

Application of Micro-PIXE to Earth and Environmental Sciences: an End-User's Experience

SATOSHI MURAO Geological Survey of Japan, MITI, Tsukuba, Japan 305-8567 Project Leader of Interdisciplinary Study on Environmental Management, Planning and Risk Communication in Gold Rush Regions, Japan Environmental Agency.

In modern geoscience and environmental sciences, in-situ grain-by-grain analysis of trace elements in minerals is an indispensable base to construct quantitative models. "PIXE" is one of the analyses for such purpose which assists users in simple and quick sample preparation and short analytical time.

The acronym PIXE stands for the Proton or Particle Induced X-ray Emission. It is a multielemental analysis using a proton or heavier ions accelerated to an energy of a few mega-electron volts which excites characteristic X-rays in the atom of a specimen. Usually a beam of proton is used for mineral analyses.

PIXE has been confined to nuclear laboratories and is not yet widely known outside of the physics. However, because of the sophisticated work in geology at such as CSIRO and the University of Guelph, many scientists in application field are now paying more attention to PIXE.

When minerals are to be analyzed, an experimental PIXE for physics study must be converted into a user-friendly system with a specimen chamber exclusively for mineral studies. Contrary, users must know some characteristics of the analysis such as pile up peaks which may lead him/her misinterpretation.

In this lecture a user's experience with PIXE in some laboratories will be presented with a stress on the mineralogical practices rather than broad coverage summary of the method.