Chapter

Production of Hydrogen through Gasification Technology

By Paresh H. Rana

Book Biohydrogen

Edition	1st Edition
First Published	2022
Imprint	Apple Academic Press
Pages	43
eBook ISBN	9781003277156

Share

ABSTRACT

To overcome CO_2 emissions and environmental problems shaped due to extensive usage of fossil fuel-based feedstock, it is essential to produce potential chemicals through the cleanest energy carrier. The industrial importance of hydrogen is not needed to be emphasized. It can be obtained from biomass via thermochemical routes, which have the potential for commercial implementation as compared to other treatment routes of biomass. Biomass conversion to produce hydrogen via pyrolysis and different gasification technologies are mostly investigated. The catalytic steam reforming is attaining significant interest owing to its optimized control in catalytic and pyrolysis steps as compared to gasification. Reforming, sorption enhanced and chemical looping processes are used for removal of generated CO_2 (in situ) and to produce high purity H_2 gas. These processes are believed to shift the thermodynamic limits of WGS (water-gas shift) reaction, which enhances the conversion of feedstock and process effectiveness. The CO_2 capture and autothermal operating conditions can be attained through the cyclic redox mechanism of oxygen carriers (OCs) in hydrogen production by chemical looping processes. This chapter deals with biomass conversion to hydrogen through gasification technology. It also discusses the process parameters such as type of biomass feedstock types, particle size, moisture content, temperature, pressure, steam/biomass ratio, equivalence ratio and catalyst-to-sorbent ratio, which have a considerable impact on the product 34quality. The challenges and perspective of conversion of biomass to hydrogen are also described.