

## Total reflection X-ray fluorescence analysis of trace elements in bio-environmental samples

I. Nakai(3307)\*<sup>1</sup>, Y. Terada(4099)<sup>1</sup>, M. Kataoka(4157)<sup>1</sup>, M. Sasaki(4156)<sup>1</sup>, N. Kondo(3308)<sup>1</sup>, Y. Izumimaya(3320)<sup>1</sup>, C. Numako(3327)<sup>2</sup>, K. Sakuari(1274)<sup>3</sup>, and S. Goto(724)<sup>4</sup>

<sup>1</sup>Science University of Tokyo, <sup>2</sup>Tokushima University, <sup>3</sup>National Research Institute for Metals, <sup>4</sup>Spring-8

Arsenic pollution in drinking water has been a serious problem at several districts in China and India. More than 500 thousands people are suffering arsenic intoxication. Moreover, there is increased use of GaAs in semiconductor industries, which produce a possibility of As intoxication in consumers as well as in workers of their industries. Therefore, there is an urgent demand to establish analytical technique of As using biopsy samples. We have applied the TXRF technique to this problem. On the other hand, we have also tried to make a new approach for trace element analysis of a single plankton. Rotifera (*Brachionus plicatilis*) was used as a target of this study because it has unique life history. We have tried to understand the life history of rotifera through the variation of its trace element level. The purpose of the present study is to establish analytical technique of these bio-environmental samples using SR-XRF technique.

Standard solution of As was diluted to appropriate concentrations. Ten microliter of each sample solution was dropped on a silicon wafer with 10  $\mu$ l Sc solution (100ppm) as an internal standard. Rotifera of different biological stage was placed on a quartz plate.

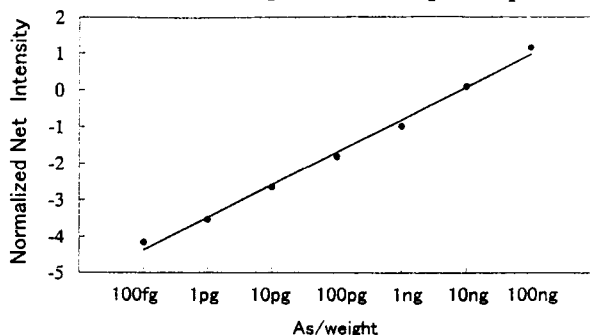


Fig.1 Caribration curve for As

The measurements were carried out using our original TXRF system and undulator beam with energy of 12.8keV.

Figure 1 shows a calibration curve for As. It shows an excellent sensitivity of the present technique: i.e., the linearity was down to 100fg and minimum detection limit of As was 10fg level. We will plan to apply this technique for the analysis of As in environmental waters, urine of patients, and biopsy samples such as hair and skin in near future. On the other hand, trace elements level in a single body of plankton was successfully detected for the first time. It is found that a certain stage of rotifera contains V, Fe and Zn in significant level (Fig.2). This information will be useful to reveal biological history of plankton through trace element chemistry.

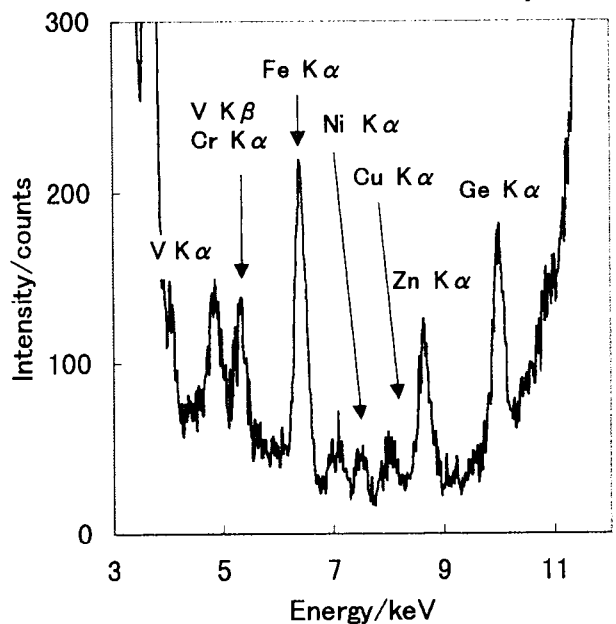


Fig.2 TXRF spectrum of Rotifera