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Special Issue Reprint

Electronic Nanodevices

www.mdpi.com/books/reprint/6064

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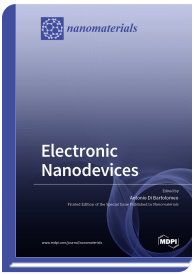
ISBN 978-3-0365-5021-3 (Hardback)
ISBN 978-3-0365-5022-0 (PDF)



The start of high-volume production of field-effect transistors with a feature size below 100 nm at the end of the 20th century signaled the transition from microelectronics to nanoelectronics. Since then, downscaling in the semiconductor industry has continued until the recent development of sub-10 nm technologies.

The new phenomena and issues as well as the technological challenges of the fabrication and manipulation at the nanoscale have spurred an intense theoretical and experimental research activity. New device structures, operating principles, materials, and measurement techniques have emerged, and new approaches to electronic transport and device modeling have become necessary. Examples are the introduction of vertical MOSFETs in addition to the planar ones to enable the multi-gate approach as well as the development of new tunneling, high-electron mobility, and single-electron devices. The search for new materials such as nanowires, nanotubes, and 2D materials for the transistor channel, dielectrics, and interconnects has been part of the process.

New electronic devices, often consisting of nanoscale heterojunctions, have been developed for light emission, transmission, and detection in optoelectronic and photonic systems, as well for new chemical, biological, and environmental sensors.

This Special Issue focuses on the design, fabrication, modeling, and demonstration of nanodevices for electronic, optoelectronic, and sensing applications.

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