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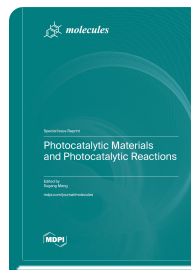
Photocatalytic Materials and Photocatalytic Reactions

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Photocatalysis is a chemical process that utilizes light energy to accelerate thermodynamically demanding reactions. It offers a sustainable and eco-friendly solution for energy production and environmental remediation. With the increasing demand for clean energy and the need to mitigate environmental pollution, photocatalytic research has gained significant momentum. In recent years, photocatalysis has been rapidly developed, and numerous new photocatalysts and photocatalytic reactions have been explored. However, designing advanced photocatalysts, understanding their structure-dependent properties, and seeking new photocatalytic reactions remain prominent challenges. Herein, various photocatalytic materials, including metal oxides, metal sulfides, metal nitrides, metallo-organic compounds, $g\text{-C}_3\text{N}_4$, clusters, LSPR, magnetic materials and heterojunction/composite materials, etc., are introduced. The photocatalytic applications in hydrogen production, carbon dioxide reduction, organic synthesis, environmental remediation, disinfection, toxicity, and dual-function photoredox reactions are also studied. We hope that these works can inspire other researchers and lead to new developments and breakthroughs in the field of photocatalysis.



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