

MS14-1-3 Next-generation MetalJet sources enabling 10 μ m high-brightness high-energy beams for high-pressure diffraction application

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Abstract

The interest of exploring new materials at more extreme condition is becoming increasingly important both for fundamental research as well as for application in e.g. superconductors and hydrogen storage. An important tool to characterize and understand these materials is by applying High pressure Xray diffraction (HPXRD). This application rely on high energy Xrays to achieve good transmission through the Diamond anvil cell (DAC) and in order to capture large part of the reciprocal space. In addition, with smaller crystals higher pressures can be achieved at the expense of diffraction intensity. For this reason more advanced application of this technology has so far been restricted to a rather limited number of synchrotron beam lines. To aid the scientists and to accelerate research we have recently demonstrated unprecedented high energy beams suitable for high pressure application utilizing the latest high power MetalJet microfocus Xray source. In this case the E1+ using I2 Indium alloy. The Xray source was coupled to a special high grade Montel optic with slits. The main beam characteristics were as follows: -Monochromatic 24keV (Indium kalfa) - Down to 10 μ m beam size (at sample position) -2-15 mRad divergence (slit controlled) -Flux approximately 1e7 photons /sec. for 10 μ m beam. In this communication we demonstrate the setup and provide first glimpse of HPXRD results possible from this unique setup.

Illustration of X-ray spot in focus

