



Molecular Electronic Devices

James M. Tour



Molecular Electronic Devices:

Molecular Electronics and Molecular Electronic Devices Kristof Sienicki, 1994 **Molecular Electronics and Molecular Electronic Devices** Kristof Sienicki, 1993-03-25 Molecular Electronics and Molecular Electronic Devices is a book that provides a comprehensive review of current problems and information regarding all aspects of molecular electronics and molecular electronic devices Experimental and theoretical aspects of molecular electronics and molecular electronic devices are reviewed by distinguished researchers working in chemistry physics computer science and various areas of biology These books are excellent references for physicists chemists electronics engineers materials scientists and researchers interested in molecular electronics and molecular electronic devices **Molecular-Scale Electronics** Xuefeng Guo, Dong Xiang, Yu Li, 2020-08-31 Provides in depth knowledge on molecular electronics and emphasizes the techniques for designing molecular junctions with controlled functionalities This comprehensive book covers the major advances with the most general applicability in the field of molecular electronic devices It emphasizes new insights into the development of efficient platform methodologies for building such reliable devices with desired functionalities through the combination of programmed bottom up self assembly and sophisticated top down device fabrication It also helps to develop an understanding of the device fabrication processes and the characteristics of the resulting electrode molecule interface Beginning with an introduction to the subject Molecular Scale Electronics Concept Fabrication and Applications offers full chapter coverage on topics such as Metal Electrodes for Molecular Electronics Carbon Electrodes for Molecular Electronics Other Electrodes for Molecular Electronics Novel Phenomena in Single Molecule Junctions and Supramolecular Interactions in Single Molecule Junctions Other chapters discuss Theoretical Aspects for Electron Transport through Molecular Junctions Characterization Techniques for Molecular Electronics and Integrating Molecular Functionalities into Electrical Circuits The book finishes with a summary of the primary challenges facing the field and offers an outlook at its future Summarizes a number of different approaches for forming molecular scale junctions and discusses various experimental techniques for examining these nanoscale circuits in detail Gives overview of characterization techniques and theoretical simulations for molecular electronics Highlights the major contributions and new concepts of integrating molecular functionalities into electrical circuits Provides a critical discussion of limitations and main challenges that still exist for the development of molecular electronics Suited for readers studying or doing research in the broad fields of Nano molecular electronics and other device related fields Molecular Scale Electronics is an excellent book for materials scientists electrochemists electronics engineers physical chemists polymer chemists and solid state chemists It will also benefit physicists semiconductor physicists engineering scientists and surface chemists *Molecular Electronics and Molecular Electronic Devices* Kristof Sienicki, 1993-09-27 Molecular Electronics and Molecular Electronic Devices is a book that provides a comprehensive review of current problems and information regarding aspects of molecular electronics and molecular

electronic devices Experimental and theoretical aspects of molecular electronics and molecular electronic devices are reviewed by distinguished researchers working in chemistry physics computer science and various areas of biology These books will be an excellent reference for physicists chemists electronics engineers and researchers interested in molecular electronics and molecular electronic devices

Molecular Electronics Juan Carlos Cuevas, Elke Scheer, 2010

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Electronics and Molecular Electronic Devices is a new book series that reflects the state of the art in the science and technology of molecular electronic devices. It provides a comprehensive review of current problems and the latest information regarding all aspects of molecular electronics and molecular electronic devices. Experimental and theoretical aspects of molecular electronics and molecular electronic devices are reviewed by distinguished researchers working in chemistry, physics, computer science and various areas of biology. **Molecular Electronic Devices** Forrest L. Carter, 1962

Molecular Electronics Ari Aviram, Mark A. Ratner, 1998 This volume explores the resurgence of interest in the field of molecular electronics in view of recent advances in such areas as molecular wires, molecular components, fabrication and assemblies of molecular scale devices and their wiring on surfaces. It shows how molecular electronics offer scientists an opportunity to study and understand a new class of materials on the molecular level and in isolation while offering to engineers a new microelectronics technology. **Molecular Electronic Devices II** Carter, 1987-08-28 *Molecular*

Electronics Michael C. Petty, 2008-03-11 This consistent and comprehensive text is unique in providing an informed insight into molecular electronics by contrasting the prospects for molecular scale electronics with the continuing development of the inorganic semiconductor industry. Providing a wealth of information on the subject from background material to possible applications, *Molecular Electronics* contains all the need to know information in one easily accessible place. Speculation about future developments has also been included to give the whole picture of this increasingly popular and important topic.

Molecular Electronic Devices Forrest L. Carter, 1982 **Molecular Electronics** James M. Tour, 2003 This book presents an in depth discussion on molecular electronics in an easy to understand manner aiming at chemists, computer scientists, surface scientists, physicists and applied mathematicians. Lighter overviews are provided for the science minded layperson and the high tech entrepreneur in this nanoscale science. The author has included a detailed synthetic chemistry treasure chest, protocols of self assembling routes for bottom up fabrication atop silicon platforms, representative current voltage and memory readouts from molecular devices and overviews of present architectural and mathematical approaches to programming molecular computing machines. The investment and commercial insertion landscape is painted along with a Who's Who in the molecular electronics business space. Advice and forewarnings are provided in a practical yet witty manner for the aspiring academic, corporate founder and the business CEO wannabe seeking to establish a high tech company while wading through the idiosyncratic morass of university personalities and university owned intellectual property. *Molecular Electronics* F.T. Hong, 2012-12-06 The dream of developing a biocomputer should not be dismissed as a sheer fantasy. Although there is naturally some doubt as to whether it is possible to design a computer using carbon based components as in living organisms instead of silicon based components as in existing computers, the fact that an average brain often outperforms the most sophisticated computer in terms of the complexity of tasks if not in terms of speed is a living testimony to this possibility. The remaining question is to what extent a biocomputer can mimic a living organism and whether it is

possible to design and fabricate such a biocomputer within the foreseeable future This volume does not attempt to provide immediate and exact answers to these questions but instead attempts to provide a vision and a progress report of the initial efforts This volume is mainly a collection of papers presented at the Symposium on Molecular Electronics Biosensors and Biocomputers sponsored by the Division of Biotechnology Health and Environment of the Fine Particle Society held from July 19-22 1989 at the Society's 19th Annual Meeting in Santa Clara California Also included are articles contributed by those who planned to attend the conference but were unable to do so The emergence of the field of molecular electronics is largely the consequence of one person's crusade that of Forrest L Carter

Single Molecule Electronics and Nanofabrication of Molecular Electronic Devices Senthil Arun Rajagopal, 2006 Molecular electronics is an emerging field that makes it possible to build electronic devices with single molecules as their active element The conductivity of single molecules can be manipulated to perform functions similar to present day bulk electronic devices These single molecules with a size of few nano meters can be designed and chemically synthesized with tailored electronic structures This thesis focuses on the design fabrication and measurement of nanogap electronic devices The enabling device to study the conductivity of dimetal paddlewheel inorganic complexes using electrode pairs with nanometer separation is fabricated A study of these inorganic complexes would provide more versatile opportunities for tailoring electron transport properties The molecular complex and its electron transport mechanism are discussed and a detailed description of the fabrication of the nano gap electrode with a controlled gap size is provided Electron beam lithography fabrication techniques are discussed in detail A reliable method to fabricate a controlled nanogap with electrodeposition and electromigration is demonstrated The results of I-V curves of gaps are used to estimate the nanogap dimensions via comparison to tunneling current theory

Molecular Electronics, 1985

Molecular Electronics P.I. Lazarev, 2012-12-06

Molecular Electronics Ioan Baldea, 2016-01-05 Molecular electronics an emerging research field at the border of physics chemistry and material sciences has attracted great interest in the last decade To achieve the ultimate goal of designing molecular electronic devices with the desired functionality and experimental manipulation at the single molecule level theoretical understanding of

Organic Conductors, Superconductors and Magnets: From Synthesis to Molecular Electronics Lahcène Ouahab, Eduard Yagubskii, 2012-12-06 The book covers different aspects of the chemistry and physics of molecular materials including organic synthesis of specific organic donors and ligands organic metals and superconductors molecule based magnets multiproperty materials and organic inorganic hybrids The 17 chapters are written by some of the most authoritative authors in their field The two last chapters are devoted to molecular electronics and devices in particular the achievements and potential for applications An excellent work for all students and researchers in organic conductors superconductors and molecule based magnets

Nano and Molecular Electronics Handbook Sergey Edward Lyshevski, 2018-10-03 There are fundamental and technological limits of conventional microfabrication and microelectronics Scaling down conventional devices and attempts

to develop novel topologies and architectures will soon be ineffective or unachievable at the device and system levels to ensure desired performance Forward looking experts continue to search for new paradigms to carry the field beyond the age of microelectronics and molecular electronics is one of the most promising candidates The Nano and Molecular Electronics Handbook surveys the current state of this exciting emerging field and looks toward future developments and opportunities Molecular and Nano Electronics Explained Explore the fundamentals of device physics synthesis and design of molecular processing platforms and molecular integrated circuits within three dimensional topologies organizations and architectures as well as bottom up fabrication utilizing quantum effects and unique phenomena Technology in Progress Stay current with the latest results and practical solutions realized for nanoscale and molecular electronics as well as biomolecular electronics and memories Learn design concepts device level modeling simulation methods and fabrication technologies used for today s applications and beyond Reports from the Front Lines of Research Expert innovators discuss the results of cutting edge research and provide informed and insightful commentary on where this new paradigm will lead The Nano and Molecular Electronics Handbook ranks among the most complete and authoritative guides to the past present and future of this revolutionary area of theory and technology *Molecular Electronics: Bio-sensors and Bio-computers* L. Barsanti,V. Evangelista,P. Gualtieri,V. Passarelli,S. Vestri,2012-12-06 How fast and powerful can computers become Will it be possible someday to create artificial brains that have intellectual capabilities comparable to those of human beings The answers to these questions depend to a very great extent on a single factor how small and dense we can make computer circuits Very recently scientists have achieved revolutionary advances that may very well radically change the future of computing There are significant advantages to using biological molecules in a new computational paradigm since nature has solved similar problems to those encountered in harnessing organic molecules to perform data manipulation Biomolecules could be used as photonic devices in holography as spatial light modulators in neural network optical computing as nonlinear optical devices and as optical memories Such computers may use a billion times less energy than electronic computers while storing data in a trillionth of the space while also being highly parallel Research projects implemented by national and international groups have produced a large amount of data from multidisciplinary work ranging from physics and engineering to chemistry and biology

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