exploitation, the casing is affected by the movement of the formation and the corrosive medium. The defective casing is easy to produce cracks and expand cracks under the action of stress corrosion, resulting in the failure of wellbore integrity and causing accidents. In this paper, the stress loading test of C-ring casing sample with defects is carried out. The relationship between the circumferential stress of the inner and outer walls of the C-ring and the loading load is analyzed. The influence of defect shape, defect depth and defect angle on casing strength is explored and verified by simulation model. In this paper, the stress corrosion experiments of defective casing under different stress conditions were also carried out. The magnetic memory signals of the inner and outer surfaces of the defective casing samples were collected, and the gradient value and gradient peak-to-peak value of the detection signal were extracted as the characteristic parameters to evaluate the stress corrosion damage of the casing. The results show that with the increase of loading load and stress corrosion duration, the magnetic field strength reaches the maximum and continues to grow. The peak value and peak-to-peak value of the magnetic field increase approximately linearly with the increase of loading load and stress corrosion time. The conclusions of this study have important practical significance for the prevention of stress corrosion cracking of horizontal well casing and the non-destructive testing of wellbore integrity.

Qian Chen
China University of Petroleum, China

Biography

Qian Chen, born in Beijing in 1999, obtained a bachelor's degree from China University of Petroleum (Beijing) in 2018.Now study at China University of Petroleum (Beijing), majoring in Safety Science and Engineering, currently pursuing a PhD.

Research on Stress Corrosion Simulation and Magnetic Memory Testing of Casing in CO_2 Medium

In oil drilling and completion engineering, the wellbore is under great pressure and often accompanied by acidic media such as CO2, which is easy to produce stress corrosion cracking phenomenon, affecting the integrity of the wellbore and resulting in oil and gas leakage. In this paper, the phenomenon of stress corrosion in wellbore is studied through the combination of experiment and simulation, and the stress corrosion is characterized by magnetic memory detection technology. The simulation results show that the larger the loading stress and electrochemical potential, the larger the stress and deformation of the whole specimen and its defects, and the more obvious the corrosion current is. Through experiments, the stress corrosion morphology of specimens under different stresses and defects was obtained. SEM was used to observe the microscopic morphology of stress corrosion, revealing the principle of stress corrosion of materials in CO2 and the generation mechanism of magnetic memory effect, laying a foundation for magnetic memory detection. A stress corrosion detection method in CO2 environment is proposed. The more severe the stress corrosion is measured by magnetic memory detection method, the more obvious the magnetic signal mutation is, which verifies the feasibility of magnetic memory in stress corrosion detection and has important significance for wellbore integrity.

Kimihisa Yamamoto
Tokyo Institute of Technology, Japan

Biography

Kimihisa Yamamoto received PhD degrees from Waseda University in Polymer Chemistry in 1990. He joined the Department of Chemistry at Keio University from 1997 as professor. Currently, he is a professor in the Laboratory for Chemistry and Life Science, Tokyo Institute of Technology since 2010. He is a project leader for Yamamoto Atom Hybrid Project adopted as a Japan Science and Technology Agency (JST), Strategic Basic Research Program (ERATO) . His interests are Metal-clusters and elemental materials.

Synthesis of Multi-metallic Nanocatalysts Using a Dendrimer Reactor

Dendrimers are highly branched organic macromolecules with successive layers or "generations" of branch units surrounding a central core. Organic inorganic hybrid versions have also been produced, by trapping metal ions or metal clusters within the voids of the dendrimers. Their unusual, tree-like topology endows these nanometer-sized macromolecules with a gradient in branch density from the interior to the exterior, which can be exploited to direct the transfer of charge and energy from the dendrimer periphery to its core.

We show that AuCl3, SnCl2, FeCl3, and so on complexes to the imines groups of a spherical polyphenyl-azomethine dendrimer in a stepwise fashion according to an electron gradient, with complexation in a more peripheral generation proceeding only after complexation in generations closer to the core has been completed. By attaching an electron-withdrawing group to the dendrimer core, we are able to change the complexation pattern, so that the core imines are complexed last. By further extending this strategy, it should be possible to control the number and location of metal ions incorporated into dendrimer structures, which might and uses as tailored catalysts, building blocks, or fine-controlled clusters for advanced materials.The metal-assembly in a discrete dendrimer molecule can be converted to a size-regulated metal particle with a size smaller than 1 nm as a molecular reactor(Fig.). Due to the well-defined number of metal clusters in the subnanometer region, its property is much different from that of bulk or general metal nanoparticles. The chemistry of nanocatalysts on the sub-nanometer scale is not yet well understood because precise multi-metallic nanoparticles are difficult to synthesize with control over size and composition. The template synthesis of multi-metallic sub-nanocalaysts is achieved using a phenylazomethine dendrimer as a macromolecular template.

Chunmeng Tian
China University of Petroleum, China

Biography

Chunmeng Tian is mainly engaged in scientific research on safety and integrity inspection and monitoring of oil and gas production facilities and intelligent early warning, drilling and completion risk assessment, machinery fault diagnosis, Non-destructive testing of oil and gas production equipment.

Assessment of contact status of seal surface in premium connections based on phased array ultrasound testing

Premium connections are widely used in high temperature high pressure (HTHP) and CO2 injection wells. The key factor in assessing the sealability of premium connections are the metal-to-metal contact state of the seal surface. This paper describes a method based on the Phased Array Ultrasound Testing (PAUT) to assess the metal-to-metal contact state of seal surface in premium connections, and presents experimental work on contact status of the seal surface in premium tubing connections using PAUT, testing impacts of torque, seal surface defect and thread compound. The test results show that the variation of ultrasonic reflection amplitude exhibits the opposite trend with that of the torque of the premium. Additionally, there is a stable exponential correlation between and the ultrasonic reflection amplitude and the torque of the premium. The ultrasonic reflection amplitude at the defect of the seal surface increases, and defect morphology of the seal surface of premium tubing in ultrasonic reflection amplitude cloud map can be clearly observed. Under the same torque, the ultrasonic reflection amplitude of the seal surface in premium connections without thread compound increased by 8.79%. These data cleary demonstrates that PAUT provides a reliable detection technique for performance assessment on premium connections, both in quality control and field inspection.

Aiichiro Nagaki
Hokkaido University, Japan

Biography

Aiichiro Nagaki received his PhD in 2005 from Kyoto University under the supervision of Professor Junichi Yoshida. He worked with Professor Hiroaki Suga, Tokyo University from 2005 as a Postdoctoral fellow. In 2006, he became an Assistant Professor of Kyoto University. He was promoted to lecturer in 2013. His current research interests are organic synthesis, polymer synthesis, and microreactor synthesis. His awards are Takeda Pharmaceutical Co., Ltd. Award in Synthetic Organic Chemistry, Japan (2012), Incentive Award in Synthetic Organic Chemistry, Japan (2012), and Young Innovator Award on Chemistry and Micro-Nano Systems (2013). He received his PhD in 2005 from Kyoto University under the supervision of Professor Jun-ichi Yoshida. He worked with Professor Hiroaki Suga, Tokyo University from 2005 as a Postdoctoral fellow. In 2006, he became an Assistant Professor of Kyoto University. He was promoted to lecturer in 2013. His current research interests are organic synthesis, polymer synthesis, and microreactor synthesis. His awards are Takeda Pharmaceutical Co., Ltd. Award in Synthetic Organic Chemistry, Japan (2012), Incentive Award in Synthetic Organic Chemistry, Japan (2012), and Young Innovator Award on Chemistry and Micro-Nano Systems (2013).

Flash Synthetic Chemistry Guided by Flow Microreactor Research

Many successful applications reported in the literature speak well for the power of the flow-microreactor method in chemical synthesis. The reaction time in a flow microreactor is defined as the residence time between a reagent inlet and the quencher inlet, which can be controlled precisely and reduced to millisecond order by adjusting the length between these positions and the flow speed. Such a feature of flow microreactors enables the use of short-lived highly reactive intermediates for synthesis. Various chemical reactions using highly reactive short-lived organolithium species that are difficult or even impossible to perform in batch processes can be accomplished in flow microreactors using space integration of reactions. In this presentation, we slow our recent results to various synthetic reactions mediated by organolithium reagents based on flash chemistry conducted in flow reactors, especially utilizing space-integration of the flow reactions.

Stefania Porcu
Dipartimento Di Fisica Universita Degli Studi Di Cagliari, Italy

Biography

Stefania Porcu was born in Nuoro in 1988. In 2011, She completed Chemistry degree after an internship at the Institut de Chimie Moléculaire et des Matériaux d'Orsay (University of Paris XI) and in Chemical Science at the University of Cagliari under the guidance of Professor Francesco Secci. Subsequently, she embarked on a PhD in Physics at the University of Cagliari, where she joined the Materials Science and Optical Spectroscopy research group (TREETOP) under the supervision of Professor Pier Carlo Ricci. During my PhD, she had the opportunity to conduct research at the College of Engineering (University of Notre Dame, Indiana, USA) under the mentorship of Professor Svetlana Neretina for three months and at the Institute of Electrochemistry (University of Ulm, Germany) in the research group led by Professor Radim Beranek for four months.

Throughout my doctoral research, she focused on exploring carbon nitride materials for their potential applications in photonics and photocatalysis. This involved synthesizing and characterizing various carbon-based nanoparticles and studying their optical and photocatalytic properties. Currently, She is working as a researcher (RTdA) in the Physics Department at the University of Cagliari. Her research interests revolve around investigating new materials for lighting and photocatalytic applications. She actively involved in the synthesis and characterization of carbon-based nanoparticles, exploring their properties and potential applications in various fields.

Overall, her academic journey has provided me with valuable experiences and opportunities to collaborate with renowned researchers in different countries. She is passionate about pushing the boundaries of knowledge in the field of materials science and contributing to the development of innovative solutions for practical applications.

Synergistic Solutions: Enhancing Visible Light Photocatalysis for Indoor Air Quality and Sustainable Energy Generation

Eco-sustainable solutions have become imperative in addressing air and water pollution, and one promising avenue is the utilization of heterogeneous photocatalysts, particularly semiconductor-based photocatalysis. This innovative approach harnesses light-driven chemical reactions on catalytic surfaces to transform pollutants into harmless substances, aligning seamlessly with eco-sustainability requirements and application convenience.

To further expand the potential of these photocatalysts, our research introduces a multifaceted approach that extends beyond mere pollutant degradation. We delve into the realm of sustainable energy by incorporating the generation of hydrogen, providing a clean and renewable energy source. This addition not only contributes to air quality improvement but also advances the agenda of sustainable energy production, offering a holistic environmental impact.

Moreover, the versatility of photocatalysts extends to virus disinfection, presenting an additional layer of public health protection. By leveraging the photocatalytic properties, these catalysts demonstrate efficacy in disinfecting surfaces and air, offering a comprehensive solution for indoor environments and contributing to a safer living environment.

Despite titanium dioxide's proven effectiveness in environmental remediation, its limited utilization of the visible spectrum poses a challenge, as it primarily relies on the UV portion of the solar spectrum for photocatalytic activity. To overcome this limitation, our re-

search introduces a highly efficient visible light hybrid catalyst by seamlessly merging titanium dioxide with phenyl carbon nitride. The incorporation of the organic component extends absorption up to 600 nm within the visible light spectrum, facilitating rapid charge exchange to the conduction band of TiO2.

This unique capability allows the catalyst to harness the power of visible light for the photocatalytic process, enabling highly efficient degradation of pollutants, air purification, and virus disinfection under visible light excitation. By effectively utilizing the visible part of the electromagnetic spectrum, our hybrid catalyst significantly.

Amir Nobahar
Atilim University, Turkey

Biography

Amir Nobahar is currently working as Assistant Professor, Department of Mechatronics Engineering Atilim University, Turkey. His reasearch interesret are Design and Modeling of Engineering Systems, Control Engineering Design and Optimization, Intelligent Control and Artificial Intelligence, Embedded Robotic Systems, UGV / UAV Control and, Navigation, Automation Systems.

Challenges and Recent Advancements in Motion Control of Oil Well Drilling Rig

Oil well drilling rigs have different operating modes during a real operation, each mode involves certain external disturbances and uncertainties. With the aim of cost reduction, increase of drill quality, enhance of control performance, while keeping a safe operation in the field, motion torque control systems are designed and implemented. To control the vertical and rotational velocities of the bit during the operation modes, against the speed controllers, robust and adaptive torque controllers have the capability of rejecting the effect of uncertain forces including the parametric uncertainties and the external disturbances. Also, some critical problems like slackening in the drilling cable can be easily prevented. On the other hand, to optimize the drilling parameters like rate of penetration and consequently decrease the operation costs, another challenge is mitigating of drill string vibrations. Here manipulation of bottom side drilling parameters is more effective than the manipulation of surface drilling parameters. These manipulations can be manipulation of the bit rotational speed, manipulation of weight on bit, and increasing of damping in the bottom of the drill-string. The optimizations need bottom-hole-assembly data like bit rotational speed, rock stiffness and torque on bit. Instead of measuring them directly from expensive sensors at bottom-hole-assembly, which is more usual, a simple and low-cost method, can be predict of these parameters. To this aim, proper observers are designed. High order observers with large bandwidth leads to more accurate in the estimation, but concludes the estimation be more sensitive to the sensor noise.

Ricardo Garsed
Autonomous University of Madrid, Spain

Biography

Ricardo Daniel Garsed Corral is a B.Sc. Chemistry, M.Sc. Biotechnology and PhD student in the Autonomous university of Madrid, Spain. He is also a research student at the Institute of Catalysis and Petro chemistry ICP-CSIC also did JAE-Intro fellowship at the Spanish National Research Council.

High luminescent multifunctional M-X (M=Cu(I), Mn(II), X=Br, I) coordination compounds as stimuli-response materials

Coordination compounds present dynamic structures, which make them suitable for the preparation of stimuli-response materials, with potential applications as sensors. Thus, the structures of these materials undergo slight structural changes under physical and/or chemical stimuli, such as vapours, temperature, and/or pressure, among others, which significantly affect their physical properties e.g. conductivity and/or emission [1]. Their architectures and properties are directly based on the selection of the building blocks, metal entities, and organic/inorganic ligands, required for the construction of their networks. In this research, we are focusing on MmXn(H2O)z(pr-ted)2 (M = Mn(II), X = Br, m = 1. N = 4, z = 1), (M = Cu(I), X = I, m = 4. N = 6, z = 0), and pr-ted = 1-Propyl-1,4-diazabicyclo[2.2.2]octan-1-ium) with high thermal stability as well as high photoluminescent quantum yields and intense green or orange emissions when exposed to UV light [2]. Both the intensity and the wavelength of theses compound's emissions have been observed to change when exposed to external stimuli, including pressure, temperature, (Figure 1) and the presence of vapors, among other stimuli. To carry out this task, the compounds were subjected to uniaxial and hydrostatic pressure changes, temperature changes, and exposed to different solvents to study the variation in the compounds' emissions. The crystal structures of the compounds were also studied both when applying hydrostatic pressure, when lowering the temperature and after the presence of solvents. The results of these studies reveal that the structures of MmXn(H2O)z(pr-ted)2 undergo phase transitions and/or structural modifications when external stimuli are applied. These observations suggest that the compounds with structure MmXn(H2O)z(pr-ted)2 could meet the requirements for their use as sensors.

Johannes Hofer
P&P Industries AG, Austria

Biography

Johannes Hofer is the Head of the Catalysis and Analytics group of P&P Industries AG, based in Austria. Innovating at the company since 2018, he has held several positions as a Project Manager, R&D Manager and Head of Research and Development. His work is focused on the development of new catalytic systems for the oxidation of SO2 in Sulphuric acid plant systems to hydrocarbon and ammonia removal in waste gas treatment. With international experience from working on plant systems of international clients he applies a scientific approach to solving problems at industrial scale. He received his doctorate in 2016 from Montanuniversitaet Leoben in materials science.

Platinum Promoted Honeycomb Catalysts for Sulphuric Acid Manufacturing and Tail Gas Treatment in Complex Environments

In a world were the ecological footprint of every chemical plant gets more and more important new catalyst technology is required to stay competitive. Sulphuric acid is the most important mineral acid produced by chemical industry. We present a novel platinum promoted honeycomb catalyst for the oxidation of Sulphur Dioxide, which can also be employed for the abatement of complex oxidizable waste gas streams. The catalyst shows a significantly higher activity than traditional Vanadium Oxide catalysts. Additionally, platinum promoted catalysts show a much lower toxicity compared with Vanadium Oxide products. Another important point that needs to be considered is the increase in platinum supply via the decrease of traditional three-way catalysts for gasoline powered cars, which will be replaced by CO2-emission free technologies such as electric engines or hydrogen powered driving. The lower ignition temperature of platinum can be used to cut overall emissions of the Sulphuric Acid plant. Another feature of the technology is a much lower pressure drop of the honeycomb catalyst compared with traditional bulk catalyst. This yields a much lower consumption of blower energy by the employment of honeycombs with about 100 CPSI (cells per square inch) compared with star ring shaped bulk catalysts. Furthermore, a case study of a waste gas treatment of carbon monoxide in a metallurgical plant bearing significant amounts of Sulphur Dioxide and Hydrogen Fluoride as a byproduct was conducted and will be presented in detail.

Jie Yang
Technology Supervision Research Institute of Petro, China

Biography

Jie Yang is presently a senior engineer in Safety, Environment, and Technology Supervision Research Institute of Petrochina Southwest Oil & Gas field Company, China. He received BA and MA degree in Applied Chemistry, Department of Chemical Engineering (China), and PhD in Chemical Engineering and Technology, Department of Chemical Engineering, China University of Petroleum (Beijing). His current research interests are Enhanced oil recovery, Membrane technology, Oil and gas field wastewater treatment.

Application of adsorption-coagulation-ultrafiltration-UV/O3/H2O2 distillation process for produced water discharge

The concentration of COD and ammonia nitrogen in produced water (PW) were commonly much higher than that in flowback water (FW) as gas lift and foaming agents were adopted to drain water out of the wellbore to optimize well production. Then, using common coagulation-ultrafiltration-distillation process to treat PW for discharge became more difficult. In this study, chemical analysis of PW from reservoir treated by artificial lift with foam technology in Changning shale gas play (Sichuan, China) was conducted and the performance of adsorption-coagulation-ultrafiltration-UV/O3/H2O2-distillation process in treating PW was systematically investigated. Different dosages (0~30g/L) of adsorbents (activated carbon, resin, quartz, clay), dosages (50~800mg/L) of polyaluminum chloride, dosages (0.02~5mg/L) of polyacrylamide, dosages (50~800mg/L) of H2O2, reaction rate (0.25~1L/min) of O3, ultraviolet light power (3~8W), initial pH (3~11) and reaction time (10~80mins) have been studied. Results show that the COD concentration (8.0×103mg/L) of PW was about 15 times that of FW and the ammonia nitrogen concentration (300 mg/L) of PW were 6 times that of FW. The adsorption-coagulation-ultrafiltration process was much more effective in reducing COD (76.4%) of PW rather than ammonia nitrogen (27.9%), on the other hand, the coagulation-UV/O3/H2O2-ultrafiltration process obviously increased the reduction of ammonia nitrogen in PW to 99% but only increased the reduction of COD to 34%. The adsorption-coagulation-UV/O3/H2O2-ultrafiltration process can remove 90.2% of COD and 99.6% of ammonia nitrogen respectively and the water quality of effluent treated the adsorption-coagulation-ultrafiltration-UV/O3/H2O2-distillation process met the requirements for discharge (GB 8978-1996 and DB 51/190-93, grade 1) and the crystalline salt quality met the requirements of Industral Salt (GB/T 5462-2015, grade 1) for reutilization. The results of this research had important guiding significance for the application of discharge treatment technology in the shale gas field.

5th Edition International Conference on

Catalysis, Chemistry and Chemical Engineering

March 25-26, 2024 | Barcelona, Spain

Keynote Speakers Day 2

Roger Saint Fort
Mount Royal University, Canada

Biography

Roger Saint-Fort is a Professor in the Faculty of Science & Technology at Mount Royal University where he teaches courses on groundwater contamination, environmental pollution prevention, and soil remediation. He received his Ph.D. from the Uninversity of Nebraska in Environmental Chemistry. His primary research and professional activities encompass fate and behavior of contaminants, contaminated site investigation and remediation, the use of CLO2/UV system for remediating NAPL contaminated groundwater, the application of electro-coagulation and nano bubble technology to reclaim a variety of wastewater streams as well as evaluating various forward-osmosis membranes suitability for water desalination. Futhermore, he continues to work passionately and successfully on prototyping, developing and implementing practical, innovative, cost effective, and long-lasting water purification systems to bring sustainable safe drinking water to needed communities around the world.

Landfill leachate as an alternative water source for Alberta oil and gas development

The Alberta oil and gas industry continually examine ways to reuse wastewater streams within the context of environmental regulations, human health protection, and system performance. The use of landfill leachate as an alternative source to freshwater in the formulation of water-based drilling fluid is examined. Drilling fluid parameters of interest were compared to class II and Class III leachate and freshwater matrices. Parameters of interest includes pH, EC, soluble salts (Ca, Mg, Na, K, SO42-, Cl, NO3-N, NO2-N, TDS), Alkalinity (HCO3-, CO32-, OH-), hardness, and SAR. The data was also evaluated with respect to Alberta's regulatory criteria to ascertain for potential environment risk, cost-benefit analysis, and intrinsic limitations, respectively. Analytical data sets of leachate both primary and secondary sources and freshwater resources including lakes and rivers, were statistically analyzed and assessed. Inferences could be drawn to determine if the leachate chemistry exceeds regulatory limits. From a regulatory standpoint, any parameter exceedance could result in noncompliance with current Alberta and/or other jurisdiction requirements. Piper multi-trilinear diagram was used to provide water chemistry differentiation. Three groupings were denoted including no single cation-anion pair > 50% represented by industrial and municipal landfill leachates, and lake water sources; carbonate hardness > 50% includes river water sources; and non-carbonate alkali > 50% consists of oilfield landfill leachates. Although landfill leachate quality and quantity vary spatially and temporally, its use may positively offset drilling fluid chemical additives and significantly freshwater volumes requirements thereby optimizing ecological, social, and economic imperatives. Effective adaptive and optimal designed management approaches could lead to sustainable landfill leachate use by industry if adequately supported by enlightening regulations and reduced administrative burden.

Bakhodir Tursunbaev
Tashkent State transport University, Uzbekistan

Biography

Bakhodir Tursunbaev is currently an academician and doctor of sciences at the Turan Academy of Sciences, head of the educational department, and associate professor of the Training Center of the Tashkent State University of Communications. He graduated from the Tashkent Automobile and Road Institute and Tashkent Higher Engineering and Pedagogical Institute. Previous main professional activity: Associate Professor of the Tashkent Automobile and Road Institute. Directions of scientific activity: fundamental questions of mechanics, modeling of systems under the action of dynamic forces, atomic physics, efficiency of internal combustion engines, and sustainable road transport.

More than 30 scientific results have been published in local and foreign international journals, including 20 books on research on the atomic structure and efficiency of combustion engines. Owners of two inventions, four utility models, and five software patents.

Engineering physics solves the problems of quantum mechanics

This study analyzed the results of experiments to visualize the structure of a hydrogen atom using a new methodology that considers the main factors missed in quantum mechanics. Theoretically and experimentally confirmed new values for the radius and diameter of hydrogen atoms.

Introduction: The history of science (especially physics) has repeatedly demonstrated a certain "quasi-periodical character' of its development; sometimes, it would seem, worked out concepts return, and proved to be useful for solving some problems. In this sense, the fate of ideas of fundamental mechanics and electrodynamics is very interesting when trying to apply them to an object such as an atom, which is stereotypically associated with quantum mechanics today.

In 1911, E. Rutherford [1] discovered the planetary model of the atom. Shortly thereafter, N. Bohr sharply criticized Rutherford's model of the atom and proposed a new model based on its postulates. In this atom model, an attempt was made to connect the motion of an electron in the structure of an atom with the energy quantization [2]. With this, he introduced into atomic physics stationary orbits, the connection of stationary orbits with the principal quantum number, and other obscure concepts.

Later, when a number of inconsistencies with experimental results were discovered in Bohr's model of the atom, the atomic world was called by his supporters a special "microworld" and the theory of quantum mechanics was developed on the basis of Bohr's principles. Currently, the founders of quantum mechanics are Bohr, Heisenberg, Schrödinger, Dirac, and Pauli. [3]. With quantum mechanics, additional imaginary concepts have been introduced into physics: microparticles have no trajectory, the concept of dualism, etc.

However, not all scientists were satisfied with the absence of the concept of electron trajectory (e.g., Einstein [4]), which stimulated the emergence of new attempts to preserve the ideas of classical physics in atomic theory. Here it is especially interesting to note the compromise theory of R. Feynman [5], who, to retain the conception of electron trajectories in an atom, introduced the idea of integration by trajectories. This description of quantum mechanics combines the approaches of Newton [6] and W. Hamilton [10] to classical mechanics. This movement has continued to the present day.

5th Edition International Conference on

Catalysis, Chemistry and Chemical Engineering

March 25-26, 2024 | Barcelona, Spain

Speakers Day 2

Hamed Movahedi
Technical University of Denmark, Denmark

Biography

Hamed Movahedi have obtained my Ph.D. in petroleum engineering from Sharif University of Technology with expertise in CFD, transport phenomena, contamination transport in porous media, filtration and purification, material physics, polymer, and nanotechnology. Currently, he is working as a postdoctoral researcher at the Technical University of Denmark, where he is focused on conducting research in the field of porous media CT scanning and the development of new polymeric fluids for well plugging and abandonment in collaboration with DTU Physics and DTU Offshore.

Polyacrylamide Hydrogel Modification for Enhanced Temporary Oil and Gas Well Abandonment: Preparing for Future CO2 Storage

The Industrial Revolution increased the use of hydrocarbon and fossil fuel resources, leading to an increasing emphasis on sustainable practices that reduce carbon emissions and use renewable energy. Many well-established oil and gas wells in petroleum reservoirs make sealing and decommissioning crucial. Cement plugs are often used to plug; however, they might fail and discharge hydrocarbons. Cement should not be used for temporary blocking, especially in gas storage or CO2 injection wells. The oil and gas industry in Denmark offers excellent CO2 injection potential, strengthening carbon capture projects in Europe.

The primary objective of this work is to produce a unique variation of hydrogel specifically designed for the purpose of plugging. Polyacrylamide was synthesized through radical polymerization and then the Hoffman rearrangement assisted partial amination of polyacrylamide. When heated within the desired temperature range, the polymer was crosslinked with glutaraldehyde to generate a hydrogel. The appropriate gelation concentrations were determined through rheological tests and gel time measurements. The gelation times ranged from 4 to 20 hours, suggesting these doses can be used for various injection methods. The hydrogel works in acidic and high-salinity environments, making it ideal for demanding reservoirs.

The fluid showed Herschel-Bulkley behavior, which increases yield stress before gelation, according to rheology. This work provides a unique hydrogel solution for well plugging, which may benefit environmentally sustainable well decommissioning and complicated reservoir conditions.

Konrad Sobczuk
West Pomeranian University of Technology in Szczecin, Poland

Biography

Konrad S. Sobczuk is a chemical engineering PhD student at the West Pomeranian University of Technology in Szczecin. His background in research includes a bachelor's degree in nanotechnology engineering (where he researched electrocatalysis) and a master's degree in inorganic chemical technology (where he researched chemically activated carbon spheres). He obtained both degrees at the West Pomeranian University of Technology in Szczecin. His current thesis in the Doctoral School of ZUT in Szczecin describes the photocatalytic activity of variously doped (with both metals and non-metals) titanium dioxide in the process of carbon dioxide photoreduction.

Investigation of the cobalt doping-method on the activity of titanium dioxide in the CO2 photoreduction process

Titanium dioxide samples were obtained via hydrolysis of titanium(IV) isopropoxide using a sol-gel method. In order to establish how different methods of introducing cobalt into the sample impact the process of photoreduction, this material was modified with cobalt(II) nitrate (Co(NO3)2) using a different methods of synthesis (ex. hydrothermal treatment, impregnation, annealing) leading to samples with varying activity in the carbon dioxide photoreduction process. Cobalt content in the samples was kept the range of contribution of 0.1%–1.0% by weight.

The obtained samples were characterized by scanning electron microscopy (SEM), low-temperature nitrogen adsorption using Brunauer–Emmett–Teller (BET) method, X-ray powder diffraction analysis (XRD), their electrocatalytic activity and their photocatalytic activity in the carbon dioxide (CO2) photoreduction process. Carbon dioxide photoreduction processes were carried out in a gas-phase system in a glass reactor equipped with a quartz cooler continuously fed with fresh water. A 150 W mercury lamp emitting UV-C light was placed in the cooler inside the glass reactor. The composition of the gas phase after the process was analyzed using a gas chromatograph (GC).

Experimental results showed that the photocatalysts modified with cobalt cations (Co2+) tend to exhibit lower photocatalytic activity when singularly modified and higher photocatalytic activity when doubly modified. It was found, that the curve representing photocatalytic tendency is higher when the cobalt(II) nitrate is additionally modified before impregnating it to titanium dioxide. The sample showing the highest photoactivity under UV-C irradiation was modified with cobalt-carbon co-dopant.

Larisa Klapshina
Razuvaev Institute of Organometallic Chemistry of Russian Academy of Sciences, Russia

Biography

Larisa Klapshina received her PhD from Razuvaev Institute of Organometallic Chemistry of Russian Academy of Sciences (IOMC RAS) in 1972. Currently she is Head of Research Sector of Chromophore Compounds for Medicine in IOMC RAS. She develops extensive interdisciplinary cooperation with the specialists in the field of biophysics, medicine and laser applications. She and her team were the first to synthesize the unique rigidochromic (cyanoaryl) porphyrazine pigments with 4 D-π-A dyads framing macrocycle. She is the author of more than 100 cited articles.

Novel Rigidochromic and Anti-Kasha Dual Emission Fluorophores Based on D-π-A Dyads as the Promising Materials for Potential Applications Ranging from Optoelectronics and Optical Sensing to Biophotonics and Medicine

The dyes whose fluorescent properties are very sensitive to the nature of local environment are now highly demanded for various applications such as biological sensors and photoactive materials.

Here we report on the new anti-Kasha rigidochromic pigments including (cyanoaryl) porphyrazine with four pyren-2-yl groups framing macrocycle. This porphyrazine is established to be a unique combination of effective photodynamic therapy agent and bifunctional probe with double-sensory ability allowing the real-time control of the therapeutic process simultaneously with the cell membrane viscosity and polarity changes [1].

The obtained pigments demonstrate the potential efficacy of modulating successive photo physical intramolecular events inducing pronounced dual emission (DE). This unique form of anti-Kasha effect is found to be controlled by the changes of environmental polarity that can be utilized for intracellular membrane polarity sensing during PDT. Previously, we found that cyanoarylporphyrazines demonstrate excellent anchorage towards the intracellular membrane (mainly, endoplasmic reticulum and Golgi apparatus) and high brightness. A potential advantage of our new compound compared to the recently reported high-performance polarity-sensitive and membrane-specific probe [2] is the ratiometric method for estimating local polarity (i.e., by the ratio of long-wavelength and anti-Kasha short-wavelength emission intensities, which depends on local polarity). This considerably simplifies polarity monitoring, since there is no need to use complex and expensive equipment for measuring the fluorescence lifetime, which depends on plasma membrane polarity.

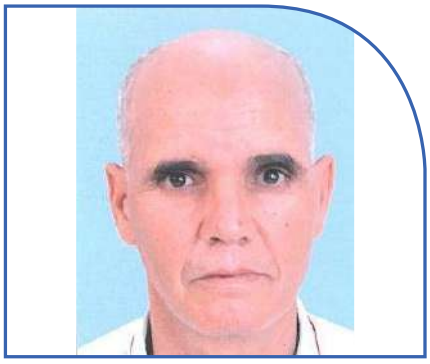
Lenard Carroll
IFF-CSIC, Spain

Biography

Lenard Carroll obtained a B.Sc in Chemistry and Pure Mathematics from the University of Cape Town (UCT) in 2016, followed by an Honours degree in Chemistry with distinction in 2017. The past 7 years, he has been distinguished with several accolades, including placement on the 2016 Dean's Merit List, the class medal in third-year chemistry for top performance, recognition among the top 15% of academic achievers in 2017, and multiple scholarships and awards. Carroll's interests led him to computational chemistry, culminating in a M.Sc degree at UCT with distinction and a PhD at UFS, both focused primarily on molecular dynamics.

Confinement and Dimerization of Cu5 on Graphene

Atomically precise metal clusters (AMCs) are nanoscale structures known for their impressive properties and applications.1-2 Graphene, a two-dimensional material with high stability and remarkable conductivity, is a suitable candidate as an ideal support for AMCs.3 Our study delves into the interaction between two Cu5 clusters on a single graphene sheet, pristine and defective. In particular, we examine how carbon vacancies influence the clusters' stability, configuration and confinement through ab initio molecular dynamics simulations, while the dimerization of the two clusters on pristine graphene are studied, with density functional theory results validated by more refined post Hartree-Fock methods. The quantum mechanical computations were executed via ORCA,4 MOLPRO,5 and the VASP software,6 with the CP2K code specifically employed for ab initio molecular dynamics simulations, known for its efficiency.7 The Langevin ensemble and adaptive-Langevin thermostat were used in these simulations, with a time step of 2 fs. The AIMD simulations were performed using a single gamma point sampling of the Brillouin zone, while 5×5×1 k-points of the Monkhorst-Pack method were chosen for the DFT computations. The results revealed that while separate planar Cu5 clusters typically dimerize into a larger Cu10 dimer with a three-dimensional structure on a pristine graphene surface, when carbon vacancies are present, this traps the Cu5 clusters, causing them to optimized to a trigonal bipyramidal 3D structure and remain isolated as individual clusters. This confinement substantially stabilizes the clusters, leading to a significantly favorable adsorption energy of the Cu5 clusters onto the graphene. Note that similar behavior for confinement and particularly dimerization are noticed at varrying tempratures (300, 400 and 600 K).



Mohamed Ouhammi
Sidi Mohamed Ben Abdellah University, Morocco

Biography

Mohamed Ouhammi worked in Moroccan standard for the quality of water intended for irrigation, state secretariat at the ministry of energy, mines, water and the environment, in charge of the environment S.E.E.E, (2007).

An Evaluation of Metallic trace Elements by aerated Lagooning in an arid climate: The case of the Wastewater Treatment plant of the City of Errachidia, Morocco

The aim of this study is to evaluate the content of heavy metals in raw and treated wastewater from the wastewater treatment plant (WWTP) of the city of Errachidia (Morocco) to evaluate their reuse in irrigation. The results of the physico-chemical analyses in October 2020 and February 2021 of the wastewater from the STEP showed that the content of heavy metals such as Al, Ag, Cd, Cr, Pb, Cu, and Co at the WWTP input is relatively low, all below 0.05 mg/l in October and below 0.01 mg/l in February, due to low industrial and agricultural activity in the region. This clearly confirms the nature of the city's domestic wastewater. At the exit of the station, the concentrations of the various metallic trace elements mentioned are all also less than 0.01mg/l in February and all less than 0.045 mg/l in October. These numbers comply with Moroccan water discharge standards for surface or underground and water intended for irrigation.

Ajay Giri
Bundelkhand University, India

Biography

Ajay Giri earned M.Phil/Ph.D degree (1995-2002) from School of Environmental Sciences (SES), JNU, New Delhi and specialized in industrial solid wastes management with resource recovery for sustainable development. He has worked as provisional RA in Research Lab WII-MoEF Dehradun and imparted technical know-how to technical staff, Research scholars and Wildlife officers. He has established a Research laboratory for water, soil and plant chemical analysis at WII, Dehradun. He obtained PG (199 -1994) in Botany from Ravenshaw College(Utkal) with specialization in Environmental Biology. After qualifying NET, JRF, SRF and brief period of post doctoral experiences he, joined (March 2003) as lecturer at Department Botany and promoted to Reader (20th January 2005) in the pay scale of Rs. 12000 -18300/- at the IEDS, BU, Jhansi. Under deputation he worked as HoD, Botany for three years. He has introduced the M.Phil programme in BU campus Jhansi. He has also served as HoD, IEDS 31/2 years. During my tenure as head, he has regularly organized workshop, national conference/ seminar and celebrated World Environment day in our university campus. As head IEDS, he has collaborated with National Referral Centre for Lead Poisoning in India (NRCLPI), Bangalore for „Awareness campaign in central India for prevention of lead poisoning. Subsequently, IEDS under my leadership has been organizing awareness lectures on “prevention of lead poisoning” in central India.

Phytoremediation of domestic-sewage followed by phycoremediation is a promising tool for remediation and resources recovery: A case study in India

Jhansi-city, central India being located in subtropical-semiarid climate has been generating huge domestic-sewage, since many decades. However, regional poor economy inhibits application of wastewater treatment-system, thereby excess quantity untreated domestic-sewage have been accumulated and damaged its environment. Hence, a field-survey was conducted which noticed that sewage-ponds in Jhansi-city have encouraged massive growth of Typha latifolia L. Consequently, a pilot study was conducted to examine phytoremediation potential of T. latifolia. Remarkably, phytoremediated effluent in our pilot study noted growth of selected algal species along with wild-type Chlorella sp. Hence, a second pilot study was devoted to evaluate the importance of phytoremediation of domestic-sewage followed by phycoremediation for sewage based resource recovery.

Phytoremediation of sewage at 48 hours detention time caused significant reduction of pH(19.1%), TSS(87.5%), BOD(67.5%), COD(69.8%), TKN(56.3%), TP(71.2%), NH+4- N(56.5%), whereas NO-3-N (8.5 mg/L), DO (3.8 mg/L) were enhanced from the non-detectable (ND) levels. Subsequently, phytoremediated effluent was employed as feedstock for growth of wild-type Chlorella sp. at six different treatments: treated-mixotrophic-(T1), treated-heterotrophic-(T2), treated-autotrophic-(T3), control-mixotrophic-(T4), control-heterotrophic-(T5) and control-autotrophic-(T6) for 8 days inside an incubator. Finally phycoremediation produced highest algal biomass (328 mg/L/day) in treated-mixotrophic, while reducing TKN (91.8 %) and TP (96.5%), compared to fresh-sewage. The results suggested that phytoremediated effluents followed by mixotrophic cultivation of microalgae could be the most efficient for sewage based resource recovery.

Myrtel Bernardo
Bulacan Agricultural State College, Philippines

Biography

Myrtel Bernardo is an Assistant Professor III and Program Chairperson of BSIT Program under the Institute of Engineering and Applied Technology at Bulacan Agricultural State College soon to be Bulacan State Agricultural University (RA11783) located at Pinaod San Ildefonso Bulacan, Philippines. She is an IEEE Member since 2021 and NRCP Associate Member in 2023. She is Graduated Doctor of Engineering Major in Computer Engineering degree under the CHED K to 12 Scholarship program at Technological Institute of the Philippines, Quezon City Campus in 2022 and earned her Master's in Engineering major in Computer Engineering from 2012 - 2016 with CHED part-timer scholarship grant, and BS Computer Engineering (2002-2007) both at Bulacan State University, Malolos, Bulacan. She is an active research faculty that received various awards and recognitions such as Best Faculty Researcher in 2022, Best Poster Award 2022 - 2023, and 2nd, 3rd Best Paper presenter in 2021. Her research interests include control systems, artificial intelligence and smart agriculture. She published several papers in the Scopus index.

Potential of solar-sharing smart lighting systems to address the Sustainable Development Goals (SDGs) of the United Nations

The SDGs are a set of 17 goals that were adopted by the United Nations in 2015. These goals aim to end poverty, protect the planet, and ensure prosperity for all by 2030. Indoor farming is a rapidly growing industry that has the potential to help address several of the SDGs. Indoor farming can be used to produce food in a sustainable and controlled environment, even in areas with limited land or water resources. It can also help to reduce food waste and improve food security. However, one of the challenges of indoor farming is the cost of lighting. Traditional lighting systems can be expensive to operate and maintain, and they can also contribute to greenhouse gas emissions. A solar-sharing smart lighting system can help to address these challenges. This system uses solar panels to generate electricity, which is then used to power the LED lights in the indoor farm. The LED lights are much more energy-efficient than traditional lights, and they can be controlled remotely using a smartphone or tablet. This allows farmers to optimize the lighting schedule to maximize crop yields while minimizing energy costs.

Jatani Bonaya Godana
Dilla University, Ethiopia

Biography

Jatani Bonaya is a young Ethiopian Lecturer who is currently working at Dilla University, Ethiopia. He is a community activist, author, Teacher, Poet, Global Peace Ambassador, Youth Opportunity Country Ambassador, Ethiopia and youth advocate. He has a BSc in Water Supply and Sanitary Engineering, an MSc in Civil Engineering, and an MSc in Project Management, Analysis, and Evaluation. He works as a community activist, Environmental defender, and Communication Director at Active Youth Initiative (AYI). He is the founder and CEO of Daayyaa Generation Network. He presently works as a communication officer for African Youth Pastoralists – Ethiopia Chapter. He is a highly active person who has been a community volunteer since 2003 when he was a grade three students and founder of the school's multimedia and drama writer. He was recently invited to join the Gayo Pastoralist Community Development in 2022, where he joined the development team to work on community-impacting projects.

Traditional groundwater exploration method for pastoralist community water supply system in semi-arid region of Ethiopia: case of tula sallan borana, Southern Ethiopia

Traditionally Borana people used to excavate a little depth in the stream alluvium, to collect the groundwater coming from side to side of outflow and use different purposes in arid and semi-arid regions, where there is no visible flow of water along the streams. In Borana semiarid region of southern Ethiopia, groundwater has been used as the source for almost all individual livestock and other domestic water supply systems. Therefore, the assessment and evaluation of traditional groundwater exploration methods is essential for the pastoral communities in arid zone like Borana of southern Ethiopia. Groundwater exploration method is the technique way to inquiry the ground formations, hydrologic cycle, nature of aquifers, and land cover of the study area. Traditional groundwater exploration method is an indigenous task to identifying the location of groundwater availability. Recently, more techniques have developed to explore the groundwater; classified as surface and subsurface methods. Traditional ground water exploration method is the part of the surface method. Traditional groundwater exploration and supply system in Borana is essential in modern hydrology. Traditionally, Borana explored groundwater by three indigenous methods. Traditional Groundwater Exploration Method for Pastoralist Community Water Supply Systems in semi-arid regions and others requires the basic concepts of position in the subsurface geological setup and natural land cover.

Osman Adiguzel
Firat University, Turkey

Biography

Osman Adiguzel graduated from Department of Physics, Ankara University, Turkey in 1974 and received PhD- degree from Dicle University, Diyarbakir-Turkey. He studied at Surrey University, Guildford, UK, as a post doctoral research scientist in 1986-1987, and his studies focused on shape memory alloys. He worked as research assistant, 1975-80, at Dicle University and shifted to Firat University in 1980. He became professor in 1996, and he has been retired due to the age limit of 67, following academic life of 45 years. He published over 80 papers in international and national journals; He joined over 120 conferences and symposia in international and national level as Plenary Speaker, Keynote Speaker, Invited speaker, speaker or Poster presenter. He served the program chair or conference chair/co-chair in some of these activities. In particular, he joined in last six years (2014 - 2019) over 60 conferences as Speaker, Keynote Speaker and Conference Co-Chair organized by different companies in different countries. Additionally, he retired at the end of November 2019, and contributed with Keynote/Plenary Speeches over 120 Virtual/Webinar Conferences, due to the coronavirus outbreak in three year of his retirement, 2020 and 2022.

He served his directorate of Graduate School of Natural and Applied Sciences, Firat University in 1999-2004. He supervised 5 PhD- theses and 3 M. SC theses. He is also technical committee member of many conferences. He received a certificate which is being awarded to him and his experimental group in recognition of significant contribution of 2 patterns to the Powder Diffraction File – Release 2000. The ICDD (International Centre for Diffraction Data) also appreciates cooperation of his group and interest in Powder Diffraction File.

Shape Reversibility and Multivariant Nature of Martensite in Shape Memory Alloys

Shape memory alloys take place in class of advanced smart materials, by exhibiting a peculiar property called shape memory effect. This phenomenon is initiated on cooling and deformation, and performed thermally on heating and cooling, with which shape of the material cycles between original and deformed shapes in reversible way. Therefore, this property called thermo elasticity. This behavior is governed by the thermal and stress induced martensitic transformations, and reverse austenitic transformation, in crystallographic level. Thermal induced martensitic transformation occurs on cooling with cooperative movements of atoms in <110 > -type directions on the {110}-type planes of austenite matrix, along with lattice twinning reaction and ordered parent phase structures turn into twinned martensite structure; and twinned structures turn into detwinned martensite structure by means of stress induced martensitic transformation by stressing material in martensitic condition. The twinning reactions are driven by lattice invariant shears.

The {110}-plane family has 6 certain lattice planes; {110}, {1 -1 0}, {101}, {1 0 -1}, {011}, {0 1 -1}; and totally 24 martensite variants are obtained by means of the lattice invariant shears on <110 > -type direction on these planes.

These alloys exhibit another characteristic called superelasticity, which is performed by stressing and releasing material in elasticity limit at a constant temperature in parent phase region, and shape recovery is performed simultaneously upon releasing the applied stress, by exhibiting elastic material behavior. Superelasticity is performed in non-linear way; stressing and releasing paths are different in the stress-strain diagram, and hysteresis loop refers to energy dissipation. Superelasticity is also result of stress induced

transformation and ordered parent phase structures turn into detwinned structure with stressing. The basic factor at the martensitic transformations is lattice twinning and detwinning reactions.

Copper based alloys exhibit this property in metastable □□□□phase region, which has bcc-based structures at parent phase field. Lattice invariant shear and twinning is not uniform in these alloys and give rise to the formation of long period layered structures, like 3R, 9R or 18R structures depending on the stacking sequences, with martensitic transformation,

In the present contribution, electron diffraction and x-ray diffraction studies performed on copper based CuZnAl and CuAlMn alloys. Electron diffraction patterns and x-ray diffraction profiles exhibit super lattice reflections in martensitic condition. Specimens of these alloys aged at room temperature in martensitic condition, and a series of x-ray diffractions were taken duration aging at room temperature. Reached results show that diffraction angles and peak intensities change with aging time at room temperature, and this result refers to the rearrangement of atoms in diffusive manner.

Jean Marie Kepdieu
University of Yaounde I, Cameroon

Biography

Jean Marie Kepdieu, Master degree in material sciences, Faculty of Science, Department of Inorganic Chemistry, University of Yaounde I, Cameroun. He is a Ph.D Student in the same faculty since 2019. His studies focus on the utilization of low-cost materials in the synthesis of multifunctional materials.

Equilibrium, Thermodynamic and Kinetic Studies of Palm Oil β-carotene Adsorption by Composites Based Silica-Smectite

Three silica-smectite-based composites with different structures denoted CSS1, CSS2 and CSS3 were used to adsorb β-carotene from palm oil via batch tests. The optimal conditions were 2% (w/w), 40 min and 95°C for adsorbent dosage, contact time, and temperature respectively. The bleaching yield was found to be 64% for CSS1, 79% for CSS2, and 92% for CSS3. R2 and Root Mean Square Deviation values indicated that equilibrium data were described well by Freundlich isotherm while the second-order and intraparticle diffusion fitted well the kinetic data. The activation energy values were less than 10 kJ/mol for all adsorbents and the enthalpy change ranged from 13.8 to 23.0 kJ/mol, pointing to a physical adsorption and an endothermic process. In addition, as the temperature increased, from 60 to 95°C, the Gibbs free energy ΔG decreased, (-964.20 to -2441.3 J/mol for CSS1), (-1717.5 to – 7175.9 J/mol for CSS2) and (– 2510.3 to -3476.9 J/mol) revealing the spontaneous character of the process at higher temperature. The positive values of entropy change ($57.5 \leq \Delta S \leq 87.6$ J/mol.K) suggested an increase in the randomness at the adsorbent-palm oil interface, related to the redistribution of energy between the β-carotene molecules and the adsorbent. Each of the three composites behaved as a good adsorbent, but CSS3 outperformed CSS2 and CSS1.

5th Edition International Conference on

Catalysis, Chemistry and Chemical Engineering

March 25-26, 2024 | Barcelona, Spain

Posters Day 2

Shirin Shahgodari
University of Barcelona, Spain

Separation of Amino Acids in Ternary Solutions by Nanofiltration

In recent years, the number of new industries using biotechnology and sophisticated natural processes in the food industry has increased significantly. His diverse interests include the purification and recovery of amino acids and peptides, which play important roles in many areas of the chemical, pharmaceutical, food and biotechnology industries. It is estimated that the production and consumption of amino acids on the market doubles in the next 10 years. The use of nanofiltration membranes offers an alternative to commonly known industrial processes such as extraction, ion exchange, evaporation, and distillation. In this work, we study the retention of NaCl, glycine (G) and triglycine (GGG) in ternary mixtures with a nanofiltration membrane as a function of feed pH.

The experiments were carried out with flat organic membranes from Koch (SelRO® MPF-36) at 20 °C, with the retentate flow circulating tangentially to the membrane. The ternary mixtures were formed in three different ratios of G/GGG (0.02, 0.2, and 2) with 0.1 M NaCl. The permeation of G was observed to be altered by the presence of the larger molecule GGG. While the permeability of the large molecules is not affected by the smaller one. For example, the maximum rejection value of G decreased particularly at high pH and remained almost constant at acidic pH. Therefore, desalination of solutions was achieved under certain conditions, for example at a basic pH.

Shirin Shahgodari
University of Barcelona, Spain

Study of the permeation of nutrients by polymeric forward osmosis membranes

Forward osmosis (FO) is widely used in industrial applications such as resource recovery from nutrient rich wastewaters, as well as in the desalination process of sea water. Some kinds of wastes, such as wastewater, are rich in ammonium and phosphorus, and thus the recovery of these nutrients via a cost-effective and energy-efficient method would be necessary.

FO uses the osmotic pressure gradient generated between a highly concentrated saline solution, called draw solution (DS), and a more diluted one, called a feed solution (FS). This difference in osmotic pressure causes the diffusion of water through a semipermeable membrane from the feed solution to the extracting solution. Usually, FO is a slow process, especially compared to RO. Although, depending on the solute used in the DS, this process could be faster.

The aim of this study was to analyze the recovery of the ammonium using a FO module. First, FO membranes were characterized by the permeation of different solutions of NaCl as DS and water as FS. The behavior of the water flux and the draw solute rejection was analyzed with the well-known mathematic model that consider the effects of internal concentration polarization (ICP). Thereafter, the permeation of NH4Cl was studied in a counter current mode at different conditions. Water and solute permeabilities were determined with appropriated mathematical model for the FO process in this special cell. The rejection of ammonium was dependent on the membrane and the pH of the feed.

Konrad Sobczuk
West Pomeranian University of Technology in Szczecin, Poland

Biography

Konrad S. Sobczuk is a chemical engineering PhD student at the West Pomeranian University of Technology in Szczecin. His background in research includes a bachelor's degree in nanotechnology engineering (where he researched electrocatalysis) and a master's degree in inorganic chemical technology (where he researched chemically activated carbon spheres). He obtained both degrees at the West Pomeranian University of Technology in Szczecin. His current thesis in the Doctoral School of ZUT in Szczecin describes the photocatalytic activity of variously doped (with both metals and non-metals) titanium dioxide in the process of carbon dioxide photoreduction.

Photo- and photoelectrocatalytic carbon dioxide reduction using titanium dioxide modified with d-block metal salts

Titanium dioxide is one of the most commonly used photocatalysts; however, its wide bandgap energy, which can be only activated under UV light as well as fast charge carrier recombination restrict its applications in practical scenarios. In order to reduce the bandgap energy of TiO2 and e.g. enhance the CO2 photoreduction, doping with metal ions is studied.

Titanium dioxide samples were obtained via hydrolysis of titanium(IV) isopropoxide using a sol-gel method. In order to establish how modifying TiO2 with different d-block metal salts impacts the photocatalytic activity in the processes of photoreduction and photoelectroreduction, samples with different d-block metals (ex. iron (Fe), zinc (Zn), chromium (Cr)) were prepared. Metal content in those samples was kept at a level of 1.0% by weight.

The obtained samples were characterized by using low-temperature nitrogen adsorption using the Brunauer–Emmett–Teller (BET) method, true density measurement, their electrocatalytic activity, and their photocatalytic activity in the carbon dioxide (CO2) photoreduction process. Carbon dioxide photoreduction processes were carried out in a gas-phase system in a glass reactor equipped with a quartz cooler continuously fed with fresh water. The composition of the gas phase after the process was analyzed using a gas chromatograph (GC).

Experimental results showed that the photocatalysts modified with d-block metal cations tend to exhibit similar photocatalytic activity when singularly modified and annealed in a tube furnace.

UPCOMING CONFERENCES

7th Edition World Congress on **Advanced Chemistry**
March 19-20, 2025 | Amsterdam, Netherlands
dileep@scholarsconferences.com
https://scholarsconferences.com/chemistry-frontiers/

6th Edition International Conference on **Catalysis and Chemical Engineering**
March 19-20, 2025 | Amsterdam, Netherlands
catalysis@scmeetings.org
https://scholarsconferences.com/catalysis-frontiers/

2nd Edition Global Summit on **Oil, Gas, Petroleum Science and Engineering**
March 19-20, 2025 | Amsterdam, Netherlands
john@scholarconferences.org
https://petroleumscienceconference.com/