

The effect of operating temperature and equivalence ratio in an entrained flow gasification of EFB

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ABSTRACT

Biomass is a renewable and sustainable source of energy that can be used to generate electricity and other forms of power. Rapid economic growth in developing countries, growing energy demand, high dependence on global and local transportation, pollution, depletion of sources, and endangered national security of energy importing countries have raised the awareness of the need for non-fossil based renewable energy sources. This paper presents the effect of operating temperature and equivalence ratio (ER) on the gasification of empty fruit bunch (EFB) in an entrained flow reactor. EFB is one of the most abundant biomass source in Malaysia, being the second largest palm oil processing nation in the world. The temperature ranges of between 700 °C to 900 °C and ER of 0.2 to 0.4 were studied to find the most optimum condition for biomass gasification in an entrained flow gasification system. It was found that the production of synthesis gas increases as the temperature increased, along with the carbon conversion and higher heating value of gas product. The most optimum operating temperature and ER for biomass gasification in the entrained flow gasifier were found at 900°C and 0.3 respectively.

KEYWORDS

Biomass gasification; EFB; Entrained flow gasifier; Equivalence ratio

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