

Surface Enhanced Raman Spectroscopy Bioanalytical Biomolecular And Medical Applications Biological And Medical Physics Biomedical Engineering

Surface-Enhanced Raman Spectroscopy Practical Raman Spectroscopy Tools and Trends in Bioanalytical Chemistry Biomolecular and Bioanalytical Techniques Surface-Enhanced Raman Spectroscopy Raman Spectroscopy Applied to Earth Sciences and Cultural Heritage Principles and Clinical Diagnostic Applications of Surface-Enhanced Raman Spectroscopy Radiation in Bioanalysis Tip-Enhanced Raman Spectroscopy for Nanoelectronics Surface-Enhanced Raman Scattering Surface Enhanced Raman Spectroscopy: Biosensing and Diagnostic Technique for Healthcare Applications Raman Spectroscopy and its Application in Nanostructures Raman Spectroscopy Bioelectrochemistry Handbook of Spectroscopy Molecular Spectroscopy—Experiment and Theory Remote Compositional Analysis Laser Spectroscopy and Laser Imaging Frontiers of Surface-Enhanced Raman Scattering Plasmonics in Chemistry and Biology Medical Nanotechnology and Nanomedicine Portable Spectroscopy and Spectrometry, Applications Infrared and Raman Spectroscopy in Forensic Science Urinary Tract Infections Bioanalytical Chemistry Issues in Industrial, Applied, and Environmental Chemistry: 2011 Edition Light Scattering Technology for Food Property, Quality and Safety Assessment The Conservation of Subterranean Cultural Heritage Handbook of Laser-Induced Breakdown Spectroscopy Smart Nanodevices for Point-of-Care Applications Advances in Applied Microbiology High Throughput Screening for Food Safety Assessment Sample Preparation with Nanomaterials Frontiers and Advances in Molecular Spectroscopy Nanotechnology Applications for Food Safety and Quality Monitoring Food Safety and Foodborne Pathogen - A Global Perspective on the Diversity, Combating Multidrug Resistance and Management Natural Products Analysis Comprehensive Nanoscience and Nanotechnology Nanoelectronic Device Applications Handbook Laser-Based Optical Detection of Explosives

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Engineering is universally compatible in imitation of any devices to read.

Surface-Enhanced Raman Spectroscopy Oct 29 2022

This book gives an overview of recent developments in RS and SERS for sensing and biosensing considering also limitations, possibilities and prospects of this technique. Raman scattering (RS) is a widely used vibrational technique providing highly specific molecular spectral patterns. A severe limitation for the application of this spectroscopic technique lies in the low cross section of RS. Surface-enhanced Raman scattering (SERS) spectroscopy overcomes this problem by 6-11 orders of magnitude enhancement compared with the standard RS for molecules in the close vicinity of certain rough metal surfaces. Thus, SERS combines molecular fingerprint specificity with potential single-molecule sensitivity. Due to the recent development of new SERS-active substrates, labeling and derivatization chemistry as well as new instrumentations, SERS became a very promising tool for many varied applications, including bioanalytical studies and sensing. Both intrinsic and extrinsic SERS biosensing schemes have been employed to detect and identify small molecules, nucleic acids and proteins, and also for cellular and in vivo sensing.

Frontiers and Advances in Molecular Spectroscopy Dec 27 2019

Frontiers and Advances in Molecular Spectroscopy once again brings together the most eminent scientists from around the world to describe their work at the cutting-edge of molecular spectroscopy. Much of what we know about atoms, molecules and the nature of matter has been obtained using spectroscopy over the last one hundred years or so. Going far beyond the topics discussed in Jaan Laane's earlier book on the subject, these chapters describe new methodologies and applications, instrumental developments and theory, which are taking spectroscopy into still new frontiers. The robust range of topics once again demonstrates the wide utility of spectroscopic techniques. New topics include ultrafast spectroscopy of the transition state, SERS/far-uv spectroscopy, femtosecond coherent anti-Stokes Raman spectroscopy, high-resolution laser induced fluorescence spectroscopy, Raman spectroscopy and biosensors, vibrational optical activity, ultrafast two-dimensional spectroscopy, biology with x-ray lasers, isomerization dynamics and hydrogen bonding, single molecule imaging, spectra of intermediates, matrix isolation spectroscopy and more. Covers spectroscopic investigations on the cutting edge of science. Written and edited by leading experts in their respective fields. Allows researchers to access a broad range of essential modern spectroscopy content.

from a single source rather than wading through hundreds of scattered journal articles. **Frontiers of Surface-Enhanced Raman Scattering** Apr 11 2021 A comprehensive presentation of Surface-Enhanced Raman Scattering (SERS) theory, substrate fabrication, applications of SERS to biosystems, chemical analysis, sensing and fundamental innovation through experimentation. Written by internationally recognized editors and contributors. Relevant to all those within the scientific community dealing with Raman Spectroscopy, i.e. physicists, chemists, biologists, material scientists, physicians and biomedical scientists. SERS applications are widely expanding and the technology is now used in the field of nanotechnologies, applications to biosystems, nonosensors, nanoimaging and nanoscience.

Bioelectrochemistry Sep 16 2021

Bioelectrochemistry is a fast growing field at the interface between electrochemistry and other sciences such as biochemistry, analytical chemistry and medicinal chemistry. In the recent years, the methods and the understanding of the fundamentals have seen significant progress, which has led to rapid development in the field. Here, the expert editors have carefully selected contributions to best reflect the latest developments in this hot and rapidly growing interdisciplinary topic. The

resulting excellent and timely overview of this multifaceted field covers recent methodological advances, as well as a range of new applications for analytical detection, drug screening, tumor therapy, and for energy conversion in biofuel cells. This book is a must-have for all Electrochemists, Biochemists, Analytical Chemists, and Medicinal Chemists. **Laser Spectroscopy and Laser Imaging** May 12 2021 "a very valuable book for graduate students and researchers in the field of Laser Spectroscopy, which I can fully recommend" —Wolfgang Demtröder, Kaiserslautern University of Technology How would it be possible to provide a coherent picture of this field given all the techniques available today? The authors have taken on this daunting task in this impressive, groundbreaking text. Readers will benefit from the broad overview of basic concepts, focusing on practical scientific and real-life applications of laser spectroscopic analysis and imaging. Chapters follow a consistent structure, beginning with a succinct summary of key principles and concepts, followed by an overview of applications, advantages and pitfalls, and finally a brief discussion of seminal advances and current developments. The examples used in this text span physics and chemistry to environmental science, biology, and medicine. Focuses on practical use in the laboratory and real-world applications Covers the basic concepts, common experimental setups Highlights advantages and caveats of the techniques

Concludes each chapter with a snapshot of cutting-edge advances This book is appropriate for anyone in the physical sciences, biology, or medicine looking for an introduction to laser spectroscopic and imaging methodologies. Helmut H. Telle is a full professor at the Instituto Pluridisciplinar, Universidad Complutense de Madrid, Spain. Ángel González Ureña is head of the Department of Molecular Beams and Lasers, Instituto Pluridisciplinar, Universidad Complutense de Madrid, Spain. **Handbook of Laser-Induced Breakdown Spectroscopy** Jun 01 2020 Starting from fundamentals and moving through a thorough discussion of equipment, methods, and techniques, the Handbook of Laser-Induced Breakdown Spectroscopy provides a unique reference source that will be of value for many years to come for this important new analysis method. The authors, with a total of over 60 years of experience in the LIBS method, use a combination of tutorial discussions ranging from basic principles up to more advanced descriptions along with extensive figures and photographs to clearly explain topics addressed in the text. In this second edition, chapters on the use of statistical analysis and advances in detection of weapons of mass destruction have been added. Tables of data related to analysis with LIBS have been updated. The Handbook of Laser-Induced Breakdown Spectroscopy, Second Edition: provides a thorough but understandable discussion of the basic principles of the method based on atomic

emission spectroscopy, including recently available data leading to better characterization of the LIBS plasma; presents a discussion of the many advantages of the method along with limitations, to provide the reader a balanced overview of capabilities of the method; describes LIBS instrumentation ranging from basic set-ups to more advanced configurations; presents a comprehensive discussion of the different types of components (laser, spectrometers, detectors) that can be used for LIBS apparatuses along with suggestions for their use, as well as an up-to-date treatment of the newest advances and capabilities of LIBS instruments; presents the analytical capabilities of the method in terms of detection limits, accuracy, and precision of measurements for a variety of different sample types; discusses methods of sampling different media such as gases, liquids, and solids; presents an overview of some real-world applications of the method, with new emphasis on sampling of biologically and physically dangerous materials; provides an up-to-date list of references to LIBS literature along with the latest detection limits and a unique list of element detection limits using a uniform analysis method; provides annotated examples of LIBS spectra which can serve as references for the general reader and will be especially useful for those starting out in the field. **Remote Compositional Analysis** Jun 13 2021 Comprehensive overview of the spectroscopic, mineralogical, and geochemical techniques

used in planetary remote sensing.

Practical Raman Spectroscopy Sep 28 2022

This text offers an open-learning approach to Raman spectroscopy providing detail on instrumentation, applications and discussions questions throughout the book. It provides a valuable guide to assist with teaching Raman spectroscopy which is gaining attention in (analytical) chemistry, and as a consequence, teaching programs have followed. Today, education in Raman spectroscopy is often limited to theoretical aspects (e.g. selection rules), but practical aspects are usually disregarded. With these course notes, the author hopes to fill this gap and include information about Raman instrumentation and how it is interpreted. Provides a user-friendly text that tackles the theoretical background, and offers everyday tips for common practice Raman instrumentation and practical aspects, which are sometimes overlooked, are covered. Appropriate for students, and includes summaries, text boxes, illustrating the ideas with examples from research literature or providing background information or links with other courses. Written with an open-learning approach, this book will be ideal for use as a self-study guide or as the basis of a taught course with discussion and self-assessment questions throughout the text. Includes a comprehensive bibliography to guide the reader to more specialized texts and sources.

Surface-Enhanced Raman Scattering Jan 20

2022 Surface-Enhanced Raman Spectroscopy:

Principles, Experiments, and Applications is a comprehensive, up to date, and balanced treatment of the theoretical and practical aspects of Surface-Enhanced Raman Scattering (SERS), a useful branch of spectroscopy for several areas of science. This book describes the basic principles of SERS, including SERS mechanisms, performing SERS measurements, and interpreting data. Also emphasized are applications in electrochemistry; catalysis; surface processing and corrosion; Self-Assemble-Layer and L-B Films; polymer science; biology; medicine and drug analysis; sensors; fuel cells; forensics; and archaeology. It is an essential guide for student and professional analytical chemists.

Sample Preparation with Nanomaterials Jan

28 2020 Discover this timely, comprehensive, and up-to-date exploration of crucial aspects of the use of nanomaterials in analytical chemistry. Sample Preparation with Nanomaterials: Next Generation Techniques for Sample Preparation delivers insightful and complete overview of recent progress in the use of nanomaterials in sample preparation. The book begins with an overview of special features of nanomaterials and their applications in analytical sciences. Important types of nanomaterials, like carbon nanotubes and magnetic particles, are reviewed and biological sample preparation and lab-on-a-chip systems are presented. The distinguished author places special emphasis on approaches that tend to green and reduce the cost of sample treatment processes. He also discusses

the legal, economical, and toxicity aspects of nanomaterial samples. This book includes extensive reference material, like a complete list of manufacturers, that makes it invaluable for professionals in analytical chemistry. Sample Preparation with Nanomaterials offers considerations of the economic aspects of nanomaterials, as well as the assessment of their toxicity and risk. Readers will also benefit from the inclusion of: A thorough introduction to nanomaterials in the analytical sciences and special properties of nanomaterials for sample preparation. An exploration of the mechanism of adsorption and desorption on nanomaterials, including carbon nanomaterials used as adsorbents. Discussions of membrane applications of nanomaterials, surface enhanced raman spectroscopy, and the use of nanomaterials for biological sample preparation. A treatment of magnetic nanomaterials, lab-on-a-chip nanomaterials, and toxicity and risk assessment of nanomaterials. Perfect for analytical chemists, materials scientists, and process engineers. Sample Preparation with Nanomaterials: Next Generation Techniques for Sample Preparation will also earn a place in the libraries of analytical laboratories, universities, and companies who conduct research into nanomaterials and seek a one-stop resource for sample preparation.

Biomolecular and Bioanalytical Techniques Jul

26 2022 An essential guide to biomolecular and bioanalytical techniques and their applications. Biomolecular and Bioanalytical Techniques

offers an introduction to, and a basic understanding of, a wide range of biophysical techniques. The text takes an interdisciplinary approach with contributions from a panel of distinguished experts. With a focus on research, the text comprehensively covers a broad selection of topics drawn from contemporary research in the fields of chemistry and biology. Each of the internationally reputed authors has contributed a single chapter on a specific technique. The chapters cover the specific technique's background, theory, principles, technique, methodology, protocol and applications. The text explores the use of a variety of analytical tools to characterise biological samples. The contributors explain how to identify and quantify biochemically important molecules, including small molecules as well as biological macromolecules such as enzymes, antibodies, proteins, peptides and nucleic acids. This book is filled with essential knowledge and explores the skills needed to carry out the research and development roles in academic and industrial laboratories. A technique-focused book that bridges the gap between an introductory text and a book on advanced research methods Provides the necessary background and skills needed to advance the research methods Features a structured approach within each chapter Demonstrates an interdisciplinary approach that serves to develop independent thinking Written for students in chemistry, biological, medical, pharmaceutical, forensic and

biophysical sciences, Biomolecular and Bioanalytical Techniques is an in-depth review of the most current biomolecular and bioanalytical techniques in the field. Raman Spectroscopy Oct 17 2021 This book gives a wide overview of the state-of-the-art applications of Raman spectroscopy in characterization of materials and biomaterials. The Raman signal is intrinsically smaller than other vibrational techniques; however, mainly through intensification processes, such as resonance Raman (RR) and surface-enhanced Raman spectroscopy (SERS), the Raman cross section can be strongly amplified. Thoroughly in these signal amplifications, the study of a diversity of chemical systems and the use of Raman technique for in situ and in vivo measurements is possible. The main goal of this book is to open up to an extended audience the possibilities of uses of Raman spectroscopy. In fact, this collective work will be beneficial to students, teachers, and researchers of many areas who are interested to expand their knowledge about Raman spectroscopy applied to nanotechnology, biotechnology, environmental science, inorganic chemistry, and health sciences.

The Conservation of Subterranean Cultural Heritage Jul 02 2020 In recent years, a debate has arisen concerning the convenience of conserving subterranean cultural heritage and the necessary management models. There is often pressure from local authorities more interested in using the cultural heritage sites in

order to develop the economy and the tourism industry rather than in the conservation of the cultural

Issues in Industrial, Applied, and Environmental Chemistry: 2011 Edition Sep 04 2020 Issues in Industrial, Applied, and Environmental Chemistry: 2011 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Industrial, Applied, and Environmental Chemistry. The editors have built Issues in Industrial, Applied, and Environmental Chemistry: 2011 Edition on the vast information databases of ScholarlyNews.™ You can expect the information about Industrial, Applied, and Environmental Chemistry in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of Issues in Industrial, Applied, and Environmental Chemistry: 2011 Edition has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>. Bioanalytical Chemistry Oct 05 2020 The urgent need for rapid and reliable analytical tools suitable to perform a large number of high

quality analyses of biological molecules has been dramatically stressed by the recent crisis caused by the COVID-19 pandemic. This book provides graduate students and young researchers with the elements of interdisciplinary knowledge necessary to apply the wide arsenal of bioanalytical devices and methods available today.

Comprehensive Nanoscience and Nanotechnology Aug 23 2019 Comprehensive Nanoscience and Technology, Second Edition allows researchers to navigate a very diverse, interdisciplinary and rapidly-changing field with up-to-date, comprehensive and authoritative coverage of every aspect of modern nanoscience and nanotechnology. Presents new chapters on the latest developments in the field Covers topics not discussed to this degree of detail in other works, such as biological devices and applications of nanotechnology Compiled and written by top international authorities in the field

Medical Nanotechnology and Nanomedicine Feb 09 2021 Considering the fluid nature of nano breakthroughs—and the delicate balance between benefits and consequences as they apply to medicine—readers at all levels require a practical, understandable base of information about these developments to take greatest advantage of them. Medical Nanotechnology and Nanomedicine meets that need by introducing non-experts to nanomedicine and

its evolving organizational infrastructure. This practical reference investigates the impact of nanotechnology on applications in medicine and biomedical sciences, and the broader societal and economic effects. Eschewing technological details, it focuses on enhancing awareness of the business, regulatory, and administrative aspects of medical applications. It gives readers a critical, balanced, and realistic evaluation of existing nanomedicine developments and future prospects—an ideal foundation upon which to plan and make decisions. Covers the use of nanotechnology in medical applications including imaging, diagnosis and monitoring, drug delivery systems, surgery, tissue regeneration, and prosthetics Part of the Perspectives in Nanotechnology series—which contains broader coverage of the societal implications of nanotechnology—this book can be used as a standalone reference. Organized by historical perspective, current status, and future prospects, this powerful book: Explores background, definitions and terms, and recent trends and forces in nanomedicine Surveys the landscape of nanomedicine in government, academia, and the private sector Reviews projected future directions, capabilities, sustainability, and equity of nanomedicine, and choices to be made regarding its use Includes graphical illustrations, references, and keywords to reinforce concepts and aid further research In its assessment of alternative and sometimes conflicting concepts proposed for the application of nanotechnology to medicine,

this book surveys major initiatives and the work of leading labs and innovators. It uses informative examples and case summaries to illustrate proven accomplishments and imagined possibilities in research and development.

Nanoelectronic Device Applications Handbook Jul 22 2019 Nanoelectronic Device Applications Handbook gives a comprehensive snapshot of the state of the art in nanodevices for nanoelectronics applications. Combining breadth and depth, the book includes 68 chapters on topics that range from nano-scaled complementary metal-oxide-semiconductor (CMOS) devices through recent developments in nano capacitors and AlGaAs/GaAs devices. The contributors are world-renowned experts from academia and industry from around the globe. The handbook explores current research into potentially disruptive technologies for a post-CMOS world. These include: Nanoscale advances in current MOSFET/CMOS technology Nano capacitors for applications such as electronics packaging and humidity sensors Single electron transistors and other electron tunneling devices Quantum cellular automata and nanomagnetic logic Memristors as switching devices and for memory Graphene preparation, properties, and devices Carbon nanotubes (CNTs), both single CNT and random network Other CNT applications such as terahertz, sensors, interconnects, and capacitors Nano system architectures for reliability Nanowire device fabrication and

applications Nanowire transistors Nanodevices for spintronics The book closes with a call for a new generation of simulation tools to handle nanoscale mechanisms in realistic nanodevice geometries. This timely handbook offers a wealth of insights into the application of nanoelectronics. It is an invaluable reference and source of ideas for anyone working in the rapidly expanding field of nanoelectronics.

Tools and Trends in Bioanalytical Chemistry
Aug 27 2022 This textbook covers the main tools and techniques used in bioanalysis, provides an overview of their principles, and offers several examples of their application and future trends in diagnosis. Chapters from expert contributors explore the role of bioanalysis in different areas such as biochemistry, physiology, forensics, and clinical diagnosis, including topics from sampling/sample preparation, chemometrics in bioanalysis to the latest techniques used in the field. Particular attention is given to the recent advances in the application of mass spectrometry, NMR, electrochemical methods and separation techniques in bioanalysis. Readers will also find more about the application of microchip-based devices and analytical microarrays. This textbook will appeal to graduate/advanced undergraduate students in Chemistry, Biology, Biochemistry, Pharmacy, and Chemical Engineering. It is also a useful resource for researchers and professionals working in the fields of biomedicine and veterinary sciences, with clear

explanations and examples of how the different bioanalytical devices are applied for clinical diagnosis.

Plasmonics in Chemistry and Biology Mar 10 2021 Over the past decade, plasmonic nanoparticles have been the subject of extensive research, owing to their remarkable optical properties. These properties arise from a collective oscillation of the conductive electrons at the nanoparticle surface under light irradiation, known as localized surface plasmon (LSP). LSP is characterized by (i) a strong absorption and scattering of the light depending on the geometrical parameters of the nanoparticles and (ii) a strong amplification of the local field in the vicinity of the nanoparticles. Quite recently, it was shown that the activation and the initiation of chemical reactions or physical processes can be facilitated using LSP excitation. Such exploitation presents two main advantages: an enhanced yield and a fine control of chemical reactions at the nanoscale. These topics have become very active and are in line with molecular plasmonics. This book explores this new field and provides a broad view on the exploitation of plasmonics in chemical and biological fields.

Nanotechnology Applications for Food Safety and Quality Monitoring Nov 25 2019 Nanotechnology Applications for Food Safety and Quality Monitoring brings together nanotechnology science-based research for food safety and quality monitoring. With the

advancement in knowledge about behavior of nano-engineered materials in food and its toxicity, the application of nanotechnology is expected to reach unprecedented levels in achieving food safety. Currently, there is no practical resource of nanotechnology as a tool specifically for monitoring safety and quality. This is a practical, concise, applications-based reference that is essential for food industry researchers and scientists to monitor the safety and quality of food to ensure quality food supplies. Demonstrates how nanotechnology can improve food safety and quality Shows how nanotechnology sensors can be used for food pesticides, pathogens and microbes Discusses the benefits and risks of nanotechnology applications for food safety

Portable Spectroscopy and Spectrometry, Applications Jan 08 2021 The most comprehensive resource available on the many applications of portable spectrometers, including material not found in any other published work Portable Spectroscopy and Spectrometry: Volume Two is an authoritative and up-to-date compendium of the diverse applications for portable spectrometers across numerous disciplines. Whereas Volume One focuses on the specific technologies of the portable spectrometers themselves, Volume Two explores the use of portable instruments in wide range of fields, including pharmaceutical development, clinical research, food analysis, forensic science, geology, astrobiology, cultural heritage and archaeology. Volume Two features

contributions by a multidisciplinary team of experts with hands-on experience using portable instruments in their respective areas of expertise. Organized both by instrumentation type and by scientific or technical discipline, 21 detailed chapters cover various applications of portable ion mobility spectrometry (IMS), infrared and near-infrared (NIR) spectroscopy, Raman and x-ray fluorescence (XRF) spectroscopy, smartphone spectroscopy, and many others. Filling a significant gap in literature on the subject, the second volume of *Portable Spectroscopy and Spectrometry*: Features a significant amount of content published for the first time, or not available in existing literature Brings together work by authors with assorted backgrounds and fields of study Discusses the central role of applications in portable instrument development Covers the algorithms, calibrations, and libraries that are of critical importance to successful applications of portable instruments Includes chapters on portable spectroscopy applications in areas such as the military, agriculture and feed, hazardous materials (HazMat), art conservation, and environmental science *Portable Spectroscopy and Spectrometry*: Volume Two is an indispensable resource for developers of portable instruments in universities, research institutes, instrument companies, civilian and government purchasers, trainers, operators of portable instruments, and educators and students in portable spectroscopy courses.

Handbook of Spectroscopy Aug 15 2021 This second, thoroughly revised, updated and enlarged edition provides a straightforward introduction to spectroscopy, showing what it can do and how it does it, together with a clear, integrated and objective account of the wealth of information that may be derived from spectra. It also features new chapters on spectroscopy in nano-dimensions, nano-optics, and polymer analysis. Clearly structured into sixteen sections, it covers everything from spectroscopy in nanodimensions to medicinal applications, spanning a wide range of the electromagnetic spectrum and the physical processes involved, from nuclear phenomena to molecular rotation processes. In addition, data tables provide a comparison of different methods in a standardized form, allowing readers to save valuable time in the decision process by avoiding wrong turns, and also help in selecting the instrumentation and performing the experiments. These four volumes are a must-have companion for daily use in every lab. [Laser-Based Optical Detection of Explosives](#) Jun 20 2019 *Laser-Based Optical Detection of Explosives* offers a comprehensive review of past, present, and emerging laser-based methods for the detection of a variety of explosives. This book: Considers laser propagation safety and explains standard test material preparation for standoff optical-based detection system evaluation Explores explosives detection using deep ultraviolet native fluorescence, Raman spectroscopy, laser-

induced breakdown spectroscopy, reflectometry, and hyperspectral imaging Examines photodissociation followed by laser-induced fluorescence, photothermal methods, cavity-enhanced absorption spectrometry, and short-pulse laser-based techniques Describes the detection and recognition of explosives using terahertz-frequency spectroscopic techniques Each chapter is authored by a leading expert on the respective technology, and is structured to supply historical perspective, address current advantages and challenges, and discuss novel research and applications. Readers are left with an in-depth understanding and appreciation of each technology's capabilities and potential for standoff hazard detection.

[Infrared and Raman Spectroscopy in Forensic Science](#) Dec 07 2020 This book will provide a survey of the major areas in which information derived from vibrational spectroscopy investigations and studies have contributed to the benefit of forensic science, either in a complementary or a unique way. This is highlighted by examples taken from real case studies and analyses of forensic relevance, which provide a focus for current and future applications and developments.

[Smart Nanodevices for Point-of-Care Applications](#) Apr 30 2020 *Smart Nanodevices for Point-of-Care Applications* examines the latest trends on the capabilities of nanomaterials for point-of-care (PoC) diagnostics and explains how these materials

can help to strengthen, miniaturize, and improve the quality of diagnostic devices. A thorough explanation of all-in-one nanosmart devices is included, incorporating all of the applications and fundamentals of these smart devices. This book provides practical information on the following: novel and effective smart materials, better-quality health management, effective management of a disease, potential point-of-care devices, and mobile nanosensors. Additional Features Includes in-depth research based collation of the latest trends of smart devices Provides practical information on all-in-one nanosmart devices Explains how nanomaterials can help to strengthen and improve the quality of diagnostic devices Emphasizes the development of smart nanodevices, especially the miniaturization aspect

Raman Spectroscopy Applied to Earth Sciences and Cultural Heritage May 24 2022

Spectroscopic methods such as Raman are used to investigate the structure and dynamics of matter. They are essential for the study of the different types of mineral or organic materials produced at the Earth's surface or interior. As a result of technological improvements in gratings, detectors, filters and personal computers in the last decade, many micro-Raman spectrometers have become plug-and-play instruments, very easy to use and available at a lower cost than the early Raman microprobes. Thus, many laboratories in Earth Sciences and Cultural Heritage are equipped

with these new spectrometers. Commercial, portable Raman spectrometers working in the field have also contributed to the spread of Raman spectroscopy. Poor levels of education in terms of Raman spectroscopy in undergraduate courses in Earth Sciences make it difficult for individuals to obtain information of the highest quality relevant to Earth sciences and Cultural Heritage. This volume is, therefore, timely. Four main topics are addressed: Theory; Methodology, including the instrumentation; Experimental aspects; and Application.

Natural Products Analysis Sep 23 2019 This book highlights analytical chemistry instrumentation and practices applied to the analysis of natural products and their complex mixtures, describing techniques for isolating and characterizing natural products. • Applies analytical techniques to natural products research - an area of critical importance to drug discovery • Offers a one-stop shop for most analytical methods: x-ray diffraction, NMR analysis, mass spectrometry, and chemical genetics • Includes coverage of natural products basics and highlights antibacterial research, particularly important as efforts to combat drug resistance gain prominence • Covers instrumental techniques with enough detail for both current practitioners and beginning researchers

High Throughput Screening for Food Safety Assessment Feb 27 2020 Recent advances in array-based detectors and imaging technologies

have provided high throughput systems that can operate within a substantially reduced timeframe and other techniques that can detect multiple contaminants at one time. These technologies are revolutionary in terms of food safety assessment in manufacturing, and will also have a significant impact on areas such as public health and food defence. This book summarizes the latest research and applications of sensor technologies for online and high throughput screening of food. The book first introduces high throughput screening strategies and technology platforms, and discusses key issues in sample collection and preparation. The subsequent chapters are then grouped into four sections: Part I reviews biorecognition techniques; Part II covers the use of optical biosensors and hyperspectral imaging in food safety assessment; Part III focuses on electrochemical and mass-based transducers; and finally Part IV deals with the application of these safety assessment technologies in specific food products, including meat and poultry, seafood, fruits and vegetables. Summarises the latest research on sensor technologies for online and high-throughput screening of food Covers high-throughput screening and the current and forecast state of rapid contaminant detection technologies Looks at the use of optical and electrochemical biosensors and hyperspectral imaging in food safety assessment and the application of these technologies in specific food products

Tip-Enhanced Raman Spectroscopy for Nanoelectronics Feb 21 2022 This dissertation focuses on the application of Tip-Enhanced Raman spectroscopy (TERS) to non-transparent and non-conductive samples, allowing for the optical characterization of nanoelectronic devices. As such, nano-crystals are analyzed as a model system for the investigation of chemical and structural properties. Furthermore, a novel method for mapping the refractive index of materials with nanometer resolution is presented. The technological progress of electronics through miniaturization has reached the nanoscale while new materials with high performance and functional properties gain importance. Quality control and the scientific understanding of size effects in electronic nanostructures are required more than ever to consolidate existing technologies and to determine scaling limits of new materials. Conventional techniques, including scanning electron and scanning probe microscopy, provide topographic information but only very limited chemical information to analyze the physical properties of nanomaterials. Chemical and structural sensitivity is available by Raman or infrared spectroscopy, but with a spatial resolution limited to the microscale by the diffraction limit of light. TERS combines the virtues of scanning probe microscopy with those of optical spectroscopy to overcome the diffraction limit through the excitation of surface plasmons on a scanning probe tip to confine light to

nanometers. In this work, a TERS system was installed to operate on opaque samples by employing optical side access. TERS probes were fabricated by electrochemical etching and operated in scanning tunneling microscopy and atomic force microscopy with quartz tuning forks to enable scanning on various surfaces. TERS was then applied to ferroelectric lead titanate nano-crystals on a platinized silicon substrate as a model system for nanostructured, charge-based memory devices at the onset of finite size effects.

Food Safety and Foodborne Pathogen - A Global Perspective on the Diversity, Combating Multidrug Resistance and Management Oct 25 2019 A question raised by many individuals today - "How Safe is Our Food Consumed Today?" Food safety has become a hot topic and an important public issue due to the increasingly widespread nature of foodborne illnesses in both developed and developing countries. As food is biological in nature and supplies consumers with nutrients, it is also equally capable of supporting the growth of microorganisms from the environmental sources. A precise method of monitoring and detecting of foodborne pathogens including Salmonella sp., Vibrio sp., Listeria monocytogenes, Campylobacter and Norovirus is needed to prevent and control human foodborne infections. Clinical treatments of infection caused by foodborne pathogens are becoming tougher with the increase number of multidrug resistant

pathogens in the environment. This situation creates a huge healthcare burden - e.g. prolonged treatment for infections, decrease in the efficacy of antibiotic, delay in treatment due to unavailability of new antibiotics, and increased number of deaths. As such, continuous investigation of the foodborne pathogens is needed to pave the way for a deeper understanding on the foodborne diseases and to improve disease prevention, management and treatments.

Urinary Tract Infections Nov 06 2020 Urinary tract infections (UTIs) are among the most common bacterial infections worldwide, and they are also the leading cause of hospital-acquired infections. Therefore, the appropriate management of UTIs is a major medical and financial issue. This book covers different clinical manifestations of UTI, with special emphasis on some hard-to-treat diseases, and special conditions in respect of treatment; antibiotic resistance and the available alternative strategies for the prevention and treatment of UTIs and it deals with urinary tract infections in children. The aim of this book is to give a summary about the different aspects of the diagnosis, management and prevention of urinary tract infections for all medical disciplines.

[Raman Spectroscopy and its Application in Nanostructures](#) Nov 18 2021 Raman Spectroscopy and its Application in Nanostructures is an original and timely contribution to a very active area of physics and

materials science research. This book presents the theoretical and experimental phenomena of Raman spectroscopy, with specialized discussions on the physical fundamentals, new developments and main features in low-dimensional systems of Raman spectroscopy. In recent years physicists, materials scientists and chemists have devoted increasing attention to low-dimensional systems and as Raman spectroscopy can be used to study and analyse such materials as carbon nanotubes, quantum wells, silicon nanowires, etc., it is fast becoming one of the most powerful and sensitive experimental techniques to characterize the qualities of such nanostructures. Recent scientific and technological developments have resulted in the applications of Raman spectroscopy to expand. These developments are vital in providing information for a very broad field of applications: for example in microelectronics, biology, forensics and archaeology. Thus, this book not only introduces these important new branches of Raman spectroscopy from both a theoretical and practical view point, but the resulting effects are fully explored and relevant representative models of Raman spectra are described in-depth with the inclusion of theoretical calculations, when appropriate.

Surface Enhanced Raman Spectroscopy: Biosensing and Diagnostic Technique for Healthcare Applications Dec 19 2021 Surface enhanced Raman spectroscopy (SERS) is a technique applied in multidisciplinary research.

Its use has tremendously grown in the last 40 years owing to improved nanofabrication, biomolecules extraction and sensitive signal acquisition techniques. This book focuses on the underlying principles of SERS by emphasizing on basic concepts and background information about the subject. Chapters explain the physics of Raman spectroscopy while also indicating its relevance to designing protocols and methodologies for biosensing and imaging. The book gives updated and recent details on colloids and nanostructures, their fabrication, surface engineering and immobilization methods, all in context to SERS based biosensing. Key Features: - Covers basic knowledge and new research about surface enhanced Raman spectroscopy (SERS) - Provides a complete framework on SERS based biosensing with concise chapters - Focuses on different active molecules critical to SERS and associated developed nanoassemblies - Presents information about ongoing research on SERS imaging applications - Highlights bottlenecks of SERS technique in biosensing - Includes references for further reading This book serves as a reference book for researchers and academicians and will also provide a reasonable understanding on the topic of SERS to newcomers irrespective of their background in a simple manner. The book is of interest to all readers within the scientific community involved with Raman spectroscopy, including chemists, physicists, biologists, material scientists as well as biomedical engineers.

Radiation in Bioanalysis Mar 22 2022 This book describes the state of the art across the broad range of spectroscopic techniques used in the study of biological systems. It reviews some of the latest advances achieved in the application of these techniques in the analysis and characterization of small and large biological compounds, covering topics such as VUV/UV and UV-visible spectroscopies, fluorescence spectroscopy, IR and Raman techniques, dynamic light scattering (DLS), circular dichroism (CD/SR-CD), pulsed electron paramagnetic resonance techniques, Mössbauer spectroscopy, nuclear magnetic resonance, X-ray methods and electron and ion impact spectroscopies. The second part of the book focuses on modelling methods and illustrates how these tools have been used and integrated with other experimental and theoretical techniques including also electron transfer processes and fast kinetics methods. The book will benefit students, researchers and professionals working with these techniques to understand the fundamental mechanisms of biological systems.

Surface-Enhanced Raman Spectroscopy Jun 25 2022 This book gives an overview of recent developments in RS and SERS for sensing and biosensing considering also limitations, possibilities and prospects of this technique. Raman scattering (RS) is a widely used vibrational technique providing highly specific molecular spectral patterns. A severe limitation for the application of this spectroscopic

technique lies in the low cross section of RS. Surface-enhanced Raman scattering (SERS) spectroscopy overcomes this problem by 6-11 orders of magnitude enhancement compared with the standard RS for molecules in the close vicinity of certain rough metal surfaces. Thus, SERS combines molecular fingerprint specificity with potential single-molecule sensitivity. Due to the recent development of new SERS-active substrates, labeling and derivatization chemistry as well as new instrumentations, SERS became a very promising tool for many varied applications, including bioanalytical studies and sensing. Both intrinsic and extrinsic SERS biosensing schemes have been employed to detect and identify small molecules, nucleic acids and proteins, and also for cellular and in vivo sensing.

Advances in Applied Microbiology Mar 30 2020 Annotation Published since 1959, 'Advances in Applied Microbiology' offers comprehensive reviews of the latest techniques and discoveries in this rapidly moving field. Principles and Clinical Diagnostic Applications of Surface-Enhanced Raman Spectroscopy Apr 23 2022 Principles and Clinical Diagnostic Applications of Surface-Enhanced Raman Spectroscopy summarizes the principles of surface-enhanced Raman scattering/spectroscopy (SERS) and plasmonic nanomaterials for SERS, with a focus on SERS applications in clinical diagnostics. This book covers the key concepts from the fundamentals,

materials, experimental aspects, and applications of SERS in clinical diagnostics with discussions on label-free/direct SERS assay, design and synthesis of SERS nanotags, SERS nanotags for point-of-care diagnostics, microfluidic SERS assay, and in vitro and in vivo sensing and imaging. Written by experts from around the world, this comprehensive volume showcases the recent progress of SERS applications in clinical diagnostics and helps readers understand when and how to use SERS in a clinical setting. Introduces the basics of SERS and suitable nanomaterials for SERS application Gives an overview of the cutting-edge research on SERS applications for clinical diagnosis, including the latest advances in our understanding of underlying principles to enable material design and clinical applications Gradually builds from the fundamental concepts to the applications of SERS for clinical diagnostics *Molecular Spectroscopy—Experiment and Theory* Jul 14 2021 This book reviews various aspects of molecular spectroscopy and its application in materials science, chemistry, physics, medicine, the arts and the earth sciences. Written by an international group of recognized experts, it examines how complementary applications of diverse spectroscopic methods can be used to study the structure and properties of different materials. The chapters cover the whole spectrum of topics related to theoretical and computational methods, as well as the practical application of

spectroscopic techniques to study the structure and dynamics of molecular systems, solid-state crystalline and amorphous materials, surfaces and interfaces, and biological systems. As such, the book offers an invaluable resource for all researchers and postgraduate students interested in the latest developments in the theory, experimentation, measurement and application of various advanced spectroscopic methods for the study of materials.

Light Scattering Technology for Food Property, Quality and Safety Assessment

Aug 03 2020 Light Scattering Technology for Food Property, Quality and Safety Assessment discusses the development and application of various light scattering techniques for measuring the structural and rheological properties of food, evaluating composition and quality attributes, and detecting pathogens in food. The first four chapters cover basic concepts, principles, theories, and modeling of light transfer in food and biological materials. Chapters 5 and 6 describe parameter estimation methods and basic techniques for determining optical absorption and scattering properties of food products. Chapter 7 discusses the spatially-resolved measurement technique for determining the optical properties of food and biological materials, whereas Chapter 8 focuses on the time-resolved spectroscopic technique for measuring optical properties and quality or maturity of horticultural products. Chapter 9 examines practical light scattering techniques for

nondestructive quality assessment of fruits and vegetables. Chapter 10 presents the theory of light transfer in meat muscle and the measurement of optical properties for determining the postmortem condition and textural properties of muscle foods and meat analogs. Chapter 11 covers the applications of spatially-resolved light scattering techniques

for assessing quality and safety of animal products. Chapter 12 looks into light scattering for milk and dairy processing. Chapter 13 examines the applications of dynamic light scattering for measuring the microstructure and rheological properties of food. Chapter 14 shows the applications of a biospeckle technique for assessing the quality and

condition of fruits and vegetables. Chapter 15 provides a detailed description of Raman scattering spectroscopic and imaging techniques in food quality and safety assessment. Chapter 16, the final chapter, focuses on applications of light scattering techniques for the detection of food-borne pathogens.