Optical Constants Of Crystalline And Amorphous Semiconductors Numerical Data And Graphical Information

This is the third volume of the very successful set. This updated volume will contain non-linear properties of some of the most useful materials as well as chapters on optical measurement techniques. * Contributors have decided the best values for n and k * References in each critique allow the reader to go back to the original data to examine and understand where the values have come from * Allows the reader to determine if any data in a spectral region needs to be filled in * Gives a wide and detailed view of experimental techniques for measuring the optical constants n and k * Incorporates and describes crystal structure, space-group symmetry, unit-cell dimensions, number of optic and acoustic modes, frequencies of optic modes, the irreducible representation, band gap, plasma frequency, and static dielectric constant

Knowledge of the refractive indices and absorption coefficients of semiconductors is especially important in the design and analysis of optical and optoelectronic devices. The determination of the optical constants of semiconductors at energies beyond the fundamental absorption edge is also known to be a powerful way of studying the electronic energy-band structures of the semiconductors. The purpose of this book is to give tabulated values and graphical information on the optical constants of the most popular semiconductors over the entire spectral range. This book presents data on the optical constants of crystalline and amorphous semiconductors. A complete set of the optical constants are presented in this book. They are: the complex dielectric constant (E=e+iε), complex refractive index (n*=n+iκ), absorption coefficient (α), and normal-incidence reflectivity (R). The semiconductor materials considered in this book are the group-IV elemental and binary, III-V, IV-VI binary semiconductors, and their alloys. The reader will find the companion book "Optical Properties of Crystalline and Amorphous Semiconductors: Materials and Fundamental Principles" useful since it emphasizes the basic material properties and fundamental principles.

This book presents data on the optical constants of metal elements (Na, Au, Mg, Hg, Sc, Al, Ti, -Sn, V, Cr, Mn, Fe, La, Th, etc.) semimetals (graphite, Sb, etc.), metallic compounds (TiN, VC, TiSi2, CoSi2, etc.) and high-temperature superconducting materials (YBa2Cu3O7-, MgB2, etc.). A complete set of the optical constants are presented in tabular and graphical forms over the entire photon-energy range. They are: the complex dielectric constant A(E)=A1(E)+iA2(E), the complex refractive index n*(E)=n(E)+iκ(E), the absorption coefficient (E) and the normal-incidence reflectivity R(E). The book will aid many who are interested to know the optical constants of the metals, semimetals, metallic compounds and high-temperature superconducting materials in the course of their work. Sample Chapter(s). Chapter 1: Introduction (1,081 KB). Chapter 2: Metals and Semimetal Elements (268 KB). Chapter 3: Transition Metal-Carbides and Nitrides (261 KB). Chapter 5: High-Tc Superconductors (129 KB). Contents: Introduction; Metal and Semimetal Elements; Transition-Metal Carbides and Nitrides; Metallic Silicides; High- T c Superconductors. Readership: Physicists, material scientists, engineers, undergraduate and postgraduate students who work in the field of Optics, especially high energy optics."

Following a semi-quantitative approach, this book presents a summary of the basic concepts, with examples and applications, and reviews recent developments in the study of optical properties of condensed matter systems. Key Features: Covers basic knowledge as well as application topics Includes theory, experimental techniques and current and developing applications Timely and useful contribution to the literature Written by internationally respected contributors working in physics and electrical engineering departments and government laboratories

We have measured the optical properties of films of the organic semiconductors PTCDA and HBC, prepared by Organic Molecular Beam Epitaxy (OMBE), on different substrates by means of Differential Reflectance Spectroscopy (DRS). The optical setup used [51] allows to characterize the samples in situ and during the film growth. This enables us to directly follow the thickness dependent optical properties of the organic films, starting from monolayer coverage up to thicker films on the order of 20 monolayers (ML) film thickness. However, due to the different optical nature of the different substrates used, i.e., mica, glass, Au(111), and HOPG, the DRS signal can not directly be interpreted in terms of the absorption of the films. Rather, the optical constants n (index of refraction) and k (absorption index) of the organic films have to be calculated to be able to discuss the spectral absorption of the films. We have proposed a method by which the calculation of the optical constants of thin films on arbitrary substrates from just one spectral measurement (in our case the DRS) becomes possible. The results fulfill a priori a Kramers-Kronig consistency, characteristic for physically meaningful values of the optical constants, and no specific model is needed to express the spectral behavior of the optical constants. Still, the requirement that the absorption index has to approach zero sufficiently at the measurement intervals restricts the application of our method to a class of materials, which exhibit distinct and well-separated absorption bands, like e.g. organic semiconductors. By means of appropriate extrapolation procedures, the method is able to account for small non-zero values of the absorption index at the boundaries of the measurement interval. Although we exclusively discussed the application of our method to differential reflectance spectra, it is anticipated that it works for all other optical quantities likewise.

Ellipsometry is a powerful tool used for the characterization of thin films and multi-layer semiconductor structures. This book deals with fundamental principles and applications of spectroscopic ellipsometry (SE). Beginning with an overview of SE technologies the text moves on to focus on the data analysis of results obtained from SE. Fundamental data analyses, principles and physical backgrounds and the various materials used in different fields from LSI industry to biotechnology are described. The final chapter describes the latest developments of real-time monitoring and process control which have attracted significant attention in various scientific and industrial fields.
Knowledge of the refractive indices and absorption coefficients of semiconductors is especially important in the design and analysis of optical and photonic devices. This book presents data on the optical constants of various elemental and compound semiconductors. A complete set of the optical constants of the semiconductors are presented in tabular and graphical forms over the entire photon-energy range. They are: the complex dielectric constant \( \varepsilon(E) = \varepsilon_1(E) + i\varepsilon_2(E) \), the complex refractive index \( n^*(E) = n(E) + ik(E) \), the absorption coefficient \( \alpha(E) \), and the normal-incidence reflectivity \( R(E) \). The book will aid many who are interested to know the optical constants of the elemental and compound semiconductors in the course of their work.

Systematically describes the physical and materials properties of copper-based quaternary chalcogenide semiconductor materials, enabling their potential for photovoltaic device applications. Intended for scientists and engineers, in particular, in the fields of multinary semiconductor physics and a variety of photovoltaic and optoelectronic devices. This impressive thesis offers a comprehensive scientific study of the alkaline earth niobates and describes their nonlinear optical properties for the first time. It explores the crystal structure, electrical properties, optical absorption properties, hot carrier dynamics, nonlinear optical property and strain-induced metal to insulator transition of alkaline earth niobates using advanced experimental techniques. These alkaline earth niobates can have a strong plasmon resonance in the visible range due to their large carrier density, and this unique property gives rise to the emergent phenomenon of photocatalysis and nonlinear optical properties. This series of intrinsic plasmonic materials based on niobates, can be used as a photocatalyst to split water under sunlight, a novel saturable absorber in the high-power ultrashort pulsed laser system, and as a sensor in microelectromechanical systems.

Deals not only with the properties of the radiation modes inside the crystals but also with their peculiar optical response to external fields. A general theory of linear and nonlinear optical response is presented in a clear and detailed fashion using the Green’s function method. Important recent developments such as the enhancement of stimulated emission, second harmonic generation, quadrature-phase squeezing, and low-threshold lasing are likewise treated in detail and made understandable. Numerical methods are also emphasised. This book provides both introductory knowledge for graduate and undergraduate students and important ideas for researchers.

Authored by leading experts from around the world, the three-volume Handbook of Nanostructured Thin Films and Coatings gives scientific researchers and product engineers a resource as dynamic and flexible as the field itself. The first two volumes cover the latest research and application of the mechanical and functional properties of thin films and coatings, while the third volume explores the cutting-edge organic nanostructured devices used to produce clean energy. This second volume, Nanostructured Thin Films and Coatings: Functional Properties, focuses on functional properties (i.e., optical, electronic, and electrical) and related devices and applications. It also addresses topics such as: Large-scale fabrication of functional thin films using nanoarchitecture via chemical routes Fabrication and characterization of SiC nanostructured/nanocomposite films Low-dimensional nanocomposite fabrication and its applications Optical and optoelectronic properties of silicon nanocrystals embedded in SiO2 matrix Electrical properties of silicon nanocrystals embedded in amorphous SiO2 matrix Optical aspects of properties and applications of sol-gel-derived nanostructured thin films Controllably micro/nanostructured films and devices Thin-film shape memory alloy for microsystem applications A complete resource, this handbook provides the detailed explanations that newcomers need, as well as the latest cutting-edge research and data for experts. Covering a wide range of mechanical and functional technologies, including those used in clean energy, these books also feature figures, tables, and images that will aid research and help professionals acquire and maintain a solid grasp of this burgeoning field. The Handbook of Nanostructured Thin Films and Coatings is composed of this volume and two others: Nanostructured Thin Films and Coatings: Mechanical Properties Organic Nanostructured Thin Film Devices and Coatings for Clean Energy

This book is devoted to the problem of the frequency dispersion of optical constants of inorganic glasses. It is the only source providing a comprehensive discussion of this topic on a unified physical and analytical basis. Optical Constants of Inorganic Glasses presents thorough descriptions of the underlying physical phenomena, analytical models for the optical constants dispersion, and detailed information on the optical constants and related optical characteristics of glasses. The broad scope of the book includes such topics as general relationships for the response of a solid to the effect of an electromagnetic field, and specific features of optical spectrum formation for a glass and the resulting constants. The text details methods for reconstructing the spectra of optical constants from raw experimental spectra of glasses, and provides data on the spectra of optical constants in the IR and VUV ranges and on the IR band parameters for inorganic glasses. It includes factors responsible for the behavior of the refractive index dispersion of glasses in the transparency range. The reference fully details the opportunities provided by the recent version of dispersion analysis for glasses based on the specific analytical model for the complex dielectric constant. Until now, this information was only available in Russian journals. A large quantity of never-before-published data on numerical values of optical constants in the medium and far IR and of IR band frequencies and intensities is given for a wide variety of inorganic glasses. For vitreous silica, data on the optical constants are also given for the broadband wavelength range in the VUV. Optical Constants of Inorganic Glasses provides the only comprehensive review of available dispersion formulas and methods for interpolating and extrapolating the refractive indices of glasses in the transparency range. The volume is a valuable resource for researchers, practitioners in the fields of glass technology

"Optical Properties of 3d-ions in Crystals: Spectroscopy and Crystal Field Analysis" discusses spectral, vibronic and magnetic properties of 3d-ions in a wide range of crystals, used as active media for solid state lasers and potential candidates for this role. Crystal field calculations (including first-principles calculations of energy levels and absorption
spectra) and their comparison with experimental spectra, the Jahn-Teller effect, analysis of vibronic spectra, materials science applications are systematically presented. The book is intended for researchers and graduate students in crystal spectroscopy, materials science and optical applications. Dr. N.M. Avram is an Emeritus Professor at the Physics Department, West University of Timişoara, Romania; Dr. M.G. Brik is a Professor at the Institute of Physics, University of Tartu, Estonia.

Research and applications in optical engineering require careful selection of materials. With such a large and varied array to choose from, it is important to understand a material's physical and optical properties before making a selection. Providing a convenient, concise, and logically organized collection of information, Physical Properties and Data of Optical Materials builds a thorough background for more than 100 optical materials and offers quick access to precise information. Surveying the most important and widely used optical materials, this handy reference includes data on a wide variety of metals, semiconductors, dielectrics, polymers, and other commonly used optical materials.

For each material, the editors examine the crystal system; natural and artificial growth and production methods along with corrosives and processing; thermal, electrical, and mechanical properties; optical properties, such as transmittance and reflectance spectra, ranging from UV to IR wavelengths; and, where applicable, applications for spectroscopy and miscellaneous remarks such as handling concerns and chemical properties. Numerous tables illustrate important data such as numerical values of optical constants for important wavelength regions, extinction and absorption coefficients, and refractive index. Physical Properties and Data of Optical Materials offers a collection of data on an unprecedented variety of fundamental optical materials, making it the one quick-look guide that every optical scientist, engineer, and student should own.

This report concerns the development of methods for obtaining the optical constants of anisotropic crystals of the triglinc and monoclinic systems. The principal method used, classical dispersion theory, is adapted to these crystal systems by extending the Lorentz line parameters to include the angles characterizing the individual resonances, and by replacing the dielectric constant by a dielectric tensor. The sample crystals are gypsum, orthoclase andchalchite. The derived optical constants are shown to be suitable for modeling the optical properties of particulate media in the infrared spectral region. For those materials where suitable size single crystals are not available, an extension of a previously used method is applied to alabaster, a polycrystalline material of the monoclinic crystal system. Keywords: Triclinic crystals; Monoclinic crystals; Complex dielectric tensor; Anisotropic crystals; Dispersion theory.

This handbook—a sequel to the widely used Handbook of Optical Constants of Solids—contains critical reviews and tabulated values of indexes of refraction (n) and extinction coefficients (k) for almost 50 materials that were not covered in the original handbook. For each material, the best known n and k values have been carefully tabulated, from the x-ray to millimeter-wave region of the spectrum by expert optical scientists. In addition, the handbook features thirteen introductory chapters that discuss the determination of n and k by various techniques. * Contributors have decided the best values for n and k * References in each critique allow the reader to go back to the original data to examine and understand where the values have come from * Allows the reader to determine if any data in a spectral region needs to be filled in * Gives a wide and detailed view of experimental techniques for measuring the optical constants n and k * Incorporates and describes crystal structure, space-group symmetry, unit-cell dimensions, number of optic and acoustic modes, frequencies of optic modes, the irreducible representation, band gap, plasma frequency, and static dielectric constant

The summary of this paper is the authors analyze UO2 by ellipsometry and Raman spectroscopy and conclude that the literature values of: (1) the optical constants of UO2 and (2) the low temperature oxidation rate of UO2 are probably incorrect.

Handbook of Optical Metrology: Principles and Applications begins by discussing key principles and techniques before exploring practical applications of optical metrology. Designed to provide beginners with an introduction to optical metrology without sacrificing academic rigor, this comprehensive text: Covers fundamentals of light sources, lenses, prisms, and mirrors, as well as optoelectronic sensors, optical devices, and optomechanical elements Addresses interferometry, holography, and speckle methods and applications Explains Moiré metrology and the optical heterodyne measurement method Delves into the specifics of diffraction, scattering, polarization, and near-field optics Considers applications for measuring length and size, displacement, strictness and parallelism, flatness, and three-dimensional shapes This new Second Edition is fully revised to reflect the latest developments. It also includes four new chapters—nearly 100 pages—on optical coherence tomography for industrial applications, interference microscopy for surface structure analysis, noncontact dimensional and profile metrology by video measurement, and optical metrology in manufacturing technology.

This set of five volumes, four volumes edited by Edward D. Palik and a volume by Gorachand Ghosh, is a unique resource for any science and technology library. It provides materials researchers and optical device designers with reference facts in a context not available anywhere else. The singular functionality of the set derives from the unique format for the three core volumes that comprise the Handbook of Optical Constants of Solids. The Handbook satisfies several essential needs: first, it affords the most comprehensive database of the refractive index and extinction (or loss) coefficient of technically important and scientifically interesting dielectrics. This data has been critically selected and evaluated by authorities on each material. Second, the dielectric constant database is supplemented by tutorial chapters covering the basics of dielectric theory and reviews of experimental techniques for each wavelength region and material characteristic. As an additional resource, two of the tutorial chapters summarize the relevant characteristics of each of the materials in the database. The data in the core volumes have been collected and analyzed over a period of twelve years, with the most recent completed in 1997. The volumes systematically define the dielectric properties of 143 of the most engaging materials, including metals, semiconductors, and insulators. Together, the three Palik books contain nearly 3,000 pages, with about 2/3 devoted to the dielectric constant data. The tutorial chapters in the remaining 1/3 of the pages contain a wealth of information, including some dielectric data. Hence, the separate volume, Index to Handbook of Optical Constants of Solids, which is included as part of the set, substantially enhances the utility of the Handbook and in essence, joins all the Palik volumes into one unit. It is of great importance to users of the set. A final volume rounds out the set. The Handbook of Thermo-Optic Coefficients of Optical Materials with Applications collects refractive index measurements and their temperature dependence for a large number of materials. Mathematical models represent these data, and in turn are used in the design of nonlinear optical devices. * Unique source of extremely useful optical data for a very broad community of scientists, researchers, and practitioners * Will be of great practical applicability to both industry and research * Presents optical constants for a broadest spectral range, for a very large number of crystals and glasses. Mathematical models represent these data, and in turn are used in the design of nonlinear optical devices. * Unique source of extremely useful optical data for a very broad community of scientists, researchers, and practitioners * Will be of great practical applicability to both industry and research * Presents optical constants for a broadest spectral range, for a very large number of materials: Paliks three volumes include 143 materials including 43 elements; Ghoshs volume includes some 70 technologically interesting crystals and many commercial glasses * Includes a special index volume that enables the user to search for the information in the three Palik volumes easily and quickly * Critique chapters in the Palik volumes discuss the data and give reference to most of the literature available for each material * Presents various techniques for measuring the optical constants and mathematical models for analytical calculations of some data * Nonlinear Optical Properties of Organic Molecules and Crystals, Volume 1 discusses the nonlinear optical effects in organic molecules and crystals, providing a classical distinction between quadratic and cubic processes. This book begins with a general overview of the basic properties of organic matter, followed by a review on the benefits derived from quantum-chemistry-based models and growth and
characterization of high quality, bulk organic crystals and waveguided contributions. A case study focusing on a specific material, namely urea, which exemplifies a situation in which transparency in the UV region has been purposely traded for nonlinear efficiency is also deliberated. This text concludes with a description of a type of trade-off between the unpredictable orientation of molecules in crystalline media, polarity of liquid-crystalline structures, and dominant electronic contribution to the electro-optic effect. This publication is beneficial to solid-state physicists and chemists concerned with nonlinear optical properties of organic molecules and crystals.

This book presents data on the optical constants of metal elements (Na, Au, Mg, Hg, Sc, Al, Ti, ?-Sn, V, Cr, Mn, Fe, La, Th, etc.) semimetal elements (graphite, Sb, etc.), metallic compounds (TiN, VC, TiSi2, CoSi2, etc.) and high-temperature superconducting materials (YBa2Cu3O7-?, MgB2, etc.). A complete set of optical constants are presented in tabular and graphical forms over the entire photon-energy range. They are: the complex dielectric constant ?(E)=?1(E)+i?2(E), the complex refractive index n?(E)=n(E)+i?k(E), the absorption coefficient ?(E) and the normal-incidence reflectivity R(E). The book will aid many who are interested to know the optical constants of the metals, semimetals, metallic compounds and high-temperature superconducting materials in the course of their work.

The aim of this 3-volume reference is to present accurate, reliable and up-to-date information on the physical properties of group IV elemental semiconductors (Vol. 1), III-V compound semiconductors (Vol. 2) and II-VI semiconductors (Vol. 3). The data on the physical properties of each material are organized in the same way throughout these volumes to facilitate searching for information. The physical properties considered in these volumes can be classified into 12 groups: structural properties, thermal properties, elastic properties, phonons and lattice vibronic properties, collective effects and related properties, energy-band structure, energy-band gaps, energy-band structure: electron and hole effective mass, electronic deformation potential, electron affinity and Schottky barrier height, optical properties, -elasto-optic, electrooptic and nonlinear optical properties; and, -carrier transport properties. An extensive bibliography is included for those who wish to find additional information.

The optical constants of a wide variety of materials were measured for this contract period. This report covers the work done at the Univ. of Missouri-Rolla. The spectral range of the measurements covered from the visible to the far infrared. The millimeter and submillimeter (far infrared) measurements were made on the Rolla Campus and the infrared, visible and ultraviolet measurements were made on the Kansas City Campus. This wide spectral range means that Kramers-Kronig analyses can be made with better precision than when reflectance data is available only over a limited spectral range. The construction of a homodyning interferometer that is capable of measuring small (diameter approximately 1 cm) samples at millimeter wavelengths and samples that are highly absorbing. To our knowledge no other instruments with this capability exist. The measurement of refractive indices of gypsum, both as a single crystal and as a powder in the far and near infrared for use as a standard. The measurement of several types of graphite. We have found that Dixon 200-10 shows a large positive real part of the dielectric constant at low frequencies. This contradicts the usual free electron picture for graphite at low frequencies. Keywords: Minerals, Metals, Ultraviolet radiation, Infrared radiation, Liquids, Optical Properties, Single crystals, Powders. (edc).

Optical constants are specific properties of condensed matter that allow to describe in a simple way the interaction of light or other electromagnetic radiation with matter. There is always a requirement for optical constants values for estimating colour, reflection, internal total reflection, refraction, scattering, phase shifting, multilayer properties, or thin film thickness.

While bits and pieces of the index of refraction n and extinction coefficient k for a given material can be found in several handbooks, the Handbook of Optical Constants of Solids gives for the first time a single set of n and k values over the broadest spectral range (ideally from x-ray to mm-wave region). The critiquers have chosen the numbers for you, gives for the first time a single set of n and k values over the broadest spectral range (ideally from x-ray to mm-wave region). The book is concerned with the practical determination of optical constants from easily accomplishable reflectance or transmittance measurements with reflectometers or ellipsometers. It provides information on the basics of optical constants and a comprehensive overview on models for optical constants. A brief overview on methods of measurement and evaluation is followed by guidelines to the practical determination of optical constants mainly of thin films on a substrate. The main task is always to find the best suited model for the parametrization of the optical constants.

This monograph is devoted to a detailed treatment of the nonlinear optical properties of liquid crystals. The basic concepts of director optical reorientation and thermal nonlinearities are presented showing the fundamental theoretical approaches and describing the main experimental observations. The presentation is self-consistent and tutorial although the subject matter is of current research interest. The last part of the book deals with more recent results on new composite materials: Polymer Dispersed Liquid Crystals (PDLC). A general presentation of the optical properties is given and the observations of several nonlinear optical effects are reported.

While bits and pieces of the index of refraction n and extinction coefficient k for a given material can be found in several handbooks, the Handbook of Optical Constants of Solids gives for the first time a single set of n and k values over the broadest spectral range (ideally from x-ray to mm-wave region). The critiquers have chosen the numbers for you, based on their own broad experience in the study of optical properties. Whether you need one number at one wavelength or many numbers at many wavelengths, what is
available in the literature is condensed down into a single set of numbers. Contributors have decided the best values for \( n \) and \( k \) References in each critique allow the reader to go back to the original data to examine and understand where the values have come from. Allows the reader to determine if any data in a spectral region needs to be filled in. Gives a wide and detailed view of experimental techniques for measuring the optical constants \( n \) and \( k \) Incorporates and describes crystal structure, space-group symmetry, unit-cell dimensions, number of optic and acoustic modes, frequencies of optic modes, the irreducible representation, band gap, plasma frequency, and static dielectric constant. Optics of Crystalline and Amorphous Semiconductors: Numerical Data and Graphical Information presents data on the optical constants of various elemental and compound semiconductors. A complete set of the optical constants of the semiconductors are presented in tabular and graphical forms over the entire photon-energy range. They are: the complex dielectric constant \( \varepsilon(E) = \varepsilon_1(E) + i\varepsilon_2(E) \), the complex refractive index \( n'(E) = n(E) + ik(E) \), the absorption coefficient \( a(E) \), and the normal-incidence reflectivity \( R(E) \). The book will aid many who are interested to know the optical constants of the elemental and compound semiconductors in the course of their work.

Optical Properties of Crystalline and Amorphous Semiconductors: Materials and Fundamental Principles presents an introduction to the fundamental optical properties of semiconductors. This book presents tutorial articles in the categories of materials and fundamental principles (Chapter 1), optical properties in the reststrahlen region (Chapter 2), those in the interband transition region (Chapters 3 and 4) and at or below the fundamental absorption edge (Chapter 5). Optical Properties of Crystalline and Amorphous Semiconductors: Materials and Fundamental Principles is presented in a form which could serve to teach the underlying concepts of semiconductor optical properties and their implementation. This book is an invaluable resource for device engineers, solid-state physicists, material scientists and students specializing in the fields of semiconductor physics and device engineering.

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.