

Investigation of gasifier performance for supercritical water gasification of glucose

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Glucose serves as a good model compound for cellulose and hemicellulose, based on its structure. The gasification of glucose in supercritical water has been investigated widely. In this report, some experiments conducted to investigate the performance of the gasifier for hydrogen production using the similar experiment condition used by other researchers. The reactor made of Haynes® 230® alloy, which exhibits excellent strength and long life time at high temperature and pressure compare to Hastelloy C-276 or stainless steel. Various gasification experiments are performed by changing residence time (15–60 s), and temperature (739–767°C), with fixed pressure of 25 MPa and fixed concentration of 1.8 wt%. The hydrogen gas yield did not varied a lot with the increment of residence time, in the range of 9.9–11.0 mol H₂/mol glucose. The highest hydrogen yield was 11.5 mol H₂/mol glucose, which is ~96% of the theoretical maximum hydrogen gas yield.