Report.

During the beamline time allocated for MI429 experiment silicon X-ray refractive lenses were examined. Parabolic refractive lenses are fabricated in the planar geometry, when the lens optical axis is lying along the silicon wafer plane. By the unique deep plasmachemical etching process relief depth in silicon up to 100 μm is achieved. Planar parabolic lenses with minimized absorption are created as a symmetrical set of parabolic segments. Fabricated lens is compound and consists from 5 individual sets. Fulfilled calculations has shown that transmission of the planar parabolic lenses with minimized absorption can reach 90,5% at energy 17 keV. Testing on synchrotron radiation with the high-resolution CCD-camera has showed a good quality of fabricated parabolic lenses. The value of r.m.s deviations of etched lens profiles from parabolic one is estimated from focused intensity measurements. Focusing properties of planar parabolic lenses with minimized absorption were investigated in the energy range 8-17 keV and compared with the features obtained by the computer simulation. The predicted and experimentally verified dependence of gain vs. energy contains a set of peaks. Unusual spectral features of these lenses are discussed in details. This study has shown that silicon planar parabolic lens with minimized absorption can effectively focus hard X-rays to a linear focal spot suitable for microprobe applications. The transmission of the proposed lens is highly competitive with that for compound refractive lenses made of low *Z* materials. The developed lens design is a promising approach to significantly increase aperture and to improve the performance of hard X-ray refractive optics. The effect of selected energies focusing makes it possible to use silicon planar parabolic lens with minimized absorption as a multi-purpose spectral device. Silicon planar refractive lenses are expected to be stable up to power density of emerging beam 10^5 Wt/cm$^{2.}$.

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