PECULIARITIES OF WATER BOILING IN CASE OF LOCAL PULSE HEATING

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Temperature values of three heat exchange modes were determined by the method of controlled pulse isothermal action using a microheater in experiments with water. The experiments were carried out at atmospheric pressure in the conductive heat exchange mode with a delay in the beginning of boiling by 50 , when the conductive heat exchange mode was changed to the probabilistic boiling mode and in the steady-state boiling mode with exceeding the equilibrium boiling temperature by more than 80 . In the intermediate temperature range, in addition to the implementation of the conductive heat exchange mode or the boiling of superheated water, it is possible to implement the ultra-intensive heat transfer mode. Using high-speed shooting, it was found that when boiling in the transient zone, that is, in the temperature range from 430 to 460 K , significant thermomechanical vibrations of a pulsed heated wire probe can occur. In this case, the heat flux and heat transfer coefficient are doubled relative to the case of boiling (and subsequent boiling) on a fixed probe. The data obtained are important in the development of miniature devices with pulsed (less than 1 s) and local heat dissipation (about 1 square mm) from a smooth metal wall into water. The investigation has been conducted at the expense of a grant of the Russian Science Foundation (project No. 23-69-10006), https://rscf.ru/project/23-69-10006