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Nota di contenuto	Related Titles; Title page; Copyright page; Contents; Preface; Abbreviations; 1: Introduction; References; 2: Synthesis Approach of Mesoporous Molecular Sieves; 2.1 Synthesis; 2.2 Hydrothermal Synthesis; 2.2.1 Surfactant; 2.2.2 Inorganic Precursor; 2.2.3 Synthesis Temperature; 2.2.4 Synthetic Media; 2.2.5 Hydrothermal Treatment; 2.2.6 Formation Rate; 2.2.7 Separation and Drying; 2.3 Removal of Template; 2.3.1 Calcination; 2.3.2 Extraction; 2.3.3 Supercritical Fluid Extraction; 2.3.4 Microwave Irradiation; 2.3.5 Ultraviolet Irradiation; 2.3.6 Microwave Digestion; 2.3.7 Oxidation of Ammonium Perchlorate; 2.4 Basic Synthesis; 2.5 Acidic Synthesis; 2.6 Nonaqueous Syntheses; 2.7 Postsynthesis Treatment; 2.7.1 Hydrothermal Treatment; 2.7.2 Secondary Synthesis; 2.7.3 Recrystallization; 2.8 Stability of Mesoporous Materials; 2.8.1 Thermal Stability; 2.8.2 Hydrothermal Stability; 2.8.3 Mechanical Stability; 2.9 Pore-Size Control; References; 3: Mechanisms for Formation of Mesoporous Materials; 3.1 Introduction; 3.2 Synthesis Pathways; 3.3 Mesophase Tailoring; 3.3.1 Micellar Mesostructure; 3.3.2 Critical Micelle Concentration; 3.3.3 The Packing Parameter; 3.3.4 The Hydrophilic/Hydrophobic Volume Ratio; 3.3.5 Surfactant Phase Diagram; 3.3.6 "Acid-Base" Route; 3.4 Hard-Templating Approach; 3.4.1 Precursor; 3.4.2 Conversion of Precursors; 3.4.3 The Influence of the Template Structure; 3.4.4 Replicated Mesoporous Carbon as a Hard Template; References; 4: Structural Characterization Methods; 4.1 XRD; 4.1.1 Basic Principles of XRD; 4.1.2 XRD Measurement; 4.1.3 XRD Pattern Analysis; 4.1.4 SAXS; 4.2 Electron Microscopy; 4.2.1 TEM; 4.2.2 SAED; 4.2.3 SEM; 4.2.4 EDX; 4.2.5 STEM; 4.3 NMR; 4.4 Physical Sorption; 4.4.1 Basic Principles; 4.4.2 Pore-Size Calculation; 4.4.3 Window-Size Calculation for Cavity-Like Pores; 4.4.4 Detection of Micropores and Mesopores; 4.4.5 Other Probes; References; 5: Representative Mesoporous Silica Molecular Sieves; 5.1 D Mesostructures; 5.1.1 MCM-41; 5.1.2 SBA-15; 5.1.3 Other 2D Phases; 5.2 3D Hexagonal Phases; 5.2.1 SBA-2; 5.2.2 SBA-12; 5.2.3 IBN-9; 5.3 Cubic Phases; 5.3.1 MCM-48, FDU-5 and KIT-6; 5.3.2 SBA-1 and SBA-6; 5.3.3 SBA-16; 5.3.4 FDU-1; 5.3.5 FDU-2; 5.3.6 FDU-12 and KIT-5; 5.3.7 SBA-11; 5.3.8 AMS-8 and AMS-10; 5.4 Disordered Mesostructures; 5.4.1 HMS and MSU; 5.4.2 KIT-1; 5.4.3 TUD-1; References; 6: Doping in Mesoporous Molecular Sieves; 6.1 Aluminum Doping; 6.2 Boron Doping; 6.3 Gallium and Indium Doping; 6.4 Germanium and Tin Doping; 6.5 Transition-Metal Doping; 6.5.1 Titanium and Zirconium Doping; 6.5.2 Vanadium and Niobium Doping; 6.5.3 Chromium and Molybdenum Doping; 6.5.4 Manganese Doping; 6.5.5 Iron and Ruthenium Doping; 6.5.6 Cobalt Doping; 6.5.7 Copper and Zinc Doping; 6.5.8 Hybrid Metal Doping; References; 7: Morphology Control; 7.1 The Methods and Techniques; 7.2 Typical Morphologies; 7.2.1 Fibers and Rods; 7.2.2 Thin Films; 7.2.3 Monoliths; 7.2.4 Spheres; 7.2.5 Single Crystals
Sommario/riassunto	The first book devoted to all aspects and types of mesoporous materials describes, in an in-depth and systematic manner, the step-by-step synthesis, synthesis mechanism, characterization, morphology control, hybridization, and applications of mesoporous molecular sieves. In so doing, it covers silicates, metal-doped silicates, non-silicates, and organic-inorganic hybrids. While the emphasis is on synthesis, the leading expert authors also discuss characterization and

applications ranging from catalysis and biochemistry to optics and the use of these materials as templates for nanomaterial
