

ANALYTICAL PERFORMANCE OF NEWLY DEVELOPED 2D/3D-XRF INSTRUMENTS

Takashi Nakazawa, Kazuhiko Nakano, and Kouichi Tsuji

Department of Applied Chemistry & Bioengineering, Graduate School of Engineering,
Osaka City University, Sugimoto 3-3-138, Sumiyoshi-ku Osaka 558-8585 Japan

Micro-XRF analysis is an essential tool for observing the elemental distributions of the inhomogeneous samples. In particular, the polycapillary x-ray optics is very important in the development of the micro-XRF instrument in the laboratory because it facilitates the achievement of a highly intense and small x-ray beam by using a compact x-ray tube in the laboratory. Moreover, recent interest in the micro-XRF analysis has been three-dimensional (3D) XRF micro-scale analysis by using a confocal 3D micro-XRF instrument combined with two polycapillary x-ray lenses. Many applications of 2D and 3D micro-XRF analysis using polycapillary x-ray lens have been developed [1-3].

In this study, we have constructed newly developed 2D and 3D micro-XRF instruments combined with the high-resolution polycapillary x-ray lens in the laboratory. The spatial resolution of the 2D-micro XRF spectrometer was less than 10 micrometers, and depth resolution of the confocal 3D-micro XRF spectrometer was 13 micrometers for Au L line (11.4 keV). The newly 2D/3D XRF configurations applied to a sagittal otolith of ayu *Plecoglossus altivelis*. The characteristic and interesting result was obtained by observing the elemental distributions of the major elements (Ca, P) and minor elements (Mn, Ni, Zn, Sr) in this sample.

References

- [1] K. Nakano, A. Matsuda, Y. Nodera, K. Tsuji: " Improvement of spatial resolution of micro-XRF by using a thin metal filter ", *X-Ray Spectrom*, **37**, 642-645 (2008).
- [2] K. Nakano, K. Tsuji: " Nondestructive Elemental Depth Profiling of Japanese Lacquer Ware "Tamamushi-nuri" by Confocal 3D-XRF Analysis in Comparison with Micro GE-XRF", *X-Ray Spectrom*, **38**, 446-450 (2009).
- [3] K. Nakano, K. Tsuji: "Development of Laboratory Confocal 3D-XRF Spectrometer and Nondestructive Depth Profiling", *J. Anal. At. Spectrom.*, in press (2010)
DOI: 10.1039/B916974A.