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Autore	Fairweather, Graeme
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3.6 Electron-beam patterning of photomasks for optical lithography3.7 Conclusion; 3.8 Acknowledgements; 3.9 References; 4: Focused ion beams for nano-machining and imaging; 4.1 Introduction; 4.2 An adumbrated history of focused ion beams (FIBs); 4.3 Sources of ions: a quartet of types; 4.4 Charged particle optics; 4.5 Ion-matter interactions; 4.6 Milling; 4.7 Deposition; 4.8 Imaging; 4.9 Spectroscopy; 4.10 Conclusion and future trends; 4.11 References; 5: Masks for microand nanolithography; 5.1 Introduction; 5.2 Mask materials; 5.3 Mask process; 5.4 Mask metrology; 5.5 Defects and masks
5.6 Conclusion5.7 References; 6: Maskless photolithography; 6.1 Introduction; 6.2 The use of photons as opposed to charged particles; 6.3 Forms of maskless photolithography; 6.4 Zone-plate-array lithography (ZPAL); 6.5 Proximity-effect correction; 6.6 Extending the resolution of ZPAL; 6.7 Commercialization of ZPAL by LumArray, Inc.; 6.8 Conclusion; 6.9 References; 7: Chemistry and processing of resists for nanolithography; 7.1 Introduction; 7.2 Resists for optical lithography: synthesis and radiation induced chemistry of resists as a function of exposure technology
7.3 Chemically amplified resist process considerations7.4 Chemically amplified resists for 193 nm lithography; 7.5 Resists for extreme ultraviolet lithography (EUVL); 7.6 Resists for electron beam lithography; 7.7 Resists for selected forward looking lithographic technologies; 7.8 Resist resolution limitations; 7.9 Conclusion; 7.10 References; 8: Directed assembly nanolithography; 8.1 Introduction; 8.2 Block copolymers in lithography; 8.3 Directed self-assembly of block copolymers; 8.4 Programmable three-dimensional lithography; 8.5 Conclusion; 8.6 References; 9: Nanoimprint lithography
9.1 Introduction

Sommario/riassunto

Integrated circuits, and devices fabricated using the techniques developed for integrated circuits, have steadily gotten smaller, more complex, and more powerful. The rate of shrinking is astonishing - some components are now just a few dozen atoms wide. This book attempts to answer the questions, "What comes next?? and "How do we get there??Nanolithography outlines the present state of the art in lithographic techniques, including optical projection in both deep and extreme ultraviolet, electron and ion beams, and imprinting. Special attention is paid to related issues, such as the re