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EFFECT OF ELECTROHYDRODYNAMICS IN SATURATED FILM BOILING WITH VARYING SUPERHEAT

Vinod Pandey, Amaresh Dalal, Gautam Biswas* and Ganesh Natarajan
Department of Mechanical Engineering
Indian Institute of Technology Guwahati
Guwahati-781039, India
*Correspondence author: gtm@iitg.ernet.in

ABSTRACT

Vapour bubble growth in film boiling occurs as a result of the increase in disturbances at the liquid vapour interface. Increase in heat flux stimulates these disturbances with the included effects of buoyancy and capillary forces acting at the interface. The present report is focussed on the analysis of the effect of electrohydrodynamics (EHD) on the heat transfer rate and bubble behaviour in saturated film boiling with different wall superheat. The analysis is done with the increasing electric field intensity to observe the space averaged Nusselt number variation and the growth rate of the interface. The destabilizing nature of the electric field force results in the faster rate of bubble release with decreasing distance between adjacent bubbles which verify the decrease in the critical wavelength of disturbance. Combined level-set and volume of fluid (CLSVOF) technique is utilized to capture the liquid-vapour interface.