ABSTRACT

Beginning in 2006, Energetiq Technology Inc. began development[1] of a soft x-ray source based on our commercially successful EUV source[2], based on a unique electrode-less Z pinch design. Operating in Nitrogen, the source produces up to 400 mW of radiation at 2.88 nm, (430 eV)[3]. The source has been used as an illuminator for our diagnostics developed. Several gasses tested; nitrogen selected: 100 watts/2 pi, 13.5 nm,

In 2006: Phase 1 – explore various gases; power and spectral measurements.


2010: Cryo-tomography at Xradia

2012: Installation at customer site (DiamondLight Source , UK)

References

2005: First EQ-10; 10 W/2 pi, 13.5 nm [1]

2010-2011 Phase 2 Renewal: Cryo-Tomo results, Extensive testing, lifetime and maintenance improvements.

• Power system rebuilt - increased pulse energy, pulse rate
• Architectural modifications to manage higher voltage

Simplified schematic diagram of power system and source.

Experimental Results: Tomography of Frozen Hydrated Yeast

Since zone plate focal length varies with wavelength, line bandwidth can cause chromatic aberration. Resolution limits due to line bandwidth have not been seen. Resolution limit is better than 30 nm. (See Xradia results, this meeting.)

2010: Cryo-tomography at Xradia

• First cryo-tomographic results
• Major effort to improve bore lifetime
• Lifetime improved from ~ 5 days to ~ 20 days, at higher output power.
• Maintenance time (bore change, power to power) reduced from ~ 3 days to ~ 12 hrs

Power output to 400 mW: 20 day bore life achieved

Various parameters vs bore lifetime

2012: Installation at customer site (DiamondLight Source , UK)

Acceptance testing onsite prior to connecting source to microscope

Ultimate resolution was limited by drift and vibration. Achieved ~ 50 nm resolution on our microscope; ~ 40 nm resolution at Xradia.