

ABSTRACT

A process for the indirect gasification of biomass using water vapor. The process uses superheated water vapor as an oxidizer and an energy carrier. First, in a gasification furnace at a temperature between 1,200 and 1,600°C, biomass fuel undergoes dehydration, separation of volatile components, cracking and gasification reaction, thus forming a tar-free crude synthetic gas, which is then chilled and quenched in a spray tower, rapidly dropping the temperature to between 650 and 800 °C, thus obtaining an initial synthetic gas free of molten slag and alkali metal oxide. Finally, the initial synthetic gas is subjected to a sequence of cooling, dust removal, acid removal and dehydration processes, thereby obtaining pure synthetic gas of high quality. Also provided is an apparatus for implementing the process. The process is easy to control, has low energy consumption, and is inexpensive. The synthetic gas produced has a high heating value and is free of tar and alkali metal oxide.