

THE BURNING OF A SOLID ALTERNATIVE FUEL AT SELF-IGNITION

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The purpose of the work. The purpose of the work is to develop a technology for combustion of solid alternative fuel in self-ignition mode.

Results. When using biomass as an alternative fuel, combustion technologies that do not depend on its fuel characteristics are required. As previous studies conducted in ITT NAS of Ukraine, one of such technologies is the organization of the process of burning in the mode of self-ignition.

When studying the process of combustion of alternative fuels, its kinetic characteristics were determined: the temperature of self-ignition and the induction period for some types of biomass.

The combustion of biomass was carried out in a flooded system of associated oxidant jets and fine-grain solid biomass in self-ignition mode, which was achieved by thermochemical treatment of fuel according to the method developed by the authors [1].

At combustion of fuel in the mode of self-ignition, the burning rate is greatest (it reaches infinity), while the prevailing components of the combustion reaction are not kinetic but diffusion processes. Therefore, as experiments have shown, solid fuel in this case burns on a double-burning boundary layer and the overall combustion process is approaching the combustion process of gaseous fuels.

On the basis of the experiments, the technology of burning solid fuel was created. Its testing on the model showed that, due to its qualitative characteristics, the process of burning fuel in the flame corresponds to the developed combustion technology. The share of fuel up to 60% burns out within a distance of 5-6 heights of a fuel nozzle. The remainder of the fuel creates a tail of the torch, which determines the size of the latter.

Conclusions: 1. Experimentally determined the temperature of self-ignition for anthracite, coal, buckwheat hulls, millet hulls and linseed pods.

2. A model of combustion in a flooded system of associated oxidant and solid fuels in a self-ignition mode was constructed.

3. The conducted experiments on the models showed that according to their qualitative characteristics, the burning process in the flame corresponds to the developed combustion technology.

Literature

1. Чмель В.Н., Новикова И.П. Сжигание топлива по методу термохимической подготовки.// Дисперсні системи. XX наукова конференція країн СНД, 23 – 27 вересня 2002р. Одеса, Україна. Тези доповідей. – Одеса: Астропринт, 2002. – С. 275 – 276.