

D41

TGM-to-SGM conversion at NSLS beamline U7A: recycling of beamline components

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The U7A bending magnet toroidal grating monochromator (TGM) beamline has been converted into spherical grating monochromator (SGM) type, without constructing any new vacuum components. That is, the mirror, slit, and grating chambers have been recycled. The inherited optical arrangement and the recycling concept prevented the use of “standard” SGM Kirkpatrick-Baez collecting and focusing mirrors at the front end. We show that this modification is not a serious detriment to the optical properties of the resulting beamline. Specifically, the resolution is completely unaffected and the throughput is approximately $2/3$ of the “standard” SGM value.

The flux and photon energy resolution of the U7A beamline throughout its 200-1000 eV operating photon energy range will be presented.

Three endstations are being constructed for this beamline, featuring soft x-ray absorption and photoemission chambers optimized for operation in the carbon K-, oxygen K-, and transition metal L-edge ranges. Two of these endstations will be preceded by refocusing mirrors which will focus the soft x-rays to <1 mm spot size onto their samples.

This work was supported by the Division of Material Sciences U. S. Department of Energy under Contract No. DE-AC02-76CH00016.