Chapter 4
Conclusion and Further Research

Microchannels are emerging most promising technology for thermal management in electronic devices or wherever high heat flux is to be dissipated from very small size surface area. Among various cooling methods, two phase cooling method outperform. Flow boiling can dissipate significantly higher heat fluxes while requiring smaller rates of coolant flow than its single-phase counterpart moreover heat exchanger surfaces are subjected to more uniform temperature which in turn provides longevity to the components. Despite these appealing adjectives, their applications in practical domain are limited. Two phase flow through microchannels experience larger pressure drop than single phase flow and is the major concern. In an effort to address this issue, flow visualization has been utilized by many researchers and this technique has greatly helped in understanding the two phase flow mechanism. Through flow visualization different flow patterns and different flow regimes have been identified. The change of flow regime from one to another has been one of the potential causes affecting pressure drop and heat transfer characteristics in two phase flow. Pressure and thermal oscillations are the major concern. Since thermal performance of microchannels are drastically reduced owing to dry out conditions prevailing due to flow instability. Some prominent techniques advocated to suppress the instability of flow boiling in microchannels are: inlet constriction, diverging channel, artificial nucleation sites and seed bubble technique. The success of two phase cooling technology is essentially dependent upon the development of measuring techniques. The more accurately measurement is done; the more accurate predictions regarding the thermohydraulic performance of flow boiling can be done.

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