

MODELING OF THE SUPER ATOMIZATION OF HOT WATER MINI JET

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ABSTRACT

The aim of this paper is to work a model for super atomization of hot water mini jet effect had been found experimentally in Joint Institute for High Temperatures of the Russian Academy of Sciences. The 0.3 mm water jet at 240 °C in atmosphere undergoes atomization to drops with the first peak above, the second below 1 μm spectra. This size is extremely small been compared with the main database, and so may be called super atomization. There is of interest what process causes the effect if not a mistake in experiment. We suppose atomization process enhanced by heat gives above micron peak and condensation after evaporation gives below micron peak. Quantitative model is developed. Classical nucleation theory both with intense evaporation approach are applied for condensation presenting. Atomization as jet instability result theory is used for liquid atomization description. Instability growth speed is summarized with bubble surface speed in superheated liquid to account for heat effect. Formulae are suggested for the drop size. Reasonable agreement between model and experimental data is observed. So the suppose gives a probable model of the effect.