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**Scandium Oxide Thin Films and Their Optical Properties in the EUV** GUILLERMO ACOSTA, DAVID ALLRED, STEVE TURLEY, RICHARD VANFLEET, Brigham Young University — In recent years, it was conjectured that scandium thin films could be used to produce highly reflective coatings in the Extreme Ultraviolet (EUV). However, scandium's affinity to form new compounds prevents such coatings from achieving calculated reflectivities. In this project, thin films of scandium oxide are studied to supplement the understanding and use of scandium, and possibly as a substitute for scandium in multilayer coatings. This study reports on the physical and optical characterization of scandium oxide thin films. Thin films of scandium oxide, 15-50 nanometers thick, were deposited on silicon photodiodes by reactively sputtering scandium in an oxygen environment. These samples were measured using EUV synchrotron radiation at the Lawrence Berkeley National Laboratory Advanced Light Source, Beamline 6.3.2. Reflection and transmission measurements, at variable angles, were taken simultaneously from 2.7-50 nanometers. Analysis of the data has provided experimentally determined optical constants. Additional characterization of the samples includes ellipsometry, scanning transmission electron microscopy, energy dispersive x-ray analysis, and high resolution transmission electron microscopy.

Guillermo Acosta
Brigham Young University

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