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Experiments of Pool Boiling Critical Heat Flux Under Local Heating

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Extended Abstract

Nucleate boiling is an effective heat transfer mechanism, but the temperature of heat transfer surface rises abruptly when the wall heat flux exceeds the limiting value called the critical heat flux [1]. In electronic devices, it is often heated with locally high heat flux. In such situation, the critical heat flux would be higher than that in large heat transfer surface with uniform heating due to heat conduction within the wall. Most of the critical heat flux correlations have however been developed for the large surfaces of uniform heating [2,3]. In this work, changing the wall material, wall thickness and heated area parametrically, systematic experiments were carried out for the pool boiling critical heat flux. It was shown that the heat conduction within the wall has significant influence on the critical heat flux. Using the present experimental data, a dimensionless correlation was developed for the pool boiling critical heat flux under local heating.

References

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