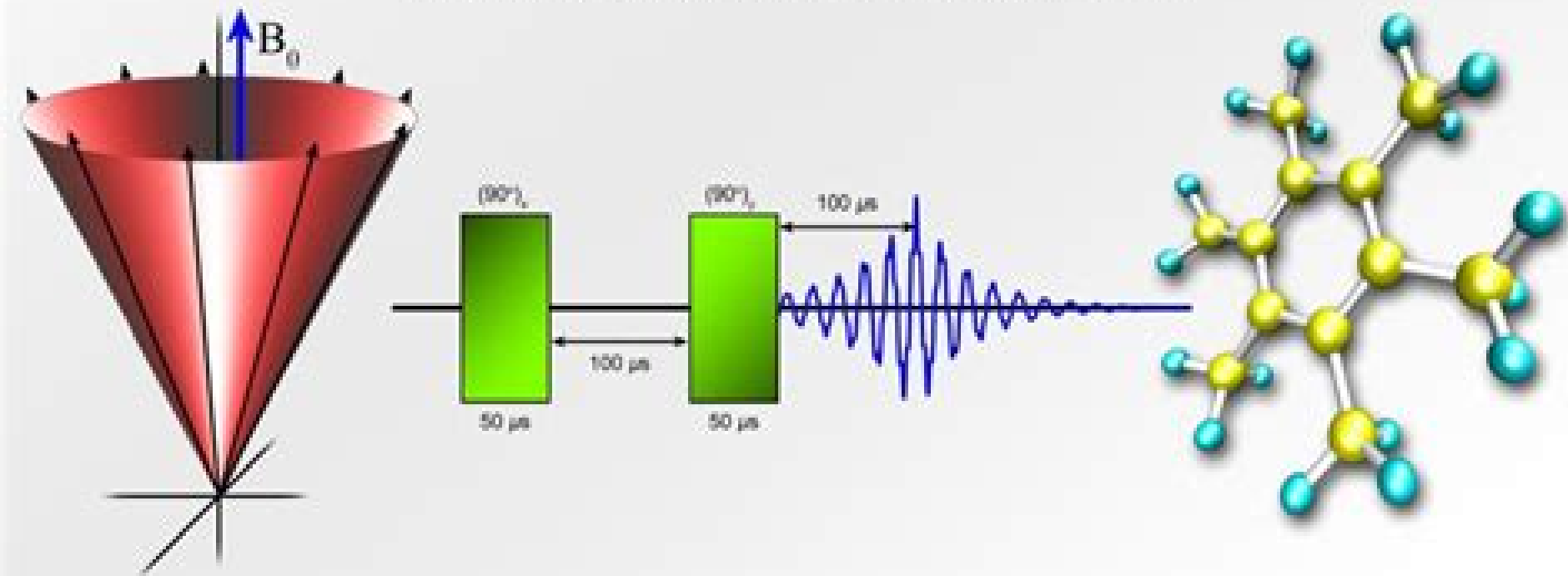


Solid-state ^2H NMR Spectroscopy for the Undergraduate Physics Laboratory

Jacob J. Kinnun, Avi Leftin, Michael F. Brown

University of Arizona, Tucson, AZ



Solidstate Spectroscopy An Introduction

A Loxley



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Solid-State Spectroscopy Hans Kuzmany,1998 This text is an introductory compilation of basic concepts methods and applications in the field of spectroscopy It discusses new radiation sources such as lasers and synchrotrons and describes the linear response together with the basic principles and the technical background for various scattering experiments Solid State Spectroscopy ,1970 *Solid-State Spectroscopy* Hans Kuzmany,2013-03-09 Spectroscopic methods have opened up a new horizon in our knowledge of solid state materials Numerous techniques using electromagnetic radiation or charged and neutral particles have been invented and worked out to a high level in order to provide more detailed information on the solids In this text new radiation sources like lasers and synchrotrons are discussed It provides a description of the linear response together with the basic principles and the technical background for various scattering experiments Fourier transform spectroscopy pulsed and magnetic NMR techniques photo emission and light and electron scattering are elucidated Each chapter includes problems The concept of this textbook is designed for graduate students *Handbook of Applied Solid State Spectroscopy* D.R. Vij,2007-02-15 Solid State spectroscopy is a burgeoning field with applications in many branches of science including physics chemistry biosciences surface science and materials science Handbook of Applied Solid State Spectroscopy brings together in one volume information about various spectroscopic techniques that is currently scattered in the literature of these disciplines This concise yet comprehensive volume covers theory and applications of a broad range of spectroscopies including NMR NQR EPR ESR ENDOR scanning tunneling acoustic resonance FTIR auger electron emission x ray photoelectron emission luminescence and optical polarization and more Emphasis is placed on fundamentals and current methods and procedures together with the latest applications and developments in the field *An Introduction to the Optical Spectroscopy of Inorganic Solids* Jose Solé,Luisa Bausa,Daniel Jaque,2005-04-01 This practical guide to spectroscopy and inorganic materials meets the demand from academia and the science community for an introductory text that introduces the different optical spectroscopic techniques used in many laboratories for material characterisation Treats the most basic aspects to be introduced into the field of optical spectroscopy of inorganic materials enabling a student to interpret simple optical absorption reflectivity emission and scattering spectra Contains simple illustrative examples and solved exercises Covers the theory instrumentation and applications of spectroscopy for the characterisation of inorganic materials including lasers phosphors and optical materials such as photonics This is an ideal beginner s guide for students with some previous knowledge in quantum mechanics and optics as well as a reference source for professionals or researchers in materials science especially the growing field of optical materials Progress in Solid State Chemistry Research Ronald W. Buckley,2007 The book on solid state chemistry presents studies of chemical structural thermodynamic electronic magnetic and optical properties and processes in solids Research areas include bonding in solids crystal chemistry crystal growth mechanisms diffusion epitaxy high pressure

processes magnetic properties of materials optical characterisation of materials order disorder phase equilibria and transformation mechanisms reactions at surfaces statistical mechanics of defect interactions structural studies and transport phenomena Practical Guide to Materials Characterization Khalid Sultan,2022-09-13 Practical Guide to Materials Characterization Practice oriented resource providing a hands on overview of the most relevant materials characterization techniques in chemistry physics engineering and more Practical Guide to Materials Characterization focuses on the most widely used experimental approaches for structural morphological and spectroscopic characterization of materials providing background insights on the correct usage of the respective techniques and the interpretation of the results With a focus on practical applications the work illustrates what to use and when including real life examples showing which characterization techniques are best suited for particular purposes Furthermore the work covers the practical elements of the analytical techniques used to characterize a wide range of functional materials both in bulk as well as thin film form in a simple but thorough manner To aid in reader comprehension Practical Guide to Materials Characterization is divided into eight distinct chapters To set the stage the first chapter of the book reviews the fundamentals of materials characterization that are necessary to understand and use the methods presented in the ensuing chapters Among the techniques covered are X ray diffraction Raman spectroscopy X ray spectroscopy electron microscopies magnetic measurement techniques infrared spectroscopy and dielectric measurements Specific sample topics covered in the remaining seven chapters include Bragg s Law the Von Laue Treatment Laue s Equation the Rotating Crystal Method the Powder Method orientation of single crystals and structure of polycrystalline aggregates Classical theory of Raman scattering quantum theory of Raman spectroscopy high pressure Raman spectroscopy and surface enhanced Raman spectroscopy Basic principles of XAS energy referencing XPS spectra and its features Auger Electron Spectroscopy AES and interaction of electrons with matter Magnetization measuring instruments the SQUID magnetometer and the advantages and disadvantages of vibrating sample magnetometer VSM With comprehensive and in depth coverage of the subject Practical Guide to Materials Characterization is a key resource for practicing professionals who wish to better understand key concepts in the field and seamlessly harness them in a myriad of applications across many different industries **Spectroscopic Properties of Inorganic and Organometallic**

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Laser Cooling of Solids S V Petrushkin, V V Samartsev, 2009-10-26 Laser cooling is an important emerging technology in such areas as the cooling of semiconductors The book examines and suggests solutions for a range of problems in the development of miniature solid state laser refrigerators self cooling solid state lasers and optical echo processors It begins by looking at the basic theory of laser cooling before considering such topics as self cooling of active elements of solid state lasers laser cooling of solid state information media of optical echo processors and problems of cooling solid state quantum processors Laser Cooling of Solids is an important contribution to the development of compact laser powered cryogenic refrigerators both for the academic community and those in the microelectronics and other industries Provides a timely review of this promising field of research and discusses the fundamentals and theory of laser cooling Particular attention is given to the physics of cooling processes and the mathematical description of these processes Reviews previous experimental investigations in laser cooling and presents progress towards key potential applications *NMR Methods for Characterization of Synthetic and Natural Polymers* Rongchun Zhang, Toshikazu Miyoshi, Pingchuan Sun, 2019-07-29 Since the introduction of FT NMR spectroscopy around five decades ago NMR has achieved significant advances in hardware and methodologies accompanied with the enhancement of spectral resolution and signal sensitivity Rapid developments in the polymers field mean that accurate and quantitative characterization of polymer structures and dynamics is the keystone for precisely regulating and controlling the physical and chemical properties of the polymer This book specifically focuses on NMR investigation of complex polymers for the polymer community as well as NMR spectroscopists and will push the development of both fields It covers the latest advances for example high field DNP and ultrafast MAS methodologies and show how these novel NMR methods characterize various synthetic and natural polymers *Spectroscopic Properties of Inorganic and Organometallic Compounds* D M Adams, E A V Ebsworth, 2007-10-31 Spectroscopic Properties of Inorganic and Organometallic Compounds provides a unique source of information on an important area of chemistry Divided into sections mainly according to the particular spectroscopic technique used coverage in each volume includes NMR with reference to stereochemistry dynamic systems paramagnetic complexes solid state NMR and Groups 13 18 nuclear quadrupole resonance spectroscopy vibrational spectroscopy of main group and transition element compounds and coordinated ligands and electron diffraction Reflecting the growing volume of published work in this field researchers will find this Specialist Periodical Report an invaluable source of information on current methods and applications Specialist Periodical Reports provide systematic and detailed review coverage in major areas of chemical research Compiled by teams of leading experts in their specialist fields this series is designed to help the chemistry community keep current with the latest developments in their field Each volume

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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.

Excitons at High Density H.

Haken, S. Nikitine, 2006-04-11 **Solid State Physics** Frederick Seitz, David Turnbull, 1975 Solid State Physics V30

Handbook of Solid State Chemistry, 6 Volume Set Richard Dronskowski, Shinichi Kikkawa, Andreas Stein, 2017-10-23

This most comprehensive and unrivaled compendium in the field provides an up to date account of the chemistry of solids, nanoparticles and hybrid materials. Following a valuable introductory chapter reviewing important synthesis techniques, the handbook presents a series of contributions by about 150 international leading experts. The Who's Who of solid state science. Clearly structured in six volumes, it collates the knowledge available on solid state chemistry, starting from the synthesis and modern methods of structure determination. Understanding and measuring the physical properties of bulk solids and the theoretical basis of modern computational treatments of solids are given ample space, as are such modern trends as nanoparticles, surface properties and heterogeneous catalysis. Emphasis is placed throughout not only on the design and structure of solids but also on practical applications of these novel materials in real chemical situations.

Luminescence of Inorganic Solids B. Bartolo, 2012-12-06 These proceedings report the lectures and seminars of a course entitled Luminescence of Inorganic Solids held at Erice, Italy, June 15-30, 1977. This course was an activity of the International School of Atomic and Molecular Spectroscopy of the Ettore Majorana Centre for Scientific Culture. The course opened with an overview of the present status of luminescence research and with an assessment of its future trends. The following lectures introduced the basic formalism behind the interaction of matter with the radiation field and the lattice phonons. The luminescence properties of various classes of inorganic materials were treated next, for the specific cases of unfilled shell activators, transition metal, lanthanide and actinide ions and filled s¹, s² and d¹⁰ ions. Different models suitable for the description of the luminescence properties of semiconductors were examined next. The dynamics of energy transfer and relaxation in the excited state of the activators were treated in lectures devoted to the luminescence phenomena of

sensitization concentration quenching and thermal quenching Finally the relevance of luminescence studies to the field of phosphor technology and to the laser field Has examined Each lecturer began the treatment of this topic s at a fundamental level and finally reached the current level of research The sequence of the lectures was determined by the requirements of a didactical presentation The emphasis of the course was primarily on basic principles The formal lectures Here complemented by seminars and discussions

Solid State Physics ,1997-10-20 Solid State Physics Volume 51 continues the serial s tradition of excellence by focusing on the optical and electronic properties and applications of semiconductors All of the topics in this volume are at the cutting edge of research in the semiconductor field and will be of great interest to the scientific community

Fundamentals and Properties of Multifunctional Nanomaterials Sabu Thomas,Nandakumar Kalarikkal,Ann Rose Abraham,2021-08-25 Fundamentals and Properties of Multifunctional Nanomaterials outlines the properties of highly intricate nanosystems including liquid crystalline nanomaterials magnetic nanosystems ferroelectrics nanomultiferroics plasmonic nanosystems carbon based nanomaterials 1D and 2D nanomaterials and bio nanomaterials This book reveals the electromagnetic interference shielding properties of nanocomposites The fundamental attributes of the nanosystems leading to the multifunctional applications in diverse areas are further explored throughout this book This book is a valuable reference source for researchers in materials science and engineering as well as in related disciplines such as chemistry and physics Explains the concepts and fundamental applications of a variety of multifunctional nanomaterials Introduces fundamental principles in the fields of magnetism and multiferroics Addresses ferromagnetics multiferroics and carbon nanomaterials

Structure of Matter Attilio Rigamonti,Pietro Carretta,2015-06-13 This textbook now in its third edition provides a formative introduction to the structure of matter that will serve as a sound basis for students proceeding to more complex courses thus bridging the gap between elementary physics and topics pertaining to research activities The focus is deliberately limited to key concepts of atoms molecules and solids examining the basic structural aspects without paying detailed attention to the related properties For many topics the aim has been to start from the beginning and to guide the reader to the threshold of advanced research This edition includes four new chapters dealing with relevant phases of solid matter magnetic electric and superconductive and the related phase transitions The book is based on a mixture of theory and solved problems that are integrated into the formal presentation of the arguments Readers will find it invaluable in enabling them to acquire basic knowledge in the wide and wonderful field of condensed matter and to understand how phenomenological properties originate from the microscopic quantum features of nature

Nuclear Magnetic Resonance G A Webb,2007-10-31 As a spectroscopic method Nuclear Magnetic Resonance NMR has seen spectacular growth over the past two decades both as a technique and in its applications Today the applications of NMR span a wide range of scientific disciplines from physics to biology to medicine Each volume of Nuclear Magnetic Resonance comprises a combination of annual and biennial reports which together provide comprehensive of the literature on this topic This Specialist Periodical

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