Recent development of EUV/X-Ray multilayer optics in IOF

Sergiy Yulin, Viatcheslav Nesterenko, Norbert Kaiser

Fraunhofer-Institut Angewandte Optik und Feinmechanik, Albert Einstein Straße 7, 07745 Jena, Germany

At the Fraunhofer IOF Jena multilayer optics development covers the full spectral range from 1.0 nm to vacuum ultraviolet around 200 nm. This paper covers some theoretical considerations, material aspects, interface-engineered designs and modern deposition techniques for controlled fabrication of

- Si-based multilayers for high-order harmonic generation in the 20 ... 50 nm spectral range,
- Mo/Si (and La/B₄C) multilayers for EUV lithography related applications and
- Cr/Sc and Cr/V multilayers for the water window.

The paper summarizes recent progress and the present knowledge in preparation and characterization of high-reflective multilayer optics for the EUV/Soft X-ray range with regard to minimization of structure imperfections and enhanced stability.