
FOREWORD

It gives me great pleasure in presenting one of the first two books in the Series in Contemporary Perspectives in Emerging Technologies. The series was started to promote dissemination of the latest technological developments by leading researchers in the fields related to thermal and fluids aspects in engineering and biological sciences. It is expected to cover broader topics as further interest develops in this series.

Flow boiling in microchannels has been a topic of intense research for over a decade. Following the general belief that flow boiling is more efficient than single-phase flow, it was expected to achieve higher heat transfer coefficients and higher heat fluxes. However, the experiments performed by various researchers worldwide have indicated that flow boiling falls significantly below this expectation. One of the main obstacles in attaining higher heat fluxes has been identified to be flow boiling instabilities.

Professor Yoav Peles is an accomplished researcher in the field of microchannel heat transfer. He has been conducting research in this area covering single-phase enhancement, nucleation phenomena, flow boiling heat transfer, and flow boiling instabilities for over a decade. His work in the area of flow boiling instabilities in particular has been ground breaking in terms of providing theoretical backbone to this phenomenon, and validation through a complex set of experiments. This book is intended to present his work in a comprehensive way to aid in further developments in this field, with the ultimate objective of attaining heat fluxes well over 1 kW/cm² desired in electronics cooling applications.

The vision and foresight of our great friend William Begell in founding Begell House Publications to promote research in the fields of engineering and medicine has been the main driving force behind this effort. The impetus provided by him is further amplified by Yelena Shafeyeva, the President of Begell House. Her encouragement and support in founding this series is gratefully acknowledged. I am also thankful to the Vice President and Production Manager, Vicky Lipowski, who has been extremely patient and supportive in the entire process leading to publication of this book. The support and tireless efforts by all Begell House staff is also gratefully acknowledged.

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