Special Issue

Advances in Carbon Dioxide Capture and Valorization Through Catalytic Conversion: Innovations and Challenges

Message from the Guest Editor

This Special Issue explores the latest advancements in carbon dioxide (CO_2) capture and valorization, with a particular focus on innovative catalytic conversion technologies. As CO_2 emissions remain a major driver of global climate change, efficient, scalable, and economically viable solutions for CO_2 capture and its subsequent transformation into value-added products are crucial for mitigating global warming and achieving carbon neutrality. This Issue highlights cutting-edge processes that integrate CO_2 capture with catalytic conversion. It addresses both fundamental and applied research, as well as the critical challenges related to scaling up and commercialization. Contributions are expected to cover the development of novel catalytic materials, such as metal-organic frameworks (MOFs), transition metal-based catalysts, photocatalysts, and electrocatalysts, with a particular focus on multifunctional catalysts that enhance catalytic performance. Key topics include CO_2 hydrogenation, CO_2 methanation, and the selective conversion of CO_2 into fuels and platform chemicals, as well as electrochemical and photochemical CO_2 conversion technologies.

Guest Editor

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