

ABSTRACT

Provided is a biomass syngas purification process under **negative pressure** for producing oil and the system thereof. In the process, a high temperature syngas extracted from a gasifier enters a water-cooled chilling tower via a water-cooled flue, and the gas is partly chilled to solidify slag by spraying water; the waste heat is recovered by a waste heat boiler of a water-tube type and a waste heat boiler of a heat-tube type in two stages with double pressure; the by-products, middle pressure steam and low pressure steam, are ejected externally; after the heavy tar is condensed and recovered by the waste heat boiler of the heat-tube type, scrubbing and dust extraction by a Venturi scrubber without padding, deep dust extraction by a wet electrostatic precipitator, and purification by removing tar fog are performed; then the resulting product is extracted by a wet electrostatic precipitator, and purification by removing tar fog are performed; then the resulting product is extracted by a gas fan and sent to a wet gas-holder for storage or supplied for use down-stream. The purification aims of cooling of the syngas in stages, gradient recycling use of waste heat, dust extraction in steps and tar removal are achieved and the technical problems of a complex system, long flow, high energy consumption, low efficiency, and poor stability and economy are resolved by optimizing the process and controlling the appropriate process parameters.