Transport Phenomena Multiphase Systems Faghri

Transport Phenomena in Multiphase SystemsTransport Phenomena in Multiphase SystemsTransport Phenomena in Multiphase SystemsVe□fazni sistemiAdvanced Transport PhenomenaFiscal Year 1993 Department of Energy AuthorizationTransport Phenomena in Multiphase SystemsComputational Modeling for Fluid Flow and Interfacial TransportTransport Phenomena in Single and Multiphase Systems: New Developments at Different FieldsMicrogravity Research in Support of Technologies for the Human Exploration and Development of Space and Planetary BodiesSpecial Issue on Transport Processes and Interfacial Phenomena in Multiphase SystemsTransient Phenomena in Multiphase and Multicomponent SystemsPolish Journal of ChemistryComputational Transport Phenomena of Multiphase Systems and Fluidization国立国会図書館所蔵科学技術関係欧文会議録目録国立国会図書館所蔵科学技術関係欧文会議録目録Electrical WorldThe Electrical WorldTransactions of the ASME.Non-Invasive Monitoring of Multiphase Flows Hamid Arastoopour João M.P.Q. Delgado Amir Faghri Iztok □un John C. Slattery United States. Congress. House. Committee on Science, Space, and Technology. Subcommittee on Energy Dariusz Butrymowicz Wei Shyy J.M.P.Q. Delgado Committee on Microgravity Research S. Srinvasa Murthy F. Mayinger Huilin Lu 国立国会図書館 (Japan) J. Chaouki

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this volume fills the need for a textbook presenting basic governing and constitutive equations followed by several engineering problems on multiphase flow and transport that are not provided in current advanced texts monographs or handbooks the unique emphasis of this book is on the sound formulation of the basic equations describing multiphase transport and how they can be used to design processes in selected industrially important fields the clear underlying mathematical and physical bases of the interdisciplinary description of multiphase flow and transport are the main themes along with advances in the kinetic theory for particle flow systems the book may be used as an upper level undergraduate or graduate textbook as a reference by professionals in the design of processes that deal with a variety of multiphase systems and by practitioners and experts in multiphase science in the area of computational fluid dynamics cfd at u s national laboratories international universities research laboratories and institutions and in the chemical pharmaceutical and petroleum industries distinct from other books on multiphase flow this volume shows clearly how the basic multiphase equations can be used in the design and scale up of multiphase processes the authors represent a combination of nearly two centuries of experience and innovative application of multiphase transport representing hundreds of publications and several books this book serves to encapsulate the essence of their wisdom and insight and

this book presents a collection of recent contributions in the field of transport phenomena in multiphase systems namely heat and mass transfer it discusses various topics related to the transport phenomenon in engineering including state of the art theory and applications and introduces some of the most important theoretical advances computational developments and technological applications in multiphase systems domain providing a self contained key reference that is appealing to

scientists researchers and engineers alike at the same time these topics are relevant to a variety of scientific and engineering disciplines such as chemical civil agricultural and mechanical engineering

engineering students in a wide variety of engineering disciplines from mechanical and chemical to biomedical and materials engineering must master the principles of transport phenomena as an essential tool in analyzing and designing any system or systems wherein momentum heat and mass are transferred this textbook was developed to address that need with a clear presentation of the fundamentals ample problem sets to reinforce that knowledge and tangible examples of how this knowledge is put to use in engineering design professional engineers too will find this book invaluable as reference for everything from heat exchanger design to chemical processing system design and more develops an understanding of the thermal and physical behavior of multiphase systems with phase change including microscale and porosity for practical applications in heat transfer bioengineering materials science nuclear engineering environmental engineering process engineering biotechnology and nanotechnology brings all three forms of phase change i e liquid vapor solid liquid and solid vapor into one volume and describes them from one perspective in the context of fundamental treatment presents the generalized integral and differential transport phenomena equations for multi component multiphase systems in local instance as well as averaging formulations the molecular approach is also discussed with the connection between microscopic and molecular approaches presents basic principles of analyzing transport phenomena in multiphase systems with emphasis on melting solidification sublimation vapor deposition condensation evaporation boiling and two phase flow heat transfer at the micro and macro levels solid liquid vapor interfacial phenomena including the concepts of surface tension wetting phenomena disjoining pressure contact angle thin films and capillary phenomena including interfacial balances for mass species momentum and energy for multi component and multiphase interfaces are discussed ample examples and end of chapter problems with solutions manual and powerpoint presentation available to the instructors

text on momentum energy and mass transfer for graduate engineering students

practical applications and examples highlight this treatment of computational modeling for handling complex flowfields a reference for researchers and graduate students of many different backgrounds it also functions as a text for learning essential computation elements drawing upon his own research the author addresses both macroscopic and microscopic features he begins his three part treatment with a survey of the basic concepts of finite difference schemes for solving parabolic elliptic and hyperbolic partial differential equations the second part concerns issues related to computational modeling for fluid flow and transport phenomena in addition to a focus on pressure based methods this section also discusses practical engineering applications the third and final part explores the transport processes involving interfacial dynamics particularly those influenced by phase change gravity and capillarity case studies employing previously discussed methods demonstrate the interplay between the fluid and thermal transport at macroscopic scales and their interaction with the interfacial transport

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the frontier represented by the near solar system confronts humanity with intriguing challenges and opportunities with the inception of the human exploration and development of space heds enterprise in 1995 nasa has acknowledged the opportunities and has accepted the very significant challenges microgravity research in support of technologies for the human exploration and development of space and planetary bodies was commissioned by nasa to assist it in coordinating the scientific information relevant to anticipating identifying and solving the technical problems that must be addressed throughout the heds program over the coming decades this report assesses scientific and related technological issues facing nasa s human exploration and development of space endeavor looking specifically at mission enabling and enhancing technologies which for development require an improved understanding of fluid and material behavior in a reduced gravity environment

due to the reinforced risk and safety analysis of industrial plants in chemical and energy engineering there has been increased demand in industry for more information on thermo and fluiddynamic effects of non equilibria during strong transients therefore the deutsche forschungsgemeinschaft initiated a special research program focusing on the study of transient phenomena in multiphase systems with one or several components this book describes macroscopic as well as microscopic transient situations

a large part of the book deals with numerical methods for describing transients in two phase mixtures new developments in measuring techniques are also presented

this book focuses on the modeling of gas solid liquid solid non newtonian fluid solid and supercritical fluid solid fluidized beds and multiphase flows simulation techniques are categorized into euler euler with kinetic theory of granular flow ktgf and euler lagrange with discrete element method dem approaches both the governing equations and numerical implementations are presented a new cfd ktgf dem approach describes phase interactions free from the empirical restitution coefficient used in ktgf and accounts for turbulence effects on discrete particle motion which dem cannot achieve additionally a low stokes number ktgf model is introduced incorporating the interstitial fluid s effect unlike the classical ktgf which assumes vacuum conditions special attention is given to momentum exchange between heterogeneous and homogeneous flows in fluidized beds and multiphase systems and various multiscale drag models are presented the book also discusses the application of these approaches in fluid solid fluidized bed reactors and oil gas drilling processes

non invasive monitoring of multiphase flows is a result of the latest advances realized in non invasive measurement of multiphase systems by means of various tomographic and velocimetric techniques written by experts on special topics within the realm of this subject the book reviews in 15 chapters the theoretical background and the physics of the measurement process for each of a number of techniques in addition the mathematical modeling related to the measured property such as in the image reconstitution problem for tomography successful application of the techniques for measurement in various multiphase systems and their advantages and limitations are described features of this book comprehensive and complete covers both theoretical and application viewpoints of noninvasive measuring techniques in multiphase systems there is no book available on this subject in the field of multiphase flows versatile material is presented in such a way that the book can be used either for research or for teaching graduate students specializing in the topic of multiphase flows awareness and uniformity the engineering community is made aware of advantages of these new techniques and they are presented in a uniform package the editors strive to provide a comprehensive compendium of all the relevant information essential for practising engineers consultants university professors graduate students and technicians who are involved in the study of multiphase flow

phenomena the book although directed to the study of multiphase systems of interest to the chemical engineer also provides valuable information for all other engineering disciplines that deal with multiphase systems

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