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gas chromatography of polymers

*V.G. Berezkin, V.R. Alishoyev and
I.B. Nemirovskaya*

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Gas Chromatography Of Polymers

Peter Kusch



Gas Chromatography Of Polymers:

Gas Chromatography of Polymers, 2011-09-22 *Gas Chromatography of Polymers Characterization and Analysis of Polymers by Gas Chromatography* Malcolm P. Stevens, 1969 Written primarily to help the polymer chemist in streamlining his analytical techniques [Polymer Thermodynamics by Gas Chromatography](#) R. Vîlcu, M. Leca, 2012-12-02 This book presents direct and inverse gas chromatography as a powerful tool for determining a great number of thermodynamic properties and quantities for micro and especially for macromolecular substances In order to ensure the continuity and clarity of the presentation the book first considers some frequently used concepts of chromatography with a mobile gas phase i e the mechanism of separation retention parameters and the theories of gas chromatography The employment of this technique as an important method of studying solutions through the most representative statistical models is also discussed The thermodynamics of direct gas chromatography as applied to dissolution adsorption and vaporization underlies the thermodynamic treatment of inverse gas chromatography The most extensive chapter of the book is devoted to the thermodynamics of inverse gas chromatography and deals with a number of important topics phase transitions in crystalline amorphous polymers and liquid crystals glass transitions other second order transitions in polymers the determination of diffusion coefficients the segregation of block copolymers and other applications This book is intended for those specialists in research and industry who are concerned with the modification and characterization of polymers with establishing polymer applications and with the processing of polymers It will also be useful to students and specialists interested in the physico chemical basis of the phenomena involved in gas chromatography in general and its inverse variant in particular

Pyrolysis - GC/MS Data Book of Synthetic Polymers Shin Tsuge, Hajima Ohtani, Chuichi Watanabe, 2011-08-02 In this data book both conventional Py GC MS where thermal energy alone is used to cause fragmentation of given polymeric materials and reactive Py GC MS in the presence of organic alkaline for condensation polymers are compiled Before going into detailed presentation of the data however acquiring a firm grip on the proper understanding about the situation of Py GC MS would promote better utilization of the following pyrolysis data for various polymers samples This book incorporates recent technological advances in analytical pyrolysis methods especially useful for the characterization of 163 typical synthetic polymers The book briefly reviews the instrumentation available in advanced analytical pyrolysis and offers guidance to perform effectually this technique combining with gas chromatography and mass spectrometry Main contents are comprehensive sample pyrograms thermograms identification tables and representative mass spectra MS of pyrolyzates for synthetic polymers This edition also highlights thermally assisted hydrolysis and methylation technique effectively applied to 33 basic condensation polymers Coverage of Py GC MS data of conventional pyrograms and thermograms of basic 163 kinds of synthetic polymers together with MS and retention index data for pyrolyzates enabling a quick identification Additional coverage of the pyrograms and their related data for 33 basic condensation polymers obtained by the thermally assisted

hydrolysis and methylation technique All compiled data measured under the same experimental conditions for pyrolysis gas chromatography and mass spectrometry to facilitate peak identification Surveyable instant information on two facing pages dedicated to the whole data of a given polymer sample

Pyrolysis-gas Chromatography: Mass Spectrometry Of Polymeric Materials Peter Kusch, 2018-10-08 The methodology of analytical pyrolysis GC MS has been known for several years but is seldom used in research laboratories and process control in the chemical industry This is due to the relative difficulty of interpreting the identified pyrolysis products as well as the variety of them This book contains full identification of several classes of polymers copolymers and biopolymers that can be very helpful to the user In addition the practical applications can encourage analytical chemists and engineers to use the techniques explored in this volume The structure and the functions of various types of pyrolyzers and the results of the pyrolysis gas chromatographic mass spectrometric identification of synthetic polymers copolymers and biopolymers at 700 C are described Practical applications of these techniques are also included detailing the analysis of microplastics failure analysis in the automotive industry and solutions for technological problems

Gas chromatography of polymers V. G. Berezkin, V. R. Alishoyev, I. B. Nemirovskaja, 1977

An Analysis of Polymers by Gas Chromatography (A Survey). Otakar Mlejnek, FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH., 1970 The determination of monomers functional groups in polymers analysis of chemical and thermal decomposition products by gas chromatography and characterization of polymers by reversed gas chromatography in columns packed with the polymer under study are reviewed

Polymer Thermodynamics by Gas Chromatography

, 1990

Pyrolysis-gas Chromatography/mass Spectrometry Of Polymeric Materials (Second Edition) Peter Kusch, 2023-08-28 Readers will find many practical applications of pyrolysis GC MS as well as R D usage in this newly revised and expanded edition Detailed experimental descriptions for the identification of synthetic polymers and copolymers are included This volume presents the current state of analytical pyrolysis and contains full identification of several classes of polymers copolymers and biopolymers that readers will find helpful Structures and functions of various types of pyrolyzers are explored as well as the results of the pyrolysis gas chromatographic mass spectrometric identification of synthetic polymers copolymers and biopolymers at 700 C Practical applications of this hyphenated technique detailing the analysis of microplastics failure analysis in the automotive industry and solutions for technological problems are provided Numerous practical applications of pyrolysis GC MS for industrial and R D usage will be of benefit to Chemists and Engineers as well as for students of Chemistry and Polymer Sciences

Chemical Methods in Gas Chromatography V.G. Berezkin, 2000-04-01

Chemical Methods in Gas Chromatography *Pyrolysis - GC/MS Data Book of Synthetic Polymers* Shin Tsuge, Hajima Ohtani, Chuichi Watanabe, 2011-10-13 In this data book both conventional Py GC MS where thermal energy alone is used to cause fragmentation of given polymeric materials and reactive Py GC MS in the presence of organic alkaline for condensation polymers are compiled Before going into detailed presentation of the data however acquiring a firm grip on the proper

understanding about the situation of Py GC MS would promote better utilization of the following pyrolysis data for various polymers samples This book incorporates recent technological advances in analytical pyrolysis methods especially useful for the characterization of 163 typical synthetic polymers The book briefly reviews the instrumentation available in advanced analytical pyrolysis and offers guidance to perform effectually this technique combining with gas chromatography and mass spectrometry Main contents are comprehensive sample pyrograms thermograms identification tables and representative mass spectra MS of pyrolyzates for synthetic polymers This edition also highlights thermally assisted hydrolysis and methylation technique effectively applied to 33 basic condensation polymers Coverage of Py GC MS data of conventional pyrograms and thermograms of basic 163 kinds of synthetic polymers together with MS and retention index data for pyrolyzates enabling a quick identification Additional coverage of the pyrograms and their related data for 33 basic condensation polymers obtained by the thermally assisted hydrolysis and methylation technique All compiled data measured under the same experimental conditions for pyrolysis gas chromatography and mass spectrometry to facilitate peak identification Surveyable instant information on two facing pages dedicated to the whole data of a given polymer sample

Inverse Gas Chromatography Douglas R. Lloyd, Thomas C. Ward, American Chemical Society. Division of Polymeric Materials: Science and Engineering, Henry P. Schreiber, Chemical Institute of Canada. Macromolecular Science Division, American Chemical Society. Meeting, 1989 Handbook of Chromatography Charles G. Smith, 2020-03-11 Handbook of Chromatography features tables and chromatograms theoretical discussions and practical applications on the topic Tables and chromatograms are based on polymer analyses abstracted from literature references dating from 1981 1991 Compounds presented in the tables and chromatograms include residual monomers plasticizers additives antioxidants and products from the thermal degradation pyrolysis of a broad range of synthetic polymers Theoretical discussions focus on new developments in the respective areas of gas pyrolysis gas liquid and size exclusion chromatographic separations Capillary column technology inverse gas chromatography IGC supercritical fluid extractions SFE and supercritical fluid chromatography SFC are also covered A Practical Applications subsection provides a list of commercial suppliers of column packings and packed columns for gas and liquid chromatography The book will be an excellent reference for chromatographers organic chemists and analytical chemists **Polymer Analysis** Barbara H. Stuart, 2002-03-12 This book introduces the techniques used for the analysis of polymers It covers the main aspects of polymer science and technology identification polymerization molecular weight structure surface properties degradation and mechanical properties Clear explanations of each analytical technique Describes the application of techniques to the study of polymers Encourages learning through numerous self assessment questions and answers Structured for flexible learning *Advanced Gas Chromatography* Mustafa Ali Mohd, 2012-03-21 Progress in agricultural biomedical and industrial applications is a compilation of recent advances and developments in gas chromatography and its applications The chapters cover various

aspects of applications ranging from basic biological biomedical applications to industrial applications Book chapters analyze new developments in chromatographic columns microextraction techniques derivatisation techniques and pyrolysis techniques The book also includes several aspects of basic chromatography techniques and is suitable for both young and advanced chromatographers It includes some new developments in chromatography such as multidimensional chromatography inverse chromatography and some discussions on two dimensional chromatography The topics covered include analysis of volatiles toxicants indoor air petroleum hydrocarbons organometallic compounds and natural products The chapters were written by experts from various fields and clearly assisted by simple diagrams and tables This book is highly recommended for chemists as well as non chemists working in gas chromatography

Chromatography Mass Spectroscopy in Polymer Analysis T. R Crompton, 2010-12-02 The combination of chromatography with mass spectroscopy is a very useful technique which is being increasingly used by polymer chemists to improve existing polymers and to discover new ones with specific physical properties such as thermal stability and retention of properties over a long service life This technique is extremely powerful for the analysis and characterisation of polymers and is often based on the use of controlled chromatography mass spectroscopy to measure a polymer's decomposition with techniques such as pyrolysis followed by chromatography to separate any breakdown product and finally mass spectroscopy to achieve an unequivocal identification of the pyrolysis products obtained The detail that can be obtained by such methods includes structure of the polymer backbone branching end groups isomeric detail and fine detail in the structure of copolymers The first three chapters of the book discuss the various chromatographic and mass spectroscopic techniques now available Chapters 3-8 cover the complementary methods based on the combination of mass spectroscopy with various chromatographic techniques such as high performance liquid chromatography gas chromatography and supercritical fluid chromatography Pyrolysis chromatography mass spectroscopy is a method of studying the structure of polymers which involves subjecting the polymer pyrolysis products to a chromatographic technique to simplify subsequent analysis and finally mass spectroscopy to identify the pyrolysis products with the possibility of deducing finer details of polymer structure than were previously attainable by classical methods Chapters 9-11 By providing a thorough up to date review of work in this field it is hoped that the book will be of interest to all those engaged in polymer research and development and polymer users in general

Mass Spectrometry of Polymers Giorgio Montaudo, Robert P. Lattimer, 2001-10-29 Mass Spectrometry MS has rapidly become an indispensable tool in polymer analysis and modern MS today complements in many ways the structural data provided by Nuclear Magnetic Resonance NMR and Infrared IR methods Recent advances have sparked a growing interest in this field and established a need for a summary of progress made and results

Characterization of Polymer Blends Sabu Thomas, Yves Grohens, P. Jyotishkumar, 2015-02-09 Filling the gap for a reference dedicated to the characterization of polymer blends and their micro and nano morphologies this book provides comprehensive systematic coverage in a one stop

two volume resource for all those working in the field. Leading researchers from industry and academia as well as from government and private research institutions around the world summarize recent technical advances in chapters devoted to their individual contributions. In so doing they examine a wide range of modern characterization techniques from microscopy and spectroscopy to diffraction, thermal analysis, rheology, mechanical measurements and chromatography. These methods are compared with each other to assist in determining the best solution for both fundamental and applied problems, paying attention to the characterization of nanoscale miscibility and interfaces both in blends involving copolymers and in immiscible blends. The thermodynamics, miscibility, phase separation, morphology and interfaces in polymer blends are also discussed in light of new insights involving the nanoscopic scale. Finally, the authors detail the processing, morphology, property relationships of polymer blends as well as the influence of processing on the generation of micro and nano morphologies and the dependence of these morphologies on the properties of blends. Hot topics such as compatibilization through nanoparticles, miscibility of new biopolymers and nanoscale investigations of interfaces in blends are also addressed. With its application oriented approach, handpicked selection of topics and expert contributors, this is an outstanding survey for anyone involved in the field of polymer blends for advanced technologies. *Modern Methods of Polymer*

Characterization Howard G. Barth, Jimmy W. Mays, 1991-09-03. Presents the methods used for characterization of polymers. In addition to theory and basic principles, the instrumentation and apparatus necessary for methods used to study the kinetic and thermodynamic interactions of a polymer with its environment are covered in detail. Some of the methods examined include polymer separations and characterization by size exclusion and high performance chromatography, inverse gas chromatography, osmometry, viscometry, ultracentrifugation, light scattering and spectroscopy. *Analysis of Polymers by Pyrolysis Gas Chromatography* S. Hirayanagi, K. Kimura, M. Sato, T. Harada, 1982.

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