IJSGS VOL. 9(2), JULY, 2023 https://doi.org/ 10.57233/ijsgs.v9i2.461 https://fugus-ijsgs.com.ng

IJSGS

ISSN: 2488-9229
FEDERAL UNIVERSITY
GUSAU-NIGERIA

INTERNATIONAL JOURNAL OF SCIENCE FOR GLOBAL SUSTAINABILITY

# Characterization of Pegmatites in Ogodo-Odobola Area of Idah Sheet 267NW, Central Nigeria

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**Received on:** April, 2023 **Revised and Accepted on:** May, 2023 **Published on:** July, 2023

***ABSTRACT***

The pegmatites of Ogodo-Odobola area around Ajaokuta, Central Nigeria belong to the pegmatite belt of Central Nigeria. A detailed geological mapping of the pegmatites and host rocks was conducted with the aim of understanding their mode of occurrence and field relationship and to assess their mineralization potentials. Twelve (12) representative samples of rocks were selected for petrographic analysis. The results show that the area is underlain by migmatite-gneiss, schist, with intrusions of granite and pegmatite. The pegmatites occur in tabular form with varying widths (2 centimetres – 6 metres) and lengths (12 – 200 metres). Principal joint direction is NNE-SSW which is believed to have influenced the pegmatite emplacement. Petrography of the representative rock samples revealed an average mineralogical composition of biotite (23.90%), microcline (22.15%), hornblende (15.05%), quartz (10.65%), plagioclase (10.35%), muscovite (8.00%), myrmekite (0.20%), and opaque and accessory minerals (9.70%). The pegmatites were found to be dominated by microcline and plagioclase feldspars, and then muscovite, biotite, and accessory and opaque minerals. The pegmatite of the Ogodo-Odobola area is worth probing as the results have shown prospect for possible economic minerals.

**Keywords:** Mineralization, Basement Complex, Structural Features, Petrography, Ajaokuta

## 1.0 INTRODUCTION

Pegmatites the world over have been acknowledged to serve as host to lots of minerals (industrial, ore and gemstones). Recently, there is an upsurge in the interest for pegmatite deposits due to the importance of lithium ore source from them, among others. Pegmatites serve as host to most strategic metals (such as Li, Ta, Cs, Sn, Nb) (Chukwu, 2022). The increasing awareness of the importance of these constituent elements has made the pegmatite deposits a reliable target. In addition to these rare metals, pegmatites are also resource-rich deposit to natural gems and non-metallic (industrial) minerals. Most especially, it is valuable for the so-called "green technologies" and the transition to more sustainable energy (Haase and Pohl, 2022). The Precambrian basement complex of Nigeria has been acknowledged for its several pegmatitic intrusions (Garba et al., 2019; Jimoh and Olatunji, 2020; Aderogbin and Okunlola, 2020; Tanko and Dzigbodi-Adjimah, 2021; Kolawole et al., 2021 and Chukwu, 2022). In Nigeria, the occurrence of rare metals is broadly divided into two episodes of mineralization; the Sn - Nb mineralization associated with Mesozoic anorogenic Younger granites of central northern Nigeria, and Older (≈550 Ma) Ta – Nb – Sn – Li – Be mineralization in the pegmatites associated with the Pan-African Orogeny (Kolawole et al., 2021). These mineralized pegmatites are delimited in a broad belt stretching for about 400km long from southwestern (Ijebu area) to northern Nigeria (through Wamba-Jema'a to Zuru-Gusau areas) (Abimbola and Adedibu, 2018). However, Ekwueme and Matheis (1995) and Garba (2003) have also identified mineralized pegmatites in the Precambrian basement of south-east and north-west Nigeria respectively. Okunlola and Somorin (2005) studied the Precambrian pegmatites of Itakpe, Central Nigeria using petrographic and geochemical (ICP-AES and ICP-MS) techniques. The underlying lithologies include granite gneiss, schist and biotite granite, with pegmatites intruding the schist. The pegmatites occur in tabular form, striking NNE-SSW direction and dips 60° on the average to the west. Rare metal indicative elements like Ta, Nb, Rb, Cs, Sn are depleted in the rock unit while elemental ratio of K/Rb and Ba/Rb suggest low index of differentiation, poor fractionation and barren mineralization compared to mineralized pegmatite bodies in Nigeria and elsewhere in the world.

Garba (2003) studied some rare metal and barren pegmatites in the basement complex of northern Nigeria using petrographic and geochemical (ICP-AES and ICP-MS) techniques. The study covered Kushaka, Maradun and Magami areas in the north-west, and Nasarawa and Richifa areas in central Nigeria respectively. The host rocks include migmatite-gneisses, schists and granitoids. These pegmatites are in dozens and occur as dykes, irregular bodies usually forming prominent ridges. Their mineralization is in the form of dissemination and discrete concentrations of columbite-tantalite accompanied by Fe-oxides, ilmenite, cassiterite and occasional fluorite and bismuthinite. More than 500t of columbite-tantalite concentrates have been produced from these pegmatites since their discovery. Jimoh and Olatunji (2020) studied the geology and geochemical characteristics of pegmatites of Olode area, Southwestern Nigeria using petrographic and geochemical (ICP-MS) methods. The area is underlain by mica and quartz schists, granite gneiss, granite, pegmatite and aplites. Two categories of pegmatites were identified; the massive quartz-muscovite tourmaline pegmatites and the NE-SW trending beryl-bearing pegmatites. These pegmatites occur as dykes intruding the mica schist host rock. The tourmaline type is spatially associated with granites and deficient in muscovite mineral while the bery-bearing type is farther away from granitic bodies and enriched with muscovite mineral. Discrimination plots of Cs and Rb versus K/Rb have classified most of the beryl bearing type as mineralized (with mean K/Rb ratio of 85) and the tourmaline bearing as barren. The Olode pegmatites emanated from same source of highly mineralized magma while the differences in their chemical composition and occurrences revealed fractional crystallization of the parent magma and varied evolutional trend.

Aderogbin and Okunlola (2020) studied the mineralization potential of Egbe Pegmatite in Southwestern Nigeria using ICP-AES technique. The area is underlain by gneiss, amphibolite, quartzite and schist lithologies and intruded by pegmatites. The ratio of A/CAN >1 and $Al_2O_3$ > $CaO$+ $Na_2O$+ $K_2O$ with enrichment of $SiO_2$, $Al_2O_3$, $Na_2O$, $K_2O$ and depletion of MgO, MnO and $Fe_2O_3$ suggested Egbe pegmatite is peraluminous bulk composition. The Plots of Rb vs (Y+Nb) and A/NK vs A/CNK discriminates Egbe pegmatite in the peraluminous LCT (Li, Rb, Cs, Be, Ga, Nb <, > Ta, Sn, Hf, B, P, F) of syncollisional to within plate granitic family. Also, the plots of Ta/W vs Cs for whole rock pegmatite, muscovite and feldspar extracts showed a very clear discrimination with more enrichment of the rare metals in the muscovite extracts. The K/Rb vs Rb and K/Rb vs Cs plots for the three samples media further establishes that Egbe pegmatite is a rare metal, highly fractionated beryl type with rare metal enrichment trend of Nb>>Sn>>Ta. Kolawole et al. (2021) studied the pegmatitic bodies in Bunu area within the well-known Kabba-Isanlu field in the Southwestern Nigeria. The area consists of gneiss-schist suite and intrusive suite respectively. Pegmatites of Bunu area intruded the basement complex gneiss-metasedimentary rocks and were classified into simple and complex types with sizes range from 40 to 180 m long and about 8 - 40 m wide. The simple pegmatites are typically barren of ore minerals compared to the complex type. Trace element geochemistry of the whole rock pegmatite and mineral samples (K-feldspar and muscovite) showed that Rb, Sr, Ba, Li and Cs are enhanced in the Otafun and Okutose pegmatites indicating higher fractionation levels. Also, Nb, Ta, and Sn are enriched in the most evolved Otafun and Okutose pegmatites. Trace element variations in mica from the pegmatites indicate they are peraluminous LCT (lithium, caesium, and tantalum) family and beryl – columbite subtype. Ta vs Cs and Ta vs Ga plots for K-feldspar and muscovite mineral extracts from the pegmatite show potential for tantalum and niobium (>75ppm) mineralization.

Chukwu (2022) characterized the mineralized pegmatites around Wowyen areas, Akwanga, north-central Nigeria. Migmatitic banded gneiss, biotite-muscovite gneiss, amphibolite and pegmatites form the underlying lithologies in the area. Pegmatites in the area occur as tabular intrusions into the biotite-muscovite gneiss and migmatite banded gneiss, and they were classified into simple and complex types. Their mineralogical and chemical signatures indicated peraluminous source of sedimentary origin that is saturated in LILE and HFSE. The relatively high concentration of Li, Rb, B, Cs, Sn, Nb and Ta and low ratios of K/Rb in addition to other variation diagrams, revealed higher fractionation in the complex than simple pegmatite. Thus, the complex pegmatite is more favoured with substantial quantity of rare metals; evolved from simple type indicating common source accompanied by internal fractionation; and are generated in post-collisional tectonic settings of Pan-African events. Despite the proximity of the pegmatites of Ogodo-Odobola area in central Nigeria to the renowned pegmatite belt, detail research has not been extended to it. The vast presence of this distinct class of rock in the study area is currently experiencing artisanal workings whose activities are uncoordinated, and scientific information about it is scanty. Hence, this research is focused on field and petrographic studies which enable the characterisation, mode of occurrence and emplacement of the pegmatites of Ogodo-Odobola area, central Nigeria.

### 1.2 Study Area Description

The study area is located in the northwestern part of Idah Sheet 267 (1:100,000), Central Nigeria. It is bounded by Latitudes 07°22' - 07°28' N and Longitudes 006°35' - 006°42' E (Figure 1), covering approximately 143km$^2$. The area is accessible through Lokoja – Ajaokuta - Itobe and Okene – Adogo - Ajaokuta highways; the Ajaokuta – Itakpe - Aladja railway line, and a number of secondary roads and footpaths that links the settlements. The footpaths aided in establishing a suitable traverse method during mapping just as the dry stream channels helped the low-lying outcrops for field studies. River Oguro running west to east along its tributaries drains the area which in turn serve as one of the tributaries to the River Niger.

Latitudinal location placed the area in tropical climate influenced by Inter-tropical Convergence Zone (ITCZ). The two major seasons include; the Wet season spans between April and October and the Dry season last between October to April and harmattan occurs in-between which forms part of the dry season. It has an annual temperature of about 30 - 34˚C. The vegetation is typical Guinea Savanna grassland with scattered shrubs, short grasses and tall trees. Total annual rainfall is between 1,190 mm and 1,590 mm (Nigerian Meteorological Agency (NIMET, 2022)).

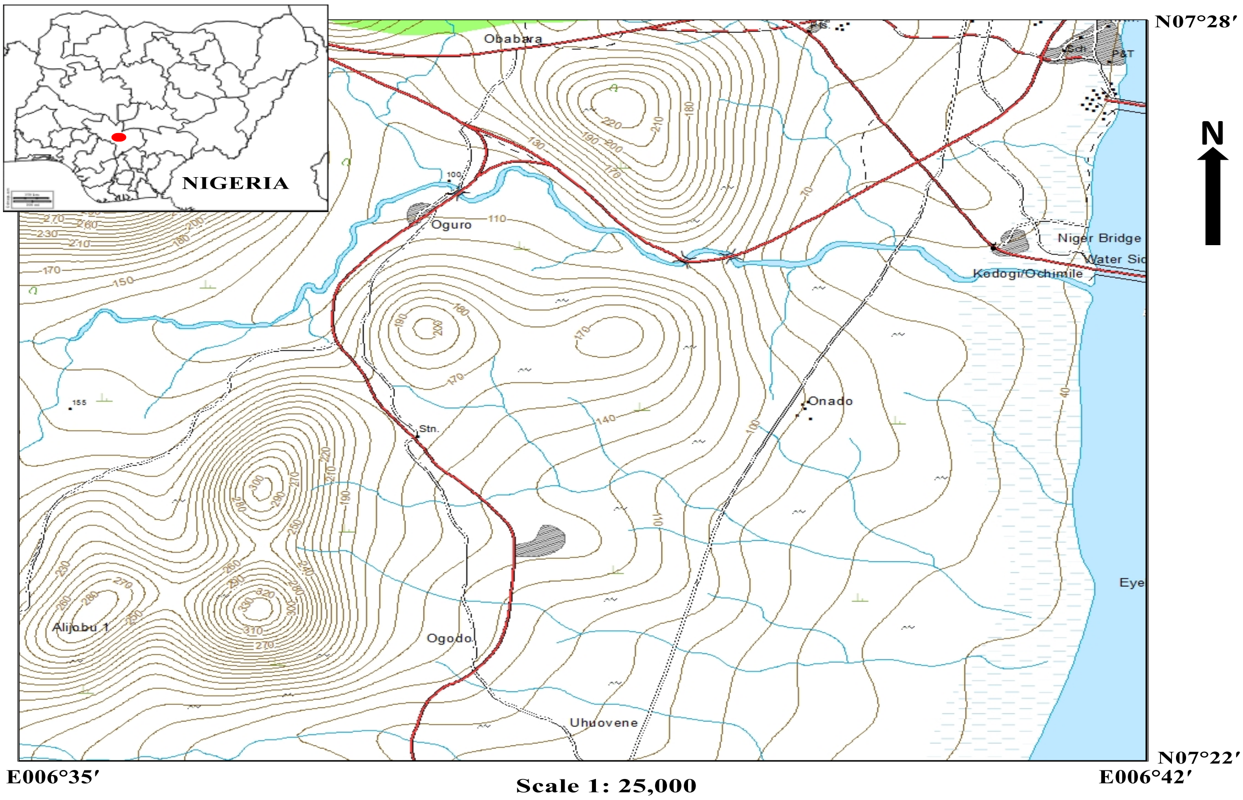


**Figure 1: Location map of Ogodo-Odobola area, central Nigeria**

## 2.0 MATERIAL AND METHODS

### 2.1 Field Method

An open traverse field method was adopted in mapping the geology of study area on a scale of 1:25,000. The fieldwork included both reconnaissance and detailed geological mapping which lasted for about four weeks during the dry season. Representative rock samples from outcrops, along river channels and road cuts and pegmatite veins occurring in the area were collected. These rock units were identified and examined on the field and their information such as hand specimen mineralogy, colour, extent, strike, structures and the location using Global Positioning System (GPS) were all recorded. Photographs of relevant features were acquired with digital camera.

### 2.2 Sampling and Sample Preparation

The location of every sample collected and structural characteristics (foliations, folds, veins, and joints) were noted and samples properly labelled. Fifty-seven (57) samples were collected during the fieldwork. The rocks were carefully sampled while avoiding weathered portions and to represent the outcrops. Fresh representative samples collected from pegmatites and host rocks were well packaged in new sample bag and labelled appropriately. These sample were then conveyed to the laboratory for petrographic studies.

### 2.3 Thin Section Analysis

Twelve (12) representative (whole rock pegmatite and host rock) samples were systematically selected from the fifty-seven (57) samples from the study area and were cut for thin sectioning. The thin section was prepared at the Petrology laboratory, Department of Geology, Abubakar Tafawa Belawa University (ATBU), Bauchi, Nigeria. Each of these thin section slides were carefully examined under the microscope using plane polarized light and cross nicols at the Microscope laboratory, Department of Geology, Federal University of Technology, Minna. The modal composition was then carried out to determine the mineralogical compositions of each sample.

## 3.0 RESULTS AND DISCUSSION

### 3.1 Petrology, Mineralogy and Field Relationships

The litho-petrological units characterising the study area includes migmatite-gneiss, mica schist, amphibole schist and porphyritic granite, and pegmatite veins occurring as intrusion to the country rocks in the area (Figure 2). The structural features of the study area comprise of joint (mostly barren), foliation, banding, fault, fold and veins

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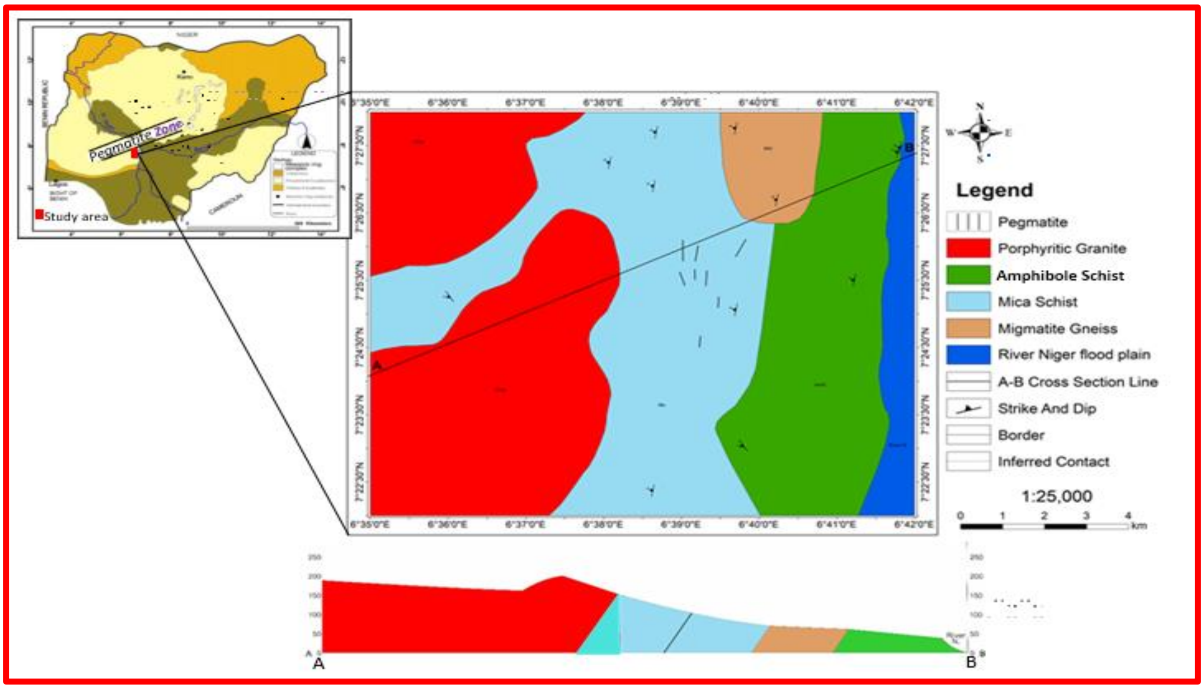


**Figure 2: Geological map of Nigeria showing location of pegmatites zone in Nigeria and the Ogodo-Odobola area, central Nigeria (Redrawn after Tanko and Dzigbodi-Adjimah, 2021)**

### 3.2 Migmatite-Gneiss

This rock type occurs as low-lying at the up north of the study area. They are mostly exposed along the streams and railway track; and occupy the least in term of areal coverage of five percentage (5%) (Figure 2). The outcrop trends nearly N-S direction and dips to the west. Joint directions on this rock is mostly parallel while few are nearly perpendicular to the strike. It has a grain size ranging from fine to medium grained. The rock shows alternation of dark and light-coloured minerals that are in patches and some in both thick and thin layers/banding (Plate I). Presence of ptygmatic folds and varied joint directions on this rock confirmed it has undergone intense deformational processes. The rock is bounded by schistose lithologies. About 60% of the rock is melanocratic while the remaining 40% is leucocratic in hand specimen. The dominant mineral assemblage of the rock includes hornblende (30%), biotite (20%), microcline (30%), quartz (10), plagioclase (5%) and opaque minerals (5%) (Plate II).

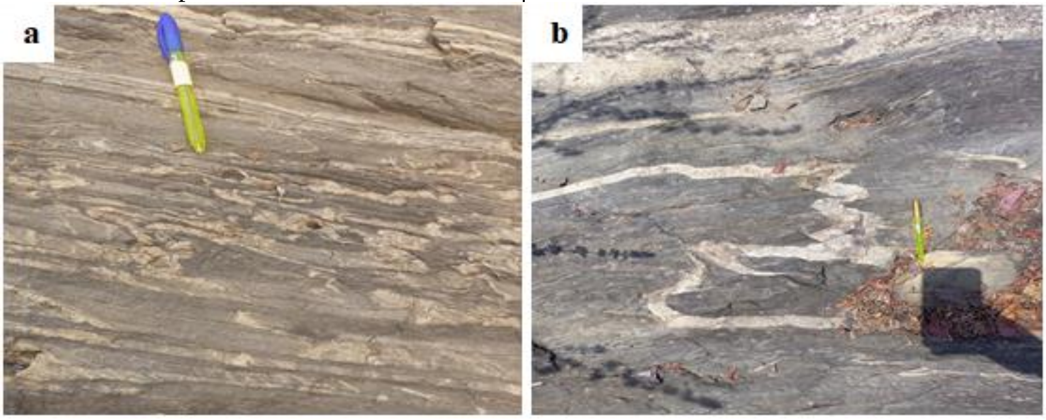


**Plate I: (a) Migmatite-gneiss having patches of light and dark mineral alternation with both thin and thick layers (b) migmatite with a conspicuous recumbent folding**

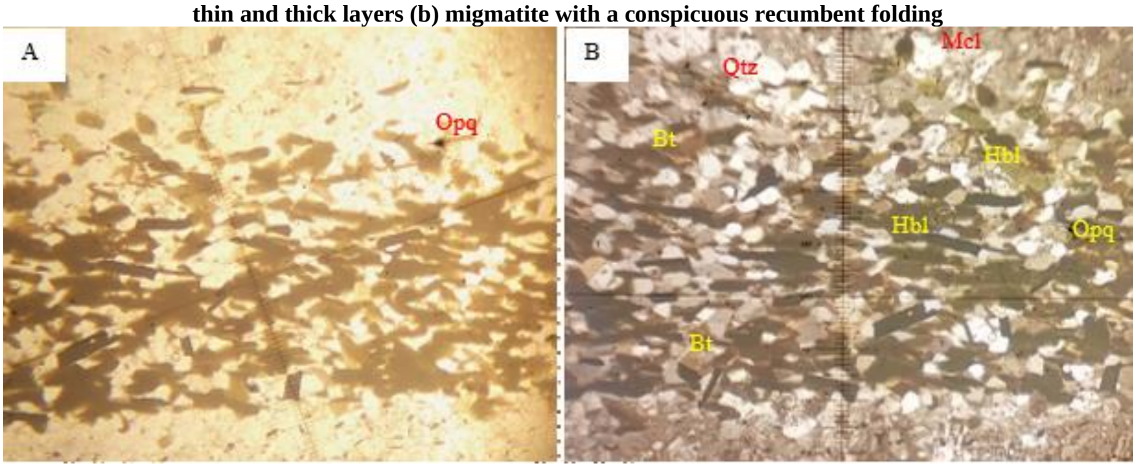


**Plate II: (Slide MG39), A photomicrograph of migmatite-gneiss (A) under plain polarized light (PPL). (B) Essential mineral composition under cross polarized light (XPL) showing banding in the migmatite-gneiss, hornblende (Hbl), biotite (Bt), microcline (Mcl), quartz (Qtz) and opaque (Opq). (x20).**

### 3.3 Mica Schist

The mica schist occurs as low-lying outcrops and in few cases as ridge. It is light grey in colour, strongly foliated, highly weathered and mostly exposed along the streams draining the area. It occupies the central position of the study area (35%) into which granites and pegmatites intruded (Figure 2). It is medium to coarse grained with clear alignment of flaky minerals in sub-parallel to parallel orientation of micaceous and quartzo-feldspathic minerals (Plate III). They generally trend in NNE-SSW and to a lesser extent in NE-SW, and dips in the western direction (58° - 60°). Onimisi et al. (2013) confirms this from his work on the adjacent Itobe marble deposit that one of its host rocks is mica schist that trends in the NNE-SSW direction. Observable structures include foliation, veins, and few joints which strikes along the foliation plane. In hand specimen, the samples are heavy with the dark portion having reddish brown spots, suspected to be effect of oxidation reaction. Megascopic minerals observed on these outcrops includes mica, feldspar and quartz. The dominant mineral assemblages found in the mica schist include biotite (40%), muscovite (10%), plagioclase (10%), quartz (8%), and opaque and accessory minerals (32%) (Plate IV).

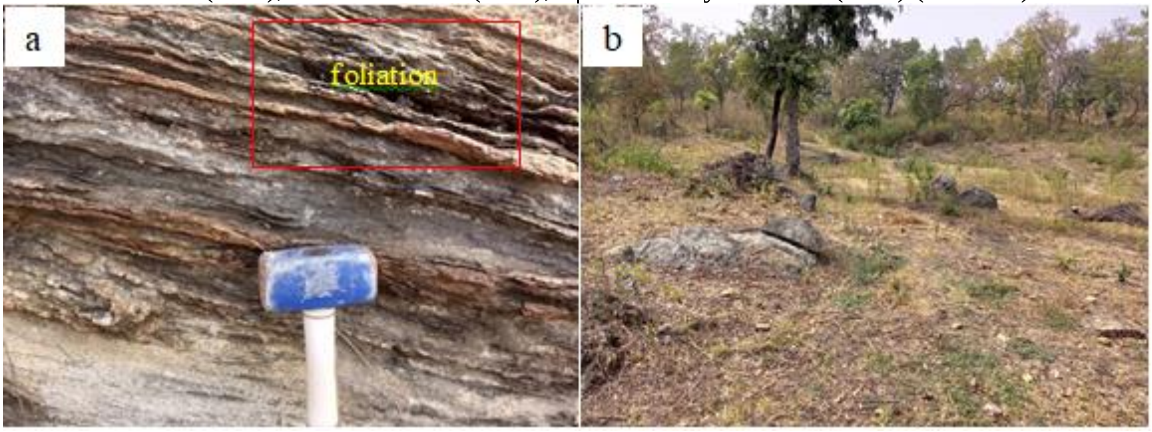


**Plate III: Photograph of (a) medium to coarse grained highly foliated schist with sign of weathering (b) a low-lying schist**

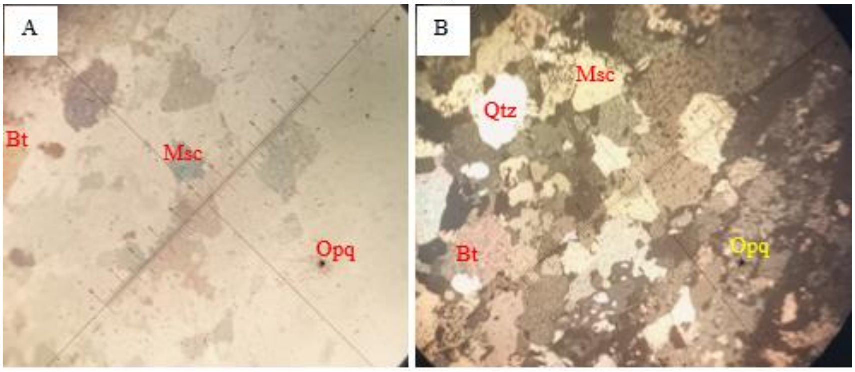


**Plate IV: (Slide LS1), Photomicrograph of mica schist showing opaque mineral (Opq) (A) under PPL. (B) biotite (Bt), quartz (Qtz), muscovite (Msc) and plagioclase (Plg) under XPL. (x20).**

### 3.4 Amphibole Schist

The low-lying amphibole schists are dark grey to green in colour, fine to medium grain sizes and slightly to strongly foliated with tiny quartz veinlets (Plate V). They are mostly exposed along the banks of River Niger and major Ajaokuta – Itobe federal road cut (around Niger bridge). The amphibole schists trend in the NNE - SSW and dip to the west with slight deviation of NW-SE in the south eastern part of the study area hosting minor pegmatitic intrusions (non-mappable unit). It is bordered by migmatite-gneiss and mica schist in the west and bank of River Niger to the east in the area (Figure 2), and covered about 22% of the area. Structure such as foliations, folds and quartz veins were observed on the outcrops. Feldspar, quartz, micas and greenish mineral (hornblende) form the minerals observed in hand specimen. The mineral assemblage from reveal hornblende (43.5%), biotite (22.5%), quartz (20%), plagioclase (9%) and opaque minerals (5%) (Plate VI).

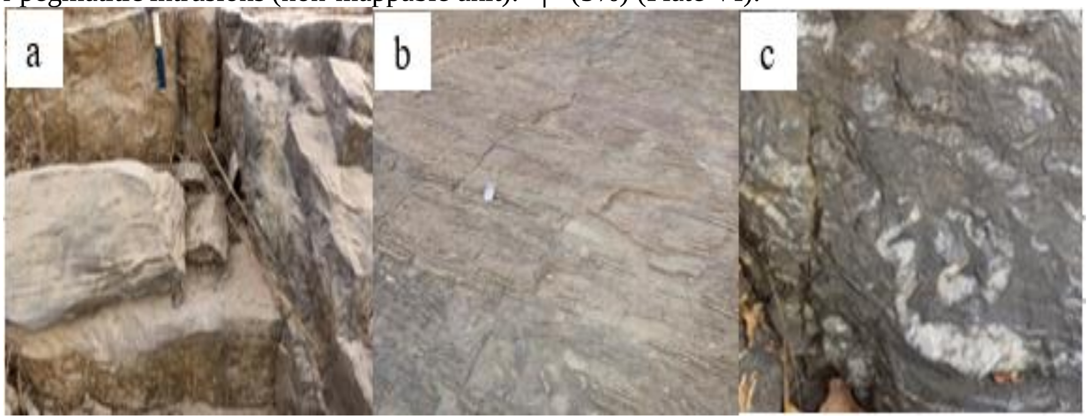


**Plate V: Photograph of amphibole schist (a) with fractures due to road - cut (b) low-lying along the bank of River Niger around Ajaokuta Village (c) with quartz veins**

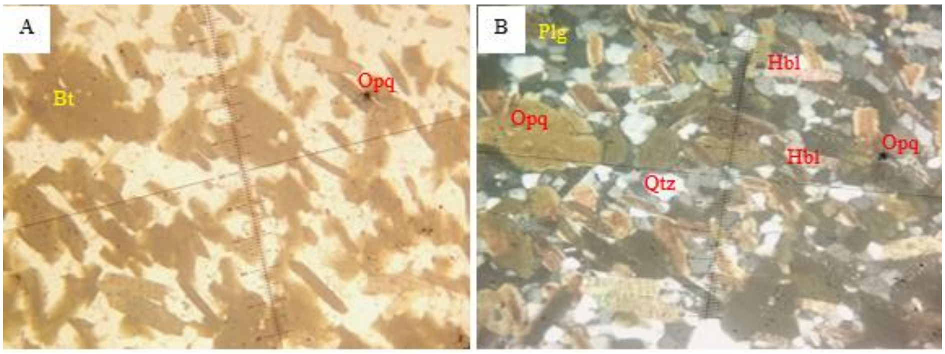


**Plate VI: (Slide 34). Photomicrograph of amphibole schist (A) under PPL and (B) under XPL showing hornblende (Hbl), biotite (Bt), plagioclase (Plg), quartz (Qtz), and opaque (Opq) minerals. (x20).**

### 3.5 Porphyritic Granite

This rock occurs as intrusions into the mica schist and occupy the western half (Ogodo side) of the study area (38%) (Figure 2). It is light to dark in colour with the dark colour portion ascribed to the abundant biotite mineral content visible around Obabara area (Plate VII a-b). The grain size ranges from coarse grained to porphyritic texture. The porphyritic granite at Obabara (northwestern) portion of the study area is presently been harnessed (Plate VIIc). Minor rock includes cross-cutting quartzo-feldsparthic, feldspar and quartz vein intrusions measuring 2 – 4cm on the average (Plate VII f). The positions of these rocks are glaring due to their high altitude, forming plutons in some areas compared to the surrounding rocks. The dominant mineral assemblages found in the porphyritic granite includes biotite (35.25%), hornblende (1.75%), plagioclase (11.50%), quartz (13.0%), microcline (16.75%), muscovite (17.0%), myrmekite (1.0%) and accessory (3.75) minerals (Plate VIII). Structures found on the outcrop includes joints, fault and veins (Plate VII d-e).


**Plate VII: Photograph of (a) coarse - grained granite (b) porphyritic granites (c) porphyritic granite currently been harnessed for tiles and slabs (d) a dextral fault on granite (fault line with red colour and displacement in yellow colour) (e-f) set of joints and quartz vein on granite**

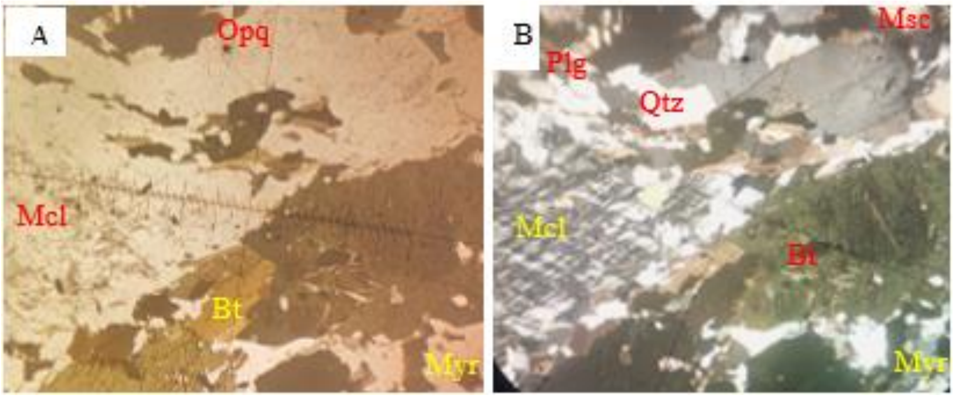


**Plate VIII: Photomicrograph of porphyritic granites (Slide LG48) (A) under PPL and (B) under XPL respectively. Showing biotite (Bt), quartz (Qtz), plagioclase (Plg), microcline (Mcl), muscovite (Msc), hornblende (Hbl), myrmekite (Myr) and opaque (Opq) mineral. (x20).**

### 3.6 Pegmatites

The pegmatites are extremely coarse-grained rocks crystallized from the very last stage of magma rich in volatiles, with visible crystals of predominantly feldspars, quartz and micas (mostly white type) (Plate IX a-b). It is white to pink in colour, occur in tabular form and concordant to the low-lying mica schist occupying the central portion of the area (Figure 2). It also occurs as dykes discordantly cross-cutting the granite and to a lesser extent the amphibole schist in south eastern part (non-mappable unit) (IX c-d). These pegmatite veins vary from few centimetres to several metres in width and 12 metres – over 200 metres in length. Some of these veins are highly weathered and become loose, especially in area receiving artisanal workings. The pegmatites trend in the NNE-SSW direction and dip (60° averagely) to the west in consonance to the major host rock (mica schist) and revalidating its late Pan-African age. Mineral assemblage of the pegmatite includes microcline (64%), plagioclase (16.25%), muscovite (13%), quartz (2.25%), biotite (1.75%) and opaque (2.75) minerals (Plate X).

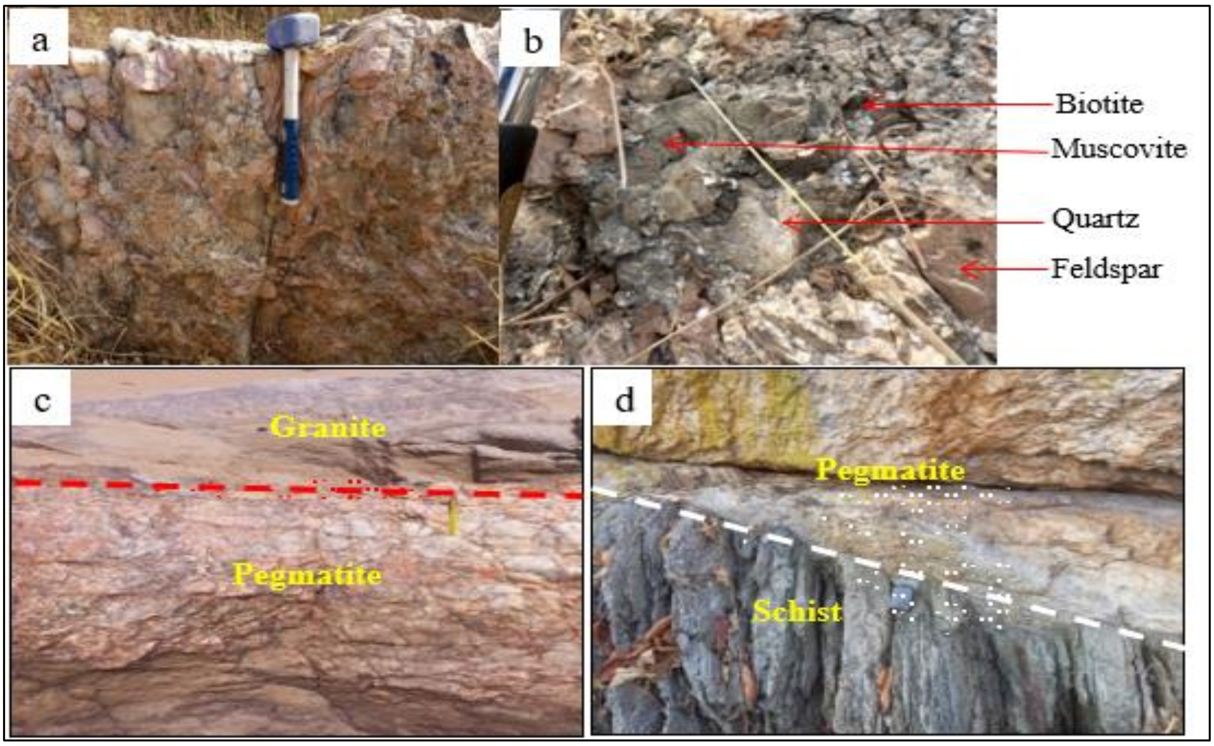


**Plate IX: Photograph of (a) pegmatite with exceptional grain size (b) differentiated pegmatite based on the common mineral constituents (c) contact between pegmatite and granite (b) intrusion of pegmatite dyke into the schist at the southeast part of the study area**

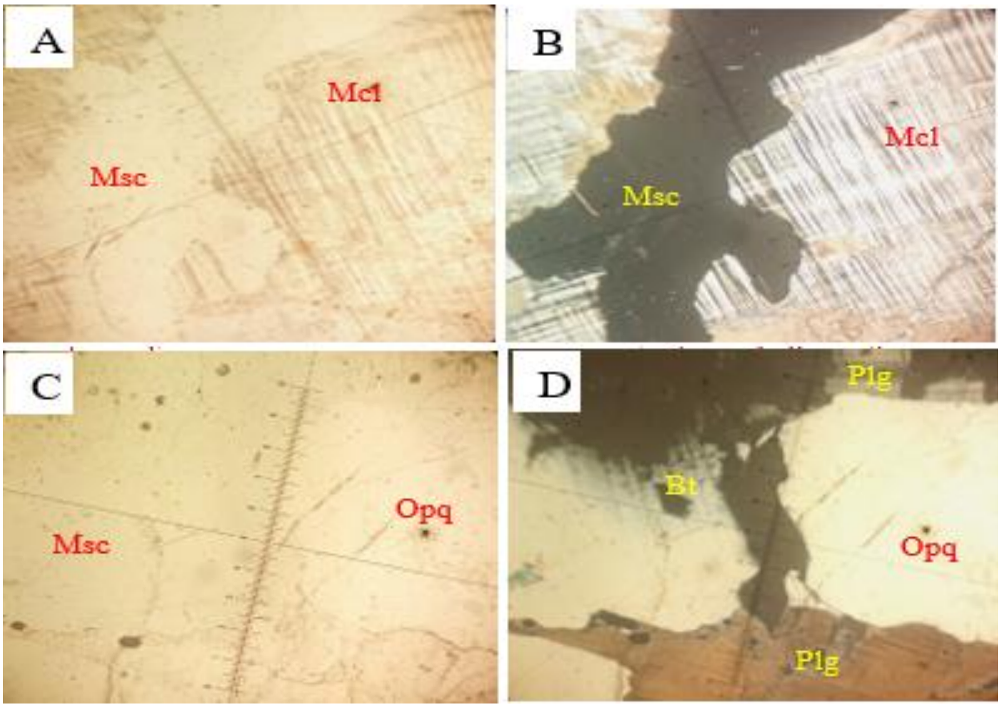


**Plate X: Photomicrograph of pegmatites (Slide LGP5) (A) under PPL and (B) under XPL. Slide LGP11 (C) under PPL and (D) under XPL. Showing biotite (Bt), plagioclase (Plg), microcline (Mcl), muscovite (Msc), and opaque (Opq) minerals. (x20).**

**Table 1: Average modal composition of the analysed rock samples from Ogodo-Odobola part of Idah Sheet 267NW, central Nigeria**

| Rock Types/Minerals | Pegmatites (%) (4 samples) | Porphyritic Granite (%) (4) | Amphibole Schist (%) (2) | Mica Schist (%) (1) | Migmatite-Gneiss (%) (1) | Average (%) |
|---|---|---|---|---|---|---|
| Biotite | 1.75 | 35.25 | 22.50 | 40.00 | 20.00 | 23.90 |
| Quartz | 2.25 | 13.00 | 20.00 | 8.00 | 10.00 | 10.65 |
| Plagioclase | 16.25 | 11.50 | 9.00 | 10.00 | 5.00 | 10.35 |
| Microcline | 64.00 | 16.75 | - | - | 30.00 | 22.15 |
| Muscovite | 13.00 | 17.00 | - | 10.00 | - | 8.00 |
| Hornblende | - | 1.75 | 43.50 | - | 30.00 | 15.05 |
| Myrmekite | - | 1.00 | - | - | - | 0.20 |
| Opaque/Access. | 2.75 | 3.75 | 5.00 | 32.00 | 5.00 | 9.70 |
| Total Average | 100 | 100 | 100 | 100 | 100 | 100 |

From the petrographic analysis, average modal composition of each samples of the rock analysed, biotite which is a common rock forming mineral has the highest percentage with a mean of 23.90% (Table 1). This high value of biotite cut across all the rock types especially in porphyritic granite and mica schist while the least is recorded in pegmatites. This make them highly susceptible to weathering. Myrmekite is an intergrowth of quartz in plagioclase feldspar giving it vermicular texture. The presence of myrmekite in porphyritic granite gives an indication of vast metasomatic changes in mafic plutonic rock and metamorphic rocks that are been subjected to deformation and micro-fracturing that opens the system for movement of hot hydrous fluid. The next most abundant mineral is alkali feldspar which dominated the pegmatites in form of microcline perthite (22.15%), while Na-plagioclase (albite) (10.35%) characterised the sample LGP11 (Table 1).

All the pegmatite samples are highly rich in muscovite (Plate X). The vein-like areas on the microcline are of the albite ($NaAlSi_3O_8$) and the cross-hatched parts are microcline ($KAlSi_3O_8$). This is probably formed as a result of a solid solution and subsequently the two minerals separated to form perthitic intergrowth. Perthitic texture is typical of alkali feldspars formed as a result of exsolution of contrasting alkali feldspar compositions as it cools to form intermediate composition (Ogbamikhumi and Eguagie, 2023). The opaque/trace mineral content in some pegmatites amounts to 5% even though on the average for the rock type is 2.27% (Table 1). Also, among the representative pegmatite samples analysed, LGP11 showed sign of ore enrichment (rare metal). This location coincides with where illegal miners are engaged. There is a very high percentage of opaque/trace (32%) (Table 1) mineral in the mica schist which appeared dark all through rotation under the microscope. A green amphibole (hornblende) showed 15.05% on the average for all rock types (Table 1). This high amount of hornblende is well documented on the amphibole schist and migmatite-gneiss (Figure 2).

**3.7 Structural Elements**

The structural imprints on rocks often tell a lot about the tectonic activities they must have been subjected to, common of these includes fold, fault, foliation, joints and veins were observed on the rocks. The foliated rocks strike in the NNE-SSW direction and dip value is 60°W, on the average. The ptygmatic folds in migmatite-gneiss occur due to flowage of partially melted rocks in different direction been aided by gravity. Dextral strike slip faults portray a transcurrent tectonic episode. The prominent joint trend is NNE-SSW with minors in NNW-SSE, NE-SW, and ENE-WSW directions on igneous and metamorphic rocks that underlain the area (Figures 2a – b). The joint, if parallel to the rock trend is considered to be syntectonic while those that are perpendicular to the rock trend must have occurred after the rock was emplaced. Evidently, the alignment of the pegmatites in NNE – SSW direction indicates that the structural systems had overbearing influence on the emplacement of the pegmatites. These defining evidences on rocks in the study area indicate imprints of the Pan-African orogeny.

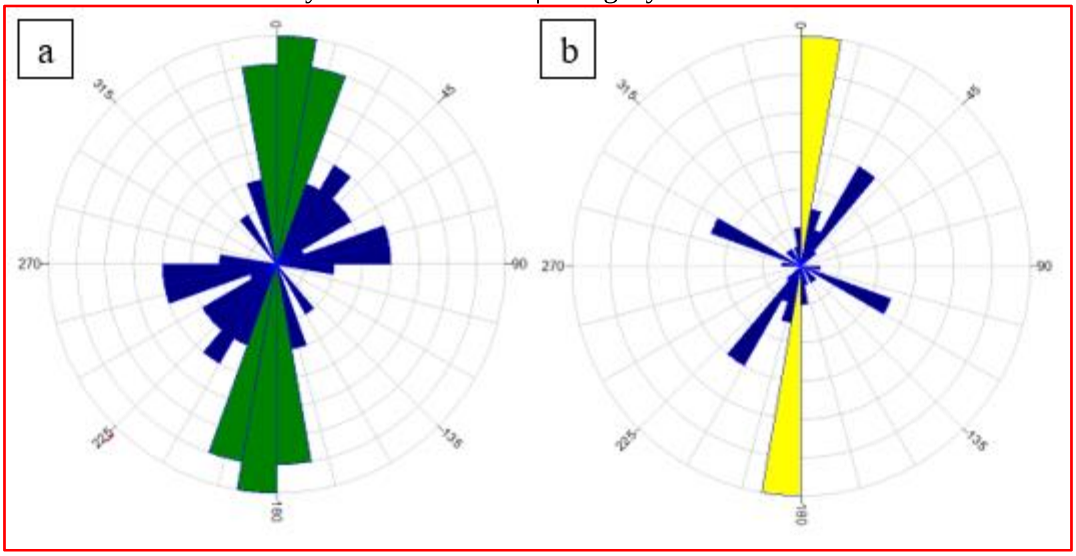


**Figure 2: Rose plots of joint directions in (a) granites and (b) migmatite-gneiss and schist lithologies respectively from the study area**

Okunlola and Somorin (2005) worked on the Itakpe pegmatites with principal trend of NNE-SSW direction and concluded their emplacement was aided by the transcurrent fault conjugate systems, thus revalidating its late Pan-African age (600±150Ma). The structural characteristics such as the trending of quartzo-feldsparthic intrusions (NW-SE) and quartz veins (NE-SW) directions in basement rocks of Jimbe area, Northcentral Nigeria indicate imprints of the Pan-African orogeny (Adamu et al., 2021). Garba (2003) had linked the genesis of pegmatites and gold mineralization in the northern basement of Nigeria to late Pan-African tectonics and asserted the development of Kalangai transcurrent fault in the Kushaka schist belt is related to it. Kuster (1990) had similar observation in Wamba pegmatite field and posited they were associated with Pan-African tectonic lineaments. Still, Kuster (1990) reported dextral movement along NE-SW and sinistral NW-SE to NNW-SSE striking faults in the Wamba pegmatite field. Also, a dextral sense of movement in NE-SW direction was also observed in Jama'alu migmatitic granodiorite gneiss of Keffi area. In this study, similar dextral fault pattern (NE-SW) was observed in Ogodo porphyritic granite.

## 4.0 CONCLUSION

The Ogodo-Odobola and environs lies within the Precambrian mobile belt of central Nigeria basement rocks. Field investigation has revealed the area is underlain by migmatite-gneiss, mica schist, amphibole schist, and granite with pegmatite intrusions. The principal joint direction of NNE-SSW is believed to have influenced the pegmatite emplacement, while the evidence of tectonic activities recorded on the major and minor lithologies links them to the Pan-African orogeny. The modal mineral compositions revealed on the average dominance of biotite (23.90%), microcline (22.15%), hornblende (15.05%), quartz (10.65%), plagioclase (10.35%), opaque/accessory (9.70), muscovite (8.00%), and myrmekite (0.20%). Mica schist serves as the main host to the pegmatite bodies in the area with clear relationship. These pegmatites have shown sign of potential ore mineralization.

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