1. Record Nr. UNINA9910139963403321

Autore	Carpi Federico <1975->
Titolo	Biomedical applications of electroactive polymer actuators [[electronic resource] /] / Federico Carpi, Elisabeth Smela
Pubbl/distr/stampa	Chichester, West Sussex ; ; Hoboken, : John Wiley & Sons, 2009
ISBN	1-282-34947-3 9786612349478 0-470-74469-3 0-470-74468-5
Descrizione fisica	1 online resource (506 p.)
Altri autori (Persone)	SmelaElisabeth
Disciplina	610.28/4 610.284
Soggetti	Polymers in medicine Conducting polymers Actuators
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Biomedical Applications of Electroactive Polymer Actuators; Contents; Preface; List of Contributors; Introduction; SECTION I POLYMER GELS; 1 Polymer Gel Actuators: Fundamentals; 1.1 Introduction and Historical Overview; 1.2 Properties of Gels; 1.2.1 Biological Gels; 1.2.2 Mechanical Properties of Simple, Single-Phase Gels; 1.2.3 Elastic Moduli; 1.2.4 Strength; 1.2.5 Multi-Phase Gels; 1.2.6 Double Network Gels; 1.2.7 Transport Properties; 1.2.8 Drying; 1.3 Chemical and Physical Formation of Gels; 1.4 Actuation Methods; 1.4.1 Thermally Driven Gel Actuators 1.4.2 Chemically Driven Gel Actuators1.4.3 Gels Driven by Oscillating Reactions; 1.4.4 Light Actuated Gels; 1.4.5 Electrically Driven Gel Actuators; 1.4.6 Electro- and Magneto-Rheological Composites; 1.4.7 LC Elastomers; 1.5 Performance of Gels as Actuators; 1.6 Applications of Electroactive Gels; 1.6.1 Gel Valves and Pumps; 1.6.2 Light Modulators; 1.6.3 Gel Drug Delivery; 1.6.4 Gel Sensors; 1.7 Conclusions; References; 2 Bio-Responsive Hydrogels for Biomedical Applications; 2.1 Introduction; 2.2 Chemical Hydrogels; 2.3 Physical

Hydrogels; 2.4 Defining Bio-Responsive Hydrogels
2.5 Bio-Responsive Chemical Hydrogels2.5.1 Actuation Based on Changing the Cross-Linking Density; 2.5.2 Actuation Based on Changes in Electrostatic Interactions; 2.5.3 Actuation Based on Conformational Changes; 2.6 Bio-Responsive Physical Hydrogels; 2.6.1 Enzyme-Responsive Physical Hydrogels; 2.7 Electroactive Chemical Hydrogels; 2.8 Conclusion; References; 3 Stimuli-Responsive and 'Active' Polymers in Drug Delivery; 3.1 Introduction; 3.2 Drug Delivery: Examples, Challenges and Opportunities for Polymers; 3.2.1 Oral Drug Delivery Systems; 3.2.2 Parenteral Drug Delivery
3.2.3 Topical and Transdermal Drug Delivery3.2.4 Delivery Challenges for Biomolecular Drugs and Cell Therapeutics; 3.2.5 Peptides and Proteins; 3.2.6 Nucleic Acids; 3.2.7 Cell Delivery; 3.3 Emerging State-of-the-Art Mechanisms in Polymer Controlled Release Systems; 3.3.1 Technologies for Controlled Drug Release; 3.3.2 Polymer-Drug Conjugates; 3.3.3 Polymer-Protein Conjugates; 3.3.4 Polymer-Nucleic Acid Conjugates; 3.3.5 Polymer-Nucleic Acid Complexes; 3.4 Responsive or 'Smart' Polymers in Drug Delivery; 3.4.1 Soluble Smart Polymers; 3.4.2 Responsive Polymer-Drug Conjugates
3.4.3 Responsive Polymer-Protein Conjugates3.4.4 Responsive Polymers for DNA Delivery; 3.5 Recent Highlights of Actuated Polymers for Drug Delivery Applications; 3.6 Conclusions and Future Outlook; References; 4 Thermally Driven Hydrogel Actuator for Controllable Flow Rate Pump in Long-Term Drug Delivery; 4.1 Introduction; 4.2 Materials and Methods; 4.3 Hydrogel Actuator; 4.3.1 Thermo-Mechanical Gel Dynamics; 4.3.2 Experimental Results; 4.4 Pump Functioning; 4.5 Conclusion; References; SECTION II IONIC POLYMER-METAL COMPOSITES (IPMC); 5 IPMC Actuators: Fundamentals; 5.1 Introduction 5.2 Fabrication

Sommario/riassunto

Giving fundamental information on one of the most promising families of smart materials, electroactive polymers (EAP) this exciting new titles focuses on the several biomedical applications made possible by these types of materials and their related actuation technologies. Each chapter provides a description of the specific EAP material and device configuration used, material processing, device assembling and testing, along with a description of the biomedical application. Edited by well-respected academics in the field of electroactive polymers with contributions from renowned international