

Editorial

Advanced Chemical Process Analysis

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It is our pleasure to announce that Scilight Press is launching a new academic journal, *Advanced Chemical Process Analysis* in the field of chemical engineering and related technologies. After a very elaborate preparation, we will start to accept manuscript submissions in September 2024.

Chemical process engineers deal with two types of tasks: The design of new processes and the analysis of existing ones for modifying or optimising them. Currently, these activities strongly rely on computational modeling and simulation of the processes, which in turn are based on the proper solution of equations related, among other things, to the fundamentals of the process operations involved, the mass and energy balances of each individual operation and the overall process, the phase and chemical, the kinetics of heat and mass transport and chemical reactions, and equipment sizing. In addition, the combination of these fundamentals with energy and exergy analyses allows us to evaluate the efficiency in the use of energy, which has an important role to play in addressing climate change and expanding the use of sustainable energy.

On the other hand, commercial process simulators are capable of solving complex tasks related to all the issues typical of process engineering. However, the availability of process simulators in this field does not exempt users from the responsibility to select a property method. Despite the advantages that simulators provide to process engineers, several restrictions related to their use can be identified. First, to make effective use of the simulators, process engineers must know the guidelines and assumptions of the models provided by each simulator: each program has its own specific “rules” of procedure, language, and/or capabilities. A solution to these issues is to automate the simulation process with third-party software. Using this functionality, the complexity of a simulation can be hidden by building a front end in another program created by the user, which allows access to only the important parameters of the simulation.

In recent years, the digitalization of the chemical industry has attracted a lot of attention. To create digital twins of physical assets, process simulators should be embedded into (more complex) central models, where different programming languages and applications are used. Artificial Intelligence (AI) and Machine Learning (ML) technologies, together with vast amounts of data obtained from modern digital technologies, have emerged as a cornerstone of the Industry 4.0 revolution. Currently, almost every industry sector including chemicals, is pursuing AI-enabled processes. AI is being widely used as a tool for predictive analysis and has been successfully used to model non-conventional processes.

ACPA will publish innovative papers from around the world focused on the application of simulation through handmade or commercial software to the analysis of chemical processes from the exergy, energy, and environmental perspectives. Studies of relevant processes as those based on the use of renewable energies and/or recycled raw materials (as the production of green H₂ and/or biogas, respectively) are welcome. Well-established processes together with the most challenging ones can be analyzed with traditional tools, such as those based on process integration and strategies to connect different software, and with other most innovative ones, based on methodologies like Digital Twins (AI), Hybrid Models, Automation, Digitalization, etc. Additionally, the design of open and standardized interfaces to connect different applications, to develop procedures based on the management of large data sets, to create efficiently executable surrogate models, or to incorporate life cycle data for automatic environmental updating of processes, can be also considered. In this sense, education tools used for contributing to a better understanding of the digitalization and simulation concepts by future professionals in the chemical industry are also welcome.

ACPA will be focused on, but is not limited to, the following areas:



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- Advanced analysis of unit operations and chemical processes from the exergy, energy, economic and environmental point of view
- Processes based on the use of renewable energies (production of green H₂)
- Processes based on the use of recycled raw materials for producing biogas
- Automation of simulators through third-party software
- Digitalization and big data in the chemical industry
- Development of surrogate (digital twins) and hybrid models
- Integration of different tools for the innovative analysis and design of chemical processes
- Optimization of chemical processes
- Simulation of chemical process from the microscale to the macroscale

In addition to publishing original research articles, *Advanced Chemical Process Analysis* will feature reviews, perspectives, and commentaries that provide insights into recent advancements and future directions in chemical process analysis. Our editorial team comprises leading experts from diverse backgrounds, ensuring rigorous peer review and editorial oversight to maintain the highest standards of scientific integrity and excellence.

As we embark on this exciting journey, we invite researchers from around the world to contribute their innovative work to *Advanced Chemical Process Analysis*. Together, we can drive forward the frontiers of chemical process analysis and pave the way for transformative discoveries with real-world impact.

We look forward to your contributions and engagement with *Advanced Chemical Process Analysis*.

Conflicts of Interest: The author declares no conflict of interest.