

**MINERALOGICAL AND GEOCHEMICAL VARIATIONS IN THE
REGOLITH OF MOKURO-ITAGUNMODI AREA, IFE-ILESA SCHIST
BELT, SOUTHWESTERN NIGERIA.**

BY

**AJIDAHUN EMMANUEL JEMINIYI
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ABSTRACT

The geochemistry of regolith overlying basement rocks in Mokuro-Itagunmodi area along selected road-cut sections and petrography of the rocks were investigated with a view to determining the mineralogy, major and trace element concentrations and their distribution patterns in relation to the bedrock.

Regoliths at four selected locations along Ife- Mokuro – Itagunmodi road were sampled across the regoliths according to the thicknesses of each regoliths. Selected major (Si, Al, Ti, Fe, Mn, Mg, Na and K) and trace (Cr, V, Co, Ni, Cu, Zn, As Pb and Mo) elements were determined in 34 representative regolith samples using the Energy Dispersive X – Ray Fluorescence (ED-XRF) analytical technique. The mineralogical constituents of eight of these samples were also determined using the X-Ray Diffraction (XRD) technique. In addition, petrographic studies of bedrock sample were carried out using the petrographic microscope.

The results showed that tremolite-anthophyllite schist and amphibolite constituted mainly the slightly migmatized to non-migmatized metasedimentary and metaigneous rocks of the area. The results further showed that Al_2O_3 ranged between 23 wt % and 25 wt % whilst Fe_2O_3 ranged between 22 wt % and 30 wt % in the mottled zone indicating a bauxitic laterite. Significant depletion in SiO_2 , CaO, Na_2O , K_2O and MgO was observed whilst Al_2O_3 , Fe_2O_3 , TiO_2 , MnO, Cr, Co, V and Cu were relatively enriched. The element associations of Cr- Ni- Cu- V- Zn suggested strong maficultramafic influence whilst the strong and significant relationships of Fe and Mn with As, Co, Cu, Ni and Zn ('r' = 0.68, 0.91, 0.86, 0.87, 0.86 and 0.50; $p \leq 0.01$) resulting from adsorption and co-precipitation in the surficial environments indicated a redistribution of potential pathfinder elements

into oxides of Fe and Mn. The XRD analysis results indicated the presence of kaolinite, quartz, chlorite, goethite, rutile, chromite, illite, smectite and montmorillonite as the major mineral constituents of the regolith. Kaolinite, quartz, chlorite and goethite had mean relative proportions of 35.68 %, 29.95 %, 16.32 % and 12.02 % respectively.

In conclusion, the element associations and distribution patterns reflected strong mafic ultramafic influence, however, the effect of heterogenous bedrock could not be ruled out. Furthermore, the clay mineral distribution showed an early stage of weathering in a well drained environment. The relatively high Ni and As enrichment indicated disseminated nickeliferous sulphide and gold mineralization for exploration application.