

Concept

The transformation of biomass into chemicals is a promising approach to contrast the negative impacts caused by the excessive consumption of fossil fuels. Natural biomass, can be considered a source of renewable energy, and it is generated through photosynthesis by plants, wherein carbon dioxide (CO₂) and water are converted into organic matter, devoid of greenhouse gas emissions. Biomass and its derivatives are considered valuable inexpensive raw materials for pharmaceutical, food, cosmetic and fuel industry. Biomass derivatives such as Glycerol, Glucose and Fructose can be used to produce high-value compounds in a sustainable mode by partial oxidation. Solar energy is the most affordable, abundant, and easily usable option. Biomass valorization through photocatalysis is a promising technology to convert solar energy into chemical energy.

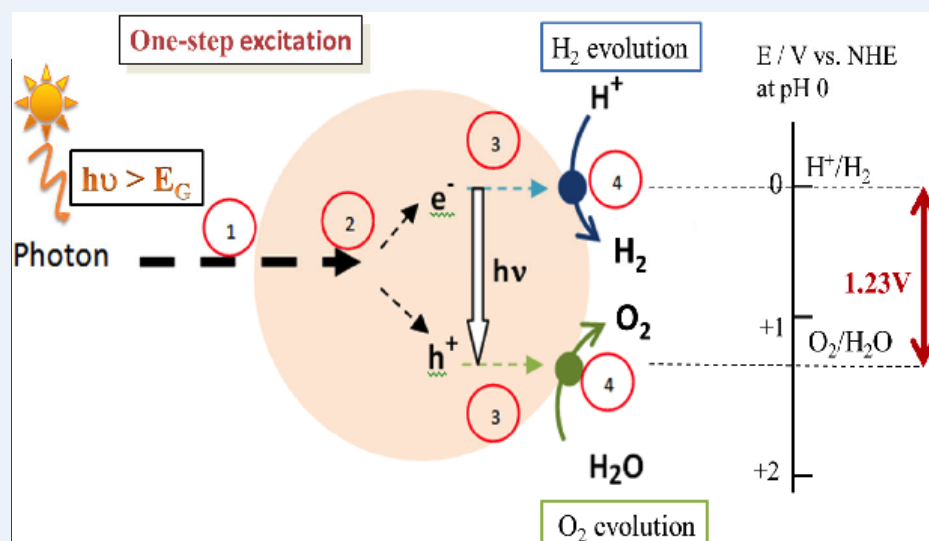
Scientific approach

Photocatalytic based processes are addressed for pollution issues by developing efficient and new photocatalysts designed to operate under solar light irradiation. A key aspect of this research involves the selection of a simple and environmentally sustainable solution route for carrying out photocatalysis, heterogeneous photocatalysis, and photoelectrocatalysis. These methodologies are applied through a range of applications, including photoreforming and the formation of high-value products, by using solar energy to achieve cost-effective utilization prospects.

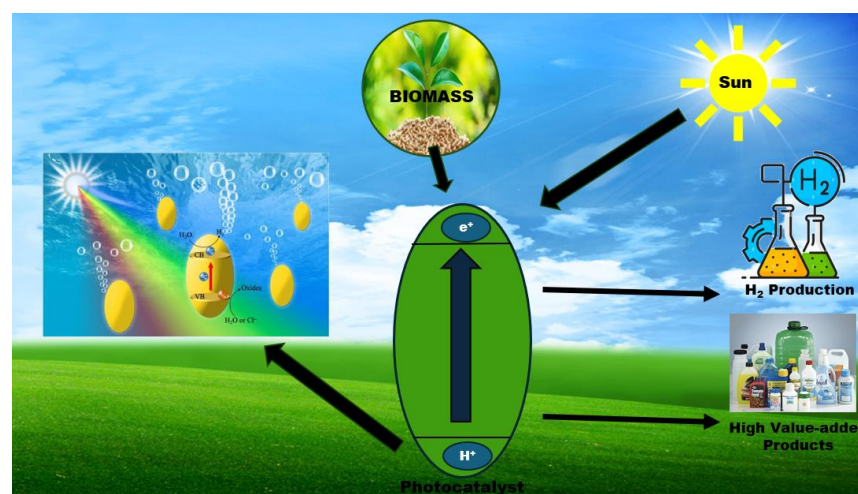
Biomass valorization via photocatalysis represents a promising avenue to convert solar into chemical energy. This scientific approach not only bypass greenhouse gas emission but also align with principles of sustainable development, facilitating the generation of valuable compounds from renewable biomass sources.

Research objectives

The objectives of this study include the synthesis of highly efficient and environmentally friendly photocatalysts. Additionally, the investigation aims to explore biomass as a sustainable, abundant, and environmentally clean substitute for fossil feedstock. Furthermore, the research strives to facilitate the formation of high-value chemicals and fuels through these methodologies.



Basic principle of photocatalysis



Biomass Valorization through Photocatalysis