



# Microscale and Nanoscale Heat Transfer: Analysis, Design, and Application

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## Microscale and Nanoscale Heat Transfer: Analysis, Design, and Application


**Microscale and Nanoscale Heat Transfer: Analysis, Design, and Applications** features contributions from prominent researchers in the field of micro- and nanoscale heat transfer and associated technologies and offers a complete understanding of thermal transport in nano-materials and devices. Nanofluids can be used as working fluids in thermal systems; the thermal conductivity of heat transfer fluids can be increased by adding nanoparticles in fluids. This book provides details of experimental and theoretical investigations made on nanofluids for use in the biomechanical and aerospace industries. It examines the use of nanofluids in improving heat transfer rates, covers the numerical approaches for computational fluid dynamics (CFD) simulation of nanofluids, and reviews the experimental results of commonly used nanofluids dispersed in both spherical and nonspherical nanoparticles. It also focuses on current and developing applications of microscale and nanoscale convective heat transfer.

In addition, the book covers a wide range of analysis that includes:

- Solid–liquid interface phonon transfer at the molecular level
- The validity of the continuum hypothesis and Fourier law in nanochannels
- Conventional methods of using molecular dynamics (MD) for heat transport problems
- The molecular dynamics approach to calculate interfacial thermal resistance (ITR)
- A review of experimental results in the field of heat pipes and two-phase flows in thermosyphons
- Microscale convective heat transfer with gaseous flow in ducts
- The application of the lattice Boltzmann method for thermal microflows
- A numerical method for resolving the problem of subcooled convective boiling flows in microchannel heat sinks
- Two-phase boiling flow and condensation heat transfer in mini/micro channels, and more

**Microscale and Nanoscale Heat Transfer: Analysis, Design, and Applications** addresses the need for thermal packaging and management for use in cooling electronics and serves as a resource for researchers, academicians, engineers, and other professionals working in the area of heat transfer, microscale and nanoscale science and engineering, and related industries.

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