Nonlinear Optical Effects In Organic Polymers 1st Edition

Nonlinear Optical Properties of Organic and Polymeric Materials
Organic Nonlinear Optical Materials
Organic Nonlinear Optical Materials
Nonlinear Optical Effects and Materials
Synthesis of Organic Compounds Exhibiting Enhanced Nonlinear Optical Effects
Organic Electro-Optics and Photonics
Nonlinear Optics
The Design and Synthesis of Organic Materials with Large Nonlinear Optical Effects
Charge Transport and Nonlinear Optical Effects in Organic Thin Films
Organic Materials for Second-order Nonlinear Optics
Organic Molecules for Nonlinear Optics and Photonics
Light Wave Manipulation Using Organic Nonlinear Optical Materials
Nonlinear Optical Properties of Organic Materials II
Nonlinear Optical Properties and Photorefractive Effect in Organic and Polymeric Materials
Nonlinear Optical Effects in Organic Polymers

Nonlinear Optical Properties of Organic Molecules and Crystals V2
Nonlinear Optics of Organic Molecules and Polymers
Principles and Applications of Nonlinear Optical Materials
Design and Synthesis of Novel Organic Materials with Large Nonlinear Optical Effects
Nonlinear Optical Properties of Organic Molecules and Crystals V1
Third-order Nonlinear Optical Effects in Organic Materials
Characterization Techniques and Tabulations for Organic Nonlinear Optical Materials
Nonlinear Optical Studies of Organic Monolayers
Second-order Organic Nonlinear Optics
Nonlinear Optical and Electroactive Polymers
Second-order Nonlinear Optical Interactions and Cascading Effects in Thin Organic Films
Nonlinear Optics
Characterization Techniques and Tabulations for Organic Nonlinear Optical Materials
Nonlinear Optical Materials
Organic Materials for Nonlinear Optical Applications: New Chalcones
Report
Molecular Nonlinear Optics
Organic Materials for Non-linear Optics
Introduction to Nonlinear Optical Effects in Molecules and Polymers
Measurement of Nonlinear Optical Effects in Organic Materials Using Low Power Lasers

Nonlinear Optical Properties of Materials
Nonlinear Optical Properties of Organic Materials
Nonlinear Optical Effects and Materials
Physics of Nonlinear Optics
Organic and Polymeric Nonlinear Optical Materials; a Topical Workshop Held in Virginia Beach, Virginia on May 16-19, 1988

PRANAV TRISTEN

Nonlinear Optical Properties of Organic and Polymeric Materials
CRC Press ""Furnishes table of nonlinear optical properties of organic substances as well as experimental procedures for measuring the nonlinearity of the elements tabulated, including composite materials- offering support for scientists and engineers involved in characterizing , optimizing, and producing materials for manufacturing optical devices.
Organic Nonlinear Optical Materials
Springer Science & Business Media
Photonics is being labelled by many as the technology for the 21st century. Because of the structural flexibility both at the molecular and bulk levels, organic materials are emerging as a very important class of nonlinear optical

materials to be used for generating necessary nonlinear optical functions for the technology of photonics. Since the last NATO advanced research workshop on "Polymers for Nonlinear Optics"held in June 1988, at Nice - Sophia Antipolis, France. there has been a tremendous growth of interest worldwide and important development in this field. Significant progress has been made in theoretical modeling, material development, experimental studies and device concepts utilizing organic materials. These important recent developments provided the rationale for organizing the workshop on "Organic Materials for Nonlinear Optics and Photonics" which was held in La Rochelle, France, in August 1990. This proceeding is the outcome of the workshop held in La Rochelle. The objective of the workshop was to bring together scientists and engineers of varied backgrounds working in this field in order to assess the current status of this field by presenting significant recent developments and make recommendations on future directions of research. The workshop was multidisciplinary as it had contributions from

chemists, physicists, materials scientists and device engineers. The participants were both from industries and universities. The workshop included plenary lectures by leading international scientists in this field, contributed research papers and a poster session. Panel discussion groups were organized to summarize important developments and to project future directions. *Organic Nonlinear Optical Materials* Springer Science & Business Media Second-order nonlinear optical effects are forbidden in a medium with inversion symmetry, but are necessarily allowed at a surface where the inversion summary is broken. They are often sufficiently strong so that a submonolayer perturbation of the surface can be readily detected. They can therefore be used as effective tools to study monolayers adsorbed at various interfaces. We discuss here a number of recent experiments in which optical second harmonic generation (SHG) and sum-frequency generation (SFG) are employed to probe and characterize organic monolayers. 15 refs., 5 figs. *Nonlinear Optical Effects*

and Materials Wiley-Interscience The field of nonlinear optics developed gradually with the invention of lasers. After the discovery of second-harmonic generation in quartz, many other interesting nonlinear optical processes were rapidly discovered. Simultaneously theoretical programmes for the understanding of nonlinear optical phenomena were stimulated in accordance to develop structure-property relationships. In the beginning, research advances were made on inorganic ferroelectric materials followed by semiconductors. In the 1970's, the importance of organic materials was realised because of their nonlinear optical responses, fast optical response, high laser damage thresholds, architectural flexibility, and ease of fabrication. At present materials can be classified into three categories - inorganic ferroelectrics, semiconductors, and organic materials. Advances have also been made in quantum chemistry approaches to investigate nonlinear optical susceptibilities and in the development of novel nonlinear optical devices. Generally, inorganic and organic nonlinear optical

materials and their related optical processes are reported in separate meetings. This book collects for the first time papers covering the recent developments and areas of present research in the field of nonlinear optical materials.

Synthesis of Organic Compounds Exhibiting Enhanced Nonlinear Optical Effects

Elsevier

This volume brings together contributions from world renowned researchers on molecular nonlinear optics. It takes as its impetus work done over the last five years in which newly developed optoelectronic devices havedeepened our understanding of the fundamental physics and chemistry underlying these materials. Organic materials involving thin films, polymers, and resulting devices will be emphasized.

Organic Electro-Optics and Photonics

Elsevier

This publication represents the proceedings of the Conference on Organic Materials for Non-Linear Optics, held in Oxford in June 1988. It was a truly international conference attended by over 160 delegates from academia, industry and government research establishments, who represented a wide range of

scientific disciplines and included organic and organometallic chemists, theorists and experimental physicists and device engineers. **Nonlinear Optics** BoD – Books on Demand This work brings together a selection of papers dealing with various aspects of organic nonlinear optical materials. **The Design and Synthesis of Organic Materials with Large Nonlinear Optical Effects** Springer Science & Business Media ""Furnishes table of nonlinear optical properties of organic substances as well as experimental procedures for measuring the nonlinearity of the elements tabulated, including composite materials- offering support for scientists and engineers involved in characterizing, optimizing, and producing materials for manufacturing optical devices. Charge Transport and Nonlinear Optical Effects in Organic Thin Films Springer Science & Business Media Nonlinear optics has been a rapidly growing field in recent decades. It is based on the study of effects and phenomena related to the interaction of intense coherent light radiation with matter. Physics of Nonlinear

Optics describes various major nonlinear optical effects, including physical principles, experimental techniques, up-to-date research achievements, and current or potential applications. This book features clear conceptual descriptions, concise formulations, and emphasizes both theoretical and experimental aspects of nonlinear optics. The readability of this book is particularly enhanced by a series of color photographs showing the spectacular appearances of various nonlinear optical effects. Both authors of this book are outstanding research scientists renowned in their professional areas. Their major research achievements in nonlinear optics include the pioneering studies of two-wave-coupled refractive-index change, Raman-enhanced self-focusing, optical-frequency Pockels effect, stimulated Kerr scattering, optical phase-conjugation via backward stimulated emission, and two-photon-absorption based optical limiting, stabilization and reshaping.

Organic Materials for Second-order Nonlinear Optics

Academic Press

At this Workshop on Organic and Polymeric

Nonlinear Optical Materials, the latest developments in the areas of theory, characterization, synthesis, molecular assemblies, and potential device applications for organic and polymeric materials exhibiting nonlinear optical behavior are discussed. Topics discussed include: An Overview on Nonlinear Optical Polymer Systems and Devices, Nonlinear Optical Effects in Polymeric Films, Recent Advances in Nonlinear Optical Properties of Organic and Polymer Systems, Anisotropy of the Third Order Nonlinear Optical Susceptibility in Conjugated Polymers, Nonlinear Optics in Ordered Molecular Systems, Several Series of Novel Polydiacetylenes for Nonlinear Optics, Resonance Effects in Cubic Hyper-polarisabilities of Conjugated Polymers, Nonlinear Optical Measurements on Liquid Crystals and Quasi-Liquid Crystals, Optical Nonlinearity: Molecules, Assemblies and Wave Phenomena, Preparation and Characterization of Organo-Transition Metal Langmuir-Blodgett Films, Advances in Organic Electro-Optic Devices, Organic Nonlinear Optical

Devices and Material Considerations, High Resolution Laser Spectroscopy in Polymers. (aw).

Organic Molecules for Nonlinear Optics and Photonics IOS Press

This book is mostly concerned on the experimental research of the nonlinear optical characteristics of various media, low- and high-order harmonic generation in different materials, and formation, and nonlinear optical characterization of clusters. We also demonstrate the inter-connection between these areas of nonlinear optics. Nonlinear optical properties of media such as optical limiting can be applied in various areas of science and technology. To define suitable materials for these applications, one has to carefully analyse the nonlinear optical characteristics of various media, such as the nonlinear refractive indices, coefficients of nonlinear absorption, saturation absorption intensities, etc. Knowing the nonlinear optical parameters of materials is also important for describing the propagation effects, self-interaction of intense laser pulses, and optimisation of various nonlinear optical processes. Among those processes one

can admit the importance of the studies of the frequency conversion of coherent laser sources. The area of interest for nonlinear optical characterization of materials is also closely related with new field of nanostructures formation and application during laser-matter interaction. We show how the nonlinear optical analysis of materials leads to improvement of their high-order nonlinear optical response during the interaction with strong laser fields. Ablation-induced nanoparticles formation is correlated with their applications as efficient sources of coherent short-wavelength photons. From other side, recent achievements of harmonic generation in plasmas are closely related with the knowledge of the properties of materials in the laser plumes. All of these studies are concerned with the low-order nonlinear optical features of various materials. The novelty of the approach developed in present book is related with inter-connection of those studies with each other.

Light Wave Manipulation Using Organic Nonlinear Optical Materials CRC Press

Molecular Dynamics in Restricted Geometries

Edited by Joseph Klafter and J. M. Drake This investigation of the chemistry and physics of complex systems focuses on the role of spatial restrictions on molecular movement. A practical source-book for researchers in chemical physics, chemical engineering, and condensed matter physics, and for graduate students in these fields, it covers a broad range of topics and critically evaluates methods as they are employed. Among the many topics it covers are: relaxation and diffusion in restricted geometries, excitation energy transfer and photoinduced electron transfer phenomena in some confined systems, electron excitation transport in micelles, polymers and multilayers, and electron excitation transport on polymer chains. 1989 (0 471-60176-4) 437 pp.

Nonlinear Optical Properties of Organic Materials II

LAP Lambert Academic Publishing

Photonics, the counterpart of electronics, involves the usage of Photons instead of electrons to process information and perform various switching operations. Photonics is projected to be the technology of the future because of the

gain in speed, processing and interconnectivity of network. Nonlinear optical processes will play the key role in photonics Where they can be used for frequency conversion, optical switching and modulation. Organic molecules and polymers have emerged as a new class of highly promising nonlinear optical materials Which has captured the attention of scientists world wide. The organic systems offer the advantage of large nonresonant nonlinearities derived from the 1T electrons contribution, femtosecond response time and the flexibility to modify their molecular structures. In addition, organic polymers can easily be fabricated in various device structures compatible with the fiber-optics communication system. The area of nonlinear optics of organic molecules and polymers offers exciting opportunities for both fundamental research and technologic development. It is truly an interdisciplinary area. This proceeding is the outcome of the first NATO Advanced Research WOrkshop in this highly important area. The objective of the workshop was to provide a forum for scientists of varying background from both

universities and industries to come together and interface their expertize. The scope of the workshop was multidisciplinary with active participations from Chemists, physicists, engineers and materials scientists from many countries. *Nonlinear Optical Properties and Photorefractive Effect in Organic and Polymeric Materials* CRC Press 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 structures. 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. *Nonlinear Optical Effects in Organic Polymers* World Scientific Nonlinear optics is a topic of much current interest that exhibits a great diversity. Some publications on the subject are clearly physics, while others reveal an engineering bias; some appear to be accessible to the chemist, while others may appeal to biological understanding . Yet all purport to be non linear optics so where is the underlying unity? The answer is that the unity lies in the phenomena and the devices that exploit them, while the diversity lies in the materials used to express the phenomena. This book is an attempt to show this unity in diversity by bringing together contributions covering an unusually wide range of materials, preceded by accounts of the main phenomena and important

devices. Because ofthe diversity, individual materials are treated in separate chapters by different expert authors, while as editors we have shouldered the task of providing the unifying initial chapters. Most main classes of nonlinear optical solids are treated: semiconductors, glasses, ferroelectrics, molecular crystals, polymers, and Langmuir-Blodgett films. (However, liquid crystals are not covered.) Each class of material is enough for a monograph in itself, and this book is designed to be an introduction suitable for graduate students and those in industry entering the area of nonlinear optics. It is also suitable in parts for final-year undergraduates on project work. It aims to provide a bridge between traditional fields of expertise and the broader field of nonlinear optics.

Nonlinear Optical Properties of Organic Molecules and Crystals V2

CRC Press

This book examines nonlinear optical effects in nonlinear nanophotonics, plasmonics, and novel materials for nonlinear optics. It discusses different types of plasmonic excitations such as volume plasmons, localized surface plasmons, and

surface plasmon polaritons. It also examines the specific features of nonlinear optical phenomena in plasmonic nanostructures and metamaterials. Chapters cover such topics as applications of nanophotonics, novel materials for nonlinear optics based on nanoparticles, polymers, and photonic glasses.

Nonlinear Optics of Organic Molecules and Polymers

Cambridge University Press

This treatise is a compendium of papers based on invited talks presented at the American Chemical Society Symposium on Electroactive Polymers which covered nonlinear optical polymers and conducting polymers, the common denominator being the correlated pi-electron structures. The improved understanding of the consequences of pi-electron delocalization upon nonlinear optical properties and charge carrier dynamics has laid the foundation for the rapid development and application of the electroresponse of conjugated polymers. As a result, the area of electroactive and nonlinear optical polymers is emerging as a frontier of sCience and technology. It is a multidisciplina

ry field that is bringing together scientists and engineers of varied background to interface their expertise. The recent explosion of interest in this area stems from the prospect of utilizing nonlinear optical effects for optical switching and logic operations in optical computing, optical signal processing, optical sensing and optical fiber communicatio ns. Polymers and organic are rapidly becoming one of the major material classes for nonlinear optical applications along with multiple quantum wells, ferroelectrics and other oxides, and direct band-gap semiconductor s. The reasons for this lie in the unique molecular structures of polymers and organics and the ability to molecularly engineer the architecture of these structures through chemical synthesis.

Principles and Applications of Nonlinear Optical Materials

CRC Press

Definitive guide to modern organic electro-optic and photonic technologies, from basic theoretical concepts to practical applications in devices and systems.

Design and Synthesis of Novel Organic Materials with Large Nonlinear Optical Effects

Springer

Nonlinear

Optical Properties of Organic Molecules and Crystals, Volume 2 deals with the nonlinear optical properties of organic molecules and crystals, with emphasis on cubic nonlinear optical effects and and the intermolecular bond. Topics covered include the basic structural and electronic properties of polydiacetylenes; cubic effects in polydiacetylene solutions and films; and degenerate third-order nonlinear optical susceptibility of polydiacetylenes. Dimensionality effects and scaling laws in nonlinear optical susceptibilities are also considered. This volume is comprised of seven chapters divided into two sections and begins with a discussion on the basic structural and electronic properties of polydiacetylenes as well as their methods of preparation. Cubic nonlinearities in polydiacetylene solutions and films are then examined, paying particular attention to polarization in one-dimensional media; multiple reflections of fundamental and harmonic waves; and harmonic generation in an absorbing medium. The following chapters focus on degenerate third-order nonlinear optical susceptibility

of polydiacetylenes; dimensionality effects and scaling laws in nonlinear optical susceptibilities; polarizabilities and hyperpolarizabilities of long molecules; and resonant molecular optics. The final chapter analyzes the nonlinear optics of a wide range of compounds that are held together by intermolecular bonding and form supramolecular assemblies. This monograph will be a useful resource for physicists, physical and organic chemists, and those in the field of quantum electronics. *Nonlinear Optical Properties of Organic Molecules and Crystals V1* Springer This book presents an excellent overview of the exciting new advances in nonlinear optical (NLO) materials and their applications in emerging photonics technologies. It is the first reference source available to cover every NLO material published through 1995! All theoretical approaches, measurement techniques, materials, technologies, and applications are covered. With more than 1,800 bibliographic citations, 324 figures, 218 tables, and 812 equations, this book is an invaluable reference source for graduate and undergraduat

e students, researchers, scientists and engineers working in academia and industries in chemistry, solid-state physics, materials science, optical and polymer engineering, and computational science.