Heat Pipe Design And Technology A Practical Approach

This book describes the characteristics of heat pipes under steady-state and transient operating conditions. It emphasizes the physical aspects of heat pipe behavior and develops design formulas on the basis of mathematical models and empirical observation. The author take a tutorial approach, presenting information on the application of heat pipe technology, design methods, and data to heat pipe cooling and heat exchange requirements. He provides the nonspecialist with sufficient understanding of heat pipe technology to appreciate and assess its application potential, while also meeting the needs of the experienced heat pipe designer and researcher.

Heat exchangers are essential in a wide range of engineering applications, including power plants, automobiles, airplanes, process and chemical industries, and heating, air-conditioning, and refrigeration systems. Revised and fully updated with new problem sets, Heat Exchangers: Selection, Rating, and Thermal Design, Fourth Edition presents a systematic treatment of heat exchangers, focusing on selection, thermal-hydraulic design, and rating. Topics discussed include Classification of heat exchangers Basic design methods of heat exchangers for sizing and rating problems Single-phase forced convection correlations for heat exchangers Pressure drop and pumping power for heat exchangers and piping circuits Design methods of heat exchangers subject to fouling Thermal design methods and processes for double-pipe, shell-and-tube, gasketed-plate, compact, and polymer heat exchangers Two-phase convection correlations for heat exchangers Thermal design of condensers and evaporators Micro/nanoheat transfer The Fourth Edition contains updated information about microscale heat exchangers and the enhancement heat transfer for applications to heat exchanger design and experiment with nanofluids. The Fourth Edition is designed for courses/modules in process heat transfer, thermal systems design, and heat exchanger technology. This text includes full coverage of all widely used heat exchanger types. A complete solutions manual and figure slides of the text's illustrations are available for qualified adopting instructors.

Completely revised and updated to reflect current advances in heat exchanger technology, Heat Exchanger Design Handbook, Second Edition includes enhanced figures and thermal effectiveness charts, tables, new chapter, and additional topics––all while keeping the qualities that made the first edition a centerpiece of information for practicing engineers, research, engineers, academicians, designers, and manufacturers involved in heat exchange between two or more fluids. See What's New in the Second Edition: Updated information on pressure vessel codes, manufacturer's association standards A new chapter on heat exchanger installation, operation, and maintenance practices Classification chapter now includes coverage of scrapped surface-, graphite-, coil wound-, microscale-, and printed circuit heat exchangers Thorough revision of fabrication of shell and tube heat exchangers, heat transfer augmentation methods, fouling control concepts and inclusion of recent advances in PHEs New topics like EMbaffle®, Helixchanger®, and Twistedtube® heat exchanger, feedwater heater, steam surface condenser, rotary regenerators for HVAC applications, CAB brazing and cupro-braze radiators Without proper heat exchanger design, efficiency of cooling/heating system of plants and machineries, industrial processes and energy system can be compromised, and energy wasted. This thoroughly revised handbook offers comprehensive coverage of single-phase heat exchangers—selection, thermal design, mechanical design, corrosion and fouling, FIV, material selection and their fabrication issues, fabrication of heat exchangers, operation, and maintenance of heat exchangers —all in one volume.

This book provides a practical study of modern heat pipe engineering, discussing how it can be optimized for use on a wider scale. An introduction to operational and design principles, this book offers a review of heat and mass transfer theory relevant to performance, leading into and exploration of the use of heat pipes, particularly in high-heat flux applications and in situations in which there is any combination of non-uniform heat loading, limited airflow over the heat generating components, and space or weight constraints. Key implementation challenges are tackled, including load-balancing, materials characteristics, operating temperature ranges, thermal resistance, and operating orientation. With its presentation of mathematical models to calculate heat transfer limitations and temperature gradient of both high- and low-temperature heat pipes, the book compares calculated results with the available experimental data. It also includes a series of computer programs developed by the author to support presented data, aid design, and predict performance.

Fundamentals and Applications

Fluid Mechanics and Fluid Power

An Introduction to Heat Pipes

Heat Pipe Theory and Practice

Numerical Simulation of Heat Exchangers

Theory, Design and Applications

This book presents the fundamental fluid flow and heat transfer principles occurring in oscillating heat pipes and also provides updated developments and recent innovations in research and applications of heat pipes. Starting with fundamental presentation of heat pipes, the focus is on oscillating motions and its heat transfer enhancement in a two-phase heat transfer system. The book covers thermodynamic analysis, interfacial phenomenon, thin film evaporation, theoretical models of oscillating motion and heat transfer of single phase and two-phase flows, primary factors affecting oscillating motions and heat transfer, neutron imaging study of oscillating motions in an oscillating heat pipes, and nanofluid's effect on the heat transfer performance in oscillating heat pipes. The importance of thermally-excited oscillating motion combined with phase change heat transfer to a wide variety of applications is emphasized. This book is an essential resource and learning tool for senior undergraduate, graduate students, practicing engineers, researchers, and scientists working in the area of heat pipes. This book also · Includes detailed descriptions on how an oscillating heat pipe is fabricated, tested, and utilized · Covers fundamentals of oscillating flow and heat transfer in an oscillating heat pipe · Provides general presentation of conventional heat pipes

This book, based on the research experience and outcomes of a group of international contributors, addresses a range of advanced energy efficiency technologies and their applications in solar heating, cooling and power generation, while also providing solutions for tackling recurring low efficiency problems in today's systems. It highlights the latest technologies and methods, which can significantly improve the performance of solar systems, enabling readers to design, construct and apply high-performance solar systems in or for their own projects. The contributors provide a systematic introduction to state-of-the-art energy efficiency technologies that demonstrates how to implement innovative solar systems. These technologies include: • heat pipes and loop heat pipes; • phase change materials (PCMs) and PCM slurries; • micro-channel panels; • desiccant/adsorption cycling; • ejector cooling and heat pumps; and • solar concentration and thermoelectric units. The book shows how innovative solar systems applicable to rural and urban buildings can be analysed and demonstrates the successful implementation of these advanced technologies. It delivers the design principles and associated energy performance assessment methods for a range of selected solar heating, cooling and power generation projects. This book offers a valuable source of information for final-year undergraduate students, as well as graduate students and academic lecturers, as it promotes the widespread deployment of advanced solar heating, cooling and power generation technologies applicable for buildings across the globe. The book is also a good point of reference for design engineers and energy consultants who wish to extend their knowledge of advanced technologies used to achieve energy efficiency.

A heat pipe is a self-contained structure which achieves very high thermal conductance by means of two-phase fluid flow with capillary circulation. A quantitative engineering theory for the design and performance analysis of heat pipes is given.

This book gathers selected and expanded contributions presented at the 4th Symposium on Space Optical Instruments and Applications, which was held in Delft, the Netherlands, on October 16-18, 2017. This conference series is organized by the Sino-Holland Space Optical Instruments Laboratory, a cooperative platform between China and the Netherlands. The symposium focused on key technological problems regarding optical instruments and their applications in a space context. It covered the latest developments, experiments and results on the theory, instrumentation and applications of space optics. The book is split into five main sections: The first covers optical remote sensing system design, the second focuses on advanced optical system design, and the third addresses remote sensor calibration and measurement. Remote sensing data processing and information extraction are then presented, followed by a final section on remote sensing data applications.

Heat Pipe Design and Technology

Heat Sinks, Thermoelectrics, Heat Pipes, Compact Heat Exchangers, and Solar Cells

Design Considerations for Lightweight Space Radiators Based on Fabrication and Test Experience with a Carbon-carbon Composite Prototype Heat Pipe

Fuels, Furnaces and Refractories

Advances in Heat Pipe Technology

Systems and Applications

Heat pipes are used in a wide range of applications, including electronics cooling, die-casting and injection moulding, heat recovery and energy conservation, de-icing and manufacturing process temperature control, and in domestic appliances. An essential guide for practicing engineers and an ideal text for postgraduate students, the book takes a highly practical approach to the design and selection of heat pipes. It is both a useful sourcebook and an accessible introduction for those approaching the topic for the first time. *Long established as the standard work on heat pipes *Suitable for use as a professional reference and graduate text; contains all information required to design and manufacture a heat pipe *Revised with greater coverage of key electronics cooling application and a new design guide

Set IV is a new addition to the previous Sets I, II and III. It contains 23 invited chapters from international specialists on the topics of numerical modeling of pulsating heat pipes and of slug flows with evaporation; lattice Boltzmann modeling of pool boiling; fundamentals of boiling in microchannels and microfin tubes, CO2 and nanofluids; testing and modeling of micro-two-phase cooling systems for electronics; and various special topics (flow separation in microfluidics, two-phase sensors, wetting of anisotropic surfaces, ultra-compact heat exchangers, etc.). The invited authors are leading university researchers and well-known engineers from leading corporate research laboratories (ABB, IBM, Nokia Bell Labs). Numerous 'must read' chapters are also included here for the two-phase community. Set IV constitutes a 'must have' engineering and research reference together with previous Sets I, II and III for thermal engineering researchers and practitioners.

With its unique ability to transfer heat over large distances with minimal loss, the heat pipe has emerged as a proven environmentally friendly, energy-saving solution for passive thermal control. However, until recently, the high cost and complex construction use of these marvelous mechanisms has generally limited their use to space technology. Written by a former senior chief scientist at Lockheed who has also worked for Westinghouse and the U.S Air Force, Heat Pipe Design and Technology: A Practical Approach provides a practical study of modern heat pipe engineering in nuclear and solar energy applications, discussing how it can be optimized and made more cost-effective for use on a wider scale. An introduction to operational and design principles, this book explores the use of heat pipes, particularly in high-heat flux applications and in situations in which there is any combination of non-uniform heat loading, limited airflow over the heat generating components, and space or weight constraints. It also discusses design and application of self-controlled, variable-conductance heat pipes for thermal control in spacecraft. Offering a review of heat and mass transfer theory relevant to performance, the book covers issues that can affect successful heat pipe operation, including: Balancing of heat pipe loads Compatibility of materials Operating temperature range Power limitations Thermal resistance Operating orientation With its presentation of mathematical models to calculate heat transfer limitations and temperature gradient of both high- and low-temperature heat pipes, the book compares calculated results with the available experimental data from various sources to increase confidence in existing models. It also explains where and how readers can access helpful interactive computer codes and a series of computer programs developed by the author to support presented data, aid design, and predict performance.

This book is about theories and applications of thermosyphons and heat pipes. It discusses the physical phenomena that drive the working principles of thermosyphons, heat pipes and related technologies. Many applications are discussed in this book, including: rationalizing energy use in industry, solar heating of houses, decrease of water consumption in cooling towers, improvement of the thermal performance of industrial and domestic ovens and driers and new devices for heating stored oil and gas in petrochemical plants. Besides, the book also presents heat pipe and thermosyphon technologies for the thermal management of electronic devices, from portable equipment to airplanes and satellites. The first part of the book explores the physical working principles of thermosyphons and heat pipes, by explaining current heat transfer and thermal resistance models. The author discusses the new heat pipe and thermosyphon technologies that have been developed in the last decade for solving a myriad of electronic, environment and industrial heat and thermal problems. The focus then shifts to the thermosyphon technology applications, and the models and simulations necessary for each application – including vehicles, domestic appliances, water conservation technologies and the thermal control of houses and other structures. Finally, the book looks at the new technologies for heat pipes (mini/micro) and similar devices (loop heat pipes), including new models for prediction of the thermal performance of porous media. This book inspires engineers to adopt innovative approaches to heat transfer problems in equipment and components by applying thermosyphon and heat pipe technologies. It is also of interest to researchers and academics working in the heat transfer field, and to students who wish to learn more about heat transfer devices.

Geoscience Applications, Industrial Technology and Quantum Aspect

A Practical Approach

Thermal Energy Storage

Gravity

Heat Exchangers

Delft, the Netherlands, October 16 –18, 2017

Your complete resource on heat pipe operation, behavior, performance characteristics, and limitations This book is designed to help students, operations engineers, and mechanical and electrical engineers in the electronic packaging industry grasp the principles of operation for a wide range of heat pipes. Packed with examples and design information, it takes you through the background and historical development of heat pipes, discusses the interfacial phenomena that govern their operational characteristics, and presents the fundamental operating principles and limitations of both heat pipes and thermosyphons. Along with detailed presentations of the governing physical phenomena involved, this comprehensive guide features extensive coverage of: The background physics of fluids, their behavior in heat pipes, and associated interfacial phenomena Heat pipe design methodologies and manufacturing considerations Applications for cooling both electrical and mechanical systems The full range of heat pipe classifications, including rotating and revolving, micro, cryogenic, and variable conductance heat pipes, as well as thermal diodes and switches This book provides all the information and guidance you need to increase your understanding of these innovative devices and to begin to apply them to the thermal control of electronic devices and components.

Since the second edition of Liquid-Vapor Phase-Change Phenomena was written, research has substantially enhanced the understanding of the effects of nanostructured surfaces, effects of microchannel and nanochannel geometries, and effects of extreme wetting on liquid-vapor phase-change processes. To cover advances in these areas, the new third edition includes significant new coverage of microchannels and nanostructures, and numerous other updates. More worked examples and numerous new problems have been added, and a complete solution manual and electronic figures for classroom projection will be available for qualified adopting professors.

Presents basic and advanced techniques in the analytical and numerical modeling of various heat pipe systems under a variety of operating conditions and limitations. It describes the variety of complex and coupled processes of heat and mass transfer in heat pipes. The book consists of fourteen chapters, two appendices, and over 400 illustrations, along with numerous references and a wide variety of technical data on heat pipes.

The proposed is written as a senior undergraduate or the first-year graduate textbook,covering modern thermal devices such as heat sinks, thermoelectric generators and coolers, heat pipes, and heat exchangers as design components in larger systems. These devices are becoming increasingly important and fundamental in thermal design across such diverse areas as microelectronic cooling, green or thermal energy conversion, and thermal control and management in space, etc. However, there is no textbook available covering this range of topics. The proposed book may be used as a capstone design course after the fundamental courses such as thermodynamics, fluid mechanics, and heat transfer. The underlying concepts in this book cover the, 1) understanding of the physical mechanisms of the thermal devices with the essential formulas and detailed derivations, and 2) designing the thermal devices in conjunction with mathematical modeling, graphical optimization, and occasionally computational-fluid-dynamic (CFD) simulation. Important design examples are developed using the commercial software, MathCAD, which allows the students to easily reach the graphical solutions even with highly detailed processes. In other words, the design concept is embodied through the example problems. The graphical presentation generally provides designers or students with the rich and flexible solutions toward achieving the optimal design. A solutions manual will be provided.

Oscillating Heat Pipes

Proceedings of the IVth International Heat Pipe Conference, 7-10 September 1981, London, UK

The Heat Pipe

Proceedings of FMFP 2019

NASA's Technology Utilization Program

Theory of Heat Pipes

Heat Pipe Design and TechnologyModern Applications for Practical Thermal ManagementSpringer

Refrigeration plays a prominent role in our everyday lives, and cryogenics plays a major role in medical science, space technology and the cooling of low-temperature electronics. This volume contains chapters on basic refrigeration systems, non-compression refrigeration and cooling, and topics related to global environmental issues, alternative refrigerants, optimum refrigerant selection, cost-quality optimization of refrigerants, advanced thermodynamics of reverse-cycle machines, applications in medicine, cryogenics, heat pipes, gas-solid absorption refrigeration, multisalt resorption heat pumps, cryocoolers, thermoacoustic refrigeration, cryogenic heat transfer and enhancement and other topics covering theory, design, and applications, such as pulse tube refrigeration, which is the most efficient of all cryocoolers and can be used in space missions.

This book deals with different aspects of gravity that has proved its effectiveness throughout the world, hence their solicitation in recent years. Fundamental theories, applications, and tools have been presented, emphasizing the implementation of the gravity technique. Different research themes for diverse areas in the world are detailed here, highlighting new methods of studies that could be helpful for sophisticated and modern development over the next few years. Four main sections are presented: Gravity Interpretation Tools in Geoscience, Gravity in Geoscience Applications, Gravity in Industrial Technology, and Quantum Gravity. Theoretical and acquisition tools and adapted processing methods have been designed to take into account the initial data, and modeling results thus converge toward a better solution. This book, which makes a worthwhile contribution to the topic gravity, is specifically addressed to specialists, researchers, and industry professionals who shall find its content extremely useful for a better comprehension of the geological, spatial, and industrial aspects of gravity.

Fuels, Furnaces and Refractories focuses on the sources and efficient use of energy available to modern industry. This book begins with the classification, properties, tests, and different kinds of fuels, as well as trends in fuel utilization. This text also tackles the generation and distribution of electricity from both chemical and nuclear energy sources. Subsequent chapters focus on the

thermodynamics, physics, chemistry, and kinetics of combustion of fuels; the burner design; the heat transfer and flow of gases through furnaces and flues; and ways of controlling energy supply rates and temperatures. The refractory materials, which are heat-resisting substances, are also described.
Low Temperature and Cryogenic Refrigeration
International Series on Materials Science and Technology
Thermal Design
Heat Pipes
Advanced Energy Efficiency Technologies for Solar Heating, Cooling and Power Generation
Liquid-Vapor Phase-Change Phenomena
Advances in Heat Pipe Technology covers the proceedings of the Fourth International Heat Pipe Conference, held at the Royal Aeronautical Society in London, United Kingdom on September 7-10, 1981. This conference focuses on the advances in heat pipe and thermosyphon technology. This book is organized into seven parts encompassing 69 chapters. The first part describes the design and features o terrestrial and spacecraft applications. The subsequent parts deal with the performance, heat transfer and hydrodynamic properties, and entrainment of thermosyphon and heat pipes, with an emphasis on their application to energy conservation. The last parts discuss the heat pipe theory, and the experimental techniques and life tests of heat pipes.
Featuring contributions from the renowned researchers and academicians in the field, this book covers key conventional and emerging cooling techniques and coolants for electronics cooling. It includes following thematic topics: - Cooling approaches and coolants - Boiling and phase change-based technologies - Heat pipes-based cooling - Microchannels cooling systems - Heat loop cooling technology - Na Theoretical development for the junction temperature of package chips. This book is intended to be a reference source and guide to researchers, engineers, postgraduate students, and academicians in the fields of thermal management and cooling technologies as well as for people in the electronics and semiconductors industries.
div="" style="" This book comprises select proceedings of the 46th National Conference on Fluid Mechanics and Fluid Power (FMFP 2019). The contents of this book focus on aerodynamics and flow control, computational fluid dynamics, fluid structure interaction, noise and aero-acoustics, unsteady and pulsating flows, vortex dynamics, nuclear thermal hydraulics, heat transfer in nanofluids, etc. This book beneficial to researchers, academicians and students interested in the broad field of mechanics. ^
This volume contains an archival record of the NATO Advanced Institute on Mini – Micro Fuel Cells – Fundamental and Applications held in Çesme – Izmir, Turkey, July 22–August 3, 2007. The ASIs are intended to be a high-level teaching activity in scientific and technical areas of current concern. In this volume, the reader may find interesting chapters on Mini- Micro Fuel Cells with fundamentals and appli fu- cell development, modeling and performance analysis has received much attention due to their potential for distributed power which is a critical issue for energy security and the environmental protection. Small fuel cells for portable applications are important for the security. The portable devices (many electronic and wireless) operated by fuel cells for providing all-day power, are very valuable for the sec the war against terrorism. Many companies in NATO and non-NATO countries have concentrated to promote the fuel cell industry. Many universities with industrial partners committed to the idea of working together to develop fuel cells. As tech- logy advanced in the 1980s and beyond, many government organizations joined in spending money on fuel-cell research. In recent years, interest in using fuel cells devices and other small equipment (cell phones, mobile phones, lab-tops, they are used as micro power source in biological applications) has increased partly due to the promise of fuel cells having higher energy density.
Spacecraft Thermal Control

Investigation of Heat Pipe Technology for Naval Applications
Heat Exchanger Design Handbook, Second Edition
Electronics Cooling
4th International Symposium of Space Optical Instruments and Applications
Heat Pipes, 6th Edition, takes a highly practical approach to the design and selection of heat pipes, making it an essential guide for practicing engineers and an ideal text for postgraduate students. This new edition has been revised to include new information on the underlying theory of heat pipes and heat transfer, and features fully updated applications, new data sections, and updated chapters on design and electronics cooling. The book is a useful reference for those with experience and an accessible introduction for those approaching the topic for the first time.
Contains all information required to design and manufacture a heat pipe Suitable for use as a professional reference and graduate text Revised with greater coverage of key electronic cooling applications
This book deals with certain aspects of material science, particularly with the release of thermal energy associated with bond breaking. It clearly establishes the connection between heat transfer rates and product quality. The editors then sharply draw the thermal distinctions between the various categories of welding processes, and demonstrate how these distinctions are translated into simulation model uniqueness. The book discusses the incorporation of radiative heat transfer processes into the simulation model.
Heat pipes are efficient passive devices that can transfer large amounts of heat over long distances with small temperature differences between the heat sources and sinks by evaporation and condensation of the working fluid. Heat can be transferred without the use of any mechanically moving parts such as pumps and active controls in heat pipes. The vapor and liquid circulate in the conventional heat pipes, including thermosiphons, via evaporation/condensation and capillary or gravitational forces. For pulsating heat pipes, liquid slug and vapor plugs in the capillary tube oscillate due to evaporation and condensation. The effective thermal conductivity of a heat pipe can be three orders of magnitude higher than that of a copper rod with the same size. A heat pipe can find its applications in many sectors of industries, including electronics cooling, energy systems, spacecraft thermal control, permafrost cooling, and manufacturing. This book presents current research and development related to the design, applications and technology of various heat pipes, including conventional heat pipes and thermosyphon, pulsating heat pipes, loop heat pipes, and variable conductance heat pipes. Design tools based on computational fluid dynamics simulation and HSHPTM (Heat Sink-Heat Pipe Thermal Module) software are also presented.
This report discusses the design implications for spacecraft radiators made possible by the successful fabrication and proof-of-concept testing of a graphite-fiber-carbon-matrix composite (i.e. carbon-carbo (C-C)) heat pipe. The prototype heat pipe, or space radiator element, consists of a C-C composite shell with integrally woven fins. It has a thin-walled furnace-brazed metallic (Nb-1%Zr) liner with end caps for containment of the potassium working fluid. A short extension of this liner, at increased wall thickness beyond the C-C shell, forms the heat pipe evaporator section which is in thermal contact with the radiator fluid that needs to be cooled. From geometric and thermal transport properties of the C-C composite heat pipe tested, a specific radiator mass of 1.45 kg/m2 can be derived. This is less than one-fourth the specific mass of present day satellite radiators. The report also discusses the advantage of segmented space radiator designs utilizing heat pipe elements, or segments, in their survivability to micrometeoroid damage. This survivability is further raised by the use of condenser sections with attached fins, which also improve the radiation heat transfer rate. Since the problem of heat radiation from a fin does not lend itself to a closed analytical solution, a derivation of the governing differential equation and boundary conditions is given in appendix A, along with solutions for rectangular and parabolic fin profile geometries obtained by use of a finite difference computer code written by the author.
Selection, Rating, and Thermal Design, Fourth Edition
Modern Applications for Practical Thermal Management
Modeling Methodologies, Boiling of CO_2, and Micro-Two-Phase Cooling(A 4-Volume Set)
Modeling, Testing, and Applications
Heat Pipe Science And Technology
Advances in Numerical Heat Transfer Volume V
Thermal control systems are an essential element of spacecraft design, ensuring that all parts of the spacecraft remain within acceptable temperature ranges at all times. Spacecraft thermal control describes the fundamentals of thermal control design and reviews current thermal control technologies. The book begins with an overview of space missions and a description of the space environment, followed by coverage of the heat transfer processes relevant to the field. In the third part of the book, current thermal control technologies are described, and in the final part, design, analysis and testing techniques are reviewed. Provides background on the fundamentals of heat transfer which gives the reader a better understanding of the phenomenon and the way Space Thermal Control Systems work Merges the experience of the authors in teaching aerospace engineering topics with the experience as compilers of the 'Spacecraft Thermal Control Design Data Handbook' of the European Space Agency and the development of in orbit thermal control systems for Spanish and ESA Missions The engineering approach is enhanced with a full section on Thermal Control Design, Analysis and Testing
Heat Pipes: Theory, Design and Applications, Seventh Edition, takes a highly practical approach to the design and selection of heat pipes, making it an essential guide for practicing engineers and an ideal text for postgraduate students.The expanded author team consolidate and update the theoretical background included in previous editions, and include new sections on recent developments in manufacturing methods, wick design and additional applications. The book serves as an introduction to the theory, design and application of the range of passive, two-phase, heat-transfer devices known as heat pipes, serving as an essential reference for those seeking a sound understanding of the principles of heat pipe technology. It provides an introduction to the basic principles of operation and design data which would permit the reader to design and fabricate a basic heat pipe. It also provides details of the various more complex configurations and designs currently available to assist in selecting such devices. This new edition has been fully updated to reflect the latest research and technologies and includes four brand new chapters on various types of heat pipe, theoretical principles of heat transfer and fluid mechanics, additive manufacturing and heat pipe heat exchangers. Fully revised with brand new chapters on Additive Manufacturing and Heat Exchangers Guides the reader through the design and fabrication of a heat pipe Includes detail on more complex configurations and designs available to assist in the election of devices
The ability of thermal energy storage (TES) systems to facilitate energy savings, renewable energy use and reduce environmental impact has led to a recent resurgence in their interest. The second edition of this book offers up-to-date coverage of recent energy efficient and sustainable technological methods and solutions, covering analysis, design and performance improvement as well as life-cycle costing and assessment. As well as having significantly revised the book for use as a graduate text, the authors address real-life technical and operational problems, enabling the reader to gain an understanding of the fundamental principles and practical applications of thermal energy storage technology. Beginning with a general summary of thermodynamics, fluid mechanics and heat transfer, this book goes on to discuss practical applications with chapters that include TES systems, environmental impact, energy savings, energy and exergy analyses, numerical modeling and simulation, case studies and new techniques and performance assessment methods.
A survey of heat pipe theory, applications and developments has been carried out with particular reference to long heat pipes. Applications in Naval operations where the heat pipe technology could be profitably employed are pointed out. Recommendations are made to design and test a long heat pipe in the laboratory with a view to applying the technology in improving equipment operation and reliability, reducing maintenance or component replacement, reducing cost of operation, or permitting designs which otherwise might not be feasible. (Author).
Recent Advances in Heat Pipes
Mini-Micro Fuel Cells
Design, Applications and Technology
Introduction to Spacecraft Thermal Design
Design And Technology Of Heat Pipes For Cooling And Heat Exchange
A Sourcebook
The standard work on the subject, providing the background required by those wishing to use or to design heat pipes. The development of the heat pipe is discussed and a wide range of applications described. This revised and updated edition takes into account the introduction of new working fluids, and extended life test data; new types of heat pipes; and some of the latest uses. Annotation copyright by Book News, Inc., Portland, OR
Develop a fundamental understanding of heat transfer analysis techniques as applied to earth based spacecraft with this practical guide. Written in a tutorial style, this essential text provides a how-to manual tailored for those who wish to understand and develop spacecraft thermal analyses. Providing an overview of basic heat transfer analysis fundamentals such as thermal circuits, limiting resistance, MLI, environmental thermal sources and sinks, as well as contemporary space based thermal technologies, and the distinctions between design considerations inherent to room temperature and cryogenic temperature applications, this is the perfect tool for graduate students, professionals and academic researchers.
Encyclopedia of Two-Phase Heat Transfer and Flow IV
An Introduction to the Thermophysics of Vaporization and Condensation Processes in Heat Transfer Equipment, Third Edition
A HEAT TRANSFER TEXTBOOK
Thermosyphons and Heat Pipes: Theory and Applications