

STUDIES IN
INTERFACE
SCIENCE

10

SERIES
EDITORS:
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Particles at Fluid Interfaces and Membranes

Attachment of Colloid Particles and
Proteins to Interfaces
and Formation of
Two-Dimensional Arrays

Peter A. Kralchevsky and
Kuniaki Nagayama

ELSEVIER

Particles At Fluid Interfaces And Membranes Volume 10

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Particles At Fluid Interfaces And Membranes Volume 10:

Particles at Fluid Interfaces and Membranes P. Kralchevsky, K. Nagayama, 2001-01-22 In the small world of micrometer to nanometer scale many natural and industrial processes include attachment of colloid particles solid spheres liquid droplets gas bubbles or protein macromolecules to fluid interfaces and their confinement in liquid films This may lead to the appearance of lateral interactions between particles at interfaces or between inclusions in phospholipid membranes followed eventually by the formation of two dimensional ordered arrays The book is devoted to the description of such processes their consecutive stages and to the investigation of the underlying physico chemical mechanisms The first six chapters give a concise but informative introduction to the basic knowledge in surface and colloid science which includes both traditional concepts and some recent results Chapters 1 and 2 are devoted to the basic theory of capillarity kinetics of surfactant adsorption shapes of axisymmetric fluid interfaces contact angles and line tension Chapters 3 and 4 present a generalization of the theory of capillarity to the case in which the variation of the interfacial membrane curvature contributes to the total energy of the system The generalized Laplace equation is applied to determine the configurations of free and adherent biological cells Chapters 5 and 6 are focused on the role of thin liquid films and hydrodynamic factors in the attachment of solid and fluid particles to an interface Surface forces of various physical nature are presented and their relative importance is discussed Hydrodynamic interactions of a colloidal particle with an interface or another particle are also considered Chapters 7 to 10 are devoted to the theoretical foundation of various kinds of capillary forces When two particles are attached to the same interface membrane capillary interactions mediated by the interface or membrane appear between them Two major kinds of capillary interactions are described i capillary immersion force related to the surface wettability Chapter 7 ii capillary flotation force originating from interfacial deformations due to particle weight Chapter 8 Special attention is paid to the theory of capillary immersion forces between particles entrapped in spherical liquid films Chapter 9 A generalization of the theory of immersion forces allows one to describe membrane mediated interactions between protein inclusions into a lipid bilayer Chapter 10 Chapter 11 is devoted to the theory of the capillary bridges and the capillary bridge forces whose importance has been recognized in phenomena like consolidation of granules and soils wetting of powders capillary condensation long range hydrophobic attraction etc The nucleation of capillary bridges is also examined Chapter 12 considers solid particles which have an irregular wetting perimeter upon attachment to a fluid interface The undulated contact line induces interfacial deformations which engender a special lateral capillary force between the particles The latter contributes to the dilatational and shear elastic moduli of particulate adsorption monolayers Chapter 13 describes how lateral capillary forces facilitated by convective flows and some specific and non specific interactions can lead to the aggregation and ordering of various particles at fluid interfaces or in thin liquid films Recent results on fabricating two dimensional 2D arrays from micrometer and sub micrometer latex particles as well as 2D crystals from proteins and protein

complexes are reviewed Chapter 14 presents applied aspects of the particle surface interaction in antifoaming and defoaming The mechanisms of antifoaming action involve as a necessary step the entering of an antifoam particle at the air water interface The considered mechanisms indicate the factors for control of foaminess

Interfacial Separation of Particles Shouci Lu,Robert J Pugh,Eric Forssberg,2005-01-25 Interfacial Separation of Particles is concerned with the processing and separation of fine solid particles in liquid solutions using interfacial technology Interfacial separation has been finding wide application in many industrial fields such as pigment and filler production mineral processing environmental protection hydrometallurgy bioengineering food and beverage industry and chemical industry This book describes all interfacial separation techniques and discusses the general and specific fundamentals of the techniques The book intends to promote theoretical understanding and the more promising developments of interfacial separation technology whilst broadening the reader s background knowledge of industrial suspensions Is clearly written based on strong systematic science fundamentals Provides comprehensive coverage on particle technology mineral processing and water treatment Includes practical examples from the different industrial fields

Transport Mediated by Electrified Interfaces ,2003-08-14 Transport Mediated by Electrified Interfaces provides an overview of the innovative use of electro kinetic phenomena in experimentally exploring non equilibrium regions of chemically non reacting systems Transport phenomena mediated by charged liquid liquid interfaces and solid liquid interfaces are also covered Transport phenomena mediated by electrified interfaces are discussed in the context of a number of important areas including soil water systems phase transfer catalysis animal plant physiology and mimicking taste smell sensing mechanisms Provides an overview of the innovative use of electro kinetic phenomena Discusses conventional electro kinetics and other transport phenomena mediated by charged interfaces Of special interest to those working in the area of interface science

Surface Activity in Drug Action ,2005-03-01 Surface activity is present in living systems for example in body fluid or cell soup and molecules of surface active nature are crucial to living matter and its organization Surface Activity in Drug Action proposes a liquid membrane hypothesis of drug action for surface active drugs Chapters 1 7 contains an account of the hypothesis and chapter 8 contains a general account of the application of surface activity in therapeutics The methodology and presentation of the information makes Surface Activity in Drug Action valuable reading for students and researchers interested in surface activity Is clearly written Includes contributions from prominent names in the field such as Bhise and Subrahmanyam Contains a general account of the application of surface activity in therapeutics

Stable-Nanoemulsions Joseph D'Arrigo,2011-06-02 Covers the underlying chemical and biochemical principles of stable lipid nanoemulsions as well as many potential applications in nanomedicine such as targeted chemotherapy

Robotic Microassembly Michael Gauthier,Stephane Regnier,2011-01-14 Discover the latest models and methods for robotic microassembly from around the world This book presents and analyzes new and emerging models and methods developed around the world for robotic microassembly a new and innovative way to produce

better microsystems By exploring everything from the physics of micromanipulation to microassembly to microhandling it provides the first complete overview and review of this rapidly growing field Robotic Microassembly is divided into three parts Part One Modeling of the Microworld Part Two Handling Strategies Part Three Robotic and Microassembly Together these three parts feature eight chapters contributed by eight different authors The authors internationally recognized experts in the field of robotic microassembly represent research laboratories in Asia Europe and North America As a result readers get a remarkable perspective on different approaches to robotic microassembly from around the world Examples provided throughout the chapters help readers better understand how these different approaches work in practice References at the end of each chapter lead to the primary literature for further investigation of individual topics Robotic microassembly offers a new improved way to manufacture high performance microelectro mechanical systems MEMS Therefore any professional or student involved in microrobotics micromechatronics self assembly or MEMS will find plenty of novel ideas and methods in this book that set the stage for new approaches to design and build the next generation of MEMS and microproducts

Characterization of Liquids, Nano- and Microparticulates, and Porous Bodies using Ultrasound Andrei S. Dukhin, Philip J. Goetz, 2010-06-03 Two key words define the scope of this book ultrasound and colloids Historically there has been little real communication between practitioners in these two fields Although there is a large body of literature devoted to ultrasound phenomenon in colloids there is little recognition that such phenomena may be of real importance for both the development and applications of colloid science On the other side colloid scientists have not embraced acoustics as an important tool for characterizing colloids The lack of any serious dialogue between these scientific fields is the biggest motivation behind this book Covers in detail this multidisciplinary field combining acoustics electroacoustics colloid science analytical chemistry and rheology Provides a bibliography with more than 1 000 references Presents theories and their experimental verification as well as analysis of the methods and hardware pertaining to applications such as pharmaceuticals ceramics and polymers

Encyclopedia of Surface and Colloid Science P. Somasundaran, 2006 **Proceedings** ,2005 **The Journal of the Acoustical Society of America** Acoustical Society of America, 2005 *Japanese Journal of Applied Physics* ,2008 *JJAP* ,2008 *Journal of Polymer Engineering* ,1999 **Bottom-up Nanofabrication: Organized films** Katsuhiko Ariga, Hari Singh Nalwa, 2009 **The Canadian Journal of Chemical Engineering** ,2007-08 **Handbook of Surfaces and Interfaces of Materials: Nanostructured materials, micelles and colloids** Hari Singh Nalwa, 2001 This handbook brings together under a single cover all aspects of the chemistry physics and engineering of surfaces and interfaces of materials currently studied in academic and industrial research It covers different experimental and theoretical aspects of surfaces and interfaces their physical properties and spectroscopic techniques that have been applied to a wide class of inorganic organic polymer and biological materials The diversified technological areas of surface science reflect the explosion of scientific information on surfaces and interfaces of materials and their spectroscopic characterization The large volume of

experimental data on chemistry physics and engineering aspects of materials surfaces and interfaces remains scattered in so many different periodicals therefore this handbook compilation is needed The information presented in this multivolume reference draws on two decades of pioneering research on the surfaces and interfaces of materials to offer a complete perspective on the topic These five volumes Surface and Interface Phenomena Surface Characterization and Properties Nanostructures Micelles and Colloids Thin Films and Layers Biointerfaces and Applications provide multidisciplinary review chapters and summarize the current status of the field covering important scientific and technological developments made over past decades in surfaces and interfaces of materials and spectroscopic techniques with contributions from internationally recognized experts from all over the world Fully cross referenced this book has clear precise and wide appeal as an essential reference source long due for the scientific community The complete reference on the topic of surfaces and interfaces of materials The information presented in this multivolume reference draws on two decades of pioneering research Provides multidisciplinary review chapters and summarizes the current status of the field Covers important scientific and technological developments made over past decades in surfaces and interfaces of materials and spectroscopic techniques Contributions from internationally recognized experts from all over the world *International Journal of Turbo & Jet-engines* ,1998 **Proceedings of the ASME Heat Transfer Division** ,2002 Wiley Encyclopedia of Chemical Biology, Volume 2 Tadhg P. Begley,2009-02-03 The first major reference at the interface of chemistry biology and medicine Chemical biology is a rapidly developing field that uses the principles tools and language of chemistry to answer important questions in the life sciences It has enabled researchers to gather critical information about the molecular biology of the cell and is the fundamental science of drug discovery playing a key role in the development of novel agents for the prevention diagnosis and treatment of disease Now students and researchers across the range of disciplines that use chemical biology techniques have a single resource that encapsulates what is known in the field It is an excellent place to begin any chemical biology investigation Major topics addressed in the encyclopedia include Applications of chemical biology Biomolecules within the cell Chemical views of biology Chemistry of biological processes and systems Synthetic molecules as tools for chemical biology Technologies and techniques in chemical biology Some 300 articles range from pure basic research to areas that have immediate applications in fields such as drug discovery sensor technology and catalysis Novices in the field can turn to articles that introduce them to the basics whereas experienced researchers have access to articles exploring the cutting edge of the science Each article ends with a list of references to facilitate further investigation With contributions from leading researchers and pioneers in the field the Wiley Encyclopedia of Chemical Biology builds on Wiley s unparalleled reputation for helping students and researchers understand the crucial role of chemistry and chemical techniques in the life sciences **The British National Bibliography** Arthur James Wells,2001

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