ABSTRACT

Agniprabha Roy1 , Rabindra K Banik2 and Dr. Pankaj Kalita1

1Scgool of Agro & Rural Technology, IIT Guwahati, India

2 School of Energy Science & Engineering,IIT Guwahati

Email-agniprabha.roy@iitg.ac.in

As a result of the ongoing global changes, there is an increasing need for energy, which has resulted in a major growth in the consumption of fossil fuels. Burning of fossil fuels releases a large amount of hazardous gases that is the source of global warming which ultimately results in several environmental problems. Both particle emissions and a decrease in coal gasification's energy efficiency are caused by incomplete char oxidation. As a result, it is crucial now more than ever to switch from reliance on fossil fuels to alternate and renewable sources of energy. Because they are carbon neutral, biomass-based energy sources are one such option that has attracted a lot of interest and research in recent years.

However, because of its inherent characteristics, such as its high moisture content, low calorific value, high hydrogen concentration, hygroscopic nature, low density, biomass gasification has some limitations and therefore makes it a lot more vital during transportation, storage and preparation for gasification. For instance, to enhance H­2 yield in the final product, tar generation in biomass gasification is a significant issue that must be solved. Co-gasification of coal and biomass in fluidized bed gasification systems is of tremendous interest due to its advantageous operational characteristics for mitigating the problems associated with coal and biomass gasification technology alone. Biomass energy is the most advanced renewable energy that can replace fossil fuels. It is capable of efficiently and environmentally-friendly production of heat, power, green hydrogen, synthetic natural gas, and liquid chemicals. A thermochemical conversion method called biomass gasification includes changing the chemical composition of biomass at high temperatures (over 700oC ) in the presence of a gasification agent, such as air, oxygen, hydrogen, carbon dioxide, or a mixture of these agents. The gasifier's ultimate output is made up of H2, CO2, CO, CH4, tar, and other undesirable elements, which causes the purifying unit to produce synthesis gas in the end.

In DFB gasification a large amount of heat is being lost with the exhaust flue gas and synthesis gas. Heat exchangers can be utilized to recover heat that is being lost in dual fluidized bed gasifiers that are currently in operation. Both synthesis gas and flue gas are expelled at very high temperatures, and heat exchangers can be utilized to reuse the heat. In order to extract the heat from flue gas and synthesis gas, water and air can be used as an operating cool fluid respectively.

Proper Stimulation has been performed in Ansys before the design and Fabrication of the Heat Exchanger .Effectiveness of the Heat Exchanger has been calculated with experimental values and compared with the stimulated values.

Keywords- *gasification,dual fluidized bed synthesis gas,heat exchanger,stimulation*