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3.6 Interaction at a Tissue Level; 3.7 Advantages of Hydroxyapatite and Bioglass Coatings; 3.8 The Promise of Cytokines; References; Chapter 4 Structure and Properties of Bioceramics Used in Orthopaedic and Dental Implants; 4.1 Bioinert Ceramics; 4.1.1 Alumina; 4.1.2 Stabilised Zirconia; 4.1.2.1 Transformation Toughening of Zirconia Ceramics; 4.1.2.2 Mechanical Properties of Zirconia; 4.1.2.3 Biocompatibility and Hydrolytic Stability of Zirconia; 4.2 Bioactive Ceramics; 4.2.1 Surface-Active Bioglasses
4.2.2 Hydroxyapatite4.2.3 Transition Metal-Substituted Calcium Orthophosphates; 4.2.4 Resorbable Calcium Orthophosphates; 4.2.4.1 Tricalcium Phosphates; 4.2.4.2 Tetracalcium Phosphate; 4.2.4.3 Ca-PO4 Sheet Structures; 4.2.4.4 Highly Soluble Alkali-Containing Calcium Orthophosphates; 4.2.4.5 Other Resorbable Bioceramics; References; Chapter 5 Technology of Coating Deposition; 5.1 Overview; 5.2 Non-Thermal Deposition Methods; 5.2.1 Biomimetic Route; 5.2.1.1 General Aspects; 5.2.1.2 Chemistry of Biomimetic Precipitation
5.2.1.3 Biomimetic Calcium Phosphate Coatings Deposited on Various Substrates5.2.2 Sol-Gel Deposition; 5.2.2.1 Titania Films and Coatings; 5.2.2.2 Hydroxyapatite; 5.2.2.3 Other Types of Coating; 5.2.3 Dip and Spin Coating; 5.2.3.1 Dip Coating; 5.2.3.2 Spin Coating; 5.2.4 Electrochemical Deposition (ECD); 5.2.4.1 Electrochemical Reactions; 5.2.4.2 Acid-Base Reactions; 5.2.4.3 Precipitation Reactions; 5.2.5 Electrophoretic Deposition (EPD); 5.2.5.1 General Aspects; 5.2.5.2 Electrophoretic Deposition of Calcium Phosphate Coatings; 5.2.6 Thermal Substrate Deposition (Hydroprocessing)
5.2.7 Hydrothermal Coating Deposition

Sommario/riassunto

Reflecting the progress in recent years, this book provides in-depth information on the preparation, chemistry, and engineering of bioceramic coatings for medical implants. It is authored by two renowned experts with over 30 years of experience in industry and academia, who know the potentials and pitfalls of the techniques concerned.Following an introduction to the principles of biocompatibility, they present the structures and properties of various bioceramics from alumina to zirconia. The main part of the work focuses on coating technologies, such as chemical vapor deposition, sol-gel depos