

Particle-particle Adhesion in Pharmaceutical Powder Handling



Fridrun Podczeck

Imperial College Press

Particle Particle Adhesion In Pharmaceutical Powder Handling

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Particle Particle Adhesion In Pharmaceutical Powder Handling:

Particle-particle Adhesion In Pharmaceutical Powder Handling Fridrun Podczec, 1998-07-31 This monograph describes the physical principles of adhesion between particles and surfaces These principles are applied to pharmaceutical processes involved in the manufacture of solid dosage forms such as powders granules tablets and dry powder inhalations To help in the understanding of these systems physical properties of solid surfaces and an introduction to the theory of friction is given Techniques for measuring particle adhesion and fracture mechanical properties of powders are introduced as far as these are relevant to the processes discussed The philosophy of the book deviates from that of standard pharmaceutical textbooks in that it focuses primarily on physical principles involved in the manufacture of dosage forms rather than describing these processes purely by observation

Particle Adhesion and Removal K. L. Mittal, Ravi Jaiswal, 2015-01-06 The book provides a comprehensive and easily accessible reference source covering all important aspects of particle adhesion and removal The core objective is to cover both fundamental and applied aspects of particle adhesion and removal with emphasis on recent developments Among the topics to be covered include 1 Fundamentals of surface forces in particle adhesion and removal 2 Mechanisms of particle adhesion and removal 3 Experimental methods e g AFM SFA SFM IFM etc to understand particle particle and particle substrate interactions 4 Mechanics of adhesion of micro and nanoscale particles 5 Various factors affecting particle adhesion to a variety of substrates 6 Surface modification techniques to modulate particle adhesion 7 Various cleaning methods both wet dry for particle removal 8 Relevance of particle adhesion in a host of technologies ranging from simple to ultra sophisticated

Particles on Surfaces: Detection, Adhesion and Removal, Volume 7 Kash L. Mittal, 2023-01-06 This volume documents the proceedings of the 7th International Symposium on Particles on Surfaces Detection Adhesion and Removal held in Newark NJ June 19 21 2000 The study of particles on surfaces is extremely important in a host of diverse technological areas ranging from microelectronics to optics to biomedical This volume contains a total of 28 papers which were all properly peer reviewed revised and edited before inclusion Therefore this book is not merely a collection of unreviewed manuscripts but rather represents information which has passed peer scrutiny Furthermore the authors were asked to update their manuscripts so the information contained in this book should be current and fresh This volume is divided into two parts 1 Particle Analysis and General Cleaning Related Topics and 2 Particle Adhesion and Removal The topics covered include surface analysis techniques for particle identification cleaning rinsing and drying issues in post CMP cleaning fundamental forces involved in particle adhesion factors affecting adhesion of small nanosize particles factors important in particle detachment particle adhesion measurement by AFM various wet and dry techniques for particle removal e g laser ultrasonic megasonic use of surfactants toner particles and pharmaceutical particles This volume offers a wealth of information on the tremendously technologically important field of particles on surfaces and should provide a consolidated source of current R D activity in this arena Therefore it will be of value and use to anyone

interested in the topic of particles on surfaces *Predictive Modeling of Pharmaceutical Unit Operations* Preetanshu Pandey,Rahul Bharadwaj,2016-09-26 The use of modeling and simulation tools is rapidly gaining prominence in the pharmaceutical industry covering a wide range of applications This book focuses on modeling and simulation tools as they pertain to drug product manufacturing processes although similar principles and tools may apply to many other areas Modeling tools can improve fundamental process understanding and provide valuable insights into the manufacturing processes which can result in significant process improvements and cost savings With FDA mandating the use of Quality by Design QbD principles during manufacturing reliable modeling techniques can help to alleviate the costs associated with such efforts and be used to create in silico formulation and process design space This book is geared toward detailing modeling techniques that are utilized for the various unit operations during drug product manufacturing By way of examples that include case studies various modeling principles are explained for the nonexpert end users A discussion on the role of modeling in quality risk management for manufacturing and application of modeling for continuous manufacturing and biologics is also included Explains the commonly used modeling and simulation tools Details the modeling of various unit operations commonly utilized in solid dosage drug product manufacturing Practical examples of the application of modeling tools through case studies Discussion of modeling techniques used for a risk based approach to regulatory filings Explores the usage of modeling in upcoming areas such as continuous manufacturing and biologics manufacturingBullet points *A Guide to Particulate Science in Pharmaceutical Product Development* Margaret D. Louey,Timothy M. Crowder,Anthony J. Hickey,2025-08-04 The pharmaceutical applications of powder technology have long been recognized Yet while many books focus on aspects of powder formation and behavior there are few texts that explore the power of particulate science in the design manufacture and control of quality medicines This revision discusses key principles and practical applications The authors cover particulate material its form and production sampling from bodies of powder particle size descriptors and statistics behavior of particles and powder instrumental analysis particle size measurement and synergy of adopted techniques and in vitro and in vivo performance criteria Case studies are included in this new edition This fully revised edition Provides an essential account of particulate science including several new chapters on multicomponent particles regulatory considerations and product development Presents a variety of topics ranging from the quality of published data on particle size in pharmaceuticals to the future of crystal engineering Reviews methods of particle measurement and their importance for specific applications Discusses misconceptions and misunderstandings of particulate science together with lessons from other industries *Pharmaceutical Inhalation Aerosol Technology, Second Edition* Anthony J. Hickey,2003-09-03 This thoroughly revised and expanded reference provides authoritative discussions on the physiologic pharmacologic metabolic molecular cellular and physicochemical factors influencing the efficacy and utilization of pharmaceutical aerosol It analyzes the latest science and developments in the generation administration and characterization

of these compounds showcasing current clinical applications the efficiency and limitations of major aerosol products and emerging aerosol therapies impacting the field *Nanotechnology in Australia* Deborah M. Kane,Adam Micolich,James Rabeau,2011-07-11 This book reports current nanotechnology research from Australia in addition to being the first trial of a new workshop program for the professional development of early career researchers ECRs including research students It showcases the professional talents and high quality writing of ECRs and also describes the workshop program organized under the auspices of the Australian Research Council Nanotechnology Network designed to facilitate this The nanotechnology research topics include plasmonics the building blocks of plasmonic circuits the use of metal nanoparticles to improve infrared light trapping in solar cell applications methods for the bulk synthesis of graphene synthesis of nanorods of vanadium compounds for energy storage nanodiamonds superparamagnetic nanoparticles and synthesis of hollow nanostructured silica along with a discussion of their applications molecular dynamics modelling of self cleaning coatings metal nanostructure enhanced fluorescence and its biological applications luminescent nano bioprobes for bioassays and bioimaging biomimicry leading to olfactory nano biosensors and superparamagnetic nanoparticles as MRI contrast agents

Handbook of Polymers for Pharmaceutical Technologies, Processing and Applications Vijay Kumar Thakur,Manju Kumari Thakur,2015-08-04 Polymers are one of the most fascinating materials of the present era finding their applications in almost every aspects of life Polymers are either directly available in nature or are chemically synthesized and used depending upon the targeted applications Advances in polymer science and the introduction of new polymers have resulted in the significant development of polymers with unique properties Different kinds of polymers have been and will be one of the key in several applications in many of the advanced pharmaceutical research being carried out over the globe This 4 partset of books contains precisely referenced chapters emphasizing different kinds of polymers with basic fundamentals and practicality for application in diverse pharmaceutical technologies The volumes aim at explaining basics of polymers based materials from different resources and their chemistry along with practical applications which present a future direction in the pharmaceutical industry Each volume offer deep insight into the subject being treated Volume 1 Structure and Chemistry Volume 2 Processing and Applications Volume 3 Biodegradable Polymers Volume 4 Bioactive and Compatible Synthetic Hybrid Polymers *Handbook of Lung Targeted Drug Delivery Systems* Yashwant Pathak,Nazrul Islam,2021-10-17

Handbook of Lung Targeted Drug Delivery Systems Recent Trends and Clinical Evidences covers every aspect of the drug delivery to lungs the physiology and pharmacology of the lung modelling for lung delivery drug devices focused on lung treatment regulatory requirements and recent trends in clinical applications With the advent of nano sciences and significant development in the nano particulate drug delivery systems there has been a renewed interest in the lung as an absorption surface for various drugs The emergence of the COVID 19 virus has brought lung and lung delivery systems into focus this book covers new developments and research used to address the prevention and treatment of respiratory diseases Written by

well known scientists with years of experience in the field this timely handbook is an excellent reference book for the scientists and industry professionals

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- Explores drug devices focused on lung treatment regulatory requirements and recent trends in clinical applications
- Examines specific formulations targeted to pulmonary systems

Aulton's
Pharmaceutics E-Book Kevin M.G. Taylor, Michael E. Aulton, 2021-04-23

The essential pharmaceutics textbook One of the world's best known texts on pharmaceutics Aulton's Pharmaceutics offers a complete course in one book for students in all years of undergraduate pharmacy and pharmaceutical sciences degrees Thoroughly revised updated and extended by experts in their fields and edited by Professors Kevin Taylor and Michael Aulton this new edition includes the science of formulation pharmaceutical manufacturing and drug delivery All aspects of pharmaceutics are covered in a clear and readily accessible way and extensively illustrated throughout providing an essential companion to the entire pharmaceutics curriculum from day one until the end of the course Fully updated throughout with the addition of new chapters to reflect advances in formulation and drug delivery science pharmaceutical manufacturing and medicines regulation Designed and written for newcomers to the design and manufacture of dosage forms Relevant pharmaceutical science covered throughout Includes the science of formulation and drug delivery Reflects current practices and future applications of formulation and drug delivery science to small drug molecules biotechnology products and nanomedicines Key points boxes throughout Over 400 online multiple choice questions

Chemical Engineering in the Pharmaceutical Industry Mary T. am Ende, David J. am Ende, 2019-04-09

A guide to the important chemical engineering concepts for the development of new drugs revised second edition The revised and updated second edition of Chemical Engineering in the Pharmaceutical Industry offers a guide to the experimental and computational methods related to drug product design and development The second edition has been greatly expanded and covers a range of topics related to formulation design and process development of drug products The authors review basic analytics for quantitation of drug product quality attributes such as potency purity content uniformity and dissolution that are addressed with consideration of the applied statistics process analytical technology and process control The 2nd Edition is divided into two separate books 1 Active Pharmaceutical Ingredients API's and 2 Drug Product Design Development and Modeling The contributors explore technology transfer and scale up of batch processes that are exemplified experimentally and computationally Written for engineers working in the field the book examines in silico process modeling tools that streamline experimental screening approaches In addition the authors discuss the emerging field of continuous drug product manufacturing This revised second edition Contains 21 new or revised chapters including chapters on quality by design computational approaches for drug product modeling process design with PAT and process control engineering challenges and solutions Covers chemistry and engineering activities related to dosage form

design and process development and scale up Offers analytical methods and applied statistics that highlight drug product quality attributes as design features Presents updated and new example calculations and associated solutions Includes contributions from leading experts in the field Written for pharmaceutical engineers chemical engineers undergraduate and graduation students and professionals in the field of pharmaceutical sciences and manufacturing Chemical Engineering in the Pharmaceutical Industry Second Edition contains information designed to be of use from the engineer's perspective and spans information from solid to semi solid to lyophilized drug products

Multiphase Flow with Solid Particles Pawel Kosinski, 2023-10-19 Multiphase flow is an area of fluid dynamics that describes interactions between two or more phases of matter and is relevant across a wide range of industrial processes and natural environmental systems from the transport of natural resources to volcanic ash flow This book covers the topic in detail providing clear explanations of the underlying physics behind the complex behaviour of solid particles in fluids The forces involved in particle fluid interactions are first used to describe the interactions between the particles and the fundamentals of contact mechanics are then outlined and applied to model interparticle collisions The book is illustrated with frequent worked examples and algorithms enabling the reader to develop the required tools for simulating the flow of fluids with solid particles This contained text will appeal to physicists applied mathematicians and mechanical engineers working in this important area of research

Pharmaceutical Blending and Mixing P. J. Cullen, Rodolfo J. Románach, Nicolas Abatzoglou, Chris D. Rielly, 2015-05-11 Written in four parts this book provides a dedicated and in depth reference for blending within the pharmaceutical manufacturing industry It links the science of blending with regulatory requirements associated with pharmaceutical manufacture The contributors are a combination of leading academic and industrial experts who provide an informed and industrially relevant perspective of the topic This is an essential book for the pharmaceutical manufacturing industry and related academic researchers in pharmaceutical science and chemical and mechanical engineering

Particulate Products Henk G. Merkus, Gabriel M.H. Meesters, 2013-11-19 Particulate products make up around 80% of chemical products from all industry sectors Examples given in this book include the construction materials fine ceramics and concrete the delicacies chocolate and ice cream pharmaceutical powders medical inhalers and sun screen liquid and powder paints Size distribution and the shape of the particles provide for different functionalities in these products Some functions are general others specific General functions are powder flow and require at the typical particulate concentrations of these products that the particles cause adequate rheological behavior during processing and or for product performance Therefore this book addresses particle packing as well as its relation to powder flow and rheological behavior Moreover general relationships to particle size are discussed for e.g. color and sensorial aspects of particulate products Product specific functionalities are often relevant for comparable product groups Particle size distribution and shape provide for example the following functionalities dense particle packing in relation to sufficient strength is required in concrete construction ceramic objects and pharmaceutical tablets good

sensorial properties mouthfeel to chocolate and ice cream effective dissolution flow and compression properties for pharmaceutical powders adequate hiding power and effective coloring of paints for protection and the desired esthetical appeal of the objects adequate protection of our body against sun light by sunscreen effective particle transport and deposition to desired locations for medical inhalers and powder paints Adequate particle size distribution shape and porosity of particulate products have to be achieved in order to reach optimum product performance This requires adequate management of design and development as well as sufficient knowledge of the underlying principles of physics and chemistry Moreover flammability explosivity and other health hazards from powders during handling are taken into account This is necessary since great risks may be involved In all aspects the most relevant parameters of the size distribution and particle shape have to be selected In this book experts in the different product fields have contributed to the product chapters This provides optimum information on what particulate aspects are most relevant for behavior and performance within specified industrial products and how optimum results can be obtained It differs from other books in the way that the critical aspects of different products are reported so that similarities and differences can be identified We trust that this approach will lead to improved optimization in design development and quality of many particulate products

Thermodynamics for Drug Product Design William Craig Stagner, 2025-10-14 Comprehensive reference reviewing how thermodynamic principles underpin the design of drug products and their applications Written in an easy to read and understand style Thermodynamics for Drug Product Design offers an abundance of real life drug product design examples applications personal anecdotes and solved problems that contextualize thermodynamic principles for the drug product design scientist Advanced undergraduate and beginning graduate students will learn to apply thermodynamic principles to create robust drug products and to predict prevent analyze and evaluate the root cause of product failures Professionals engaged in drug product design will find this book to be a rich and easy to use reference guide The first two chapters address some key basics of data reporting and analysis math and thermodynamic properties using simple and accessible language These chapters also help readers understand fundamental underlying definitions and physical relationships required to use thermodynamic laws in the design of drug products In later chapters the book focuses on six industrial pharmacy relevant thermodynamic topics the laws of thermodynamics Gibbs free energy equilibrium drug solubility equilibrium surface thermodynamics and adsorption phenomena Thermodynamics for Drug Product Design features chapters including Data Reporting and Analysis Underlying Thermodynamic Physical Property Relationships and Definitions The Laws of Thermodynamics Gibbs Free Energy Equilibrium Drug Solubility Equilibrium Surface Thermodynamics Adsorption Phenomena What others say comprehensive rigorous and logically organized the explanations flow effortlessly from the page BRUNO HANCOCK PhD FAAPS Editor JPharmSci has a unique style of communicating complex scientific issues KEN MORRIS PhD FAAPS Professor Emeritus Founding Director Lachman Institute unusual wide range of subjects unusual for detail DALE ERIC WURSTER PhD FAAPS

Professor Emeritus 2019 AAPS President Modern Pharmaceutics Gilbert S. Banker, Juergen Siepmann, Christopher Rhodes, 2002-05-24 Completely revised and expanded throughout Presents a comprehensive integrated sequenced approach to drug dosage formulation design and evaluation Identifies the pharmacodynamic and physicochemical factors influencing drug action through various routes of administration **Inhalation Drug Delivery** Paolo Colombo, Daniela Traini, Francesca Buttini, 2013-02-11 There has been a rapid evolution in the field of inhalation drug therapy including new drugs increased regulation and quality control and strong pressure from generics Inhalation Drug Therapy brings together the most current inhalation drug research as well as practical developments and processes into one essential guide Focusing on inhalation products and specific equipment and techniques used in manufacturing and quality control the book balances research with the industrial aspects of creating the drugs and features a highly regarded author team with both academic and industry experience **Dosage Form Design Parameters** , 2018-07-25 Dosage Form Design Parameters Volume II examines the history and current state of the field within the pharmaceutical sciences presenting key developments Content includes drug development issues the scale up of formulations regulatory issues intellectual property solid state properties and polymorphism Written by experts in the field this volume in the Advances in Pharmaceutical Product Development and Research series deepens our understanding of dosage form design parameters Chapters delve into a particular aspect of this fundamental field covering principles methodologies and the technologies employed by pharmaceutical scientists In addition the book contains a comprehensive examination suitable for researchers and advanced students working in pharmaceuticals cosmetics biotechnology and related industries Examines the history and recent developments in drug dosage forms for pharmaceutical sciences Focuses on physicochemical aspects preformulation solid state properties and polymorphism Contains extensive references for further discovery and learning that are appropriate for advanced undergraduates graduate students and those interested in drug dosage design Pharmaceutical Process Engineering Anthony J. Hickey, David Ganderton, 2016-03-09 With step by step methods of drug production and knowledge of major unit operations and key concepts of pharmaceutical engineering this guide will help to improve communication among the varied professionals working in the pharmaceutical industry Key features REVISION OF A BESTSELLER Updates include recent advances in the field to keep pharmac Simulations in Bulk Solids Handling Don McGlinchey, 2023-01-30 Simulations in Bulk Solids Handling Valuable resource for engineers and professionals dealing with bulk granular or powdered materials across industries using Discrete Element Methods DEM In many traditional university engineering programmes no matter whether undergraduate or postgraduate the behavior of granular materials is not covered in depth or at all This omission leaves recent engineering graduates with little formal education in the major industrial area of bulk solids handling This book teaches young professionals and engineers to find appropriate solutions for handling granular and powdered materials It also provides valuable information for experienced engineers to gain an understanding and appreciation of the most significant

simulation methods DEM chief amongst them For any student or professional involved with bulk solids handling this book is a key resource to understand the most efficient and effective stimulation methods that are available today Its comprehensive overview of the topic allows for upcoming professionals to ensure they have adequate knowledge in the field and for experienced professionals to improve their skills and processes

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