

Multilayer Phase-Only Diffraction Gratings: Fabrication and Application to EUV Optics

Farhad Salmassi,^{*} Eric M. Gullikson, Erik H. Anderson, and Patrick P. Naulleau

Center for X-Ray Optics (CXRO), Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, CA 94720, USA

Abstract

The use of phase-only diffractive devices has long played an important role in advanced optical systems in varying fields. Such devices include gratings, diffractive and holographic optical elements, diffractive lenses, and phase-shift masks for advanced lithography. Extending such devices to the increasingly important regime of extreme ultraviolet (EUV) wavelengths, however, is not trivial. Here, we present an effective fabrication and etch process enabling high-resolution patterning of Mo/Si multilayers for use in EUV phase devices, providing another method for fabrication of high numerical aperture diffractive devices or high-resolution EUV phase shift masks

^{*} Electronic mail: fsalmassi@lbl.gov