

Abstract Submitted
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Paris-Edinburgh cell applications at HPCAT¹ CHANGYONG PARK, GUOYIN SHEN, HPCAT, Carnegie Institution of Washington, YANBIN WANG, GSECARS, University of Chicago — A Paris-Edinburgh cell (model VX-3) has been installed at HPCAT 16BM-B, a bending magnet white X-ray beamline at the Advanced Photon Source. The PE anvil and the heater assembly are specifically designed to contain the sample volume ranging from 0.03 mm³ to >1.2 mm³ while the entire sample volume can be seen through X-ray windows widely open in radial direction. The pressure and temperature of sample can reach up to 7 GPa and 2,300K, respectively. For diffraction experiment, the maximum momentum transfer, $Q=4\pi\sin(\theta)/\lambda$, can reach up to $\sim 40 \text{ \AA}^{-1}$. A real-time white-beam radiography imaging system obtains the absorption contrast images of compressed sample with 7x magnification, 5 μm image resolutions, and update rate of 0.1 msec to 60 sec per frame. A table top channel-cut monochromator which can provide 30-90 keV monochromatic X-rays is also available for transmission measurement. These series of new instrumental developments are expected to widen the range of user sciences at HPCAT with new opportunities for in-situ measurement of real-time radiography, amorphous and liquid structure, ultrasound velocity, density, electrical resistivity and thermal conductivity.

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