Mo/Y and Mo/Sr normal incidence multilayer mirror for the 8-12 nm wavelength region

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Abstract

Mo/Y and Mo/Sr multilayer mirrors were deposited by dc-magnetron sputtering and characterized *in situ* with synchrotron radiation. The work performed on Mo/Y is the continuation of an investigation conducted several years ago on this material pair. Slightly higher normal incidence reflectances were achieved and the stability of this multilayer system was evaluated over a period of 12 months. Several Mo/Sr multilayer mirrors were successfully produced for the first time, and normal incidence reflectances of 23.0% at 8.8 nm, 40.8% at 9.4 nm and 48.3% at 10.5 nm were measured before exposing the samples to air. These reflectances are slightly higher than those obtained with the Mo/Y multilayers, and are the best reported to date for wavelengths below 11.1 nm (Be *L*-edge). However, as a result of the reactivity of Sr with oxygen and water vapor, the reflectance of these multilayers decayed rapidly after exposure to ambient air. Attempts to use thin layers of C to passivate the surface of these Mo/Sr multilayers were unsuccessful.

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