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Preface of the special issue dedicated to the International Energy Conference (IEC 2023): Energy and Climate Change

<https://doi.org/10.1515/ijcre-2025-0023>

Received February 3, 2025; accepted February 4, 2025;

published online February 24, 2025

Abstract: This Special Issue of the *International Journal of Chemical Reactor Engineering* (IJCRE) presents selected manuscripts from the International Energy Conference 2023 (IEC 2023), which took place in Zacatecas, Mexico, from September 18 to 22, 2023. As a biennial event, the IEC fosters research and discussions on global energy challenges. The 2023 edition of the conference focused on the role of sustainable processes in addressing energy and climate change. Key topics included energy efficiency, life-cycle assessments, sustainability strategies, public policies, and energy awareness. Beyond these themes, the IEC 2023 provided a platform for knowledge exchange, critical discussions, and reflections on the influence of both fossil fuels and renewable energy sources on the global energy landscape.

Keywords: energy; conference; IEC-2023



The International Energy Conference was organized by the Universidad Autónoma de Zacatecas (UAZ), located in Zacatecas, Zacatecas, Mexico. The image shows the UAZ rectorate building.

The IEC 2023 was organized by the Universidad Autónoma de Zacatecas (UAZ) with support from prestigious institutions

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such as the Universidad Autónoma Metropolitana (UAM), Mexico; the Universidad Nacional Autónoma de México (UNAM); and the Centro de Investigación en Ciencia Aplicada y Tecnología Avanzada (CICATA), Querétaro Unit, of the Instituto Politécnico Nacional (IPN), Mexico. The theme of this edition, “*Energy and Climate Change*,” highlights the urgent need to accelerate a cleaner, more efficient, and carbon-free energy transition. It is worth recalling that on April 22, 2014, Mexico committed, through the 2030 Agenda and the Paris Agreement, to reducing greenhouse gas emissions by 25 %, as well as to lowering industrial sector emissions by increasing clean energy generation to 43 %, by 2030. Additionally, commitments were made to food security, particularly in vulnerable municipalities, zero deforestation, and wastewater treatment. These challenges remain fundamental to achieving the goal of limiting global warming to no more than 2 °C, a target that, as discussed during the IEC 2023, still seems distant. Given this scenario, the participation from all sectors of society, including academics, professionals, entrepreneurs, and industry leaders, is essential for establishing agreements and preparing for the transition from carbon-based energy to alternative sources, free of greenhouse gases. To this end, fostering discussions and the exchange of ideas is essential for promoting the global adoption of cleaner and more sustainable energy solutions for the benefit of society.

On this occasion, the IEC 2023 encouraged the exploration of the key sectors involved in the development of new energy transformation processes and public energy policies. The Scientific-Cultural Program maintained the high quality of previous editions. The conference featured an extensive selection of contributions covering new energy sources, technological processes, and the implementation of clean, safe, and efficient energy alternatives. The IEC 2023 also included keynote lectures (*magistral conferences*) and contributions from distinguished international researchers, including Dr. Rafiqul Gani, CEO of Speed Company, as well as renowned national researchers such as Dr. José Antonio de los Reyes Heredia, General Rector of UAM; Dr. Ilse Cervantes Camacho, from CICATA-Qro.; Dr. Ysuihiro Matsumoto Kubahara, from CINVESTAV; Dr. Gilberto Espinosa Paredes, from UAM-Iztapalapa; and Drs. Antonio del Río and Diego Esparza from the host institution, UAZ.

This Special Issue encompasses selected papers based on presentations from the IEC 2023. The Guest Editors acknowledge the authors for their valuable contributions and patience

throughout the revision process to meet all IJCRE requirements. The articles in this issue cover a wide range of topics, with a primary focus on reactor engineering fundamentals. We hope that these contributions will have a lasting impact on the academic community interested in applying reactor engineering to emerging technologies for environmentally friendly energy and processes. Furthermore, we anticipate that this IJCRE Special Issue will serve as a valuable reference for researchers working in the energy field. We sincerely hope it fosters discussion and collaboration among researchers, policymakers, and industry professionals. We trust that these contributions will drive progress toward greater economic development and energy self-sufficiency, in our country, Mexico.

The Guest Editors, Carlos O. Castillo-Araiza and Margarita González-Brambila, extend their gratitude to Professor Hugo de Lasa, Editor-in-Chief of the *International Journal of Chemical Reactor Engineering*, for the opportunity to coordinate the publication of this fourth Special Issue. We look forward to continuing our collaboration with the IJCRE in future IEC conferences, by publishing new research, in this prestigious journal.

Sincerely,
Guest Editors



Dr. Carlos O. Castillo-Araiza

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Carlos O. Castillo-Araiza is a full-time professor in the Chemical Engineering Group at the Department of Hydraulic and Process Engineering of the Metropolitan Autonomous University (UAM), Iztapalapa Campus, Mexico. He obtained his

Bachelor's degree in Chemical Engineering from the Ecatepec Institute of Technology and Higher Education, Mexico. During his undergraduate studies, he completed a one-year research stay at the Mexican Petroleum Institute. Castillo-Araiza earned his Master's degree and PhD in Chemical Engineering from the Metropolitan Autonomous University. As part of his postgraduate education, he also completed a research stay at the Department of Chemical Engineering at Penn State University, United States. He then held a two-year postdoctoral position at the Laboratory for Chemical Technology at Ghent University, Belgium, where his research was conducted in collaboration with the Shell Technology Center in Houston, United States. Since 2013, Castillo-Araiza has led the Laboratory of Chemical Reactor Engineering Applied to Chemical and Biological Systems, at the Metropolitan Autonomous University, Mexico. His research focuses on catalytic reactor engineering, with contributions in kinetics, transport phenomena, and reactor modeling. His work emphasizes the application of reactor engineering to energy-efficient and environmentally friendly processes. Castillo-Araiza has co-authored approximately 70 indexed articles, 5 book chapters, and over 100 conference papers. Additionally, he has co-edited a book on Advances in Chemical Engineering and several special issues for the *International Journal of Chemical Reactor Engineering*. He has supervised over 15 PhD, 2 MSc, and 15 bachelor theses. He is currently a member of the Sistema Nacional de Investigadores of Mexico and the Academia Mexicana de Ciencias.



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Dr. Margarita González Brambila holds an undergraduate degree in Industrial Biochemistry Engineering from the Autonomous Metropolitan University (UAM), Mexico, a Master's degree in Chemical Engineering from the National Autonomous University of Mexico, and a Doctoral degree in Biotechnology from the Autonomous Metropolitan University. She held a Postdoctoral appointment, at the Autonomous Metropolitan University and was a scientific researcher, at the Mexican Institute of Petroleum. She is a Professor-Researcher at the Autonomous Metropolitan University, since 2008. She is the co-author of about 30 scientific articles, published in high impact scientific journals. Dr. Brambila has presented at almost 50 international congresses of high diffusion. She is the author of a book on Process Engineering, published in Latin America by LIMUSA Wiley, and a book on Biofilm Reactors, published by PUBLICIA. Her research work deals with aspects of biotechnology mainly applied to the environment and chemical processes. Dr. Brambila has directed 35 bachelor theses and 7 postgraduate theses. She is also the founder and member of the postgraduate program in Process Engineering at UAM-A. She was the head of the Process Analysis, of the

Research Areas of the Basic Sciences and Engineering Division, of the UAM-A, from January 2012 to April 2014. Dr. Margarita González Brambila is a member of several evaluation committees, and a participant in the development of the Institutional Plan for Sustainability of the Azcapotzalco Unit, of the UAM-A. Since April 28, 2014, until 2018, she was head of the Department of Energy, of the Division of Basic Sciences and Engineering, of the Metropolitan Autonomous University – Azcapotzalco. Dr. Margarita González Brambila is a founding member and was President of the Mexican Energy Academy and the general coordinator of the International Energy Conferences in 2015, 2017 and 2019. She is also a member of the Sistema Nacional de Investigadores de Mexico.

Research ethics: Not applicable.

Informed consent: Informed consent was obtained from all individuals included in this study.

Author contributions: All authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Use of Large Language Models, AI and Machine Learning Tools: None declared.

Conflict of interest: The authors state no conflict of interest.

Research funding: None declared.

Data availability: Not applicable.