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PLASMA RECEIVING THERMAL ENERGY FROM SULPHATE LIGNIN

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Lignin is a component of the timber as produced in significant amounts in the processing of wood waste most difficult disposition [1]. According to the International Institute of lignin (International Lignin Institute) annually in the world produced about 70 million tones. Of technical lignin, but it is used for industrial, agricultural and other purposes not more than 2%. The rest is burned in power plants or are buried in the cemeteries [2].

Sulfate lignin (SFL) is formed on the pulp and paper mills chemical pulping of wood in quantities of 30 ÷ 35% of the raw material and has a fairly constant composition [3]: ash 1.0 ÷ 2.5%; acid based on sulfuric acid - 0.1-0.3%; water-soluble compounds - 9 ÷ 11%; resinous compounds 0.3 ÷ 0.4%; Klason lignin - 85%, and the sulfur weight content of which is 2.0 ÷ 2.5%, including unrelated – 0.4 ÷ 0.9%.

In this paper, the possibility and efficiency of production of heat energy in the process of plasma recycling SFL in air plasma in the form of optimal fuel water-organic compositions (WOC) to ensure its efficient and environmentally safe recycling.

The results of the calculations determined the optimal flammable wok with a maximum of SFL (SFL 30% : 70% water), which has Tad≈1200 ° C and the calorific value of 6.4 MJ/kg, allows to obtain at recycling 1 ton of waste to 1.8 MW (1.5 Gcal) thermal energy.

This was followed by calculations of equilibrium compositions of gaseous and condensed products SFL plasma utilization in air plasma in the form of optimal fuel WOC. Used for the calculation licensed program TERRA. Calculations were carried out at atmospheric pressure (0.1 MPa) in a wide temperature range (300 ÷ 4000) K and for various mass fractions of coolant air plasma (10 ÷ 95)%.

The results obtained can be recommended for practical implementation of the process under investigation following optimal modes:• the composition of the fuel of: (SFL 30% : 70% water); the weight ratio of the phases: (66% of the air : 34% WOC);• operating temperature range (1200 ± 100) °C.

Conducted research on this installation process plasma recycling SFL as dispersed combustible WOC confirmed the recommended mode for the process.

The results of these studies can be used to create industrial units for plasma recycling sulfate lignins and other combustible waste from the pulp and paper industry.

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