Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

**Silicon x-ray monochromator surfaces by independent oxidation and etching steps**[1] ALBERT MACRANDER, Advanced Photon Source, Argonne, KIMBERLEY MACARTHUR, EE Dept. Northern IL Univ., JOSEF MAJ, JUN QIAN, APS, Argonne, DAN LINNEN, EE, NIU, RUBEN KHACHATRYAN, MICHAEL WIECZOREK, APS, Argonne, RAY CONLEY, NSLS II, Brookhaven, ALAN GENIS, EE, NIU — X-ray monochromators should ideally possess a surface that does not distort a diffracted beam. Beam distortions have been observed at the APS for rough surfaces. Mechanical polishing leaves sub-surface damage. The standard method to remove this damage is to wet etch Si crystals in a mixture of nitric acid and hydrofluoric acid. During the etch an oxide is produced and removed in the same acid bath. X-ray diffraction from a bulk reflection that is largely unaffected by strain can be obtained by this method. However, the smoothness is degraded to produce an orange-peel morphology. For the present study we carried out the oxidation and etching steps independently. By first growing an oxide layer in a furnace and subsequently etching away the the oxide layer, we find that sub-surface damage can be removed and the surface quality can be improved over that found with only wet etching.

[1]Work supported by US DOE, Office of Science, Basic Energy Sciences under Contract No. DE-AC02-06CH11357

Albert Macrander
Advanced Photon Source, Argonne

Date submitted: 14 Nov 2008 Electronic form version 1.4