Development of high reflectance and narrow spectral bandpass Si/Gd multilayers for the 63 nm solar imaging applications

Benjawan Kjornrattanawanich*

Universities Space Research Association, National Synchrotron Light Source Beamline X24C

Brookhaven National Laboratory, Upton, NY 11973

David Windt

Reflective X-ray Optics LLC, 1361 Amsterdam Ave. Suite 3B, New York, NY 10027

John Seely

Naval Research laboratory, Space Science Division, Washington DC 20375

Si/Gd multilayers, designed as narrow-band reflective coatings near 63 nm were developed. The multilayer structure was characterized by fitting the x-ray and EUV reflectance data using the standard 2-layer model as well as the 4-layer model where silicide formation is permitted at the Si-Gd interfaces. Several materials such as B_4C, Cr, W, and SiN alloy were introduced as interface barrier layers to improve reflectance performance of Si/Gd multilayers. Longterm reflectance stability of standard and interface-engineered Si/Gd multilayers, kept under room temperature or undergone high temperature treatment, will be discussed.

* Corresponding author, e-mail: benjawan@bnl.gov