



A QUICK X-RAY FLUORESCENCE ANALYSIS METHOD FOR EVALUATING THE CHEMICAL COMPOSITION OF ZIRCON AND MONAZITE CONCENTRATES FROM THE JOS PLATEAU AREA, NIGERIA

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ABSTRACT

Nigeria, in the 1950s ranked among the leading producers of tin and columbite, of which the main sources are recent alluvial and placer deposits derived from the Younger Granites of northern Nigeria. Compositional characteristics of zircon and monazite recovered as concentrates from milling and processing of cassiterite and columbite in the Jos area, were evaluated using a special modification of X-ray fluorescence analysis. The analysis results reveal that the zircon and monazite samples are enriched in Th_2O and U_3O_8 with average values of 0.5 and 7.3 wt. % respectively. The average REE content is 18.91 and 25.44 wt. % for the zircon and monazite respectively and with the fractionation patterns showing dominance of LREE (La – Sm) over the HREE (Gd-Lu). Unlike the conventional X-ray Fluorescence spectrometry, the method of analysis employed in this work does not require suites of certified Reference Standard Materials with similar composition to the unknown. Apart from being simple and rapid, the method of analysis presents added advantage of qualitative and quantitative determination of elements from fluorine to uranium routinely. From economic viewpoint, the materials, which are regarded as specific concentrates are still enriched in other highly valued metals but as “impurities”. A highly impure mineral concentrate would be unlikely to command a market that would repay processing.

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