Special Issue

Advanced Solutions for Carbon Capture, Storage, and Utilization

Message from the Guest Editor

The urgency of mitigating anthropogenic carbon emissions has accelerated the development of carbon capture and storage (CCS) as a key pathway toward net-zero energy systems. CCS integrates multidisciplinary challenges across capture efficiency, transport, and long-term subsurface storage. Recent advancements in experimental geomechanics, rock-fluid interactions, reactive transport modeling, and in situ monitoring have significantly enhanced our understanding of CO2 behavior in geologic formations, including saline aquifers, depleted hydrocarbon reservoirs, and caprock formations. However, questions remain about long-term sealing integrity, fracture responses, and the coupling of thermal, hydraulic, mechanical, and chemical (THMC) processes under in situ conditions. This Special Issue aims to present cutting-edge research focused on advanced technologies that support the secure and efficient deployment of CCS. We invite original research and reviews that encompass experimental studies, modeling approaches, and monitoring techniques relevant to CCS.

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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