

Petrology and Petrochemistry of Basement Rocks in Ila Orangun Area, Southwestern Nigeria

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Abstract : From field studies, six (6) lithological units were identified to be common around the study area, which includes quartzites, granites, granite gneiss, porphyritic granites, amphibolite and pegmatites. Petrographical analysis was done to establish the major mineral assemblages and accessory minerals present in selected rock samples, which represents the major rock types in the area. For the purpose of this study, twenty (20) pulverized rock samples were taken to the laboratory for geochemical analysis with their results used in the classification, as well as suggest the geochemical attributes of the rocks. Results from petrographical studies of the rocks under both plane and cross polarized lights revealed the major minerals identified under thin sections to include quartz, feldspar, biotite, hornblende, plagioclase and muscovite with opaque other accessory minerals, which include actinolite, spinel and myrmekite. Geochemical results obtained and interpreted using various geochemical plots or discrimination plots all classified the rocks in the area as belonging to both the peralkaline metaluminous and peraluminous types. Results for the major oxides ratios produced for $\text{Na}_2\text{O}/\text{K}_2\text{O}$, $\text{Al}_2\text{O}_3/\text{Na}_2\text{O} + \text{CaO} + \text{K}_2\text{O}$ and $\text{Na}_2\text{O} + \text{CaO} + \text{K}_2\text{O}/\text{Al}_2\text{O}_3$ show the excess of alumina, Al_2O_3 over the alkaline $\text{Na}_2\text{O} + \text{CaO} + \text{K}_2\text{O}$ thus suggesting peraluminous rocks. While the excess of the alkali over the alumina suggests the peralkaline metaluminous rock type. The results of correlation coefficient show a perfect strong positive correlation, which shows that they are of same geogenic sources, while negative correlation coefficient values indicate a perfect weak negative correlation, suggesting that they are of heterogeneous geogenic sources. From factor analysis, five component groups were identified as Group 1 consists of Ag-Cr-Ni elemental associations suggesting Ag, Cr, and Ni mineralization, predicting the possibility of sulphide mineralization. in the study area. Group II and III consist of As-Ni-Hg-Fe-Sn-Co-Pb-Hg element association, which are pathfinder elements to the mineralization of gold. Group IV and V consist of Cd-Cu-Ag-Co-Zn, which concentrations are significant to elemental associations and mineralization. In conclusion, from the potassium radiometric anomaly map produced, the eastern section (northeastern and southeastern) is observed to be the hot spot and mineralization zone for the study area.

Keywords : petrography, Ila Orangun, petrochemistry, pegmatites, peraluminous

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