Lifetime Spectroscopy A Method Of Defect Characte

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BURCH ALVARADO

New Trends in Fluorescence Spectroscopy IOS Press
During the past two decades, there has been an increasing appreciation of the significant value that lifetime-based techniques can add to biomedical studies and applications of fluorescence. Bringing together perspectives of different research communities, Fluorescence Lifetime Spectroscopy and Imaging: Principles and Applications in Biomedical Diagnostics explores the remarkable advances in time-resolved fluorescence techniques and their role in a wide range of biological and clinical applications. Broadly accessible, the book captures the state-of-the-art of fluorescence lifetime metrology and imaging and provides current perspectives on their applications to biomedical studies of intact tissues and medical diagnosis. The text introduces these techniques within the wider context of fluorescence spectroscopy and describes basic principles underlying current instrumentation for fluorescence lifetime imaging and metrology (FLIM). It also covers the wide range of methods, including single channel (point) spectroscopy, fluorescence lifetime imaging microscopy, and single- and multi-photon excitation. Edited by pioneers in this field, with contributions from leading experts, the book includes an overview of complementary techniques that help researchers beginning FLIM research. It offers a comprehensive treatment of fundamental principles, instrumentation, analytical methods, and applications. It also provides an overview of the label-free contrast available from lifetime measurements of tissue autofluorescence and the prospects for exploiting this for clinical applications and biomedical research including drug discovery.
Bibliography of Mass Spectroscopy Literature for 1971 Springer Science & Business Media
Reflecting the expanding field’s need for reliable protocols, Fluorescence Spectroscopy and Microscopy: Methods and Protocols offers techniques from a worldwide team of experts on this versatile and vital subject. The topics covered fall into four broad categories: steady-state fluorescence spectroscopy, time-resolved fluorescence spectroscopy, fluorescent probe development, and the various sub-categories of fluorescence microscopy, such as fluorescence recovery after photobleaching (FRAP), live cell FRET imaging (FRETim), fluorescence lifetime imaging (FLIM), fluorescence fluctuation spectroscopy (FFS), and single-molecule fluorescence spectroscopy (smFS). Written as a part of the popular Methods in Molecular Biology series, chapters include the kind of unambiguous detail and key implementation advice that proves essential for successful results. Comprehensive and practical, Fluorescence Spectroscopy and Microscopy: Methods and Protocols aims to guide both ‘novice’ and established scientists toward furthering their research with these invaluable techniques.
Fluorescence Lifetime Spectroscopy and Imaging CRC Press
This first volume in the new Springer Series on Fluorescence brings together fundamental and applied research from this highly interdisciplinary and field, ranging from chemistry and physics to biology and medicine. Special attention is given to supramolecular systems, sensor applications, confocal microscopy and protein-protein interactions. This carefully edited collection of articles is an invaluable tool for practitioners and novices.
Time-Resolved Fluorescence Spectroscopy in Biochemistry and Biology Open Dissertation Press
During the past two decades, there has been an increasing appreciation of the significant value that lifetime-based techniques can add to biomedical studies and applications of fluorescence. Bringing together perspectives of different research communities, Fluorescence Lifetime Spectroscopy and Imaging: Principles and Applications in Biomedical Diagnostics explores the remarkable advances in time-resolved fluorescence techniques and their role in a wide range of biological and clinical applications. Broadly accessible, the book captures the state-of-the-art of fluorescence lifetime metrology and imaging and provides current perspectives on their applications to biomedical studies of intact tissues and medical diagnosis. The text introduces these techniques within the wider context of fluorescence spectroscopy and describes basic principles underlying current instrumentation for fluorescence lifetime imaging and metrology (FLIM). It also covers the wide range of methods, including single channel (point) spectroscopy, fluorescence lifetime imaging microscopy, and single- and multi-photon excitation. Edited by pioneers in this field, with contributions from leading experts, the book includes an overview of complementary techniques that help researchers beginning FLIM research. It offers a comprehensive treatment of fundamental principles, instrumentation, analytical methods, and applications. It also provides an overview of the label-free contrast available from lifetime measurements of tissue autofluorescence and the prospects for exploiting this for clinical applications and biomedical research including drug discovery.
Positron Annihilation in Semiconductors Elsevier
Defect Structure and Properties of Nanomaterials: Second and Extended Edition covers a wide range of nanomaterials including metals, alloys, ceramics, diamond, carbon nanotubes, and their composites. This new edition is fully revised and updated, covering important advances that have taken place in recent years. Nanostructured materials exhibit unique mechanical and physical properties compared with their coarse-grained counterparts, therefore these materials are currently a major focus in materials science. The production methods of nanomaterials affect the lattice defect structure (vacancies, dislocations, disclinations, stacking faults, twins, and grain boundaries) that has a major influence on their mechanical and physical properties. In this book, the production routes of nanomaterials are described in detail, and the relationships between the processing conditions and the resultant defect structure, as well as the defect-related properties (e.g. mechanical behavior, electrical resistance, diffusion, corrosion resistance, thermal stability, hydrogen storage capability, etc.) are reviewed. In particular, new processing methods of nanomaterials are described in the chapter dealing with the manufacturing procedures of nanostructured materials. New chapters on (i) the experimental methods for the study of lattice defects, (ii) the defect structure in nanodisperse particles, and (iii) the influence of lattice defects on electrical, corrosion, and diffusion properties are included, to further enhance what has become a leading reference for engineering, physics, and materials science audiences. Provides a detailed overview of processing methods, defect structure, and defect-related mechanical and physical properties of nanomaterials Covers a wide range of nanomaterials including metals, alloys, ceramics, diamond, carbon nanotubes, and their composites Includes new chapters covering recent advances in both processing techniques and methods for the study of lattice defects Provides valuable information that will help materials scientists and engineers highlight lattice defects and the related mechanical and physical properties
IMPLEMENTING VARIABLE ENERGY P Open Dissertation Press
Imaging from Cells to Animals In Vivo offers an overview of optical imaging techniques developed over the past two decades to investigate biological processes in live cells and tissues. It comprehensively covers the main imaging approaches used as well as the application of those techniques to biological investigations in preclinical models. Among the areas covered are cell metabolism, receptor-ligand interactions, membrane trafficking, cell signaling, cell migration, cell adhesion, cytoskeleton and other processes using various molecular optical imaging techniques in living organisms, such as mice and zebrafish. Features Brings together biology and advanced optical imaging techniques to provide an overview of progress and modern methods from microscopy to whole body imaging. Fills the need for a comprehensive view of application-driven development and use of new tools to ask new biological questions in the context of a living system. Includes basic chapters on key methods and instrumentation, from fluorescence microscopy and imaging to endoscopy, optical coherence tomography and super-resolution imaging. Discusses approaches at different length scales and biomedical applications to the study of single cell, whole organ, and whole organism behavior. Addresses the impact on discovery, such as cellular function as implicated in human disease and translational medicine, for example in cancer diagnosis. Margarida M. Barroso is a Professor in the Department of Molecular and Cellular Physiology, Albany Medical College (Albany, New York). Xavier Intes is a Professor in the Biomedical Engineering Department and Co-Director of the Center for Modeling, Simulation and Imaging for Medicine (CeMSIM) at Rensselaer Polytechnic Institute (Troy, New York).
Fluorescence Spectroscopy and Microscopy Elsevier
Covers the advantages of using photothermal spectroscopy over conventional absorption spectroscopy, including facilitating extremely sensitive measurements and non-destructive analysis This unique guide to the application and theory of photothermal spectroscopy has been newly revised and updated to include new methods and applications and expands on applications to chemical analysis and material science. The book covers the subject from the ground up, lists all practical considerations needed to obtain accurate results, and provides a working knowledge of the various methods in use. Photothermal Spectroscopy Methods, Second Edition includes the latest methods of solid state and materials analysis, and describes new chemical analysis procedures and apparatuses in the analytical chemistry sections. It offers a detailed look at the optics, physical principles of heat transfer, and signal analysis. Information in the temperature change and optical elements in homogeneous samples and photothermal spectroscopy in homogeneous samples has been updated with a better description of diffraction effects and calculations. Chapters on analytical measurement and data processing and analytical applications are also updated and include new information on modern applications and photothermal microscopy. Finally, the Photothermal Spectroscopy of Heterogeneous Sample chapter has been expanded to incorporate new methods for materials analysis. New edition updates and expands on applications to chemical analysis and materials science, including new methods of solid state and materials analysis Includes new chemical analysis procedures and apparatuses Provides an unmatched resource that develops a consistent mathematical basis for signal description, consolidates previous theories, and provides invaluable insight into laser technology Photothermal Spectroscopy Methods, Second Edition will appeal to researchers from both academia and industry (graduate students, postdocs, research scientists, and professors) in the general field of analytical chemistry, optics, and materials science, and researchers and engineers at scientific instrument developers in fields related to photonics and spectroscopy.
FRET and FLIM Techniques Springer Science & Business Media
Provides a semi-quantitative approach to recent developments in the study of optical properties of condensed matter systems Featuring contributions by noted experts in the field of electronic and optoelectronic materials and photonics, this book looks at the optical properties of materials as well as their physical processes and various classes. Taking a semi-quantitative approach to the subject, it presents a summary of the basic concepts, reviews recent developments in the study of optical properties of materials and offers many examples and applications. Optical Properties of Materials and Their Applications, 2nd Edition starts by identifying the processes that should be described in detail and follows with the relevant classes of materials. In addition to featuring four new chapters on optoelectronic properties of organic semiconductors, recent advances in electroluminescence, perovskites, and ellipsometry, the book covers: optical properties of disordered condensed matter and glasses; concept of excitons; photoluminescence, photoinduced changes, and electroluminescence in noncrystalline semiconductors; and photoinduced bond breaking and volume change in chalcogenide glasses. Also included are chapters on: nonlinear optical properties of photonic glasses; kinetics of the persistent photoconductivity in crystalline III-V semiconductors; and transparent white OLEDs. In addition, readers will learn about excitonic processes in quantum wells; optoelectronic properties and applications of quantum dots; and more. Covers all of the fundamentals and applications of optical properties of materials Includes theory, experimental techniques, and current and developing applications Includes four new chapters on optoelectronic properties of organic semiconductors, recent advances in electroluminescence, perovskites, and ellipsometry Appropriate for materials scientists, chemists,

physicists and electrical engineers involved in development of electronic materials Written by internationally respected professionals working in physics and electrical engineering departments and government laboratories Optical Properties of Materials and Their Applications, 2nd Edition is an ideal book for senior undergraduate and postgraduate students, and teaching and research professionals in the fields of physics, chemistry, chemical engineering, materials science, and materials engineering.

Methods of Laser Spectroscopy Springer Science & Business Media

This is the second of three volumes of Methods in Molecular Biology that deal with Physical Methods of Analysis. The first of these, Spectroscopic Methods and Analyses dealt with NMR spec troscopy, mass spectrometry, and metalloprotein techniques, and the third will cover X-ray crystallographic methods. As with the first volume. Microscopy, Optical Spectroscopy, and Macroscopic Techniques is intended to provide a basic understand ing for the biochemist or biologist who needs to collaborate with spe cialists in applying the techniques of modern physical chemistry to biological macromolecules. The methods treated in this book fall into four groups. Part One covers microscopy, which aims to visualize individual molecules or complexes of several molecules. Electron microscopy is the more familiar of these, while scanning tunneling microscopy is a new and rapidly developing tool. Methods for determining the shapes and sizes of molecules in solution are described in Part Two, which includes chapters on X-ray and neutron scattering, light scattering, and ult- centrifugation. Calorimetry, described in Part Three, provides the means to monitor processes involving thermodynamic changes, whether these are intramolecular, such as conformational transition, or the interactions between solutes or between a solute and its sol vent. Part Four is concerned with optical and infrared spectroscopy and describes applications ranging from the measurement of protein concentration by UV absorbance to the analysis of secondary struc ture using circular dichroism and Fourier-transform infrared spec troscopy.

Defect Study of Zinc Oxide Bulk Materials by Positron Lifetime Spectroscopy John Wiley & Sons

Time-correlated Single Photon Counting has been written in the hope that by relating the authors' experiences with a variety of different single photon counting systems, they may provide a useful service to users and potential users of this formidably sensitive technique. Of all the techniques available to obtain information on the rates of depopulation of excited electronic singlet states of molecular species, monitoring of fluorescence provides, in principle, the simplest and most direct measure of concentration. This volume comprises eight chapters, with the first focusing on the time dependence and applications of fluorescence. Succeeding chapters go on to discuss basic principles of the single photon counting lifetime measurement; light sources; photomultipliers; electronics; data analysis; nanosecond time-resolved emission spectroscopy; time dependence of fluorescence anisotropy. This book will be of interest to practitioners in the field of chemistry.

Scientific and Technical Aerospace Reports Springer

This dissertation, "Defect Study of Zinc Oxide Bulk Materials by Positron Lifetime Spectroscopy" by □□□, Chun-keung, So, was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. Abstract: Abstract of thesis entitled DEFECT STUDY OF ZINC OXIDE BULK MATERIALS BY POSITRON LIFETIME SPECTROSCOPY submitted by So Chun Keung for the Degree of Master of Philosophy at The University of Hong Kong in January 2008 Vacancy type defects in ZnO bulk materials grown by different methods from various companies were studied by positron lifetime spectroscopy. Hydrothermal grown ZnO samples from University Wafers Company contained a single 193 ps positron lifetime component, attributed to a zinc vacancy related defect. Upon electron irradiation, a single 185 ps positron lifetime was identified which was explained by the formation of another zinc vacancy related defect. This defect remained stable after isochronal annealing of the sample up to 1200C. Samples from the same company but of different batches contained a 180 ps single lifetime component. In addition, hydrothermal grown ZnO single crystals from Altramet Company and MaTecK Company also demonstrated the 180 ps single lifetime component. Two batches of ZnO single crystals grown by pressurized melt grown method from Cermet company were studied. Data analyses on the older batch samples revealed 1the existence of a 257 ps lifetime component, tentatively attributed to Zn+O divacancy defect. This defect was not detected in more recently grown samples. Instead, a 166 ps single component was found, of which the nature of it could not be unambiguously determined. Vapour phase grown as-grown and 900C annealed ZnO samples were studied. Single lifetime component of 175 ps was identified. Nevertheless, the exact nature of it required further investigation. In the present study, positron lifetimes in different ZnO samples were found. The kinds of open volume vacancy-type defects were believed to be dependent on the growing methods. In addition, production of ZnO single crystals with high and consistent qualities was yet to be achieved at present. 2 DOI: 10.5353/th_b3955869 Subjects: Zinc oxide Materials - Defects Positrons - Spectra

Lifetime Spectroscopy BoD – Books on Demand

Fluorescence spectroscopy and its applications to the physical and life sciences have evolved rapidly during the past decade. The increased interest in fluorescence appears to be due to advances in time resolution, methods of data analysis and improved instrumentation. With these advances, it is now practical to perform time-resolved measurements with enough resolution to compare the results with the structural and dynamic features of mac- molecules, to probe the structures of proteins, membranes, and nucleic acids, and to acquire two-dimensional microscopic images of chemical or protein distributions in cell cultures. Advances in laser and detector technology have also resulted in renewed interest in fluorescence for clinical and analytical chemistry. Because of these numerous developments and the rapid appearance of new methods, it has become difficult to remain current on the science of fluorescence and its many applications. Consequently, I have asked the experts in particular areas of fluorescence to summarize their knowledge and the current state of the art. This has resulted in the initial three volumes of Topics in Fluorescence Spectroscopy, which is intended to be an ongoing series which summarizes, in one location, the vast literature on fluorescence spectroscopy. These first three volumes are designed to serve as an advanced text. These volumes describe the more recent techniques and technologies (Volume 1), the principles governing fluorescence and the experimental observables (Volume 2), and applications in biochemistry and biophysics (Volume 3).

Terahertz Spectroscopy Springer Science & Business Media

This volume reviews the techniques Förster Resonance Energy Transfer (FRET) and Fluorescence Lifetime Imaging Microscopy (FLIM) providing researchers with step by step protocols and handy hints and tips. Both have become staple techniques in many biological and biophysical fields.

Introduction to Laser Spectroscopy Springer

Lifetime spectroscopy is one of the most sensitive diagnostic tools for the identification and analysis of impurities in semiconductors. Since it is based on the recombination process, it provides insight into precisely those defects that are relevant to semiconductor devices such as solar cells. This book introduces a transparent modeling procedure that allows a detailed theoretical evaluation of the spectroscopic potential of the different lifetime spectroscopic techniques. The various theoretical predictions are verified experimentally with the context of a comprehensive study on different metal impurities. The quality and consistency of the spectroscopic results, as explained here, confirms the excellent performance of lifetime spectroscopy.

Biochemical Applications John Wiley & Sons

The terahertz regime of the electromagnetic spectrum was largely unexplored due to the lack of technology needed to generate and detect the radiation. However, in the last couple of decades, there has been a dramatic increase in tools needed to harness the radiation. This remarkable progress made in the development of terahertz sources, components, and detectors has resulted in an ever-increasing inquisitiveness of the applications of terahertz technology in a wide range of fields including medicine, pharmaceuticals, security, sensing, and quality assurance. This book, Terahertz Spectroscopy - A Cutting Edge Technology, presents an overview of the recent advances in terahertz technology and their application in a vast array of fields. The scientists and students are encouraged to read and share the content of this volume. The book also provides a good starting point for researchers who are new to the terahertz regime. The various chapters of the book have been written by renowned scientists in different parts of the world who are at the forefront of terahertz research fields. It is our (InTech publisher, editor, and authors) hope that this book will enhance knowledge and stimulate more interest and future research in terahertz technology.

Progress in Atomic Spectroscopy Humana

Fluorescence spectroscopy is an important investigational tool in many areas of analytical science, due to its extremely high sensitivity and selectivity. With many uses across a broad range of chemical, biochemical and medical research, it has become an essential investigational technique allowing detailed, real-time observation of the structure and dynamics of intact biological systems with extremely high resolution. It is particularly heavily used in the pharmaceutical industry where it has almost completely replaced radiochemical labelling. Principles and Applications of Fluorescence Spectroscopy gives the student and new user the essential information to help them to understand and use the technique confidently in their research. By integrating the treatment of absorption and fluorescence, the student is shown how fluorescence phenomena arise and how these can be used to probe a range of analytical problems. A key element of the book is the inclusion of practical laboratory experiments that illustrate the fundamental points and applications of the technique.

Photothermal Spectroscopy Methods John Wiley & Sons

At the time that the editors conceived the idea of trying to organize the meeting on which the contents of this volume are based and which became, in March 1980, a NATO Advanced Study Institute, the techniques of time-resolved fluorescence spectroscopy, in both the nanosecond and sub-nanosecond time-domains, might reasonably have been said to be coming of age, both in their execution and in the analysis and interpretation of the results obtained. These techniques, then as now, comprised mainly a number of pulse methods using laser, flash-lamp or, most recently, synchrotron radiation. In addition, significant developments in the more classical phase approach had also rendered that method popular, utilizing either modulation of an otherwise continuous source or, again recently, the ultra-rapid pulse rate attainable with a synchrotron source. In general terms, time-resolved fluorescence studies are capable, under appropriate conditions, of supplying direct kinetic information on both photophysics and various aspects of molecular, macromolecular and supramolecular structure and dynamics. The nanosecond and sub-nanosecond time-scales directly probed render these techniques particularly appropriate in studying relaxation and fluctuation processes in macromolecules, particularly biopolymers (e. g. proteins, nucleic acids), in supramolecular assemblies such as cell membranes, and in a variety of relatively simpler model systems.

Laser Spectroscopy CRC Press

Volume 3 of this new series focuses on brandnew research and applications in biology, biophysics and other fields of life sciences. Many frontline researcher have contributed to this highly attractive and interdisciplinary volume which spans the entire field of present fluorescence spectroscopy including nanotechnology, membrane and DNA studies and fluorescence imaging in cancer research.

Photothermal Spectroscopy Methods for Chemical Analysis Springer Science & Business Media

This work describes experimental techniques using laser spectroscopy and presents specific practical applications for this technology in many fields, including physics, engineering, chemistry, medicine and bioscience. The general spectroscopic features of molecules are delineated; transition metal and rare earth complexes are examined; and transition selection rules are explained.

Principles and Applications of Fluorescence Spectroscopy Springer Science & Business Media

During the past two decades, there has been an increasing appreciation of the significant value that lifetime-based techniques can add to biomedical studies and applications of fluorescence. Bringing together perspectives of different research communities, Fluorescence Lifetime Spectroscopy and Imaging: Principles and Applications in Biomedical Dia