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Nota di contenuto	Silicon Nanocrystals: Fundamentals, Synthesis and Applications; Contents; List of Contributors; 1 Introduction; References; 2 Electronic and Optical Properties of Silicon Nanocrystals; 2.1 Introduction; 2.2 Ab Initio Calculation for Small Nanocrystals; 2.2.1 Hydrogenated Silicon Nanocrystals; 2.2.2 Oxidized Silicon Nanocrystals; 2.2.3 Doped Silicon Nanocrystals; 2.2.3.1 Single-Doped Silicon Nanocrystals; 2.2.3.2 Codoped Silicon Nanocrystals; 2.2.4 Silicon Nanocrystals Embedded in a SiO ₂ Matrix; 2.3 Pseudopotential Calculations for Large Nanocrystals; 2.3.1 Effective Optical Gap 2.3.2 Radiative Lifetime 2.3.3 Linear Optical Absorption; 2.3.3.1 Interband Absorption; 2.3.3.2 Intraband Absorption; 2.3.3.3 Excited State Absorption; 2.3.4 Third-Order Nonlinear Optical Properties; 2.3.5 Quantum-Confined Stark Effect in Si Nanocrystals; References; 3 Optical Properties of Intrinsic and Shallow Impurity-Doped Silicon

Nanocrystals; 3.1 Introduction; 3.2 PL Properties of Intrinsic Silicon Nanocrystals; 3.2.1 Fundamental Properties; 3.2.2 Effect of Size and Shape Distribution on the PL Bandwidth; 3.2.3 Resonant Quenching of PL Band Due to Energy Transfer
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5.4.2 Epitaxially Grown Si/SiGe Nanostructures: Superlattices and Cluster Multilayers

Sommario/riassunto

This unique collection of knowledge represents a comprehensive treatment of the fundamental and practical consequences of size reduction in silicon crystals. This clearly structured reference introduces readers to the optical, electrical and thermal properties of silicon nanocrystals that arise from their greatly reduced dimensions. It covers their synthesis and characterization from both chemical and physical viewpoints, including ion implantation, colloidal synthesis and vapor deposition methods. A major part of the text is devoted to applications in microelectronics as well as photonics
