DEPARTMENT OF GEOLOGY
FACULTY OF EARTH AND ENVIRONMENTAL SCIENCES
UNIVERSITY OF DHAKA

Results of Petrographic Analyses

Client: Maddhapara Granite Mining Company Ltd.

Dated: 2 JULY 2019

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University of Dhaka
Dhaka 1000, Bangladesh

Sample Received on	25 April 2019	Delivery Date	30 June 2019
Project Name:		Tested by:	Md Jahangir Alam
Company	MGMCL	Checked by	Dr. Aziz Hasan
No of Samples	04		

Summary

This report includes the results of 'Petrographic Tests' of rock samples provided by Maddhapara Granite Minning Company Ltd. Petrographic tests have been carried out at the Department of Geology, University of Dhaka following the 'STD.ASTM C295-98' method. All together 4 samples from Maddhapara hard rock mine has been provided. The analyses including physical observation, acid treatment, petrographic examinations and chemical staining of the supplied samples have been performed to find the constituent components of rock samples and to classify the rocks. Thin sections from each of the samples have been prepared and analyzed under polarizing microscope. Thin section petrographic analysis together with acid treatment and chemical staining suggest similar rock type for the samples provided. Only 'Granodiorite' rock type has been observed in the supplied samples. Following sections include the results of the laboratory analyses.

Geology Department University of Dhaka

Dr. Kazi Matin Uddin Ahmed
Professor and Chairman

Sample Name: Maddhapara

Petrographic Analysis of Slide No: 01

Physical description:

The rock is dark colored, hard and compact, medium to coarse grained and massive. Does not show any reaction to cold and diluted HCl acid. Does not absorb any water.

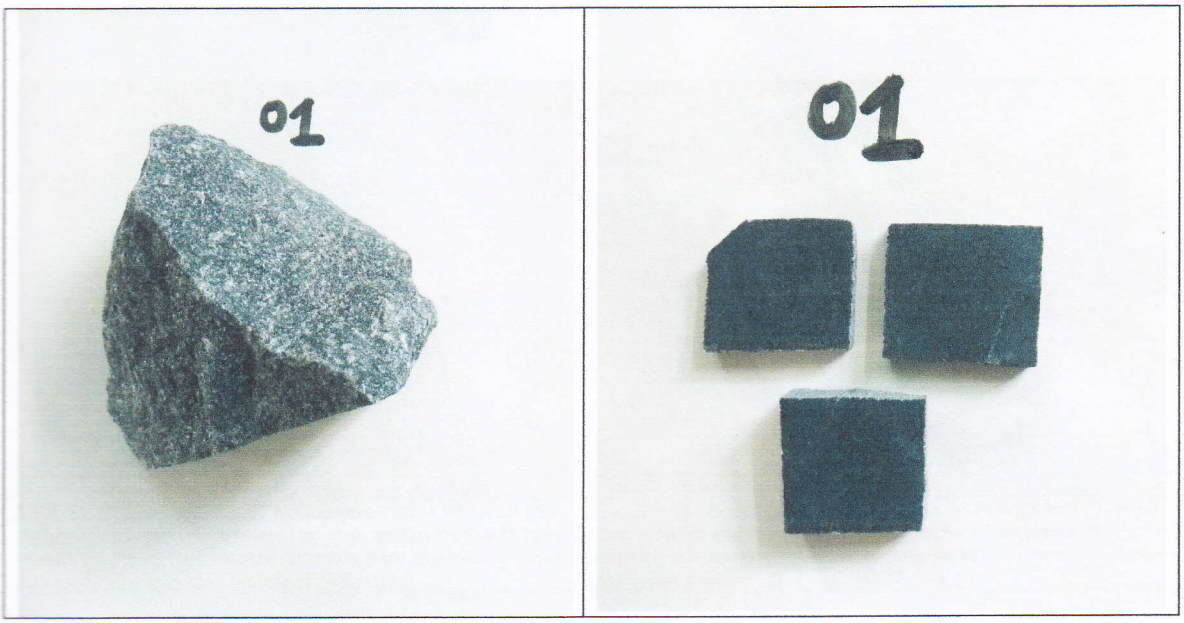


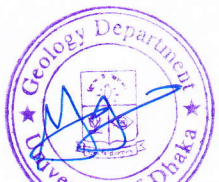
Fig-1.1 Photographs show the supplied rock sample before and after cutting

Thin Section Analysis

The rock is holocrystalline, phaneric (medium grained), and subhedral to anhedral.

Mineral Composition

1. Plagioclase Feldspar: Identified by its colorless appearance, low relief, presence of cleavage under PPL and 1st order grey interference color, lamellar twinning, straight extinction under CPL. Most of the crystals are subhedral. It constitutes about 50% of the rock.
2. Quartz: Quartz is identified by its anhedral form, colorless appearance, low relief and absence of cleavage under PPL and 1st order grey to 1st order yellow interference color, wavy extinction under CPL. It constitutes about 25% of the rock.



3. Hornblende: Identified by its green color, presence of 2 sets of cleavage, high relief under PPL and 2nd order red maximum interference color and low angle inclined extinction under CPL. The grains are subhedral. It constitutes about 20% of the rock.
4. Biotite: Identified by its brown color, low relief, presence of cleavage under PPL and 2nd order interference color, nearly straight extinction under CPL. This mineral constitutes about 3% of the rock.
5. Opaque minerals: These minerals are appeared black under both plane and cross polarized light; hence they are not identifiable- about 2%.

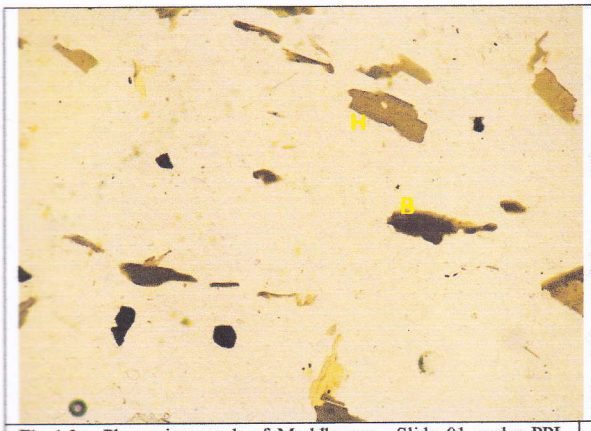


Fig-1.2a: Photomicrograph of Maddhapara Slide 01 under PPL (x25). Greenish and brown colored minerals are Hornblende (H) and Biotite (B). The light-colored minerals with cleavage indicate feldspars(Pl_F) which were confirmed under CPL.

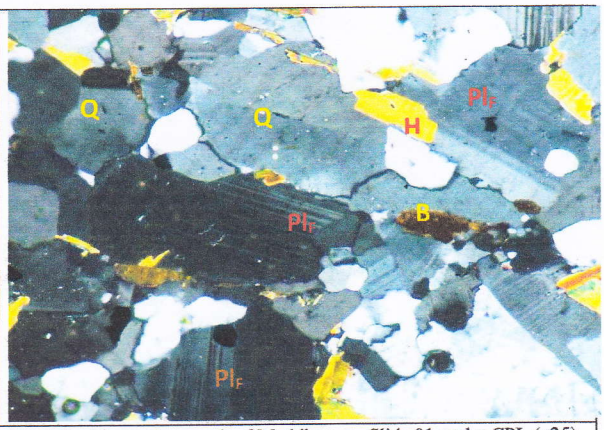
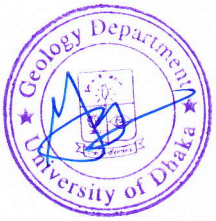


Fig-1.2b: Photomicrograph of Maddhapara Slide 01 under CPL (x25). Dark greenish and brown colored minerals are Hornblende (H), grey minerals are quartz (Q), minerals with lamellar twinning indicates plagioclase feldspar. (Pl_F).

Name and Type of Rock

Rock Name: **Granodiorite**

Rock type: **Felsic Igneous rock**



Petrographic Analysis of Slide No: 02

Physical description:

The rock is dark colored, hard and compact, medium to coarse grained and massive.
Does not show any reaction to cold and diluted HCl acid. Does not absorb any water.

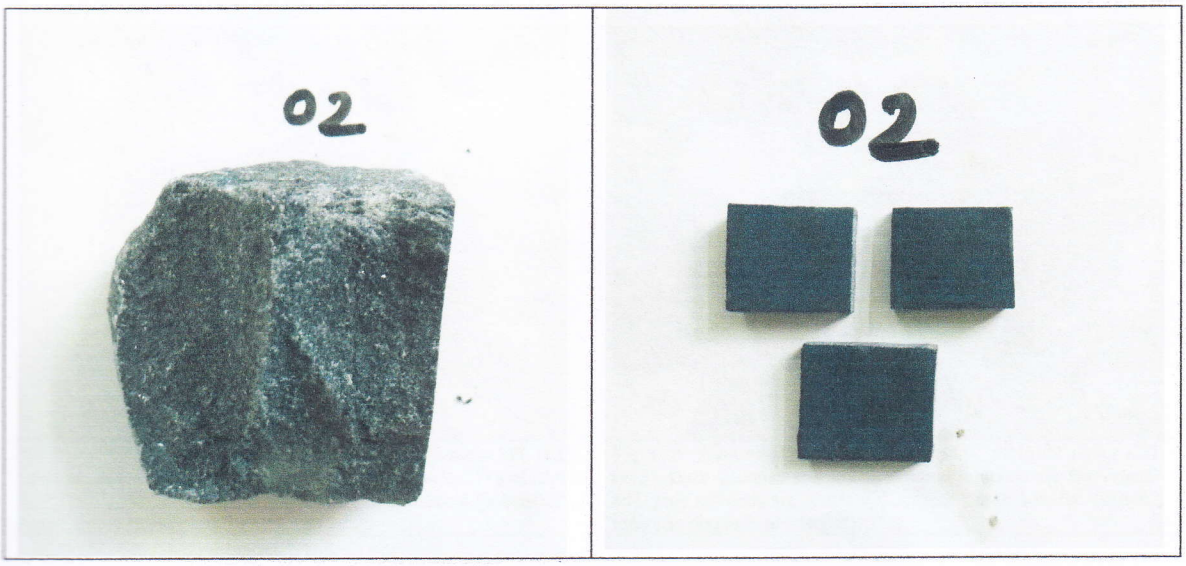


Fig-2.1 Photographs show the supplied rock sample before and after cutting

Thin Section Analysis

The rock is holocrystalline, phaneric (medium grained), and subhedral to anhedral.

Mineral Composition

1. Plagioclase Feldspar: Identified by its colorless appearance, low relief, presence of cleavage under PPL and 1st order grey interference color, lamellar twinning, straight extinction under CPL. Most of the crystals are subhedral. It constitutes about 45% of the rock.
2. Quartz: Quartz is identified by its anhedral form, colorless appearance, low relief and absence of cleavage under PPL and 1st order grey to 1st order yellow interference color, wavy extinction under CPL. It constitutes about 30% of the rock.
3. Hornblende: Identified by its green color, presence of 2 sets of cleavage, high relief under PPL and 2nd order red maximum interference color and low angle inclined extinction under CPL. The grains are subhedral. It constitutes about 20% of the rock.

4. Biotite: Identified by its brown color, low relief, presence of cleavage under PPL and 2nd order interference color, nearly straight extinction under CPL. This mineral constitutes about 4% of the rock.
5. Opaque minerals: These minerals are appeared black under both plane and cross polarized light; hence they are not identifiable- about 1%.

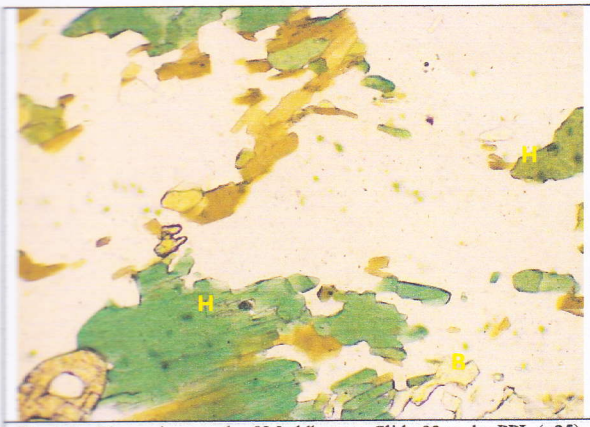


Fig-2.2a: Photomicrograph of Maddhapara Slide 02 under PPL (x25). Greenish and brown colored minerals are Hornblende (H) and Biotite (B). The light-colored minerals with cleavage indicate feldspars(Pl_F) which were confirmed under CPL.

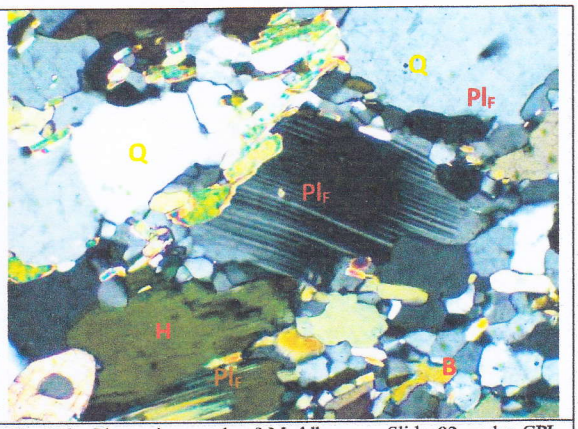


Fig-2.2b: Photomicrograph of Maddhapara Slide 02 under CPL (x25). Dark greenish and brown colored minerals are Hornblende (H), grey minerals are quartz (Q), minerals with lamellar twinning indicates plagioclase feldspar. (Pl_F).

Name and Type of Rock

Rock Name: **Granodiorite**

Rock type: **Felsic Igneous rock**

Petrographic Analysis of Slide No: 03

Physical description:

The rock is dark colored, hard and compact, medium to coarse grained and massive.
Does not show any reaction to cold and diluted HCl acid. Does not absorb any water.

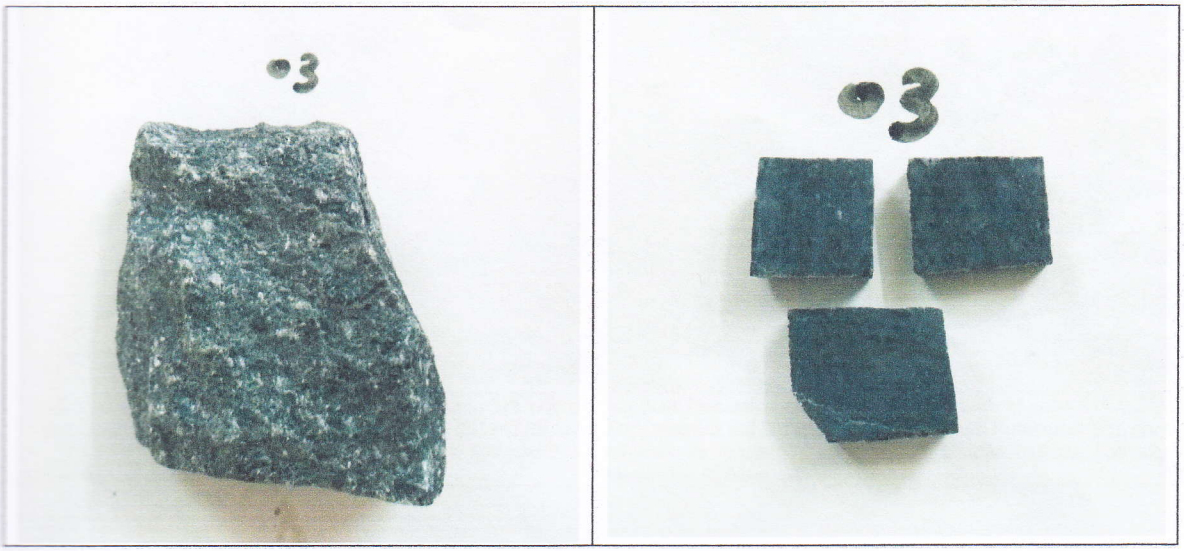


Fig-3.1 Photographs show the supplied rock sample before and after cutting

Thin Section Analysis

The rock is holocrystalline, phaneric (medium grained), and subhedral to anhedral.

Mineral Composition

1. Plagioclase Feldspar: Identified by its colorless appearance, low relief, presence of cleavage under PPL and 1st order grey interference color, lamellar twinning, straight extinction under CPL. Most of the crystals are subhedral. It constitutes about 55% of the rock.
2. Quartz: Quartz is identified by its anhedral form, colorless appearance, low relief and absence of cleavage under PPL and 1st order grey to 1st order yellow interference color, wavy extinction under CPL. It constitutes about 20% of the rock.
3. Hornblende: Identified by its green color, presence of 2 sets of cleavage, high relief under PPL and 2nd order red maximum interference color and low angle inclined extinction under CPL. The grains are subhedral. It constitutes about 20% of the rock.

4. Biotite: Identified by its brown color, low relief, presence of cleavage under PPL and 2nd order interference color, nearly straight extinction under CPL. This mineral constitutes about 4% of the rock.
5. Opaque minerals: These minerals are appeared black under both plane and cross polarized light; hence they are not identifiable- about 1%.

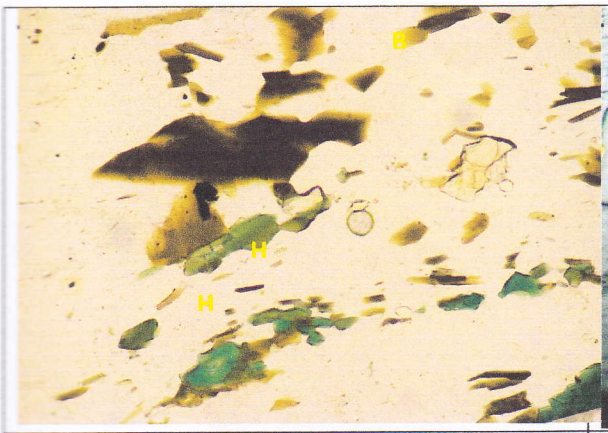


Fig-3.2a: Photomicrograph of Maddhapara Slide 03 under PPL (x25). Greenish and brown colored minerals are Hornblende (H) and Biotite (B). The light-colored minerals with cleavage indicate feldspars(Pl_F) which were confirmed under CPL.

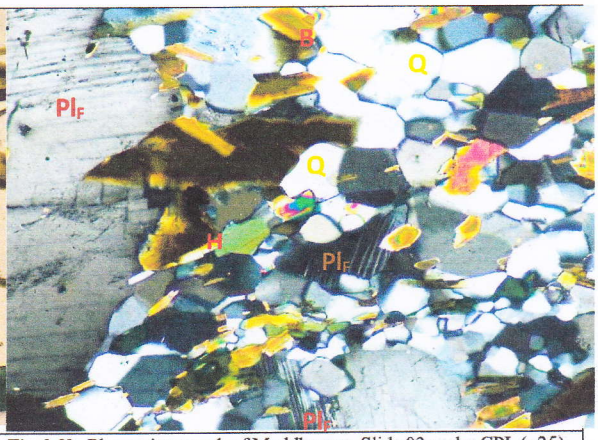


Fig-3.2b: Photomicrograph of Maddhapara Slide 03 under CPL (x25). Dark greenish and brown colored minerals are Hornblende (H), grey minerals are quartz (Q), minerals with lamellar twinning indicates plagioclase feldspar. (Pl_F).

Name and Type of Rock

Rock Name: **Granodiorite**

Rock type: **Felsic Igneous rock**

Petrographic Analysis of Slide No: 04

Physical description:

The rock is dark colored, hard and compact, medium to coarse grained and massive. Does not show any reaction to cold and diluted HCl acid. Does not absorb any water.

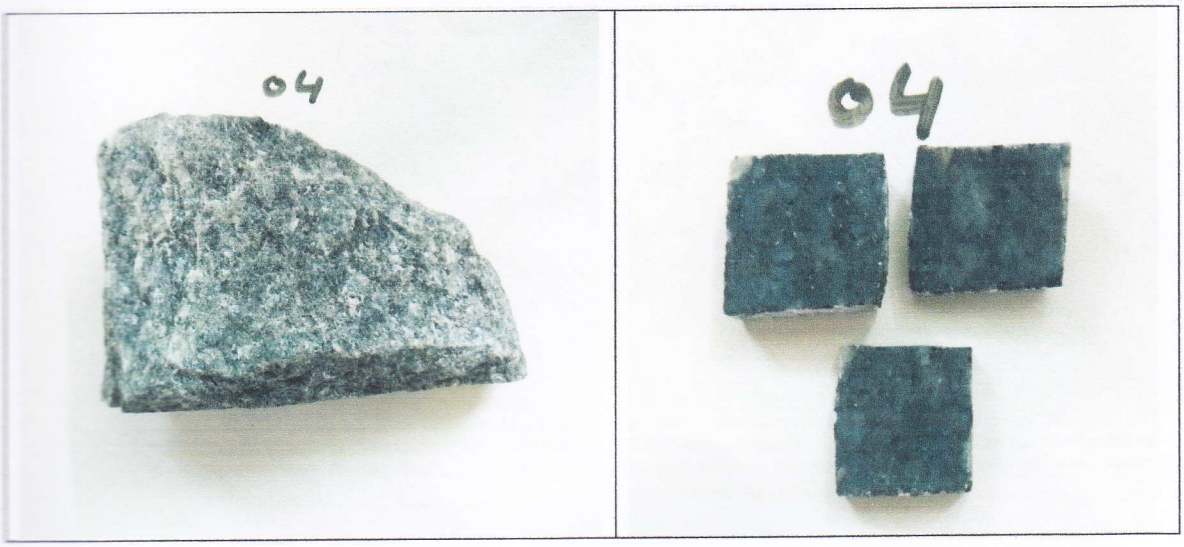


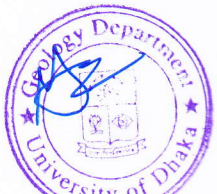
Fig-4.1 Photographs show the supplied rock sample before and after cutting

Thin Section Analysis

The rock is holocrystalline, phaneric (medium grained), and subhedral to anhedral.

Mineral Composition

1. Plagioclase Feldspar: Identified by its colorless appearance, low relief, presence of cleavage under PPL and 1st order grey interference color, lamellar twinning, straight extinction under CPL. Most of the crystals are subhedral. It constitutes about 50% of the rock.
2. Quartz: Quartz is identified by its anhedral form, colorless appearance, low relief and absence of cleavage under PPL and 1st order grey to 1st order yellow interference color, wavy extinction under CPL. It constitutes about 20% of the rock.
3. Hornblende: Identified by its green color, presence of 2 sets of cleavage, high relief under PPL and 2nd order red maximum interference color and low angle inclined extinction under CPL. The grains are subhedral. It constitutes about 25% of the rock.



4. Biotite: Identified by its brown color, low relief, presence of cleavage under PPL and 2nd order interference color, nearly straight extinction under CPL. This mineral constitutes about 3% of the rock.
5. Opaque minerals: These minerals are appeared black under both plane and cross polarized light; hence they are not identifiable- about 2%.

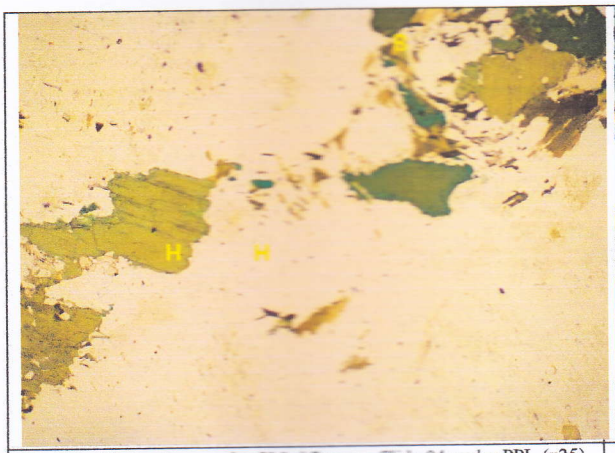


Fig-4.2a: Photomicrograph of Maddhapara Slide 04 under PPL (x25). Greenish and brown colored minerals are Hornblende (H) and Biotite (B). The light-colored minerals with cleavage indicate feldspars(Pl_F) which were confirmed under CPL.

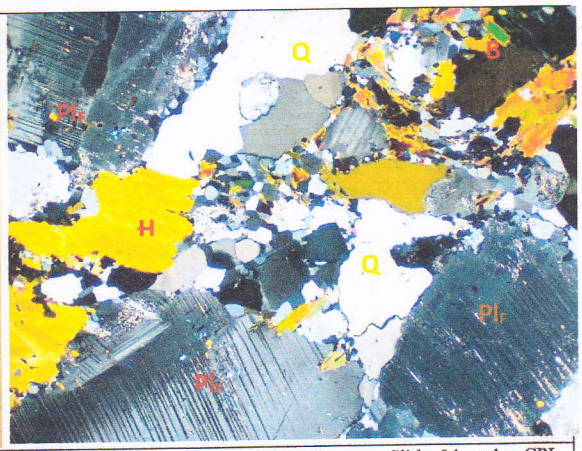


Fig-4.2b: Photomicrograph of Maddhapara Slide 04 under CPL (x25). Dark greenish and brown colored minerals are Hornblende (H), grey minerals are quartz (Q), minerals with lamellar twinning indicates plagioclase feldspar. (Pl_F).

Name and Type of Rock

Rock Name: **Granodiorite**

Rock type: **Felsic Igneous rock**