

Diamond CRL and Other Applications of Laser Ablation for X-Ray Beamline Components

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The next generation light sources will require x-ray optical components capable of handling large instantaneous and average power densities while tailoring the properties of the x-ray beams for a variety of scientific experiments. Euclid Techlabs had been developing x-ray refractive diamond lens to meet this future needs. Standard deviation of lens shape error figure gradually was decreased to sub-micron values. Post-ablation polishing procedure yields $\sim 10\text{nm}$ surface roughness. In this paper we will report on recent developments towards beamline-ready lens including packaging and compound refractive lens stacking.

Diamond lens fabrication is done by femtosecond laser micromachining. We had been using this technology for customization of other beamline components. Several application cases will be highlighted in this presentation: diamond anvils, x-ray flow cells and in-beam mirrors.