

Quantitative analysis with a two-detector measuring system in in-air PIXE

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Abstract

A two-detector measuring system in in-air PIXE system composed of two Si(Li) detectors has been developed for simultaneous measurement from low- to high-Z elements. In order to improve detection sensitivity at the low energy region, a new device which is attached at the tip of the detector has been designed. As a result, it exhibited a miraculous effect in improving detection sensitivity at low energies and it became possible to detect K-X rays of aluminium. In order to perform quantitative analysis in in-air system, we have measured detection efficiencies for the two Si(Li) detectors including the effect of X-ray absorption in air on the basis of the method that we developed. Concerning the beam energy at the target and corresponding X-ray production cross sections, the same values as were reported in the previous paper could be used since the same conditions in the irradiating system was employed. It was confirmed that the present method allows us to quantitatively analyze all the elements heavier than aluminum and almost the same results as those obtained by in-vacuum PIXE were obtained for various kinds of samples. It is also confirmed that the present method gives accurate results from light to heavy elements in the analyses of a standard material.