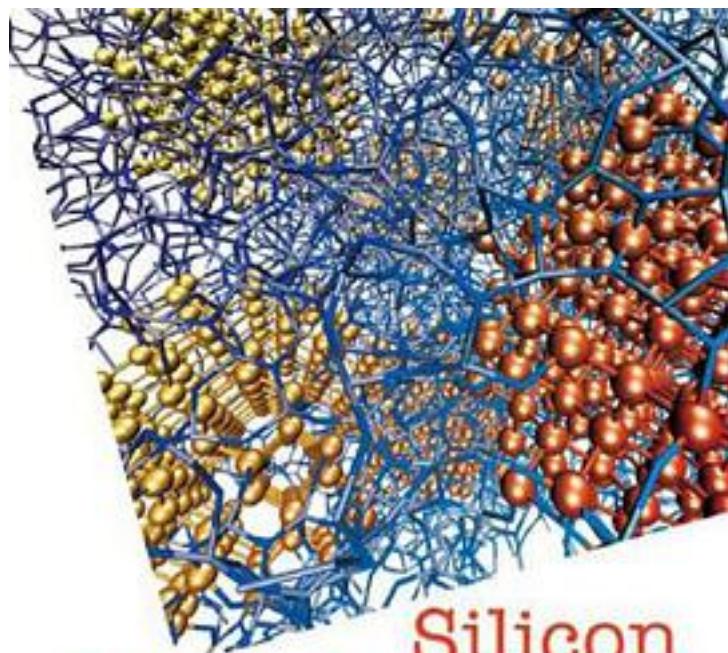


# SILICON NANOPHOTONICS



## Silicon Nanophotonics

Basic Principles, Present Status and Perspectives

Leonid Khriachtchev

Editor



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出版者:

出版时间:2008-8

装帧:

isbn:9789814241113

Nanoscale materials are showing great promise in various optoelectronics applications, especially for the fast developing fields of optical communication and optical computers. With silicon as the leading material for microelectronics, the integration of optical functions into silicon technology is a very important challenge. This book concentrates on the optoelectronic properties of silicon nanocrystals, associated phenomena and related topics, from basic principles to the most recent discoveries. The areas of focus include silicon-based light-emitting devices, light modulators, optical waveguides and interconnectors, optical amplifiers, and memory elements. The book comprises theoretical and experimental analysis of various properties of silicon nanocrystals, research methods and preparation techniques, and some promising applications.

Contents: Silicon Nanocrystals Enabling Silicon Photonics (N Daldosso & L Pavesi); Theoretical Studies of Absorption, Emission and Gain in Silicon Nanostructures (E Degoli et al.); Computational Studies of Free-Standing Silicon Nanoclusters (O Lehtonen & D Sundholm); Optical Gain in Silicon Nanocrystal Waveguides Measured by the Variable Stripe Length Technique (H Chen et al.); Si-nc Based Light Emitters and Er Doping for Gain Materials (O Jambois et al.); Silicon Nanocrystals: Structural and Optical Properties and Device Applications (F Iacona et al.); Optical Spectroscopy of Individual Silicon Nanocrystals (J Valenta & J Linnros); Silicon Nanocrystal Memories (P Dimitrakis et al.); Engineering the Optical Response of Nanostructured Silicon (J Diener et al.); Guiding and Amplification of Light Due to Silicon Nanocrystals Embedded in Waveguides (T Ostatnický et al.); Silicon Nanocrystals in Silica: Optical Properties and Laser-Induced Thermal Effects (L Khriachtchev); Light Emission from Silicon-Rich Nitride Nanostructures (L D Negro et al.); Energy Efficiency in Silicon Photonics (B Jalali et al.); Light Emitting Defects in Ion-Irradiated Alpha-Quartz and Silicon Nanoclusters (J Keinonen et al.); Auger Processes in Silicon Nanocrystals Assemblies (D Kovalev & M Fujii); Biological Applications of Silicon Nanostructures (S M Weiss).

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