

## Stability of micromembrane-enhanced boiling in minichannel

The use of a micromembrane in the mini-channel system increases the critical heat flow in boiling (CHF) by separating the vapor and liquid transport processes. In such processes, the oscillatory flow is observed. These oscillations play an important role in increasing heat and mass transfer. The work will analyze the boiling in a system with minichannels and a hydrophobic micromembrane. Boiling of distilled water will be analyzed. The micromembrane will be manufactured using a woven stainless steel mesh covered with thin hydrophobic layers. The flow structures will be recorded using a Phantom v1610 high speed camera at 2000 fps. The following parameters will be recorded: changes in the pressure drop, changes in the time of liquid flow, changes in time flow patterns (using a camera for fast photography), changes in time of temperature of the heating surface, changes in time of the heat flux supplied to minichannel. The data from the sensors will be recorded by the data acquisition system (9804) with a sampling frequency of 2 kHz. The following analysis of measurement data will be carried out: statistical analysis, frequency analysis (Fourier and wavelet), analysis of the largest Lyapunov exponent, fractal and multifractal analysis (correlation dimension, recursive graphs and the spectrum of the fractal dimension) and RQA analysis. Obtained results will give important information about the construction of heat exchangers and explain the mechanism of the appearance of flow oscillations. Obtained results of measurements will be used to develop a boiling model in a minichannel with a hydrophobic membrane. The model will be developed in the Comsol Multiphysics program.