# A New Nuclear but Non Radioactive Method for Rapid Elemental Analysis of Clays

**G. Demortier and G. Hoffelt-Fontaine**

L.A.R.N., Facultés Universitaires de Namur, 22, rue Muzet, B-5000 Namur, Belgium

**Abstract:** A method using the bombardment of samples with protons and other positive ions of energy in the MeV range is described: the prompt atomic (X-rays) and nuclear ($\gamma$-rays and charged particles) events generated during the bombardment, are detected with energy sensitive solid state detectors: cooled Ge(Li) for $\gamma$-rays and hard X-rays, cooled Si(Li) detectors for soft X-rays ($3-20$ keV) and Si-barrier detectors for charged particles. These 3 types of detectors can be simultaneously used for multipurpose experiments. These techniques are particularly useful for simultaneous detection of all the elements of interest in the sample. Comparisons are made with other microtechniques. Analyses of Li, Na, K, Ca, Rb, Cs and Cl exchanged in appropriate chloride solutions have been achieved for several clays (Geisenheim, Isola di Ponza, Layton). A new phenomenon relative to the anion contribution in cation exchangers is observed. A method of profile analysis of Na by resonant nuclear reactions is discussed.

*Clays and Clay Minerals*; April 1976 v. 24; no. 2; p. 69-78; DOI: 10.1346/CCMN.1976.0240204