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Thermal Transport in Microchannels

By Dong Liu

VDM Verlag Feb 2009, 2009. Taschenbuch. Book Condition: Neu. 220x150x16 mm. Neuware - Thermal transport in microchannels is investigated to better understand the fundamentals of single-phase convection and flow boiling at the microscale. Measurements of single-phase pressure drop and heat transfer suggest that conventional Navier-Stokes theory and carefully selected correlations developed at larger scales are entirely capable of predicting single-phase transport characteristics in the microchannels. Both computational fluid dynamics analysis and approximate analytical models are then presented to study the microscale convection-conduction conjugate problem and to aid in the practical design and optimization of microchannel heat sinks. Convective flow boiling in microchannels is also experimentally characterized. Analytical models are developed to predict the onset of nucleate boiling and convective boiling heat transfer coefficients in microchannels over a wide range of flow conditions. In addition, a non-intrusive diagnostic technique, infrared micro-particle image velocimetry, is developed to facilitate the measurement of flow fields within silicon-based MEMS devices with micron-scale resolution. 264 pp. Englisch.



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