Access Free Ultrathin Magnetic Structures Iii Fundamentals Of Pdf Free Copy

Spin Dynamics in Confined Magnetic Structures II Feb 21 2023
Novel Magnetic Nanostructures Mar 30 2021 Novel Magnetic Nanostructures: Unique Properties and Applications reviews the synthesis, design, characterization and unique properties of emerging nanostructured magnetic materials. It discusses the most promising and relevant applications, including data storage, spintronics and biomedical applications. Properties investigated include electronic, self-assembling, multifunctional, and magnetic properties, along with magnetic phenomena. Structures range from magnetic nanoclusters, nanoparticles, and nanowires, to multilayers and self-assembling nanosystems. This book provides a better understanding of the static and dynamic magnetism in new nanostructures for important applications. Provides an overview of the latest research on novel magnetic nanostructures, including molecular nanomagnets, metallacrown magnetic nanostructures, magnetic dendrimers, self-assembling magnetic structures, multifunctional nanostructures, and much more Reviews the synthesis, design, characterization and detection of useful properties in new magnetic nanostructures Highlights the most relevant applications, including spintronic, data storage and biomedical applications
Ultrathin Magnetic Structures III Oct 29 2023 The ability to understand and control the unique properties of interfaces has created an entirely new field of magnetism which already has a profound impact in technology and is providing the basis for a revolution in electronics. The last decade has seen dramatic progress in the development of magnetic devices for information technology but also in the basic understanding of the physics of magnetic nanostructures. This volume describes thin film magnetic properties and methods for characterising thin film structure topics that underpin the present 'spintronics' revolution in which devices are based on combined magnetic materials and semiconductors. Volume IV deals with the fundamentals of spintronics: magnetoelectronic materials, spin injection and detection, micromagnetics and the development of magnetic random access memory based on GMR and tunnel junction devices. Together these books provide readers with a comprehensive account of an exciting and rapidly developing field. The treatment is designed to be accessible both to newcomers and to experts already working in this field who would like to get a better understanding of this very diversified area of research.
Ultrathin Magnetic Structures and Interface Magnetism Oct 05 2021
Magnetic Multilayers and Giant Magnetoresistance Jan 28 2021 This unified overview of recent progress in a growing, multi-disciplinary field places special emphasis on the industrial applications of magnetic multilayered materials. The text describes a wide range of physical aspects, together with experimental and theoretical methods.
The Magnetic Structures of Rare Earth Manganites RMnO[sub]3[/sub]. Jul 02 2021 The crystal structures and ferroelectric properties of the RMnO3 compounds with R = Ho, Er, Tm, Yb, Lu, and Y have recently been reported. In this paper, the magnetic configurations of the manganese ion moments in representative members of this series as well as in the newly prepared isostructural compound ScMnO3 are described.
Spin Dynamics in Confined Magnetic Structures I Dec 19 2022 Introductory chapters help newcomers to understand the basic concepts, and the more advanced chapters give the current state of the art for most spin dynamic issues in the milliseconds to femtoseconds range. Emphasis is placed on both the discussion of the experimental techniques and on the theoretical work. The comprehensive presentation of these developments makes this volume very timely and valuable for every researcher working in the field of magnetism.
Advanced Magnetic Nanostructures Feb 26 2021 Advanced magnetic nanostructures is an emerging field in magnetism and nanotechnology, but the literature consists of a rich variety of original papers and parts of reviews and books whose scope is comparatively broad. This calls for a book with specific emphasis on state-of-the-art synthetic methods for fabricating, characterizing and theoretically modeling new magnetic nanostructures. This book is intended to provide a comprehensive overview of the present state of the field. Leading researchers world-wide have contributed a survey of their special ties to guide the reader through the exploding literature in nanomagnetic structures. The focus is on deliberately structured nanomagnets. It includes cluster assembled, self-organized and patterned thin films but excludes, for example, multilayered thin films. We target both industrial and academic researchers in magnetism and related areas, such as nanotechnology, materials science, and theoretical solid-state physics.
Nanoscale Artificial Magnetic Structures Nov 25 2020 Over the past three years, we investigated patterned magnetic nanostructures and their applications in ultra-high density magnetic storage. We have (1) developed nanofabrication technology and fabricated various nanoscale and high density magnetic structures; (2) demonstrated advantages of patterned magnetic nanostructures, (such as self-formation of single domain, quantized magnetization, and control of switching field by controlling the size and shape of the structures); (3) proposed and demonstrated quantum magnetic disks--a new paradigm for magnetic storage (e.g. fabricated QMDs of 65 Gbits/in(2) density, which is nearly 100 times of the density in current commercial hard disks); and (4) developed micromagnetic modeling tool and used them to study the domain configurations and switching of patterned magnetic nanostructures, and to design and analyze nanoscale spin-valve memory elements. Our research has significantly advanced the development of future ultra-high density magnetic storage and sensors.
Carbon Based Magnetism Jun 20 2020 Carbon Based Magnetism is the most complete, detailed, and accurate guide on the magnetism of carbon, the main element of living creatures. Written by the leading experts in the field, the book provides a comprehensive review of relevant experimental data and theoretical concepts related to the magnetism of metal-free carbon systems. These systems include carbon based compounds, namely organic radical magnetic systems, and magnetic materials based on carbon structures. The aim is to advance the understanding of the fundamental properties of carbon. This volume discusses all major modern hypotheses on the physical nature of magnetic ordering in carbon systems. The first chapters deal with magnetic ordering mechanisms in p-electron systems as well as molecular magnets with spins residing only in p-orbitals. The following chapters explore the magnetic properties of pure carbon, with particular emphasis on nanosized carbon systems with closed boundary (fullerenes and nanotubes) and with open boundary (structures with edge-localized magnetic states). The remaining chapters focus on newer topics: experimental observation and theoretical models for magnetic ordering above room temperature in pure carbon. The book also includes twenty three review articles that summarize the most significant recent and ongoing exciting scientific developments and provide the explanation. It also highlights some problems that have yet to be solved and points out new avenues for research. This book will appeal to physicists, chemists and biologists. The most complete, detailed, and accurate Guide in the magnetism of carbon Dynamically written by the leading experts Deals with recent scientific highlights Gathers together chemists and physicists, theoreticians and experimentalists Unified treatment rather than a series of individually authored papers Description of genuine organic molecular ferromagnets Unique description of new carbon materials with Curie temperatures well above ambient.
Magnetic Structures of 2D and 3D Nanoparticles Oct 17 2022 Magnetic nanoparticles appear naturally in rock magnetism together with a large distribution of sizes and shapes. They have numerous applications from nano-size magnetic memories to metamaterials for electromagnetic waves as well as biological applications such as nanosurgery with minimal traumatism. Their long-ranged size- and shape-dependent dipolar interactions provide numerous useful properties. This book describes the preparation as well as the magnetic properties of nanoparticles and also considers 2D dots, nearly spherical samples, elongated samples, and various assemblies of nanoparticles. The authors report the static magnetic structures and dynamic properties of these nanoparticles and the topological defects in 2D and 3D nanoparticles with new examples of S-shaped vortex or antivortex and of bent vortex or antivortex in 3D nanoparticles. The spectrum of magnetic excitations is shown to exhibit the occurrence of gaps, a key for magnonic metamaterial devices. Magnetic excited states are also considered with their coupling to nanoparticle elastic properties.
Structures of Permanent Magnets Jul 14 2022 Commences with a review of the fundamental concepts of magnetostatics and the analysis of solutions to problems in simple geometrics, followed by the design of magnetic structures. The third section analyzes two major aspects of the magnetic structures and demagnetization properties of actual magnetic material. Offers a number of practical uses for permanent magnets, particularly to Magnetic Resonance Imaging and also includes industrial machinery, high energy accelerators and free electron lasers.
Spin Arrangements and Crystal Structure, Domains, and Micromagnetics Dec 27 2020 Spin Arrangements and Crystal Structure, Domains, and Micromagnetics deals with cooperative phenomena characterized by ordered arrangements of magnetic moments subject to strong mutual interactions. The

emphasis is on the ferromagnetism, ferrimagnetism, and antiferromagnetism of magnetically ordered materials such as insulators and metals. Both theoretical and experimental points of view are presented. Comprised of 12 chapters, this volume begins with an introduction to magnetism and crystal structure in nonmetals, followed by an evaluation of exchange interactions from experimental data. Subsequent chapters focus on the theory of neutron scattering by magnetic crystals; spin configuration of ionic structures; spin arrangements in metals; and permanent magnet materials. Fine particles, thin films, and exchange anisotropy are also considered, with particular reference to the effects of finite dimensions and interfaces on the basic properties of ferromagnets. The book also examines micromagnetics; domains and domain walls; the structure and switching of permalloy films; magnetization reversal in nonmetallic ferromagnets; and preparation and crystal synthesis of magnetic oxides. This book will be a useful resource for professionals and students with physics or chemistry backgrounds.

Quantum Mechanical First Principles Calculations of the Electronic and Magnetic Structure of Fe-Bearing Rock-Forming Silicates Jun 01 2021 The focus of this thesis is the study of the electronic and magnetic structure of three representative members of Fe-bearing rock-forming silicates, viz. orthoferrosilite (Fe2+2Si2O6), almandine (Fe2+3Al2(SiO4)3) and andradite (Ca3Fe3+2(SiO4)3). These minerals have attracted significant attention due to their abundance in the Earth's crust and mantle, and because crystallised silicates are main components of cosmic dust which is the most abundant raw material in the Universe. For this purpose quantum mechanical first principles electronic structure calculations are performed by the most efficient DFT method in the local spin-density approximation for calculating spectroscopic data: the spin-polarized self consistent charge Xa method. The specific feature and strength of these investigations consist in the theoretical characterization of these complex systems based on experimental results. This means that, on one hand, experimental spectroscopic and crystallographic data are being used to judge the reliability of the calculations, whereas, on the other hand, experimental data are interpreted and explained by the theoretical results. This work comprises seven chapters. After a brief introduction (Chapter 1) Chapter 2 describes the theoretical bases, ideas, approximations and advantages of the SCC- Xa method and basics of the art of cluster construction. Chapter 3 considers physical bases of crystal field theory, absorption, Mossbauer spectroscopy and magnetic interactions, as well as the calculation of spectroscopic data within the frame of the SCC-Xa method. In addition, tetragonally, trigonally and angularly distorted octahedral sites with various degrees of the distortions are calculated and analyzed. The electronic and magnetic structures of orthoferrosilite, almandine and andradite are described in the following chapters. In the case of orthoferrosilite the magnetic interactions between the iron spins within the ribbons and between neighboring ribbons are characterized. Two identical interpenetrating magnetic sublattices of circles of 10 edge-shared dodecahedra are revealed and characterized in almandine. The calculated spin structure explains and solves the controversy in the interpretation of the Mossbauer spectra of almandine below the Neel temperature. For andradite a model of the magnetic structure is proposed based on geometrical considerations and the calculated spin coupling constants for the various interaction pathways. According to this model, the magnetic structure of andradite consists of two frustrated equivalent magnetic sublattices. The spins of the Fe ions within each sublattice are coupled antiferromagnetically. The derived spin pattern explains two sextets in the Mossbauer spectra of andradite below the Neel temperature. Finally, the main results are summarized in Chapter 7.

Ultrathin Magnetic Structures: Measurement techniques and novel magnetic properties Mar 10 2022

Elements of Slow-Neutron Scattering Aug 03 2021 This book provides a comprehensive and up-to-date introduction to the fundamental theory and applications of slow-neutron scattering.

Ultrathin Magnetic Structures II Jul 26 2023

Neutron Scattering from Magnetic Materials Jun 13 2022 Neutron Scattering from Magnetic Materials is a comprehensive account of the present state of the art in the use of the neutron scattering for the study of magnetic materials. The chapters have been written by well-known researchers who are at the forefront of this field and have contributed directly to the development of the techniques described. Neutron scattering probes magnetic phenomena directly. The generalized magnetic susceptibility, which can be expressed as a function of wave vector and energy, contains all the information there is to know about the statics and dynamics of a magnetic system and this quantity is directly related to the neutron scattering cross section. Polarized neutron scattering techniques raise the sophistication of measurements to even greater levels and gives additional information in many cases. The present book is largely devoted to the application of polarized neutron scattering to the study of magnetic materials. It will be of particular interest to graduate students and researchers who plan to investigate magnetic materials using neutron scattering. · Written by a group of scientist who have contributed directly in developing the techniques described. · A complete treatment of the polarized neutron scattering not available in literature. · Gives practical hits to solve magnetic structure and determine exchange interactions in magnetic solids. · Application of neutron scattering to the study of the novel electronic materials.

Magnetic Properties of Metals Sep 23 2020 During the last decades the knowledge of the magnetic properties of the d transition elements and of their metallic alloys and compounds has increased widely. The improvement of preparation techniques for well-defined substances, the development of sophisticated measuring methods and above all the drive to obtain more insight in the origin of magnetic interactions in solids have resulted in the publication of many specific magnetic properties for an abundance of all kinds of metallic materials. The data assembled in this booklet are selected from the comprehensive compilation of magnetic and related properties of metals in the Landolt-Bornstein New Series Group III sub volumes 19a, band c. It has been attempted to include preferentially those properties which are of a basic character and which therefore are most often needed by scientists active in the field of solid state magnetism. In the field of magnetism, there is a gradual transition from the use of cgs/emu units to SI units. It was, however, not intended to represent all data in the units of one system, regardless of how nice this would have been from a systematic point of view. Instead, mostly preference was given to the system of units that was originally used by the authors whose work is quoted. Thus cgs/ emu units occur most frequently. Of colirse the user of the tables and figures is helped in several ways to convert the data to the units which he is most familiar with, see, e. g.

Modern Techniques for Characterizing Magnetic Materials Jan 08 2022 Modern Techniques for Characterizing Magnetic Materials provides an extensive overview of novel characterization tools for magnetic materials including neutron, photon and electron scatterings and other microscopy techniques by world-renowned scientists. This interdisciplinary reference describes all available techniques to characterize and to understand magnetic materials, techniques that cover a wide range of length scales and belong to different scientific communities. The diverse contributions enhance cross-discipline communication, while also identifying both the drawbacks and advantages of different techniques, which can result in deriving effective combinations of techniques that are especially fruitful at nanometer scales. It will be a valuable resource for all graduate students, researchers, engineers and scientists who are interested in magnetic materials including their crystal structure, electronic structure, magnetization dynamics and their associated magnetic properties and underlying magnetism.

Magnetic Neutron Diffraction Aug 15 2022 The inter action between the magnetic field generated by the neutron and the magnetic moment of atoms containing unpaired electrons was experimentally demonstrated for the first time about twenty years ago. The basic theory describing such an in teraction had already been developed and the first nuclear reactors with large available thermal neutron fluxes had recently been con structed. The power of the magnetic neutron interaction for in vestigating the structure of magnetic materials was immediately recognized and put to use where possible. Neutron diffraction, however, was practicable only in countries with nuclear reactors. The earliest neutron determinations of magnetic ordering were hence primarily carried out at Oak Ridge and Brookhaven in the US, at Chalk River in Canada and at Harwell in England. Diffraction patterns from polycrystalline ferromagnets and antiferromagnets are interpretable if produced by simple spin arrays. More complex magnetic scattering patterns could often be unravelled, in terms of a three-dimensional array of atomic moments, if the specimen studied is a single crystal. The devel opment of sophisticated cryogenic equipment, with independently alignable magnetic fields, opened the way to greater complexity in the magnetic structures that could be successfully determined, as did also the introduction of polarized neutron beams. By the end of the 'sixties, many countries were contributing significantly to neutron diffraction studies of a wide variety of magnetic materials.

Atomic- and Nanoscale Magnetism Aug 23 2020 This book provides a comprehensive overview of the fascinating recent developments in atomic- and nanoscale magnetism, including the physics of individual magnetic adatoms and single spins, the synthesis of molecular magnets for spintronic applications, and the magnetic properties of small clusters as well as non-collinear spin textures, such as spin spirals and magnetic skyrmions in ultrathin films and nanostructures. Starting from the level of atomic-scale magnetic interactions, the book addresses the emergence of many-body states in quantum magnetism and complex spin states resulting from the competition of such interactions, both experimentally and theoretically. It also introduces novel microscopic and spectroscopic techniques to reveal the exciting physics of magnetic adatom arrays and nanostructures at ultimate spatial and temporal resolution and demonstrates their applications using various insightful examples. The book is intended for researchers and graduate students interested in recent developments

of one of the most fascinating fields of condensed matter physics.

Nanoscale Magnetic Materials and Applications Apr 11 2022 Nanoscale Magnetic Materials and Applications covers exciting new developments in the field of advanced magnetic materials. Readers will find valuable reviews of the current experimental and theoretical work on novel magnetic structures, nanocomposite magnets, spintronic materials, domain structure and domain-wall motion, in addition to nanoparticles and patterned magnetic recording media. Cutting-edge applications in the field are described by leading experts from academic and industrial communities. These include new devices based on domain wall motion, magnetic sensors derived from both giant and tunneling magnetoresistance, thin film devices in micro-electromechanical systems, and nanoparticle applications in biomedicine. In addition to providing an introduction to the advances in magnetic materials and applications at the nanoscale, this volume also presents emerging materials and phenomena, such as magnetocaloric and ferromagnetic shape memory materials, which motivate future development in this exciting field. Nanoscale Magnetic Materials and Applications also features a foreword written by Peter Grünberg, recipient of the 2007 Nobel Prize in Physics.

Ultrathin Magnetic Structures I May 24 2023 The ability to understand and control the unique properties of interfaces has created an entirely new field of magnetism, with profound impact in technology and serving as the basis for a revolution in electronics. Our understanding of the physics of magnetic nanostructures has also advanced significantly. This rapid development has generated a need for a comprehensive treatment that can serve as an introduction to the field for those entering it from diverse fields, but which will also serve as a timely overview for those already working in this area. The four-volume work Ultra-Thin Magnetic Structures aims to fulfill this dual need. The original two volumes – now available once more – are An Introduction to the Electronic, Magnetic and Structural Properties (this volume) and "Measurement Techniques and Novel Magnetic Properties." Two new volumes, "Fundamentals of Nanomagnetism" and "Applications of Nanomagnetism," extend and complete this comprehensive work by presenting the foundations of spintronics.

Chirality, Magnetism and Magnetoelectricity Oct 25 2020 This book discusses theoretical and experimental advances in metamaterial structures, which are of fundamental importance to many applications in microwave and optical-wave physics and materials science. Metamaterial structures exhibit time-reversal and space-inversion symmetry breaking due to the effects of magnetism and chirality. The book addresses the characteristic properties of various symmetry breaking processes by studying field-matter interaction with use of conventional electromagnetic waves and novel types of engineered fields: twisted-photon fields, toroidal fields, and magnetoelectric fields. In a system with a combined effect of simultaneous breaking of space and time inversion symmetries, one observes the magnetochiral effect. Another similar phenomenon featuring space-time inversion symmetries is related to use of magnetoelectric materials. Cross-coupling of the electric and magnetic components in these material structures, leading to the appearance of new magnetic modes with an electric excitation channel – electromagnons and skyrmions – has resulted in a wealth of strong optical effects such as directional dichroism, magnetochiral dichroism, and rotatory power of the fields. This book contains multifaceted contributions from international leading experts and covers the essential aspects of symmetry-breaking effects, including theory, modeling and design, proven and potential applications in practical devices, fabrication, characterization and measurement. It is ideally suited as an introduction and basic reference work for researchers and graduate students entering this field.

Ultrathin Magnetic Structures II Nov 18 2022 The ability to understand and control the unique properties of interfaces has created an entirely new field of magnetism which already has a profound impact in technology and is providing the basis for a revolution in electronics. The last decade has seen dramatic progress in the development of magnetic devices for information technology but also in the basic understanding of the physics of magnetic nanostructures. This volume describes thin film magnetic properties and methods for characterising thin film structure topics that underpin the present 'spintronics' revolution in which devices are based on combined magnetic materials and semiconductors. Volume IV deals with the fundamentals of spintronics: magnetoelectronic materials, spin injection and detection, micromagnetics and the development of magnetic random access memory based on GMR and tunnel junction devices. Together these books provide readers with a comprehensive account of an exciting and rapidly developing field. The treatment is designed to be accessible both to newcomers and to experts already working in this field who would like to get a better understanding of this very diversified area of research.

Ultrathin Magnetic Structures: An introduction to the electronic, magnetic, and structural properties Jan 20 2023

Hard X-ray Tomography of Three Dimensional Magnetic Structures Jul 22 2020

Introduction to Magnetism and Magnetic Materials Dec 07 2021 A long overdue update, this edition of Introduction to Magnetism and Magnetic Materials is a complete revision of its predecessor. While it provides relatively minor updates to the first two sections, the third section contains vast updates to reflect the enormous progress made in applications in the past 15 years, particularly in magnetic recordin

Ultrathin Magnetic Structures III Jun 25 2023 The ability to understand and control the unique properties of interfaces has created an entirely new field of magnetism which already has a profound impact in technology and is providing the basis for a revolution in electronics. The last decade has seen dramatic progress in the development of magnetic devices for information technology but also in the basic understanding of the physics of magnetic nanostructures. This volume describes thin film magnetic properties and methods for characterising thin film structure topics that underpin the present 'spintronics' revolution in which devices are based on combined magnetic materials and semiconductors. Volume IV deals with the fundamentals of spintronics: magnetoelectronic materials, spin injection and detection, micromagnetics and the development of magnetic random access memory based on GMR and tunnel junction devices. Together these books provide readers with a comprehensive account of an exciting and rapidly developing field. The treatment is designed to be accessible both to newcomers and to experts already working in this field who would like to get a better understanding of this very diversified area of research.

Ultrathin Magnetic Structures Mar 22 2023

Magnetic Structures of Metal (I) Chromium (III) Sulfides and Selenides May 12 2022

Neutron Diffraction of Magnetic Materials Feb 09 2022 Detennination of the magnetic structure of magnetic materials is a fundamental problem that can be solved by magnetic neutron diffraction techniques. By magnetic structures we refer to the mutual alignment of the magnetic moments of the atoms in a crystal and their overall alignment relative to the crystallographic axes. Some indirect, tentative data on the magnetic structure of magnetic materials can be obtained from research on their magnetic, mechanical, thermal, and other properties. But only neutron diffraction is a unique direct method of detennining the magnetic structure of a crystal. The magnetic structure of more than one thousand crystals with magnetic order has been studied during 30 years of neutron diffraction research made on reactors in a large number of laboratories in the world. The results of this research work are extensively described in the handbook Magnetic Structures Determined by Neutron Diffraction [176]; in the present book, we will often refer to this handbook. The first extensive theoretical generalization of the principles of magnetic neutron diffraction and the results of research on magnetic structures appeared in the book by Yu. A. Izyumov and R. P. Ozerov Magnetic Neutron Diffraction [24, 134].

Magnetic Microscopy of Nanostructures Sep 16 2022 A comprehensive collection of overview articles on novel microscopy methods for imaging magnetic structures on the nanoscale. Written by leading scientists in the field, the book covers synchrotron based methods, spin-polarized electron methods, and scanning probe techniques. It constitutes a valuable source of reference for graduate students and newcomers to the field.

Introduction to Magnetic Materials Apr 30 2021 Introduction to Magnetic Materials, 2nd Edition covers the basics of magnetic quantities, magnetic devices, and materials used in practice. While retaining much of the original, this revision now covers SQUID and alternating gradient magnetometers, magnetic force microscope, Kerr effect, amorphous alloys, rare-earth magnets, SI Units alongside cgs units, and other up-to-date topics. In addition, the authors have added an entirely new chapter on information materials. The text presents materials at the practical rather than theoretical level, allowing for a physical, quantitative, measurement-based understanding of magnetism among readers, be they professional engineers or graduate-level students.

Spin Dynamics in Confined Magnetic Structures I Sep 04 2021

Ultrathin Magnetic Structures Applications Of Nanomagnetism Nov 06 2021

Ultrathin Magnetic Structures IV Apr 23 2023 The ability to understand and control the unique properties of interfaces has created an entirely new field of magnetism which already has a profound impact in technology and is providing the basis for a revolution in electronics. The last decade has seen dramatic progress in the development of magnetic devices for information technology but also in the basic understanding of the physics of magnetic nanostructures. Volume III describes thin film magnetic properties and methods for characterising thin film structure topics that underpin the present 'spintronics' revolution in which devices are based on combined magnetic materials and semiconductors. The present volume (IV) deals with the fundamentals of spintronics: magnetoelectronic materials, spin injection and detection, micromagnetics and the development of magnetic random access memory based on GMR and tunnel junction devices. Together these books provide readers with a comprehensive account of an exciting and rapidly developing field. The treatment is designed to be accessible both to newcomers and to experts already working in this field who would like to get a better understanding of this very diversified area of

research.

Ultrathin Magnetic Structures III Sep 28 2023 The ability to understand and control the unique properties of interfaces has created an entirely new field of magnetism which already has a profound impact in technology and is providing the basis for a revolution in electronics. The last decade has seen dramatic progress in the development of magnetic devices for information technology but also in the basic understanding of the physics of magnetic nanostructures. This volume describes thin film magnetic properties and methods for characterising thin film structure topics that underpin the present 'spintronics' revolution in which devices are based on combined magnetic materials and semiconductors. Volume IV deals with the fundamentals of spintronics: magnetoelectronic materials, spin injection and detection, micromagnetics and the development of magnetic random access memory based on GMR and tunnel junction devices. Together these books provide readers with a comprehensive account of an exciting and rapidly developing field. The treatment is designed to be accessible both to newcomers and to experts already working in this field who would like to get a better understanding of this very diversified area of research.

Spin Dynamics in Confined Magnetic Structures II Aug 27 2023 This second volume of the book on spin dynamics in confined magnetic structures covers central aspects of spin dynamic phenomena, so that researchers can find a comprehensive compilation of the current work in the field. Introductory chapters help newcomers to understand the basic concepts, and the more advanced chapters give the current state of the art for most spin dynamic issues in the milliseconds to femtoseconds range. Both experimental techniques and theoretical work are discussed. The comprehensive presentation of these developments makes this volume very timely and valuable for every researcher working in the field of magnetism. It describes the new experimental techniques which have advanced this field very rapidly. Among the techniques covered, particular attention is given to those involving high temporal, elemental and spatial resolution as well as to techniques involving magnetic field pulses with very short rise times and durations.