Special Issue

Thermodynamic Analysis and Modeling in Biomass Thermal Conversion Processes

Message from the Guest Editor

Biomass thermal conversion processes—including pyrolysis, gasification, and combustion—offer promising routes toward renewable energy production and carbon neutrality. These processes are inherently complex, involving multi-phase, multi-scale phenomena influenced by the heterogeneous nature of biomass feedstocks. Understanding and optimizing these conversion pathways require robust thermodynamic analysis and advanced modeling approaches. This Special Issue aims to highlight recent advances in the thermodynamic study and modeling of biomass thermal conversion. We welcome innovative research covering theoretical developments, numerical simulations, experimental validation, and process integration. Areas of interest include, but are not limited to, the following:

- Reaction kinetics in pyrolysis, gasification, and combustion;
- Char oxidation and gas–solid interactions;
- CFD modeling of biomass reactors;
- Energy and exergy analyses;
- Artificial intelligence in modeling and optimization;
- Pollutant formation, transport, and mitigation;
- Heat and mass transfer in thermochemical systems;
- Integration with carbon capture and energy storage technologies.

Guest Editor

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Deadline for manuscript submissions

20 November 2025

Thermo

an Open Access Journal by MDPI

Impact Factor 2.3
CiteScore 3.9

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About the Journal

Message from the Editor-in-Chief

Thermo (ISSN: 2673-7264) is an international, peer-reviewed, and open access journal that publishes original research papers, reviews, and Special Issues dealing with experimental, theoretical, and applied thermal sciences. Both theoretical (simulation) and/or experimental research papers within our journal's scope are of particular interest, including satellite-related topics considering thermophysics, solubility phenomena, chemical thermodynamics, and chemical engineering. We encourage scientists to publish their results in as much detail as possible, and there is no restriction on the maximum length of papers. We greatly appreciate suggestions for enhancing the journal.

Editor-in-Chief

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