

Special Issue

Renewable Fuels and Catalysis: Expanding Pathways from CO₂ and Hydrogen to Methanol, Ethanol, Methane, and Biofuels

Message from the Guest Editors

At present, concerns over climate change, energy security, and the depletion of fossil resources have accelerated the search for sustainable fuel alternatives. Renewable fuels are promising due to their versatility and potential for carbon neutrality. Significant advances have been made in developing catalytic pathways for the conversion of CO₂ and green hydrogen into liquid and gaseous fuels. This Special Issue highlights innovative catalytic materials, reaction mechanisms, process intensification strategies, and techno-economic and environmental assessments for sustainable fuel production. The topics of interest include:

- Advanced catalytic systems for CO₂ hydrogenation to methanol, ethanol, and methane
- Catalytic and biochemical routes for biofuel synthesis
- Mechanistic insights and kinetic modeling of catalytic processes
- Integration of renewable energy (solar, wind, biomass) with sustainable fuel synthesis
- Process design, reactor engineering, and scale-up approaches
- Techno-economic and life cycle assessments of renewable fuel production
- Hybrid and emerging technologies for CO₂ capture, utilization, and conversion
- Industrial case studies and pilot-scale demonstrations

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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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