1. Record Nr. UNINA9911019764903321

Autore	Inamuddin
Titolo	Biomimicry Materials and Applications
Pubbl/distr/stampa	Newark : , : John Wiley & Sons, Incorporated, , 2023 ©2023
ISBN	9781394167043 1394167040 9781394167036 1394167032
Edizione	[1st ed.]
Descrizione fisica	1 online resource (254 pages)
Altri autori (Persone)	AltalhiTariq AlrogiAshjan
Disciplina	610.284
Soggetti	Biomimicry Materials science
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Cover -- Title Page -- Copyright Page -- Contents -- Preface -- Chapter 1 Biomimetic Optics -- 1.1 Introduction -- 1.2 What is Biomimicry? -- 1.3 Step-by-Step Approach for Designing Biomimetic Optical Materials From Bioorganisms -- 1.3.1 Optical Structure Analysis in Biology -- 1.3.2 The Analysis of Optical Characteristics in Biological Materials -- 1.3.3 Optical Biomimetic Materials Fabrication Strategies -- 1.4 Biological Visual Systems-Animal and Human -- 1.4.1 Simple Eyes -- 1.4.2 Compound Eyes -- 1.4.2.1 Appositional Compound Eyes -- 1.4.2.2 Superpositional Compound Eyes -- 1.5. The Eye's Optical and Neural Components -- 1.5.1 Cornea -- 1.5.2 Pupils -- 1.5.3 Lens -- 1.5.4 Retina -- 1.6 Application of Biomimetic Optics -- 1.6.1 Hybrid Optical Components are Meant to Resemble the Optical System of the Eye -- 1.6.2 Microlens With a Dual-Facet Design -- 1.6.3 Fiber Optics in Nature -- 1.6.4 Bioinspired Optical Device -- 1.6.4.1 Tunable Lenses Inspired by Nature -- 1.6.4.2 X-Ray Telescope -- 1.6.4.3 Bioinspired Sensors -- 1.7 Conclusion -- References -- Chapter 2 Mimicry at the Material-Cell Interface -- 2.1 Cell and Material Interfaces -- 2.2 Host-Microbe Interactions and Interface Mimicry -- 2.3 Alterations in

Considerations -- 8.2.2 Nacre -- 8.2.3 Tooth Enamel -- 8.3 Protein-Based Materials With Tailored Properties -- 8.3.1 General Considerations -- 8.3.2 Dragline Silk -- 8.3.3 Fish Scales -- 8.4 Polymers Fit for Easy Junction/Self-Cleaning -- 8.4.1 General Considerations -- 8.4.2 Gecko for No-Glue Adhesion -- 8.4.3 Blue Mussel for Development of Specific Adhesives -- 8.4.4 Shark Skin for Functional Surfaces.
8.5 Recent Prototype Developments on Materials Biomimicked from Natural Ones -- 8.6 Conclusions -- References -- Chapter 9 Novel Biomimicry Techniques for Detecting Plant Diseases -- 9.1 Introduction -- 9.2 Preharvest Biomimicry Detection Techniques -- 9.2.1 Remote Sensing Technique Approach -- 9.2.2 Machine Vision and Fuzzy Logic Approaches -- 9.2.3 Robotics Approach -- 9.3 Postharvest Biomimicry Detection Techniques -- 9.3.1 Neural Network Approach -- 9.3.2 Support Vector Machine Approach -- 9.4 Prospects and Conclusion -- References -- Chapter 10 Biomimicry for Sustainable Structural Mimicking in Textile Industries -- 10.1 Introduction -- 10.2 Examples of Biomimicry Fabrics -- 10.2.1 Algae Fiber -- 10.2.2 Mushroom Leather -- 10.2.3 Fabric Mimics -- 10.2.4 Bacterial Pigments -- 10.2.5 Orange Fabrics -- 10.2.6 Protein Couture -- 10.2.7 Natural Fiber Fabrics -- 10.3 Fabric Production from Biomaterial -- 10.3.1 Soy Fabric -- 10.3.2 Cotton Fabric -- 10.3.3 Supima Fabric -- 10.3.4 Pima Fabric -- 10.3.5 Wool Fabric -- 10.3.6 Hemp Fabric -- 10.4 Current Methods of Biomimicry Materials -- 10.5 Future of Biomimicry -- 10.6 Benefits of Biomimicry -- 10.6.1 Sustainability -- 10.6.2 Perform Welt -- 10.6.3 Energy Saving -- 10.6.4 Cut-Resistant Costs -- 10.6.5 Eliminate Waste -- 10.6.6 New Product Derivation -- 10.6.7 Disrupt Traditional Thinking -- 10.6.8 Adaptability to Climate -- 10.6.9 Nourish Curiosity -- 10.6.10 Leverage Collaboration -- 10.7 Conclusion -- References -- Index -- EULA.

Sommario/riassunto

This book explores the intersection of biomimicry and material science, focusing on how natural structures and processes inspire innovative applications in various fields. It covers topics such as biomimetic optics, material-cell interactions, and bacteriocins as antimicrobial agents. The text also delves into the use of polydopamine in biomedicine, the development of electroactive polymer actuators, and the potential of bioinspired hydrogels through 3D bioprinting. Additionally, it discusses the role of biomimicry in sustainable textile production and plant disease detection. The book is intended for researchers, engineers, and students interested in biomimicry and its practical applications in technology and biomedicine.