A REVIEW ON CO-GASIFICATION OF PLASTIC WASTE AND BIOMASS FOR HYDROGEN PRODUCTION

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ABSTRACT

A REVIEW ON CO GASIFICATION OF PLASTIC WASTE AND BIOMASS FOR HYDROGEN PRODUCTION

Uncontrolled generation of plastic waste has been a challenge in the environment at a global level, which is the need of hour for environmental sustainable management strategies and in the energy sector. And at the same time, there is a huge potential in the biomass resource availability. Currently, novel gasification process developments have been raised much attention due to the utilization of plastics as well as biomass materials as feedstock that generates synthesis gas, with hydrogen as a strong new energy carrier. This chapter is an attempt to estimate the current status of global plastic production in view of the availability of the biomass resource. The basic gasification process is outlined and the gasification of plastics and biomass together (co-gasification) is discussed. A detailed account of the plastic gasification reactions, including plastic depolymerization, gasification reactions and tar and char production, is also provided. The effects of the main gasification parameters, i.e. plastic type, gasification temperature, gasification agent, S/C and equivalence ratio on the rate of hydrogen production are discussed in a critical manner. Furthermore, the significance of plastic gasification towards building a sustainable hydrogen economy is highlighted, and eventually, the existing knowledge gaps and future outlooks are indicated, in terms of further studies aimed at improving the performance, and sustainable applications of plastic gasification processes for the production of hydrogen.

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