

## **Optical Constants from AXAF Synchrotron Reflectance Measurements**

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We report iridium optical constants measured in reflectance measurements of coated witness flats from the coating process of AXAF (Advanced X-ray Astrophysics Facility). These mirrors have been measured in considerable detail over 2010-12000 eV at the X8 beamlines of the National Synchrotron Light Source (NSLS). Additional measurements are under way using Beamline 6.3.2 of the Advanced Light Source (ALS) over the 50-1000 eV range, and further measurements are scheduled in the 1000-2000 eV range on NSLS Beamline U3A.

The coatings are 300Å of iridium on a 100Å chromium binding layer. Witness mirrors exist in three varieties, each with a different polishing quality and resulting surface roughness. We have used a fitting algorithm of D.L. Windt called NKFIT to derive optical constants from the reflectance versus angle and reflectance versus energy scans taken for the calibrations. We have used a modified Debye-Waller roughness correction factor attributed to Nevot and Croce (1980). The Fresnel equation model with this correction produces fits adequate for calibration within 1%, but does not adequately deconvolve the surface corrections from the beta optical constant (the extinction coefficient). We have decided to undertake scattering studies of our various flats to determine the appropriate form of this correction and to allow the proper deconvolution of optical constants from the fits, for the purpose of completing the AXAF calibration.

We present calibration measurements, optical constants, and plans and initial results from our roughness studies.

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