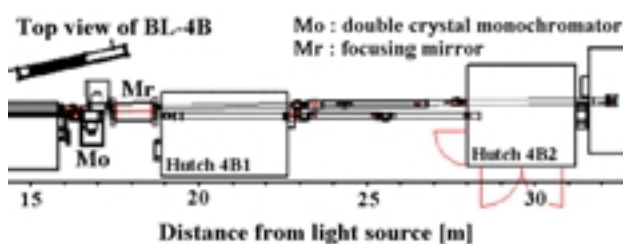


BL-4B2 X-ray Powder Diffraction Station

This station is used for X-ray powder diffraction experiments using a monochromatized X-ray. The beam line optics consists of 1) a fix exit Si(111) flat double-crystal monochromator and 2) Pt-coated bent-cylinder focusing mirror. The synchrotron radiation monochromatized and horizontally focused by these optics becomes 13mm(h) * 2mm(v) at the sample point. A diffractometer called MDS (Multiple Detector System) is installed in the experimental hatch. The MDS was a diffractometer specialized for synchrotron X-ray powder diffraction developed by Professor Toraya of Nagoya Institute of Technology. The peculiarity of the MDS was the optical design based on the flat-specimen-reflection geometry using parallel-beam, the 2θ-scan technique in the asymmetric diffraction at a fixed incident angle and the multiple detector arm system. The MDS has six 2-theta arms and each arm equips an analyzer monochromator and a NaI scintillation counter. Operating these arms simultaneously, the MDS can rapidly obtain high quality powder diffraction data. An advanced facility for X-ray powder diffraction has been realized by the combination of synchrotron radiation and the MDS.



SCHEMATIC VIEW OF THE BEAMLINE

Area of Research

X-ray powder diffraction

Light Source

Bending magnet

Optics

Monochromator : Si(111) flat double crystal monochromator.
 Focusing mirror : Rh coated Si bent-cylindrical mirror.

Photon at Sample

Energy range : 6 - 20 keV
 Energy resolution : $\sim 2 \times 10^{-4}$
 Beam size: 13mm(h) \times 2mm(v)

Facilities in Experimental Station

Multiple detector system (MDS) for synchrotron powder X-ray diffraction

Detector arms: Multi-purpose arm: long 2-theta arm equipped a slit-box and a counter also used as multi-detector arm No.6.

Multi detector-arms: 2-theta arms equipped an analyzer monochromator and a counter

Measurement mode: 2-theta scan: Multi-purpose arm, No.5 arm, Multi-detector arm
 theta scan: Multi-purpose arm, No.5 arm, Multi-detector arm
 theta-2-theta scan: Multi-purpose arm, No.5 arm, Multi-detector arm

Angle range: Multi-Purpose arm: -2 – 154.8
 No.5 arm: -27 – 129.8
 Multi-detector-arm: -27-29.8 each, (-27 – 154.8 all arm)

Angle accuracy [degree]: 2-theta, theta: 0.0001

Analyzer monochromator : Ge(111), Si(111)

Angular resolution: FWHM 0.016-0.025(low-angle range), 0.1- 0.15(high-angle range)

Sample holder: flat holder 30mm ϕ \times 0.2-0.8mm(d), capillary holder

References

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