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High Resolution NMR Spectroscopy of Synthetic Polymers in Bulk

Edited by
Richard A. Komoroski



High Resolution Nmr Spectroscopy Of Synthetic Polymers In Bulk

S.J. Spells



High Resolution Nmr Spectroscopy Of Synthetic Polymers In Bulk:

High Resolution NMR Spectroscopy of Synthetic Polymers in Bulk Richard A. Komoroski, 1986 **High Resolution NMR Spectroscopy synthetic polymers in bulk**, 1986 High-Resolution Nmr Spectroscopy of Synthetic Polymers in Bulk Komoroski, 1986-07 NMR Spectroscopy of Polymers R.N. Ibbett, 2012-12-06 R N IBBETT This book provides a source of information on all major aspects of NMR spectroscopy of synthetic polymers It represents a deliberate attempt to pull together the numerous strands of the subject in a single comprehensive volume designed to be readable at every scientific level It is intended that the book will be of use to the vast majority of polymer scientists and NMR spectroscopists alike Readers new to NMR will find extensive information within the book on the available techniques allowing full exploration of the many polymer science applications Readers already established within a branch of NMR will find the book an excellent guide to the practical study of polymers and the interpretation of experimental data Readers who have specialised in polymer NMR will find the book a valuable dictionary of proven methodologies as well as a guide to the very latest developments in the subject Workers from all of the main branches of polymer NMR have been invited to contribute Each chapter therefore contains information relating to a particular investigative topic identified mainly on the basis of technique The book is loosely divided between solution and solid state domains although the numerous interconnections confirm that these two domains are parts of the same continuum Basic principles are explained within each chapter combined with discussions of experimental theory and applications Examples of polymer investigations are covered generously and in many chapters there are discussions of the most recent theoretical and experimental developments

Solid State NMR of Polymers T. Asakura, Isao Ando, 1998-08-03 In polymer science and technology the advanced development of various new polymer materials with excellent properties and functions is desirable For this purpose it is necessary to determine the exact relationship between physical properties and molecular structure dynamics with powerful techniques One such technique is solid state NMR Recently high resolution NMR studies of solids have been realized by using advanced pulse and mechanical techniques which has resulted in a variety of structural and dynamical information on polymer systems Solid state NMR has provided characteristic information which cannot be obtained by other spectroscopic methods This book is divided into two parts The first part covers the principles of NMR important NMR parameters such as chemical shifts relaxation times dipolar interactions quadrupolar interactions pulse techniques and new NMR methods In the second part applications of NMR to a variety of polymer systems in the solid state are described Features of this book Contains an up to date and comprehensive account of solid state NMR of polymers by leading researchers in the field Provides a compilation of solid state NMR of polymers which makes it an ideal reference book for both NMR researchers and general polymer scientists This book will be of interest to the NMR community and will be invaluable for both the beginner and the expert **Annual Reports on NMR Spectroscopy** Graham A. Webb, 2011-09-29 Nuclear magnetic resonance NMR

is an analytical tool used by chemists and physicists to study the structure and dynamics of molecules. In recent years no other technique has gained such significance as NMR spectroscopy. It is used in all branches of science in which precise structural determination is required and in which the nature of interactions and reactions in solution is being studied. Annual Reports on NMR Spectroscopy has established itself as a premier means for the specialist and non specialist alike to become familiar with new techniques and applications of NMR spectroscopy. Provides updates on the latest developments in NMR spectroscopy. Includes comprehensive review articles. Highlights the increasing importance of NMR spectroscopy as a technique for structural determination. Annual Reports on NMR Spectroscopy, 1994-04-12. This collection of reports demonstrate the extensive purview of NMR and its applications. The pellucid presentations provided include accounts on application of NMR spectroscopy to sciences and technologies of glass and ceramics, high resolution solid state NMR studies on ceramics, NMR studies of zeolite, NMR studies of higher order structures of solid polymers and organic thin films. Taken together with reviews in other volumes of this series, the present accounts demonstrably demonstrate that NMR is facile princeps when it comes to problem solving in most areas of science including the medical sciences. *NMR Applications in Biopolymers* John W. Finley, Siegfried J. Schmidt, A.S. Serianni, 2012-12-06. Elucidating the structures of biopolymers as they exist in nature has long been a goal of biochemists and biologists. Understanding how these substances interact with themselves, other solutes and solvents can provide useful insights into many areas of biochemistry, agriculture, food science and medicine. Knowledge of the structure of a protein or complex carbohydrate in its native form provides guidelines for the chemical or genetic modifications often desired to optimize these compounds to specific needs and applications. For example, in the pharmaceutical industry, structure-function relationships involving biopolymers are studied routinely as a means to design new drugs and improve their efficacies. The tools to conduct structure investigations of biopolymers at the molecular level are limited in number. Historically, X-ray crystallography has been the most attractive method to conduct studies of this type. However, X-ray methods can only be applied to highly ordered crystalline materials, thus obviating studies of solution dynamics that are often critical to attaining a global understanding of biopolymer behavior. In recent years, nuclear magnetic resonance (NMR) spectroscopy has evolved to become a powerful tool to probe the structures of biopolymers in solution and in the solid state. NMR provides a means to study the dynamics of polymers in solution and to examine the effects of solute, solvent and other factors on polymer behavior. With the development of 2D and 3D forms of NMR spectroscopy, it is now possible to assess the solution conformations of small proteins, oligonucleotides and oligosaccharides. *Solid State NMR of Polymers* L.J. Mathias, 2013-06-29. The chapters in this collection are from papers which were presented at a symposium on solid state NMR of polymers. A two part program on available NMR techniques applicable to solid polymer analysis was presented at the 3rd Chemical Congress of North America held in Toronto, Ontario, June 5-10, 1988. The program was sponsored by the Division of Polymer Chemistry with support provided by the Division, its Industrial Sponsors and the Donors of the Petroleum

Research Fund administered by the American Chemical Society Co organizers included Professor Colin Fyfe of the University of British Columbia Vancouver Canada Professor Hans Spiess of the Max Planck Institut fur Polymerforschung Mainz West Germany and myself The full day tutorial which was free to registered attendees covered the range of topics The purpose of the tutorial was to provide a basic introduction to the field so that newcomers to its present and future applications could develop sufficient understanding to learn effectively from the subsequent symposium The first talk attempted to give listeners a feel for the way a novice spectroscopist can learn to use the various NMR techniques to explore his own areas of interest Simple experiments can provide unique information about solid polymers that can be useful in interpreting synthetic results and in relating solid state conformation morphology and molecular motion to physical properties *Solid-State Properties of Pharmaceutical Materials* Stephen R. Byrn, George Zograf, Xiaoming (Sean) Chen, 2017-07-17 Presents a detailed discussion of important solid state properties methods and applications of solid state analysis Illustrates the various phases or forms that solids can assume and discusses various issues related to the relative stability of solid forms and tendencies to undergo transformation Covers key methods of solid state analysis including X ray powder diffraction thermal analysis microscopy spectroscopy and solid state NMR Reviews critical physical attributes of pharmaceutical materials mainly related to drug substances including particle size surface area hygroscopicity mechanical properties solubility and physical and chemical stability Showcases the application of solid state material science in rational selection of drug solid forms analysis of various solid forms within drug substance and the drug product and pharmaceutical product development Introduces appropriate manufacturing and control procedures using Quality by Design and other strategies that lead to safe and effective products with a minimum of resources and time **Acronyms and Abbreviations in Molecular**

Spectroscopy Detlef A.W. Wendisch, 2012-12-06 Highly recommended for all academic library chemistry collections biochemistry and medical collections may also want to consider Choice Each entry is provided with a definition a description of the effect application and literature citations the selection in this book is broad and useful J of Am Chem Soc The book is not just a collection of definitions of acronyms each entry contains a concise and informative explanation of the origins of the technique or method to which it refers this book is a must for progression of any budding spectroscopist Analyst

Macromolecular Design of Polymeric Materials Hatada, 1997-01-02 Providing a range of information on polymers and polymerization techniques this text covers the gamut of polymer science from synthesis structure and properties to function and applications It analyzes speciality polymers including acrylics fluoropolymers polysilanes polyphosphazenes and inorganic and conducting polymers The book examines the stereochemistry of polymerization and the stereoregularity of polymers **Multidimensional Solid-State NMR and Polymers** Klaus Schmidt-Rohr, Hans Wolfgang Spiess, 2012-12-02 NMR spectroscopy is the most valuable and versatile analytical tool in chemistry While excellent monographs exist on high resolution NMR in liquids and solids this is the first book to address multidimensional solid state NMR Multidimensional

techniques enable researchers to obtain detailed information about the structure dynamics orientation and phase separation of solids which provides the basis of a better understanding of materials properties on the molecular level Dramatic progress much of it pioneered by the authors has been achieved in this area especially in synthetic polymers Solid state NMR now favorably competes with well established techniques such as light x ray or neutron scattering electron microscopy and dielectric and mechanical relaxation The application of multidimensional solid state NMR inevitably involves use of concepts from different fields of science This book also provides the first comprehensive treatment of both the new experimental techniques and the theoretical concepts needed in more complex data analysis The text addresses spectroscopists and polymer scientists by treating the subject on different levels descriptive technical and mathematical approaches are used when appropriate It presents an overview of new developments with numerous experimental examples and illustrations which will appeal to readers interested in both the information content as well as the potential of solid state NMR The book also contains many previously unpublished details that will be appreciated by those who want to perform the experiments The techniques described are applicable not only to the study of synthetic polymers but to numerous problems in solid state physics chemistry materials science and biophysics Presents original theories and new perspectives on scattering techniques Provides a systematic treatment of the whole subject Gives readers access to previously unpublished material Includes extensive illustrations

Polymer Microscopy Linda Sawyer, David T. Grubb, 2013-03-09 A practical guide to the study and understanding of the structure of synthetic polymer materials using the complete range of microscopic techniques The major part of the book is devoted to specimen preparation and applications New applications and additional references provide a critical update

Characterization of Solid Polymers S.J. Spells, 2012-12-06 The last decade or so has seen a dramatic increase in the amount of detailed structural information available from a range of experimental techniques Exciting new techniques such as atomic force microscopy have become widely available while the potential of established methods like X ray diffraction and electron microscopy has been greatly enhanced by powerful new sources and analytical methods Progress in computing has also had a widespread impact in areas such as neutron scattering large data sets can now be manipulated more readily The software supplied with commercial instruments generally provides more sophisticated analytical facilities while time resolved X ray studies rely on rapid data handling capabilities The polymer scientist is faced with an expanding array of experimental tools for addressing both fundamental science and industrial problems This work reviews some recent developments in structural techniques with the aim of presenting the current state of the art in a selection of areas

Analysis of Rubber and Rubber-like Polymers M.J. Loadman, 2012-12-06 The first edition of this book 1958 described an analytical situation which had existed for a number of years for maintaining quality control on vulcanizates of natural rubber although the situation had recently been disturbed by the introduction of a range of synthetic rubbers which required identification and quantitative estimation For the former purpose wet chemistry based on various imperfectly understood

organic reactions was pressed into service. Alongside this was the first introduction of instrumental analysis using the infrared spectra of either the polymers or more usually their pyrolytic products to fingerprint the material. The identification of a range of organic accelerators, antioxidants and their derivatives which had been introduced during the 1920s and 30s was in the first edition dealt with by a combination of column chromatography and infrared spectroscopy or by paper chromatography. Quantitative procedures were however still classical in the tradition of gravimetric or volumetric assays with an initially weighed sample yielding after chemical manipulation a carefully precipitated, dried and weighed end product or a solution of known composition whose weight or titre as a percentage of the initial sample quantified the function being determined. The second edition of this work (1968) consolidated the newer techniques which had been introduced in the first without adding to them, although in other applications of analytical chemistry instrumental analysis had already brought about a transformation in laboratory practice.

The Plasma Chemistry of Polymer Surfaces Jörg Friedrich, 2012-05-29
More than 99% of all visible matter in the universe occurs as highly ionized gas plasma with high energy content. Electrical low and atmospheric pressure plasmas are characterized by continuous source of moderate quantities of energy or enthalpy transferred predominantly as kinetic energy of electrons. Therefore such energetically unbalanced plasmas have low gas temperature but produce sufficient energy for inelastic collisions with atoms and molecules in the gas phase thus producing reactive species and photons which are able to initiate all types of polymerizations or activate any surface of low reactive polymers. However the broadly distributed energies in the plasma exceed partially the binding energies in polymers thus initiating very often unselective reactions and polymer degradation. The intention of this book is to present new plasma processes and new plasma reactions of high selectivity and high yield. This book aims to bridge classical and plasma chemistry particularly focusing on polymer chemistry in the bulk and on the surface under plasma exposure. The stability of surface functionalization and the qualitative and quantitative measurement of functional groups at polymer surface are featured prominently and chemical pathways for suppressing the undesirable side effects of plasma exposure are proposed and illustrated with numerous examples. Special attention is paid to the smooth transition from inanimate polymer surfaces to modified bioactive polymer surfaces. A wide range of techniques, plasma types and applications are demonstrated.

Electronic Properties of Polymers Hans Kuzmany, Michael Mehring, Siegmund Roth, 2012-12-06
The International Winter School on Electronic Properties of Polymers: Orientation and Dimensionality of Conjugated Systems held March 9-16, 1991 in Kirchberg Tyrol, Austria was a sequel to three meetings on similar subjects held there. The 1991 winter school was again organized in cooperation with the Bundesministerium für Wissenschaft und Forschung in Austria and with the Bundesministerium für Forschung und Technologie in the Federal Republic of Germany. The basic idea of the meeting was to provide an opportunity for experienced scientists from universities and industry to discuss their most recent results and for students and young scientists to become familiar with the present status of research and applications in the field. Like the

previous winter schools on polymers this one concentrated on the electronic structure and potential for application of polymers with conjugated double bonds This time however special attention was paid to the effects of orientation and dimensionality Anisotropy of the electric conductivity in stretch oriented samples and whether the transport mechanisms are one two or three dimensional or might even have a fractal dimensionality were therefore central topics The problem of orientation was extended to systems such as Langmuir Blodgett films and other layered structures Accordingly thin films were the focus of most of the application oriented contributions Whereas in the previous winter schools discussions on applications dealt with large volume applications such as electromagnetic shielding and energy storage this time molecular materials for electronics and prospects of molecular electronics were at the center of interest

Perspectives in Modern Chemical Spectroscopy David L. Andrews, 2012-12-06 An interesting and enlightening book well worth the time for someone who is grounded in the basics of spectroscopy yet interested in newer techniques and applications particularly useful in providing breadth for those whose work has caused them to narrow their appreciation of spectroscopy to one area Spectroscopy This book should be on the bookshelves of all chemists whose daily work involves the practical application of spectroscopy to chemical analysis Fresenius J of Analytical Chem stands in style between an introduction to the various topics covered and near monographic treatments meets a real need Faraday Transactions It covers an enormous amount of spectral theory and methodology in a condensed and readable format SIM News

Molecular Characterization and Analysis of Polymers John M. Chalmers, Robert J. Meier, 2008-12-09 Written by expert contributors from the academic and industrial sectors this book presents traditional and modern approaches to polymer characterization and analysis The emphasis is on pragmatics problem solving and property determination real world applications provide a context for key concepts The characterizations focus on organic polymer and polymer product microstructure and composition Approaches molecular characterization and analysis of polymers from the viewpoint of problem solving and polymer property characterization rather than from a technique championing approach Focuses on providing a means to ascertaining the optimum approach or techniques to solve a problem measure a property and thereby develop an analytical competence in the molecular characterization and analysis of real world polymer products Provides background on polymer chemistry and microstructure discussions of polymer chain morphology degradation and product failure and additive analysis and considers the supporting roles of modeling and high throughput analysis

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