CLAIMS

1. A method for producing synthesis gas from biomass by carbonization, comprising the following steps:

1) pre-treating a biomass raw material;

2) carrying out low-temperature carbonization to obtain products of a pyrolysis gas and a charcoal, cooling the charcoal at an outlet of an carbonization furnace to a temperature of 60-280°C, and conveying the cooled charcoal to a charcoal storage bin;

3) separating the pyrolysis gas from a charcoal powder after allowing a gas output from an upper part of the carbonization furnace to pass through a gas-solid separator;

4) delivering part of a separated pyrolysis gas to a combustion bed for combustion, heating the other part of the separated pyrolysis gas with a hot flue gas generated during the combustion of the combustion bed, and then delivering a heated pyrolysis gas to the carbonization furnace as a heat source for the carbonization furnace; delivering a waste hot flue gas after heat exchange to a pretreatment part for the biomass raw material for drying; conveying the separated charcoal powder to the charcoal storage bin;

5) milling the charcoal powder to prepare a slurry; and

6) introducing the charcoal slurry to a gasification furnace for gasification through a ~~high-pressure~~ charcoal slurry pump.

2. The method of claim 1, wherein the low-temperature carbonization is a slow

pyrolysis carried out under conditions of an atmospheric pressure and an oxygen insulation in the carbonization furnace, and through adjusting a proportion of the pyrolysis gas and the air, a temperature of the carbonization furnace is controlled at 200-400°C, a rate of temperature rise of the carbonization furnace is controlled at 5-20°C /min, and a retention time of the biomass raw materials in the carbonization furnace is controlled in 20-90 min.

3. The method of claim 1 or 2, wherein in the process of milling the charcoal powder for preparing the slurry, an atmospheric mill is adopted, and water and an additive are added for milling.

4. The method of claim 1 or 2, wherein a content of the charcoal powder in the charcoal slurry is 50-70 wt. %.

5. The method of claim 1 or 2, wherein the temperature of the carbonization furnace is controlled at 250°C ±10°C, the rate of temperature rise of the carbonization furnace is controlled at 15°C /min, and the retention time of the biomass raw materials in the furnace is controlled in 50 min.

6. The method of claim 1 or 2, wherein a content of the charcoal powder in the charcoal slurry is 60-65 wt. %.

7. A gasification system for producing synthetic gas from biomass by pyrolysis using the method of any of claims 1-6, comprising:

a) the pre-treatment part for the biomass raw material;

b) the carbonization furnace;

c) the gasification furnace;

d) a pipeline connector for the carbonization furnace and the gasification furnace; and

e) a pneumatic conveying system;

wherein

a top of the carbonization furnace (4) is connected with ~~the~~ a cyclone separator (5);

an output end of the cyclone separator (5) is connected with ~~the~~ a combustion bed (7) and the charcoal storage bin (12);

an output end of the combustion bed (7) is connected to a heat exchanger (9) for heating recycle pyrolysis gas;

a heated pyrolysis gas outlet is connected with the carbonization furnace (4); and

a heat-exchanged waste heat flue gas outlet is connected with a drying system (2).

8. The gasification system of claim 7, wherein a water-cooled screw conveyor (11) is arranged on a pipeline from a charcoal outlet of the carbonization furnace (4) to the charcoal storage bin (12), and the water-cooled screw conveyor (11) is used for cooling the charcoal at the charcoal outlet of the carbonization furnace to 60-280°C and then conveying the cooled charcoal to the charcoal storage bin (12).

9. The gasification system of claim 7 or 8, wherein a mill (13), a charcoal slurry tank

(16), and the high-pressure charcoal slurry pump (17) are arranged on a pipeline from an outlet of the charcoal storage bin (12) to the gasification furnace (20) in sequence.

10. The gasification system of claim 7 or 8, wherein an input gas supply pipe for the combustion bed (7) is connected with an air pipeline (6), and the air is used as a combustion-supporting gas.