Special Issue

Advances in Mineral-Based Carbon Capture and Storage

Message from the Guest Editor

This Special Issue focuses on the critical role of minerals in both the capture and long-term storage of CO2, particularly from major industrial sources such as cement, steel, refining, and chemical production. On the capture side, porous solid materials like zeolites, hydrotalcites, and natural or modified clays are being explored for selective CO2 adsorption, influencing the efficiency and viability of industrial-scale deployment. In storage, mineral interactions with CO2, whether dissolved in brine or in the supercritical phase, are central to the permanence and safety of geological sequestration. Key processes include carbonation reactions with carbonates (e.g., calcite, dolomite), mafic and felsic silicates (e.g., olivine, pyroxene, feldspars), and clay minerals (e.g., serpentine, smectite), as well as competitive interactions involving organic matter and methane. Topics such as mineral dissolution/precipitation kinetics, brine–CO2–rock chemistry, and the scalability of lab experiments to reservoir conditions are also essential to advancing CCS technologies.

Guest Editor

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About the Journal

Message from the Editor-in-Chief

Minerals welcomes submissions that report basic and applied research in mineralogy. Research areas of traditional interest are mineral deposits, mining, mineral processing and environmental mineralogy. The journal footprint also includes novel uses of elemental and isotopic analyses of minerals for petrology, geochronology and thermochronology, thermobarometry, ore genesis and sedimentary provenance. Contributions are encouraged in emerging research areas such as applications of quantitative mineralogy to the oil and gas, manufacturing, forensic science, climate change, geohazard and health sectors.

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manuscripts are peer-reviewed and a first decision is provided to authors approximately 17.7 days after submission; acceptance to publication is undertaken in 2.6 days (median values for papers published in this journal in the second half of 2025).

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