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Nota di contenuto	Cover; Title Page; Copyright Page; Contents; List of Contributors; Preface; Acknowledgements; 1 Biomimetic Polysaccharides and Derivatives for Cartilage Tissue Regeneration; 1.1 Introduction; 1.2 Strategies for Cartilage Tissue Engineering; 1.3 Designing Scaffold for Cartilage Tissue Engineering; 1.4 Natural Polysaccharides for Cartilage Tissue Engineering; 1.4.1 Chitin and Chitosan (CS)-based Materials; 1.4.2 HA-based Materials; 1.4.3 Alginate-based Materials; 1.4.4 Starch-based Materials; 1.4.5 Cellulose-based Materials; 1.5 Conclusions and Remarks on Prospects; References 2 Biomimetic Synthesis of Self-Assembled Mineralized Collagen-Based Composites for Bone Tissue Engineering 2.1 Introduction; 2.2 Hierarchical Assembly of Mineralized Collagen Fibrils in Natural Bone; 2.2.1 Panorama of Natural Bone; 2.2.1.1 Chemical Composition of Bone; 2.2.1.2 Hierarchical Organization of Natural Human Bone; 2.2.2 Self-Assembly of Mineralized Collagen Fibrils in Nature; 2.2.2.1 Collagen and Collagen Fibrils Array; 2.2.2.2 Structural Organization of Mineralized Collagen Fibrils; 2.2.2.3 Examples of Mineralized Collagen Fibrils in Natural Tissues 2.3 Biomimetic Synthesis of Self-Assembled Mineralized Fibrils 2.3.1 In Vitro Self-Assembly of Mineralized Collagen Fibrils; 2.3.2 In Vitro Self-Assembly of Mineralized Recombinant Collagen Fibrils; 2.3.3 In Vitro Self-Assembly of Mineralized Silk Fibroin Fibrils; 2.3.4 In Vitro Self-Assembly of Mineralized Peptide-Amphiphilic Nanofibers; 2.4 Applications of Mineralized Collagen-based Composites for Bone Regeneration; 2.4.1 Fabrication of Nano-HA/Collagen-based Composites; 2.4.1.1 Three-Dimensional Biomimetic Bone Scaffolds: Nano-HA/Collagen/PLA Composite (nHAC/PLA) 2.4.1.2 Injectable Bone Cement: Nano-HA/Collagen/Calcium Sulfate Hemihydrate (nHAC/CSH)2.4.2 Functional Improvements of Mineralized Collagen-based Composites; 2.4.3 Examples of Animal Models and Clinical Applications; 2.5 Concluding Remarks; References; 3 Biomimetic Mineralization of Hydrogel Biomaterials for Bone Tissue Engineering; 3.1 Introduction; 3.2 Incorporation of Inorganic Calcium Phosphate Nanoparticles into Hydrogels; 3.2.1 Inorganic Nanoparticles; 3.2.2 Hydrogel Composites Based on Natural Polymer Matrices; 3.2.3 Hydrogel Composites Based on Synthetic Polymer Matrices 3.3 Biomimetic Mineralization in Calcium and/or Phosphate-Containing Solutions 3.3.1 Soaking in Solutions Containing Calcium and Phosphate Ions; 3.3.2 In Situ Synthesis of Hydroxyapatite; 3.4 Enzymatically-Induced Mineralization Using Alkaline Phosphatase (ALP); 3.4.1 ALP-Induced Hydrogel Mineralization for Fundamental Research; 3.4.2 Enyzmatic Mineralization for Bone Regeneration Applications; 3.4.3 ALP Entrapment; 3.5 Enhancement of Hydrogel Mineralization Using Biomacromolecules; 3.5.1 Systems to Test Mineralization-Inducing Potential of Biomacromolecules 3.5.2 Biomacromolecule-Enhanced Mineralization for Bone Regeneration Applications
Sommario/riassunto	This book compiles all aspects of biomimetics from fundamental principles to current technological advances and their future trends in the development of nanoscale biomaterials and tissue engineering. The scope of this book is principally confined to biologically-inspired

design of materials and systems for the development of next generation nanobiomaterials and tissue engineering. The book addresses the state-of-the-art of research progress in the applications of the principles, processes, and techniques of biomimetics. The prospective outcomes of current advancements and challenges in bio