Special Issue

CO_2 Capture and Electrochemical Conversion: Process Design and Optimization

Message from the Guest Editor

This Special Issue focuses on the intersection of CO2-separation science, electrochemical-reactor engineering and systems-level optimization. We invite contributions that advance fundamental understanding, propose innovative process designs, or demonstrate rigorous modeling and optimization frameworks that enable scalable and economically viable CO2-management technologies.

Topics of interest include, but are not limited to:

- Emerging solvent, sorbent, and membrane-based capture technologies
- Coupling capture units with CO2 electrolyzers
- Reactor-level studies on catalyst performance, mass transport, and cell design

Authors may consider dynamic modeling, flowsheet synthesis, techno-economic analysis, lifecycle assessment, heat- and mass-integration strategies, or machine-learning-assisted optimization.

The Special Issue also aims to highlight emerging challenges that hinder commercial viability. These include impurity tolerance in electrolyzers, the cost and sustainability of capture media, membrane durability, catalyst degradation, and the design of balance-of-plant systems supporting high-rate electrochemical operation.

Guest Editor

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Message from the Editor-in-Chief

Energies is an international, open access journal in energy engineering and research. The journal publishes original papers, review articles, technical notes, and letters. Authors are encouraged to submit manuscripts which bridge the gaps between research, development and implementation. The journal provides a forum for information on research, innovation, and demonstration in the areas of energy conversion and conservation, the optimal use of energy resources, optimization of energy processes, mitigation of environmental pollutants, and sustainable energy systems.

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