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Nota di contenuto	Title Page; Copyright Page; Contents; List of Contributors; Preface; Chapter 1 Zirconium Phosphate Nanoparticles and Their Extraordinary Properties; 1.1 Introduction; 1.2 Synthesis and Crystal Structure of - Zirconium Phosphate; 1.3 Zirconium Phosphate-Based Dialysis Process; 1.4 ZrP Titration Curves; 1.5 Applications of Ion-Exchange Processes; 1.6 Nuclear Ion Separations; 1.7 Major Uses of -ZrP; 1.8 Polymer Nanocomposites; 1.9 More Details on -ZrP: Surface Functionalization; 1.10 Janus Particles; 1.11 Catalysis; 1.12 Catalysts Based on Sulphonated Zirconium Phenylphosphonates 1.13 Proton Conductivity and Fuel Cells 1.14 Gel Synthesis and Fuel Cell Membranes; 1.15 Electron Transfer Reactions; 1.16 Drug Delivery; 1.17 Conclusions; References; Chapter 2 Tales from the Unexpected: Chemistry at the Surface and Interlayer Space of Layered Organic-Inorganic Hybrid Materials Based on -Zirconium Phosphate; 2.1 Introduction; 2.2 The Inorganic Scaffold: -Zirconium Phosphate (Microwave-Assisted Synthesis); 2.3 Microwave-Assisted Synthesis of

-ZrP; 2.4 Reactions; 2.4.1 Intercalation; 2.4.2 Microwave-Assisted Intercalation into -ZrP  
2.4.3 Phosphate/Phosphonate Topotactic Exchange  
2.5 Labyrinth Materials: Applications; 2.5.1 Recognition Management; 2.5.1.1 Chirality at Play; 2.5.1.2 Gas and Vapour Storage; 2.5.2 Dissymmetry and Luminescence Signalling; 2.5.3 Building DSSCs; 2.5.4 Molecular Confinement; 2.6 Conclusion and Prospects; Final Comments and Acknowledgements; References; Chapter 3 Phosphonates in Matrices; 3.1 Introduction: Phosphonic Acids as Versatile Molecules; 3.2 Acid-Base Chemistry of Phosphonic Acids; 3.3 Interactions between Metal Ions and Phosphonate Ligands  
3.4 Phosphonates in 'All-Organic' Polymeric Salts  
3.5 Phosphonates in Coordination Polymers; 3.6 Phosphonate-Grafted Polymers; 3.7 Polymers as Hosts for Phosphonates and Metal Phosphonates; 3.8 Applications; 3.8.1 Proton Conductivity; 3.8.2 Metal Ion Absorption; 3.8.3 Controlled Release of Phosphonate Pharmaceuticals; 3.8.4 Corrosion Protection by Metal Phosphonate Coatings; 3.8.5 Gas Storage; 3.8.6 Intercalation; 3.9 Conclusions; Acknowledgments; References; Chapter 4 Hybrid Materials Based on Multifunctional Phosphonic Acids; 4.1 Introduction  
4.2 Structural Trends and Properties of Functionalized Metal Phosphonates  
4.2.1 Monophosphonates; 4.2.1.1 Metal Alkyl- and Aryl-Carboxyphosphonates; 4.2.1.2 Hydroxyl-Carboxyphosphonates; 4.2.1.3 Nitrogen-functionalized phosphonates; 4.2.1.4 Metal Phosphonatosulphonates; 4.2.2 Diphosphonates; 4.2.2.1 Aryldiphosphonates: 1,4-Phenylenebisphosphonates and Related Materials; 4.2.2.2 1-Hydroxyethylidenediphosphonates; 4.2.2.3 R-Amino-N,N-bis(methylphosphonates) and R-N,N'-bis(methyl phosphonates); 4.2.3 Polyphosphonates; 4.2.3.1 Functionalized Metal Triphosphonates  
4.2.3.2 Functionalized Metal Tetraphosphonates

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Sommario/riassunto

This book explores the limitless ability to design new materials by layering clay materials within organic compounds. Assembly, properties, characterization, and current and potential applications are offered to inspire the development of novel materials. Coincides with the government's Materials Genome Initiative, to inspire the development of green, sustainable, robust materials that lead to efficient use of limited resources Contains a thorough introductory and chemical foundation before delving into techniques, characterization, and properties of these materials Applications in biocatalys

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