

Waste Utilization by Combustion in the Composition of Gel Fuels

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Abstract : In recent years, due to the intensive development of the Arctic and Antarctic areas, the actual task is to develop technology for the effective utilization of solid and liquid combustible wastes in an environment with low temperatures. Firstly, such technology will help to prevent the dumping of waste into the World Ocean and reduce the risks of causing environmental damage to the Far North areas. Secondly, promising actions will help to prepare fuel compositions from the waste in the places of their production. Such kind of fuels can be used as energy resources. It will reduce waste utilization costs when transporting them to the mainland. In the present study, we suggest a solution to the problem of waste utilization by the preparation of gel fuels based on solid and liquid combustible components with the addition of the thickener. Such kind of fuels is characterized by ease of preparation, storage, transportation and use (as energy resources). The main regularities and characteristics of physical and chemical processes are established with varying parameters of gel fuels and heating sources in wide ranges. The obtained results let us conclude about the prospects of gel fuels practical application for combustible wastes utilization. Appropriate technology will be characterized by positive environmental, operational and economic effects. The composition of the gel fuels can vary in a wide range. The fuels preparation based on one type of a combustible liquid or a several liquids mixture with the finely dispersed components addition makes it possible to obtain compositions with predicted rheological, energy or environmental characteristics. Besides, gel fuels have a lower level of the fire hazard compared to common solid and liquid fuels. This makes them convenient for storage and transportation. In such conditions, it is not necessary to transport combustible wastes from the territory of the Arctic and the Antarctic to the mainland for processing, which is now quite an expensive procedure. The research was funded by the Russian Science Foundation (project No. 18-13-00031).

Keywords : combustible liquid waste, gel fuel, ignition and combustion, utilization

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