

Organic Nonlinear Optical Materials



Ch. Bosshard, K. Sutter,
Ph. Prêtre, J. Hulliger,
M. Flörsheimer, P. Kaatz,
and P. Günter

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Jen-Tai Su



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Organic Nonlinear Optical Materials Ch. Bosshard, J. Hulliger, M. Florsheimer, P. Gunter, 2001-08-24 *Organic Nonlinear Optical Materials* provides an extensive description of the preparation and characterization of organic materials for applications in nonlinear and electro optics The book discusses the fundamental optimization and practical limitations of a number of figures of merit for various optical parameters and gives a clinical appraisal of the potential of organic materials for applicators in optical technology Among the topics addressed are the basic molecular design of nonlinear optical chromophores fundamentals and novel techniques of organic crystal growth preparation and characterization of Langmuir Blodgett and polymer films experimental methods for determining microscopic and macroscopic optical properties Also included is a discussion of first results of the photorefractive effect in organic crystals and the potential of organics for photorefractive applications as well as an extensive review of published linear and nonlinear optical measurement of organic materials

Organic Nonlinear Optical Materials Ch. Bosshard, 2020-04-23 *Organic Nonlinear Optical Materials* provides an extensive description of the preparation and characterization of organic materials for applications in nonlinear and electro optics The book discusses the fundamental optimization and practical limitations of a number of figures of merit for various optical parameters and gives a clinical appraisal of

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Organic Nonlinear Optical Materials S. Okada, H. Nakanishi, 1986

Organic Nonlinear Optical Materials Manfred Eich, Mark G. Kuzyk, 1999 This work brings together a selection of papers dealing with various aspects of organic nonlinear optical materials

Light Wave Manipulation Using Organic Nonlinear Optical Materials Seizo Miyata, Hiroyuki Sasabe, 2000-12-21 This monograph contains all major achievements and future insights in the field of optical communication systems It covers the molecular design and synthesis of new organic compounds processing processing of materials and their characterization due to novel techniques device fabrications and assessment of optical devices in display and information processing

Introduction to Organic Electronic and Optoelectronic Materials and Devices Sam-Shajing Sun, Larry R. Dalton, 2016-10-03 This book covers the combined subjects of organic electronic and optoelectronic materials devices It is designed for classroom instruction at the senior college level Highlighting emerging organic and polymeric optoelectronic materials and devices it presents the fundamentals principle mechanisms representative examples and key data

Organic Nonlinear Optical Materials and Devices: Volume 561 B. Kippelen, H. S. Lackritz, R. O. Claus, 1999-08-11 The field of organic optical materials is rapidly growing and advances are being made both in attaining a deeper understanding of device phenomena and in designing improved materials for thin films fibers and

waveguides This book offers an interdisciplinary discussion of research on electronic and photonic devices made with organic and polymeric materials The 1999 MRS Spring Meeting was highlighted by several major advances in fields ranging from nonlinear absorbers and electro optic polymers to photorefractive polymers organic transistors and electroluminescent materials and devices for displays This book highlights developments in materials chemistry and physics relevant to such devices and strikes a balance between basic science and technology Topics include nonlinear optical materials

photorefractive polymers and electronic and light emitting materials **Nonlinear Optics of Organic Molecules and**

Polymers Hari Singh Nalwa, Seizo Miyata, 2020-07-09 The field of nonlinear optics emerged three decades ago with the development of the first operating laser and the demonstration of frequency doubling phenomena These milestone discoveries not only generated much interest in laser science but also set the stage for future work on nonlinear optics 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 undergraduate students researchers scientists and engineers working in academia and industries in chemistry solid state physics materials science optical and polymer engineering and computational science **Characterization**

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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 **Nonlinear Optical Materials** D. A.

B. Miller, 1985 **Nonlinear Optical Effects and Materials** Peter Günter, 2012-12-06 It is now well established that a unique feature of coherent optical beams is their ability to transmit process store and interconnect in parallel a large number of high bandwidth information channels However although these techniques possess great potential their development depends critically on the nonlinear optical effects used and on the availability of nonlinear optical materials that work at high speed and low incident optical power At present these requirements are stimulating a great deal of research in materials science and are challenging existing technologies in particular high speed electronics This volume devoted to nonlinear optical effects and materials presents a detailed account of selected topics in inorganic and organic materials research The status of organic crystals and polymers for nonlinear optics is critically compared with their inorganic counterparts The preparation techniques and a description of the methods used to characterize the nonlinear optical effects relevant for device applications are dealt with as well as a theoretical description of the nonlinear optical electro optical and photorefractive effects observed The main concepts and potential applications are outlined and developed in the various chapters of

this book This collection of articles provides a broad survey of selected research topics in organic and inorganic nonlinear optics **Synthetic Study of New Organic Nonlinear Optical Materials** Jen-Tai Su,1993 *Engineering of Crystalline Materials Properties* Juan J. Novoa,Dario Braga,Lia Addadi,2007-12-14 This volume collects the state of the art in molecular materials It collects the lecture notes of a series of lectures given by some of the best specialists in the field at the 2007 Erice International School of Crystallography and also a NATO ASI course The school first established where we are in terms of modeling design synthesis and applications of crystalline solids with predefined properties and then defined current and possible futuristic lines of development Organic Photovoltaics Christoph Joseph Brabec,Vladimir Dyakonov,Jürgen Parisi,Niyazi Serdar Sariciftci,2013-11-21 The present volume describes and explains the fundamentals of organic plastic solar cells in a manner accessible to both researchers and students It provides an up to date and comprehensive account of these materials and corresponding devices which will play a key role in future solar energy systems *Linear and nonlinear optical Zn(II)-metal-organic materials. Correlation between molecular structure, crystal structure and chemical-physical properties* Bojidarka Ivanova,Michael Spiteller,2015-12-16 Research Paper postgraduate from the year 2015 in the subject Chemistry Other grade Subventionierte Projekt University of Dortmund Institut f r Umweltforschung Lehrstuhl f r Analytische Chemie language English abstract This book deals with chemistry and chemical physical effects of Zn II containing metal organics with emergence as an interdisciplinary area of coordination chemistry blending of optical and nonlinear optical materials research optical fiber communication and optical computing technologies data storage techniques image processing dynamic holography printers producing of harmonic generators optical switching and limiting devices fluorescence materials and more In this context the book collects new trends and presents for first time more recent work in the field of applied oriented design of molecular scaffolds synthesis optical and nonlinear optical studies of coordination compounds of Zn II ion The book is divided into four chapters The first Chapter 1 is designed to give readers a general overview on relevance of metal organic materials containing metal ions with completed electronic d10 configurations to mentioned above areas of applied sciences We have chosen to introduce relationship between molecular structure and properties of zinc tris thiourea sulphate and its derivatives in a short Chapter 2 because of those compounds are seriously tested for an industrial scale application as NLO phores Chapter 3 is devoted principally to a correlation between molecular structure crystal structure and chemical physical effects of Zn II containing metal organic materials mainly part of our research work Chapter 4 concentrates on theoretical methodological formalism of most applicable quantum chemical methods treating optical and non linear optical phenomena which are base on same thematic overall organization of this part of the book The importance of this chapter is that it refers to basic computational chemistry methodology associated with prediction of chemical physical effects of metal organics in gas and condense phase as a crucial step defining applied oriented chemical synthesis of new coordination compounds thus producing results relevant to their real application as

materials to optical and nonlinear optical technologies Chapter 4 can serve as methodological reference point But the content of the book generally can be useful to scientific research of MSc and PhD students in Chemistry which work involves fields such as coordination chemistry applied materials research crystal engineering and the fourth Polymers and Light Wolfram Schnabel, 2007-06-27 This first book to focus on the important and topical effect of light on polymeric materials reflects the multidisciplinary nature of the topic building a bridge between polymer chemistry and physics photochemistry and photophysics and materials science Written by one experienced author a consistent approach is maintained throughout covering such applications as nonlinear optical materials core materials for optical waveguides photoresists in the production of computer chips photoswitches and optical memories Advanced reading for polymer physical and organic chemists manufacturers of optoelectronic devices chemical engineers and materials scientists

Nonlinear Optical Effects in Organic Polymers J. Messier, P. Prasad, D. Ulrich, 2012-12-06 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 π 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 expertise The scope of the workshop was multidisciplinary with active participations from Chemists physicists engineers and materials scientists from many countries

Organic Molecules for Nonlinear Optics and Photonics J. Messier, F. Kajzar, P. Prasad, 2012-12-06 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

Photoinduced Modifications of the Nonlinear Optical Response in Liquid Crystalline Azopolymers Raquel Alicante, 2012-10-02 Nonlinear optical NLO phenomena such as frequency conversion have played a key role in the development of photonic technologies This thesis reports a detailed study of the molecular response of a large variety of push pull organic compounds using the Second Harmonic Generation technique which will serve as a starting point for the investigation at the macroscopic scale of azobenzene based liquid crystalline polymeric films and their blends with highly efficient NLO chromophores These materials are designed with the aim of exploiting their photoaddressability in order to tailor their nonlinear behaviour The magnitude and symmetry of their NL response was successfully controlled via light irradiation and thermal treatments Moreover as a specific application the recording of efficient NLO gratings was achieved

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