

Study of Reactive Ion Etching for Kinoform Lenses

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The growing worldwide availability of high-brightness synchrotron radiation in the hard x-ray regime has increased the demand for high resolution focusing optics. Kinoforms offer achievable focusing efficiencies of over 90%. In this project, we developed the Reactive Ion Etching process at the Center for Functional Nanomaterials for kinoform lenses, thus increasing the available supply of locally produced refractive lenses, for the Coherent Hard X-ray beamline, and other beamlines at the National Synchrotron Light Source II. The Reactive Ion Etching process was performed on silicon material, achieving an etch dept of 100 microns in the making of the kinoform lenses. The kinoform lenses were tested at the Coherent Hard X-ray beamline achieving a focusing resolution from 200 microns to 8 microns Full width at half maximum. This work was supported by the U.S. Department of Energy, Office of Basic Energy Sciences, under Contract No. DE-SC0012704.