Simultaneous measurement of two different targets by means of vacuum and In-air PIXE

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Abstract

A simultaneous measuring system of two different targets by in-vacuum and in-air PIXE has been developed in order to improve efficiency of analyses in the limited machine time. The proton beam passes through a thin target in vacuum and it allows us to perform in-vacuum PIXE, and the beam is further transported to the in-air PIXE system for analyzing another target. The beam intensity for in-air PIXE while performing in-vacuum PIXE is 1.5 nA, which is almost sufficient. The effect of slight changes in the beam transport parameters on the background X-rays for both in-vacuum and in-air PIXE has been found to be negligible. As a result, it is confirmed that accuracy and sensitivity of analysis for many kinds of sample, such as various samples in earth, environmental sciences and in bio-medicine, are almost unchanged for the both systems, and a four-detector-simultaneous measuring system has been completed. It is expected that the system will work miracle for solving the problem of deficient machine time in our laboratory.

Keywords : PIXE, In-Air, Vacuum, Simultaneous measurement, Quantitative analysis