

ABSTRACT

A process and system for producing synthesis gas from biomass by pyrolysis are provided. The process comprises the following steps: 1) pre-treating biomass raw material (1); 2) performing pyrolysis on the biomass raw material (1) by fast biomass pyrolysis technology to obtain a pyrolysis gas and carbon powders in a pyrolysis bed (5); 3) separating the pyrolysis gas from the carbon powders and a solid heat carrier by a cyclone separator (6); 4) separating the carbon powders from the solid heat carrier by a solid-solid separator (7), with the carbon powders being collected via a carbon powder hopper (8) and the solid heat carrier being recycled in the pyrolysis bed (5) after being heated in a carrier heating fluidized bed (9-2); 5) delivering the generated pyrolysis gas to a condensation tank (12) for spray-condensing with the condensable part in the pyrolysis gas being condensed to generate biofuel oil which are compressed by a high-pressure oil pump (17) and then introduced into a gasification furnace (20) to be gasified; and 6) delivering a part of the uncondensed pyrolysis gas to a combustion bed (9-1) to combust with air, and delivering the other part to the pyrolysis bed (5) as a fluidizing medium. The raw material is directly dried by using hot flue gas produced by the carrier heating fluidized bed (9-2). The heat generated by combusting the uncondensed pyrolysis gas produced by the pyrolysis bed (5) with air in the combustion bed (9-1) is supplied to the pyrolysis bed (5).