

Experiments and Models for Two-Phase Transport of Water in Microchannels

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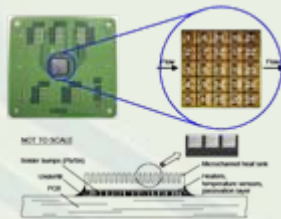
Students: P. S. Lee & D. Liu

OBJECTIVE

Understand the fundamentals of convective boiling and two-phase flow in microchannel heat sinks

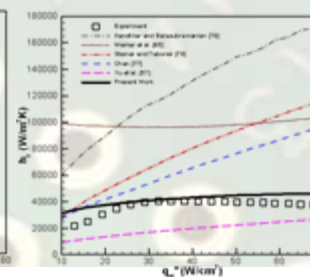
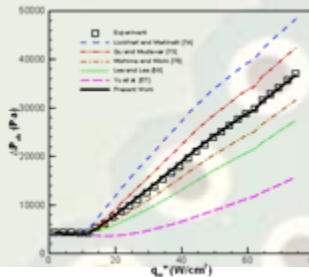
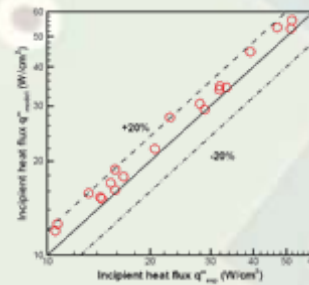
APPROACH

- Careful experimental investigations using silicon microchannel heat sinks integrated with arrays of temperature microsensors
- Employ high-speed photography to capture the dynamic flow boiling processes at the microscale



IMPACT

- Developed analytical model for predicting onset of nucleate boiling (ONB) in microchannels
- Showed that existing correlations in the literature do not match experimental results obtained for two-phase pressure drop and heat transfer associated with flow boiling in microchannels
- Developed models for predicting two-phase pressure drop and saturated boiling heat transfer coefficient, which agree well with experimental data



SELECTED PUBLICATIONS

- D. Liu, P. S. Lee and S. V. Garimella, *Int. J. Heat Mass Transfer* **48**:5134-5149, 2005.
- D. Liu and S. V. Garimella, *J. Heat Transfer*, (In press).
- P. S. Lee and S. V. Garimella, *Int. J. Heat Mass Transfer* (Submitted).