
POLYMER SURFACES AND INTERFACES: CHARACTERIZATION, MODIFICATION AND APPLICATION

Editors: K.L. Mittal and K.-W. Lee



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Polymer Surfaces Interfaces Characterization Modification Appli

Wolfgang Fritzsche, Jürgen Popp



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Polymer Surfaces and Interfaces: Characterization, Modification and Application Kash L. Mittal, 2023-01-06 Polymeric materials are used for a legion of applications in a wide array of technological areas and their proper surface interface characteristics are of cardinal importance for their applications Therefore the need to characterize polymer surfaces interfaces and their suitable modification to impart desired characteristics is quite patent This book chronicles the proceedings of the Symposium on Polymer Surfaces and Interfaces Characterization Modification and Application held as a part of the Society of Plastics Engineers Annual Technical Conference Boston May 7 11 1995 The articles in this book address many aspects of polymer surfaces and interfaces Topics covered include various ways chemical photochemical laser flame corona to modify polymer surfaces modification of contact lens surfaces various ways to analyze characterize polymer surfaces metal polymer interfaces metal polyimide adhesion metal self assembled organic monolayer interfaces polymer alignment layers for liquid crystals alignment of liquid crystal surfaces polyimide alignment layers molecular re orientation of polymer surfaces plasma polymerized organic coatings epoxy fiber interphase epoxy underfill materials for packaging integrated circuits transport in polymers polymer miscibility and cell adhesion

Polymer Surfaces and Interfaces Manfred Stamm, 2008-01-26 In what is an extremely practical and applicable new work experts provide concise explanations with examples and illustrations of the key techniques in this important field In each case after basic principles have been reviewed applications of the experimental techniques are discussed and illustrated with specific examples Scientists and engineers in research and development will benefit from an application oriented book that helps them to find solutions to both fundamental and applied problems They will know that the surfaces and interfaces of polymers play an important role in most of the application areas of polymers from moulds foils and composites to biomaterials and applications in micro and nanotechnology

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polymers polymer miscibility and cell adhesion *Polymeric Biomaterials for Tissue Regeneration* Changyou Gao, 2016-10-08 This book reviews state of the art of polymeric biomaterials for regenerative medicine and highlights advances in both basic science and clinical practice It summarizes the latest techniques in polymeric scaffold fabrication delivery carriers physicochemical property modulation as well as their influence on adhesion and the performance of biomolecules cells and tissues It also describes methods for creating biofunctional surfaces interfaces and subsequently modulating the host response to implantable materials Lastly it discusses the applications of biomaterials and constructs in soft tissue regenerative medicine It is a valuable resource for materials scientists and engineers wishing to identify research priorities to fulfill clinical needs and provides physicians with insights into emerging novel biomaterials This integrated approach also offers engineering students a sense of the relevance of materials science in the development of novel therapeutic strategies **Polymer Surfaces and Interfaces: Characterization, Modification and Application** ,2023

Polymeric materials are used for a legion of applications in a wide array of technological areas and their proper surface interface characteristics are of cardinal importance for their applications Therefore the need to characterize polymer surfaces interfaces and their suitable modification to impart desired characteristics is quite patent This book chronicles the proceedings of the Symposium on Polymer Surfaces and Interfaces Characterization Modification and Application held as a part of the Society of Plastics Engineers Annual Technical Conference Boston May 7 11 1995 The articles in this book address many aspects of polymer surfaces and interfaces Topics covered include various ways chemical photochemical laser flame corona to modify polymer surfaces modification of contact lens surfaces various ways to analyze characterize polymer surfaces metal polymer interfaces metal polyimide adhesion metal self assembled organic monolayer interfaces polymer alignment layers for liquid crystals alignment of liquid crystal surfaces polyimide alignment layers molecular re orientation of polymer surfaces plasma polymerized organic coatings epoxy fiber interphase epoxy underfill materials for packaging integrated circuits transport in polymers polymer miscibility and cell adhesion

Recent Advances in Adhesion Science and Technology in Honor of Dr. Kash Mittal Wojciech (Voytek) Gutowski, Hanna Dodiuk, 2013-12-31 The surface of an object is the first thing we see or touch Nearly every article or object we encounter at home in industry land transportation aerospace or the medical field in some way uses an adhesive a sealant or a decorative coating Adhesion science provides the technology and the know how behind these applications Recent Advances in **Natural Gums** Shakeel Ahmed, Akbar Ali, 2023-07-22 Natural Gums Extraction Properties and Applications provides thorough methodical coverage of a range of natural gums These naturally forming polysaccharides or complex carbohydrates offer advantageous properties and a range of possible applications The book begins by introducing fundamental knowledge regarding natural gums including structures and properties functionalization gelatin behavior and characterization techniques Subsequent sections of the book provide in depth chapters each guiding the reader through the extraction properties and applications of a specific gum type covering

plant based animal based microbial based and marine based natural gums Finally the future potential of natural gums and their implications in a circular economy approach are considered This is an informative resource for researchers and advanced students in bio based materials polymer science chemistry bioengineering materials science and food science as well as industrial scientists and R D professionals with an interest in natural gums and bio based materials for advanced applications Explains origin extraction processing and structural analysis of natural gums Offers in depth information on specific natural gum types their properties and potential uses Explores a range of advanced applications across food biomedicine pharmaceuticals and more

Polymer Characterization Daria Bukharina, Paraskevi Flouda, Vladimir Tsukruk, 2025-09-01 The book provides a concise and practically driven overview of fundamentals and current experimental practices in the field of characterization of modern polymer biopolymer materials and related composites Such guide is important for experienced undergraduate students and new graduate students starting their adventure into polymer materials research It helps students with quick introduction into theoretical basics guidance on experimental routines specimen preparations data analysis resolution and limitations of experimental measurements and common issues and artifacts It includes most popular spectroscopic and microscopic techniques for understanding chemical composition microstructure and morphology and fundamental properties of solid polymeric materials including mechanical viscoelastic thermomechanical surface and optical properties All chapters are accompanied by examples of specific study cases experimental problems and questions for solving and self testing as well as laboratory practice videos collected by the authors in their labs Includes long lasting and in depth research experience in the field of polymer characterization of a wide variety of polymers biopolymers and composites Contains guide to training practical use data analysis limitations and resolution common experimental routine parameters and other practical considerations such as applicability in real lab environment Includes examples of study cases questions and problems for student self testing and analysis Includes examples of prominent artifacts and data corruptions and how to avoid and correct those Shows practical lessons in the video collected by the authors with specimen preparation experimental parameters selection measuring process and data collection all in real time

Purification of Peptides in High-Complexity Arrays Christopher Schirwitz, 2013-08-13 Christopher Schirwitz's thesis focuses on improving the quality of in situ synthesized high complexity peptide micro arrays Micro arrays containing proteins or small protein fragments in the form of peptides have become of great interest in proteomic research With the help of these microarrays a large number of potential target molecules can be screened for interaction with a probe in a short timeframe However protein and peptide micro arrays are still lagging behind oligonucleotide arrays in terms of density quality and manufacturing costs A new approach developed at the German Cancer Research Center DKFZ has improved the synthesis of high density peptide arrays The current technology is capable of producing arrays with up to 40 000 different peptides per square cm by means of micro particle based solid phase peptide synthesis However in situ

synthesis approaches bear a conceptual disadvantage The quality of the peptides is dependent on the efficiency of the synthesis so that peptide fragments are present in the resulting array among the desired full length peptides In peptide protein interaction studies such peptide fragments The central achievement of this thesis is the development of a new method allowing for the fast one step purification of entire arrays without loss of resolution or spatial information Christopher Schirwitz's work has resulted in a number of publications in high ranking journals Scanning Probe Microscopy in Nanoscience and Nanotechnology 2 Bharat Bhushan, 2010-12-17 This book presents the physical and technical foundation of the state of the art in applied scanning probe techniques It constitutes a timely and comprehensive overview of SPM applications The chapters in this volume relate to scanning probe microscopy techniques characterization of various materials and structures and typical industrial applications including topographic and dynamical surface studies of thin film semiconductors polymers paper ceramics and magnetic and biological materials The chapters are written by leading researchers and application scientists from all over the world and from various industries to provide a broader perspective

Synchrotron Radiation in Materials Science Chunhai Fan, Zhentang Zhao, 2018-02-12 Endlich ein Fachbuch mit detaillierten Informationen zu einer der fortschrittlichsten Methoden zur Materialcharakterisierung Ein herausragendes Team aus Herausgebern und Autoren von renommierten Einrichtungen und Institutionen besch ftigt sich mit Synchrotron Verfahren die sich in der Materialforschung bew hrt haben Nach einer Einf hrung in die Synchrotronstrahlung und ihrer Quellen werden die verschiedenen Techniken beschrieben die von diesem besonders hellen Licht profitieren u a R ntgenabsorption Diffraktion Streuung Bildgebung und Lithographie Zum Schluss folgt ein berblick ber die Anwendungen der Synchrotronstrahlung in den Materialwissenschaften Dieses einzigartige unabdingbare Referenzwerk f r akademische Forscher und Forscher aus der Industrie verbindet Spezialisten aus der Synchrotronforschung und Materialwissenschaftler

First International Congress on Adhesion Science and Technology---invited papers van Ooij, Jr. Anderson, 2023-03-08 This Festschrift documents the Proceedings of the First International Congress on Adhesion Science and Technology held in honor of Dr Kash Mittal on the occasion of his 50 birthday in Amsterdam The Netherlands October 16 20 1995 It contains the full accounts of the plenary and invited lectures which are divided into the following seven part **First International Congress on Adhesion Science And Technology---invited Papers** W. J. Van Ooij, 1998-12 This Festschrift documents the Proceedings of the First International Congress on Adhesion Science and Technology held in honor of Dr Kash Mittal on the occasion of his 50 birthday in Amsterdam The Netherlands October 16 20 1995 It contains the full accounts of the plenary and invited lectures which are divided into the following seven parts Part 1 Fundamental aspects of adhesion and general topics Part 2 Contact angle wettability and surface energetics Part 3 Surface modification Relevance to adhesion Part 4 Adhesives and adhesive joints Part 5 Adhesion aspects of polymeric coatings and polymer polymer interphase Part 6 Metal polymer and metal ceramic adhesion and Part 7 General papers The topics covered include many different aspects of

adhesion science and technology and both fundamental and applied issues are addressed The final section of this volume gives a listing of titles authors and affiliations of the other 185 papers which were included in the technical program of the conference

Intelligent Stimuli-Responsive Materials Quan Li,2013-09-03 There has been concerted effort across scientific disciplines to develop artificial materials and systems that can help researchers understand natural stimuli responsive activities With its up to date coverage on intelligent stimuli responsive materials Intelligent Stimuli Responsive Materials provides research industry and academia professionals with the fundamentals and principles of intelligent stimuli responsive materials with a focus on methods and applications Emphasizing nanostructures and applications for a broad range of fields each chapter comprehensively covers a different stimuli responsive material and discusses its developments advances challenges analytical techniques and applications

Wetting and Wettability Mahmood Aliofkhazraei,2015-12-16 On the liquid s surface the molecules have fewer neighbors in comparison with the bulk volume As a result the energy interaction shows itself in the surface tension Traditionally the surface tension can be assumed as a force in the unit of the length which can be counted by the unit of Newton on squared meter or energy on the units of the surface The surface tension implies the interface between liquid and vapor which is an example of the surface tensions The equilibrium between these surface tensions decides that a droplet on a solid surface would have a droplet form or will change to layer form This book collects new developments in wetting and wettability science

Glass Transition, Dynamics and Heterogeneity of Polymer Thin Films Toshiji Kanaya,2012-12-15 Mobility Gradient of Polystyrene in Films Supported on Solid Substrates by Yoshihisa Fujii Hiroshi Morita Atsushi Takahara and Keiji Tanaka Probing Properties of Polymers in Thin Films Via Dewetting by G nter Reiter Heterogeneous and Aging Dynamics in Single and Stacked Thin Polymer Films by Koji Fukao Takehide Terasawa Kenji Nakamura Daisuke Tahara Heterogeneous Dynamics of Polymer Thin Films as Studied by Neutron Scattering by Rintaro Inoue and Toshiji Kanaya

Applications of Polyurethanes in Medical Devices Ajay Padsalgikar,2022-05-19 Applications of Polyurethanes in Medical Devices provides detailed coverage of polyurethane PU chemistry processing and preparation for performant medical devices Polyurethanes have found many uses in medical applications due to their biocompatibility biostability physical properties surface polarity and the ability to suit the field of application This book enables the reader to understand polyurethane and how this valuable material can be used in medical devices Sections cover the chemistry structure and properties of polyurethane with in depth sections examining raw materials reaction chemistry synthesis techniques reaction kinetics material microstructure and structure property relationships Subsequent chapters demonstrate how polyurethane can be utilized in medical device applications examining biological properties rheology and processing before methodical coverage explains how polyurethane may be used for each category of medical device Finally future directions and safety and environmental aspects are covered Bridges the gap between polyurethane chemistry processing and preparation for cutting edge medical device applications Includes in depth coverage of polyurethane covering

raw materials chemistry synthesis techniques reaction kinetics properties and microstructural analysis Takes a valuable and practical approach addressing manufacturing issues and using testing and modeling to solve problems encountered in processing Thin Film Coatings for Biomaterials and Biomedical Applications Hans J Griesser,2016-02-19 Thin Film Coatings for Biomaterials and Biomedical Applications discusses the latest information on coatings including their historic use by scientists who are looking to improve the properties and biological responses of the material host interface Thin films in particular are becoming more widely researched and used as an alternative to traditional sprayed coatings because they have a more uniform structure and therefore greater stability This book provides readers with a comprehensive guide to thin film coatings and their application in the biomaterials field Part One of the book details the fundamentals of thin films for biomedical application while Part Two looks at the special properties of thin films with a final section reviewing functional thin films and their usage in biomedical applications Provides a comprehensive review on the fundamentals properties and functions of thin film coatings for biomaterials Covers a broad range of applications for implantable biomaterials Written by an international team of contributors who carefully tailor the presented information in a way that addresses industry needs

Optical Nano- and Microsystems for Bioanalytics Wolfgang Fritzsche,Jürgen Popp,2012-02-03 This book describes the state of the art in the field of bioanalytical nano and microsystems with optical functionality In 12 chapters distinguished scientists and leaders in their respective fields show how various optical technologies have been miniaturized and integrated over the last few decades in order to be combined with nano and microsystems for applications in the life sciences The main detection and characterization technologies are introduced and examples of the superiority of these integrated approaches compared to traditional ones are provided Examples from e g the fields of optical waveguides integrated interferometers surface plasmon resonance or Raman spectroscopy are introduced and discussed and it is shown how these approaches have led to novel functionalities and thereby novel applications **Membrane-Distillation in Desalination** Farid

Benyahia,2019-05-30 Membrane Distillation in Desalination is an attempt to provide the latest knowledge state of the art and demystify outstanding issues that delay the deployment of the technology on a large scale It includes new updates and comprehensive coverage of the fundamentals of membrane distillation technology and explains the energy advantage of membrane distillation for desalination when compared to traditional techniques such as thermal or reverse osmosis The book includes the latest pilot test results from around the world on membrane distillation desalination

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