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Current status and future plans of BL04B1/SPring-8

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BL04B1 is a bending magnet beamline, where energy-dispersive X-ray diffraction measurements and X-ray radiography observations using white X-rays are available. The X-rays emitted from the bending magnet are directly introduced into the experimental hutch, and white X-rays with a wide energy range up to 145 keV are utilized in measurements. The beamline is also equipped with a compact Si(111) double-crystal monochromator, which makes it possible to perform angle-dispersive X-ray diffraction measurements and X-ray radiographic observations using monochromatic X-rays with the photon energy between 30 and 60 keV. These high-energy X-rays allow us to conduct X-ray observations for samples surrounded totally by materials such as high-pressure vessels.

The beamline has two experimental hutches in tandem, and a large-volume press with a maximum load of 1500 tons is installed in each hutch. These large-volume presses make it possible to carry out high-pressure and high-temperature experiments. The "SPEED-1500" Kawai-type high-pressure press (DIA-type press, upstream hutch) and the "SPEED-Mk. II" Kawai-type high-pressure press (D-DIA-type press, downstream hutch) are installed. The "SPEED-Mk.II" has differential rams (D-RAM) inside, which move independently of the main ram, and we can conduct deformation experiments under high-pressure and high-temperature conditions. By utilizing the large-volume presses with high-energy X-rays, one can routinely carry out in situ observations of materials under high pressure and high temperature conditions up to 100 GPa and 2500 K in the beamline. The technologies including viscosity measurement by in-situ falling sphere viscometry, melt structure measurement by CEASAR system, density measurement by X-ray absorption method, sound velocity measurement et al., are all available in our beamline.

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