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Nota di contenuto	1. EUV Lithography: A Historical Perspective / Hiroo Kinoshita and Obert Wood -- Introduction -- The Early Stage of Development: 1981 to 1992 -- The Second Stage of Development: 1993 to 1996 -- Other Developments in Japan and Europe -- The Development of Individual Technologies -- EUVL Conferences -- Summary. 2. EUV LLC: An Historical Perspective / Chuck Gwyn and Stefan Wurm -- Introduction -- Formation of the LLC -- Program Structure -- Program Results -- Retrospective Observations -- Status of EUV Development at the End of LLC -- Summary. 3. EUV Source Technology / Vivek Bakshi-- Introduction -- EUV Source Requirements -- DPP and LPP Source Technologies -- EUV Source Performance -- Summary and Future Outlook. 4A. Optics and Multilayer Coatings for EUVL Systems / Regina Soufli, Sasa Bajt, Russell M. Hudyma and John S. Taylor -- Introduction -- Properties of EUVL Systems. 4B. Projection Systems for Extreme Ultraviolet Lithography / Russell M. Hudyma and Regina Soufli -- General EUVL Optical Design Considerations -- EUV Microsteppers -- Engineering Test Stand (ETS) -- Six-Mirror EUVL Projection Systems. 4C. Specification, Fabrication, Testing, and Mounting of EUVL Optical Substrates / John S. Taylor and Regina Soufli -- Introduction --

Specification -- Projection Optics -- Effect of Substrate Errors on Imaging Performance -- Low-Frequency (Figure) Errors -- Mid-Spatial-Frequency Errors -- High-Spatial-Frequency Errors -- Influence of Coatings on Roughness Specification -- Calculation of Surface Errors -- Uniformity -- Substrate Materials -- Fabrication -- Metrology -- Mounting and Assembly -- Alignment -- Condenser Optics.
4D. Multilayer Coatings for EUVL / Regina Soufli and Sasa Bajt -- Overview and History of EUV Multilayer Coatings -- Choice of ML Materials and Wavelength Considerations -- Multilayer Deposition Technologies -- Theoretical design -- High Reflectivity, Low Stress, and Thermal Stability Considerations -- Optical Constants -- Multilayer Thickness Specifications for Imaging and Condenser EUVL Mirrors.
5. EUV Optical Testing / Kenneth A. Goldberg -- Introduction -- Target Accuracy -- Techniques for Angstrom-scale EUV Wavefront Measurement Accuracy -- Intercomparison -- Future Directions.
6A. Optics Contamination / Sasa Bajt -- Introduction -- Fundamentals of Optics Contamination -- Optics Contamination Control -- Summary and Future Outlook.
6B. Grazing Angle Collector Contamination / Valentino Rigato -- Introduction -- Collector Lifetime Status and Challenges -- Summary.
6C. Normal Incidence (Multilayer) Collector Contamination / David N. Ruzic and Shailendra N. Srivastava -- Introduction -- Overview of Normal-Incidence Collector Mirrors -- Collector Performance -- Summary.
7. EUV Mask and Mask Metrology / Han-Ku Cho and Jinho Ahn -- Introduction -- EUV Mask Structure and Process Flow -- Mask Substrate -- Mask Blank Fabrication -- Absorber Stack and Backside Conductive Coating -- Mask Patterning -- Mask Cleaning -- Advanced Mask Structure -- Summary and Future Outlook.
8. Photoresists for Extreme Ultraviolet Lithography / Robert L. Brainard -- Introduction -- Earliest EUV Resist Imaging -- Absorption Coefficients of EUV Photoresists -- Multilayer Resists and Pattern Transfer -- Resist Types -- PAGs and Acids -- Line Edge Roughness -- Summary and Future Outlook.
9. High-Resolution EUV Imaging Tools for Resist Exposure and Aerial Image Monitoring / Malcolm Gower -- Introduction -- EUV Tool Design Considerations -- EUV Microstepper -- Reticle Imaging Microscope -- Summary and Future Outlook.
10. Fundamentals of the EUVL Scanner / Kazuya Ota -- Introduction -- Illumination Optics -- Projection Optics -- Stages -- Sensors -- Handling Systems -- Vacuum and Environment System -- Budgets -- Summary.
11. EUVL System Patterning Performance / Patrick Naulleau, John E. Bjorkholm, and Manish Chandhok -- Introduction: The Benefits of EUV Imaging -- Imaging with the 0.1-NA ETS Optic -- Imaging with the 0.3-NA MET Optic -- System Contributors to Line Edge Roughness -- Flare in EUVL Systems -- Summary.
12. Lithography Cost of Ownership / Phil Seidel -- Cost of Ownership Overview -- Lithography: Historical Cost and Price Trends -- Major Lithography CoO Parameter and Productivity Drivers -- General Observations on Lithography Cell and CoO Improvements (Past Decade) -- CoO Considerations for Future Lithography Technologies -- Summary -- Appendix: Example Case Studies of Lithography CoO Calculations.

Sommario/riassunto

Dr. Bakshi has compiled a thorough, clear reference text covering the important fields of EUV lithography for high-volume manufacturing. This book has resulted from his many years of experience in EUVL development and from teaching this subject to future specialists. The book proceeds from an historical perspective of EUV lithography,

through source technology, optics, projection system design, mask, resist, and patterning performance, to cost of ownership. Each section contains worked examples, a comprehensive review of challenges, and relevant citations for those who wish to further investigate the subject matter. Dr. Bakshi succeeds in presenting sometimes unfamiliar material in a very clear manner. This book is also valuable as a teaching tool. It has become an instant classic and far surpasses others in the EUVL field.