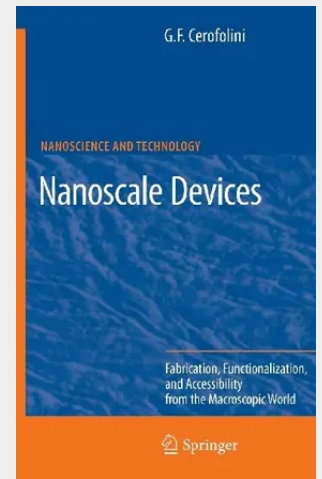


Nanoscale Devices

Fabrication, Functionalization, and Accessibility from the Macroscopic World

The second half of the twentieth century and the beginning of the twenty-first have been characterized by the most impressive industrial revolution ever seen. In approximately 40 years, the complexity of integrated circuits (ICs) has increased by a factor of 10, with a corresponding reduction of the cost per bit by eight orders of magnitude. Not only has this evolution allowed dramatic progress in all scientific fields (large computers, space probes, etc.), but also has fueled the economic development with the rise of new markets (personal computers, cellular phones, etc.) and even social revolutions (world wide web, global village, etc.). In last years, however, the situation has significantly changed: the continuous scaling down of device size has eventually brought the IC major technique, photolithography, to its limits. Overcoming its original limits has been proved to be possible, but the price to pay for that has changed the playing rules – while at the beginning of the IC history the evolution was driven by technology, now it is driven by economy, the cost of a medium size production plant being in the range of a few billion dollars.

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