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## **Device Applications of Silicon Nanocrystals and ...**

Some novel devices and applications, in fields such as photonics (electroluminescence diode, microcavity, and waveguide), electronics (single-electron device, spin transistor, nonvolatile memory, and ballistic

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electron emitter), acoustics, and biology, have been developed by the use of these quantum-induced functions in ways different from the conventional scaling principle for ULSI.

### **Device Applications of Silicon Nanocrystals and ...**

In addition to efficient visible luminescence, various other useful material functions are induced in nanocrystalline silicon and periodic silicon nanostructures. Some novel devices and applications, in fields such as photonics (electroluminescence diode, microcavity, and waveguide), electronics (single-electron device, spin transistor, nonvolatile memory, and ballistic electron emitter), acoustics, and biology, have been developed by the use of these quantum-induced functions in ways ...

### **Device Applications of Silicon Nanocrystals and ...**

Silicon nanocrystals (Si Ncs) based

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devices attract a strong interest thanks to their potential application in microelectronic and opto-electronic domains [1]. Si Ncs help to overcome downscaling ...

## **Device Applications of Silicon Nanocrystals and ...**

Silicon nanocrystals (SiNCs) featuring size-dependent novel optical and electrical properties have been widely employed for various functional devices. We have demonstrated SiNC-based hybrid photovoltaics (SiNC-HPVs) and proposed several approaches for performance promotion. Recently, owing to the superiorities such as low power operation, high portability, and designability, organic photovoltaics (OPVs) have been extensively studied for their potential indoor applications as power sources.

## **Silicon nanocrystal hybrid photovoltaic devices for indoor ...**

Research in silicon nanocrystals (Si NCs)

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has over thirty years of history; nevertheless, it still attracts significant attention today. Initially, a great effort was devoted to extending the use of silicon in optoelectronics for the realization of Si-based light-emitting devices, especially lasers.

## **Nanomaterials | Special Issue : Silicon Nanocrystals: From ...**

Lee "Device Applications of Silicon Nanocrystals and Nanostructures" por disponible en Rakuten Kobo. Recent developments in the technology of silicon nanocrystals and silicon nanostructures, where quantum-size effects are...

## **Device Applications of Silicon Nanocrystals and ...**

Due to excellent fluorescence intensity, low toxicity, good biocompatibility and stability, silicon nanocrystals (Si NCs) and Si NCs-based composites have attracted extensive attention and have been widely applied in analytical

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detection, biomarkers, photocatalysts,  
photodiodes, and solar cells

## **Silicon Nanocrystals and Their Composites: Syntheses ...**

The continuous improvement of the electronic and optical properties of Si NCs has been enabled by manipulating the size, surface and doping of Si NCs. The use of Si NCs for optoelectronic devices such as light-emitting diodes, solar cells, photodetectors and synaptic devices have been explored in the past years.

## **Silicon nanocrystals: unfading silicon materials for ...**

Silicon-based device solutions have been demonstrated for planar waveguides and for high-speed detectors. However, silicon is a poor material for making modulators or lasers, which together comprise the necessary signal transmission source in optical communication.

# Get Free Device Applications Of Silicon Nanocrystals And Nanostructures Nanostructure **Silicon Nanocrystals for Silicon Photonics** And Technology

device fabrication. It is used for almost all modern electronic devices. However, the indirect energy gap in bulk crystalline Si makes it unable to emit light efficiently and thus unsuitable for optoelectronic applications. For example, lasers, photodetectors are not constructed from silicon.

## **Silicon Nanocrystals - IntechOpen**

Comparison of the measured absolute absorption cross section on a per Si atom basis of plasma-synthesized Si nanocrystals (NCs) with the absorption of bulk crystalline Si shows that while near the band edge the NC absorption is weaker than the bulk, yet above  $\sim 2.2$  eV the NC absorbs up to 5 times more than the bulk. Using atomistic screened pseudopotential calculations we show that this ...

## **Quasi-Direct Optical Transitions in Silicon Nanocrystals ...**

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In the meantime, it has been shown that silicon nanocrystals (Si NCs) can effectively trap and release photo-generated carriers because of defects such as dangling bonds at the Si-NC surface [45].

## **(PDF) Hybrid Structure of Silicon Nanocrystals and 2D WSe<sub>2</sub> ...**

Silicon nanocrystal charging dynamics and memory device applications - NASA/ADS The application of Si nanocrystals as floating gate in the MOSFET-based memory brings many advantages due to separated charge storage.

## **Silicon nanocrystal charging dynamics and memory device ...**

The application of Si nanocrystals as floating gate in the metal oxide semiconductor field-effect transistor (MOSFET) based memory, which brings many advantages due to separated charge storage, attracted much attention in recent years.

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## **SILICON NANOCRYSTAL CHARGING DYNAMICS AND MEMORY DEVICE ...**

Silicon nanocrystals are also of interest for applications in solid state lighting. While bulk silicon shows basically no photoluminescence due to its indirect band-gap, strong photoluminescence has been demonstrated for silicon nanocrystals even at room 4Author to whom any correspondence should be addressed.

## **Plasma synthesis of single-crystal silicon nanoparticles ...**

Nowadays, study of silicon-based visible light-emitting devices has increased due to large-scale microelectronic integration. Since then different physical and chemical processes have been performed to convert bulk silicon (Si) into a light-emitting material. From discovery of Photoluminescence (PL) in porous Silicon by Canham, a new field of research was opened in optical properties of the Si ...

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## **Synthesis and Luminescent Properties of Silicon Nanocrystals**

Successful preparation of Si nanocrystals for memory applications has been also realized by chemical vapour deposition. Devices for non-volatile purposes were produced using 3.8-5.0 nm thick tunnel oxide (Rao et al., 2004) and a threshold voltage shift of  $\sim 1.5$  V has

## **Silicon Oxide Films Containing Amorphous or Crystalline ...**

Shuangyi Zhao received his Ph.D. degree in the School of Materials Science and Engineering at Zhejiang University in 2018. He worked on the fabrication of silicon nanocrystals and their applications in optoelectronic devices such as solar cells, light-emitting devices, and synaptic devices.

## **Synaptic silicon-nanocrystal phototransistors for ...**

Motorola Semiconductor (Austin, TX) has demonstrated the first 4-Mbit memory

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device based on silicon nanocrystals.  
The test chip represents a major  
milestone in the search for a successor  
to present floating-gate-based flash  
memories, which are nearing the end of  
their ability to scale to smaller  
geometries.

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