

# Study of Making of Hydrogen Gas by Using Waste and Sewage Water

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**Abstract:** *In recent years, the intensification of human activities has led to an increase in waste production and energy demand. The treatment of pollutants contained in wastewater coupled with energy recovery is an attractive solution to simultaneously reduce environmental pollution and provide alternative energy sources. Hydrogen represents a clean energy carrier for the transition to a carbonized society. Hydrogen can be generated by photosynthetic water splitting where oxygen and hydrogen are produced, and the process is driven by the light energy absorbed by the photocatalyst. Alternatively, hydrogen may be generated from hydrogenated pollutants in water through photocatalysis, and the overall reaction is thermodynamically more favorable than water splitting for hydrogen. This review is focused on recent developments in research surrounding photocatalytic and photoelectrochemical hydrogen production from pollutants that may be found in wastewater. The fundamentals of photocatalysis and photoelectrochemical cells are discussed, along with materials, and efficiency determination. Then the review focuses on hydrogen production linked to the oxidation of compounds found in wastewater. Some research has investigated hydrogen production from wastewater mixtures such as olive mill wastewater, juice production wastewater, and waste-activated sludge. This is an exciting area for research in photocatalysis and semiconductor photo electrochemistry with real potential for scale-up in niche applications.*

**Keywords:** Hydrogen gas, Waste water, sewage water, Green Hydrogen gas, photocatalytic, photoelectrochemical cell

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