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Second Edition

CONDUCTIVE ELECTROACTIVE POLYMERS

Intelligent Materials Systems



Gordon G. Wallace
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Kane-Maguire, 2002-12-13 From the authors preface As we enter the era of intelligent materials and embark upon a new approach to material design synthesis and system integration certain groups of materials will emerge as champions Standing high among these champions are conductive electroactive polymers CEPs which appear destined to play a central role in the development of intelligent materials Although recent advances have enabled the design and assembly of polymers from the molecular level creating sophisticated structures requires a solid understanding of the structure property relationships Building on the standard setting first edition *Conductive Electroactive Polymers Intelligent Materials Systems Second Edition* provides a thorough up to date introduction to conductive electroactive polymers The authors discuss the parameters that affect the formation of important CEPs including polypyrroles polyanilines and polythiophenes They show how to use these parameters to manipulate the properties of the polymers and they clarify the chemical and energy parameters that determine the structure and its properties New in this edition are more details on polythiophene and polyaniline systems an update on progress in polypyrroles and reports on recent advances in CEP processing techniques and device fabrication As the use of intelligent materials grows it becomes increasingly important for scientists and engineers in fields ranging from materials science to electronics and biomedicine to understand the properties and potential of CEPs This book is an outstanding introduction to conducting polymers and a valuable reference that brings you quickly up to date on recent developments

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Biomimetic Robotic Artificial Muscles Kwang Jin Kim, Hyouk Ryeol Choi, Xiaobo Tan, David Pugal, 2013-03-26 *Biomimetic Robotic Artificial Muscles* presents a comprehensive up to date overview of several types of electroactive materials with a view of using them as biomimetic artificial muscles The purpose of the book is to provide a focused in depth yet self contained treatment of recent advances made in several promising EAP materials In particular ionic polymer metal composites conjugated polymers and dielectric elastomers are considered Manufacturing physical characterization modeling and control of the materials are presented Namely the book adopts a systems perspective to integrate recent developments

in material processing actuator design control oriented modeling and device and robotic applications While the main focus is on the new developments in these subjects an effort has been made throughout the book to provide the reader with general basic information about the materials before going into more advanced topics As a result the book is very much self contained and expected to be accessible for a reader who does not have background in EAPs Based on the good fundamental knowledge and the versatility of the materials several promising biomimetic and robotic applications such robotic fish propelled by an IPMC tail an IPMC energy harvester an IPMC based valveless pump a conjugated polymer petal driven micropump and a synthetic elastomer actuator enabled robotic finger are demonstrated Mechatronic Systems Clarence W. de Silva,2007-10-17 Mechatronics has emerged as its own discipline over the past decade yet no reference has lived up to the demands of being a working guide for designing and implementing the new generation of mechatronic systems Uniting an international team of leading experts Mechatronic Systems Devices Design Control Operation and Monitoring rises to the ch **Polymer Nanocomposites for Advanced Engineering and Military Applications** Ramdani, Noureddine,2019-04-01 The field of polymer nanocomposites has become essential for engineering and military industries over the last few decades as it applies to computing sensors biomedical microelectronics hard coating and many other domains Due to their outstanding mechanical and thermal features polymer nanocomposite materials have recently been developed and now have a wide range of applications Polymer Nanocomposites for Advanced Engineering and Military Applications provides emerging research on recent advances in the fabrication methods properties and applications of various nano fillers including surface modification methods and chemical functionalization Featuring coverage on a broad range of topics such as barrier properties biomedical microelectronics and matrix processing this book is ideally designed for engineers industrialists chemists government officials military professionals practitioners academicians researchers and students Solid State Electrochemistry I Vladislav V. Kharton,2009-07-10 The only comprehensive handbook on this important and rapidly developing topic combines fundamental information with a brief overview of recent advances in solid state electrochemistry primarily targeting specialists working in this scientific field Particular attention is focused on the most important developments performed during the last decade methodological and theoretical aspects of solid state electrochemistry as well as practical applications The highly experienced editor has included chapters with critical reviews of theoretical approaches experimental methods and modeling techniques providing definitions and explaining relevant terminology as necessary Several other chapters cover all the key groups of the ion conducting solids important for practice namely cationic protonic oxygen anionic and mixed conductors but also conducting polymer and hybrid materials Finally the whole is rounded off by brief surveys of advances in the fields of fuel cells solid state batteries electrochemical sensors and other applications of ion conducting solids Due to the very interdisciplinary nature of this topic this is of great interest to material scientists polymer chemists physicists and industrial scientists too *Nanotechnology in the Defense Industry*

Madhuri Sharon, Angelica S. L. Rodriguez, Chetna Sharon, Pio Sifuentes Gallardo, 2019-10-01 This book will be about various aspects related to applications and use of knowledge of nanotechnology in promoting defense activities The area in which scientists are focusing includes i nano devices such as sensors GPS computers chemical biological weapons nano fabrics bulletproof materials nano stealth coating use of nanotechnology in various areas of aerospace It is intended to cover available methodologies and understanding of technologies for these applications Not only for destructive but also to improve medical and casualty safety care for soldiers and to produce lightweight strong and multi functional materials for use in body armour both for protection and to provide enhanced connectivity will be covered Intelligent Textiles and Clothing H Mattila, 2006-07-28 The use of intelligent textiles in clothing is an exciting new field with wide ranging applications Intelligent textiles and clothing summarises some of the main types of intelligent textiles and their uses Part one of the book reviews phase change materials PCM their role in such areas as thermal regulation and ways they can be integrated into outdoor and other types of clothing The second part of the book discusses shape memory materials SMM and their applications in medical textiles clothing and composite materials Part three deals with chromic colour change and conductive materials and their use in such areas as sensors within clothing The final part of the book looks at current and potential applications including work wear and medical applications With its distinguished editor and international team of contributors Intelligent textiles and clothing is an essential guide for textile manufacturers in such areas as specialist clothing for example protective sports and outdoor clothing as well as medical textiles Summarises the main types of intelligent textiles and their uses Reviews phase change materials and their role in clothing Discusses shape memory materials and their applications

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 - Chapter 4: Conductive Electroactive Polymers Intelligent Materials Systems Second Edition in Specific Contexts
 - Chapter 5: Conclusion
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