

The Effects of Surface Roughness on Flow Boiling in Microchannels

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OBJECTIVE

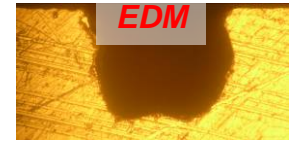
Conduct exploratory experiments on the effect of surface roughness in microchannels.

APPROACH

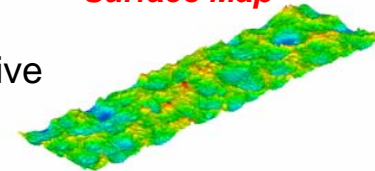
- Develop method of producing microchannel surfaces of varying roughness.
- Conduct experiments to establish the dependence of surface roughness on heat transfer and pressure drop.
- Evaluate the suitability of flow boiling correlations over a wide range of roughness.

IMPACT

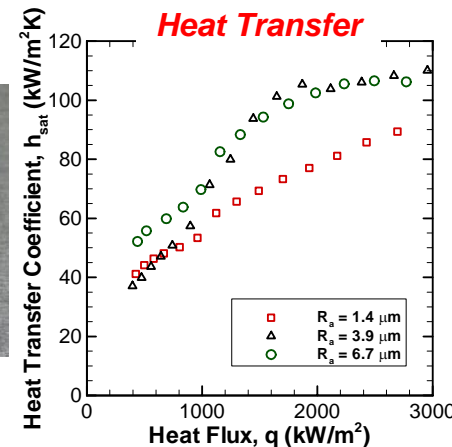
- Surface roughness has a notable impact on flow boiling heat transfer and pressure drop.
- Considering the typical uncertainties in flow boiling correlations, the added uncertainties due to surface roughness do not lead to a significant loss in predictive accuracy.



Surface Map



Test Piece



SELECTED PUBLICATIONS

- B.J. Jones, and S.V. Garimella, Surface roughness effects on flow boiling in microchannels, *ASME Journal of Thermal Science and Engineering Applications*, (in review).
- B.J. Jones and S.V. Garimella, Surface roughness effects on boiling heat transfer, *IMAPS Advanced Technology Workshop and Tabletop Exhibition on Thermal Management*, Palo Alto, CA, October 5-8, 2009.
- B.J. Jones and S.V. Garimella, Surface roughness effects on flow boiling in microchannels, *2009 InterPACK*, San Francisco, CA, July 19-23, 2009, paper no. IPACK2009-89168.

