

APPLICATIONS OF POLYCAPILLARY OPTICS TO MICRO AND TWO DIMENSIONAL XRF ANALYSIS

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The analysis of small regions of a sample has become one of the significant trends in x-ray fluorescence spectrometry (XRF) studies. XRF has been applied to micrometer-scale analysis (micro-XRF) by using various focusing x-ray optics in the laboratory. We have studied applications of micro-XRF with polycapillary x-ray lens [1-3]. The micro x-ray beam less than 0.01 mm, however, were hard to achieve by using the polycapillary x-ray lens, because this is limited by the “halo effect” [4]. In this study, we investigated that a new optics system for micro-XRF instrument combined capillary optics, such as the polycapillary x-ray lens and the x-ray guide tube or the single capillary. The polycapillary x-ray lens was attached to an x-ray tube (Mo tube). A spot size of 0.07 mm was obtained at the output focal distance. This micro x-ray beam was collimated by using the x-ray guide tube or the single capillary, and the beam size was decreased to about 0.02 mm with reasonable intensity. Another application of the polycapillary optics will also be presented.

References

- [1] Emoto T, Sato Y, Konishi Y, Ding X, Tsuji K. *Spectrochim. Acta, Part B*, **59** (2004) 1291-1294.
- [2] K. Tsuji, T. Emoto, Y. Matsuoka, Y. Miyatake, T. Nagamura, and X. Ding. *Powder Diffraction*, **20**, (2005) 137-140.
- [3] K. Tsuji, K. Nakano, *X-Ray Spectrom.*, **36** (2007) 145-149.
- [4] N. Gao, I. Y. Ponomarev, *X-ray spectrum*. **32** (2003) 186-194.