



Valorization of biomass through gasification for green hydrogen generation: A comprehensive review

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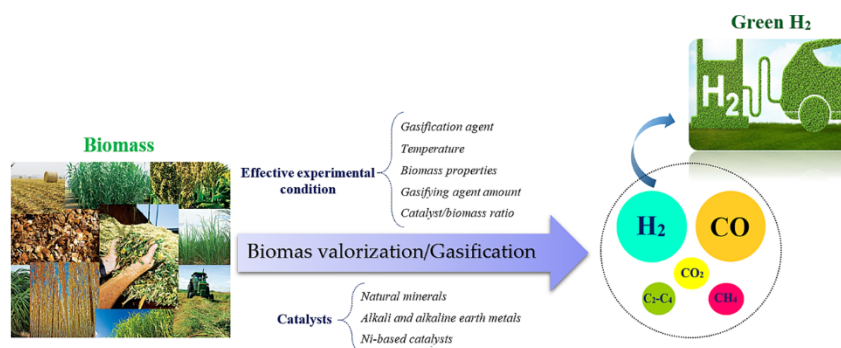
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HIGHLIGHTS

- The production of green H₂ from biomass valorization by gasification was explained.
- The gaseous product of gasification is intensely affected by experimental conditions.
- Steam has been known as the most efficient gasifying agent for the H₂ production.
- Functional mechanism of catalyst affects the gasification efficiency and H₂ yield.
- Technical and economic obstacles should be solved for gasification commercialization.

GRAPHICAL ABSTRACT



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ABSTRACT

Green and sustainable hydrogen from biomass gasification processes is one of the promising ways to alternate fossil fuels-based hydrogen production. First off, an overview of green hydrogen generation from biomass gasification processes is presented and the corresponding possible gasification reactions and the effect of respective experimental criteria are explained in detail. In addition, a comprehensive explanation of the catalytic effect on tar reduction and hydrogen generation via catalytic gasification is presented regarding the functional mechanisms of various types of catalysts. Furthermore, the commercialization aspects, the associated technical challenges and barriers, and the prospects of a biomass gasification process for green hydrogen generation are discussed. Finally, this comprehensive review provides the related advancements, challenges, and great insight of

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