

## Special Issue

# Photocatalytic Water Splitting: Cutting-Edge Research and Future Directions

### Message from the Guest Editor

Photocatalytic water splitting represents a cornerstone technology in the pursuit of a sustainable energy future, offering a direct pathway for converting solar energy into clean hydrogen fuel. However, achieving high solar-to-hydrogen (STH) conversion efficiency and long-term stability remains a significant scientific hurdle. This Special Issue is dedicated to showcasing original research and comprehensive review articles that illuminate the latest advancements in this dynamic field. The collection aims to encompass cutting-edge topics, such as the design and synthesis of novel photocatalysts, sophisticated heterostructure engineering, and the exploration of innovative co-catalysts for enhanced charge separation and surface redox reactions. Furthermore, contributions delve into advanced mechanistic studies through in-situ characterization and theoretical modeling, providing deep insights into the fundamental processes governing photocatalytic activity. The ultimate goal is to accelerate the development of efficient, scalable, and economically viable photocatalytic systems for large-scale solar hydrogen production, paving the way for a hydrogen-based economy.

### Guest Editor

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## Molecules

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### Message from the Editor-in-Chief

As the premier open access journal dedicated to molecular chemistry, now in its 30th year of publication, the papers published in *Molecules* span from classical synthetic methodology to natural product isolation and characterization, as well as physicochemical studies and the applications of these molecules as pharmaceuticals, catalysts, and novel materials. Pushing the boundaries of the discipline, we invite papers on all major fields of molecular chemistry and multidisciplinary topics bridging chemistry with biology, physics, and materials science, as well as timely reviews and topical issues on cutting-edge fields in all of these areas.

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