INVESTIGATION OF HEAT FLUX IN HYDROCARBON FUELS AT THE FILM AND BUBBLE BOILING

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The issues of heat transfer during the boiling of fuels are of great interest to the developers of aviation units. Heat transfer during boiling of a liquid depends on the boiling regime. The heat flux is ten times greater than in the bubbling boiling mode versus the film mode at the same temperature of the surface. In the present work we have studied the process of heat transfer during boiling of fuels in the regime of ultra-intense bubble boiling, as well as other regimes under conditions of high-density heat flow [1].

The electrothermographic method using platinum filaments 100 μm in thickness was used as the main experimental method. Platinum filament has a strong dependence of electrical resistance from temperature. Its heating was carried out by means of a constant electric current. In this method, the heater, in addition to its direct function, is also used as a resistance thermometer. By removing its current-voltage characteristic, one can obtain information on the magnitude of the heat flux and surface temperature. Samples of aviation kerosene were taken as objects of research. Complete boiling curves were obtained for the temperatures of 18°C, 100°C, and 184°C It is found that under boiling conditions with underheating, the SPK-super-intense bubbly boiling regime is realized in the system. Under these conditions, the branch of bubbly boiling has an unusual "step-like" form. The transition (mixed) boiling is carried out in an autooscillatory mode. When the liquid reaches the boiling point, the above effects disappear.

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1. Concerning the Magnitude of the Maximum Heat Flux and the Mechanisms of Superintensive Bubble Boiling. Zhukov S.A., Afanas'eva S.Yu., Echmaev S.B.
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