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35: Injection grouting for delaminated wall paintings (Conservation Insights 2020)~~Particles At Fluid Interfaces And~~

Editorial on the Research TopicParticles at Fluid Interfaces. The research topic Particles at Fluid Interfaces encompasses the industrial processes and product formulations that involve the stabilization of fluid interfaces by adsorbed particles. The prevalence of these multiphase materials underpins their use in a broad range of industries from personal care and food technology to oil and mineral processing.

~~Frontiers | Editorial: Particles at Fluid Interfaces ...~~

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Synopsis: 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 ...

~~Particles at Fluid Interfaces and Membranes by Peter A ...~~

The adsorption of colloidal particles to fluid interfaces is a phenomenon that is of interest to multiple disciplines across the physical and biological sciences. In this review we provide an entry level discussion of our current understanding on the physical principles involved and experimental observations of the adsorption of a single isolated particle to a liquid – liquid interface.

~~Colloidal particles at fluid interfaces: behaviour of ...~~

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).

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particles at fluid interfaces and membranes volume 10 Sep 13, 2020 Posted By William Shakespeare Publishing TEXT ID 953ea2ac Online PDF Ebook Epub Library nagayama in studies in interface science 2001 221 meniscus meeting the axis of revolution the interfaces ur and vr in fig 23 belong to this type of menisci as well as the

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Selfassembly of ellipsoidal particles at fluidfluid interfaces with an empirical pair ... either solving an energy minimisation problem where the energy of the interface and particles is considered and generally consists of solving the Young-Laplace 3.

Selfassembly of ellipsoidal particles at fluidfluid ...
This Research Topic encompasses the processes and formulations that involve the stabilization of fluid interfaces by adsorbed particles. The prevalence of these multiphase materials underpins their use in a broad range of industries from personal care and food technology to oil and mineral processing. The stabilization conferred by the adsorbed particles can be transient, as found in froth ...

Particles at Fluid Interfaces | Frontiers Research Topic
Magnetic particles are model systems for exploring the adsorption at fluid-fluid interfaces. The confined dipolar particles form new static and dynamic assemblies. Dynamic assemblies can be used in the transport of adsorbed particles and molecules. Adsorbed magnetic particles are used as stabilizing agents in smart foams and emulsions.

Magnetic particles at fluid interfaces - ScienceDirect
Such particle assemblies at fluid interfaces can be transferred to solid surfaces to create new materials and structures. Deposition of aligned anisotropic particles such as nanowires from fluid interfaces has led to the manufacturing of interconnected and integrated field-effect transistors with high performance and scalability.

Fluid Interface - an overview | ScienceDirect Topics
Abstract. Soft particles can be better emulsifiers than hard particles because they stretch at fluid interfaces. This deformation can increase adsorption energies by orders of magnitude relative to rigid particles. The deformation of a particle at an interface is governed by a competition of bulk elasticity and surface tension.

Adsorption of soft particles at fluid interfaces - Soft ...
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Particles at Fluid Interfaces and Membranes: Volume 10 ...
Monday, June 11, 2018 — Room 205 Time Presentation 10:00 – 10:40 a.m. Fundamental aspects and applications of star polymer adsorption at fluid interfaces R. D. Tilton; Department of Chemical Engineering and Department of Biomedical Engineering, Carnegie Mellon University, Pittsburgh, PA. 10:40 – 11:00 a.m. Tears of Wine P. Rathore, C. Xu, V. Sharma; Chemical Engineering, University of ...

Molecules and Particles at Fluid Interfaces - ACS Colloid ...
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).

Particles at Fluid Interfaces and Membranes eBook by ...
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

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.

Particles at Fluid Interfaces encompasses the processes and formulations that involve the stabilisation of fluid interfaces by adsorbed particles. The prevalence of these multiphase materials underpins their use in a broad range of industries from personal care and food technology to oil and mineral processing. The stabilisation conferred by the adsorbed particles can be transient as found in froth flotation or long-lived as occurs within Pickering Emulsions. The particles can range in size from nanoparticles to millimetre-sized particles, and cover a spectrum from collapsed proteins, polymeric colloids of controlled size and shape to high dispersity mineral particles.

Anisotropic Particle Assemblies: Synthesis, Assembly, Modeling, and Applications covers the synthesis, assembly, modeling, and applications of various types of anisotropic particles. Topics such as chemical synthesis and scalable fabrication of colloidal molecules, molecular mimetic self-assembly, directed assembly under external fields, theoretical and numerical multi-scale modeling, anisotropic materials with novel interfacial properties, and the applications of these topics in renewable energy, intelligent micro-machines, and biomedical fields are discussed in depth. Contributors to this book are internationally known experts who have been actively studying each of these subfields for many years. This book is an invaluable reference for researchers and chemical engineers who are working at the intersection of physics, chemistry, chemical engineering, and materials science and engineering. It educates students, trains the next generation of researchers, and stimulates continuous development in this rapidly emerging area for new materials and innovative technologies. Provides comprehensive coverage on new developments in anisotropic particles Features chapters written by emerging and leading experts in each of the subfields Contains information that will appeal to a broad spectrum of professionals, including but not limited to chemical engineers, chemists, physicists, and materials scientists and engineers Serves as both a reference book for researchers and a textbook for graduate students

Particles floating on fluid-liquid interfaces are of considerable interest because of their importance in a range of physical applications and biological processes, e.g., self-- assembly of particles at fluid-fluid interfaces resulting in novel nano structured materials, stabilization of emulsions, formation of pollen and insect egg rafts, etc. The aim of this dissertation is to explore the mechanism by which particles are adsorbed at fluid-liquid interfaces. It is shown that the inertia of a particle plays an important role in its motion in the direction normal to a fluid-liquid interface, and in determining the particles adsorption trajectory and orientation in the adsorbed state. Although the importance of inertia diminishes with decreasing particle size, on an air-water interface the inertia continues to be important even when the particle size is as small as a few nanometers. This dissertation also investigates the vertical oscillations of a particle while it is being adsorbed on an interface. The fact that the particle oscillates vertically implies that its behavior is similar to that of an under-damped mass-spring-dashpot system, and that it has characteristic linear and rotational frequencies which depend on the physical properties of the fluids involved and those of the particle. The experimentally measured frequency of oscillation of a particle is in approximate agreement with the frequency calculated analytically, which is noteworthy considering that the latter depends only on the fluid and particle properties, and that there are no adjustable parameters in the analytic expression. It is shown that similarly to an under-damped system, these characteristic frequencies can be excited by an external forcing. When a particle is adsorbed on a fluid-liquid interface it induces a relatively strong transient flow in the liquid which persists for several seconds. For a spherical particle the flow is axisymmetric about the vertical passing through the particle's center. To visualize this flow, an experiment is designed based of the Particle Image Velocimetry (PIV) technique. The measurements show that the fluid directly below the particle rises up, and near the interface it moves away from the particle. The velocity near the interface is found to be about an order of magnitude larger than in the liquid below the particle.

Small solid particles adsorbed at liquid interfaces arise in many industrial products and process, such as anti-foam formulations, crude oil emulsions and flotation. They act in many ways like traditional surfactant molecules, but offer distinct advantages. However, the understanding of how these particles operate in such systems is minimal. This book brings together the diverse topics actively being investigated, with contributions from leading experts in the field. After an introduction to the basic concepts and principles, the book divides into two sections. The first deals with particles at planar liquid interfaces, with chapters of an experimental and theoretical nature. The second concentrates on the behaviour of particles at curved liquid interfaces, including particle-stabilized foams and emulsions and new materials derived from such systems. This collection will be of interest to academic researchers and graduate students in chemistry, physics, chemical engineering, pharmacy, food science and materials science.

Computational Methods for Complex Liquid-Fluid Interfaces highlights key computational challenges involved in the two-way coupling of complex liquid-fluid interfaces. The book covers a variety of cutting-edge experimental and computational techniques ranging from macro- to meso- and microscale approaches (including pivotal applications). As examples, the text: defines the most important interfacial quantities and their experimental investigations, providing theoretical background and detailed solutions, describes vital techniques used in interfacial flow problems, such as modern meshless numerical methods and conventional computational fluid dynamics methods, and discusses the technicalities of correctly using the computational methods developed for interfacial flows, as well as the simulation of interesting interfacial flow physics. Edited and authored by leading scientists and researchers, Computational Methods for Complex Liquid-Fluid Interfaces offers an authoritative and state-of-the-art overview of computational methodologies and simulation techniques for the quantification of interfacial quantities.

Surfactants... today you have probably eaten some, or rubbed others on your body. Plants, animals (including you) and microorganisms make them, and many everyday products (e.g. detergents, cosmetics, foodstuffs) contain them. Surfactant molecules have one part which is soluble in water and another which is not. This gives surfactant molecules two valuable properties: 1) they adsorb at surfaces (e.g. of an oil droplet in water), and 2) they stick together (aggregate) in water. The aggregates (micelles) are able to dissolve materials not soluble in water alone, and adsorbed surfactant layers, at the surfaces of particles or (say) oil droplets in water, stop the particles or drops sticking together. This is why stable emulsions such as milk do not separate into layers. This book treats the basic physical chemistry and physics underlying the behaviour of surfactant systems. In this book, you will first learn about some background material including hydrophobic hydration, interfacial tension and capillarity (Section I). Discussion of surfactant adsorption at liquid/fluid and solid/liquid interfaces is given in Section II, and includes thermodynamics of adsorption, dynamic and rheological aspects of liquid interfaces and the direct characterisation of surfactant monolayers. In Section III, a description is given of surfactant aggregation to give micelles, lyotropic liquid crystals, microemulsions and Winsor systems. There follows a discussion of surface forces and the way they confer stability on lyophobic colloids and thin liquid films (Section IV). Various dispersions stabilised by adsorbed surfactant or polymer (including solid in liquid dispersions, emulsions and foams) are considered in Section V. The wetting of solids and liquids is explored in Section VI. Like surfactants, small solid particles can adsorb at liquid/fluid interfaces, form monolayers and stabilise emulsions and foams. Such behaviour is covered in Section VII. It is assumed the reader has a knowledge of undergraduate physical chemistry, particularly chemical thermodynamics, and of simple physics. Mathematics (elementary algebra and calculus) is kept at a level consistent with the straightforward derivation of many of the equations presented.

Directed assembly of complex shaped particles at fluid interfaces.