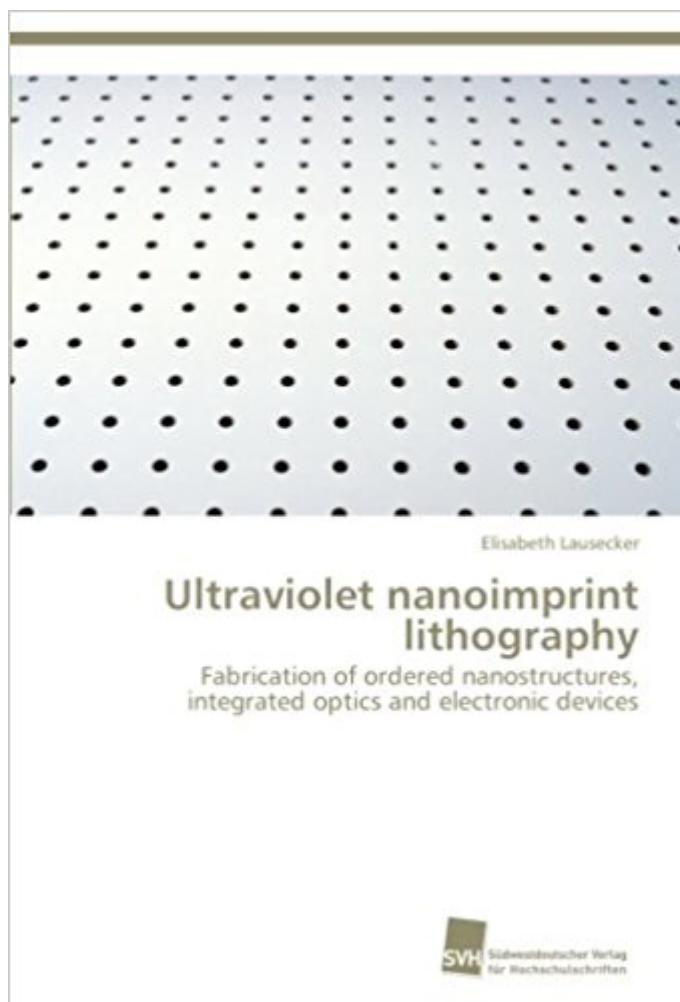


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Ultraviolet Nanoimprint Lithography: Fabrication Of Ordered Nanostructures, Integrated Optics And Electronic Devices



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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Elisabeth Lausecker received her master's degree in technical physics and her Ph.D. degree in engineering science from the Johannes Kepler University Linz, Austria, in 2008 and 2012, respectively. In 2008, she conducted a research stay at Princeton University, USA. Her research is focused on nanoimprint lithography and semiconductor nanostructures.

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