

Engineering Heat And Mass Transfer By Mahesh M Rathore Pdf Download

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previous editions published under title absorption and exttaction

mass transfer along with separation processes is an area that is often quite challenging to master as most volumes currently available complicate the learning by teaching mass transfer linked with heat transfer rather than focusing on more relevant techniques with this thoroughly updated second edition mass transfer and separation processes pr

mass transfer and absorbers deals with absorption and mass transfer processes and the factors to consider in designing absorbers calculations are supported by a uniform generalized process driving force complying with maxwell s equation and the coefficients are made as independent as possible in terms of the kind of diffusion and of the values of the concentrations this volume is comprised of seven chapters and begins with an overview of the general principles of diffusional mass transfer absorption and stripping and equilibrium between gas and liquid phases steady state mass transfer by diffusion is then discussed along with mass transfer in a single phase forced flow and unforced flow subsequent chapters explore design considerations for mass transfer equipment and related problems adsorption accompanied by a chemical reaction and problems relating to hydrodynamics the final chapter is devoted to some practical issues including economic flow velocity and mechanical features of packed plate and spray tower designs this book is intended for practicing designers and engineers

mass transfer describes the net movement of mass from one location usually meaning stream phase fraction or component to another mass transfer happens in many processes such as absorption evaporation adsorption drying precipitation membrane filtration and distillation mass transfer is used by different scientific disciplines for different processes and mechanisms the phrase is commonly used in engineering for physical processes that involve diffusive and convective transport of chemical species within physical systems the theory of mass transfer allows for the computation of mass flux in a system and the distribution of the mass of different species over time and space in such a system also when chemical reactions are present the purpose of such computations is to understand and possibly design or control such a system some usual phenomenon of mass transfer processes are the evaporation of water from a pond to the atmosphere the purification of blood in the kidneys and liver and the distillation of alcohol in industrial processes mass transfer operations include separation of chemical components in distillation columns mass transfer is frequently attached to additional transport processes such as in industrial cooling towers these towers combine heat transfer to mass transfer by sanctioning hot water to flow in dealings with hotter air and evaporate as it grips heat from the air this book entitled mass transfer in chemical engineering processes compromises several approaches in solving mass transfer

problems for different practical chemical engineering applications the book should be of great importance to its readers with interesting ideas and inspirations or direct solutions of their particular problems

this comprehensive text on the basics of heat and mass transfer provides a well balanced treatment of theory and mathematical and empirical methods used for solving a variety of engineering problems the book helps students develop an intuitive and practical understanding of the processes by emphasizing the underlying physical phenomena involved focusing on the requirement to clearly explain the essential fundamentals and impart the art of problem solving the text is written to meet the needs of undergraduate students in mechanical engineering production engineering industrial engineering auto mobile engineering aeronautical engineering chemical engineering and biotechnology

mass transfer operations are of great importance in a process industry as it has a direct impact on the cost of the final product a chemical process engineer therefore should have sound knowledge of the basics of mass transfer and its applications this book is designed to equip the reader with sufficient knowledge of mass transfer operations and face the challenges ahead the objective of this textbook is to teach a budding chemical engineer the principles involved in analyzing a process and apply the desired mass transfer operation to separate the components involved it deals with operations involving diffusion interphase mass transfer humidification drying crystallization absorption distillation extraction leaching and adsorption the principles and equipment used for different mass transfer operations have been lucidly explained designed for a two semester course this text is primarily intended for the undergraduate students of chemical pharmaceutical petrochemical engineering as well as biotechnology and industrial biotechnology it will also be useful to plant engineers and design professionals key features 1 explains the theoretical concepts with full derivation of equations 2 illustrates the application of theory through worked out numerical examples 3 provides exercise problems with answers at the end of each chapter for practice

an invaluable guide for problem solving in mass transfer operations this book takes a highly pragmatic approach to providing the principles and applications of mass transfer operations by offering a valuable easily accessible guide to solving engineering problems both traditional and novel mass transfer processes receive treatment as with all of the books in this series emphasis is placed on an example based approach to illustrating key engineering concepts the book is divided into two major parts it starts with the principles underlying engineering problems showing readers how to apply general engineering principles to the topic of mass transfer operations it then goes on to provide step by step guidance

for traditional mass transfer operations including distillation absorption and stripping and adsorption plus novel mass transfer processes essential topics for professional engineering exams are also covered geared towards chemical environmental civil and mechanical engineers working on real world industrial applications mass transfer operations for the practicing engineer features numerous sample problems and solutions with real world applications clear precise explanations on how to carry out the basic calculations associated with mass transfer operations coverage of topics from the ground up for readers without prior knowledge of the subject overview of topics relevant to the abet accreditation board for engineering and technology for those taking the professional engineering pe exams appendix containing relevant mass transfer operation charts and tables

a thorough introduction to the fundamentals and applications of microscopic and macroscopic mass transfer

addresses the use of rigorous multicomponent mass transfer models for the simulation and design of process equipment deals with the basic equations of diffusion in multicomponent systems describes various models and estimations of rates of mass and energy transfer covers applications of multicomponent mass transfer models to process design includes appendices providing necessary mathematical background contains a large number of numerical examples worked out in detail

this book presents a new computational methodology called computational mass transfer cmt it offers an approach to rigorously simulating the mass heat and momentum transfer under turbulent flow conditions with the help of two newly published models namely the $c_2 - c$ model and the reynolds mass flux model especially with regard to predictions of concentration temperature and velocity distributions in chemical and related processes the book will also allow readers to understand the interfacial phenomena accompanying the mass transfer process and methods for modeling the interfacial effect such as the influences of marangoni convection and rayleigh convection the cmt methodology is demonstrated by means of its applications to typical separation and chemical reaction processes and equipment including distillation absorption adsorption and chemical reactors professor kuo tsong yu is a member of the chinese academy of sciences dr xigang yuan is a professor at the school of chemical engineering and technology tianjin university china

book presents mass transfer fundamentals in easily understandable form using worked examples to illustrate basic

concepts and calculations

in recent years the subject of mass transfer has been treated as a minor player in the larger field of transport phenomena and taken a back seat to its more mature brother heat transfer yet mass transfer is sufficiently mature as a discipline and sufficiently distinct from other transport processes to merit a separate treatment particularly one that does not overwhelm readers with an abundance of high level mathematics mass transfer principles and applications takes an integrated approach that uses a wealth of real world examples organizes the material according to mode of operation and highlights the importance of modeling the author begins by introducing diffusion rates fick s law film theory and mass transfer coefficients then develops these concepts in complementary stages the treatment of phase equilibria covers topics generally not addressed in thermodynamics courses and these concepts are then used to analyze compartmental models and staged processes as well as continuous contact operations the final chapter offers a concise survey of simultaneous mass and heat transfer throughout the book discussions transition smoothly between theory and practice and clearly reflect the author s many years of engineering experience and the breadth of mass transfer applications mass transfer principles and applications is a unique and accessible treatment of this relatively complicated topic that will fill a significant gap as both a textbook and professional reference

this didactic approach to the principles and modeling of mass transfer as it is needed in modern industrial processes is unique in combining a step by step introduction to all important fundamentals with the most recent applications based upon the renowned author s successful new modeling method as used for the o 18 process the exemplary exercises included in the text are fact proven taken directly from existing chemical plants fascinating reading for chemists graduate students chemical and process engineers as well as thermodynamics physicists

mass transfer complements the third edition of heat transfer by a f mills and c f m coimbra temporal publishing 2016 it is a revised updated and expanded version of the 2nd edition of mass transfer by a f mills prentice hall 2001 this book is a suitable text for undergraduate or graduate level courses on mass transfer for engineering

fundamentals of heat and mass transfer 7th edition is the gold standard of heat transfer pedagogy for more than 30 years with a commitment to continuous improvement by four authors having more than 150 years of combined experience in heat transfer education research and practice using a rigorous and systematic problem solving

methodology pioneered by this text it is abundantly filled with examples and problems that reveal the richness and beauty of the discipline this edition maintains its foundation in the four central learning objectives for students and also makes heat and mass transfer more approachable with an additional emphasis on the fundamental concepts as well as highlighting the relevance of those ideas with exciting applications to the most critical issues of today and the coming decades energy and the environment an updated version of interactive heat transfer iht software makes it even easier to efficiently and accurately solve problems

a textbook of heat and mass transfer is a comprehensive textbook for the students of mechanical engineering and a must buy for the aspirants of different entrance examinations including gate and upsc divided into 4 parts the book delves into the subject beginning from basic concepts and goes on to discuss heat transfer by convection and radiation and mass transfer the book also becomes useful as a question bank for students as it offers university as well as entrance exam questions with solutions

our knowledge of mass transfer processes has been extended and applied to various fields of science and engineering including industrial processes in recent years since mass transfer is primordial phenomenon it plays a key role in the scientific researches and fields of mechanical energy environmental materials bio and chemical engineering in this book energetic authors especially provide advances in scientific findings and technologies and develop new theoretical models concerning mass transfer for sustainable energy and environment this book brings valuable references for research engineers working in the variety of mass transfer sciences and related fields since the constitutive topics cover the advances in broad research areas the topics will be mutually stimulus and informative not only to research engineers but also to university professors and students

in a simple and systematic manner this book presents an exhaustive account of various mass transfer operations involved in chemical engineering emphasising the basic concepts and techniques the book discusses in detail material and energy balances distillation absorption and stripping and extraction the book also explains the relevant aspects of equipment design recent developments like permeation ion exchange and froth floatation have also been discussed a large number of digital computer programs are included to illustrate computer aided techniques several solved examples and practice problems are presented in each chapter to illustrate the theory with all these features this is an ideal text for undergraduate chemical engineering students practising engineers and students of pharmacy and metallurgy would also

find the book a useful reference source

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