# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY

Celebration

**Materials, Electrochemistry & Environment**

**Freely accessible**

**Call for paper**

https://cimee-science.org/cimee26/

## 8th International Symposium on Materials, Electrochemistry & Environment. CIMEE'26


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

We warmly invite you to join the CIMEE'26 – the 8th international Symposium on Materials, Electrochemistry and Environment taking place from September 24–26, 2026, in Lebanon, and accessible worldwide through an online platform. https://cimee-science.org/cimee26/ centered around the theme: "Materials and electrochemistry for clean energy and environmental sustainability", the event champions scientific dialogue and real-world application. Through advanced chemical studies and research to investigate and explore rational solutions to global and local environmental problems, new technologies are being developed to combat issues such as air, water, and soil pollution, climate change, waste, and soil contamination. Using analytical techniques and environmental fate modeling, methods for measuring and assessing pollutants released into the environment can determine the persistence time of chemical substances and their transfer through the food chain. Furthermore, new, sustainable, and safe technologies are being developed to improve the energy efficiency of electricity, natural gas, and renewable energy sources. The topics of this conference actively contribute to research aimed at identifying and developing ways to prevent, reduce, and eliminate environmental pollutants for the benefit of humans, plants, and animals. Advances in research and technology are frequently implemented in numerous fields, including industrial processes, waste treatment, and resource management. This effectively contributes to resolving global environmental challenges. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals

©Copyright CIMEE 2026

**Keywords:** **Materials Chemistry, Electrochemistry, Environmental Analytical Chemistry, clean energy, environmental sustainability, climate change, waste, air, water, soil pollution,** resource management

# CALL for Papers

https://cimee-science.org/cimee26/

# CIMEE 2026 - Call for Papers

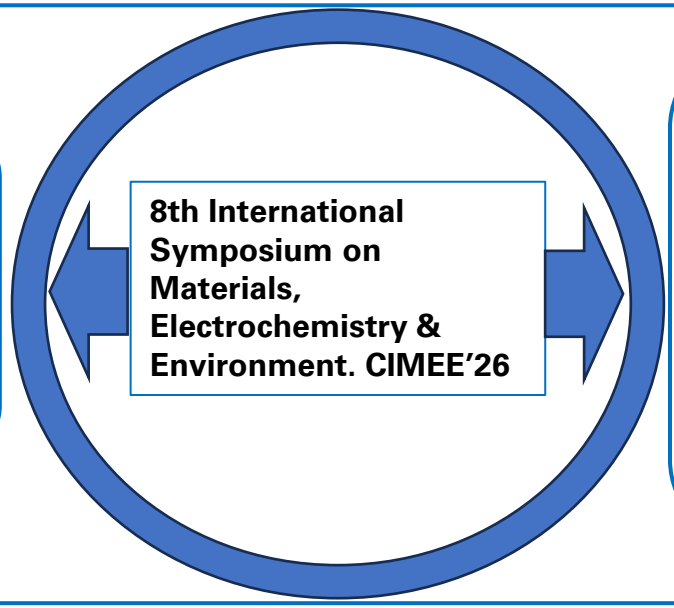
The CMEE'26 symposium is a leading academic event that brings together researchers, scholars, and professionals to explore the critical intersections of advanced materials, Electrochemistry, sustainable energy systems, and environmental preservation. It encourages participants to share their knowledge and develop their professional skills. By creating a stimulating and interactive environment, it fosters the emergence of innovative ideas and the building of connections among participants. https://cimee-science.org/cimee26/

CMEE'26 emphasizes the crucial role of new materials, including nanomaterials, composites, and smart materials, electrochemistry, and the environment in driving innovation across various sectors and addressing global needs for energy efficiency and environmental sustainability. It showcases cutting-edge advances in renewable energy technologies, such as biomass, biowaste, hydrogen, and bioenergy, as well as energy storage and conversion systems, demonstrating how materials science and electrochemistry underpin these innovations. The conference also focuses on environmental resilience through green chemistry, water and air purification, waste management, and green technologies, with the aim of mitigating pollution and adapting to climate challenges. By fostering dialogue and collaboration across disciplines, CIMEE'26 highlights the interdependence of materials, electrochemistry, energy, and the environment, offering a holistic approach to addressing global challenges and promoting sustainable solutions.

# CIMEE'26

Environmental sustainability is being advanced through the intersection of materials chemistry, and electrochemistry, focusing on decarbonization, waste reduction, and renewable energy

**Advanced Materials for Sustainability:** (i) **Bio-based Materials:** Research focuses on developing biodegradable, bio-sourced polymers from waste or biomass to reduce oil dependence.
(ii) **Smart Materials:** New materials are engineered for improved catalysis, enabling efficient energy conversion and environmental remediation. (iii) **Circular Economy:** Materials are designed for reuse and recycling, aiming to minimize raw material extraction




**Sustainable Electrochemistry** . (i) **Energy Storage**: Advancements in batteries and electrochemical devices are crucial for storing renewable energy, with researchers tailoring electrode materials for higher energy densities. (ii) **Environmental Remediation**: Techniques like electrocoagulation, electrooxidation, and electroreduction are used to treat wastewater, purify water, and degrade pollutants. . (iii) **Carbon Management:** Electrochemical methods are employed for carbon dioxide reduction, helping to reduce greenhouse gases. . (iv) **Electrocatalysis:** Development of non-toxic catalysts is key to driving green chemical manufacturing and efficient renewable energy storage. The integration of these fields is crucial for tackling global challenges like water scarcity, climate change, and resource shortages.

Key approaches include developing eco-friendly materials, employing green chemistry to minimize hazards, and utilizing electrochemical processes for energy storage, carbon capture, and water purification

CIMEE'26

# Materials chemistry, electrochemistry and their contribution to solving global environmental challenges

Materials chemistry and electrochemistry are foundational to modern sustainability efforts, providing the tools to develop clean energy, manage waste, and remediate pollution. By designing novel materials at the molecular level and utilizing electron transfer processes, these disciplines create "green" chemical synthesis, effective energy storage, and innovative environmental monitoring.

## Key Contributions to Global Environmental Challenges:

**Renewable Energy Storage & Conversion:**

**(i) Advanced Batteries:** Materials chemistry drives the development of high-capacity, safe, and abundant electrode materials (e.g., sodium-ion, solid-state batteries) to replace conventional lithium-ion, improving energy storage for solar and wind power.

**(ii) Fuel Cells & Electrolyzers**: Electrochemistry enables the production of green hydrogen from water splitting and the conversion of chemical energy into electricity, crucial for decarbonizing transportation and industry.

**Carbon Capture and Utilization (CCU):**

Electrochemical reduction technologies are being designed to capture CO2 and convert it directly into valuable chemicals and fuels, reducing greenhouse gas emissions.

**Water Treatment and Environmental Remediation:**

**(i) Advanced Oxidation Processes (AOPs):** Electrochemical methods like electrocoagulation and electrooxidation are used to destroy organic pollutants, pharmaceuticals, and microplastics in wastewater without adding harsh chemical agents.

**(ii) Resource Recovery:** Electrochemistry allows for the recovery of valuable metals from electronic waste (e-waste) and wastewater streams (e.g., heavy metal removal), supporting a circular economy.

**Green Chemical Manufacturing:**

**(i) Sustainable Materials:** Design of non-toxic, biodegradable materials (e.g., bio-based plastics) reduces reliance on fossil fuels.

**(ii) Electro-synthesis:** Using electrons as clean, low-cost reagents replaces traditional toxic reducing or oxidizing agents, lowering waste generation and energetic costs.

**Real-time Environmental Monitoring:**

**Electrochemical Sensors:** Portable devices provide real-time detection of air and water pollutants, enabling rapid identification of contamination sources and effective environmental monitoring.

Through the synthesis of advanced catalysts and electrode materials, these fields ensure technology translation from lab-scale to industrial eco-friendly applications, actively contributing to United Nations Sustainable Development Goals


cimee-science.org
CIMEE
Eight International Symposium on Materials, Electrochemistry & Environment
Materials,
Electrochemistry &
Environment
24 – 26 September 2026, Lebanon
Celebrating 10 years
10 YEARS
CIMEE'26

CIMEE'26

cimee-science.org

# Scientific Sessions

1. Agro-geochemistry, Agro-geoEnvironment & Sustainability: Challenges & Solutions
2. Carbon-climate connection monitoring : the potential role of Remote sensing
3. Synthesis, biodegradable, and sustainable nanoparticles to enhance bioenergy production from biowaste: Challenges and Future Direction
4. Advancing carbon capture: the role of sustainable catalysis
5. The role of Biochar to Removal of Volatile Organic Compounds: Optimization Strategies
6. Hydrogen Production & Storage: Benefits of Polymer-Graphene Composites & Key Applications
7. Hydrogen storage materials: Status and Targets
8. Hydrogen Storage Materials: current status, challenges, innovations and future trends
9. New porous materials for hydrogen storage: Innovations and challenges
10. Accelerating the Energy Transition with e-Fuels: The Potential Role of Hydrogen
11. Advancing carbon capture and renewable energy : the potential role of sustainable catalysis
12. Advancing carbon capture, renewable energy and sustainable goals

Scientific Sessions

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY

Celebration

Materials, Electrochemistry & Environment

Freely accessible

Call for paper

https://cimee-science.org/cimee26/

## Agro-geochemistry, Agro-geoEnvironment & Sustainability: Challenges & Solutions


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

To optimize food production while protecting natural resources, agro-chemistry, agro-environmental science, and sustainable development form an interdisciplinary field that effectively contributes to understanding the chemical, geological, and biological processes within agricultural systems. This interdisciplinary field links soil science, geology, and environmental science to address challenges such as soil degradation, nutrient depletion, and water pollution caused by intensive farming. This session is based on three points: **Essential elements and key areas:** (i) Agro-Geochemistry: Focuses on the chemical composition of rocks, soil, water, and atmosphere, and how these affect soil fertility and nutrient uptake by plants. It involves managing the geochemical cycling of nutrients (nitrogen, phosphorus, potassium) and tracking potentially toxic elements (PTEs) like cadmium, lead, and arsenic. (ii) Agro-Geo-Environment: Refers to the physical and chemical setting of agricultural land, including the pedosphere (soil) and water resources, and how agricultural activities impact these environments. (iii) Sustainability: Aims to maintain the long-term productivity and health of agroecosystems, minimizing negative environmental impacts and reducing reliance on excessive synthetic inputs. **Key Concepts in Agro-Geochemistry and Sustainability.** (i) Soil Organic Matter (SOM) Dynamics: SOM is critical for the ecological functioning of agroecosystems, playing a significant role in biogeochemistry and controlling the mobility of contaminants. (ii) Agro-minerals and Soil Amendments: The use of natural mineral amendments is growing to correct nutrient deficiencies, reduce soil acidity, and improve water-holding capacity. (iii) Contaminant Mobility Control: Understanding geochemical conditions (such as pH) is essential to managing the mobility of contaminants like aluminum, iron, and manganese, which can be toxic to plants. (iv) Nutrient Management: Sustainable practices focus on the "right source, rate, time, and place" for fertilizer application to minimize nutrient runoff (eutrophication) and leaching into groundwater. (v) Precision Agriculture: Using data analytics, sensors, and GPS to optimize input usage, enhancing yield while decreasing the environmental footprint. **Sustainability Challenges & Solutions:** *Challenges:* Intensive agriculture has led to widespread soil degradation, nutrient runoff causing dead zones, and biodiversity loss. Climate change further complicates this by altering nutrient availability. *Solutions:* (i) Integrated Nutrient Management: Combining organic methods (manure, compost) with chemical inputs to improve soil structure and biodiversity. (ii) Integrated Pest Management (IPM): Combining biological, cultural, and chemical methods to minimize pesticide usage.(iii) Remediation: Using geochemistry to identify and treat contaminated agricultural land and water. (iv) Microbial Bio-stimulants: Employing beneficial microorganisms to enhance plant growth, nutrient absorption, and stress resistance. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords:** Agro-Geochemistry, Agro-Geo-Environment, Sustainability, Precision Agriculture, soil structure, biodiversity, Agrominerals, Biogeochemistry, fertilizer application, Precision Agriculture, sensors, biodiversity.

## Session Overview:

Agro-geochemistry, Agro-geoEnvironment, and Sustainability focus on the intersection of soil chemistry, geological materials, and agricultural management to address food security while minimizing environmental impact. The main challenge involves mitigating the impact of human activity (such as intensive farming, pollution, and climate change) on Earth's surface resources, including water and soil health. Sustainable development requires integrating geochemical monitoring with agricultural policy to manage soil and water resources effectively. Solutions are shifting towards circular economy approaches, such as converting agricultural waste to biofuel. More specifically, sustainable development, through agro-chemistry and agro-environmental science, primarily aims to manage the chemical, physical, and biological processes within agricultural systems to maintain soil health, water quality, and ecosystem stability. It involves using geological and geochemical principles to understand soil nutrient dynamics, prevent contamination from agrochemicals, and restore degraded lands.

To promote a sustainable planet for future generations, objectives can be achieved by addressing several points: fostering biodiversity, restoring habitats and natural landscapes, and strengthening ecosystem resilience, particularly by improving soil health and carbon sequestration. This can help mitigate the effects of climate change and facilitate adaptation, thus protecting against severe droughts, floods, and soil erosion. In this session we will discuss the following points:

1. Study the challenges and barriers to adopting sustainable agricultural practices in eastern Mediterranean region, such as limited resources, water shortages, and climate change.

2. Evaluate the potential benefits of transitioning to environmentally sustainable agriculture, including improved soil health, water conservation, biodiversity conservation, and resilience to climate change.

3. Discuss the importance of interdisciplinary collaboration and stakeholder engagement in achieving environmental sustainability goals in agriculture.

4. Apply knowledge of environmental sustainability principles to real-world agricultural scenarios in the eastern Mediterranean region, proposing sustainable solutions and strategies.

5. Synthesize the key concepts related to environmental sustainability in agriculture effectively through written and oral presentations, discussions, and case studies.

**This symposium welcomes submissions from a diversity of chemistry researchers and scholar. By bringing together researchers and experts from several disciplines of chemistry such as materials chemistry, electrochemistry and environmental analytical chemistry, CIMEE-2026 aims to inspire transformative ideas and collaborative efforts that will contribute to a safer, greener and more sustainable future.**

# Agro-geochemistry, Agro-geoEnvironment & Sustainability: Challenges & Solutions

Agro-geochemistry, Agro-geoEnvironment, and Sustainability are critical, interconnected fields addressing the challenges of feeding a growing global population while managing environmental impacts on soil, water, and ecosystems. Key challenges involve heavy metal contamination, water scarcity, and climate-induced land degradation, while solutions focus on precision agriculture, nanotechnology, and circular economy approaches.

CIMEE'26

Cimee-science.org

## Challenges in Agro-geochemistry and Agro-geoEnvironment

**Soil and Groundwater Contamination:** Agricultural, industrial, and mining activities contribute to the contamination of soil and groundwater with toxic heavy metals such as As, Cd, Co, Cr, Cu, Pb, and Zn.

**Water Scarcity and Salinity:** Increased water demand for agriculture leads to depletion of freshwater resources and increasing salinity in soil and groundwater, particularly in arid regions.

**Contaminant Transfer to Food:** Hazardous heavy metals and metalloids accumulate in crops (bioaccumulation) from contaminated soil and water, posing risks to human health.

**Emerging Contaminants:** The widespread use of agricultural plastic films has increased microplastic pollution in farmland by 5%–8% annually.

**Climate Change Impacts:** Droughts, land degradation, and extreme events affect food quality and soil health, while increasing methane emissions, which can be mitigated to avoid significant warming.

## Solutions and Sustainable Approaches

**Precision Agriculture and IoT:** Using IoT-based smart irrigation systems and precision fertilization can enhance water-use efficiency by over 40% and improve nitrogen use efficiency from 30% to 60%.

**Green Chemistry & Remediation:** The application of natural minerals, nanomaterials, and carbonaceous materials can help treat contaminated soils and waters.

**Circular Economy Solutions:** Transforming agricultural and mining waste, such as fly ash, into useful, productive agricultural resources reduces environmental impact and improves sustainability.

**Sustainable Farming Practices:** Adopting agroecology and organic farming to improve biodiversity, enhance soil carbon sequestration (0.5–2.0 tons per hectare annually), and reduce synthetic chemical use.

**Geochemical Mapping and Monitoring**: Utilizing GIS and remote sensing to monitor soil geochemistry allows for better tracking of contaminant spread and better management of land use.

**Sustainability and Future Outlook**: Integrating geochemical insights into agricultural policy is crucial to ensure safety, such as monitoring soil-to-plant transfer of elements. Emerging research focuses on "One Health" approaches that link environmental geochemistry with animal and human health, ensuring that sustainable food systems do not jeopardize long-term environmental health.

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY

Celebration

Materials, Electrochemistry & Environment

Freely accessible

Call for paper

https://cimee-science.org/cimee26/

## Carbon-climate connection monitoring : the potential role of Remote sensing


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

The Remote sensing plays an indispensable, "watchful eye" role in monitoring the carbon-climate connection by providing large-scale, continuous, and independent measurements of greenhouse gases and ecosystem carbon sinks. It enables scientists to track increasing carbon dioxide CO2 and methane CH4 concentrations in the atmosphere, quantify carbon storage in vegetation and soil, and monitor the impacts of disturbances like wildfires and deforestation

**The Role of Remote Sensing in Carbon-Climate Monitoring:** Remote sensing provides crucial data across three main pillars, linking atmospheric changes to surface responses: **A - Monitoring Greenhouse Gas Emissions (Atmospheric):** (i) satellite Observations: Satellites such as GOSAT, OCO-2, OCO-3, and TanSat measure column-averaged dry mole fractions CO2 and CH4 of GHGs, enabling the identification of high-emission areas. (ii) Plume Detection: High-resolution instruments can identify and quantify CO2 plumes from point sources, such as coal-fired power plants, allowing for independent monitoring of anthropogenic emissions. (iii) Synergistic Monitoring: Combining satellite data (e.g., combining NO2 withCO2 data) improves accuracy in estimating emissions and mapping the impact of climate-relevant activities. **B - Monitoring Terrestrial Ecosystems (Carbon Sinks):** (i) Biomass Estimation: LiDAR (e.g., GEDI) and SAR instruments map forest structure, biomass, and carbon stocks, providing detailed spatial information on carbon storage in forests, grasslands, and wetlands. (ii) Photosynthesis Mapping (SIF): Sun-induced chlorophyll fluorescence (SIF) remote sensing directly monitors actual plant photosynthesis (Gross Primary Productivity—GPP), advancing understanding of vegetation's role in absorbing CO2. (iii) Land Use Changes: Satellites track land-cover changes, including deforestation and land degradation, which are critical for calculating carbon emissions. **C – Monitoring Climate Impacts on Carbon Cycle:** (i) Surface Temperature and Water: Thermal infrared sensors are used to invert land surface temperatures, which are key drivers of respiration—the release of CO2from soil to the atmosphere. (ii) Fire Monitoring: Satellite hotspots and burn-area products (MODIS, VIIRS) estimate carbon emissions from forest fires and crop residue burning.

**Key Technologies and Future Directions**: The potential of remote sensing is increasing with advancements in sensor resolution and analytical methods: (i) Hyperspectral Imagers: These improve the ability to detect methane concentrations at high spatial resolutions ((30 m), identifying leaks at the facility scale. (ii) Machine Learning (ML): ML algorithms are increasingly used to translate raw spectral reflectance data into ecological parameters like biomass and soil organic carbon. (iii) Space-Air-Ground Integration: Building a "space-air-ground" observational architecture (combining satellites, drones, and ground sensor networks) is essential to bridge the scale gap and enhance validation of carbon estimates. (iv) Future Missions: New missions like the European Methane Remote Sensing Lidar Mission (MERLIN) are designed to improve measurements of carbon sources and sinks

**Limitations and Challenges:** (i) Data Gaps: Satellite observations can be hindered by cloud cover. (ii) Short Time Series: Long-term climate monitoring requires continuous data, while many satellite records are of relatively short duration. (iii) Below-Ground Carbon: It remains challenging to monitor soil carbon and below-ground biomass via remote sensing. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords**: Remote Sensing, Carbon-Climate Monitoring, Monitoring Greenhouse Gas Emissions, Monitoring Terrestrial Ecosystems, Monitoring Climate Impacts on Carbon Cycle, remote sensing, Hyperspectral Imagers,

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY

Celebration

**Materials, Electrochemistry & Environment**

**Freely accessible**

**Call for paper** https://cimee-science.org/cimee26/

## Synthesis, biodegradable, and sustainable nanoparticles to enhance bioenergy production from biowaste: Challenges and Future Direction


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

Polymer-graphene The utilization of biodegradable, sustainable, and eco-friendly nanoparticles (NPs) derived from biowaste is an emerging "green nanotechnology" approach to enhance bioenergy production (biogas, bioethanol, biohydrogen, and biodiesel) from organic waste. These nanomaterials, (such as bio-derived carbon nanotubes, nanocellulose, and metal oxide nanocomposites), act as superior nanocatalysts by accelerating biomass hydrolysis, improving microbial activity, and increasing biofuel yields by up to 80%
**Synthesis of Biodegradable and Sustainable Nanoparticles:** (i) Sustainable, "green" synthesis approaches avoid toxic chemicals and high-energy inputs, instead using plant extracts, bacteria, fungi, or agro-industrial waste to produce nanoparticles. (ii) Biowaste-derived Carbon Nanomaterials (CNMs): Agricultural residues (rice straw, wheat straw, corn stover) and forest residues (sawdust, bark) are processed into porous carbon materials, graphene oxide, or carbon quantum dots, which act as efficient, sustainable supports. (iii) Green Synthesis Methods: Techniques like hydrothermal carbonization (180–260 °C) are preferred as they use water, manage wet biowaste efficiently, and reduce energy consumption. Ultrasonication is also used for producing bio-nanofibers and dispersing particles, aiding in the synthesis of sulfonated carbon catalysts for biodiesel. (iv) Biosynthesis of Metal Oxide Nanoparticles: Fruit and vegetable peels (orange, banana, pomegranate) contain phenolic compounds that reduce and stabilize metal ions (e.g., ZnO, $Fe_3O_4$). These biowaste-derived NPs often show high catalytic activity for biodegradation. (v) Magnetic Nanoparticles (MNPs): Used to enhance anaerobic digestion (AD), these particles can be recovered magnetically, increasing their reusability and improving economic feasibility. **Enhancing Bioenergy Production from Biowaste:** (i) Nanoparticles improve the efficiency of various conversion pathways by enhancing catalytic activity and microbial metabolic rates. (ii) Anaerobic Digestion (Biogas/Methane): Nanoparticles, particularly iron-based (nZVI, $Fe_3O_4$), are highly effective at accelerating hydrolysis, improving Direct Interspecies Electron Transfer (DIET) between bacteria, and reducing lag time. (iii) Biodiesel Production: Metal oxide nanoparticles (e.g., CaO-based) are used in transesterification of waste cooking oil to speed up reactions, with reports of over 97% biodiesel yield. (iv) Bioethanol and Biohydrogen: Carbon-based nanostructures and metal oxide NPs improve enzymatic hydrolysis of lignocellulosic biomass. **Challenges:** Despite promising laboratory results, significant hurdles exist for scaling up these technologies: (i) Toxicity and Environmental Impact: While green-synthesized NPs are better, certain metallic NPs (like ZnO or Cu) can inhibit microbial activity at high concentrations, reducing biogas yields. (ii) High Production Costs: The cost of synthesizing and functionalizing nanomaterials, as well as the energy required for some processes, may not be cost-effective. (iii) Scalability and Stability: Moving from batch-mode lab experiments (250 mL) to continuous, large-scale industrial reactors is a major barrier. (iv) Recovery and Disposal: Recovering nanoparticles at the end of the process, particularly from digestate, is difficult and raises environmental concerns. Future Directions: (i) Development of Smart and Functionalized Nanomaterials: Focusing on non-toxic, highly durable, and easily recoverable magnetic nanoparticles. (ii) Enhanced Hybrid Systems: Combining bio-based nanomaterials with other materials (e.g., graphene, metal oxides) to construct composite nanosystems that are more stable and active. (iii) AI and Machine Learning Integration: Using AI to predict and optimize the synthesis of biomass-derived nanomaterials, reducing experimental time and costs. (iv) Pilot-Scale Validation: Shifting from lab-scale studies to pilot-scale and full-scale industrial validation is essential for commercial viability. (v) Regulatory and Safety Frameworks: Establishing standardized protocols for the safe handling and, environmental impact assessment of nanoparticles to avoid potential toxic consequences. The future of biowaste-derived energy lies in integrating sustainable nanotechnologies to create a circular economy, turning agricultural, food, and municipal waste into high-value energy products with minimal environmental harm. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords:** biowaste, green synthesis, eco-friendly nanoparticles, Anaerobic Digestion, biodiesel production, Bioenergy Production, bioethanol biohydrogene, nanocatalysts, scaling up technologies

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY

Celebration

**Materials, Electrochemistry & Environment**

**Freely accessible**

**Call for paper**

https://cimee-science.org/cimee26/

## Advancing carbon capture: the role of sustainable catalysis


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

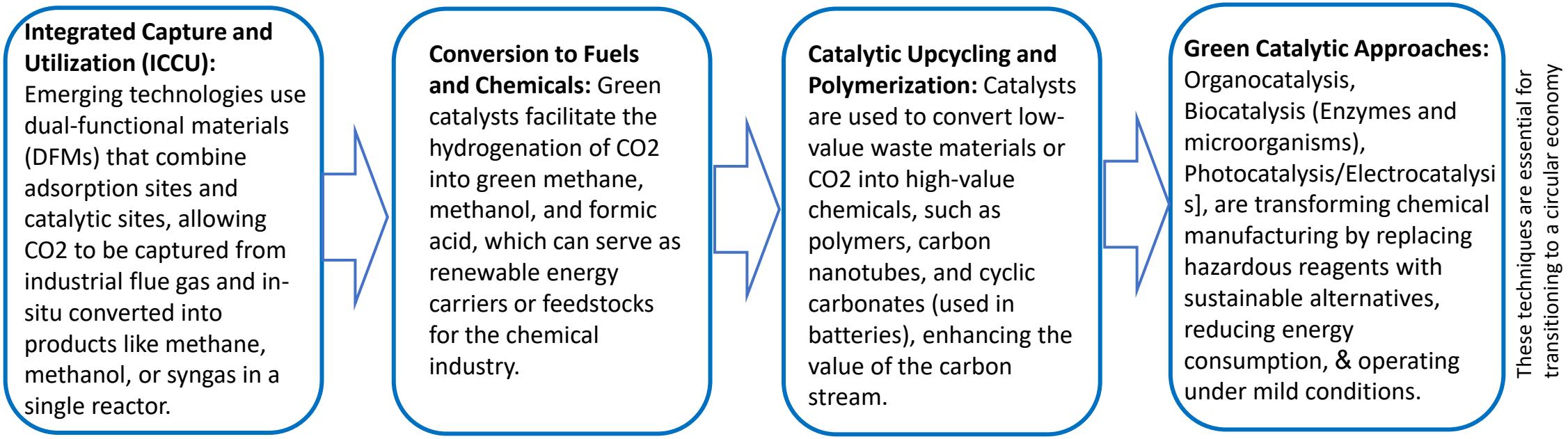
### Key elements & essential information of the session

The development of carbon capture by transforming captured $CO_2$ from waste into valuable fuels, chemicals, and materials (CCU) closes the carbon cycle and improves the economic viability of capture technologies. Indeed, by using earth-abundant materials, enhancing reaction selectivity, and operating under milder conditions, these catalysts are vital to closing the carbon cycle, transitioning away from fossil feedstocks, and making carbon capture financially viable. **Key Roles of Sustainable Catalysis.** sustainable catalysis drives innovation across several areas of carbon management: (i) Integrated Capture and Conversion (ICCU): Emerging technologies combine CO2 capture and chemical transformation into a single reactor step, removing the need for energy-intensive intermediate steps like compression and transportation. (ii) CO2 Utilization and Valorization: Catalysts facilitate the conversion of CO2 into valuable products such as methanol, cyclic carbonates, methane, ethanol, and urea. (iii) Reduction of Energy Intensity: Sustainable catalysts improve the efficiency of hydrogen-based (H2) hydrogenation and electrochemical reduction of CO2, lowering the overall energy footprint of the process. (iv) Replacing Rare Metals: Research focuses on developing catalysts from earth-abundant materials, such as bio-based materials, non-precious metals, or iron-based catalysts, to ensure long-term scalability. **Key Catalytic Pathways and Materials:** Recent advancements in sustainable catalysis have yielded several promising pathways for CO2 utilization: (i) Thermocatalytic Hydrogenation: High-efficiency catalysts, such as copper-based (Cu/ZnO/Al2O3) and mixed metal oxide catalysts (e.g., (In2O3/ZrO2), are used to produce methanol and fuels, leveraging renewable (H2). (ii) Electrocatalytic Reduction: Using renewable electricity, this process operates under mild conditions to create value-added products. Examples include copper-based catalysts for producing hydrocarbons (ethylene, methane) and silver/gold catalysts for carbon monoxide (CO). (iii) Photocatalysis/Photo-thermal Conversion: These methods use solar energy to activate CO2, with emerging materials such as carbonaceous-supported catalysts (e.g., nitrogen-doped graphene) offering superior selectivity and stability. (iv) Biological Fixation: The use of enzymes (e.g., carbonic anhydrase) to catalyze CO2 hydration into bicarbonate, which can then be permanently stored via mineralization as calcium carbonate. **Challenges and Future Directions:** Despite the potential, several barriers remain for widespread implementation: (i) Stability and Deactivation: Catalysts often deactivate over time, requiring improved durability to maintain performance in industrial environments. (ii) Selectivity at High Rates: Achieving both high conversion rates and high selectivity for desired products under industrial-scale conditions remains difficult. (iii) Scalability and Cost: Transitioning from lab-scale (TRL 4-5) to industrial-scale (TRL 7-9) requires reducing production costs and ensuring robust performance. Future Research is currently shifting toward merging artificial intelligence (AI) with green catalysis to accelerate the design of highly selective, durable catalysts. The ultimate goal is creating a "circular carbon economy" where industrial emissions are continuously captured, converted, and reused, minimizing environmental impact. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords:** CO2 Utilization and Valorization, Integrated Capture and Conversion, energy intensity, replacing rare metals, Photocatalysis, Photo-thermal Conversion, Thermocatalytic Hydrogenation, Sustainable catalysts

## This approach transforms CO2 from a waste product into a renewable feedstock, minimizing environmental impact




Green catalysis offers significant environmental advantages

These techniques are essential for transitioning to a circular economy

## Organocatalysis (Metal-Free Catalysis)

Organocatalysis utilizes small organic molecules, rather than toxic metals, to catalyze reactions.
**Key Characteristics:** Often uses natural amino acids (e.g., L-proline), amines, or peptides. They are usually biodegradable and essentially non-toxic.
**Advantages:** Excellent for asymmetric synthesis (preparing chiral drugs), low cost, and ease of separation.
**Applications:** Key tools for forming C-C and C-heteroatom bonds in pharmaceuticals and specialty chemicals.
**Recent Trends:** Merging organocatalysis with photocatalysis or electrocatalysis to unlock new, asymmetric radical-mediated reactions.

## Biocatalysis (Enzymes and Microorganisms)

Biocatalysis leverages enzymes or whole cells to catalyze complex transformations.
**Key Characteristics:** Highly selective (chemo-, regio-, and stereoselective) and operates under mild conditions (aqueous solvents, ambient temperature/pressure).
**Advantages:** Environmentally benign, biodegradable, and sustainable; protein engineering (directed evolution) allows for designing enzymes for specific tasks.
**Applications:** Industrial synthesis of pharmaceuticals (e.g., Pregabalin), bio-based materials, and waste bioremediation.
**Recent Trends:** The use of metagenomics to discover new enzymes and combining them with electrochemistry for high-efficiency cascades

## Photocatalysis and Electrocatalysis

These methods use renewable energy (light or electricity) to drive redox reactions, replacing traditional chemical oxidants or reductants.
**Photocatalysis:** Uses light-driven (often solar) semiconductor materials to excite electrons for chemical transformations.
**Electrocatalysis:** Uses electrodes to lower activation energy and drive reactions, often powered by renewable energy sources.
**Advantages:** Low energy consumption, minimal waste generation, and high selectivity, particularly in green oxidation and reduction of alcohol/nitrobenzene.
**Applications:** Wastewater treatment, hydrogen production, $CO_2$ reduction, and solar energy conversion.
**Hybrid Systems:** Photobiocatalysis combines enzymes with semiconductors to boost efficiency in producing renewable chemicals

These approaches prioritize environmental responsibility by utilizing renewable resources, increasing selectivity, minimizing waste, and enabling energy-efficient transformations

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY

Celebration

**Materials, Electrochemistry & Environment**

**Freely accessible**

**Call for paper**

https://cimee-science.org/cimee26/

## The role of Biochar to Removal of Volatile Organic Compounds: Optimization Strategies


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

Biochar is an effective, low-cost, and sustainable adsorbent for removing Volatile Organic Compounds (VOCs) from air, composting, and industrial emissions, which can be significantly enhanced through modification. VOC removal is primarily driven by physical adsorption and partition mechanisms, influenced strongly by the surface area and non-carbonized organic matter content of the biochar. While biochar is a promising, "greener" option, some Factors Affecting Performance such as specific Surface Area (SSA), Surface Functional Groups and Production Temperature. Optimizing the removal of Volatile Organic Compounds (VOCs) requires a multi-faceted approach that integrates source reduction, high-efficiency adsorption, and advanced destructive technologies (like catalytic oxidation) to handle complex, low-concentration emission streams. The most effective strategies for using biochar to remove Volatile Organic Compounds (VOCs) currently focus on engineered modifications that increase surface area, optimize microporosity, and introduce functional groups to enhance adsorption capacity and selectivity. The most effective methods include ball milling, chemical activation (KOH, $H_2SO_4$), molten salt modification, and biochar-based composites (e.g., with MOFs). **Key Factors for Maximum VOC Removal.** (i) Pyrolysis Temperature: High temperatures (e.g., 600–700°C) generally increase surface area and aromaticity, favoring the adsorption of nonpolar. (ii) Feedstock Selection: Woody biomass generally offers better structural integrity for adsorption compared to agricultural waste. (iii) Surface Chemistry: Introducing nitrogen or oxygen groups enhances the adsorption of polar VOCs. Key applications include reducing odors in compost, treating industrial emissions, and removing contaminants in wastewater. **Key Aspects of Biochar for VOC Removal:** (i) Effectiveness and Mechanisms: Biochar effectively captures a wide range of VOCs. The removal mechanisms are driven by high surface area and noncarbonized organic matter content. (ii) Optimal Production Conditions: Biochar produced via pyrolysis at 550°C to 600°C has been found to be highly effective for VOC sorption. (iii) Activation Methods: Activating biochar significantly increases its surface area and pore volume. (iv) Applications: a) Odor Control: Used in composting (chicken manure/straw) to reduce VOCs during the thermophilic phase. (iv) Air Filtration: Acts as an alternative to activated carbon for capturing gaseous VOCs. (v) Industrial Mitigation: Effective at removing VOCs from asphalt and livestock environments.(v) Reusability: Biochar maintains its removal efficiency over multiple adsorption-desorption cycles. **Limitations and Optimization:** (i) Impact of Moisture: High humidity can sometimes hinder VOC adsorption, though it can be managed. (ii) Feedstock Variation: The type of biomass (e.g., wood vs. manure) affects the final adsorption performance. Future innovations focus on developing cost-effective, large-scale production techniques and optimizing the regeneration process to enhance economic viability for industrial off-gas purification. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords:** biochar, VOCs, optimizations strategies, microporosity, adsorption capacity, adsorption capacity, selectivity, Impact of Moisture, Feedstock Variation.

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY

Celebration

Materials, Electrochemistry & Environment

Freely accessible

**Call for paper**

https://cimee-science.org/cimee26/

## Hydrogen Production & Storage: Benefits of Polymer-Graphene Composites and Key Applications


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

Polymer-graphene composites are advancing the green hydrogen economy by solving critical challenges in production efficiency and storage safety. By combining the high-strength, barrier properties of polymers with the exceptional electrical conductivity and surface area of graphene, these materials enable lighter, more robust, and more efficient hydrogen infrastructure. Graphene-enhanced polymers have been shown to reduce hydrogen gas leakage by up to 83% compared to traditional materials. **Benefits in Hydrogen Storage (High-Pressure Tanks & Pipes).** Polymer-graphene composites are crucial for developing high-performance Type IV hydrogen storage tanks and pipelines, which are typically subject to leakage, particularly in heavy-duty applications.
(i) Superior Barrier Performance (Reduced Leakage): Graphene flakes introduce a "tortuous path" within the polymer matrix, which makes it harder for small hydrogen molecules to diffuse through, lowering permeability. (ii) Enhanced Mechanical Strength: Graphene increases the tensile strength, stiffness, and heat resistance of thermoplastic materials, enabling them to withstand higher pressures and pressures, with thermal degradation temperatures increased by up to 40°C. (iii) Improved Safety (ESD Protection): The addition of graphene makes typically insulating polymers electrically conductive, allowing them to safely dissipate static electricity (electrostatic discharge - ESD), a critical safety requirement for high-pressure hydrogen systems. (iv) Reduced Weight: Compared to traditional metal or early polymer liners, these composites allow for lighter, more fuel-efficient transportation storage tanks (Type IV). (v) Enhanced Interfacial Bonding: Graphene integration can improve the adhesion between the plastic liner and the carbon fiber reinforced polymer (CFRP) structural layer, reducing risks of liner delamination. **Benefits in Hydrogen Production (Electrolysis & Photocatalysis)** In hydrogen production, polymer-graphene composites improve the efficiency of water splitting, particularly in proton exchange membrane (PEM) electrolyzers. (i) Improved Electrocatalytic Performance: Graphene serves as a high-surface-area support for noble metal catalysts (like Pt or Ir), preventing the agglomeration of nanoparticles and ensuring more active reaction sites. (ii) Enhanced Charge Transport: Graphene's excellent conductivity enables faster electron transport during electrolysis, which speeds up the Hydrogen Evolution Reaction (HER) and reduces electrical energy consumption. (iii) Increased Stability: Polymer matrices help stabilize the graphene and catalytic nanoparticles, protecting them from corrosion in harsh (acidic or alkaline) environments, which extends the operating lifespan of the electrolyzer. (iv) Improved Light Harvesting: In photocatalytic systems, graphene-based polymers expand light absorption, facilitating solar-driven hydrogen production. **Key Applications.** Hydrogen Storage Pressure Vessels (Type IV Tanks): Graphene-embedded polyamide or polyethylene liners for automotive and high-pressure storage tanks, reducing leakage by 83%. (i) Hydrogen Transport Pipelines: Durable, conductive, and low-permeability pipes for distributing hydrogen, often manufactured using 3D printing or extrusion methods. (ii) Proton Exchange Membranes (PEM): Polymer-graphene electrolyte membranes that provide higher ionic conductivity and thermal stability in fuel cells and electrolyzers. (iii) Electrodes for Electrolyzers: Graphene-supported nanoparticle catalysts on conductive polymer substrates that replace expensive noble metals in water splitting. (iv) Hydrogen Sensors: Polymer-graphene composites that offer sensitive, real-time leakage detection in confined spaces. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords:** Solid-State Materials, Liquid Organic Hydrogen Carriers (LOHCs). Advanced physical storage, Hybrid Storage Systems, Nanostructuring and Doping, Low-Cost Carbon Fiber

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY Celebration

**Materials, Electrochemistry & Environment**

Freely accessible

**Call for paper**

https://cimee-science.org/cimee26/

## Hydrogen storage materials: Status and Targets


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

Hydrogen storage materials enable safe, compact, and efficient storage by binding hydrogen physically or chemically, overcoming the limitations of compressed gas. Key technologies include metal hydrides, chemical hydrides (e.g., ammonia borane), porous carbon materials (graphene, nanotubes), and Metal-Organic Frameworks (MOFs). Solid-state storage is preferred for higher density, allowing for improved safety and efficiency. While physical storage is mature, R & D aims to achieve DOE targets (> 6.5) wt% capacity, moderate pressure) to replace high-pressure infrastructure.

**Key Material-Based Storage Approaches:** (i) Metal Hydrides (Interstitials/Intermetallics): Store hydrogen in the crystal lattice of metals, providing high volumetric density. Examples include (MgH2) and complex hydrides like (LiBH4). (ii) Adsorbent Materials (Physisorption): Porous materials like activated carbon, carbon nanotubes, and MOFs utilize high surface areas to adsorb hydrogen molecules at low temperatures. (iii) Chemical Hydrides (Chemical Storage): Materials like ammonia borane release hydrogen through chemical reactions. (iv) Liquid Organic Hydrogen Carriers (LOHCs): Liquid compounds, such as toluene, that act as carriers to absorb and release hydrogen through catalytic hydrogenation/dehydrogenation reactions

**Key Requirements & Trends:** (i) Capacity: High weight percentage (wt%) is preferred, with some materials achieving over 15 wt%. (ii) Kinetic Performance: Effective materials must have fast charging and discharging kinetics. (iii) Stability & Safety: Materials are being developed to ensure long-term stability and reduce explosion risk compared to pressurized tanks.

**Comparison of Technologies:** (i) Carbon Materials: Include graphene and nanotubes, which are light and ideal for high-capacity applications, though they sometimes face lower cycling performance in practical tests. (ii) MOFs: Offer high porosity and surface area, often seen as a high-potential material. (iii) LOHCs: Provide easy storage and transport using existing infrastructure.

All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords:** Hydrogen storage materials , Liquid Organic Hydrogen Carriers (LOHCs), Advanced physical storage, Nanostructuring and Doping, Hybrid Storage Systems, carbon nanotubes, porous materials

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY

Celebration

**Materials, Electrochemistry & Environment**

**Freely accessible**

**Call for paper**

https://cimee-science.org/cimee26/

## Hydrogen Storage Materials: current status, challenges, innovations and future trends


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

Hydrogen storage materials are critical for enabling a hydrogen economy, with key research focusing on solid-state solutions (metal hydrides, chemical carriers) to overcome the low density of gas. While high-pressure CFRP tanks (700 bar) are current standards, they face cost and safety challenges, driving innovation toward materials offering higher, safe, and reversible storage density.

**Current Status of Hydrogen Storage Materials:** (i) Solid-State Materials: Focus is on materials that store hydrogen via adsorption or absorption. (ii) Liquid Organic Hydrogen Carriers (LOHCs): These allow safe storage and transport under ambient conditions using hydrogenation/dehydrogenation cycles, though they require high energy to release hydrogen. (iii) Advanced Physical Storage: Carbon fiber reinforced polymer (CFRP) tanks (Type 4) are currently used for 350-700 bar compression, and liquid hydrogen is used for cryogenic, high-density storage, though both are energy-intensive. **Key Challenges:** (i) Low Volumetric Capacity: Hydrogen's low density requires significant compression or cooling, which is costly. (ii) Thermodynamics and Kinetics: Many materials require high heat for hydrogen release (desorption) or have slow loading speeds. (iii) Cycle Stability and Cost: Materials can lose capacity over repeated cycles, and current advanced materials are expensive to produce. (iv) Infrastructure and Safety: Developing widespread, safe infrastructure for storage and refueling is critical to match the maturity of transportation, and there is a need to lower the cost of materials and manufacturing. **Innovations and Future Trends:** (i) Nanostructuring and Doping: Research is actively focused on nano-structuring, doping, and surface modification to improve storage kinetics and reduce operating temperatures. (ii) Machine Learning (AI) Material Discovery: AI is used to simulate and predict promising new metal hydride and MOF compositions, accelerating development. (iii) Hybrid Storage Systems: Combining physical adsorption with chemical storage (e.g., MOFs used as carriers to contain metal hydrides) to enhance overall stability and capacity. (iv) Type V Pressure Vessels: Research into fully composite tanks without metal/polymer liners to increase volumetric efficiency to (>70 MPa). (v) Low-Cost Carbon Fiber: New fabrication techniques aim to lower the cost of Type IV and V tanks. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords:** Hydrogen Storage Materials, Hydrogen Storage, Advanced Physical Storage, Carbon fiber, liquid hydrogen Hybrid Storage Systems

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY

Celebration

---

**Materials, Electrochemistry & Environment**

Freely accessible

**Call for paper** https://cimee-science.org/cimee26/

## New porous materials for hydrogen storage: Innovations and challenges


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

New porous materials for hydrogen storage—including Metal-Organic Frameworks (MOFs), Covalent Organic Frameworks (COFs), and Porous Organic Polymers (POPs)—are engineered with ultra-high surface areas and tailored microporosity (1–2 nm) to maximize physical physisorption of hydrogen. These materials, often exhibiting diamond-like or crystalline topologies, use lightweight organic linkers and metal nodes to create vast internal surfaces that optimize volumetric and gravimetric hydrogen uptake.

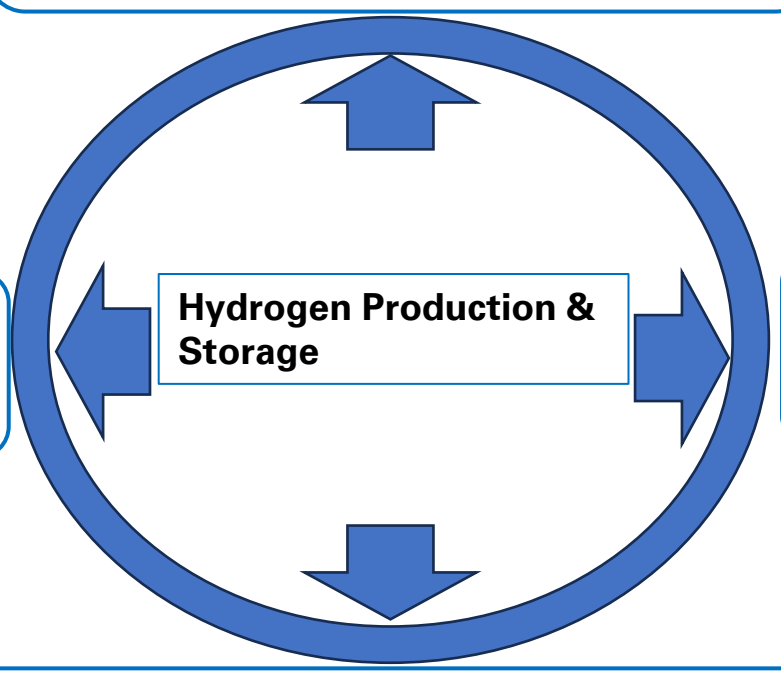
**Key Structural Types and Characteristics:** (i) Metal-Organic Frameworks (MOFs): Composed of metal corners (nodes) connected by organic linker molecules to form highly ordered, porous crystalline structures. Their structures are customizable, allowing for optimized pore sizes to improve hydrogen interaction, with high BET surface areas. (ii) Porous Organic Polymers (POPs): Amorphous structures including Hyper-cross-linked Polymers (HCPs) and Conjugated Microporous Polymers (CMPs). They offer high thermal stability and are constructed from rigid building units, such as tetrahedral tetraphenylene methane. (iii) Porous Aromatic Frameworks (PAFs): A type of POP, often featuring diamond-like structures that provide exceptional surface area and high hydrogen storage capacity. (iv) Polymers of Intrinsic Microporosity (PIMs): Derive their porosity from the rigid, non-linear, and inefficient packing of monomers, allowing for significant pore volume. (v) Carbon-Based Materials: Includes activated carbon, carbon nanotubes, graphite, and templated carbons. They feature high porosity, including micro- and mesopores, often tailored through chemical activation (e.g., KOH) to increase surface area. **Key Structural Features Affecting Performance:** (i) High Microporosity: Pore sizes tailored (often < 1 nm) to match the kinetic diameter of hydrogen, maximizing binding energy. (ii) Surface Modification: Structural tuning, such as metal doping (e.g., Ni) or nitrogen functionalization (N-doped), to enhance binding strength between hydrogen and the surface. (iii) High Surface Area: Extremely high surface areas are crucial for maximizing storage, with optimized micropore volume enhancing volumetric density. (iv) Structural Robustness: Materials designed with covalent bonds (like COFs) ensure stability, allowing them to withstand pressure changes without losing pore structure. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords:** Nano Porous Materials, Metal-Organic Frameworks, Covalent Organic Frameworks, and Porous Organic Polymers, Conjugated Microporous Polymers, Structural Types, Characteristics, performance

Hydrogen Production & Storage: Benefits of Polymer-Graphene Composites and Key Applications

Hydrogen storage materials: Status and Targets




New porous materials for hydrogen storage: Innovations and challenge

Hydrogen Storage Materials: current status, challenges, innovations and future trends

# Hydrogen storage materials: Key technologies and Materials-Based Approaches

**Metal Hydrides (Chemisorption):**

Magnesium-based alloys ($MgH_2$): High hydrogen capacity (7.6 wt%) but require high desorption temperatures (>300°C). Key technologies include nanosizing, catalyst doping (e.g., Ni, Ti, $Nb_2O_5$), and alloying (e.g., $Mg_2Ni$) to improve kinetics and lower operating temperatures.
Titanium/Vanadium-based Alloys: BCC alloys (e.g., Ti-Cr-V) offer fast kinetics and moderate capacities (~2.5 wt%) for near-room temperature applications.
Rare Earth-Mg Alloys: In-situ formed rare earth hydrides acting as catalysts to speed up hydrogen pumping.

**Complex Hydrides**

Alanates (e.g., $NaAlH_4$): Store hydrogen up to 10.4 wt%, requiring moderate temperatures when doped with titanium catalysts.
Borohydrides (e.g., $LiBH_4$, $Mg(BH_4)_2$): Offer very high capacity (>10 wt%) but face slow kinetics and high thermodynamic stability, requiring advanced destablization techniques.

**Physical Adsorption Sorbents (Physisorption):**

Metal-Organic Frameworks (MOFs): Highly porous materials with large surface areas, designed to maximize hydrogen uptake at low temperatures (77 K).
Carbon-Based Materials: Activated carbons, graphene, and carbon nanotubes (CNTs) are being researched for their ability to bind hydrogen through van der Waals forces. Enhanced by functionalization and doping with metals (e.g., Li) to increase binding energies.

**Advanced Material Tailoring Techniques:**

Nanostructuring and Nanosizing: Reducing particle size to the nanometer scale to shorten hydrogen diffusion paths, thereby improving kinetics.
Catalyst Doping: Adding TMs (Ti, Ni, Nb, Fe) or TM oxides/carbides to decrease activation energy for hydrogen dissociation.
Nanoconfinement: Encapsulating materials (e.g., in MOFs or porous carbon) to prevent agglomeration and improve cycling stability.
Polymer Encapsulation: Coating materials to prevent degradation from moisture and air.

**Liquid Organic Hydrogen Carriers (LOHCs):**

Using liquids (e.g., toluene, carbazole) to store hydrogen at ambient conditions through reversible catalytic hydrogenation/dehydrogenation.

**AI/Computational Design:**

Using Density Functional Theory (DFT) and machine learning to predict and design new high-capacity storage materials, accelerating development and reducing experimental trials

**Hydrogen storage materials: Key technologies**

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY

Celebration

**Materials, Electrochemistry & Environment**

**Freely accessible**

**Call for paper**

https://cimee-science.org/cimee26/

## Accelerating the Energy Transition with e-Fuels: The Potential Role of Hydrogen


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

Green hydrogen is a key element of the energy transition, crucial for decarbonizing several sectors by replacing fossil fuels, thereby reducing greenhouse gas emissions in industry and transportation. Indeed, green hydrogen can reduce $CO_2$ emissions, acts as a decarbonized energy carrier, enables the storage of renewable energy, and facilitates the decarbonization of sectors that are difficult to electrify. By using green hydrogen produced by electrolysis powered by renewable energy, e-fuels enable the decarbonization of many sectors using existing infrastructure. Furthermore, hydrogen and e-fuels are essential for achieving carbon neutrality, particularly in sectors that are difficult to decarbonize, such as heavy industry, aviation, and maritime transport. Green hydrogen, produced by electrolysis powered by renewable energy, offers a clean, versatile, and storable energy carrier that serves as a transitional solution in the face of fluctuating renewable energy sources. **The Crucial Role of Hydrogen in E-Fuel Production:** (i) Production Pathway: E-fuels (or electrofuels) are created through Power-to-X (PtX) technologies, where green hydrogen (H2) is synthesized with captured (CO2) or nitrogen (N2) to create hydrocarbons like e-methanol or synthetic aviation fuel (e-SAF). (ii) Decarbonizing Hard-to-Abate Sectors: E-fuels provide a necessary solution for sectors that cannot directly rely on electrification (batteries), such as long-haul aviation and maritime, where high energy density is mandatory. (iii) Infrastructure Compatibility: A major benefit of hydrogen-based e-fuels is their "drop-in" capability, meaning they can be used in current internal combustion engines and fuel distribution systems without requiring expensive hardware modifications. (iv) Renewable Energy Storage: Hydrogen serves as a storage medium for intermittent renewable energy, converting surplus wind or solar power into transportable and storable fuel. **Accelerating the Transition.** (i) Speeding Up Decarbonization: E-fuels can reduce life-cycle greenhouse gas emissions significantly compared to traditional fuels, provided the hydrogen and synthesis processes are powered by renewables. (ii) Utilizing Existing Assets: By enabling the use of current infrastructure (ships, planes, pipelines), e-fuels allow for faster emissions reductions without needing to immediately replace the entire global transport fleet. (iii) Future Market Growth: While current production is low, the e-fuel market is projected to expand rapidly, with major industrial actors and projects accelerating production by 2030 and beyond. **Challenges and Constraints.** (i) High Energy Inefficiency: E-fuel production is extremely energy-intensive, requiring roughly five times more electricity than a battery electric vehicle (BEV) to travel the same distance. (ii) High Costs: Currently, e-fuels are significantly more expensive to produce than traditional fuels, limiting their initial application to niche, high-cost sectors. (iii) Need for Massive Renewable Expansion: Scaling e-fuel production to meaningful levels requires a massive expansion of renewable electricity infrastructure, which must be planned in parallel to avoid diverting green energy from direct electrification. While electrification is prioritized for passenger vehicles, hydrogen-based e-fuels are considered indispensable for global net-zero goals, particularly as a sustainable, drop-in replacement for fossil fuels in shipping and aviation. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords:** Decarbonization of sectors , Renewable Energy Storage, Scaling e-fuel production, battery electric vehicle transport, Power-to-X , renewable electricity, accelerating the transition

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY

Celebration

**Materials, Electrochemistry & Environment**

Freely accessible

**Call for paper**

https://cimee-science.org/cimee26/

## Advancing carbon capture and renewable energy: the potential role of Sustainable catalysis


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

Catalyst development is critical for advancing carbon capture and renewable energy, enabling efficient CO2 capture, storage, and conversion into valuable products like methanol, syngas or Hydrogen. Key innovations include copper/zinc-oxide catalysts for water-gas shifts and nanoporous silver electrocatalysts for efficient CO2 reduction. These technologies, alongside renewable energy, are vital for achieving net-zero emissions. **Catalyst Development in Carbon Capture:** (i) Enhanced Capture Efficiency: Research focuses on reducing energy consumption in solvents and improving the efficiency of capturing CO2 from industrial sources. (ii) Solid Catalysts: Advanced catalysts (e.g., Copper oxide, Zinc oxide, Cerium oxide) supported by materials like alumina or hydrotalcite are developed to improve carbon capture performance. (iii) Bio-based Catalysis: Use of algae-based catalysts for capturing CO2 from gas streams. **Carbon Capture & Utilization (CCU) Technologies:** (i) Conversion to Fuel: Catalysts allow for the hydrogenation of CO2 into useful chemicals like ethanol, polymers, or methanol. (ii) Electrocatalytic Conversion: Electrochemical methods reduce CO2 directly into carbon monoxide or hydrocarbons, sometimes replacing traditional hydrogen-dependent processes. (iii) Carbonylation: Use of Metal-Organic Frameworks (MOFs) to act as novel catalysts for creating valuable organic compounds. **Renewable Energy Integration:** (i) Low-Carbon Hydrogen: Captured carbon is combined with green hydrogen production to create a sustainable, circular carbon economy. (ii) Renewable-Powered Conversion: The conversion of captured CO2 into fuels can be entirely driven by renewable electricity, creating a low-carbon footprint process. (iii) Direct Air Capture (DAC): Catalysts facilitate the removal of CO2 directly from the atmosphere. **Key Trends & Future Outlook:** (i) Scaling Up: 30% year-on-year growth in CCUS projects is requiring more high-performance catalysts. (ii) Economic Viability: Research is focused on reducing the high costs associated with CCS, which currently makes electricity about 50% more expensive. (iii) Decarbonizing Industry: Technologies are crucial for industries like cement and steel to achieve net-zero targets. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords:** carbon capture, renewable energy, Sustainable catalysis, Bio-based Catalysis, solid Catalysts, Enhanced capture Efficiency, Low-Carbon Hydrogen, direct Air Capture. Advanced catalysts

# CIMEE'26

Theme : Materials & electrochemistry for clean energy & environmental sustainability
Online Event

**September 24-26, 2026 | LEBANON**

# CALL FOR ABSTRACTS & MANUSCRIPTS

**SUBMIT YOUR MANUSCRIPT TROUGH THE CONFERENCE WEBSITE:**
**https://cimee-science.org/cimee26/**

Celebrating 10 years

10 YEARS ANNIVERSARY Celebration

Materials, Electrochemistry & Environment

Freely accessible

## Call for paper

https://cimee-science.org/cimee26/

## Advancing carbon capture, renewable energy and sustainable goals


- Center of Materials Technology and Photonics, Hellenic Mediterranean University, Heraklion, Crete, Greece
- Laboratory of Applied Chemistry & Environment, ENSA, University of Ibn Zohr, Morocco
- Laboratory of Environmental Engineering & Ecotechnology, LGEET, ENIS, University of Sfax, Tunisia.
- Department of analytical Chemistry, Faculty of Pharmacy, Ankara University, Turkey.
- Laboratory of Electrochemistry, LEIMCR, Faculty of Technology, University of Ferhat Abbas Sétif-1, Algeria
- Faculty of Public Health, Faculty of Science, Doctoral School for Science & Technology, DSST, Lebanese University, Lebanon


June 30, 2026 – Deadline for FP and WP (Second round)

August 31, 2026 – Deadline for FP and WP (Final round)

### Key elements & essential information of the session

Carbon capture, utilization, and storage (CCUS) technologies are advancing rapidly as critical tools for reaching net-zero emissions by 2050, with global capacity projected to grow significantly as projects in industrial, power, and fuel transformation sectors scale up. These technologies, including post-combustion capture, oxy-fuel combustion, and direct air capture (DAC), are necessary to address emissions in "hard-to-abate" sectors like cement and steel. **Advancements in Carbon Capture (CCUS) Technologies:** (i) Key Techniques: Post-combustion (chemical absorption using amine solvents) is the most mature method, while Oxy-fuel combustion (burning fuel in pure oxygen) allows for easier capture. Direct Air Capture (DAC) is also being deployed to remove $CO_2$ already in the atmosphere. (ii) Innovative Materials: Researchers are developing next-generation materials like metal-organic frameworks (MOFs), covalent organic frameworks (COFs), and ionic liquids to improve efficiency and reduce energy usage for regeneration. (iii) Carbon Capture and Utilization (CCU): Captured carbon is being turned into products like green cement, urea, methanol, and synthetic fuels, turning a waste product into a valuable resource. (iv) Storage Solutions: Captured $CO_2$ is stored in deep geological formations, such as depleted oil and gas fields or saline aquifers. **Renewable Energy Integration:** (i) Complementary Solutions: CCUS is not a replacement for renewables but a complement, necessary for sectors that cannot fully electrify. (ii) Solar-Assisted Capture: Using solar thermal energy to power post-combustion capture systems (e.g., in hydrogen production) is being investigated as a sustainable way to meet the high energy demand of capture processes. (iii) Green Hydrogen: CCUS is essential for producing low-emission blue hydrogen/ammonia, providing a clean energy source. **Sustainable Goals (SDGs) and Policy:** (i) Net Zero 2050: CCUS contributes to SDG 13 (Climate Action) and SDG 7 (Affordable and Clean Energy). (ii) Global Funding: Governments are providing massive funding, including over $20 billion in the U.S. and Europe (as of early 2024), to support CCUS demonstration projects. (iii) Key Players: The US, Canada, the Netherlands, Denmark, and the UK are currently leading in CCUS deployment. (iv) Collaboration: Cross-border projects are increasing, particularly in the North Sea, to manage and store $CO_2$ regionally. **Challenges:** (i) High Costs: CCUS remains capital-intensive, with costs ranging from $30-$100 per ton of $CO_2$. The IEA notes that greater deployment is needed to reduce these costs. (ii) Infrastructure Requirements: A significant bottleneck is the need for rapid expansion of $CO_2$ transport pipelines and storage infrastructure. (iii) Energy Penalty: The capture process itself requires significant energy, reducing the overall efficiency of power plants. All authors and researchers interested in making a scholarly contribution at the conference are invited to submit an abstract by following the procedure described on the CIMEE'26 information website. The accepted papers considered of having enough quality can be further considered by Advisory and review committee for publication in International Journals.

©Copyright CIMEE 2026

**Keywords:** Green Hydrogen, carbon capture and utilization storage, Clean energy technologies, Renewable Energy Integration, Direct Air Capture Innovative Materials, covalent organic frameworks, Solar-Assisted Capture

# Key Aspects of Carbon Capture & Sustainability:

**Decarbonization Pathways:** CCUS captures CO2 from power plants and industrial facilities, storing it in geological formations or reusing it for products, reducing total greenhouse gas emissions

**Synergy with Renewables:** Integrating CCUS with renewable energy sources enables flexible energy systems, balancing fluctuating loads from solar and wind.

**Sustainability Goal:** The technologies contribute to a circular economy by turning emissions into value-added products (like fuels or construction materials).

**Technological Approaches:** Key methods include post-combustion capture, pre-combustion capture, and direct air capture (DAC), often used with bioenergy (BECCS) for negative emissions.

**Challenges and Outlook:** While essential for climate targets, investment in CCS needs to increase to meet global Paris Agreement targets, alongside advancements in reducing high energy consumption and operational costs.

Achieving net-zero emissions targets by removing CO2 from industrial sources and the atmosphere through carbon capture and storage (CCUS/CCS) technologies, complementing renewable energy to promote sustainability.

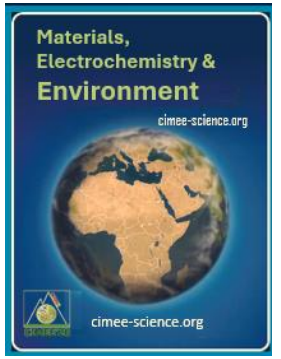
CIMEE'26

10 YEARS

8th International Symposium
on Materials Electrochemistry
& Environment

# CALL FOR PAPER

Africa | Asia | Europe




## Call for Papers

We invite original research papers, case studies, reviews, and industry reports that contribute to the advancement of knowledge in the field of Materials chemistry Electrochemistry and Environmental analytical chemistry. All submissions will undergo a rigorous peer-review process. https://cimee-science.org/cimee26/

## Topics

A - Materials & the Environment
B - Electrochemistry, BioElectrochemistry & Environment
C - Atmospheric chemistry, Remote Sensing & Environmental Pollution
D - Structural, Analytical & Physical Chemistry
E – Agro-GeoEnvironment, Agro-chemistry & Biogeochemistry
F - Biotechnology & phytochemistry for environmental sustainability
G - Climate change, Coastal & Marine Ecosystem
H - Bio-Green-Energy & Waste Treatment Technology

SUBMIT YOUR PAPER https://cimee-science.org/cimee26/

## Important dates

Early Bird Registration
July 31, 2026

Abstract Submission Deadline:
Second Round Submission:
**June 30, 2026**
Final Round Submission:
**August 31, 2026**

General registration Deadline
September 10, 2026

cimee-science.org

