

Special Issue

Molecular Insights into Photocatalytic Degradation and Biomass Valorization for Green Chemistry Applications

Message from the Guest Editor

This Special Issue focuses on the molecular mechanisms of photocatalytic processes for pollutant degradation and biomass valorization, framed within the principles of green chemistry. We welcome contributions that link photocatalyst structure (including defects, heterojunctions, dopants, plasmonic systems, and single atoms) to the generation, dynamics, and reactivity of reactive oxygen species and radical intermediates. Submissions addressing in operando/in situ characterization (e.g., EPR spectroscopy, transient absorption, fluorescence probes) to unravel mechanistic pathways are particularly encouraged. Beyond pollutant degradation, we also invite studies on biomass-derived feedstocks (e.g., lignin model compounds, natural polyphenols) where photocatalysis and advanced oxidation enable sustainable transformations into value-added products. Works that integrate kinetic modeling, structure–activity relationships, stability, by-product/toxicity assessment, and energy/lifecycle metrics are especially valuable. This Special Issue seeks to highlight photocatalysis as a dual platform for clean water and circular bioeconomy solutions.

Guest Editor

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Message from the Editor-in-Chief

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