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| Nota di contenuto       | Front Cover; Nanotechnology-Enhanced Orthopedic Materials: Fabrications, Applications and Future Trends; Copyright; Contents; Woodhead Publishing Series in Biomaterials; Foreword; Acknowledgments; Chapter 1: Fundamentals of nanotechnology and orthopedic materials; 1.1 Introduction: nanotechnology and nanomaterials; 1.2 Fundamentals of fabrication and modification of nanomaterials; 1.2.1 Fabrication strategies: top-down and bottom-up; 1.2.1.1 Top-down strategy; Patterning techniques; Additive techniques; Subtractive techniques; Comminution (break-down) techniques<br>1.2.1.2 Bottom-up strategy Colloidal synthesis; Unguided self-assembly; Template-assisted self-assembly; Phase separation approaches; 1.2.1.3 Combination of top-down and bottom-up strategies; 1.2.2 Modification of nanomaterials; 1.2.2.1 Coating deposition; 1.2.2.2 Discharge and plasma treatments; 1.2.2.3 Molecular grafting; 1.2.2.4 Enzymatic modification; 1.3 Interactions between musculoskeletal tissue and biomaterial; 1.3.1 Biological |

responses to biomaterials; 1.3.2 Nanomaterial properties affecting biological responses; 1.3.2.1 Size and surface area  
1.3.2.2 Topography and roughness  
1.3.2.3 Surface chemistry; 1.3.2.4 Surface wettability and surface energy; 1.3.2.5 Other nanomaterial properties; 1.4 Summary; References; Chapter 2: Nanotechnology-enhanced metals and alloys for orthopedic implants; 2.1 Fabrication techniques of nanostructured metals and alloys; 2.1.1 Vapor condensation or deposition; 2.1.2 High-energy ball milling; 2.1.3 Wet-chemical synthesis; 2.1.4 Severe plastic deformation; 2.1.5 Anodization; 2.1.6 Other fabrication methods  
2.2 Nanostructured metals for better orthopedic implants with improved biological functions  
2.2.1 Ti-based biomaterials; 2.2.2 Nanophase CoCrMo; 2.2.3 Nanostructured selenium (Se) for inhibiting cancer cell; 2.3 Nanotechnology-enabled functionality in metallic implants; 2.3.1 Nanostructured metals for preventing infection; 2.3.2 Drug delivery via nanostructured implants; 2.3.3 Metallic nanoparticles for sensing and detection; 2.4 Nanostructured metallic implants with superior mechanical properties; 2.5 Commercialization status of nanostructured metallic implants; 2.6 Summary  
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Chapter 3: Orthopedic nanoceramics; 3.1 Fabrication of nanoceramics; 3.1.1 Synthesis of ceramic nanoparticles; 3.1.2 Fabrication of ceramic nanocoatings; 3.1.3 Fabrication of ceramic nanoscaffolds; 3.2 Nanoceramics for orthopedic applications; 3.2.1 Nanoparticles; 3.2.1.1 Iron oxides; 3.2.1.2 Calcium phosphates; 3.2.1.3 Other ceramic nanoparticles; 3.2.2 Nanocoatings; 3.2.2.1 Oxides; 3.2.2.2 Calcium phosphates and apatite; 3.2.3 Nanotechnology-enhanced structural ceramics; 3.2.4 Nanoscaffolds; 3.3 Commercialization status of orthopedic nanoceramics; 3.4 Summary  
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## Sommario/riassunto

Nanotechnology-Enhanced Orthopedic Materials provides the latest information on the emergence and rapid development of nanotechnology and the ways it has impacted almost every aspect of biomedical engineering. This book provides readers with a comprehensive overview of the field, focusing on the fabrication and applications of these materials, presenting updated, practical, and systematic knowledge on the synthesis, processing, and modification of nanomaterials, along with the rationale and methodology of applying such materials for orthopedic purposes. Topics covered include a wide ra

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