EURASIA CONFERENCES

Book of Abstracts

8th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

8th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

MAY 19-20, 2025

VIENNA, AUSTRIA

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

EURASIA CONFERENCES

8th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

8th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 19-20, 2025 | Vienna, Austria

BOOK OF ABSTRACTS

Abstracts of the 8th World Conference on Advanced Materials, Nanoscience and Nanotechnology
&
Abstracts of the 8th World Conference on Chemistry and Chemical Engineering

Conference Dates:
May 19-20, 2025

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:
978-81-981865-7-7

ISBN 978-81-981865-7-7
9 788198 186577

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

8th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

8th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 19-20, 2025 | Vienna, Austria

SCIENTIFIC PROGRAM

09:25-09:30 @

Introduction and Welcome Note

Conference Room: Papageno

DAY 1

MAY 19, 2025

Speaker Sessions

09:30-10:00

Title: A Digital Twin model of Coal gasifier for High ash Indian Coal

P. Narendra Kumar, Engineers India Ltd (R&D), Gurugram, Haryana, India

10:00-10:30

Title: Phosphate-Based Glass Electrolytes in Solid-State Lithium-Ion Batteries: Overcoming Development Challenges

Hicham Es-soufi, National Higher School of Chemistry (NHSC), Ibn Tofaïl University, BP. 133-14000, Kenitra, Morocco

Group Photo, Net working, Tea and Refreshments Break 10:30-11:00

11:00-11:30

Title: Applications of Nanotechnology in Drug Delivery: Recent Advances

Mohamed Abbas Ibrahim, Department of Pharmaceutics, College of Pharmacy, King Saud University, Riyadh, Saudi Arabia

11:30-12:00

Title: Toward Cleaner Ironmaking Routes: Energy and Environmental Evaluation of Hydrogen-Based Ironmaking

Abdallah Skaf, Toulouse Biotechnology Institute (TBI), Université de Toulouse, CNRS, INRAE, INSA, Toulouse, France

12:00-12:30

Title: Biodegradable Hollow-structured Nanozymes Modulate Phenotypic Polarization of Macrophages and Relieve Hypoxia for Treatment of Osteoarthritis

Hao Xiong, Department of Orthopedics, Shanghai Jiao Tong University Affiliated Sixth People's Hospital, Shanghai, Shanghai, China

Session Wrap and Lunch Break 12:30-13:30

13:30-14:00

Title: Recent Progress in Phosphate Glassy Electrolytes for Solid-State Lithium-Ion Batteries

Hicham Es-soufi, National Higher School of Chemistry (NHSC), Ibn Tofaïl University, BP. 133-14000, Kenitra, Morocco

14:00-14:30

Title: Natural Nanocarriers for Nucleic Acids Transfection and Biotechnological Applications

Fidel Antonio Castro Smirnov, Instituto Superior de Tecnologías Ciencias Aplicadas, Universidad de la Habana (Instec-UH), Habana, Cuba

14:30-15:00

Title: Corrosion Protection of Steel in Industry Using Eco-friendly Green Synthesized Materials

Reda Abdel Hameed, Basic Science Department, Preparatory Year, University of Ha'il, Hail, KSA

Net working, Tea and Refreshments Break 15:00-15:30

Poster Sessions @ 15:30-16:30

Poster-1

Title: Economic Assessment of Small-scale e-NH_3 Production Plant

Berta Galan, Department of Chemical and Process & Resource Engineering, Green Engineering & Resources Research Group, ETSIIT, University of Cantabria, Santander, Spain

Poster-2

Title: Comparison of Predictive Values with Experimental Results for Cyclic C5-Curcuminoids

Levente Tyukodi, Institute of Pharmaceutical Chemistry, Faculty of Pharmacy, University of Pécs, Pécs, Hungary

Poster-3

Title: Study on Conditions for Concrete Construction Using Lunar Simulant Sand

Yuta YAMACHI, Graduate School of Science and Engineering, Ritsumeikan University, Kusatsu, Shiga, Japan

Poster-4

Title: Study on Material Design of Hardened Materials Using Hemicellulose as Binder

Ayane Yui, Graduate School of Science and Engineering, Ritsumeikan University, Kusatsu, Siga, Japan

Poster-5

Title: Polyoxazoline Functionalized Magnetic Iron Oxide Nanoparticles for the Removal of Pharmaceuticals and Heavy Metal Ions From Water

Agnese Ricci, Department of Science, Roma Tre University, Rome, Italy

Poster-6

Title: Poly(2-(3-(Amino)propyl)-2-Oxazoline) Graphene Oxide Supported: Go-pAmOx, a Route Towards Water Remediation From Organic Pollutants

Luca Stefanuto, Department of Science, Roma Tre University, Rome, Italy

Poster-7

Title: Green Ammonia Small-Scale Production Plant: Simulation on the Base of Energetic Aspects

Berta Galan, Department of Chemical and Process & Resource Engineering, Green Engineering & Resources Research Group, ETSIIT, University of Cantabria, Santander, Spain

Certificate cermony, Day-1 Conference Closing 16:30-17:00

DAY 2

08:55-09:00 @ Introduction and Welcome Note (Virtual)

MAY 20, 2025

Keynote Speaker Sessions

09:00-09:30

Title: Green Hydrogen Production From Pig Manure Gasification in Supercritical Water

Bin CHEN, State Key Laboratory of Multiphase Flow, Xi'an Jiaotong University, Xi'an, China

09:30-10:00

Title: Exothermic and Endothermic Characterization of Reversibility in Shape Memory Alloys

Osman Adiguzel, Department of Physics, Firat University, Elazig, Turkey

Speaker Sessions

10:00- 10:20

Title: A Fluorescent Heterobimetallic IrIII-PdII Complex (HBMC) Selectively Images Cancer Cells

Debashree Das, Department of Chemistry, University of Calcutta, 92 APC Road, Kolkata, India. Department of Chemistry, Bharat Institute of Engineering & Technology, Hyderabad, India

10:20-10:40

Title: Waste to Fuels: Decarbonizing Aviation Sector by converting inedible oil to Sustainable Aviation Fuel

Sanjib Paul, Engineers India Limited (R&D), Gurgaon, Haryana, India

Net working, Tea and Refreshments Break 10:40-11:00

11:00-11:20

Title: EIL's Sulphur Portfolio – Helping Industry to Reduce Carbon Footprint

Vamsi Kamesh Jayanti, R&D division, Engineers India Ltd, Gurugram, Haryana, India

11:20-11:40

Title: Facile Synthesis and Characterization of a Novel 1,2, 4,5-Benzene Tetracarboxylic Acid Doped Polyaniline@zinc Phosphate Nanocomposite for Highly Efficient Removal of Hazardous Hexavalent Chromium Ions From Water

Abdelghani HSINI, Laboratory of Advanced Materials and Process Engineering (LAMPE), Faculty of Science, Ibn Tofail 10 University, BP 133, 14000, Kenitra, Morocco

11:40-12:00

Title: A Novel Approach to Prepare a Composite of Hydroxyapatite With Cellulose Nanocomposites by Novel Methods Including Theoretical Studies

Khalil Azzaoui, Engineering Laboratory of Organometallic, Molecular Materials and Environment, Faculty of Sciences, Sidi Mohamed Ben Abdellah University, Morocco

12:00-12:20

Title: Synthesis and Structural Exploration of $NaFe_1$ Cr $(MoO_4)_2$ ($0 \leq y \leq 1$): A New Class of Molybdate Electrode Materials for Next-Gen Sodium-Ion Batteries

Hssain Bih, Process Engineering, Computer Science and Mathematics Laboratory (LIPIM), National School of Applied Engineering-Khouribga, Sultan Moulay Slimane University, Beni Mellal, Morocco

Day-2 Conference Closing 12:20-12:30

UPCOMING CONFERENCES

9th World Conference on
Chemistry and Chemical Engineering
October 23-24, 2025 | Budapest, Hungary

10th World Conference on
Chemistry and Chemical Engineering
November 20-21, 2025 | Bangkok, Thailand

9th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
October 23-24, 2025 | Budapest, Hungary

10th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
November 20-21, 2025 | Bangkok, Thailand

EURASIA CONFERENCES

8th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

8th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 19-20, 2025 | Vienna, Austria

SPEAKER PRESENTATIONS | DAY 1

EURASIA CONFERENCES

8th World Conference on Chemistry and Chemical Engineering
May 19-20, 2025 | Vienna, Austria

https://doi.org/10.62422/978-81-981865-7-7-001

A Digital Twin model of Coal gasifier for High ash Indian Coal

Rajasekhar M[1], G. Srivardhan[1], K. Kumar[1], Narendra Kumar. P[1]
[1]Engineers India Ltd (R&D), Gurugram, Haryana, India

Energy and Chemicals are the backbone for development in this modern age and are generally met by Oil & Gas. India being a net importer of Oil is looking towards better utilization of Coal. Coal gasification produces syngas that can further be used in for power generation, production of liquid fuels through FT synthesis and intermediate chemicals like methanol, DME etc. and thus meeting the requirement of New India.

Normally three types of beds are used viz. moving, entrained and fluidized bed gasifier for coal gasification. Among various gasifier types, Fluidised bed gasifier is preferred choice for high ash Indian Coals due to excellent mixing characteristics that allow better carbon conversion. Understanding of Fluidized bed gasifiers requires experimental studies of different scales for various operating scenarios based on the gasification medium viz. steam, air oxygen gas etc.

Recent progression in numerical techniques and computing efficacy has advanced CFD as a widely used computational tool to provide efficient design solutions by modelling the complex physics involved in systems like fluidized bed gasifier.

This paper presents CFD modeling using DDPM and Population Balance models to design a Digital Twin to study combustion and gasification in fluidized beds of high ash Indian Coals. The work highlights the development of digital twin model CFD tool through sub models such as dense bed, dilute bed, cyclone and loop seal system to predict the behavior and the show the capability of model for optimization of design & operation of high ash coal fluidized gasification system.

Keywords: Fluidized Bed, Population Balance, Digital Twin. DDPM- Dense Discrete Phase Model, DME-Di Methyl Ether, FT-Fischer Tropsch, CFD-Computational Fluid Dynamics

https://doi.org/10.62422/978-81-981865-7-7-002

Phosphate-Based Glass Electrolytes in Solid-State Lithium-Ion Batteries: Overcoming Development Challenges

Hicham Es-soufi
National Higher School of Chemistry (NHSC), Ibn Tofaïl University, BP. 133-14000, Kenitra, Morocco

All-solid-state lithium-ion batteries (ASSLIBs) are emerging as promising alternatives to conventional batteries with liquid electrolytes due to their enhanced safety, increased energy density, and longer lifespan. However, their widespread adoption is hampered by challenges in developing effective solid electrolytes. Phosphate glassy electrolytes have attracted attention as a viable solution, offering high lithium-ion conductivity, robust chemical stability, and excellent compatibility with lithium metal anodes. This review summarizes our earlier work on phosphate glassy electrolytes for ASSLIBs, focusing on strategies to overcome critical industrial hurdles. It discusses various elements such as synthesis methods, structural properties, and electrochemical performance, with particular emphasis on enhancing ionic conductivity, mechanical resilience, and interface stability. The review also explores how these electrolytes are integrated into ASSLIB designs and interact with diverse cathode materials, and it outlines future research directions that could enable the next generation of lithium-ion battery systems to overcome existing limitations and achieve safer, more efficient energy storage.

Biography:

Dr. Hicham Es-Soufi is a Professor at the National Higher School of Chemistry (NHSC) at Ibn Tofail University in Kenitra, Morocco. He has previously served as the Director of Studies and Professor at the Higher School of Engineering, ESGCNT, in Meknès, Morocco. Dr. Es-Soufi is an active member of the editorial boards of four international scientific journals and has contributed as a peer reviewer for over 45 international journals.

His research focuses on the development of innovative materials, with a strong emphasis on the physical-chemistry of materials for applications in electrochemical and electrostatic energy storage, wastewater treatment, corrosion prevention, and gamma radiation shielding. Dr. Es-Soufi has published more than 50 papers in renowned international scientific journals, reflecting his significant contributions to the field.

https://doi.org/10.62422/978-81-981865-7-7-003

Applications of Nanotechnology in Drug Delivery: Recent Advances

Mohamed Abbas Ibrahim
Department of Pharmaceutics, College of Pharmacy, King Saud University, Riyadh, Saudi Arabia

Nanotechnology became a widespread technology in recent years in several medical and pharmaceutical applications. The major goals in designing nanoparticles as a delivery system can be summarized in three main areas including enhancing bioavailability by enhancing solubility and dissolution rate, targeting the drug to specific organs and controlling drug release rate. Different classes of pharmaceutical nanoparticles including nanonized drug (API) particles, biodegradable polymeric nanoparticles, and hydrophobic nanoparticles will be discussed. Nanonization of drug particles can result in enhancing oral, topical, transdermal and corneal bioavailability of several drugs. The stability the nanoparticulate delivery systems is one of the important issues in the formulation of nanonized particles. Therefore, the use of stabilizers to prevent the aggregation of nanoparticles is crucial for these delivery systems. In addition, the lecture discusses the formulation challenges facing incorporation of nanonized drug particles in oral pharmaceutical dosage forms with examples. In addition, variable polymer classes utilized in polymeric nanoparticles, including hydrophilic, hydrophobic and biodegradable polymers. The presentation sheds a light on the nanonization techniques of the polymeric nanoparticles are based on physical methods including primary and multiple emulsion solvent evaporation methods, ionic gelation, spray-drying, supercritical fluid technology as well as precipitation with a compressed fluid techniques anti-solvent. Other polymeric nanoparticle manufacturing techniques based on chemical synthesis schemes such as silica nanoparticles of variable internal structures will be illustrated with example.

Biography:

Dr. Mohamed Abbas Ibrahim is a professor of Pharmaceutics, Kayyali Chair for Pharmaceutical Industries, Department of Pharmaceutics, King Saud University, KSA. He gained a Ph.D. in Pharmaceutical Technology from the University of Regensburg, Germany, in collaboration with Al-Azhar University, Cairo Egypt. His Research interests include biomaterials as drug delivery systems, pelletisation nanotechnology and tablet technology. He supervised more than 10 master and Ph.D. students in Egypt and Saudi Arabia. Dr. Ibrahim has a good experience in the tablet and pelletisation technology, biomaterials, nanotechnology and polymeric drug delivery systems. He published more than 100 research and review articles in these areas.

8th World Conference on Chemistry and Chemical Engineering
May 19-20, 2025 | Vienna, Austria
https://doi.org/10.62422/978-81-981865-7-7-004

Toward Cleaner Ironmaking Routes: Energy and Environmental Evaluation of Hydrogen-Based Ironmaking

Abdallah Skaf[1], Ligia Tiruta-Barna[1], Aras Ahmadi[1]
[1]Toulouse Biotechnology Institute (TBI), Université de Toulouse, CNRS, INRAE, INSA, Toulouse, France

The iron and steel industry is a major contributor to global CO_2 emissions, accounting for approximately 7% of the world's total emissions [1]. Hydrogen-based direct reduction of iron oxide offers a sustainable alternative to conventional processes, particularly when powered by renewable energy [2]. Building on prior research demonstrating the feasibility of pure hydrogen as a reducing agent in shaft reactors [3], this study explores the full hydrogen-based ironmaking process considering also the gas heating, the gas recycling and the hydrogen production via electrolysis, and evaluates in parallel the energy performance and the environmental impacts via Life Cycle Assessment (LCA).

A detailed flowsheet simulation was developed, incorporating key components: electrolyzer for renewable hydrogen production, gas heater, condenser, and gas recycling system. The hydrogen-based process relies on electricity for hydrogen production and gas heating, enabling decarbonization when paired with renewable energy. This process was benchmarked against the MIDREX NG process, a leading natural gas-based reduction technology that is considered an improvement over the blast furnace route due to lower emissions.

The LCA covers all stages of both processes, including in-depth construction of inventories for infrastructures, feed material, iron production, energy production. Based on GWP100 indicator from ReCiPe midpoint method, the LCA results show that MIDREX emits 0.88 kgCO2-eq/kgiron, while hydrogen-based technology emits 0.41 kgCO2-eq/kgiron using the French electricity mix. By using hydropower and wind-power, emissions can be further reduced to 0.16 and 0.23 kgCO2-eq/kgiron, respectively, demonstrating that the transition to hydrogen-based Ironmaking in shaft reactors enables a 74-82% reduction in CO2 emissions.

References:

1. "Iron & steel," IEA. Accessed: Dec. 16, 2024. [Online]. Available: https://www.iea.org/energy-system/industry/steel
2. C. Harpprecht, T. Naegler, B. Steubing, A. Tukker, and S. Simon, "Decarbonization scenarios for the iron and steel industry in context of a sectoral carbon budget: Germany as a case study," Journal of Cleaner Production, vol. 380, p. 134846, Dec. 2022, doi: 10.1016/j.jclepro.2022.134846.
3. A. Skaf, L. Tiruta-Barna, and A. Ahmadi, "Assessing the potential of low-temperature ironmaking using pure hydrogen in shaft reactors," Chemical Engineering Science, vol. 304, p. 121049, Feb. 2025, doi: 10.1016/j.ces.2024.121049.

8th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 19-20, 2025 | Vienna, Austria

https://doi.org/10.62422/978-81-981865-7-7-005

Biodegradable Hollow-structured Nanozymes Modulate Phenotypic Polarization of Macrophages and Relieve Hypoxia for Treatment of Osteoarthritis

Hao Xiong[1, 2], Qifan Shen[1, 2], Yuhang Hu[1, 2], Cunyi Fan[1, 2]
1 Department of Orthopedics, Shanghai Jiao Tong University Affiliated Sixth People's Hospital, Shanghai, Shanghai, China
2 Shanghai Engineering Research Center for Orthopaedic Material Innovation and Tissue Regeneration, Shanghai, Shanghai, China

Nanozymes are widely applied for treating various major diseases, including neurological diseases and tumors. However, the biodegradability of nanozymes remains a great challenge, which hinders their further clinical translation. Based on the microenvironment of osteoarthritis (OA), a representative pH-responsive biodegradable hollow-structure manganese Prussian blue nanozyme (HMPBzyme) was designed and applied for treatment of OA. HMPBzyme with good biodegradability, biocompatibility and multi-enzyme activities was constructed by bovine serum albumin bubbles as a template-mediated biomineralization strategy. In vitro, HMPBzyme suppressed hypoxia inducible factor-1α (HIF-1α) expression and decreased reactive oxygen species (ROS) level. Furthermore, HMPBzyme markedly suppressed the expression of ROS and alleviated degeneration of cartilage in OA rat models. The results indicated that the biodegradable HMPBzyme inhibited oxidative damage and relieved hypoxia synergistically to suppress inflammation and promote the anabolism of cartilage extracellular matrix by protecting mitochondrial function and down-regulating the expression of HIF-1α, which modulates the phenotypic conversion of macrophages from pro-inflammatory M1 subtype to anti-inflammatory M2 subtype for OA treatment. This research laid a solid foundation for the design, construction and biomedical application of degradable nanozymes and promoted the application of nanozymes in biomedicine.

Biography:

Dr. Hao Xiong is an orthopedic physician at the Shanghai Sixth People's Hospital. He has published 22 papers indexed by SCI as the first author (including co-first author), with a cumulative impact factor of 228.283. Among them, he has published 10 papers in international top journals such as eClinicalMedicine, ACS Nano, Small, and Chemical Engineering Journal. Participated in 10 provincial-level or above projects such as key projects of the National Natural Science Foundation of China. Dr. Xiong was awarded the first prize for Shanghai Technological Invention in 2022 as the main contributor.

8th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 19-20, 2025 | Vienna, Austria

https://doi.org/10.62422/978-81-981865-7-7-006

Recent Progress in Phosphate Glassy Electrolytes for Solid-State Lithium-Ion Batteries

Hicham Es-soufi
National Higher School of Chemistry (NHSC), Ibn Tofaïl University, BP. 133-14000, Kenitra, Morocco

All-solid-state lithium-ion batteries (ASSLIBs) have drawn considerable interest as potential replacements for traditional liquid electrolyte batteries, offering advantages such as improved safety, higher energy density, and extended cycle life. Despite these benefits, significant obstacles remain to their large-scale commercialization, particularly in the development of efficient solid electrolytes. Among the promising options, phosphate glassy electrolytes stand out due to their high lithium-ion conductivity, chemical stability, and compatibility with lithium metal anodes. This article reviews our prior research on phosphate glassy electrolytes for ASSLIBs, emphasizing strategies to address critical industry challenges. It covers various aspects, including synthesis techniques, structural characteristics, and electrochemical performance, with a focus on improving ionic conductivity, mechanical strength, and interfacial stability. Additionally, it examines the incorporation of phosphate glassy electrolytes into ASSLIB designs and their interaction with different cathode materials. Finally, the study highlights future research prospects and the potential applications of phosphate glassy electrolytes in next-generation lithium-ion battery systems, emphasizing their pivotal role in overcoming current limitations and advancing safer, more efficient energy storage technologies.

Biography:

Dr. Hicham Es-Soufi is a Professor at the National Higher School of Chemistry (NHSC) at Ibn Tofail University in Kenitra, Morocco. He has previously served as the Director of Studies and Professor at the Higher School of Engineering, ESGCNT, in Meknès, Morocco. Dr. Es-Soufi is an active member of the editorial boards of four international scientific journals and has contributed as a peer reviewer for over 45 international journals.

His research focuses on the development of innovative materials, with a strong emphasis on the physical-chemistry of materials for applications in electrochemical and electrostatic energy storage, wastewater treatment, corrosion prevention, and gamma radiation shielding. Dr. Es-Soufi has published more than 50 papers in renowned international scientific journals, reflecting his significant contributions to the field.

8th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 19-20, 2025 | Vienna, Austria

https://doi.org/10.62422/978-81-981865-7-7-007

Natural nanocarriers for nucleic acids transfection and biotechnological applications

Fidel Antonio Castro Smirnov[1], David Adame Brooks[2], Olivier Piétrement[3], Elodie Dardillac[4], Pilar Aranda[5], Eduardo Ruiz-Hitzky[5] and Bernard S Lopez[4]

[1]Instituto Superior de Tecnologías Ciencias Aplicadas, Universidad de la Habana (Instec-UH), Habana, Cuba
[2]Centro de Biofísica Médica (Cbiomed), Universidad de Oriente, Santiago de Cuba, Cuba
[3]Université Bourgogne Europe, CNRS, Laboratoire interdiciplinaire Carnot de Bourgogne ICB UMR 630, Dijon, France
[4]Université de Paris Cité, INSERM U1016, UMR 8104 CNRS, Institut Cochin, Paris, France
[5]Instituto de Ciencia de Materiales de Madrid (ICMM), CSIC, Madrid, Spain

Sepiolite is a natural clay silicate with a wide range of applications, including promising avenues in biotechnology and biomedicine. Importantly, sepiolite nanofibes spontaneously internalize into mammalian cells, and have also been shown to bind effectively to proteins, monoclonal antibodies, RNA and various types of DNA molecules through electrostatic interactions, hydrogen bonding, cationic bridging and van der Waals forces. Because sepiolite spontaneously forms aggregates, its disaggregation can represent an important challenge for improving their disaggregation in liquid dispersion and the assembly with biological species. However, this can also affect the possible toxicity of sepiolite in interaction with mammalian cells. Here, a very pure commercial sepiolite (Pangel S9), which is present as a partially defibrillated clay mineral, was used to study the consequences of additional deagglomeration/dispersion through sonication. We have also addressed the response of human cells to interactions with those sepiolite fibers, testing three classical cell responses to stress. This study shows that mammalian cells respond to sepiolite exposure and respond, inducing the production of reactive oxygen species and the expression of inflammatory cytokines. Remarkably, sepiolite exposure did not alter the cell cycle distribution and triggers neither the DNA damage response program nor apoptosis, suggesting that it does not significantly assault the genetic material in mammalian cells. These studies demonstrated the use of sepiolite nanofibers as a promising potential nanocarriers for the nonviral transfer of biological macromolecules for functional or therapeutic purposes, among other clinical applications.

Biography:

Fidel Antonio Castro-Smirnov is a Tenured Academician of the Academy of Sciences of Cuba, a Full Professor and Senior Researcher of the University of Havana. His interdisciplinary research includes more than 30 publications and 2 patents in nanobiotechnology, nanomedicine, radionanomedicine, molecular biophysics and nuclear physics. Honored with prestigious national and international awards, including the Medal “Carlos J. Finlay” from the President of the Republic of Cuba, two Annual National Awards of the Cuban Academy of Sciences, a Cuban National Prize of Health and Prize RECELL MX2023 from the Mexican College of Regenerative Medicine.

8th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 19-20, 2025 | Vienna, Austria

https://doi.org/10.62422/978-81-981865-7-7-008

Corrosion Protection of Steel in Industry Using Eco-friendly Green Synthesized Materials

Reda Abdel Hameed[1,2], Sawsan El-Syed Mohamad[2]
[1]Basic Science Department, Preparatory Year, University of Ha'il, 1560, Hail, KSA.
[2]Chemistry Department, Faculty of Science, Al-Azhar University, 11884, Cairo, Egypt.

Corrosion control of metals in industry using eco-friendly green synthesized materials has a technical, economic, and environmental impact. Green recycling of waste materials for the corrosion inhibition of steel in the petroleum industry plays a significant role in sustainable development. Recently the significant corrosion protection efficiency of several wastes has been introduced by Abdel-Hameed et al,. Green recycling of plastic PET waste and expired drug waste as well were used as eco-friendly corrosion inhibitors for metals in the heavy and petroleum industry. Abdel-Hameed and coworkers reported surfactant products of waste recycling as multifunctional additives in the petroleum industry. Several reports have mentioned the application of novel environmentally friendly molecules as corrosion inhibitors. One of these prominent areas in this field is pharmaceutical products. In the present review, the studies on the inhibition properties in metal corrosion processes of both plastic waste recycled products and expired drugs have been emphasized, starting with the paper of R. S. Abdel Hameed, published in 2009. This lecture presents most of the contributions made to the literature on the use of waste as an environmentally sustainable corrosion inhibitor.

Keywords: Green Recycling; Plastic waste; Multi-function inhibitors; Expired drug; Sustainable corrosion inhibitors; Metal protection.

Biography:

One of the Top World Ranking Scientists (2020-2024). ("World Ranking of Top 2% Scientists" in the database created by experts at Stanford University, USA. Royal Society of Chemistry (RSC) member (Membership ID: 757891)

Professor of applied physical chemistry. He is a professor degree in applied physical chemistry from the Faculty of Science, Al-Azhar University. Dr. Reda Abdel Hameed Published more than 100 research articles in international journals, and participated in more than 10 international scientific conferences, he supervised more than 10 Master's and Ph.D. Students and he is a reviewer for more than 35 scientific journals. He carried out research projects in applied organic chemistry, biomedical application of nanomaterials, Antimicrobial activity of some eco-friendly synthesized materials, electrochemistry, green chemistry, and materials sciences as PI. He has more than 25 years of teaching experience as an assistant, associate, and full professor in Egypt and Saudi Arabia; he is an expert in quality and development as he worked as a quality manager 10 years. He is an international accreditation team member for academic and institutional accreditation. Dr. Reda Abdel Hameed worked as Director of the Training and Development Unit University of Hail, in addition to his work as the General Coordinator of Quality and Development. He has provided a large number of training courses and workshops for faculty members. He also worked as a general coordinator for community service and continuing education programs, during which he presented many community initiatives and training programs for the various spectrums of society from the Department of Education, environmental, health, and Civil Defense. He also supervised many students of talent and creativity in the KSA, where students under his supervision won the Grand Prize and the Gold Award. He also won the University of Hail's Scientific Research Award, the Best Course Specification Award, the Best Academic Work Mechanisms, and the Best Academic Program Coordinator Award. He won the award for the best lecturer at an international conference. He also won the teaching award at the University of Hail.

Member of the Egyptian Atomic Energy Society.

Secretary General of the Egyptian Society for Pyramid Research and Sciences (Shams El Nil).

Scientific reporter of the Egyptian Society for Medical Tourism and Environmental Recovery.

Google Scholar link: https://scholar.google.com/citations?user=zmtlXLQAAAAJ&hl=en.

EURASIA CONFERENCES

8th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

8th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 19-20, 2025 | Vienna, Austria

POSTER PRESENTATIONS | DAY 1

8th World Conference on Chemistry and Chemical Engineering
May 19-20, 2025 | Vienna, Austria
https://doi.org/10.62422/978-81-981865-7-7-009

Economic Assessment of Small-scale e-NH_3 Production Plant

Lucia Pérez-Gandarillas[2], Eva Cifrian[2], Berta Galan[1], Gema Ruiz-Gutiérrez[2], Javier R. Viguri[2]
[1,2]Department of Chemical and Process & Resource Engineering, Green Engineering & Resources Research Group, ETSIIT, University of Cantabria, Santander, Spain.

Ammonia has been traditionally produced in large-scale plants using natural gas as hydrogen source, leading to high energy consumption and significant CO_2 emissions. Green ammonia synthesis is a sustainable alternative, specifically electro-ammonia (e-NH_3), produced from hydrogen via water electrolysis powered by renewable energy. Moreover, advancements in energy integration and decentralized production strategies have increased the interest in small-scale e-NH_3 plants, providing a flexible solution using local renewable sources1.

However, the high capital costs associated with electrolysis-based systems require a detailed cost analysis to determine economic feasibility. Understanding the cost distribution across process units—air separation, electrolysis, and ammonia synthesis—is essential for optimizing plant design and improving the competitiveness of small-scale e-NH_3 plants2,3.

This study presents an economic assessment of a small-scale e-NH_3 production plant. The research applied established cost estimation methodologies, including Guthrie, Seider, Turton, and Matche, to determine equipment costs, highlighting the electrolyzer as the most significant cost driver. From these results, capital expenditures (CAPEX) and operational expenditures (OPEX) were evaluated and compared with literature. Finally, an analysis of the unit cost and the levelized cost of ammonia (LCOA) was conducted, considering various economic scenarios.

Acknowledgment: This study forms part of the ThinkInAzul programme and is supported by Ministerio de Ciencia e Innovación with funding from European Union NextGenerationEU (PRTR-C17.I1) and by Comunidad Autónoma de Cantabria. Project: C17.I01 (AMONSOS) – Plan Complementario de Ciencias Marinas.

References:

1. de la Hera et al. Flexible Green Ammonia Production Plants: Small-Scale Simulations Based on Energy Aspects. Environments 2024, 11, 71.
2. Sousa et al. Techno-economic Study of an Electrolysis-Based Green Ammonia Production Plant. 2022. Ind. Eng. Chem. Res., 61, 14515-14530
3. Nosherwani et al. Techno-economic assessment of commercial ammonia synthesis methods in coastal areas of Germany. Journal of Energy Storage 2021, 34, 102201

Biography:

I got the Bachelor degree in Chemistry (1989) by the University of Basque Country, master's degree (Mphil) by the University of Bath (United Kingdom) in 1992 and PhD in chemistry by the University of Cantabria in 1994 where I am at present. Currently, the objective of my research is modelling and simulation of chemical and environmental processes, systems, or industrial sub-

systems and the development of methods for selecting operating conditions or configurations. This work leads to proposal for alternatives for improvement and optimization of processes, or (ii) intermediate solutions that enable improvements in the system or in the search of optimum conditions. The main areas of application of my work are: process design of water separation, simulation of operations and environmental optimization.

8th World Conference on Chemistry and Chemical Engineering
May 19-20, 2025 | Vienna, Austria
https://doi.org/10.62422/978-81-981865-7-7-010

Comparison of Predictive Values with Experimental Results for Cyclic C5-Curcuminoids

Levente Tyukodi[1], Imre Huber[1] and Zsuzsanna Rozmer[1]
[1]Institute of Pharmaceutical Chemistry, Faculty of Pharmacy, University of Pécs, Pécs, Hungary

Curcuminoids, both C7- and C5-derivatives, are natural bioactive compounds with diverse pharmacological properties. Structural modifications, such as the incorporation of a cyclic system into the carbon chain, can significantly alter their physicochemical characteristics, including lipophilicity and solubility as key factors influencing biological activity. This study compares the predicted lipophilicity and solubility of C5 cyclic curcuminoids with experimental data.

Lipophilicity estimation is a critical parameter in drug development, typically assessed through high-throughput screening (HTS) and chromatographic techniques. Here, the physicochemical properties of these curcuminoids were characterized by measuring logP values using both thin-layer chromatography (logPTLC) and high-performance liquid chromatography (logPHPLC), which were then compared to various predicted clogP values. Similarly, solubility predictions play a key role in evaluating drug-like properties. Kinetic solubility was determined by preparing a series of samples up to the point of supersaturation, followed by centrifugation and subsequent analysis using an HPLC method with UV-Vis detection.

The experimentally measured lipophilicity values were compared with SwissADME open-source models. The Z-score, RMSE, and MAE values were calculated, and the best-performing model was XlogP3. A similar evaluation was conducted for solubility, where the closest prediction was given by the so called ESOL model.

Future structure–activity relationship (SAR) studies will elucidate how the structural features of cyclic C5-curcuminoids correlate with cytotoxicity and physicochemical stability. By comparing predictive models with experimental outcomes, this study provides insights into the reliability and limitations of computational approaches in describing real-world behavior.

Biography:

Levente Tyukodi is a PhD candidate pharmacist specializing in pharmaceutical and analytical chemistry. With expertise in chromatography, spectroscopy, and bioanalytical techniques, he contributes to advancing drug development and therapeutic applications. Passionate about data-driven solutions, he integrates computational tools into experimental workflows, particularly in predictive modeling and chromatography-based analysis.

8th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 19-20, 2025 | Vienna, Austria

https://doi.org/10.62422/978-81-981865-7-7-011

Study on Material Design of Hardened Materials Using Hemicellulose as Binder

Ayane Yui[1], Yuta Yamachi[1], Ejazulhaq Rahimi[1] and Yuma Kawasaki[2]
[1]Graduate School of Science and Engineering, Ritsumeikan University, Kusatsu, Siga, Japan
[2]Department of Civil and Environmental Engineering, Ritsumeikan University, Kusatsu, Shiga, Japan

In recent years, the depletion of natural resources and the reduction of their use have become international issues, and alternative materials are being considered. In addition, the Artemis manned lunar exploration project has stimulated the development of building materials for constructing a lunar base worldwide. One of the challenges of constructing a lunar base is that the environment is very different from Earth's and that it is challenging to procure construction materials. Therefore, it is necessary to develop construction materials that can be procured locally. In this study, it investigated the development of concrete that can be constructed on the lunar surface, and that can cope with the depletion of resources and the reduction in the number of materials used. As a material, it focused on plants, which may be grown on the Moon to secure food, and used hemicellulose, a type of plant-derived cell, as a binder. It also used simulated lunar sand as the aggregate material, focusing on lunar sand on the lunar surface. Two types of hemicelluloses, xylan and glucomannan, were examined. As a result, the hardened material using xylan is sensitive to humidity and high-temperature and is considered difficult to use as a construction material on the Moon. Glucomannan was examined as an alternative to xylan, and high-temperature resistance was obtained. On the other hand, under low-temperature conditions, the water remaining inside the specimens froze, which reduced their strengths.

Biography:

Ayane Yui is a graduate student at Ritsumeikan University, working on research related to concrete and materials.

8th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 19-20, 2025 | Vienna, Austria

https://doi.org/10.62422/978-81-981865-7-7-012

Study on Conditions for Concrete Construction Using Lunar Simulant Sand

Yuta YAMACHI[1], Ejazulhaq Rahimi[1], Ayane YUI[1], Yuma KAWASAKI[2]
[1]Graduate School of Science and Engineering, Ritsumeikan University, Kusatsu, Shiga, Japan
[2]Department of Civil and environmental Engineering, Ritusmeikan University, Kusatsu, Shiga, Japan

Concrete is a material composed of natural resources. Cement, which is made of limestone and aggregates such as fine aggregate and coarse aggregate are in danger of being depleted, and there is a need to reduce the use of natural resources. In addition, lunar construction, especially in outer space, is an important research theme both domestically and internationally. The environment on the moon is very different from that on Earth. Construction on the moon requires consideration of various aspects of construction, such as the amount of water used, and the strength required for the structure. In addition, since the cost of transporting materials from the Earth is also an issue, it is necessary to produce a hardened specimen based on the materials obtained on the moon. Therefore, in this study, as a concrete that does not use natural resources that are in danger of being depleted, it investigated the preparation of a hardened specimen mainly using "hemicellulose," a type of plant cell, and used lunar simulant sand instead of sand used for ordinary concrete. In preparing of the hardened specimen, the mixture proportions were studied and experimented with from two viewpoints: the material design, which varied the moisture content and the ratio of moon sand to hemicellulose, and the preparation conditions, which varied the heating temperature, time, and pressure. As a result, higher compressive and bending strengths were obtained than ordinary concrete when the heating temperature and demolding time were set to 60°C and 60 minutes, respectively.

Biography:

I'm a first-year master's student at Ritsumeikan University in Japan. I majored in Concrete Structures in Materials Science.

8th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 19-20, 2025 | Vienna, Austria

https://doi.org/10.62422/978-81-981865-7-7-013

Polyoxazoline Functionalized Magnetic Iron Oxide Nanoparticles for the Removal of Pharmaceuticals and Heavy Metal Ions From Water

Agnese Ricci[1]*, Luca Stefanuto[1], Sara Del Galdo[1], Simone Pepi[2], Valerio Graziani[1], Barbara Capone[1], Claudio Rossi[2], Gaspare Varvaro[3], Luca Tortora[1], Stefano Casciardi[4], Giancarlo Masci[5] and Tecla Gasperi[1]

[1]Department of Science, Roma Tre University, Rome, Italy.
[2]Department of Chemistry, Siena University, Siena, Italy.
[3]Institute of Structure of Matter ISM, CNR, Rome, Italy.
[4]Department of Occupational Hygiene, INAIL, Rome, Italy.
[5]Department of Chemistry, Sapienza University, Rome, Italy.

Pharmaceutical pollution has become one growing environmental issue, with rising levels of pharmaceutical contaminants in water bodies as a result of human and industrial activities. These pollutants pose a serious threat to both aquatic life and human health, especially since traditional water treatment methods often do not adequately remove them. In this research, the development and application of iron oxide nanoparticles coated with polyoxazoline, a biocompatible polymer, for the removal of pharmaceutical pollutants from water are explored. Polyoxazoline was selected because of its biocompatibility, its affinity to water, and its property of forming stable coated surfaces on the nanoparticles that might subsequently enhance their adsorption capacities. The successful synthesis and functionalization of the nanoparticles were confirmed by a series of characterization techniques such as Transmission Electron Microscopy, Scanning Electron Microscopy, Fourier Transform Infrared Spectroscopy, and Thermogravimetric Analysis. The magnetic properties of the nanoparticles after polyoxazoline functionalization were also retained and indicated by the vibrating sample magnetometry measurements, which have thus enabled their application in magnetic separation methods. The results of the adsorption experiments showed that the nanoparticles coated with polyoxazoline possessed strong affinities for pharmaceutical compounds in water and caused substantial reductions in their concentrations. Based on the present results, it can be concluded that the functionalized nanoparticles can satisfactorily treat pharmaceuticals-contaminated water, giving it potentials for applications in wastewater treatment. Future research will additionally focus on optimizing the adsorption process, testing the long-term stability and reusability of nanoparticles, and evaluating their performance in real environmental conditions. The promising results reported in this study indicate that polyoxazoline-coated iron oxide nanoparticles might well represent a key tool to improve water quality and safeguard environmental health.

Biography:

I'm a PhD student in Material Science and Nanomaterials at "Roma Tre" University, specializing in the synthesis of polyoxazoline-based nanomaterials for removing organic compounds and metal ions from water. I hold an MSc in Chemistry from "La Sapienza" University, where I graduated cum laude. During my master's thesis, I focused on synthesizing amphiphilic block copolymers containing the 2-(hydroxyimino)aldehyde function, which can form multistimuli-responsive micelles. My research combines material science, nanomaterials, and water remediation to address environmental challenges.

8th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 19-20, 2025 | Vienna, Austria

https://doi.org/10.62422/978-81-981865-7-7-014

Poly(2-(3-(Amino)propyl)-2-Oxazoline) Graphene Oxide Supported: Go-pAmOx, a Route Towards Water Remediation From Organic Pollutants

Luca Stefanuto[1]*, Agnese Ricci[1], Elisa Fardelli[1], Sara Del Galdo[1], Simone Pepi[2], Valerio Graziani[1], Luca Tortora[1], Claudio Rossi[2], Valentina Arena[3], Corrado Bongiorno[3], Emanuele Smecca[3], Giovanni Capellini[1], Barbara Capone[1], Daniela Tofani[1] and Tecla Gasperi[1]

[1]Department of Science, Roma Tre University, Rome, Italy.
[2]Department of Biotechnology, Chemistry, and Farmacy, University of Siena, Siena, Italy.
[3]Department of Microelectronics and Microsystems Institute (IMM) of National Research Council (CNR), VIII Street, Catania, Italy.

Organic wastewater compounds (OWCs) employed in human activities are, nowadays, commonly detected in surface water, groundwater and drinking water. In particular, pharmaceuticals have caused great concern because, after their consumption, traces or metabolites are excreted and reach the water resources either directly or after inefficient treatment. Considering the necessity to find new efficient, reusable and biocompatible systems to remove organic pollutants from wastewater, the adsorption process has been found to be the most effective and economical; because it is simple, highly efficient, regenerative, scalable and doesn't produce intermediates that can increase the toxicity of the parent contaminants. Prompted by these reasons, an adsorbed medium composed of graphene oxide (GO) and an amine-2-oxazoline-based polymer (pAmOx) was synthesized and employed in several adsorption experiments targeting non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, aspirin, ketoprofen, and benzoic acid. The specific interaction between acidic moieties of the drugs and basic domains of the polymer, has been investigated by targeting both acid compounds and pharmaceutical products free of carboxylic groups. The prepared GO-pAmOx shows a better adsorption efficiency compared to solely GO for acidic pharmaceuticals, and a lower adsorption for other drugs demonstrating the selectivity, ensured by the acid-base interaction. Other investigations concern the concentration of the drugs, the pH effect on the adsorption process, and the reusability of the material. These findings suggest that the prepared GO-pAmOx material has significant potential for adsorbing acidic pharmaceuticals in water, a good versatility for all investigated acid compounds, and maintains high reusability.

Biography:

I'm a PhD student in Material Science and Nanomaterials at "Roma Tre" University, specializing in the synthesis of polyoxazoline-based nanomaterials for removing organic compounds and metal ions from water. I hold an MSc in Analytical chemistry from "La Sapienza" University, where I graduated cum laude. During my PhD, I focused on synthesizing poly(2-oxazoline)s capable of interacting with pollutants detected in wastewater, realizing also composite materials with Graphene oxide (GO) and lignocellulosic substrates. My research combines material science and biocompatible polymer synthesis with the aim of remediate wastewater.

8th World Conference on Chemistry and Chemical Engineering
May 19-20, 2025 | Vienna, Austria
https://doi.org/10.62422/978-81-981865-7-7-015

Green ammonia small-scale production plant: simulation on the base of energetic aspects

Berta Galan[1], Gema Ruiz-Gutiérrez[2], Lucia Pérez-Gandarillas[2], Javier R. Viguri[2]
[1,2]Department of Chemical and Process & Resource Engineering, Green Engineering & Resources Research Group, ETSIIT, University of Cantabria, Santander, Spain

Generally speaking, the Haber-Bosch (HB) process for ammonia (NH3) production requires large-scale industrial equipment; however, a smaller and more cost-effective setup could improve accessibility to ammonia production. The transition to an electrically driven HB ammonia process will depend on the development of agile systems that align with geographically isolated and intermittent renewable energy sources. Such a flexible system could utilize renewable energy to produce ammonia for fertilizer and fuel applications, meet local electricity demands and generate hydrogen for energy storage. Motivated by these advancements, this work focuses on small-scale NH3 production plants. The proposed green ammonia system integrates a nitrogen membrane generator, a water alkaline electrolyzer stack, and an HB ammonia synthesis unit, designed for three different capacities: 1 MW, 5 MW, and 10 MW electrolyzers. The plants are analyzed through Aspen Plus simulations, being energetic aspects the main criteria for selecting the working conditions. The study examines the effects of pressure and temperature on electrolysis, nitrogen production, and ammonia synthesis, providing insights into energy efficiency, product purity and flow rates. Additionally, the results asses the impact of reactor number, providing valuable information for designing efficient small-scale green ammonia production systems. Figure 1 show the percentage of energy consumption as a function of reactor number and electrolyzer power in the HB process.

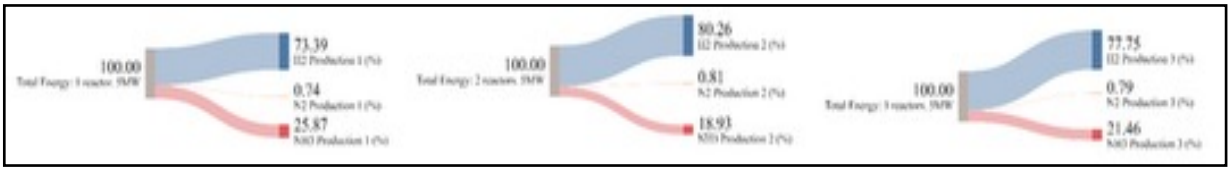


Figure 1. Energy consumption (%) for each process stage as a function of the number of reactors in a 5 MW plant.

Acknowledgment: This study forms part of the ThinkInAzul programme and is supported by Ministerio de Ciencia e Innovación with funding from European Union NextGenerationEU (PRTR-C17.I1) and by Comunidad Autónoma de Cantabria. Project: C17.I01 (AMONSOS) – Plan Complementario de Ciencias Marinas.

Biography:

I got the Bachelor degree in Chemistry (1989) by the University of Basque Country, master's degree (Mphil) by the University of Bath (United Kingdom) in 1992 and PhD in chemistry by the University of Cantabria in 1994 where I am at present. Currently, the objective of my research is modelling and simulation of chemical and environmental processes, systems, or industrial sub-systems and the development of methods for selecting operating conditions or configurations. This work leads to proposal for alternatives for improvement and optimization of processes, or (ii) intermediate solutions that enable improvements in the system or in the search of optimum conditions. The main areas of application of my work are: process design of water separation, simulation of operations and environmental optimization.

EURASIA CONFERENCES

8th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

8th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 19-20, 2025 | Vienna, Austria

VIRTUAL

KEYNOTE PRESENTATIONS | DAY 2

https://doi.org/10.62422/978-81-981865-7-7-016

Green Hydrogen Production From Pig Manure Gasification in Supercritical Water

Bin CHEN
State Key Laboratory of Multiphase Flow, Xi'an Jiaotong University, Xi'an, China

The world can produce 7.27×109 Kg of pig manure in only one year. Between 2018 and 2020, China's major livestock produced 1.27×1010 Kg of manure annually, of which pig manure accounted for one-eighth. Pig manure is overflowing with HMs, Escherichia coli, nitrogen, phosphorus, and carbon, contributing to global climate change and environmental pollution through nitrous oxide, ammonia, and bioaccumulation. Supercritical water gasification (SCWG) technology can convert pig manure into green hydrogen or hydrogen-rich gas, which has immense potential in waste-to-wealth conversion while controlling environmental pollution. This work experimentally investigated the impact of multiple variables in batch reactor: (1) reaction temperature, (2) reaction time, and (3) the type of catalyst on H2-enriched syngas production. Results showed that the gasification efficiency increased with the growth of temperature (580–660 °C), extension of residence time (1-45min), and addition of alkali homogeneous catalyst (K2CO3). The GC–MS analysis showed that organic component in liquid products was mainly composed of aniline, phenolic, and N-heterocyclic compounds. The optimum conditions for generating carbon gasification efficiency (CE) of 85.78% and H2 yield of 15.23 mol/kg were the addition of K2CO3 at 620 °C, 30min, and 10 wt% feed concentration. In particular, the H2 yield is significantly enhanced by 100.2% compared with non-catalyst SCWG. Subsequently, with an average relative error of 8.08%, a double-intermediates kinetic model was established to obtain the gasification mechanism and yield prediction of pig manure in SCWG.

Biography:

Dr. Bin CHEN got his Ph. D degree in Xi'an Jiaotong University and worked as PostDoc researcher fellow in Japan Society for Prompting Science. Now he is a full professor and vice director of State Key Laboratory of Multiphase Flow, Xi'an Jiaotong University. For more than decades, Dr. Chen has devoted his efforts to the research on high-efficient conversion of fossil fuel and clean production of hydrogen from biomass gasification in supercritical water. He has published over 150 peer-reviewed journal papers and was invited for more than 30 keynote speeches.

8th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 19-20, 2025 | Vienna, Austria

https://doi.org/10.62422/978-81-981865-7-7-017

Exothermic and Endothermic Characterization of Reversibility in Shape Memory Alloys

Osman Adiguzel
Department of Physics, Firat University, Elazig, Turkey

A series of ally systems called shape memory alloys exhibit a peculiar property called shape memory effect with special chemical compositions in the β-phase fields. These alloys are energetic materials and sensitive to the change of temperature and stressing. This phenomenon is initiated by cooling and deformation processes and performed on heating and cooling after these treatments, with which shape of the materials cycles between original and deformed shapes. Therefore, this behavior can be called thermoelasticity. This phenomenon is governed by successive crystallographic transformations, thermal and stress induced martensitic transformations. Thermal induced transformations are exothermic reactions and occur on cooling with the cooperative movement of atoms in <110 > -type directions on {110}-type planes of austenite matrix, along with lattice twinning, and ordered parent phase structures turn into twinned martensitic structure. Twinned structures turn into detwinned martensite by means of stress induced martensitic transformation with deformation in martensitic state. Also, detwinned structure turn into ordered parent phase structure on heating by means of reverse austenitic transformation, which is an endothermic reaction, and ordered parent phase structure turn into ordered parent o-phase structure. Forward martensitic and reverse austenitic transformations are solid state reactions; these reactions do not occur at the equilibrium temperature at Gibbs Free Energy Temperature Diagram and a driving force is necessary for the transformations. These alloys exhibit another character, called superelasticity, which is performed with mechanically stressing the material in elasticity limit at a constant temperature in parent phase region, and shape recovery occurs instantly upon releasing. Superelasticity is governed by stress induced transformation, and ordered parent phase structure turns into the fully detwinned martensite structure with stressing. The crystal structure cycles between the parent phase structure and detwinned martensite structures on stressing and releasing. Twinning and detwinning reactions play important role in crystallographic transformations, and they are driven by lattice invariant shears. Copper based alloys exhibit this property in metastable beta-phase region, which has bcc based structures at high temperature parent phase field. Lattice invariant shear and twinning is not uniform in these alloys and cause to the formation of complex layered structures.

In the present contribution; x-ray and electron diffraction studies were carried out on two solution treated copper based CuZnAl and CuAlMn alloys. Electron and x-ray diffraction exhibit super lattice reflections. Specimens of these alloys were aged at room temperature, and a series of x-ray diffractions were taken at different stages of aging in a long-term interval. X-Ray diffraction profiles taken from the aged specimens in martensitic conditions reveal that crystal structures of alloys chance in diffusive manner, and this result refers to the stabilization.

Key words: Shape memory effect, martensitic transformation, thermoelasticity, superelasticity, twinning and detwinning.

Biography:

Dr. Adiguzel graduated from Department of Physics, Ankara University, Turkey in 1974 and received PhD- degree from Dicle University, Diyarbakir-Turkey. He has studied at Surrey University, Guildford, UK, as a post-doctoral research scientist in 1986-1987, and studies were focused on shape memory effect in shape memory alloys. His academic life started following graduation by attending an assistant to Dicle University in January 1975. He became professor in 1996 at Firat University in Turkey, and retired on November 28, 2019, due to the age limit of 67, following academic life of 45 years. He supervised 5 PhD- theses and 3 M. Sc- theses and published over 80 papers in international and national journals; He joined over 120 conferences and symposia in international level with contribution. He served the program chair or conference chair/co-chair in some of these activities. Also, he joined in last six years (2014 - 2019) over 60 conferences as Keynote Speaker and Conference Co-Chair organized by different companies. Additionally, he joined over 180 online conferences in the same way in pandemic period of 2020-2023.

Dr. Adiguzel served his directorate of Graduate School of Natural and Applied Sciences, Firat University, in 1999-2004. He received a certificate 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)

EURASIA CONFERENCES

8th World Conference on

CHEMISTRY AND CHEMICAL ENGINEERING

&

8th World Conference on

ADVANCED MATERIALS, NANOSCIENCE AND NANOTECHNOLOGY

May 19-20, 2025 | Vienna, Austria

VIRTUAL

SPEAKER PRESENTATIONS | DAY 2

8th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
May 19-20, 2025 | Vienna, Austria

https://doi.org/10.62422/978-81-981865-7-7-018

A Fluorescent Heterobimetallic IrIII-PdII Complex (HBMC) Selectively Images Cancer Cells

Debashree Das[1,2], Sampurna Bhattacharya[3], Adhir Majumder[1], Pallabi Roy[1], David Morgan[4], Ramananda Maity[1], Kamalika Sen[1]*

[1]Department of Chemistry, University of Calcutta, 92 APC Road, Kolkata, India
[2]Department of Chemistry, Bharat Institute of Engineering & Technology, Hyderabad, India
[3]Department of Biophysics, Molecular Biology & Bioinformatics, University of Calcutta, 92 APC Road, Kolkata, India
[4]Cardiff Catalysis Institute, School of Chemistry, Cardiff University, Park Place, Cardiff CF10 3AT, UK

Early detection and treatment of cancer cell is the only way to eradicate cancer in patients and this can be efficiently achieved via fluorescence imaging technique. Henceforth, we present a fluorescent heterobimetallic complex (HBMC) of Ir(III)/Pd(II) which selectively images the nucleus of the cancer cells over normal cells at a very low concentration (12 μM), established by confocal laser scanning microscopy. HBMC has a unique property by virtue of which it is selectively taken up by cancer cells (HeLa) and hence allows selective imaging of cancer cells over normal cells (HaCat). However, the subunits of HBMC, i.e., homonuclear Ir(III) and Pd(II) complexes are ineffective in imaging cancer cells. HBMC showed pH dependent uptake into HeLa cells followed by its subsequent localization in nucleus, supported by fluorescence microscopy. The possible reason behind its selectivity towards cancer cells is its interaction with a protein of ~44 KDa molecular weight as obtained from mass spectrometric analysis. Bioinformatics study predicted the protein of ~44 KDa molecular weight as serotonin receptor, 5-HT, overexpressed in HeLa cells. Moreover, HBMC is also found to interact with DNA with a sequential binding pattern and the interaction of DNA with HBMC has been established by fluorescence spectroscopy, isothermal calorimetric titration, and theoretical studies as well. Hence, our low-cost fluorosensor may have dual applicability in early diagnosis of patients having cancer and therapeutic approach as DNA binder.

Keywords: Heterobimetallic complex; Cancer cell-imaging; Confocal microscopy; Fluorescence spectroscopy; DNA binding

Biography:

Dr. Debashree Das is an assistant professor in Department of Chemistry in Bharat Institute of Engineering and Technology, Telangana, India. She did Ph.D. in Chemistry at Saha Institute of Nuclear Physics under Prof. Abhijit Chakrabarti and her thesis title is “Spectrin and membrane interactions of heme and heme proteins”. Dr. Das has 8 years of postdoctoral experience in Analytical Chemistry, Biophysical Chemistry, Nanotechnology etc. Dr. Das has published 20 research articles and 1 book chapter in the international journals of repute. She has been awarded 6 national fellowships for PhD and Postdocs.

8th World Conference on Chemistry and Chemical Engineering
May 19-20, 2025 | Vienna, Austria
https://doi.org/10.62422/978-81-981865-7-7-019

Waste to Fuels: Decarbonizing Aviation Sector by converting inedible oil to Sustainable Aviation Fuel

Subimal Jana[1], Sanjib Paul[1], Akshya Khandelwal[1]
[1]Engineers India Limited (R&D), Gurgaon, Haryana, India

The reduction of Greenhouse Gas emissions and achieving net zero to combat global warming are not just goals but necessities. Worldwide, the aviation sector contributes 15% of total emissions generated in the transportation sector. Therefore, achieving net zero is nearly impossible without the introduction of alternative aviation fuels with a lower carbon footprint.

In this regard, one promising alternative is to utilize used cooking oil (UCO) and Tree-Born Oils for the production of SAF. Repurposing these feedstocks will prevent their reuse, eliminating associated health hazards.

Engineers India Limited (EIL) along with CSIR-Indian Institute of Petroleum (CSIR-IIP) has developed a single-step HEFA process to convert lipids (Palm Stearin, Palm Fatty Acid Distillate, Jatropha Oil, UCO, etc.) into hydrocarbons. In this process, feed is de-oxygenated, selectively cracked, and isomerized over a single catalyst, in a single step, to produce SAF and green diesel with high yield. The process parameters can be tailored to maximize SAF or prioritize green diesel based on real-time requirements, with by-products including Green Naphtha, Fuel Gas etc.

The SAF produced by this technology has already been demonstrated for use in civilian aircraft and defense jets. This process of producing SAF is similar to other refinery process operations, making it easily implementable and economically viable as compared to other globally available technologies.

The present paper focuses on the production of SAF by CSIR-IIP and EIL exploring key aspects of the technology, processing diverse feedstocks, with varying yield patterns and overall impact on sustainability.

8th World Conference on Chemistry and Chemical Engineering
May 19-20, 2025 | Vienna, Austria
https://doi.org/10.62422/978-81-981865-7-7-020

EIL's Sulphur Portfolio – Helping Industry to Reduce Carbon Footprint

V Kamesh Jayanti[1], Saptarshi Paul[1], Anurag Pal[1]
[1]R&D division, Engineers India Ltd, Gurugram, Haryana, India

Engineers India Limited (EIL) is a leading player in India's energy sector. EIL's Decarbonization approach includes – Rationalization & upgradation of facilities, Intervention of New Technologies, Heat Integration, Optimization of Process parameters, Focus on Steam & Power Network etc.

Sulphur Recovery is one of the main technology portfolios of EIL, wherein, EIL has been involved from concept to commissioning and has executed multiple projects in India. In this area, EIL offers various technologies for meeting emission targets of refineries. In the Sulphur recovery area, EIL offers following technologies:

- Conventional Sulphur Recovery Unit
- Tail Gas Treatment Unit
- SRU Oxygen enrichment for capacity & efficiency enhancement
- Sulphur Degassing process
- Liquid catalyst based SRU for lean acid gases
- Ammonia recovery from refinery Sour gases – to produce aqueous ammonia and anhydrous ammonia
- Amine Purification for HSS removal

These technologies, while meeting their required performance criteria, are being constantly upgraded for achieving energy efficiency and thereby reducing the carbon footprint.

EIL has realized / identified potential energy savings in the SRU which include rationalization of sulphur recovery units using oxygen enrichment, minimization of furnace heat loss, reduction of impact of HSS in amine unit, addressing channeling issues in catalyst, reduction in carbon foot print due to conversion of waste to value (Ammonia recovery from sour gases), options to reduce startup & shutdown times etc. Corresponding energy savings to the tune of 16000 MTOEs per annum have been realized, resulting in reduction of carbon footprint.

This paper summarizes various case studies implemented along with energy savings thereof.

Key words: Carbon footprint, Sulphur technologies, SRU, MTOEs, Energy efficiency, waste to value

8th World Conference on Chemistry and Chemical Engineering
May 19-20, 2025 | Vienna, Austria
https://doi.org/10.62422/978-81-981865-7-7-021

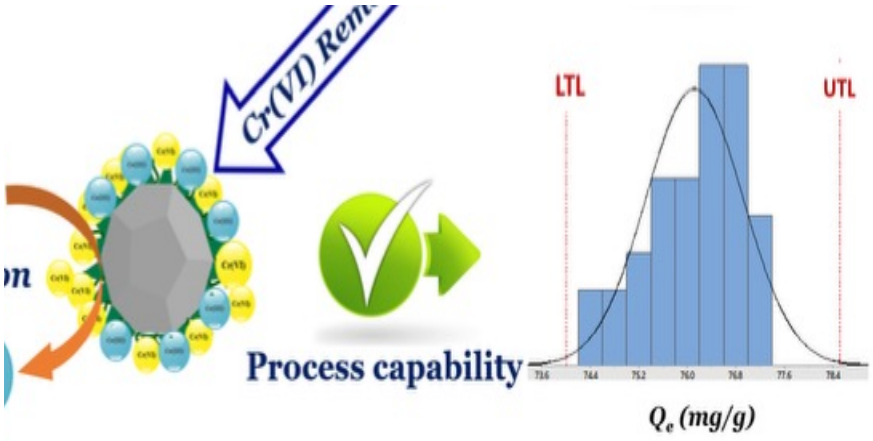
Facile synthesis and characterization of a novel 1,2,4,5-benzene tetracarboxylic acid doped polyaniline@zinc phosphate nanocomposite for highly efficient removal of hazardous hexavalent chromium ions from water

Abdelghani HSINI[a,b]*, Hicham ES-SOUFI[b], Karim TANJI[a], Abdelillah SHAIM[a]

[a]Laboratory of Advanced Materials and Process Engineering (LAMPE), Faculty of Science, Ibn Tofail 10 University, BP 133, 14000, Kenitra, Morocco.
[b]National Higher School of Chemistry (NHSC), University Ibn Tofail, BP. 133-14000, Kenitra, Morocco.

The present study describes the development of a novel 1,2,4,5-benzene tetracarboxylic acid doped polyaniline@zinc phosphate (BTCA-PANI@ZnP) nanocomposite via a facile two-step procedure. Thereafter, as-prepared composite material adsorption characteristics for Cr(VI) ions removal were evaluated under batch adsorption. Removal kinetic and equilibrium approaches clearly demonstrate the well simulation of adsorption data via pseudo second order and Langmuir models. The thermodynamic study indicated a spontaneous, endothermic and increasing randomness surface sites availability of BTCA-PANI@ZnP material for Cr(VI) ions adsorption. Furthermore, higher monolayer adsorption of about 933.88 mg.g-1. In addition, the capability study of the Cr(VI) ions adsorption process over nanocomposite has revealed that our method is suitable and capable to be applied on a large scale. The XPS analysis showed Cr(VI) ions with a peak Cr 2p1/2 (586.5 eV) reduction into Cr(III) species as witnessed by the appearance of Cr 2p3/2 (576.9 eV) peaks during adsorption process. Thus, the occurrence of external mass transfer, electrostatic attraction and reduction phenomenon were considered as main mechanistic pathways of Cr(VI) ions removal. In conclusion, the material superior adsorption performance, multi-dimensional surface characteristics and multiple removal mechanism involvements clearly suggest the potential applicability of that BTCA-PANI@ZnP material as an effective alternative for Cr(VI) ions wastewaters treatment.

Keywords: Adsorption; Computational formulation; Hexavalent chromium ions; Polyaniline@zinc phosphate nanocomposite.

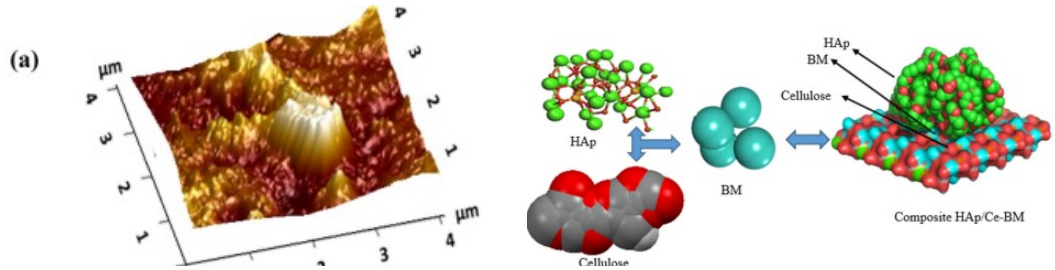


8th World Conference on Chemistry and Chemical Engineering
May 19-20, 2025 | Vienna, Austria
https://doi.org/10.62422/978-81-981865-7-7-022

A novel approach to prepare a composite of hydroxyapatite with cellulose nanocomposites by novel methods including theoretical studies

Khalil Azzaoui[1], Mejdoubi EL Miloud[1]
[1]Engineering Laboratory of Organometallic, Molecular Materials and Environment, Faculty of Sciences, Sidi Mohamed Ben Abdellah University, 30000 Fez, Morocco

This paper presents a novel cheminformatics approach for the design and synthesis of hydroxyapatite/ cellulose nanocomposites, which have potential biomedical and environmental applications, removal of dyes. The nanocomposites are synthesized by the co-precipitation method with different ratios of hydroxyapatite and cellulose. Over the past decade, calcium phosphate composites and similar biomaterials have seen commercial use in bone substitution and allograft applications. These biomaterial composites, which include an organic matrix and an inorganic mineral, have been developed. The principal inorganic component is hydroxyapatite, with the organic matrix made of cellulose derived from Esparto "STIPA TENACISSIMA TENDRARA" which covers the territory of Tendrara, from Eastern-Morocco. The final product received extensive characterization using techniques such as FTIR, XRD, thermal analysis, Morphological studies, XPS, 31P NMR, AFM, SEM, Ligand preparation and Prediction of ADME/Toxicity Properties, with SEM micrographs revealing the product's nanometric size, XRD analysis show that a significant hydrogen bonding interaction between HAp and cellulose may have occurred as the cellulose peak intensity steadily decreased with HAp level. Concurrently, enterprises have been recorded discharging substantial amounts of methylene blue into natural water sources, raising worries about human health and ecosystems. Computational analysis revealed the compound's properties, revealing potential side effects and environmental risks. Toxicity tests have identified considerable hazards, particularly for cardiac problems, necessitating cautious use. Theoretical computations confirmed the composites' high contact strength, particularly when HAp, Ce, and HAp/Ce were deprotonated. These findings are consistent with experimental evidence. Theoretical calculations utilizing Monte Carlo (MC) and Molecular Dynamic (MD) simulation models revealed that the produced foams had an outstanding affinity for methylene blue, as shown by strongly negative adsorption energy values indicating strong interactions with adsorbate surfaces. Based on the calculated chemical hardness values for the adsorbent, adsorbate, and the complex system, it can be inferred that the adsorbent system demonstrates a higher level of hardness in comparison to the adsorbate.



1. Gandini, A. & Belgacem, M. N. 1—Modifying cellulose fiber surfaces in the manufacture of natural fiber composites. In Interface Engineering of Natural Fibre Composites for Max.
2. Li, Z. et al. Design and properties of alginate/gelatin/cellulose nanocrystals interpenetrating polymer network composite hydrogels based on in situ cross-linking. Eur. Polym. J. 201, 112556 (2023).
3. ElHajjaji F., Greche H., Taleb M., ChetouaniA.,,Aouniti A., Hammouti B., J. Mater. Environ. Sci. 7 (2) (2016) 566-578.
4. Bouknana D., Hammouti B., Messali M., Aouniti A., Sbaa M., Port. Electrochim. Acta, 32 (2014) 1-19.
5. 5.Azzaoui, K. et al. Synthesis of hydroxyapatite/polyethylene glycol 6000 composites by novel dissolution/ precipitation method: optimization of the adsorption p

8th World Conference on Chemistry and Chemical Engineering
May 19-20, 2025 | Vienna, Austria
https://doi.org/10.62422/978-81-981865-7-7-023

Synthesis and Structural Exploration of $NaFe_{1-y}Cr_y(MoO_4)_2$ ($0 \leq y \leq 1$): A New Class of Molybdate Electrode Materials for Next-Gen Sodium-Ion Batteries

M. Bargani [a,*], H. Bih[a], L. Khamar[a], H. Es-soufi[b], L. Bih[c], B. Manoun[d]
[a]Process Engineering, Computer Science and Mathematics Laboratory (LIPIM), National School of Applied Engineering-Khouribga, Sultan Moulay Slimane University, Beni Mellal, 25000, Morocco
[b]National Higher School of Chemistry (NHSC), Ibn Tofail University, BP. 133-14000, Kenitra, Morocco
[c]Laboratory of Sciences and Professions of the Engineer, Materials and Processes Department, ENSAM-Meknes, Moulay Ismail University, Meknes, Morocco
[d]Laboratory of Radiation-Matter and Instrumentation S3M, FST Settat, Hassan First University, Settat, 6000, Morocco

The rapid advancement of embedded systems in electric, hybrid, and satellite vehicles, along with the widespread adoption of portable electronics (smartphones) and the development of renewable energy sources (such as wind and solar), has led to a substantial increase in global demand for high energy density storage systems, particularly lithium-ion batteries.

However, the increasing cost of lithium, linked to its scarcity and uneven global distribution, presents a major challenge to the scalability and sustainability of current battery technologies. This has intensified interest in sodium-ion batteries, which rely on sodium, a more abundant, low-cost, and environmentally benign element.

Despite sodium's chemical similarity to lithium, its larger ionic radius and slightly higher redox potential necessitate the development of new electrode materials tailored to its specific electrochemical behavior. To address this challenge, the present study investigates a family of sodium molybdate-based materials with the general composition $NaFe_{1-y}Cr_y(MoO_4)_2$ ($0 \leq y \leq 1$), chosen for their favorable redox characteristics, structural adaptability, and ecological compatibility. A series of compositions with varying chromium-to-iron ratios is synthesized to explore their impact on material stability and potential electrochemical performance.

Comprehensive characterization is conducted through X-ray diffraction (XRD), infrared (IR) spectroscopy, and scanning electron microscopy (SEM), with crystallographic data refined via the Rietveld method. This integrative approach provides insight into how chromium substitution influences the structural framework and suitability of these compounds as a novel anode materials for rechargeable sodium ion batteries in next-generation.

Keywords: Sodium-ion batteries, Electrode materials, Molybdates, Chromium substitution, Structural analysis, XRD, IR, SEM, Rietveld refinement.

Participants Index

UPCOMING CONFERENCES

9th World Conference on
Chemistry and Chemical Engineering
October 23-24, 2025 | Budapest, Hungary

10th World Conference on
Chemistry and Chemical Engineering
November 20-21, 2025 | Bangkok, Thailand

9th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
October 23-24, 2025 | Budapest, Hungary

10th World Conference on
Advanced Materials, Nanoscience and Nanotechnology
November 20-21, 2025 | Bangkok, Thailand

Organized by:

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

ISBN 978-81-981865-7-7