SPECTROMICROSCOPY INSTRUMENTATION AND TECHNIQUES WITH SYNCHROTRON AND LABORATORY X-RAY SOURCES

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X-ray analysis with spatial resolution ranges from nm to mm scale. The spatial resolution better than 1 micron is achieved with the combination of synchrotron light source and state-of-art optical elements, and poly-capillary optics is successfully utilized for realizing focused X-rays around 10\(\mu\)m. Owing to the large divergence of the laboratory X-ray sources choices of optical elements are limited to those with the greater acceptance.

In this talk two types of spectroscopies with the spatial resolution will be presented. One is micro X-ray absorption fine structure measurement with polycapillary optics. The focused beam of 20\(\mu\)m is utilized for the fine source for the dispersive optics, and micro XAFS spectrum of a sample placed on the beam waist is measured with the transmission mode. The other microscope utilizes brilliant X-rays of 1\(\mu\)m realized with the combination of undulator radiation from SPring-8 and Kirkpatrick-Baez (KB) system. Owing to the nature of the KB mirror the vertically focused line beam can be easily realized, and the square beam and the line beam can be easily switched by switching a vertical focusing mirror in and out of the optical axis. The line shaped beam was utilized to perform fast finding of the small object like forensic evidences, and the founded small objects can be characterized with the focused square beam of 1 \(\mu\)m by means of XRF and XAFS spectroscopies.