

Special Issue

Catalysts for Solar Fuels

Message from the Guest Editors

Fossil fuels, e.g., coal, oil and gas, are important carbon carriers in the long-term carbon cycle, and were literally derived from renewable energy, solar energy, by the growth and burial of organic matters on Earth over a geological timescale. Artificial interference with the carbon cycle using cutting-edge technologies appears to be feasible, resulting in a very short cycle, aiming at zero emissions. Semiconductor-based photocatalysis has profoundly extended solar energy utilization to chemical production processes, where solar fuels emerge, via either water splitting for hydrogen production or CO₂ reduction for hydrocarbon formation. Key challenges remain, particularly in terms of catalyst materials, i.e., semiconductor photocatalysts. This Special Issue therefore collects original research papers, reviews and commentaries on the rational design, synthesis, characterization, computational studies, and performance evaluation of catalyst materials, including semiconductors and co-catalysts, in either homogeneous or heterogeneous forms, for solar fuel production. Perspectives on the feasibilities of solar fuels are also welcome.

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