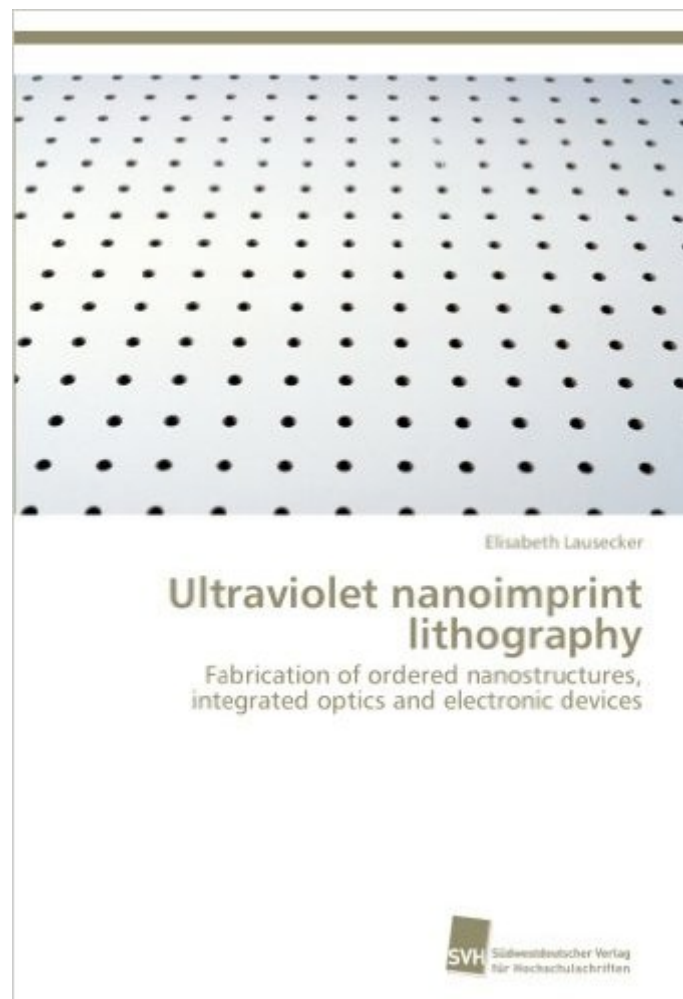


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Ultraviolet Nanoimprint Lithography: Fabrication Of Ordered Nanostructures, Integrated Optics And Electronic Devices



Synopsis

Nanoimprint lithography (NIL) is a lithographic technique that allows the patterning of substrates with nanostructures over large areas with high density. NIL relies on the simplicity of mechanically deforming a polymeric resist layer by a patterned mold. The author gives a detailed introduction to NIL and developed ultraviolet NIL for the pit-patterning of substrate surfaces. By combining the self-assembled growth of silicon-germanium (SiGe) islands by molecular-beam epitaxy with the pit-patterning of the Si substrate, an ordering of the islands is achieved. Both, a position-control of the SiGe islands and an improvement of their homogeneity and emission efficiency is accomplished. Moreover, the work towards integrating these ordered SiGe islands into a two-dimensional photonic crystal slab was pursued, demanding a second imprinted layer precisely aligned to the first one. Finally, self-aligned imprint lithography was developed at Princeton University, USA, for the fabrication of the first top-gate amorphous Si thin-film transistor. The book contains detailed descriptions of executed process steps.

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