

ABSTRACT

The present invention relates to an externally heated microwave plasma gasifier and a synthesis gas production method, comprising mainly a vertically arranged cylindrical gasifier main body, a feeder apparatus in communication with the main body and arranged at the middle-section of the gasifier main body, an upper-layer steam nozzle arranged at a clearance area, a lower-level carbon dioxide/steam nozzle arranged at a bed-layer area, a synthesis gas outlet at the top part of the gasifier main body, a monitoring unit arranged on the outlet, and a microwave plasma generator arranged in the clearance area and on the upper end of the upper-layer steam nozzle; also provided is an external heating apparatus utilizing an external heat source for heating the gasifier main body, where the external heating apparatus is arranged integrally with the gasifier main body or arranged separately from the gasifier main body. Because the external heat source is used to supply heat, the amount of biomass chemical energy converted into thermal energy is reduced, so much so that no additional oxidizer is added for oxidation reaction, this allows for high effective ingredient content in the synthesis gas, for highly efficient and economic subsequent utilization process, and for comprehensive utilization in combination with various forms of energy.