Particle Induced X Ray Emission Spectrometry Pixe Chemical Analysis A Series Of Monographs On Analytical Chemistry And Its Applications

The authoritative handbook to exploiting the full power and versatility of PIXE— now and in the next century Respected for its practical accuracy and detection range of parts per million, particle-induced X-ray emission has enjoyed a secure place in the analytical arsenal of the nuclear physics laboratory. Yet, its undeniable analytical potential in other areas of science has scarcely been tapped. This unique reference, from PIXE specialists in biomedicine, atmospheric science, earth science, and art and archaeology, features a user-based look at PIXE's conceptual basics and methodology, with a view toward new and creative analytical work. Touching on every facet of PIXE technology, from basic instrumentation, specimens, the characteristics of X-ray spectroscopy, standardization of quantitative analysis, to the accuracy of PIXE analysis and its limits of detection, the book offers an unprecedented look at the newer uses of PIXE in such areas as: Applications of macro- and micro-PIXE in medicine, zoology, and botany Analysis of atmospheric aerosols Geological and extra-terrestrial material Analysis of gem stones, pottery, glass, and alloys As an exploratory tool for pigments and paintings and "paper-like" materials Complete with a comparative look contrasting PIXE with more conventional forms of analysis, this important reference is key to grasping the technique's practical specifics and exploiting its full analytical potential.

Particle-Induced X-Ray Emission Spectrometry (PIXE)John Wiley & Sons

A material analysis system using particle-induced x-ray emission (PIXE) analysis has been developed to measure trace element composition in a wide range of samples. The system was constructed in the particle accelerator laboratory in the Department of Physics at East Carolina University, and includes a new high-vacuum beamline on the 2-million-volt tandem Pelletron ion accelerator, which includes a modified multi-sample target chamber. PIXE analysis can provide sensitivities to the parts-per-million level or better for many elements. In this method, a sample is irradiated with protons in the energy range of 1 - 3 MeV from the particle accelerator. Characteristic x-rays emitted from the sample are detected with an x-ray spectrometer, and the emission spectrum is fit using known spectral line energies to determine elemental composition of the sample. Capabilities of the new PIXE analysis system, including a new state-of-the-art x-ray spectrometer and multi-sample target system, will be presented, and proposed multidisciplinary applications, such as in geology, will be discussed.