

## **Improvement in digestion method using nitric acid for PIXE analysis of plant samples containing opal-A**

M. Sakakibara<sup>1</sup>, N. T. H. Ha<sup>1</sup>, M. Hikoda<sup>1</sup>, Y. Kubota<sup>1</sup> and K.Sera<sup>2</sup>

<sup>1</sup>Graduate School of Science and Engineering,  
Ehime University, 2-5 Bunkyo-cho, Matsuyama 790-8577, Japan

<sup>2</sup>Cyclotron Research center, Iwate Medical University  
348-58 Tomegamori, Takizawa, Iwate 020-0173, Japan

### **Abstract**

Si is found in plants at concentrations ranging from 0.1 to 10 %, which is equal to or even higher than that of several macronutrients. There are some general trends in silicon accumulation that monocots and dicots tend to be high and poor Si accumulators, respectively. *Eleocharis acicularis*, a monocot, has recently been reported as a Si accumulator. PIXE is one of the convenient methods to analyse the total concentrations of heavy metals in plant. However, *E. acicularis* contains opal-A within the plant cells, which is difficult to be totally dissolved by using nitric acid. Therefore, it is necessary to improve the digestion method using nitric acid for PIXE analysis of plant samples containing opal-A. In this study, the effect of microwave heating times and leaving time after heating was investigated. When the samples were heated twice, the concentrations of heavy metal by PIXE are lower than those by ICP-MS. However, when the samples were heated three times and left one day after heating, metal concentration difference between PIXE and ICP-MS became small. The result of the present study suggested that it is necessary to improve the digestion method for plant samples containing opal-A.