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Nota di contenuto	Molecular Chemistry of Sol-Gel Derived Nanomaterials; Contents; Preface; About the Authors; 1 Molecular Chemistry and Nanosciences; 1.1 INTRODUCTION; 1.2 SCOPE AND ORIGIN OF NANOSCIENCES: THE 'TOP-DOWN' AND 'BOTTOM-UP' APPROACHES; 1.3 CHEMICAL MUTATION: FROM AN EXPLORATORY TO A CREATIVE SCIENCE; 1.4 CARBON AND CERAMIC FIBERS: THE NANOMATERIAL 'ANCESTORS'; 1.4.1 Carbon Fibers; 1.4.2 SiC, Si ₃ N ₄ Ceramic Fibers; 1.5 CONCLUSIONS; REFERENCES; 2 Nano-Objects; 2.1 INTRODUCTION; 2.2 PRESENTATION OF NANO-OBJECTS; 2.3 SYNTHESIS OF NANO-OBJECTS; 2.4 THE NANO-OBJECT: ENTRY INTO NANOSCIENCES 2.4.1 Nano-Objects and the Exploration of the Nanoworld; REFERENCES; 3 Introduction to Material Chemistry; 3.1 GENERAL REMARKS; 3.1.1 The Difference Between Materials and Chemical Compounds; 3.1.2 Examples of Shaping and Use; 3.2 INORGANIC MATERIALS: CRYSTALS

AND GLASSES; 3.3 THERMODYNAMICALLY CONTROLLED ORGANIC-INORGANIC HYBRID MATERIALS; 3.3.1 Crystalline Molecular Materials; 3.3.2 Materials Derived from Hydrothermal Synthesis; 3.4 CERAMIC MATERIALS OBTAINED FROM ORGANOMETALLIC POLYMERS: CERAMICS WITH INTERPENETRATING NETWORKS; 3.5 INORGANIC POLYMER MATERIALS (SOL-GEL PROCESS)

3.5.1 Inorganic Polymerization: An Introduction 3.5.2 Physical Characteristics of the Solid Obtained; 3.5.3 Control of the Texture of Materials; 3.5.4 Solid State NMR: A Very Useful Tool; 3.6 INORGANIC POLYMERIZATION AND MOLECULAR CHEMISTRY; 3.7 SILICA AND MOLECULAR CHEMISTRY: A DREAM TEAM; 3.7.1 Introduction to the Chemistry of Other Oxides; 3.7.2 Generalization to Other Types of Combinations; REFERENCES; 4 From Nano-Object to Nanomaterial; 4.1 THE DIFFERENT TYPES OF NANOMATERIALS; 4.2 INORGANIC POLYMERIZATION: A MAJOR ROUTE TO NANOMATERIALS; 4.3 NANOCOMPOSITE MATERIALS

4.3.1 Nanocomposites in Silica Matrices 4.3.2 Some Developments of Nanocomposites; 4.3.3 Presentation of Potential New Matrices; 4.4 GRAFTED MATERIALS; 4.4.1 Advantages of Solid Supports; 4.4.2 General Remarks; 4.5 SELECTIVE SEPARATION; 4.6 MATERIALS OBTAINED BY POLYCONDENSATION OF MONOSUBSTITUTED TRIALKOXYSILANES; 4.7 MULTISTAGE SYNTHESES - CASCADE REACTIONS; REFERENCES; 5 Nanostructured Materials; 5.1 GENERAL REMARKS; 5.2 SYNTHESIS OF HYBRID NANOMATERIALS; 5.2.1 General Remarks; 5.2.2 Why Silicon and Silica?; 5.2.3 Main Silylation Methods.

Some Examples of Synthesis

5.3 NANOSTRUCTURED HYBRID MATERIALS 5.3.1 Examples of the Materials; 5.3.2 Description of Nanostructured Hybrid Materials; 5.3.3 Some Characteristics; 5.4 KINETIC CONTROL OF THE TEXTURE OF NANOSTRUCTURED HYBRID MATERIALS; 5.5 SUPRAMOLECULAR SELF-ORGANIZATION INDUCED BY HYDROGEN BONDS; 5.6 SUPRAMOLECULAR SELF-ORGANIZATION INDUCED BY WEAK VAN DER WAALS TYPE BONDS; 5.6.1 What do We Mean by Self-Organization?; 5.6.2 Chemical Behavior and Self-Organization; 5.6.3 Study of Self-Organization; 5.6.4 Generalization of the Self-Organization Phenomenon; 5.6.5 Study of Tetrahedral Systems

5.6.6 Kinetic Control of Self-Organization

Sommario/riassunto

Presenting the wide range of synthetic possibilities opened by sol-gel processes in the field of organic-inorganic materials, Molecular Chemistry of Sol-Gel Derived Nanomaterials discusses the state of the art in the synthesis of the various nanomaterials. The text includes examples of applications, including photoluminescent nanocomposites, grafted nanomaterials for selective separations of ions or isotopes, for cascade syntheses, chelation of transition metals and lanthanides by lamellar structured nanomaterials, and immobilized enzymes on mesoporous nanomaterials. This indispensable text fo
