

1. Record Nr.	UNINA9910830997103321
Autore	Reinke Petra
Titolo	Inorganic nanostructures [[electronic resource]] : properties and characterization / / Petra Reinke
Pubbl/distr/stampa	Weinheim, Germany, : Wiley-VCH, 2012
ISBN	3-527-64592-6 1-280-66352-9 9786613640451 3-527-64590-X 3-527-64593-4
Descrizione fisica	1 online resource (203 p.)
Disciplina	620 620.5 620/.5
Soggetti	Nanostructures Inorganic polymers
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Inorganic Nanostructures: Properties and Characterization; Contents; Preface; 1: Dimensions and Surfaces - an Introduction; 1.1: Size, Dimensionality, and Confinement; 1.1.1: Density of States for 3,2,1,0 Dimensions; 1.2: Synthesis of Nanostructures: Fundamental Surface Processes and Reactions; 1.3: Closing Remarks; 2: Experimental Techniques for Nanoscale Materials Analysis; 2.1: Scanning Probe Microscopy; 2.1.1: Scanning Tunneling Microscopy - STM; 2.1.2: Atomic Force Microscopy - AFM; 2.1.3: Manipulation and Construction of Nanostructures with STM and AFM 2.2: Photoelectron Spectroscopy and Electron Spectroscopy Techniques 2.3: Closing Remarks; 3: Semiconductor Nanowires; 3.1: Nanowire Growth; 3.2: Vapor-Liquid-Solid and Vapor-Solid-Solid Growth; 3.2.1: The Size and Position of the Catalyst Particle; 3.3: Nanowire Crystallography - Wire Structure; 3.3.1: Competing Structures: Wurtzite and Zincblende; 3.3.2: Nanowire Crystallography: Connecting to the Substrate; 3.3.3: Complex Nanowires: Branching,

Co-axial and Axial Nanowires; 3.4: Horizontal Nanowires; 3.4.1: Synthesis of Horizontal Wires
 3.4.2: The Smallest Wire - Electronic Structure of Monoatomic Wires
 3.5: Controlling the Electronic Properties of Semiconductor Nanowires;
 3.5.1: Controlling the Electronic Properties of Nanowires - Confinement; 3.5.2: Controlling the Electronic Properties of Nanowires - Doping; 3.6: Closing Remarks; 4: Metal Clusters; 4.1: Cluster-Surface Interaction; 4.2: Synthesis of Metal Clusters; 4.2.1: Non-Wetting Metal Clusters; 4.2.2: Aerosols and Cluster Sources; 4.2.3: Synthesis and Stabilization of Metal Clusters; 4.2.4: Clusters on Surfaces: The Smallest Templates; 4.3: Geometry of Clusters
 4.3.1: Shells of Atoms; 4.3.2: Magic Clusters and Stability; 4.4: Closing Remarks; 5: Quantum Dots; 5.1: Size and Shape in Quantum Dots; 5.1.1: A Short Excursion to Optical Properties; 5.2: Band Gap, Size, and Absorption Edge; 5.3: Synthesis of QDs; 5.3.1: QD Synthesis by Chemical Methods; 5.3.2: Strain-Driven Self-Assembly - Stranski-Krastanov Growth; 5.3.3: The Ge-Si System - Shape Evolution During Growth; 5.4: Superlattices Made of QDs; 5.5: Closing Remarks; 6: Pure Carbon Materials; 6.1: Carbonaceous Materials and Bonding; 6.2: Low-Dimensional Carbon Nanostructures
 6.2.1: Zero-Dimensional - Fullerenes; 6.2.2: One- and Two-Dimensional - Carbon Nanotubes and Graphene; 6.3: Electronic and Geometric Structure: Graphene and Carbon Nanotubes; 6.3.1: From Graphene to Graphite to Graphene; 6.3.2: Geometric Structure of Carbon Nanotubes; 6.3.3: Electronic Structure of Carbon Nanotubes; 6.3.4: Synthesis of Carbon Nanotubes; 6.4: Graphene - the Electron as a Massless Dirac Fermion; 6.4.1: Electronic Properties, Doping, and Band Gap; 6.4.2: Quantum Confinement and Carbon Nanoribbons; 6.5: Synthesis of Graphene; 6.5.1: Exfoliation from Graphite
 6.5.2: Growth on Metal Substrates

Sommario/riassunto

This monograph for young researchers and professionals looking for a comprehensive reference offers an advanced treatment of the topic that extends beyond an introductory work. As such, it systematically covers the inorganic nanostructures in the breadth needed, while presenting them together with the surface science tools used to characterize them, such as electron spectroscopy and scanning probe techniques. The unique challenges in the fabrication of nanostructures are illustrated, and set into context of controlling structure, dimensionality and electronic properties.