



CITTA' DI ABANO TERME

Garwan

*Organized in Cooperation with:*  
*Istituto Nazionale di Fisica Nucleare, INFN, Italy*  
*Universita' di Padova, Italy*  
*Ruder B̆osković Institute, Zagreb, Croatia*  
*International Atomic Energy Agency, Vienna, Austria*

VII INTERNATIONAL CONFERENCE ON  
PARTICLE INDUCED X-RAY EMISSION  
AND ITS ANALYTICAL APPLICATION

■ Padua, May 26-30, 1995 ■

PROGRAMME AND ABSTRACTS BOOK

Volcanic sediments and distinctive geological setting as revealed by microbeam-PIXE technique. N. I. KHANDAKER, M. AHMED, and M. A. GARWAN. King Fahd University of Petroleum and Minerals, Dhahran 31261, Saudi Arabia. — Single mineral grains collected from a suite of Cretaceous (85-90 Ma) volcanic sedimentary rocks were studied using microbeam-PIXE technique to understand fundamental geological processes responsible for micro-scale variation in elemental composition across mineral zones, twinning, cleavage planes, fractures, and grain boundaries. Identification of notable geochemical trends was possible in terms of major constituents and trace elements distribution within a single mineral. This chemical behavior indicates specific geological setting and subsequent diagenetic process controlling the ultimate chemical make-up of these volcanic sediments. Of particular importance to this study is the evidence of significant post-depositional fluid-flow through these volcanic sediments and was amply supported by the characteristic distribution of certain elements within a mineral.

Recent applications to the study of ancient inks with the Florence external-PIXE facility

F.LUCARELLI AND P.A.MANDÒ

*Dipartimento di Fisica and I.N.F.N. Firenze (Italy)*

External PIXE is an ideal technique for the analysis of inks in precious documents, since it provides a reliable quantitative measurement in a very short time and with no risk of damage. The results are often conclusive in that they are able to unambiguously discriminate among different inks, which is not the case with any other analytical technique not requiring to pick up small samples of material.

The general aspects of ink analysis by external PIXE will be discussed, showing the advantages but also the problems which must be taken into consideration (ink-substrate interactions, penetration, inhomogeneities, etc.). A survey of the results obtained in Florence during the past few years will be given. They refer to a corpus of several tens of manuscripts from central Italy, dating from the XI to the XV century. Some general trends in ink composition have been detected.

A number of specific previously unpublished results concerning some particular cases will also be presented.

IT S.9 A MICROSCOPIC APPROACH TO THE STUDY OF ENRICHMENT PHENOMENA IN THE ELECTROSTATIC PRECIPITATION OF COAL FLY ASH PARTICLES

E. CEREDA, *Cise*, P.O. Box 12081, 20134 Milan, Italy; G.M. BRAGA MARCAZZAN, *University of Milan*, Italy; G.W. GRIME, *SPM Unit*, Oxford, UK.

Previous work<sup>1</sup>, based on ordinary PIXE analysis of fly ash samples collected at the inlet and outlet of the electrostatic precipitators of coal-fired power plants, had shown the occurrence of enrichment phenomena for several elements. This had been attributed to the volatile nature of compounds associated with these elements and to the decreasing electrostatic precipitator efficiency versus particle size.

In this work a microscopic approach to the study of enrichment phenomena has been undertaken. Nuclear microscopy has been applied to the analysis of hundreds of individual fly ash particles collected at the inlet and outlet of the electrostatic precipitators of coal-fired power plants. The occurrence of an additional mechanism, besides that pointed out by ordinary PIXE analysis, has been evidenced. In particular, the enriched trace element concentrations at the outlet of the electrostatic precipitators can be related also to the preferential penetration of particles with higher concentrations of trace elements because of their influence on the electrical properties of the particles themselves.

1 B. Bellagamba, A. Caridi, E. Cereda, G.M. Braga Marcazzan and V. Valkovic, *Nucl. Instr. and Meth.* B75(1993)222.