

HIGH-THROUGHPUT SYSTEM FOR SYNCHROTRON X-RAY POWDER DIFFRACTOMETRY

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The X-ray powder diffractometry with synchrotron radiation (SR) is becoming more and more important in a research field of materials science. High-energy and -brilliance beam generated from the third generation SR facility, SPring-8, allows us to see the charge density level structure closely related to physical and chemical properties. [1]

On the other hand, there is a great demand for analytical research of toxic chemicals such as asbestos and TiO₂ nanoparticles. So far, we have demonstrated that the SPring-8 beam enabled detection of a very small amount of asbestos equivalent to 0.02 weight percent within 1 minute using the powder diffraction beamline, BL02B2. [2]

However, it has been revealed that time taken in addition to measurement such as sample exchange, sample position alignment and Imaging Plate exchange/readout is more than ten times as long as measurement time. That must prevent us from promoting analytical research using SR X-ray. To break the bottleneck, we have developed the automatic sample exchanger, the image recognition system for automatic sample position alignment and the online detector aiming for high-throughput of synchrotron X-ray powder diffraction experiment. In my talk, I will present the details of the high-throughput system which realizes fully automatic measurement of 36 powder and thin-film samples. We believe that the system contributes to materials science research as well as analytical research.

[1] M. Takata *et al.*, *Advances in X-ray Analysis*, **45** (2002) 377.

[2] The Mainichi Newspapers (front page), 1 April 2006.