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Nota di contenuto	Nanocomposites: In Situ Synthesis of Polymer-Embedded Nanostructures; Contents; Preface; Contributors; 1 Metal-Polymer Nanocomposites by Supercritical Fluid Processing; 1.1 Introduction to Polymers, Nanoparticles, and Supercritical Fluids; 1.2 Properties; 1.3 Catalysis; 1.4 Optics and Photonics; 1.4.1 Quantum Dots; 1.4.2 Plasmons; 1.4.3 Nonlinear Optical Limitation; 1.4.4 Surface-Enhanced Raman Spectroscopy; 1.4.5 Metal-Enhanced Fluorescence; 1.5 General Synthetic Strategies; 1.5.1 Top Down; 1.5.2 Bottom Up; 1.5.3 Solution Synthesis; 1.6 Stabilization; 1.6.1 Electrostatic Stabilization 1.6.2 Steric Stabilization1.7 Polymers; 1.7.1 Definition; 1.7.2 Crystallinity in Polymers; 1.7.3 The Glass Transition and Melting Point; 1.8 Metal-Polymer Nanocomposites; 1.8.1 Ex Situ; 1.8.2 In Situ; 1.9 Thermal Decomposition of Metal Precursors Added to Polymers; 1.10 Ion Implantation; 1.11 Chemical Vapor Deposition (CVD) and Physical Vapor Deposition (PVD); 1.12 scCO2 Impregnation into Polymers; 1.13 Supercritical Fluids; 1.13.1 The Discovery and Development of SCFs; 1.13.2 Supercritical CO2; 1.14 Polymer Processing with scCO 2; 1.15

Nanoparticles by scCO2 Impregnation of Host Materials
1.16 Synthetic Method for Impregnating Polymer Films with Metal Nanoparticles1.17 Silver-Polymer Nanocomposite Films for Optical/Photonic Applications; 1.18 Silver-Polymer Nanocomposite Films for Antimicrobial Applications; 1.19 Palladium-Polymer Nanocomposite Films for Catalysis or Hydrogen Uptake Applications; 1.20 Conclusions; References; 2 In Situ Synthesis of Polymer-Embedded Nanostructures; 2.1 Introduction; 2.2 Metals; 2.2.1 Gold; 2.2.2 Cobalt; 2.2.3 Platinum; 2.3 Metal Oxides; 2.3.1 Titanium Dioxide; 2.3.2 Zinc Oxide; 2.4 Metal Sulfides; 2.4.1 Lead Sulfide; 2.4.2 Iron Sulfides
2.5 ConclusionsReferences; 3 Preparation and Characterization of Metal-Polymer Nanocomposites; 3.1 Introduction; 3.2 Nanocomposite Preparation; 3.3 Mercaptide Synthesis; 3.4 Preliminary Study of Pure Mercaptide Thermolysis Behavior by Thermal Analysis; 3.5 Metal Nanoparticle Formation in Polymeric Media; 3.6 Nanocomposite Morphology; 3.7 Nanocomposite Structural Characterization; 3.8 Some Applications of Metal-Polymer Nanocomposites; 3.9 Conclusions; References; 4 Macromolecular Metal Carboxylates as Precursors of Metallopolymer Nanocomposites; 4.1 Introduction
4.2 Structure and Molecular Organization of Macromolecular Metal Carboxylates4.2.1 Metal-Carboxylate Ionomers; 4.2.2 Hybrid Supramolecular Structures; 4.3 Preparation of Metallopolymer Nanocomposites Based on Metal Carboxylates; 4.3.1 Controlled Thermolysis of Unsaturated Metal Carboxylates; 4.3.2 Metal Nanoparticles in Polymer Carboxylate Gels and Block Copolymers; 4.3.3 Sol-Gel Methods in the Obtaining of Oxocluster Hybrid Materials; 4.4 Metal-Carboxylate Nanocomposite Materials; 4.5 Conclusion; Acknowledgments; References
5 In-Situ Microwave-Assisted Fabrication of Polymeric Nanocomposites

Sommario/riassunto

"Structured as a practical lab manual, this book provides detailed descriptions of how polymeric nanocomposites are synthesized, offering the reader an understanding of the principles and techniques involved. Topics covered include: an introduction to the properties and applications of nanocomposite materials; explanation of morphological and topological concepts; theory of phase separation and nanoparticle aggregation; methods for the synthesis of nanocomposites; exercising morphological control; standard characterization techniques and methods for data analysis used in the synthesis of NCs; and related toxicity issues"--
"The two aspects of scCO2 use most relevant to the scope of this book are the processing and synthesis of polymers, and scCO2 generation and impregnation of nanoparticles. These topics will be discussed in greater detail"--