Problem-based studies using PIXE and technical developments at Nishina Memorial Cyclotron Center (NMCC)

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Abstract

At Nishina Memorial Cyclotron Center (NMCC), a large number of studies in various research fields have been pursued under nation-wide common usage since 1993. One of the features of NMCC's PIXE is the performance of many problem-based studies in order to determine effective measures against a range of issues. Various samples must be quantitatively analyzed quickly and accurately to cope with environmental issues. We have developed several original methods for analyzing a variety of samples with good sensitivity. Specially designed absorbers were developed for sensitive analyses of samples composed of heavy elements. In addition, a powdered- internal- standard method was established for the accurate quantitative analyses of powdered samples whose matrixes are heavy elements. The standard-free method for bio-samples allowed us to quantitatively analyze untreated samples, micro samples of nearly 1 □g, and live bio-samples. We have been tackling a number of environmental problems in many countries in Southeast and East Asia using these original methods. We also wrestled with environmental problems caused by the massive tsunami that struck the Sanriku district of Japan in March 2011.