Measurement of gas-dynamic parameters of heated gas flow in the gap with reference to the Bazhenov Formation

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One of the most promising technologies for the development of rocks of the Bazhenov Formation is the thermal gas method of influence on the formation. It is assumed that in the process of heat action may form a pyrolysis zone of kerogen (insoluble waxy organic matter, part of the shale), moving in the direction of the filtration stream. During pyrolysis, an increase in porosity will occur. In terms of hydrodynamics, the melting and evaporation of a part of a skeleton substance of permeable rocks when heated by a filtration stream having a high temperature can be considered a model of such a process. The study of combustion and filtration processes consists of solving problems:

- it is the determination of the conditions of propagation of the waves of an exothermic reaction in a co-filtered filtration gas stream, in which the reaction products are represented by different phases - liquid and gaseous.

- determination of the speed and amount of the carried-out mass of the material of the walls of the slit by hot combustion products together with the gas stream.

In solving both problems, it is necessary to find a connection between the heat flux released during combustion and the integral velocity of the ablation of mass from the surface of the gap.

For this, an original experimental setup was created and a technique was developed for studying the filtration of heated air flows through a slot with a constant cross section along the length. The temperature of the evaporating surface was determined experimentally. We measured the flow rate, as well as the ablation of mass from the surface of the slit heated co-current flows of air and combustion products. During the experiments, the gas-dynamic parameters of the air flow in a porous medium were also measured.

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