Parametric Trends of Critical Heat Flux in Pool Boiling

Sang Jun Ha, Hyung Suk Oh
Korea Electric Power Research Institute

Hee Cheon NO
Korea Advanced Institute of Science and Technology

Abstract

In order to attain a better understanding of the CHF phenomena, parameteric trends of CHF are investigated using existing experimental data in pool boiling. The CHF is very sensitive to the change of several parameters and can be affected by the influences of fluid sides as well as by the influences of heater side and fluid-heater interface. Also the CHF can be affected by interactions among various parameters. In relation with the mechanism of CHF in different boiling conditions, all of the CHF data show smooth trends and approach an asymptotic value. It seems to support that the basic mechanism of the CHF is same even though the boiling conditions are different.

A Photographic Study on the Near-Wall Bubble Behavior in Subcooled Flow Boiling

In-Chul Bang, Won-Pil Baek and Soon-Heung Chang
Department of Nuclear Engineering

Abstract

The behavior of near-wall bubbles in subcooled flow boiling has been investigated photographically to identify the physical mechanisms of critical heat flux at subcooled and low-quality conditions. Visualization experiments were performed for water flow in vertical rectangular channels under atmospheric pressure for mass fluxes below 2020 kg/m2s. The thickness and other features of the near-wall bubble layer were examined with the aid of a high-speed camera, a still camera and an 8mm-camera recorder. The number of activated nucleation sites increased as the wall heat flux was increased. The growth of near-wall bubbles and the appearance of some crowded areas of large bubbles were observed when the heat flux was further increased. At sufficiently high heat flux, four (4) characteristic regions were observed in the heated channel: (a) a thin liquid layer on the heated wall, (b) an attached bubble layer over the thin liquid layer, (c) a flowing bubble layer over the attached bubble layer, and finally (d) the liquid core. Further investigation is needed to identify more detailed characteristics of those regions according to flow and geometrical conditions.