

Horst Friebolin Ein Und Zweidimensionale Nmr Spektroskopie

Horst Friebolin Basic One- and Two-Dimensional NMR Spectroscopy Third Revised Edition A classic among NMR textbooks, this thoroughly revised and enlarged third edition includes new treatment of the fundamentals, focusing on pulsed FT methods description of recently developed techniques, such as pulsed field gradient methods coverage of software for spectra simulation and spin-echo experiments Written by an NMR expert with long-standing teaching experience, this text provides students and professionals with a lucidly written introduction to NMR spectroscopy. From reviews of previous editions: "This is an excellent book... we have been using the first edition of the book in our graduate course in NMR for three years and have been very pleased with it. My opinion is that someone who began knowing nothing about NMR could become quite proficient at structure determination by simply mastering the contents of this book. I highly recommend it." Journal of the American Chemical Society "Almost every course in chemistry and biochemistry nowadays has some NMR component, and the student's interest depends on how the material is delivered. This book is a pleasure to read and if it does not arouse the student's interest, then it is difficult to see what could. It is clearly written and illustrated, with a near perfect balance of mathematics and text." Chemistry in Britain

Nuclear magnetic resonance (NMR) spectroscopy is one of the most powerful and widely used techniques in chemical research for investigating structures and dynamics of molecules. Advanced methods can even be utilized for structure determinations of biopolymers, for example proteins or nucleic acids. NMR is also used in medicine for magnetic resonance imaging (MRI). The method is based on spectral lines of different atomic nuclei that are excited when a strong magnetic field and a radiofrequency transmitter are applied. The method is very sensitive to the features of molecular structure because also the neighboring atoms influence the signals from individual nuclei and this is important for determining the 3D-structure of molecules. This new edition of the popular classic has a clear style and a highly practical, mostly non-mathematical approach. Many examples are taken from organic and organometallic chemistry, making this book an invaluable guide to undergraduate and graduate students of organic chemistry, biochemistry, spectroscopy or physical chemistry, and to researchers using this well-established and extremely important technique. Problems and solutions are included.

This book describes the use of NMR spectroscopy for dealing with problems of small organic molecule structural elucidation. It features a significant amount of vital chemical shift and coupling information but more importantly, it presents sound principles for the selection of the techniques relevant to the solving of particular types of problem, whilst stressing the importance of extracting the maximum available information from the simple 1-D proton experiment and of

using this to plan subsequent experiments. Proton NMR is covered in detail, with a description of the fundamentals of the technique, the instrumentation and the data that it provides before going on to discuss optimal solvent selection and sample preparation. This is followed by a detailed study of each of the important classes of protons, breaking the spectrum up into regions (exchangeables, aromatics, heterocyclics, alkenes etc.). This is followed by consideration of the phenomena that we know can leave chemists struggling; chiral centres, restricted rotation, anisotropy, accidental equivalence, non-first-order spectra etc. Having explained the potential pitfalls that await the unwary, the book then goes on to devote chapters to the chemical techniques and the most useful instrumental ones that can be employed to combat them. A discussion is then presented on carbon-13 NMR, detailing its pros and cons and showing how it can be used in conjunction with proton NMR via the pivotal 2-D techniques (HSQC and HMBC) to yield vital structural information. Some of the more specialist techniques available are then discussed, i.e. flow NMR, solvent suppression, Magic Angle Spinning, etc. Other important nuclei are then discussed and useful data supplied. This is followed by a discussion of the neglected use of NMR as a tool for quantification and new techniques for this explained. The book then considers the safety aspects of NMR spectroscopy, reviewing NMR software for spectral prediction and data handling and concludes with a set of worked Q&As.

This text is aimed at people who have some familiarity with high-resolution NMR and who wish to deepen their understanding of how NMR experiments actually 'work'. This revised and updated edition takes the same approach as the highly-acclaimed first edition. The text concentrates on the description of commonly-used experiments and explains in detail the theory behind how such experiments work. The quantum mechanical tools needed to analyse pulse sequences are introduced set by step, but the approach is relatively informal with the emphasis on obtaining a good understanding of how the experiments actually work. The use of two-colour printing and a new larger format improves the readability of the text. In addition, a number of new topics have been introduced: How product operators can be extended to describe experiments in AX₂ and AX₃ spin systems, thus making it possible to discuss the important APT, INEPT and DEPT experiments often used in carbon-13 NMR. Spin system analysis i.e. how shifts and couplings can be extracted from strongly-coupled (second-order) spectra. How the presence of chemically equivalent spins leads to spectral features which are somewhat unusual and possibly misleading, even at high magnetic fields. A discussion of chemical exchange effects has been introduced in order to help with the explanation of transverse relaxation. The double-quantum spectroscopy of a three-spin system is now considered in more detail. Reviews of the First Edition "For anyone wishing to know what really goes on in their NMR experiments, I would highly recommend this book" – Chemistry World "...I warmly recommend for budding NMR spectroscopists, or others who wish to deepen their understanding of elementary NMR theory or theoretical tools" –

Magnetic Resonance in Chemistry

Nanofiber Composite Materials for Biomedical Applications presents new developments and recent advances in nanofiber-reinforced composite materials and their use in biomedical applications, including biomaterial developments, drug delivery, tissue engineering, and regenerative medicine. Unlike more conventional titles on composite materials, this book covers the most innovative new developments in nanofiber-based composites, including polymers, ceramics, and metals, with particular emphasis on their preparation and characterization methodology. Selected case studies illustrate new developments in clinical and preclinical use, making the information critical for the development of new medical materials and systems for use in human health care, and for the exploration of new design spaces based on these nanofibers. This book is essential reading for those working in biomedical science and engineering, materials science, nanoscience, biomedical nanotechnology, and biotechnology. Covers innovative new developments in nanofiber composites, including polymers, ceramics, and metals with particular emphasis on their preparation and characterization methodology Deals with biomedical applications, including biomaterials developments, drug delivery, tissue engineering, and regenerative medicine Presents selected case studies on nanofiber composite materials in both clinical and preclinical use

Updated and with approximately 25% new content, this textbook covers the latest developments, including instrumentation for microscopy and imaging, as well as current applications. The authors adopt a didactic approach, introducing infrared spectroscopy in a clear and well-structured way to provide students with a solid background in the principles and knowledge for efficiently using the method to obtain reliable results. Both beginners and experts will find up-to-date references for further reading. A must-have for advanced students (Master's and PhD) as well as those wanting to learn how the method works and how to work with it, including scientists from private and governmental labs.

"This book marks a significantly different approach to the subject. It has been designed specifically to offer a simpler and less sophisticated treatment of organic reaction mechanisms than that to be found in the Guidebook. It is based on three underlying principles: that there are three types of reaction - substitution, addition and elimination; that there are three types of reagent - nucleophiles, electrophiles and radicals; and that there are two effects - electronic and steric - through which the behaviour of a particular atom or group can be influenced by the rest of the molecule of which it is a constituent part." "A Primer to Mechanism in Organic Chemistry is an essential resource for first- and second-year chemistry undergraduates and particularly, though not exclusively, those not then proceeding to further chemical study. It is also a useful reference for sixth-form students."--BOOK JACKET.Title Summary field provided by Blackwell North America, Inc. All Rights Reserved

Die lange erwartete, vierte Auflage des Lehrbuchklassikers zur IR-Spektroskopie!

Will man Substanzen eindeutig charakterisieren und auf ihre Reinheit überprüfen, führt kein Weg an der IR-Spektroskopie als Analysemethode vorbei. Präzise und leicht verständlich, aktuell und sehr praxisbezogen lernen die künftigen Anwender alles, was sie über die IR-Spektroskopie wissen müssen: - Aufbau und Handhabung von Spektrometern, - Vorbereitung der Proben und deren Messung, - qualitative Interpretation der Spektren, - quantitative Bestimmungen, - spezielle Anwendungsgebiete und - spezielle und verwandte Methoden. Zahlreiche Hinweise auf weiterführende Literatur vermitteln eine gute Orientierung bei speziellen Fragestellungen, und helfen dabei, sich zum Experten weiterzuentwickeln.

From complex structure elucidation to biomolecular interactions - this application-oriented textbook covers both theory and practice of modern NMR applications. Part one sets the stage with a general description of NMR introducing important parameters such as the chemical shift and scalar or dipolar couplings. Part two describes the theory behind NMR, providing a profound understanding of the involved spin physics, deliberately kept shorter than in other NMR textbooks, and without a rigorous mathematical treatment of all the physico-chemical computations. Part three discusses technical and practical aspects of how to use NMR. Important phenomena such as relaxation, exchange, or the nuclear Overhauser effects and the methods of modern NMR spectroscopy including multidimensional experiments, solid state NMR, and the measurement of molecular interactions are the subject of part four. The final part explains the use of NMR for the structure determination of selected classes of complex biomolecules, from steroids to peptides or proteins, nucleic acids, and carbohydrates. For chemists as well as users of NMR technology in the biological sciences.

Heutzutage werden in fast allen Bereichen der Biowissenschaften und Medizin eine Vielzahl von experimentellen und analytischen Methoden angewandt. In diesem Buch werden in kompakter Form die für die interdisziplinäre Forschung und Entwicklung benötigten Labormethoden dargestellt. Zunächst werden allgemeine Methoden wie Chromatographie, Elektrophorese, enzymatische Testmethoden und Zentrifugation behandelt. Darauf folgen als anwendungsbezogene Methoden die Sequenzanalyse von Proteinen, DNA und Kohlenhydraten. Weitere Schwerpunkte liegen bei Radioisotopen, Elektroanalytik und immunologischen Methoden. Darüber hinaus wird auch auf die modernen Entwicklungen wie Elektrospray-Massenspektrometrie und Biosensoren ausführlich eingegangen.

Each volume includes "Wissenschaftliche Zeitschriften."

A solid introduction to the field of surfactant science, this new edition provides updated information about surfactant uses, structures, and preparation, as well as seven new chapters expanding on technology applications. Offers a comprehensive introduction and reference of the science and technology of surface active materials Elaborates, more fully than prior editions, aspects of

surfactant crystal structure as well as their effects on applications Adds more information on new classes and applications of natural surfactants in light of environmental consequences of surfactant use

Diese vollständig überarbeitete und aktualisierte Neuauflage des klassischen Lehrbuches beinhaltet neben den Grundlagen der NMR-Spektroskopie auch die der Spektreninterpretation. Ohne viel Mathematik bietet der Text eine Einleitung und deckt somit auch den Lehrstoff von Hochschulkursen ab. Der Hauptanteil des Buches ist nach wie vor der NMR-Spektroskopie an Lösungen gewidmet, doch wurden auch verstärkt Untersuchungen an Festkörpern und die Analyse von Biopolymeren berücksichtigt. Zum Schluss werden einige Einsatzmöglichkeiten der Kernspintomographie und der Kombination von Tomographie und Spektroskopie besprochen. Ergänzt wurde jedes Kapitel um Aufgaben, deren Lösungsvorschläge im Anschluss an Kapitel 14 zu finden sind. Mit seiner übersichtlichen Darstellung ist dieses Buch ein Muss für Studenten, Dozenten und Anwender der NMR-Spektroskopie in der Chemie, Biochemie und Pharmazie.

Oxide Thin Films and Nanostructures is an interdisciplinary approach to introduce readers to the field of oxide nano-materials, that is oxides of nano-meter size and dimensions. Emphasis is put to differentiate these nanoscale oxide objects from their solid bulk oxide parents and present their properties in a pedagogic way. Porosity in carbons often means different things to different people depending largely on the different applications of the various carbon materials. On the one hand, users involved in gas purification or respiratory protection are concerned primarily with microporosity, and at the other extreme, the user of carbon in the form of metallurgical coke is concerned with macroporosity because of its influence on the mechanical properties of the coke. Between these extremes there is a range of applications which rely on different aspects of the nature of the porous structure and the characterization required reflects the particular application in mind. This characterization of a wide diversity of porous structures presents some problems. However recent developments have produced some solutions, for example computerized image analysis has facilitated the measurement of pore shape and size. The eleven chapters in this book present an analysis of the current methods of characterization and the role of various aspects of carbon porosity in some representative and diverse applications.

A concise and accessible primer on the scientific writer's craft The ability to write clearly is critical to any scientific career. The Scientist's Guide to Writing provides practical advice to help scientists become more effective writers so that their ideas have the greatest possible impact. Drawing on his own experience as a scientist, graduate adviser, and editor, Stephen Heard emphasizes that the goal of all scientific writing should be absolute clarity; that good writing takes deliberate practice; and that what many scientists need are not long lists of prescriptive rules but rather direct engagement with their behaviors and attitudes when they write. He combines advice on such topics as how to generate and maintain writing momentum with practical tips on

structuring a scientific paper, revising a first draft, handling citations, responding to peer reviews, managing coauthorships, and more. In an accessible, informal tone, *The Scientist's Guide to Writing* explains essential techniques that students, postdoctoral researchers, and early-career scientists need to write more clearly, efficiently, and easily. Emphasizes writing as a process, not just a product Encourages habits that improve motivation and productivity Explains the structure of the scientific paper and the function of each part Provides detailed guidance on submission, review, revision, and publication Addresses issues related to coauthorship, English as a second language, and more

Solid State NMR A thorough and comprehensive textbook covering the theoretical background, experimental approaches, and major applications of solid-state NMR spectroscopy Nuclear Magnetic Resonance (NMR) spectroscopy is a powerful non-destructive technique capable of providing information about the molecular structure and dynamics of molecules. Alongside solution-state NMR, a well-established technique to study chemical structures and investigate physico-chemical properties of molecules in solutions, solid-state NMR (SSNMR) offers many exciting possibilities for the analysis of solid and soft materials across scientific fields. SSNMR shows unique capabilities for a detailed investigation of structural and dynamic properties of materials over wide space and time ranges. For this reason, and thanks to significant advances in the past several years, the application of SSNMR to materials is rapidly increasing in disciplines such as chemistry, physics, and materials and life sciences. *Solid State NMR: Principles, Methods, and Applications* offers a systematic introduction to the theory, methodological concepts, and major experimental methods of SSNMR spectroscopy. Exploring the unique potential of SSNMR for the structural and dynamic characterization of soft and either amorphous or crystalline solid materials, this comprehensive textbook provides foundational knowledge and recent developments of SSNMR, covering physical and theoretical background, experimental methods, and applications to pharmaceuticals, polymers, inorganic and hybrid materials, liquid crystals, and model membranes. Written by two expert authors to ensure a clear and consistent presentation of the subject, this textbook: Includes a brief introduction to the historical aspects and broad theoretical background of solid-state NMR spectroscopy Provides helpful illustrations to explain the various SSNMR concepts and methods Features accessible descriptive text with self-consistent use of quantum mechanics Covers the experimental aspects of SSNMR spectroscopy and in particular a description of many useful pulse sequences Contains references to relevant literature *Solid State NMR: Principles, Methods, and Applications* is the ideal textbook for university courses on SSNMR, advanced spectroscopies, and a valuable single-volume reference for spectroscopists, chemists, and researchers in the field of materials. First multi-year cumulation covers six years: 1965-70.

Magnetic Resonance in Biological Systems, Volume 9 is a collection of manuscripts presented at the Second International Conference on Magnetic Resonance in Biological Systems, held in Wenner-Gren Center, Stockholm, Sweden on June 1966. The conference is sponsored by International Union of Biochemistry Swedish Medical Research Council Swedish Natural Science Research Council Wenner-Gren Center Foundation for Scientific Research. This book contains 51 chapters, and begins with reviews of NMR investigations of biological macromolecules, including proteins, amino

acids, and glycylglycine copper (II). Considerable chapters are devoted to numerous biological studies using the electronic paramagnetic resonance (EPR), thus introducing the branch of science called submolecular biology. This book also explores other applications of NMR and EPR, with special emphasis on blood component analysis and protein-metal complexes. The final chapters survey the principles and applications of Mössbauer spectroscopy. This book will prove useful to analytical chemists and biologists.

Combines clear and concise discussions of key NMR concepts with succinct and illustrative examples Designed to cover a full course in Nuclear Magnetic Resonance (NMR) Spectroscopy, this text offers complete coverage of classic (one-dimensional) NMR as well as up-to-date coverage of two-dimensional NMR and other modern methods. It contains practical advice, theory, illustrated applications, and classroom-tested problems; looks at such important ideas as relaxation, NOEs, phase cycling, and processing parameters; and provides brief, yet fully comprehensible, examples. It also uniquely lists all of the general parameters for many experiments including mixing times, number of scans, relaxation times, and more. Nuclear Magnetic Resonance Spectroscopy: An Introduction to Principles, Applications, and Experimental Methods, 2nd Edition begins by introducing readers to NMR spectroscopy - an analytical technique used in modern chemistry, biochemistry, and biology that allows identification and characterization of organic, and some inorganic, compounds. It offers chapters covering: Experimental Methods; The Chemical Shift; The Coupling Constant; Further Topics in One-Dimensional NMR Spectroscopy; Two-Dimensional NMR Spectroscopy; Advanced Experimental Methods; and Structural Elucidation. Features classical analysis of chemical shifts and coupling constants for both protons and other nuclei, as well as modern multi-pulse and multi-dimensional methods Contains experimental procedures and practical advice relative to the execution of NMR experiments Includes a chapter-long, worked-out problem that illustrates the application of nearly all current methods Offers appendices containing the theoretical basis of NMR, including the most modern approach that uses product operators and coherence-level diagrams By offering a balance between volumes aimed at NMR specialists and the structure-determination-only books that focus on synthetic organic chemists, Nuclear Magnetic Resonance Spectroscopy: An Introduction to Principles, Applications, and Experimental Methods, 2nd Edition is an excellent text for students and post-graduate students working in analytical and bio-sciences, as well as scientists who use NMR spectroscopy as a primary tool in their work.

Der einfache Einstieg in die moderne NMR-Spektroskopie! Bei der nun nach knapp 4 Jahren fälligen zweiten Auflage hat sich an dem erfolgreichen Konzept - Anschaulichkeit und Praxisnähe - nichts geändert. Das Buch wurde jedoch an einigen Stellen aktualisiert und erweitert, z.B. um einige neue Aufnahmetechniken wie die invers geführten Experimente. Um zu zeigen, daß die Methode durchaus nicht nur für Organiker geeignet ist, wurden nun auch einige Besonderheiten der NMR-Spektroskopie 'anderer' Kerne als ^1H und ^{13}C aufgenommen. Aus Rezensionen der ersten Auflage: '... eine insgesamt gelungene Einführung in alle NMR-Techniken, von denen heute im wesentlichen die Rede ist. Fraglos gehört das Buch in jede Lehrbuchsammlung.' Nachr. Chemie, Technik und Labor. 'Damit eignet sich dieses Lehrbuch als Einstieg für alle, die diese wichtige Methode für Studium und Arbeit brauchen, aber auch für diejenigen, die zwar die alten Techniken beherrschen, nun aber die neuen wie insbesondere die zweidimensionalen Verfahren verstehen und anwenden müssen.'

Chemiker-Zeitung

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