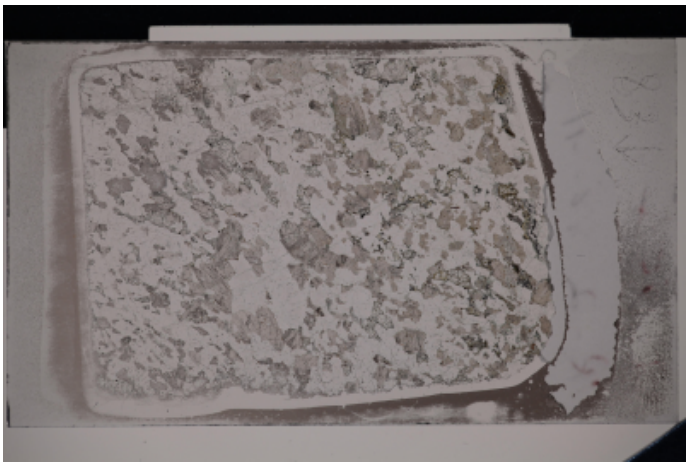
THIN SECTION LABEL ID: **179-1105A-1R-2-W 88/91-TSB-TSS** Piece no.: #02 TS no.:

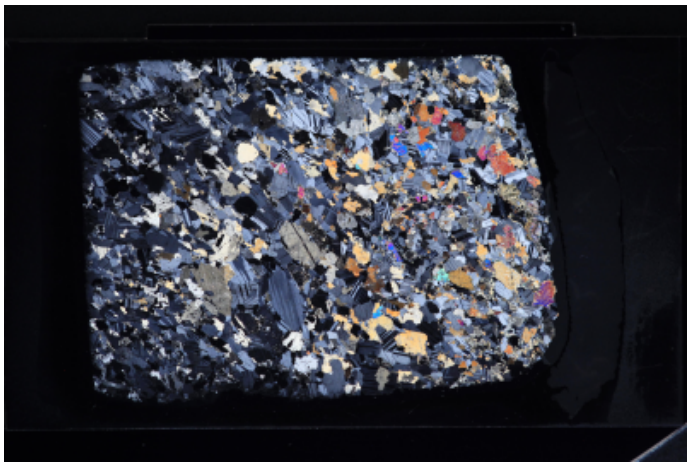
Group	Summary
Igneous petrology:	Medium-grained olivine gabbronorite; plagioclase chadacryst within orthopyroxene oikocryst; rims of olivine and clinopyroxene replaced by amphibole
Structure:	Granular, largely undeformed plagioclase with pyroxene and olivine in a granular to interstitial texture.

Plane-polarized



32826051

Cross-polarized



32826071

IGNEOUS PETROLOGY

Lithology: **Olivine-rich gabbro medium grained** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	9	0.2	0.2	1	anhedral	subequant	the rim is replaced by smectite
Plagioclase	60	0.2	5	1.5	anhedral	equant	
Clinopyroxene	20	0.1	2	1.5	anhedral	equant	
Orthopyroxene	2				Irregular		
Amphibole	1	5			Irregular		
Opaques	1						
Oxide	1				irregular		Assoc brown amph and oxides

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: submagmatic Observer: OP

Detailed description Granular plagioclase with pyroxene and olivine in a granular to interstitial texture. Grain

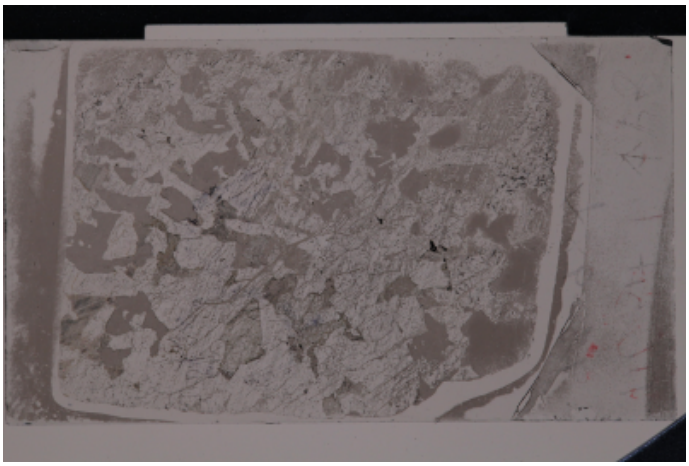
Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF fabric intensity:	weakly foliated/lineated [CPF_fabric]	1

Type	Comment
Olivine:	Grain size: medium-grained; Grain shape: subhedral to anhedral; Grain boundary: straight to curved; Undulose extinction: irregular; Texture: granular olivine with deformation lamellae and local kink banding
Plagioclase:	Grain size: medium-grained; Grain shape: granular; Grain boundary: straight to curved; Undulose extinction: irregular; Twinning: magmatic and some tapered; Texture: Granular plagioclase with pyroxene and olivine in a granular to interstitial texture
Clinopyroxene:	Grain size: medium-grained; Grain shape: subhedral; Grain boundary: straight to curved; Texture: clinopyroxene with exsolution lamellae
Oxide:	interstitial oxide

THIN SECTION LABEL ID: **179-1105A-1R-4-W 95/98-TSB-TSS** Piece no.: #05 TS no.:

Group	Summary
Igneous petrology:	Medium- to coarse-grained olivine gabbro; clinopyroxene partly replaced by amphibole
Metamorphic petrology:	Total static alteration intensity is moderate. Alteration minerals indicate amphibolite to subgreenschist facies.
Structure:	Undeformed olivine gabbro with subophitically intergrown plagioclase and olivine.

Plane-polarized



32825921

Cross-polarized

32825941

IGNEOUS PETROLOGY

Lithology: **olivine gabbro medium grained** Observer:

Texture: subophitic Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	10	4	4	4	anhedral	subequant	Heterogeneously distributed
Plagioclase	55	1	7	3	anhedral	subequant	
Clinopyroxene	34	0.4	4	3	anhedral	subequant	Partly replaced by amphibole
Opaques	1						
Magnetite	1						

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 15 Observer(s): TN

Detailed description Olivine is replaced by talc pseudomorphically or at rims, by serpentine and brown clay along fractures; clinopyroxene by brown and colorless amphiboles at rims; and plagioclase has microcracks filled with chlorite or replaced by secondary plagioclase along fractures.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	40	10		10
Amphibole, brown	n/a	50	n/a	n/a
Amphibole, colorless	10	50		10
Chlorite				80
Clay minerals	10			
Oxide	4			n/a
Plagioclase, sec.	n/a	n/a	n/a	10
Sulfide	1			n/a
Talc	60	n/a		n/a
Subtotals replaced	100	100		100

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: magmatic Observer: OP

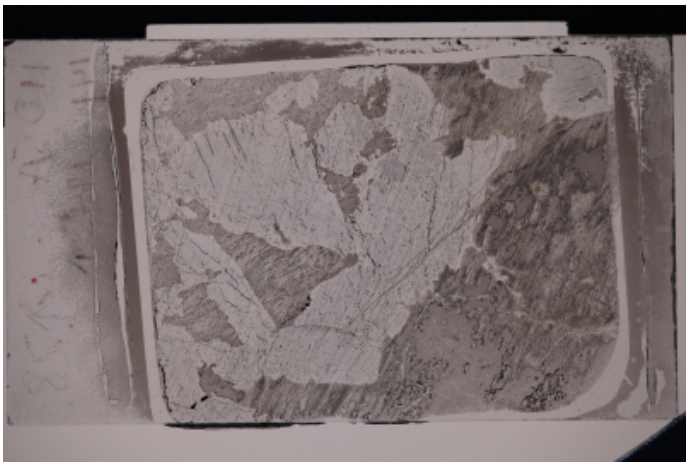
Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF fabric intensity:	undeformed [CPF_fabric]	0

Type	Comment
Olivine:	Grain size: coarse-grained; Grain shape: subhedral; Grain boundary: straight to curved; Undulose extinction: regular; Texture: olivine phenocryst with deformation bands
Plagioclase:	Grain size: coarse-grained; Grain shape: euhedral to subhedral; Grain boundary: straight to curved; Undulose extinction: irregular Twinning: tapered; Texture: Plagioclase subophitically intergrown with olivine, numerous inclusions
Clinopyroxene:	Grain size: coarse-grained; Grain shape: subhedral; Grain boundary: curved; Undulose extinction: regular; Texture: oikocrystic to intersertal clinopyroxene rimmed by amphibole

THIN SECTION LABEL ID: **179-1105A-1R-4-W 141/144-TSB-TSS** Piece no.: #08 TS no.:

Group	Summary
Igneous petrology:	Very coarse-grained, isotropic and undeformed gabbro
Metamorphic petrology:	The rock shows a slight alteration mostly into pale-green amphibole and chlorite.
Structure:	Gabbro with mechanically deformed plagioclase and clinopyroxene rims replaced by amphibole.

Plane-polarized



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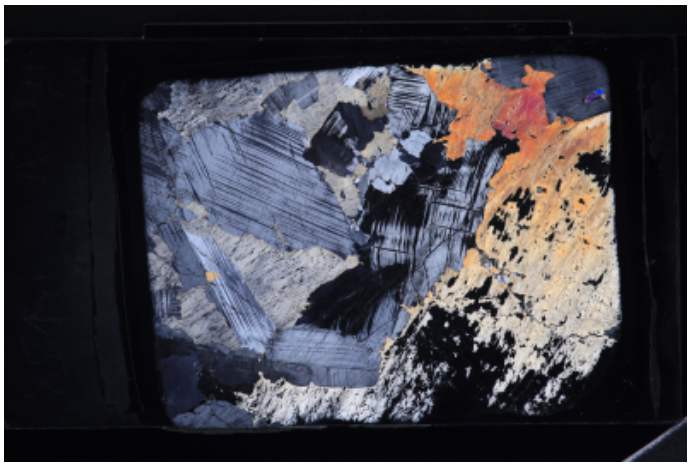
Cross-polarized



32825981

IGNEOUS PETROLOGY

Lithology: **gabbro coarse grained** Observer:

Texture: granular Ave. grain size: coarse grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	55	0.6	16	8	subhedral	tabular	
Clinopyroxene	42	0.4	20	15	anhedral	subequant	
Amphibole	2	0.04	0.6	0.1	anhedral		Brown amphibole as patchy on cpx
Opaques	1						
Magnetite	1						

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 5 Observer(s): RT

Detailed description The rock shows a slight alteration mostly into pale-green amphibole and chlorite.

Comment type	Comment
Alteration general comments:	The rock shows a slight alteration mostly into pale-green amphibole and chlorite.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)		5		5
Amphibole, brown	n/a	50	n/a	n/a
Amphibole, colorless				20
Amphibole, green		50		
Chlorite				60
Plagioclase, sec.	n/a	n/a	n/a	20
Subtotals replaced		100		100

MICROSTRUCTURES

Interval domain no: 1 Domain rel. abundance (%): 100 Domain name: microfabric

Microstructure: magmatic Observer: CF

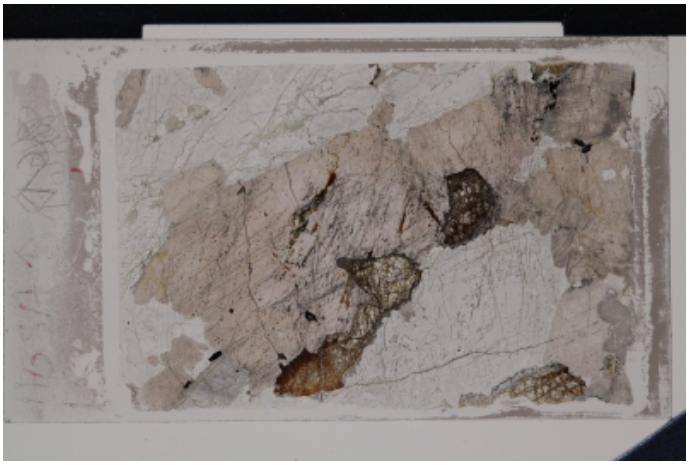
Feature type	Observation	Intensity rank
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	isotropic	0
CPF dynamic recrystallization:	absent	n/a
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	common	n/a

Type	Comment
Plagioclase:	coarse and subhedral, straight grain boundaries, magmatic twinning and mechanical twinning, regular undulose extinction, fractured grains
Clinopyroxene:	coarse and anhedral, straight to serrate grain boundaries, fractured grains
Oxide:	anhedral pod

THIN SECTION LABEL ID: **179-1105A-1R-5-W 137/141-TSB-TSS_1** Piece no.: #10 TS no.:

Group	Summary
Igneous petrology:	Point count 2000 points (Leg 179). Granular intergrowth of olivine, augite and plagioclase with incipient talc/chlorite (?)-magnetite ol alteration in small fractures and at mineral edges. No spinel, but traces of ilmenite + pyrite inclusions occur in olivine. Olivine has subgrains. Some fine exsolution in clinopyroxene. Undulose extinction and deformation twins in unzoned plagioclase.
Structure:	Coarse-grained, undeformed olivine gabbro with granular intergrowth of olivine, plagioclase and clinopyroxene. Deformation bands in olivine

Plane-polarized



32826001

Cross-polarized

32826021

IGNEOUS PETROLOGY

Lithology: **olivine gabbro** Observer:

Texture: Granular Ave. grain size:

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	11.2	4	4		anhedral	Irregular	
Plagioclase	29	2	8		anhedral		
Clinopyroxene	55.3	1	5		anhedral		
Orthopyroxene	4.2						3
Amphibole	trace	0.01	0.1				
Opaques	0.8						
Magnetite	0.8						
Ilmenite	trace						
Sulfide	trace						

MICROSTRUCTURES

Microstructure: magmatic Observer:

Detailed description Overall coarse grained magmatic texture composed of mechanically deformed plagioclase in straight to curved contact with altered olivine and clinopyroxene. There is a coarse grained orthopyroxene in the center of the thin section, marked by subhedral to anhedral shape, high incidence of fractures and alteration veins crosscuting the cleavage.

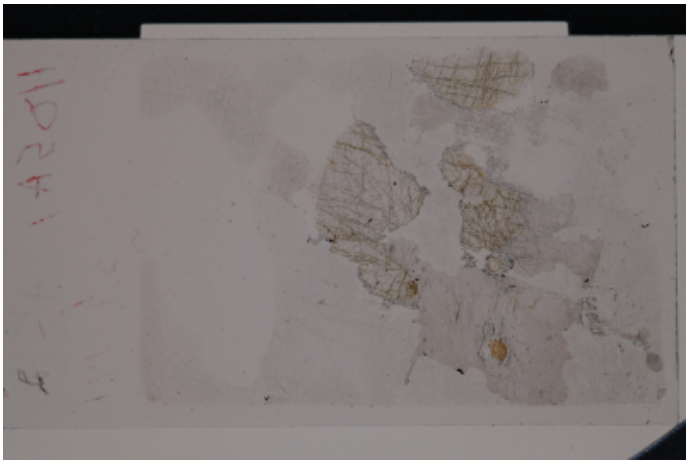
Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF dynamic recrystallization:	absent	n/a
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	common	n/a

Type	Comment
Olivine:	coarse fractured grains in curved contact with plagioclase. The fractures might be filled by oxides and undulose extinction is common.
Plagioclase:	coarse grains with mechanical twins and abundant fractures. Mostly subhedral with straight contacts with clinopyroxene. Can locally display globular or "drop like" boundary geometries, suggesting crystallization from melt.
Clinopyroxene:	medium sized grains with anhedral shapes and curved/wavy contacts with plagioclase and olivine. Contacts with olivine may be marked by a reaction front. Local alterarion veins cross-cutting the cleavage.

THIN SECTION LABEL ID: **179-1105A-1R-5-W 137/141-TSB-TSS_2** Piece no.: #10 TS no.:

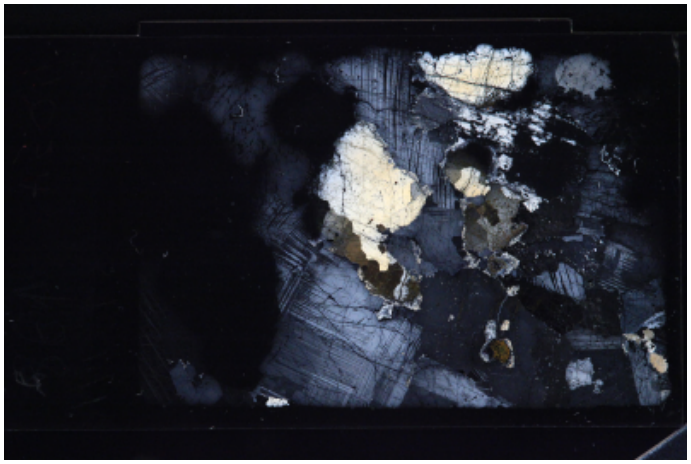
Group	Summary
Igneous petrology:	Coarse-grained, isotropic and undeformed olivine gabbro with mechanically deformed plagioclase and clinopyroxene partly or completely replaced by amphibole. Spinel occurs as inclusion within olivine. Fractures are common.
Metamorphic petrology:	The alteration intensity of this thin section is moderate.
Structure:	Coarse-grained, undeformed olivine gabbro with granular intergrowth of olivine, plagioclase and clinopyroxene. Deformation bands in olivine

Plane-polarized



33228001

Cross-polarized



33228021

IGNEOUS PETROLOGY

Lithology: **olivine gabbro coarse grained** Observer:

Texture: granular Ave. grain size: coarse grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	15	0.4	0.4	7	anhedral	subequant	
Plagioclase	54	1	11	6	anhedral	tabular	
Clinopyroxene	30	1	11	5	anhedral	subequant	partly replaced by amphibole
Spinel	0.2	0.1	0.2	0.2	anhedral	poikilitic	occuring as inclusions within olivine
Opaques	1						
Magnetite	0.3						
Ilmenite	0.1						
Sulfide	0.6						

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 12 Observer(s): QM

Detailed description The alteration intensity of this thin section is moderate. Ol developed typical mesh textures. The mesh core are fresh oivine and the mesh rim mainly consist of serpentine, clay and oxides. Cpx altered into colorless amphibole, brown amphibole and clay. Pl are mostly replaced by secondary plagioclase with chlorite occurring in the cleavages.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	15	15		10
Amphibole, brown	n/a	10	n/a	n/a
Amphibole, colorless		75		
Chlorite				20
Clay minerals	10	15		5
Oxide	10			n/a
Plagioclase, sec.	n/a	n/a	n/a	75
Talc	40	n/a		n/a
Subtotals replaced	90	100		100

MICROSTRUCTURES

Microstructure: magmatic Observer:

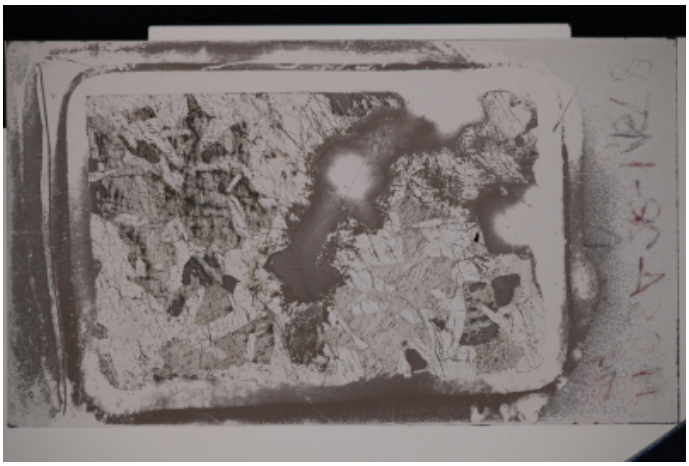
Detailed description second part of sample 1105A-1R-5-W (this is 1R-5-W-II). Magmatic texture with coarse plagioclase grains and medium anhedral olivine crystals. plagioclase commonly shows mechanical twinning and thin fractures filled by dark-blue coloured material (chlorite?). Olivine is intensively fractured and altered to a fibrous mass at the contacts with plagioclase.

Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF dynamic recrystallization:	absent	n/a
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	common	n/a

THIN SECTION LABEL ID: **179-1105A-2R-1-W 79/82-TSB-TSS** Piece no.: #06 TS no.:

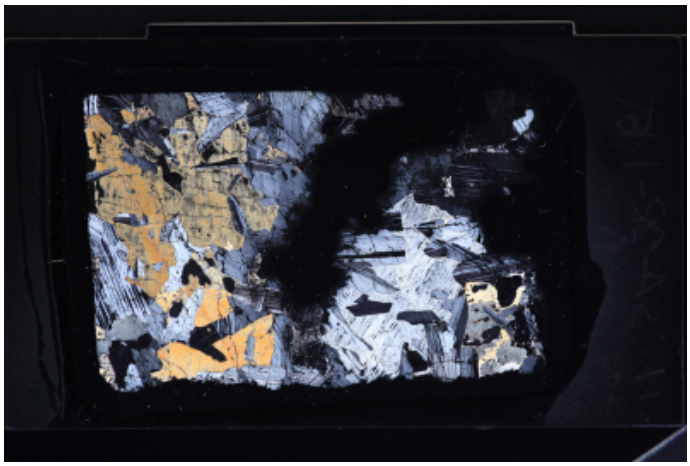
Group	Summary
Metamorphic petrology:	The rock shows a moderate alteration that is mostly confined to olivine.
Structure:	Isotropic and undeformed gabbro with mechanically deformed plagioclase and fractured olivine.

Plane-polarized



32826091

Cross-polarized



32826111

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 20 Observer(s): RT

Detailed description The rock shows a moderate alteration that is mostly confined to olivine.

Comment type	Comment
Alteration general comments:	The rock shows a moderate alteration that is mostly confined to olivine.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	80	20		10
Amphibole, colorless	50	30		
Chlorite				60
Clay minerals	10	40		20
Clinopyroxene, sec.	n/a	30	n/a	n/a
Oxide	10			n/a
Plagioclase, sec.	n/a	n/a	n/a	20
Talc	30	n/a		n/a
Subtotals replaced	100	100		100

MICROSTRUCTURES

Microstructure: magmatic Observer:

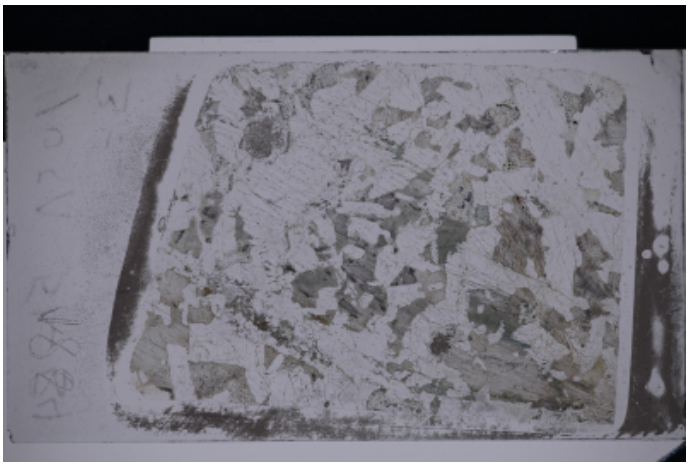
Detailed description Magmatic texture characterized by coarse subhedral to anhedral plagioclase in straight contact anhedral olivine. Fractures are common in both phases and olivine shows alteration rims. Mechanical twins are observed in plagioclase, and undulose extinction is present in both phases. Oxides can be observed as pools in contact with plagioclase and olivine.

Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF dynamic recrystallization:	absent	n/a
CPF fabric intensity:	undeformed [CPF_fabric]	0

THIN SECTION LABEL ID: **179-1105A-3R-1-W 51/54-TSB-TSS** Piece no.: #03 TS no.:

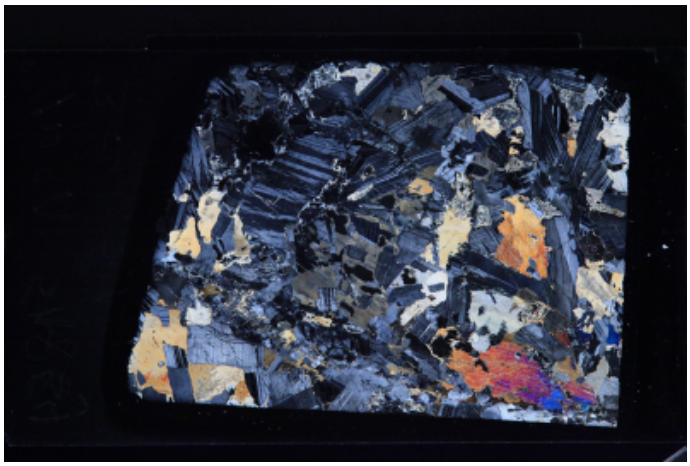
Group	Summary
Igneous petrology:	Undeformed gabbro
Metamorphic petrology:	Static alteration intensity is moderate. Minerals indicate amphibolite to greenschist facies alteration.
Structure:	Isotropic and undeformed gabbro with common fractures.

Plane-polarized



32920221

Cross-polarized



32920241

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 20 Observer(s): TN

Detailed description Olivine and orthopyroxene are completely altered to pseudomorphs of talc + tremolite and chlorite + tremolite, respectively; clinopyroxene is replaced by secondary clinopyroxene patchily and by amphiboles at rims; plagioclase is replaced by epidote and secondary plagioclase patchily or along fractures, and has fractures filled with chlorite and minor amounts of green and colorless amphiboles.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	100	20	100	20
Amphibole, brown	n/a	20	n/a	n/a
Amphibole, colorless	35	20	15	10
Amphibole, green		40	5	5
Chlorite			80	50
Clinopyroxene, sec.	n/a	20	n/a	n/a
Epidote/zoisite	n/a	n/a	n/a	20
Oxide	4			n/a
Plagioclase, sec.	n/a	n/a	n/a	15
Sulfide	1			n/a
Talc	60	n/a		n/a
Subtotals replaced	100	100	100	100

MICROSTRUCTURES

Microstructure: magmatic Observer:

Detailed description Magmatic fabric with altered clinopyroxene in curved contact with coarse grained subhedral to anhedral plagioclase. Fractures are common.

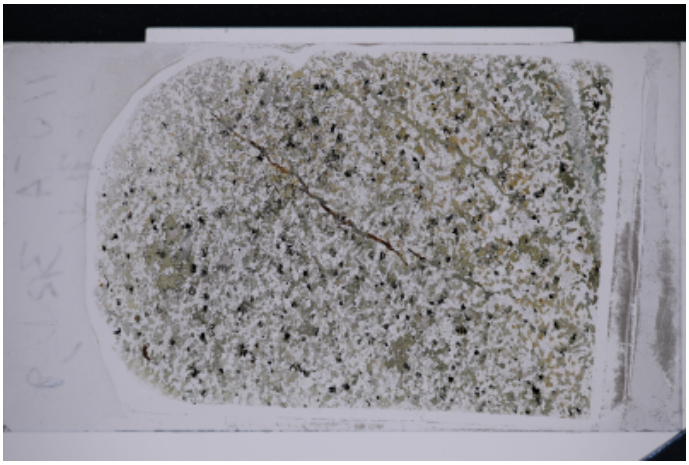
Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	common	n/a

THIN SECTION LABEL ID: **179-1105A-3R-2-W 87/91-TSB-TSS** Piece no.: #09 TS no.:

Group **Summary**

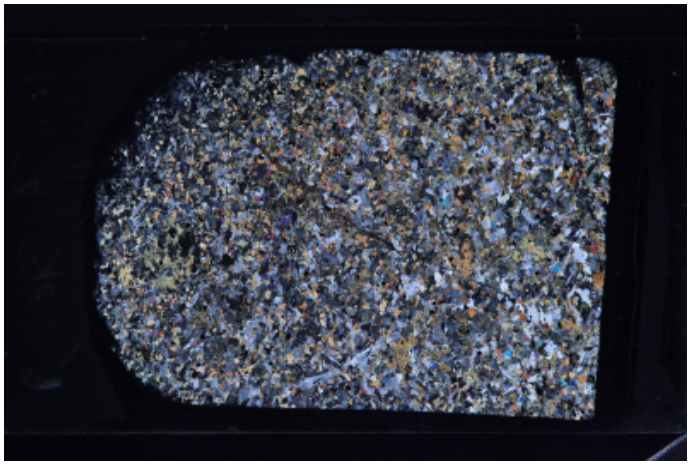
Structure: Undeformed gabbro with weak magmatic fabric defined by elongated subhedral plagioclase and clinopyroxene. Fractures are rare.

Plane-polarized



32920261

Cross-polarized



32920281

MICROSTRUCTURES

Microstructure: magmatic Observer: CF

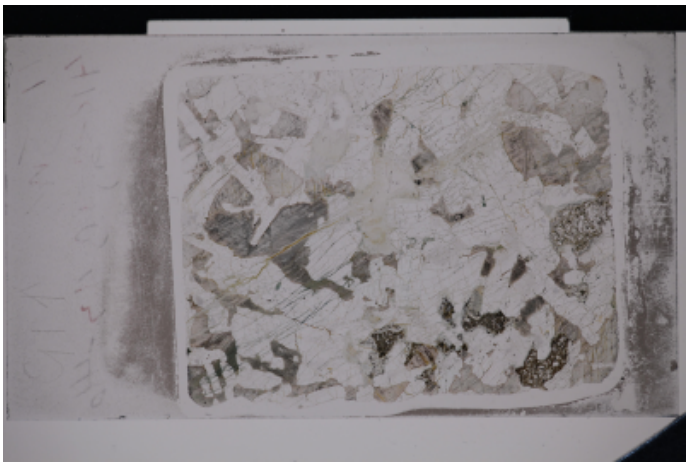
Feature type	Observation	Intensity rank
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	weak	1
CPF dynamic recrystallization:	absent	n/a
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	rare	n/a

THIN SECTION LABEL ID: **179-1105A-4R-2-W 43/46-TSB-TSS** Piece no.: #01 TS no.:

Group **Summary**

Structure: Largely undeformed, granular-poikilitic olivine gabbro

Plane-polarized



32826251

Cross-polarized

32826271

METAMORPHIC PETROLOGY

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	20	35		15
Amphibole, brown	n/a	5	n/a	n/a
Amphibole, colorless	5	50		10
Chlorite	10	40		90
Clay minerals	35			
Oxide	10	5		n/a
Talc	40	n/a		n/a
Subtotals replaced	100	100		100

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: submagmatic Observer: OP

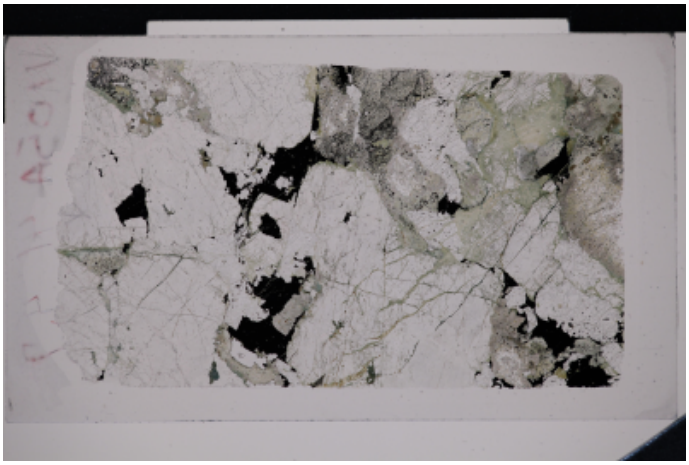
Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	common	n/a

Type	Comment
Olivine:	Grain-size: coarse-grained; Grain shape: anhedral; Grain boundary: straight to curved; Texture: extensively altered
Plagioclase:	Grain size: coarse-grained; Grain shape: anhedral to subhedral; Grain boundary: straight to curved; Twinning: tapered and magmatic;
Clinopyroxene:	Grain size: coarse-grained; Grain shape: anhedral; Grain boundary: straight to curved;
Oxide:	interstitial; spatially associated with pyroxene

THIN SECTION LABEL ID: **179-1105A-4R-4-W 57/62-TSB-TSS_1** Piece no.: #07 TS no.:

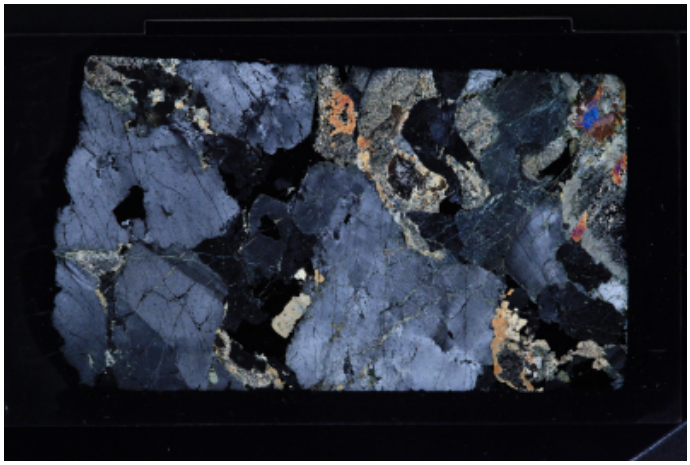
Group	Summary
Igneous petrology:	Coarse-grained oxide gabbro, with felsic patches; clinopyroxene has been partly or completely replaced by amphibole; felsic patches commonly surround plagioclase; contain a small amount of sulfides
Structure:	Weakly deformed with preserved magmatic texture. Deformation is recorded in plagioclase partially and locally recrystallized.

Plane-polarized



32832631

Cross-polarized



32832651

IGNEOUS PETROLOGY

Lithology: **oxide-bearing gabbro medium grained** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	37	3	11	6	anhedral	subequant	
Clinopyroxene	30	1	8	5	anhedral	subequant	partly or completely replaced by amphibole
Amphibole	3	0.02	0.4	0.1	anhedral	interstitial	
Opaques	10						
Magnetite	10						
Oxide	10	0.1	10	4	anhedral	equant	
Quartz	10	0.2	1	0.3	anhedral	subequant	

MICROSTRUCTURES

Microstructure: magmatic Observer: CF

Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	isotropic	0
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	weak	n/a
CPF fabric intensity:	weakly foliated/lineated [CPF_fabric]	1
Fracture abundance:	common	n/a

Type	Comment
Plagioclase:	Grain size: coarse porphyroclasts and fine recrystallized Grain shape: subhedral to anhedral Grain boundary: straight to curved Twining: tapered Undulose extinction: regular and common Texture: porphyroclastic partially recrystallized
Clinopyroxene:	Grain size: coarse Grain shape: subhedral Grain boundary: straight to curved Texture: intensively altered
Oxide:	anhedral, may form interstitial and irregular pods.

Microstructure: magmatic Observer: CF

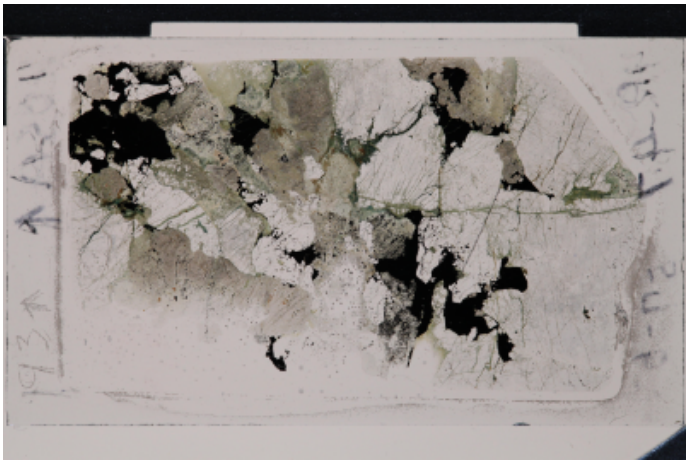
Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	isotropic	0
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	weak	n/a
CPF fabric intensity:	weakly foliated/lineated [CPF_fabric]	1
Fracture abundance:	common	n/a

Type	Comment
Plagioclase:	Grain size: coarse porphyroclasts and fine recrystallized Grain shape: subhedral to anhedral Grain boundary: straight to curved Twining: tapered Undulose extinction: regular and common Texture: porphyroclastic partially recrystallized
Clinopyroxene:	Grain size: coarse Grain shape: subhedral Grain boundary: straight to curved Texture: intensively altered
Oxide:	anhedral, may form interstitial and irregular pods.

THIN SECTION LABEL ID: **179-1105A-4R-4-W 57/62-TSB-TSS_2** Piece no.: #07 TS no.:

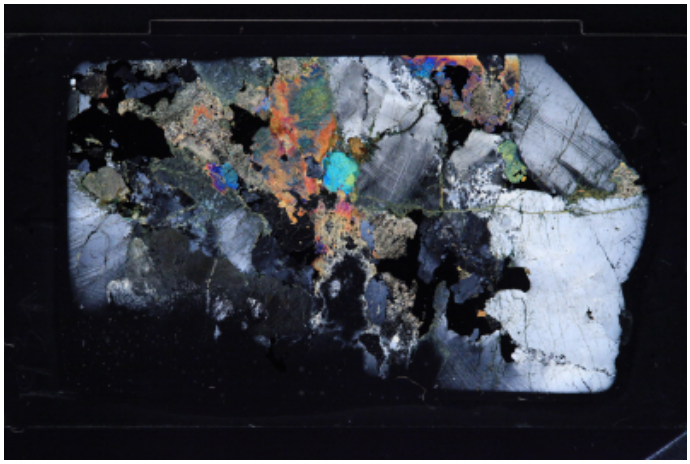
Group	Summary
Igneous petrology:	Coarse-grained oxide gabbro; clinopyroxene has been partly or completely replaced by amphibole; oxides are interstitial between plagioclase and clinopyroxene or disseminated in amphibole; it contains ~ 1% apatite.
Structure:	Weakly deformed with preserved magmatic texture. Deformation is recorded in plagioclase partially and locally recrystallized.

Plane-polarized



33227921

Cross-polarized



33227941

IGNEOUS PETROLOGY

Lithology: **oxide-bearing gabbro coarse grained** Observer:

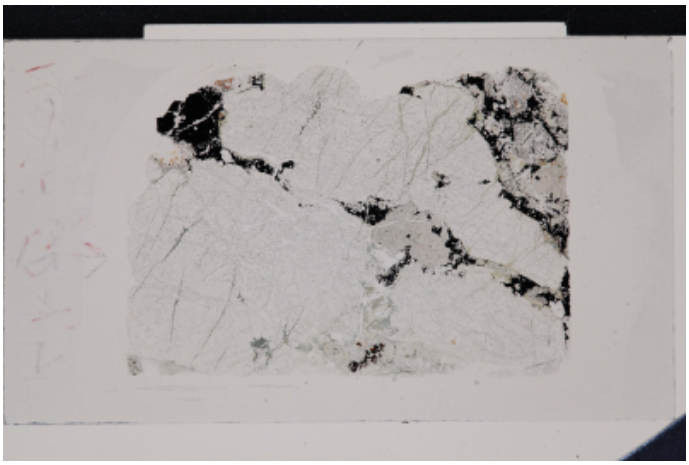
Texture: granular Ave. grain size: coarse grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	50	1	8	5	anhedral	equant	
Clinopyroxene	25	1	12	4	anhedral	subequant	Partly or completely replaced by amphibole
Amphibole	10	0.02	0.04	0.02	anhedral	elongate	
Opaques	14						
Magnetite	14						

THIN SECTION LABEL ID: **179-1105A-5R-1-W 115/118-TSB-TSS_1** Piece no.: #07 TS no.:

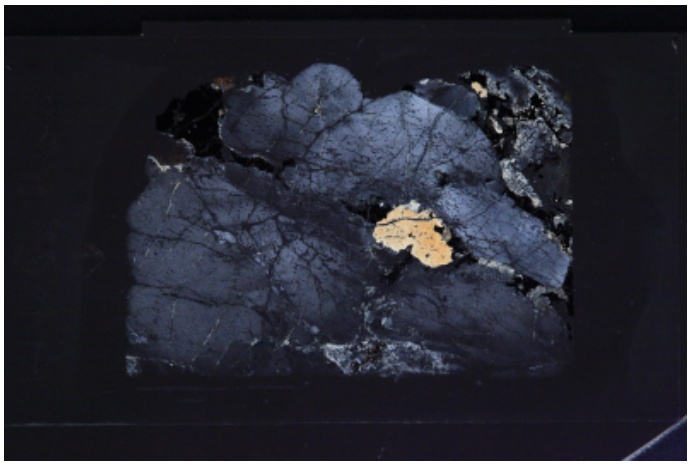
Group	Summary
Igneous petrology:	The rock is a porphyroclastic to gneissic oxide gabbro, originally a cumulate. Most of it is very fine grained with equant crystals of plagioclase and clinopyroxene each on the order of 0.1 mm and with several per cent of rounded clinopyroxene porphyroclasts up to 2 mm in diameter. There are also recrystallized and elongate lozenges of plagioclase, formerly large crystals, but now having a fine-grained mosaic fabric stretched along a principal foliation in the rock. Bands of intergrown clinopyroxene and plagioclase make up most of the rock, alternate with stretched out mosaic plagioclase, and are steeply inclined with respect to the vertical arrow on the slide. The intergrowths of mosaic clinopyroxene and plagioclase are laden with 10-20% mosaic ilmenite, also about 0.1 mm in diameter, that tends to surround or enclose fine plagioclase and clinopyroxene grains. Traces of sulfide (mainly pyrite) occur in these intergrowths. The clinopyroxene porphyroclasts enclose larger than average crystals of ilmenite and some sulfide. The order of crystallization/segregation was 1) plagioclase and clinopyroxene; 2) ilmenite + minor brown amphibole; and 2) segregation of sulfides; The rock was formerly coarser grained, was deformed in the presence of oxide-precipitating melts and the oxide minerals in turn were subject to crystal-plastic deformation. Some of the fine-grained mosaic plagioclase and clinopyroxene appears to be matrix-supported by interstitial ilmenite. That may have precipitated from melts that migrated through and filled the late-stage porosity structure of the deformed rock. I could not identify small amounts of altered olivine and green secondary amphibole reported in the Leg 179 description.
Structure:	oxide gabbro with a coarse granular texture. Plagioclase is observed as coarse grains mantled by fine recrystallized crystals. Oxide pods may rim the coarse grains. Cpx is fractured and may be contained within the oxide pods.

Plane-polarized



32826171

Cross-polarized

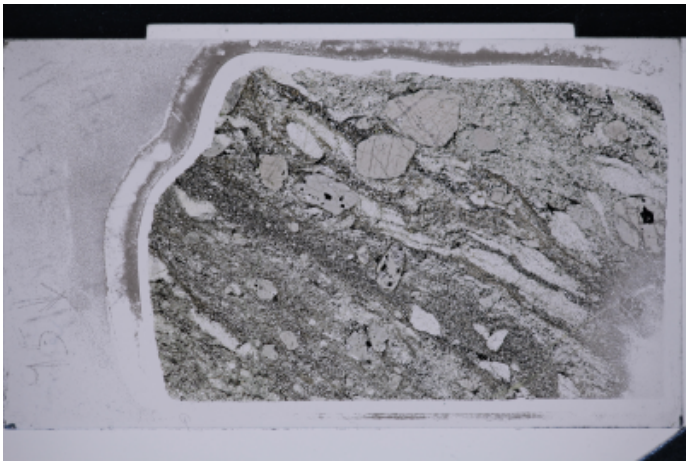


32826191

THIN SECTION LABEL ID: **179-1105A-5R-1-W 144/147-TSB-TSS** Piece no.: #09 TS no.:

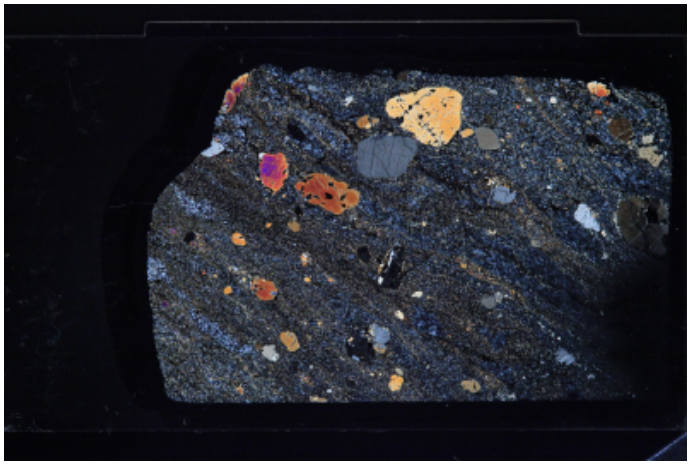
Group	Summary
Structure:	Protomylonitic deformed oxide gabbro with recrystallized plagioclase and clinopyroxene. Subhedral oxides are included in coarse clinopyroxene or in bands parallel to crystal plastic foliation.

Plane-polarized



32920621

Cross-polarized



32920641

MICROSTRUCTURES

Microstructure: crystal-plastic Observer: CF

Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	equigranular	n/a
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	isotropic	0
CPF subgrain boundary shape:	serrate	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	porphyroclastic/protomylonitic [CPF_fabric]	3
Fracture abundance:	rare	n/a

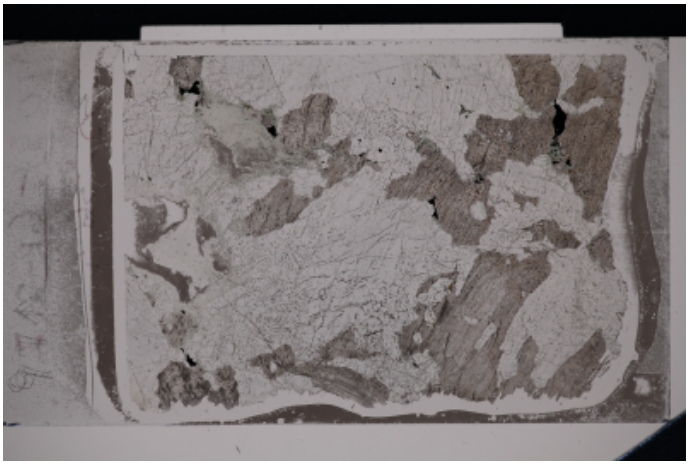
Type	Comment
Plagioclase:	mechanical twinning and regular undulose extinction, recrystallized phase
Clinopyroxene:	subhedral to rounded and coarse to fine grained, serrate grain boundary, coarse clinopyroxene are fractured, fine grained recrystallized
Oxide:	rectangular to subrectangular pods in coarse clinopyroxene and bands parallel to foliation

THIN SECTION LABEL ID: **179-1105A-6R-2-W 32/36-TSB-TSS** Piece no.: #02, #03 TS no.:

Group **Summary**

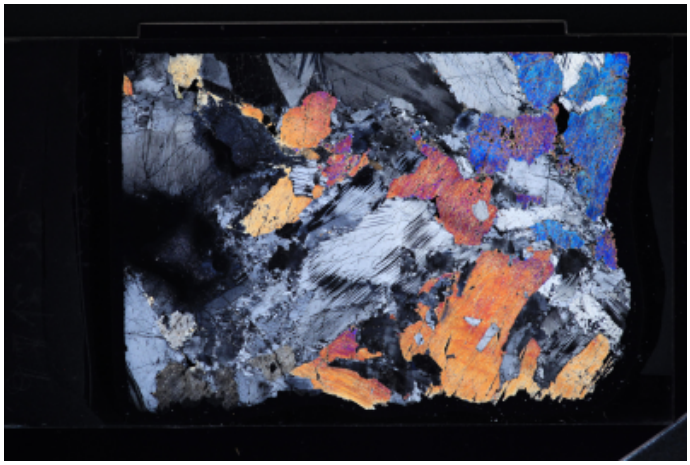
Structure: Partially deformed oxide gabbro with weak crystal plastic foliation and recrystallized plagioclase. Oxides are in interstitial pods.

Plane-polarized



32832751

Cross-polarized



32832771

MICROSTRUCTURES

Interval domain no: 1 Domain rel. abundance (%): 95 Domain name: microfabric

Microstructure: magmatic Observer: CF

Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF subgrain boundary shape:	straight	n/a
CPF dynamic recrystallization:	absent	n/a
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	common	n/a

Type	Comment
Plagioclase:	euhedral to subhedral, magmatic and mechanical twinning, regular undulose extinction
Clinopyroxene:	coarse and poikilitic, curved grain boundaries, fractured
Oxide:	interstitial pods

Interval domain no: 2 Domain rel. abundance (%): 5 Domain name: microfabric

Microstructure: crystal-plastic Observer: CF

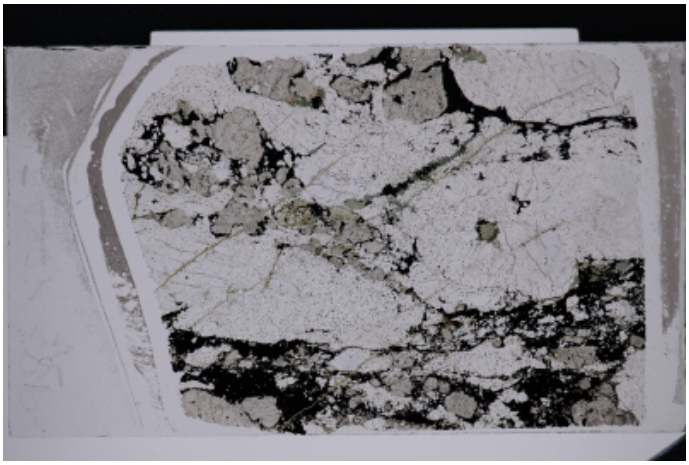
Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	isotropic	0
CPF subgrain boundary shape:	serrate	n/a
CPF dynamic recrystallization:	weak	n/a
CPF fabric intensity:	weakly foliated/lineated [CPF_fabric]	1
Fracture abundance:	rare	n/a

Type	Comment
Plagioclase:	mechanical twinning and regular undulose extinction, recrystallized phase

THIN SECTION LABEL ID: **179-1105A-7R-3-W 33/36-TSB-TSS** Piece no.: #02 TS no.:

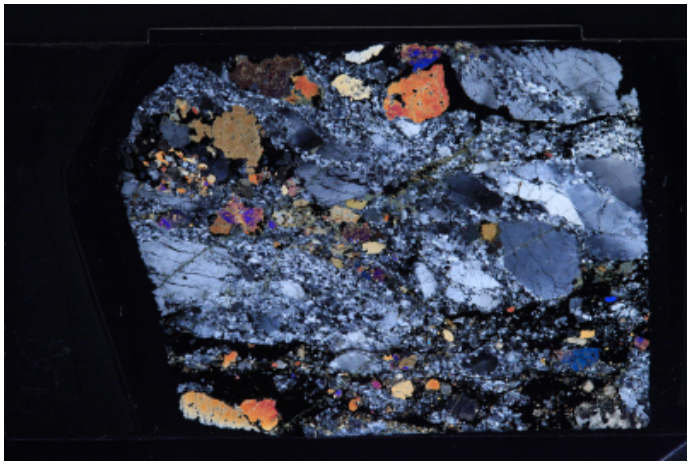
Group	Summary
Structure:	Strongly deformed oxide gabbro with recrystallized inequigranular plagioclase. Oxides are interstitial and in bands parallel to the crystal plastic foliation.

Plane-polarized



32920301

Cross-polarized



32920321

MICROSTRUCTURES

Microstructure: crystal-plastic Observer: CF

Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	inequigranular	n/a
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	isotropic	0
CPF subgrain boundary shape:	straight	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	strongly foliated/lineated [CPF_fabric]	2
Fracture abundance:	common	n/a

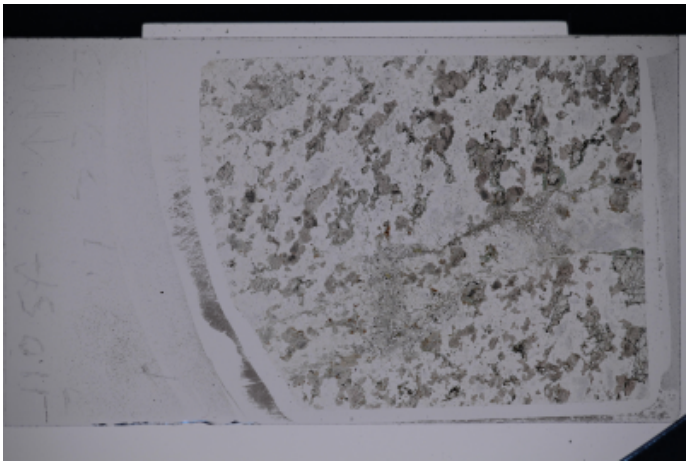
Type	Comment
Plagioclase:	coarse to fine recystallized grain,euhedral, mechanical twinning and regular undulose extinction
Clinopyroxene:	predominantly coarse grain, serrate grain boundaries, fractured, poikilitic
Oxide:	band parallel to foliation, and interstitial pods

THIN SECTION LABEL ID: **179-1105A-7R-4-W 30/33-TSB-TSS** Piece no.: #07 TS no.:

Group **Summary**

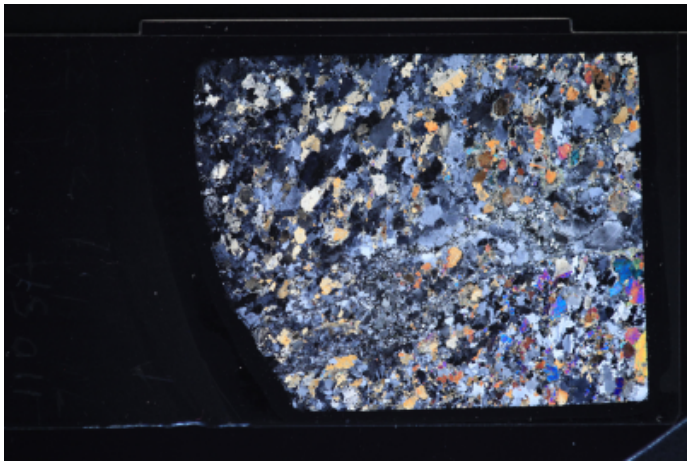
Structure: Disseminated oxide gabbro weakly recrystallized with foliation defined by oriented clinopyroxene. Fractures are common and composed of oxides plagioclase. Alteration veins are observed.

Plane-polarized



32920341

Cross-polarized



32920361

MICROSTRUCTURES

Microstructure: crystal-plastic Observer:

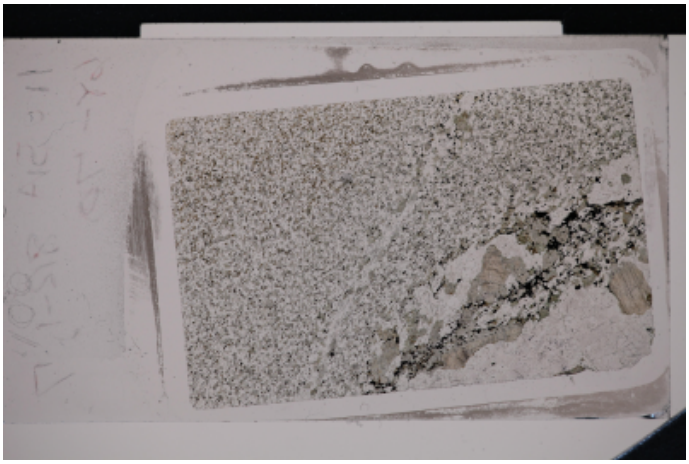
Detailed description weakly recrystallized rock consisting of coarse plagioclase grains in curved contact with oriented clinopyrexene. The latter define a solid state foliation. Plagioclase grains show mechanical twins, subgrains and fractures that can be locally filled with fine-grained recrystallized Plag grains. Clinopyroxene displays fractures and local undulose extinction. Major fractures are observed crosscutting all phases in the rock; these are composed of a mixture of oxides + plagioclase, and might be derived from melt/fluid infiltration. Plagiolcase grains within these cracks are strain-free. Olivine is observed as medium-size anhedral grains; Fractures are widespread and can be filled with alteration products (serpentine? Oxides?). The fractures may generate local cataclastic zones filled with fine-grained plagioclase and clinopyroxene grains.

Feature type	Observation	Intensity rank
Recrystallization grain size:	medium grained [BGS]	n/a
Recrystallization grain shape:	inequigranular	n/a
Intensity of dynamic recrystallization:	weak	n/a
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	weakly foliated/lineated [CPF_fabric]	1
Fracture abundance:	common	n/a

THIN SECTION LABEL ID: **179-1105A-8R-1-W 68/70-TSB-TSS** Piece no.: #07 TS no.:

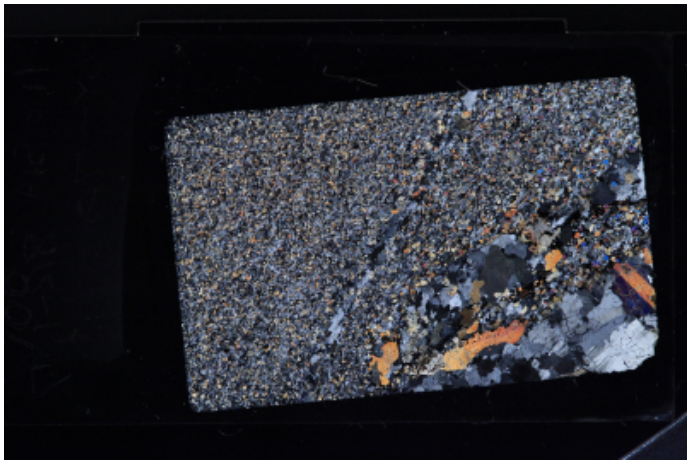
Group	Summary
Igneous petrology:	This thin section mainly consist of oxide gabbro mylonite, which is tranisitonal to coarse-grained oxide gabbronorite; in the mylonite, abundant brown amphibole and small amount of apatite are present; it may contain tiny zircons; plagioclase is recrystallized; opaque minerals are mainly ilmenite, but small amount of sulfides are present. In the coarse-grained gabbronorite, plagioclase is fresh but both clinopyroxene and orthopyroxene are rimmed by green amphibole; clinopyroxene contain chadacrysts of ilmenite and plagioclase; orthopyroxene is more altered than clinopyroxene, with brown amphibole patches.
Metamorphic petrology:	Sample consist of two domains: a substantially altered coarse grained gabbro and a moderately altered fine grained gabbro. Cpx and Opx are rimmed by green and brown amphibole. Brown amphibole are abundant in the fine grained domain of the sample.
Structure:	Undeformed preserved magmatic texture with weakly developped fabric.

Plane-polarized



32832711

Cross-polarized



32832731

IGNEOUS PETROLOGY

Interval domain no: **1** Domain rel. abundance (%): 20 Domain name: Coarse-grained oxide gabbronorite

Lithology: **oxide-bearing gabbronorite coarse grained** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	55	0.8	5	3	subhedral	tabular	
Clinopyroxene	30	0.8	4	3	anhedral	tabular	rimmed by brown amphibole
Orthopyroxene	10	2.8	4	3	anhedral	subequant	3
Opaques	5						
Ilmenite	5						

Interval domain no: **2** Domain rel. abundance (%): 80 Domain name: Foliated oxide gabbro

Lithology: **oxide-bearing gabbro foliated** Observer:

Texture: granular Ave. grain size: fine grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	40	0.1	1	0.6	anhedral	equant	
Clinopyroxene	30	0.05	0.4	0.1	anhedral	equant	
Amphibole	15	0.01	0.2	0.1	anhedral	interstitial	
Opaques	15						
Ilmenite	13						
Sulfide	2						

METAMORPHIC PETROLOGY

Interval domain no: 1 Domain rel. abundance (%): 25 Domain name:

Total rock alteration estimate (%): 40 Observer(s): JL

Detailed description Sample is substantially altered. Green, brown and pale amphibole replace clinopyroxene and orthopyroxene. Plagioclase grains are characterized by growth of hydrogrossular in the lath center.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)		50	60	30
Amphibole, brown	n/a	30	n/a	n/a
Amphibole, colorless		50	60	
Amphibole, green		20	40	
Chlorite				10
Garnet	n/a	n/a	n/a	20
Plagioclase, sec.	n/a	n/a	n/a	70
Other			100	100
Subtotals replaced		100	200	100

Interval domain no: 2 Domain rel. abundance (%): 75 Domain name:

Total rock alteration estimate (%): 15 Observer(s): JL

Detailed description Sample is moderately altered. Fine grained plagioclase seems fresh. On the other hand, Cpx and Opx are substantially rimmed by pale green amphibole. Significant occurrence of brown amphibole.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)		50	30	0
Amphibole, brown	n/a	90	n/a	n/a
Amphibole, colorless		10	100	
Subtotals replaced		100	100	

MICROSTRUCTURES

Interval domain no: 1 Domain rel. abundance (%): Domain name: microfabric

Microstructure: magmatic Observer: CF

Feature type	Observation	Intensity rank
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	isotropic	0
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	rare	n/a

Type	Comment
Plagioclase:	coarse grained
Clinopyroxene:	coarse grained

Interval domain no: 2 Domain rel. abundance (%): Domain name: microfabric

Microstructure: magmatic Observer: CF

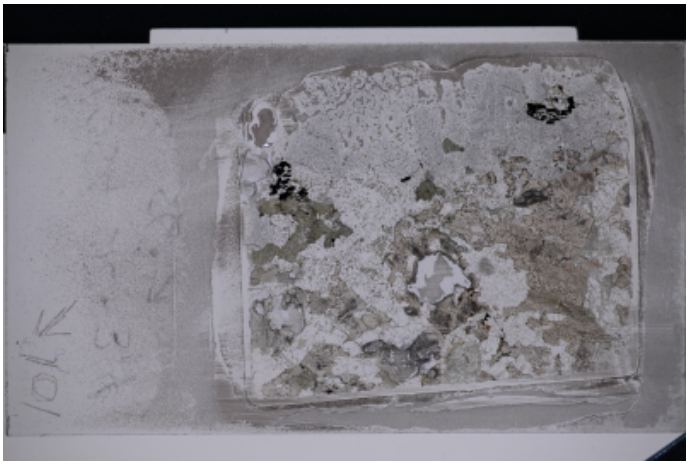
Feature type	Observation	Intensity rank
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	moderate	2
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	absent	n/a

Type	Comment
Olivine:	fine grained
Plagioclase:	fine grained
Clinopyroxene:	fine grained
Oxide:	fine grained

THIN SECTION LABEL ID: **179-1105A-8R-3-W 53/56-TSB-TSS** Piece no.: #04 TS no.:

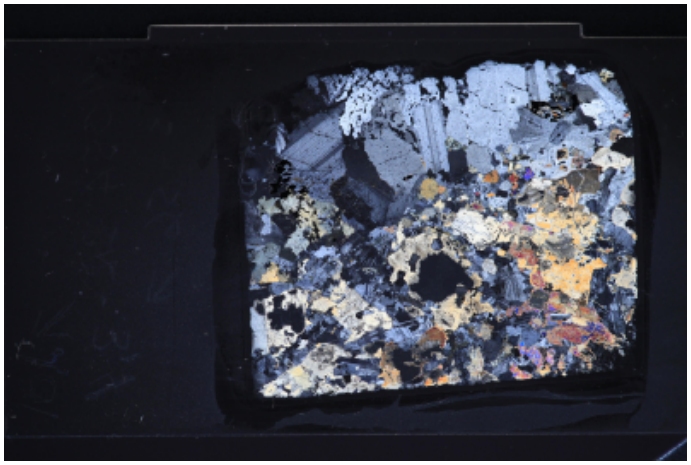
Group	Summary
Igneous petrology:	Undeformed medium-grained oxide gabbro. Plagioclase is variably mechanically deformed and occassionally occur as chadacryst within clinopyroxene. Clinopyroxene has been partly replaced by amphibole.
Metamorphic petrology:	The alteration intensity of this thin section is substantial.
Structure:	Magmatic texture marked by minor crystal-plastic features.

Plane-polarized



32920381

Cross-polarized



32920401

IGNEOUS PETROLOGY

Lithology: **disseminated oxide gabbro medium grained** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	55	0.4	5	1	subhedral	equant	
Clinopyroxene	46	0.2	3	2	anhedral	subequant	
Amphibole	4	0.2	1	0.5	anhedral	elongate	
Opaques	4						
Magnetite	1						

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 40 Observer(s): QM

Detailed description The alteration intensity of this thin section is substantial. Ol totally altered into pseudomorphic talc with oxide and colorless amphibole. Cpx mainly altered into tiny colorless amphibole with clay and minor brown amphibole. Pl alteration characterized by the occurrence of tiny colorless amphibole in the cleavages.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	100	40		35
Amphibole, colorless	20	75		15
Chlorite				5
Clay minerals		25		10
Oxide	20			n/a
Plagioclase, sec.	n/a	n/a	n/a	70
Talc	60	n/a		n/a
Subtotals replaced	100	100		100

MICROSTRUCTURES

Microstructure: magmatic

Magmatic texture marked by minor crystal-plastic features, such as mechanical twinning in plagioclase, undulose extinction in plagioclase and clinopyroxene and recrystallized polygonal fine-grained plagioclase aggregates. Overall the texture is magmatic.

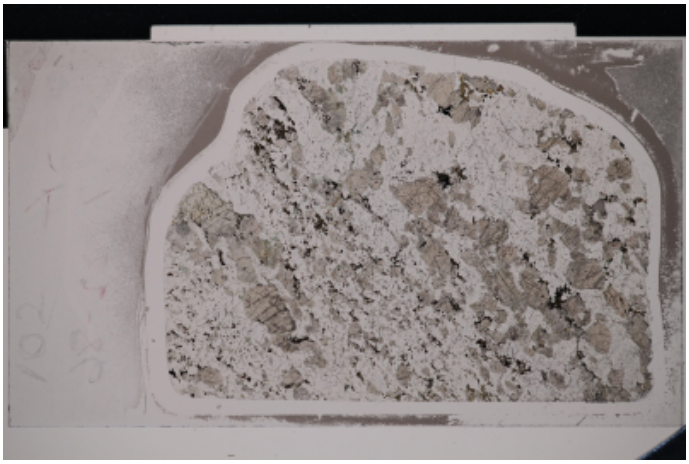
Observer:

Detailed description Magmatic texture marked by minor crystal-plastic features, such as mechanical twinning in plagioclase, undulose extinction in plagioclase and clinopyroxene and recrystallized polygonal fine-grained plagioclase aggregates. Overall the texture is magmatic.

THIN SECTION LABEL ID: **179-1105A-9R-1-W 82/86-TSB-TSS** Piece no.: #07 TS no.:

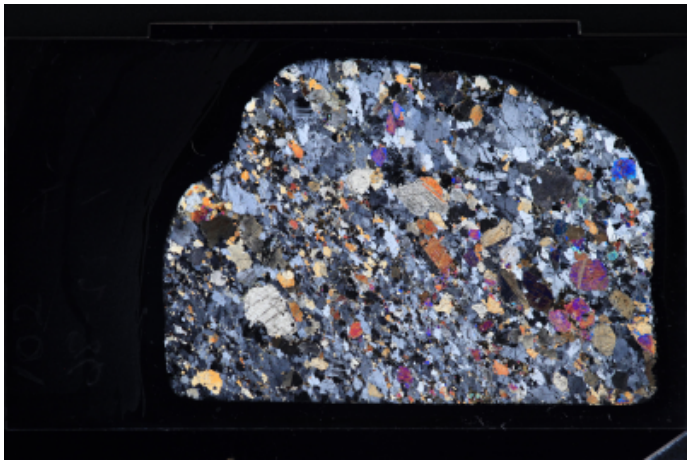
Group	Summary
Igneous petrology:	Strongly recrystallized and weakly foliated, fine- to coarse-grained oxide-bearing olivine gabbro with euhedral olivine. Mechanically deformed plagioclase occassionally occurs as chadacryst within clinopyroxene. Fractures are common.
Metamorphic petrology:	The rock shows a moderate alteration that is confined to olivine and clinopyroxene.
Structure:	Recrystallized foliated rock with overall equant proportions of plagioclase and clinopyroxene that define the foliation.

Plane-polarized



32832791

Cross-polarized



32832811

IGNEOUS PETROLOGY

Lithology: **oxide-bearing olivine gabbro medium grained** Observer:

Texture: granular Ave. grain size: medium grained [345]

Texture comment: Locally shows foliation

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	5	0.2	0.2	0.4	euhedral	equant	
Plagioclase	50	0.1	3	0.4	subhedral	subequant	
Clinopyroxene	43	0.1	3	1	anhedral	subequant	
Opaques	2						
Magnetite	2						

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 20 Observer(s): RT

Detailed description The rock shows a moderate alteration that is mostly confined to olivine and clinopyroxene.

Comment type	Comment
Alteration general comments:	The rock shows a moderate alteration that is confined to olivine and clinopyroxene.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	90	30		5
Amphibole, brown	n/a	20	n/a	n/a
Amphibole, colorless		35		30
Amphibole, green		35		
Chlorite	20			40
Clay minerals	80	10		30
Subtotals replaced	100	100		100

MICROSTRUCTURES

Microstructure: crystal-plastic

Recrystallized foliated rock with overall equant proportions of plagioclase and clinopyroxene that define the foliation.

Observer:

Detailed description

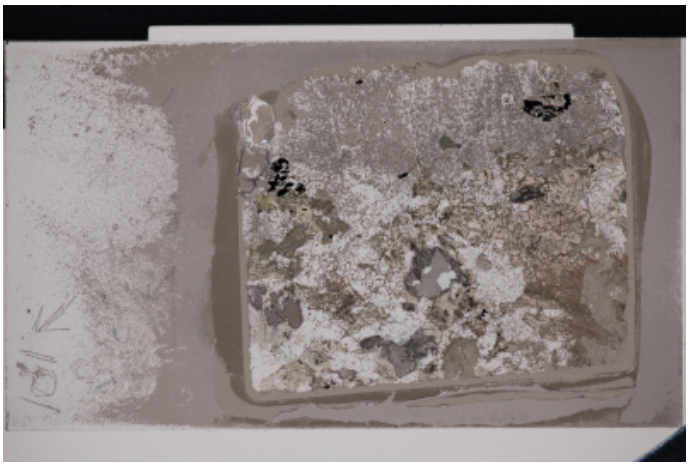
Recrystallized plagioclase grains show subhedral shapes, undulose extinction and mechanical twinning. The majority of grains have their long axes oriented and defining a shape preferred orientation. Additionally, aggregates of coarser recrystallized plagioclase can also be observed. Clinopyroxene displays a bimodal grain size: i) coarse grained fractured clasts are observed as anhedral grains in curved contact with plagioclase, while finer recrystallized sub-spherical grains define the mylonitic foliation and have curved/wavy contacts with plagioclase. These small clinopyroxene grains are commonly associated with fine oxide "films". Olivine content is low (< 25%) and is usually observed as relict coarse grains in straight to curved contacts with pyroxene and plagioclase.

Feature type	Observation	Intensity rank
Recrystallization grain size:	medium grained [BGS]	n/a
Recrystallization grain shape:	subhedral	n/a
Intensity of dynamic recrystallization:	weak	n/a
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	weakly foliated/lineated [CPF_fabric]	1
Fracture abundance:	common	n/a

THIN SECTION LABEL ID: **179-1105A-9R-4-W 12/16-TSB-TSS** Piece no.: #01 TS no.:

Group	Summary
Igneous petrology:	Medium-grained olivine gabbro; olivine in an anhedral shape; clinopyroxene partly replaced by amphibole
Structure:	Undeformed, oxide-brearing olivine gabbro. Some plagioclase deformation twinning.

Plane-polarized



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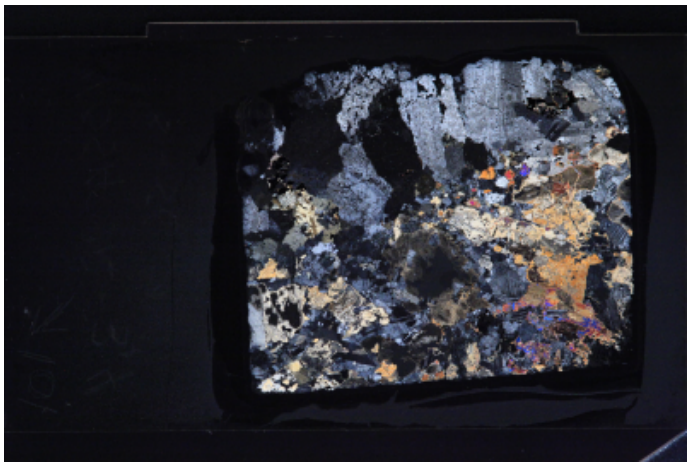
Cross-polarized



32832891

IGNEOUS PETROLOGY

Lithology: **oxide-bearing olivine gabbro medium grained** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	15	1	1	4	anhedral	subequant	
Plagioclase	55	0.5	10	1	anhedral	subequant	
Clinopyroxene	25	0.4	8	1	anhedral	subequant	
Amphibole	2	0.1	0.4	0.2	anhedral	interstitial	
Opaques	3						
Magnetite	3						

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: magmatic

The section displays an igneous texture. Oxide minerals are disseminated throughout the section as <0.5 mm grains. Plagioclase shows undulatory extinction and some extensive core-rim zoning. Deformation twins are present. The mafic phases often occur interstitially between plagioclase crystals. Little secondary replacements. The texture indicates a meso- to orthocumulate texture.

Observer: OP

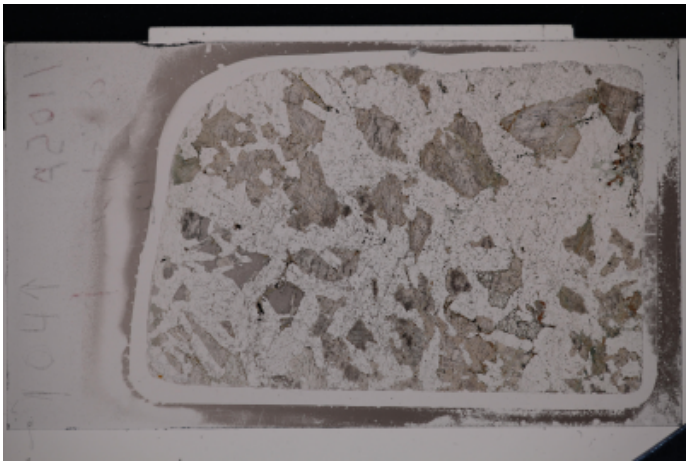
Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
Fracture abundance:	rare	n/a

Type	Comment
Olivine:	Grain size: medium-grained; Grain shape: anhedral; Grain boundary: curved; Undulose extinction: regular\ Texture: Olivine often interstitial between plagioclase crystals
Plagioclase:	Grain size: medium-grained; Grain shape: anhedral to subhedral; Grain boundary: straight to curved; Undulose extinction: irregular: Twinning: tapered Texture: Plagioclase with undulatory extinction and some extensive core-rim zoning
Clinopyroxene:	Grain size: medium-grained; Grain shape: anhedral; Grain boundary: straight to curved; Undulose extinction: irregular Texture: clinopyroxene often interstitial between plagioclase crystals
Oxide:	disseminated throughout the section

THIN SECTION LABEL ID: **179-1105A-10R-1-W 38/42-TSB-TSS** Piece no.: #03 TS no.:

Group	Summary
Igneous petrology:	Clinopyroxene partly replaced by green amphibole; brown amphibole together with magnetite occur at rim of clinopyroxene; containing small zircons
Structure:	Weakly deformed, granular to poikilitic, medium-grained olivine gabbro. Olivine and clinopyroxene are partly recrystallized.

Plane-polarized



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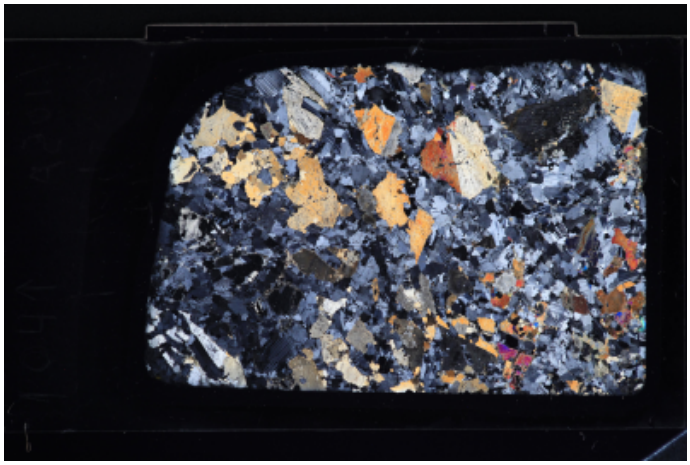
Cross-polarized



32832851

IGNEOUS PETROLOGY

Lithology: **disseminated oxide olivine gabbro medium grained** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	2	0.4	0.4	0.6	subhedral	equant	
Plagioclase	65	0.4	5	0.8	anhedral	equant	
Clinopyroxene	26	0.4	5	1	anhedral	subequant	
Amphibole	5	0.1	0.4	0.2	anhedral	interstitial	
Opaques	2						
Magnetite	2						

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: magmatic Observer: OP

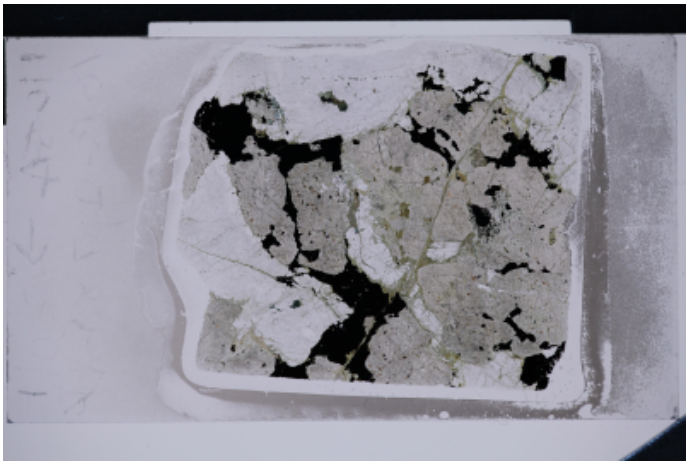
Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
Magmatic fabric intensity:	isotropic	0
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	weak	n/a
CPF fabric intensity:	weakly foliated/lineated [CPF_fabric]	1
Fracture abundance:	rare	n/a

Type	Comment
Olivine:	Grain size: fine-grained neoblasts; Grain shape: anhedral; Grain boundary: curved; Undulose extinction: irregular; Texture: olivine is replaced by an aggregate of granular and fine-grained olivine neoblasts.
Plagioclase:	Grain size: medium- to fine-grained; Grain shape: anhedral; Grain boundary: curved to irregular: Undulose extinction: irregular; Twinning: tapered; Texture: Plagioclase often has interlocking plagioclase-plagioclase boundaries and is granular and distinctly finer grained than pyroxene. Weak core-rim zonation.
Clinopyroxene:	Grain size: coarse-grained; Grain shape: anhedral; Grain boundary: curved to irregular; Twinning: magmatic; Texture: Granular to interstitial clinopyroxene showing signs of neocrystallization to secondary pyroxene
Oxide:	disseminated

THIN SECTION LABEL ID: **179-1105A-10R-2-W 85/88-TSB-TSS_1** Piece no.: #07 TS no.:

Group	Summary
Igneous petrology:	Coarse-grained oxide gabbro; clinopyroxene is partly replaced by brown amphibole; green amphibole is associated magnetite or occurs as patch on plagioclase; opaque mineral is predominated by magnetite, but sulfide is also present
Structure:	Undeformed, medium- to coarse-grained oxide gabbro

Plane-polarized



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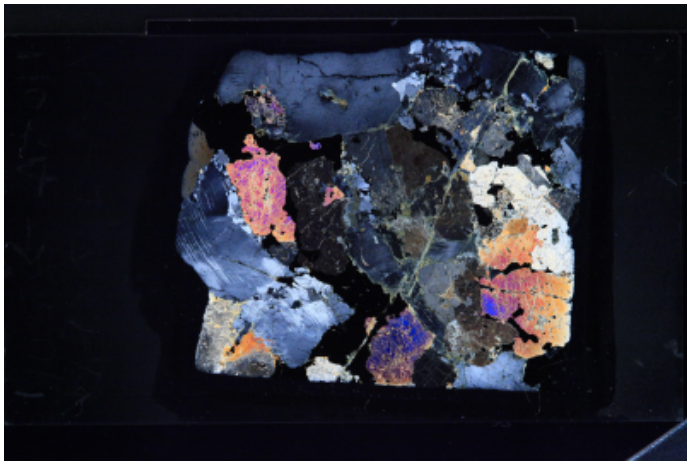
Cross-polarized



32865221

IGNEOUS PETROLOGY

Lithology: **oxide-bearing gabbro coarse grained** Observer:

Texture: granular Ave. grain size:

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	20	0.5	14	5	anhedral	subequant	
Clinopyroxene	55	4	9	8	anhedral	subequant	
Amphibole	5	0.2	1	0.5	anhedral	interstitial	
Opaques	19						
Magnetite	19						
Sulfide	1						

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: magmatic Observer: OP

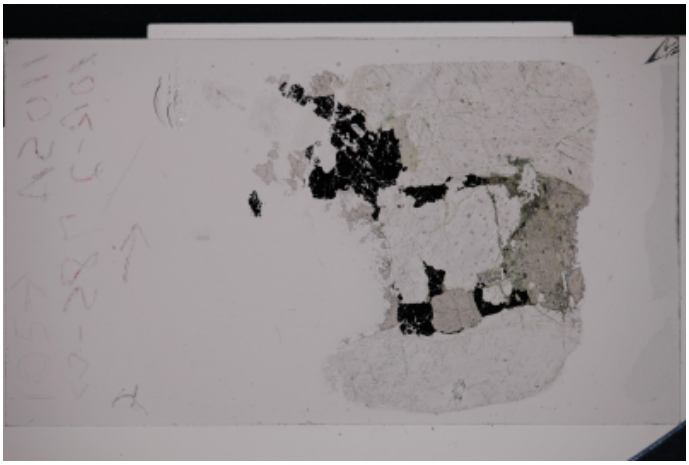
Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	common	n/a

Type	Comment
Plagioclase:	Grain size: coarse- to medium-grained; Grain shape: subhedral to anhedral; Grain boundary: straight to curved; Undulose extinction: irregular; Twinning; tapered; Texture: Plagioclase shows veins and cracks filled with green amphibole, and smectite. Some plagioclase neoblasts.
Clinopyroxene:	Grain size: coarse-grained; Grain shape: subhedral to anhedral; Grain boundary: curved to irregular; Texture: Several clinpyroxene grains show herringbone texture with [001] exolsution lamellae.
Oxide:	interstitial oxide

THIN SECTION LABEL ID: **179-1105A-10R-2-W 85/88-TSB-TSS_2** Piece no.: #07 TS no.:

Group	Summary
Igneous petrology:	Coarse-grained oxide gabbro; clinopyroxene partly replaced by amphibole
Structure:	coarse, undeformed, oxide-gabbro with a granular texture. Local recrystallization of plag is observed at the periphery of porphyroclasts.

Plane-polarized



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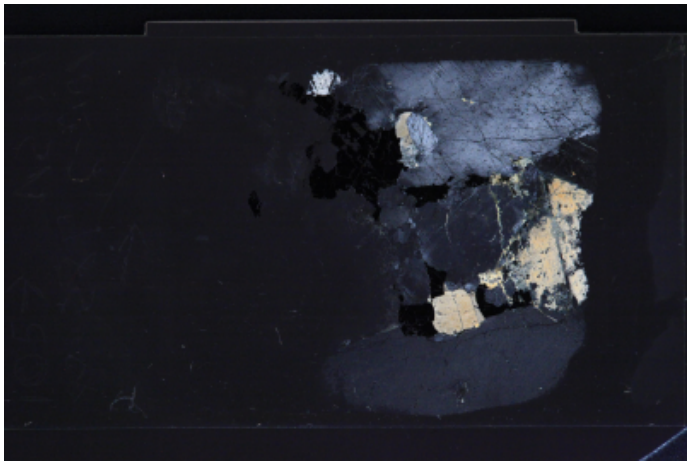


32833271

IGNEOUS PETROLOGY

Lithology: **oxide-bearing gabbro coarse grained** Observer:

Texture: granular Ave. grain size: coarse grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	60	0.4	18	8	anhedral	subequant	
Clinopyroxene	17	1	8	3	anhedral	subequant	
Amphibole	3	0.2	1	0.5	anhedral	interstitial	
Opaques	20						
Magnetite	20						

MICROSTRUCTURES

Microstructure: magmatic Observer: GV

Detailed description coarse, undeformed, oxide-gabbro with a granular texture. Local recrystallization of plag is observed at the periphery of porphyroclasts.

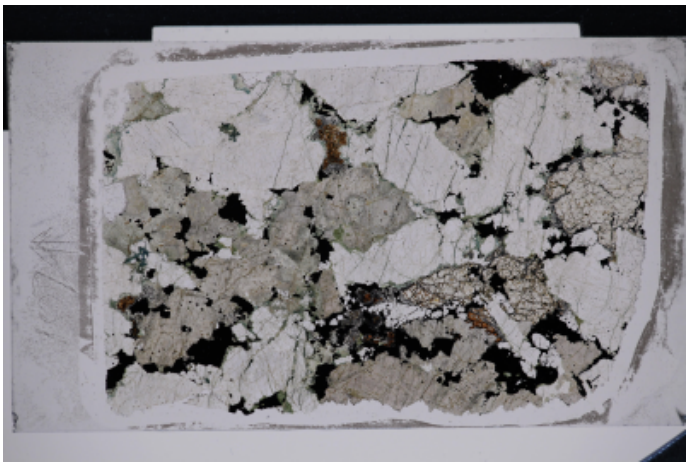
Feature type	Observation	Intensity rank
Fracture abundance:	rare	n/a

Type	Comment
Plagioclase:	size: coarse to fine shape: subhedral boundaries: straight to curved twinning: tapered undulose extinction: irregular texture: coarse, altered grains in contact with oxides. Local recrystallization at the margins of porphyroclasts.
Clinopyroxene:	size: coarse to medium shape: subhedral boundaries: straight to curved fractures: common texture: altered to amphibole
Oxide:	geometry: pods irregularly distributed along the sample; curved contacts with cpx and plag

THIN SECTION LABEL ID: **179-1105A-11R-2-W 51/54-TSB-TSS** Piece no.: #07 TS no.:

Group	Summary
Igneous petrology:	Weakly foliated oxide-bearing olivine gabbro with clinopyroxene partly replaced by green amphibole and plagioclase locally deformed. Fe-Ti oxides pods are magnetite and sulfides.
Structure:	Weakly deformed under submagmatic regime and recrystallization is restricted at grain boundaries.

Plane-polarized



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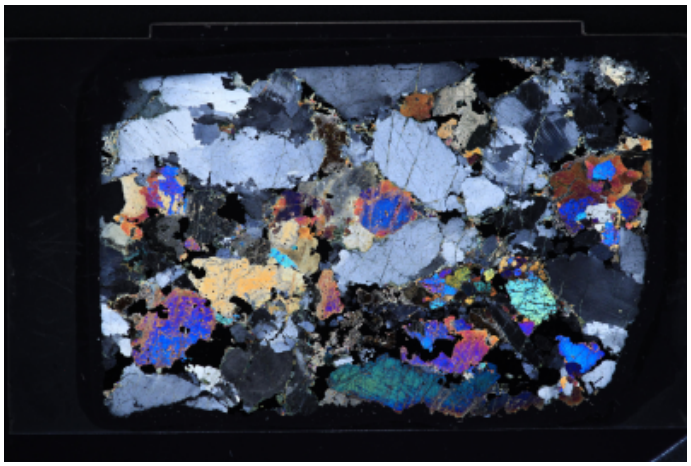
Cross-polarized



32920481

IGNEOUS PETROLOGY

Lithology: **oxide-bearing olivine gabbro medium grained** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	10	0.4	0.4	1	subhedral	equant	
Plagioclase	40	0.4	12	4	anhedral	subequant	
Clinopyroxene	40	1	6	2	anhedral	subequant	
Opaques	9.5						
Magnetite	9						
Sulfide	0.5						

MICROSTRUCTURES

Microstructure: submagmatic Observer:

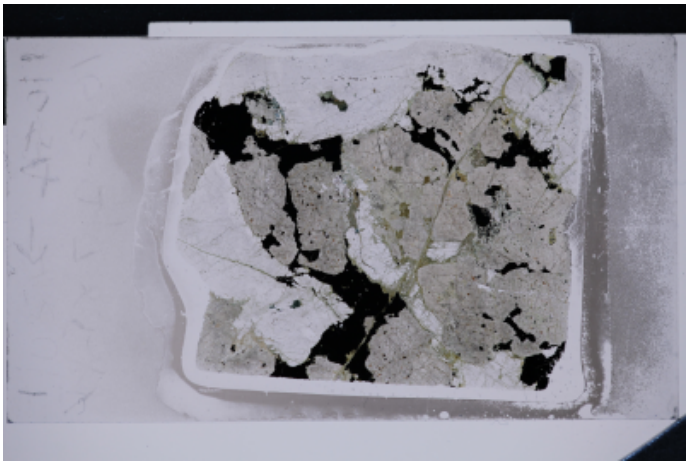
Detailed description Magmatic texture characterized by coarse plagioclase, clinopyroxene and olivine grains with subhedral to anhedral shapes and in curved contact with oxide "pools". Recrystallization is restricted to fine mantle grains around coarse plagioclase cores. Crystal-plastic structures include mechanical twinning, unduose extinction and subgrains in plagioclase. Fractures are common and might be filled with alteration products in both clinopyroxene and olivine. Oxides are observed as pools and might include coarse olivine grains, which suggest reaction. The oxide pools also have ""drop-like"" and vermicular shapes, which can potentially indicate the infiltration of melt and/or fluids.

Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	weakly foliated/lineated [CPF_fabric]	1
Fracture abundance:	common	n/a

THIN SECTION LABEL ID: **179-1105A-11R-2-W 129/133-TSB-TSS** Piece no.: #12 TS no.:

Group	Summary
Igneous petrology:	Oxide-bearing olivine gabbro; olivine is in a subhedral shape; clinopyroxene contains inclusions of both magnetite and plagioclase; clinopyroxene is partly replaced by amphibole; magnetite contains sulfide inclusion;
Structure:	Weakly deformed preserved magmatic texture with isotropic fabric.

Plane-polarized



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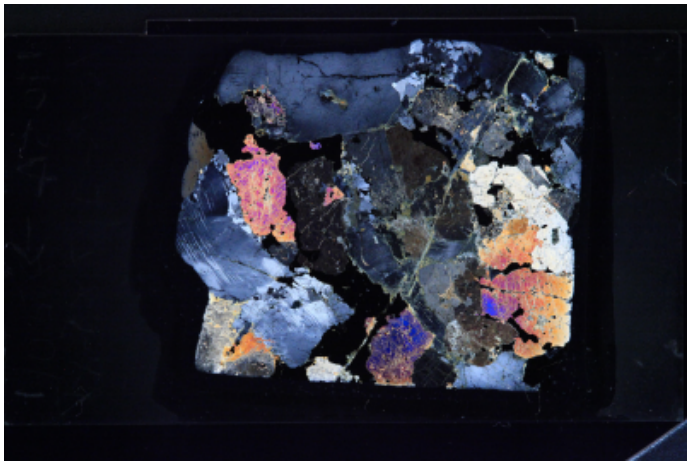
Cross-polarized



32865221

IGNEOUS PETROLOGY

Lithology: **oxide-bearing olivine gabbro coarse grained** Observer:

Texture: granular Ave. grain size: coarse grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	10	0.4	0.4	1.2	subhedral	equant	
Plagioclase	40	0.5	8	6	anhedral	tabular	
Clinopyroxene	40	0.4	6	3	anhedral	subequant	with magnetite and plagioclase inclusion
Opaques	10						
Magnetite	9.5						
Sulfide	0.5						

MICROSTRUCTURES

Microstructure: magmatic Observer: CF

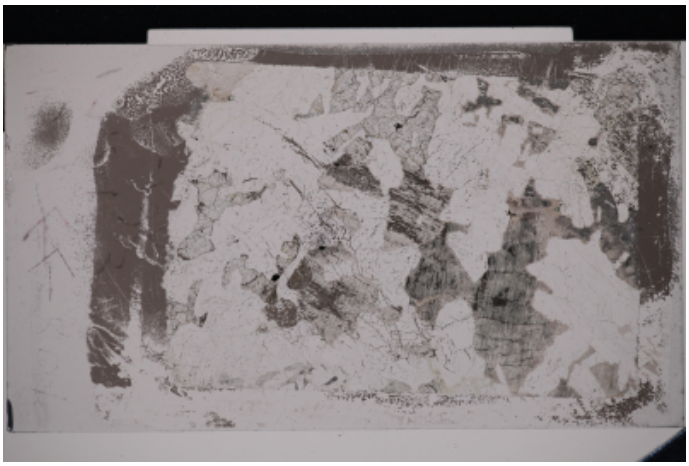
Feature type	Observation	Intensity rank
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	isotropic	0
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	rare	n/a

Type	Comment
Olivine:	Grain size: coarse Grain shape: subhedral to anhedral Grain boundary: curved Undulose extinction: regular Texture: partially preserved and deformed
Plagioclase:	Grain size: coarse Grain shape: subhedral to anhedral Grain boundary: curved Twinning: tapered Undulose extinction: regular Texture: deformed and fractured
Clinopyroxene:	Grain size: coarse Grain shape: anhedral Grain boundary: straight Undulose extinction: regular Texture: partially preserved, highly altered
Oxide:	anhedral and interstitial

THIN SECTION LABEL ID: **179-1105A-12R-1-W 106/108-TSB-TSS** Piece no.: #13 TS no.:

Group	Summary
Metamorphic petrology:	Static alteration intensity is moderate. Minerals indicate amphibolite to subgreenschist facies alteration.
Structure:	Undeformed preserved magmatic texture with isotropic fabric.

Plane-polarized



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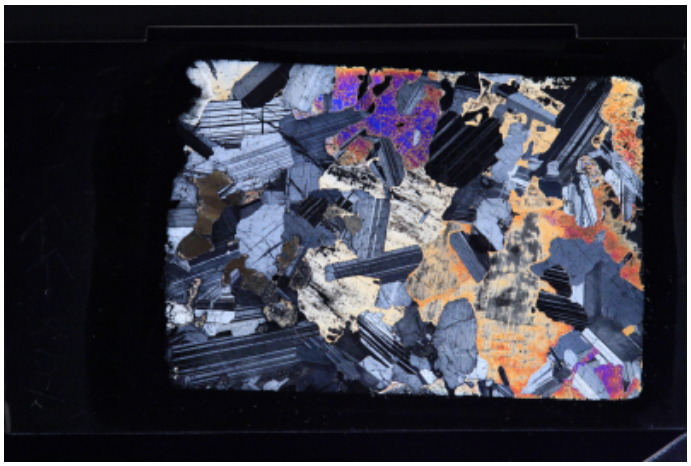
Cross-polarized



32833311

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 15 Observer(s): TN

Detailed description Olivine is replaced by pseudomorphic aggregate of talc + tremolite and by fracture-filling serpentine and clay; clinopyroxene by amphiboles at rims and by chlorite or clay along cleavage surfaces or pseudomorphically; plagioclase by chlorite that forms corona around olivine or fills microfractures.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	30	50		5
Amphibole, brown	n/a	10	n/a	n/a
Amphibole, colorless	30	10		
Amphibole, green		10		
Chlorite		20		100
Clay minerals	10	40		
Clinopyroxene, sec.	n/a	10	n/a	n/a
Oxide	4			n/a
Sulfide	1			n/a
Talc	40	n/a		n/a
Subtotals replaced	100	100		100

MICROSTRUCTURES

Microstructure: magmatic Observer: CF

Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	rare	n/a

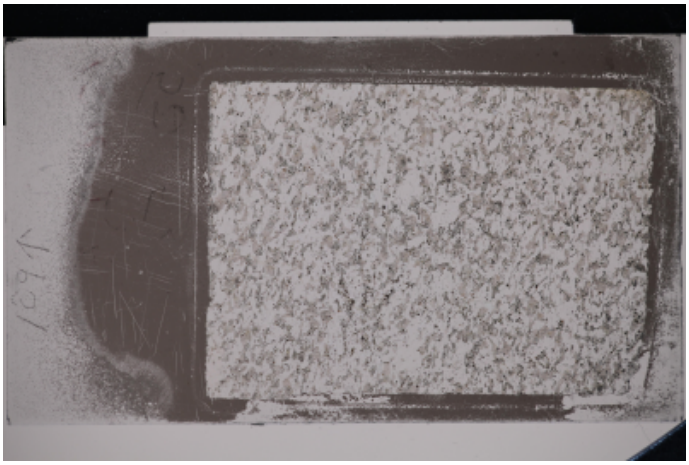
Type	Comment
Olivine:	Grain size: coarse Grain shape: anhedral Grain boundary: straight to curved Undulose extinction: regular Subgrains: straight Texture: fractured and partially altered
Plagioclase:	Grain size: coarse Grain shape: euhedral to subhedral Grain boundary: straight Undulose extinction: rare Texture: original texture preserved, not oriented
Clinopyroxene:	Grain size: coarse Grain shape: subhedral to anhedral Grain boundary: curved to straight Texture: altered

THIN SECTION LABEL ID: **179-1105A-12R-2-W 50/53-TSB-TSS** Piece no.: #05 TS no.:

Group **Summary**

Structure: Undeformed clinopyroxene-rich troctolite with moderate magmatic fabric defined by elongated plagioclase and clinopyroxene.

Plane-polarized



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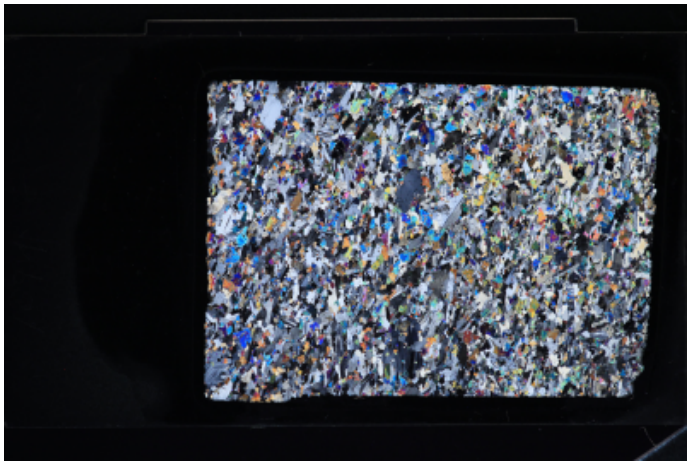
Cross-polarized



32833191

MICROSTRUCTURES

Microstructure: magmatic Observer: CF

Feature type	Observation	Intensity rank
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	moderate	2
CPF dynamic recrystallization:	absent	n/a
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	rare	n/a

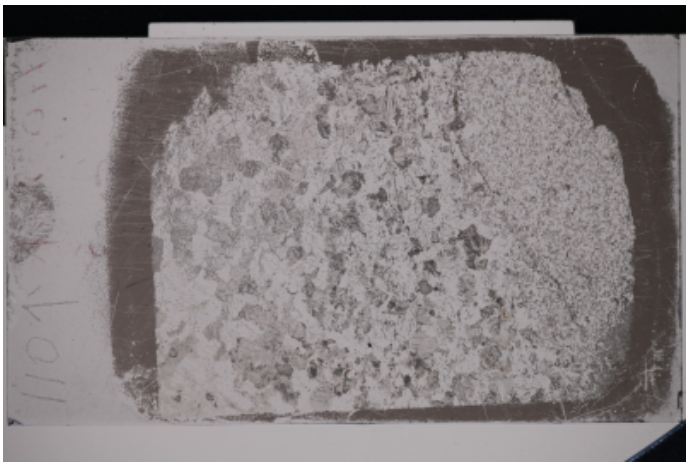
Type	Comment
Olivine:	euhedral to anhedral, medium grained
Plagioclase:	subhedral elongated crystals define magmatic fabric, mechanical and magmatic twinning, irregular undulose extinction
Clinopyroxene:	anhedral and elongated SPO that defines magmatic fabric

THIN SECTION LABEL ID: **179-1105A-12R-2-W 123/127-TSB-TSS** Piece no.: #15 TS no.:

Group **Summary**

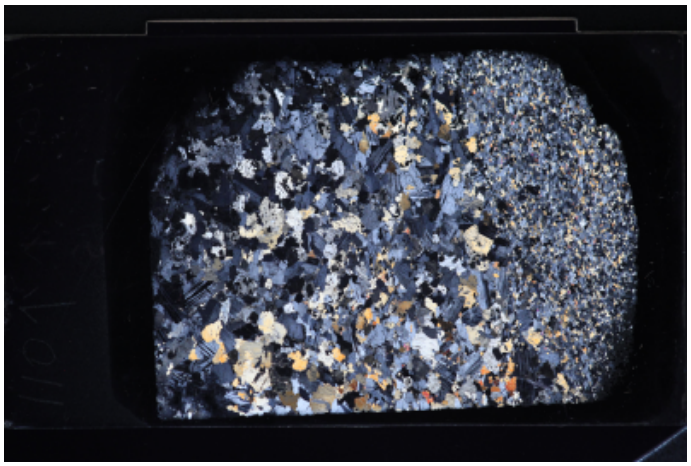
Structure: Strongly recrystallized, fine grained mylonite.

Plane-polarized



32833211

Cross-polarized



32833231

MICROSTRUCTURES

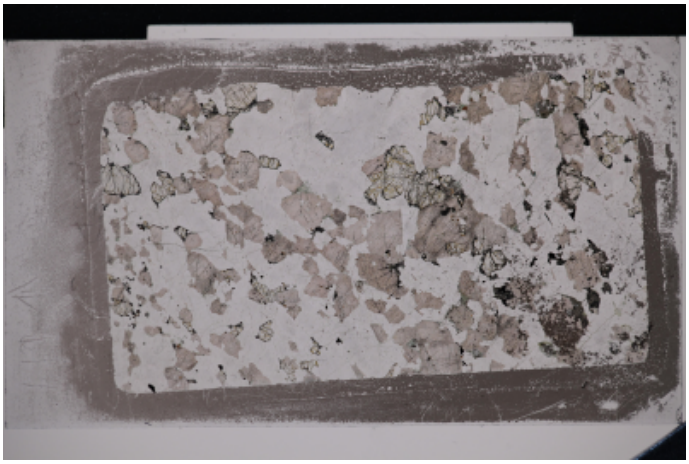
Microstructure: metamorphic Observer:

Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
CPF subgrain boundary shape:	straight	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	mylonitic [CPF_fabric]	4
Fracture abundance:	common	n/a

THIN SECTION LABEL ID: **179-1105A-13R-1-W 87/89-TSB-TSS** Piece no.: #03 TS no.:

Group	Summary
Igneous petrology:	Undeformed slightly foliated medium-grained granular disseminated-oxide olivine gabbro. Olivine grains are commonly rimmed by brown amphibole and orthopyroxene (less commonly by clinopyroxene). Late magmatic brown amphibole also rims some clinopyroxene grains. Olivine and clinopyroxene are partially altered.
Structure:	Undeformed magmatic structure preserved with a weak fabric defined by plagioclase and clinopyroxene.

Plane-polarized



32842801

Cross-polarized

32842821

IGNEOUS PETROLOGY

Lithology: **disseminated-oxide olivine gabbro medium grained** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	15	0.3	0.3	1.2	subhedral	elongate	
Plagioclase	50	0.3	7	2.5	subhedral	tabular	
Clinopyroxene	33	0.3	5	3	anhedral	interstitial	
Amphibole	0.5	0.05	0.3	0.2	anhedral	interstitial	
Opaques	1						
Sulfide	0.1						

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 5 Observer(s): JL

Comment type	Comment
Alteration general comments:	Rock is very fresh (<10% alteration). OL is the most altered mineral followed by CPX and PL. Most of the alteration occur near grain boundaries and in cleavage planes and fractures.
Mylonite comments:	Rock is undeformed
Vein 1 minerals:	no vein, only fractures along PL grains filled with CHL

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	40	5		1
Amphibole, brown	n/a	50	n/a	n/a
Amphibole, green	50	30		
Chlorite				100
Clinopyroxene, sec.	n/a	20	n/a	n/a
Oxide	0	0		n/a
Talc	50	n/a		n/a
Subtotals replaced	100	100		100

MICROSTRUCTURES

Microstructure: magmatic Observer: CF

Feature type	Observation	Intensity rank
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	weak	1
CPF dynamic recrystallization:	absent	n/a
CPF fabric intensity:	undeformed [CPF_fabric]	0

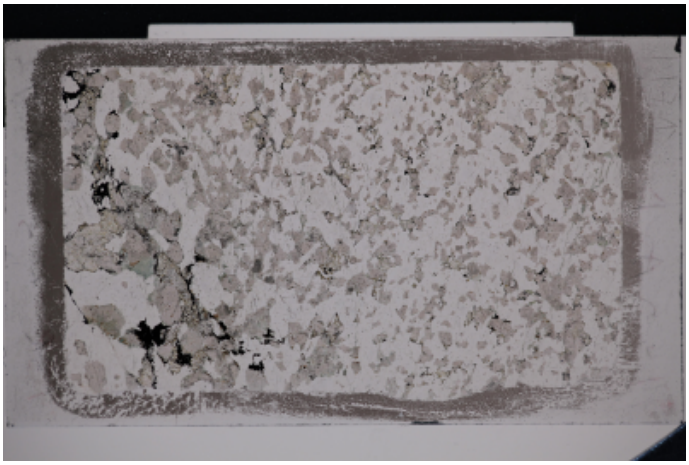
Type	Comment
Olivine:	medium to fine grained, subhedral to anhedral, straight grain boundaries, sometimes curved; irregular undulose extinction. Present as chadacryst in clinopyroxene
Plagioclase:	medium to coarse grained, straight to curved grain boundaries, magmatic and mechanical twinning, irregular undulose extinction. Present also as fine grained chadacryst in clinopyroxene, in equilibrium with olivine. It presents low SPO that define magmatic fabric.
Clinopyroxene:	anhedral and oikocryst, curved to serrategrain boundaries, fractured. It present low SPO that define magmatic fabric.

THIN SECTION LABEL ID: **179-1105A-13R-3-W 38/42-TSB-TSS** Piece no.: #03 TS no.:

Group **Summary**

Structure: Oxide gabbro weakly deformed and foliated, with partially recrystallized plagioclase and clinopyroxene. Oxides are in irregular pods and bands parallel to crystal plastic foliation.

Plane-polarized



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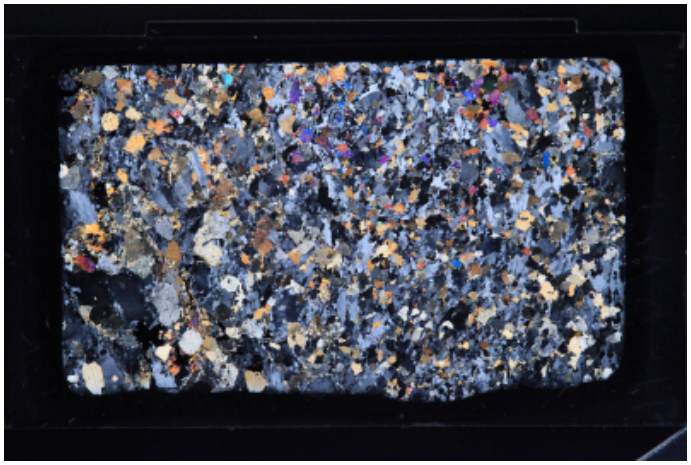
Cross-polarized



32842091

MICROSTRUCTURES

Interval domain no: 1 Domain rel. abundance (%): 10 Domain name: microfabric

Microstructure: magmatic Observer: CF

Feature type	Observation	Intensity rank
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	weak	1
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	rare	n/a

Type	Comment
Olivine:	anhedral and fine grained, serrate grain boundaries, straight subgrains and undulose extinction, fractured. Serpentine and oxide crystallize in the fractures, at variable degree of alteration
Plagioclase:	medium and subhedral, straight grain boundaries, magmatic and mechanical twinning, irregular undulose extinction
Clinopyroxene:	elongate crystals have SPO that define magmatic fabric, but present also as anhedral and interstitial; fractured and exsolution lamellae present. Regular undulose extinction

Interval domain no: 2 Domain rel. abundance (%): 75 Domain name: microfabric

Microstructure: crystal-plastic Observer: CF

Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	subhedral	n/a
CPF subgrain boundary shape:	straight	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	weakly foliated/lineated [CPF_fabric]	1
Fracture abundance:	absent	n/a

Type	Comment
Olivine:	fine and anehdral, fractured but not altered, no undulose extinction observed.
Plagioclase:	fine and subhedral, straight grain boundaries, mechanical twinning, irregular to regular undulose extinction. Mainly recrystallized in pods between magmatic minerals, no indicators of sense of shear
Clinopyroxene:	fine and anhedral, straight boundaries, variably fractured, no undulose extinction observed. Recrystallized in pods with plagioclase.
Oxide:	irregular pods

Interval domain no: 3 Domain rel. abundance (%): 15 Domain name:

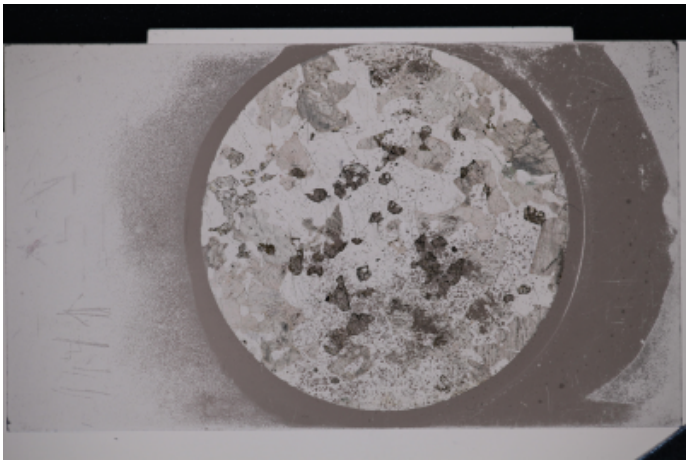
Feature type	Observation	Intensity rank
CPF dynamic recrystallization:	weak	n/a

Type	Comment
Plagioclase:	coarse to recrystallized fine grained and subhedral, curved grain boundaries to straight in recrystallized crystals, mechanical twinning, irregular to regular undulose extinction. Recrystallized around magmatic clinopyroxene relicts.
Oxide:	irregular pods and bands semi-parallel to foliation

THIN SECTION LABEL ID: **179-1105A-13R-3-W 79/82-TSB-TSS** Piece no.: #06 TS no.:

Group	Summary
Igneous petrology:	Undeformed weakly foliated medium-grained olivine gabbro. Olivine occur as chadacryst within plagioclase and also occassionally contain plagioclase inclusion; plagioclase is commonly in a tabular shape and contain olivine chadacryst; clinopyroxene with well-developed lamallae contain plagioclase and olivine chadacrysts.
Structure:	Olivine gabbro with pristine igneous texture exhibiting randomly orientated plagioclase grains

Plane-polarized



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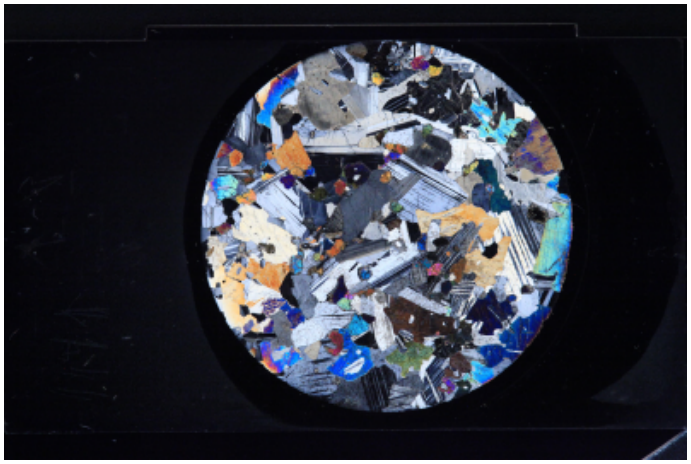
Cross-polarized



32842131

IGNEOUS PETROLOGY

Lithology: **olivine gabbro coarse grained** Observer:

Texture: ophitic Ave. grain size:

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	5	0.2	0.2	1.5	subhedral	equant	
Plagioclase	65	1	6	3	subhedral	tabular	
Clinopyroxene	30	1	5	3	anhedral	subequant	

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: magmatic Observer: OP

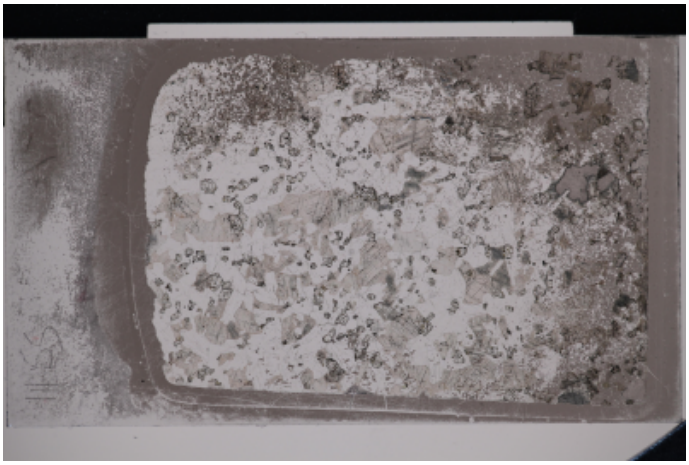
Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0

Type	Comment
Olivine:	Grain size: medium-grained; Grain shape: rounded, anhedral; Grain boundary: curved; Texture: Olivine poikilitically encloses small plagioclase chadacrysts, rare subgrain development, only minor alteration along fractures. Olivine occurs in clusters and as single grains.
Plagioclase:	Grain size: medium- to coarse grained; Grain shape: tabular to equant; Grain boundary: straight to curved;
Clinopyroxene:	Grain size: medium- to coarse-grained; Grain shape: opthitic to subophitic; Grain boundary: straight to curved; Texture: Clinopyroxene encloses plagioclase grains
Oxide:	interstitial oxide

THIN SECTION LABEL ID: **179-1105A-14R-1-W 42/45-TSB-TSS** Piece no.: #03 TS no.:

Group	Summary
Igneous petrology:	Fresh medium-grained olivine-bearing gabbro; olivine in a subhedarl shape occurs chadacryst within both clinopyroxene and plagioclase; clinopyroxene display well developed lamallae and is partly replaced by amphibole; plaigolcase shows a tabular or equant shape; sulfide commonly occurs at the contact of olivine and plagioclase
Structure:	undeformed olivine gabbro. Olivine is observed as medium to fine-grained crystals in curved contact with plagioclase. Cpx is subhedral to anhedral and is fracured. Plag is randomly oriented and might show some bulges at phase-phase contacts.

Plane-polarized



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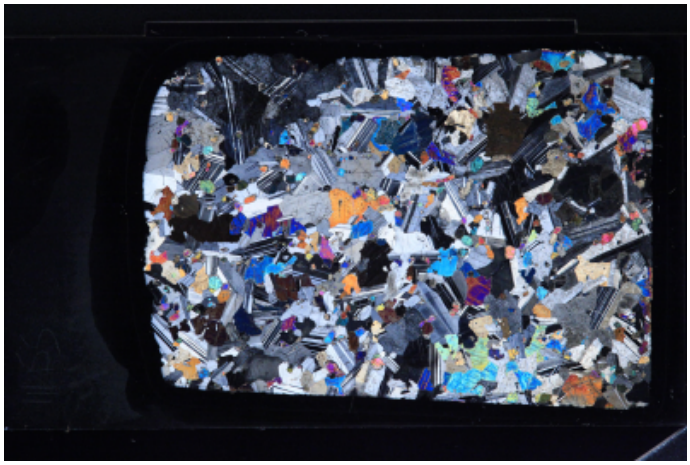
Cross-polarized



32842171

IGNEOUS PETROLOGY

Lithology: **olivine-bearing gabbro medium grained** Observer:

Texture: ophitic Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	3	0.2	0.2	1	anhedral	equant	chadacryst within plagioclase
Plagioclase	60	0.4	6	3	subhedral	tabular	
Clinopyroxene	36	0.8	5	1	anhedral	subequant	partly replaced by amphibole
Opaques	0.5						
Sulfide	0.5						

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 5 Observer(s): JL

Comment type	Comment
Alteration general comments:	Very fresh rock (<10% altered). Most of the alteration occurs in olivine and in the rims/cleavages of CPX and PL. Dominant alteration minerals includes green and brown amphibole, talc, chlorite and minor oxides.
Mylonite comments:	undeformed
Vein 1 minerals:	no veins.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	30	5		1
Amphibole, brown	n/a	50	n/a	n/a
Amphibole, green	50	45		
Chlorite				100
Clinopyroxene, sec.	n/a	5	n/a	n/a
Oxide	0			n/a
Talc	50	n/a		n/a
Subtotals replaced	100	100		100

MICROSTRUCTURES

Microstructure: magmatic Observer:

Detailed description undeformed olivine gabbro. Olivine is observed as medium to fine-grained crystals in curved contact with plagioclase. Cpx is subhedral to anhedral and is fracured. Plag is randomly oriented and might show some bulges at phase-phase contacts.

Feature type	Observation	Intensity rank
Intensity of dynamic recrystallization:	weak	n/a
CPF fabric intensity:	undeformed [CPF_fabric]	0

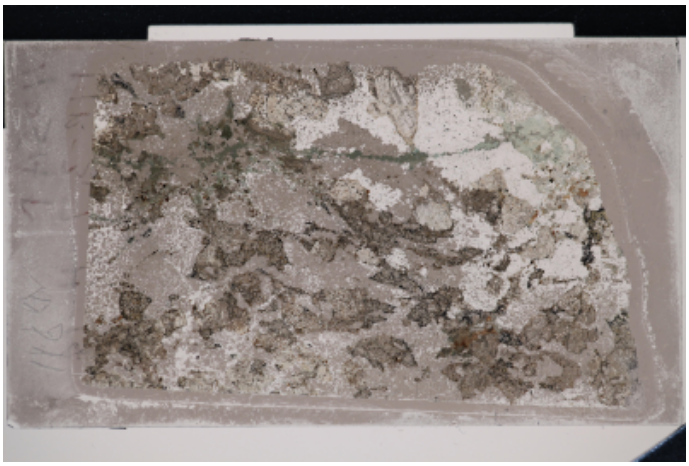
Type	Comment
Olivine:	size: medium to fine shape: anhedral boundaries: curved undulose extinction: rare texture: medium to fine rounded grains with curved contacts.
Plagioclase:	size: coarse to medium shape: subhedral boundaries: straight to curved twinning: tapered (magmatic locally preserved) undulose extinction: rare texture: coarse grains with straight contacts, locally developing bulges towards other grains.
Clinopyroxene:	size: medium shape: anhedral boundaries: straight to curved fractures: common texture: dispersed grains with curved contacts with plagioclase.

THIN SECTION LABEL ID: **179-1105A-14R-3-W 91/94-TSB-TSS** Piece no.: #07 TS no.:

Group **Summary**

Structure: Deformed and weakly foliated gabbro with equigranular recrystallized plagioclase.

Plane-polarized



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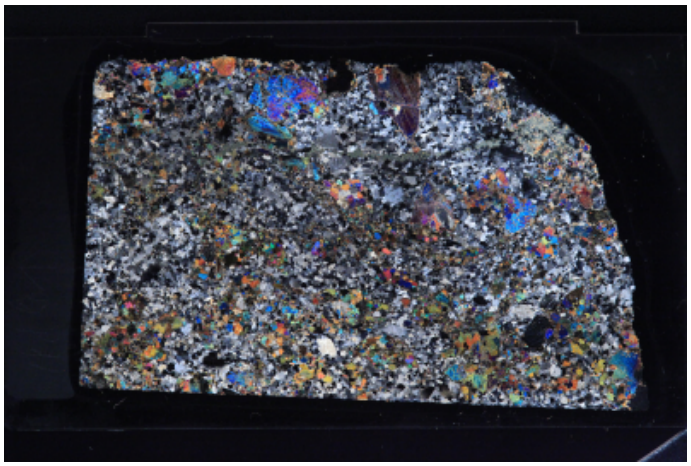
Cross-polarized



32842251

MICROSTRUCTURES

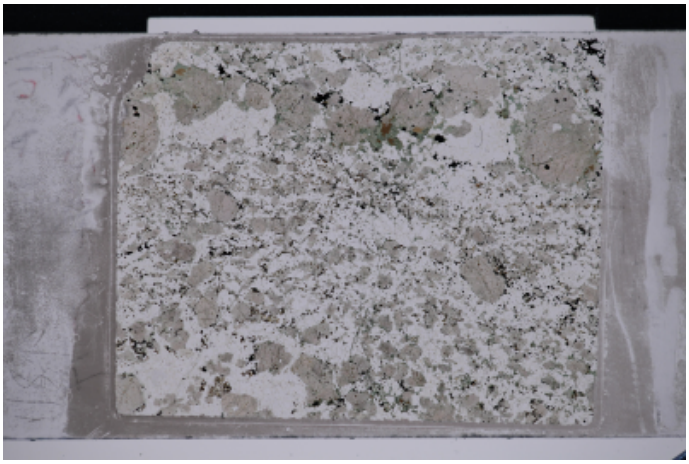
Microstructure: crystal-plastic Observer:

Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	equigranular	n/a
Intensity of dynamic recrystallization:	partial	n/a
CPF subgrain boundary shape:	straight	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	weakly foliated/lineated [CPF_fabric]	1
Fracture abundance:	rare	n/a

THIN SECTION LABEL ID: **179-1105A-15R-2-W 71/74-TSB-TSS** Piece no.: #09 TS no.:

Group	Summary
Igneous petrology:	High deformed oxide olivine gabbro. Olivine is commonly altered and partly replaced by opaque minerals. Plagioclase is completely recrystallized. Porphyroblasts are mainly cpx with well-developed exsolution lamallae. Blebs of brown amphibole and ilmenite are quite common in cpx porphyroblasts. Opaque minerals are predominated by ilmenite, and small amount of sulfides are also present.
Structure:	Porphyroclastic microgabbro with recrystallized plagioclase and clinopyroxene

Plane-polarized



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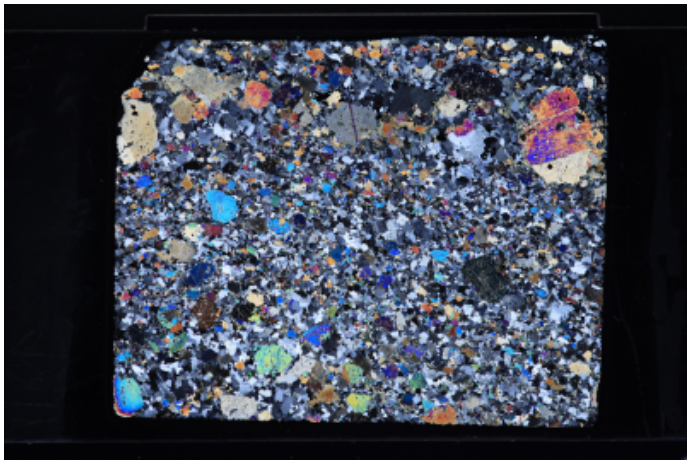
Cross-polarized



32853461

IGNEOUS PETROLOGY

Lithology: **oxide-bearing olivine gabbro** Observer:

Texture: granular Ave. grain size: fine grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	3	0.01	0.01	0.4	anhedral	elongate	Altered and partly repaced by opaque minerals
Plagioclase	50	0.01	2	0.5	anhedral	subequant	Occasionally occurs as chadacryst within cpx porphyroblast
Clinopyroxene	43	0.01	5	0.6	anhedral	subequant	Lamallae is well developed in cpx porphyroblasts rather than the neoblasts
Amphibole	1	0.01	1	0.2	anhedral	subequant	
Opaques	3						
Ilmenite	3						

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: crystal-plastic

The thin section displays a weak tectonite texture consisting of a coarse bimodal grain sizes. The texture consists of coarse (up to 6 mm) porphyroclasts of nearly nondeformed clinopyroxene with a dominantly coarsely recrystallized (~1 mm) plagioclase neoblast matrix. Plagioclase shows a coarse mosaic texture with polygonal grains and many 120Â° triple junctions. Clinopyroxene occurs both as porphyroclasts and groundmass mineral. All the three phases (i.e., olivine, plagioclase, and clinopyroxene) occur in the groundmass. Clinopyroxene porphyroclasts are subhedral, but do not show planar crystal faces. Some of the clinopyroxene porphyroclasts ophitically enclose euhedral to subhedral plagioclase laths that do not show deformation effects. The rock possesses little preferred dimensional orientation even though recrystallized to a bimodal grain size texture.

Observer: OP

Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	porphyroclastic/protomylonitic [CPF_fabric]	3

Type	Comment
Plagioclase:	Grain size: medium- to fine-grained porphyroclasts, fine-grained neoblasts; Grain shape: subhedral to anhedral; Grain boundary: straight to curved; Twinning: tapered;
Clinopyroxene:	Grain size: coarse-grained porphyroclasts; Grain shape: subhedral to anhedral; Grain boundary: straight to curved; Texture: Clinopyroxene porphyroclasts ophitically enclose euhedral to subhedral plagioclase laths that do not show deformation effects.
Oxide:	interstitial oxide

THIN SECTION LABEL ID: **179-1105A-16R-1-W 91/94-TSB-TSS** Piece no.: #10 TS no.:

Group	Summary
Igneous petrology:	Strongly deformed mylonitic olivine gabbro with elongated olivine and plagioclase mostly recrystallized. Clinopyroxene porphyroblast is locally rimmed by brown late magmatic amphibole; opaque minerals are dominated by ilmenite, but sulfides are also present; it contains apatite.
Metamorphic petrology:	Overall, sample is moderately altered. Primary phases are mostly fresh but are extensively replaced near a tremolite/actinolite vein.

Plane-polarized

32842271

Cross-polarized

32842291

IGNEOUS PETROLOGY

Lithology: **oxide-bearing olivine gabbro** Observer:

Texture: Ave. grain size: fine grained [345]

Texture comment: foliated

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	10	0.04	0.04	0.4	anhedral	elongate	
Plagioclase	55	0.04	1.2	0.4	subhedral	equant	
Clinopyroxene	30	0.1	2	1	anhedral	equant	
Opaques	5						
Ilmenite	4						
Sulfide	1						

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 15 Observer(s): JL

Detailed description Sample is rather fresh at areas further away from the veins with most of the alteration limited to talc and oxide replacement after olivine. Near the tremolite vein, the primary phases are extensively altered: olivine -> tremolite + talc; clinopyroxene -> tremolite; plagioclase -> chlorite

Comment type	Comment
Vein 1 minerals:	Pale green amphibole veins, likely composed of tremolite and/or actinolite. Vein is branching and cuts the hole thin section. Alteration is intense near the vein.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	30	20		10
Amphibole, brown	n/a	20	n/a	n/a
Amphibole, colorless	20			10
Amphibole, green		75		
Chlorite				70
Clay minerals		5		20
Oxide	20			n/a
Talc	60	n/a		n/a
Subtotals replaced	100	100		100

MICROSTRUCTURES

Microstructure: crystal-plastic Observer: CF

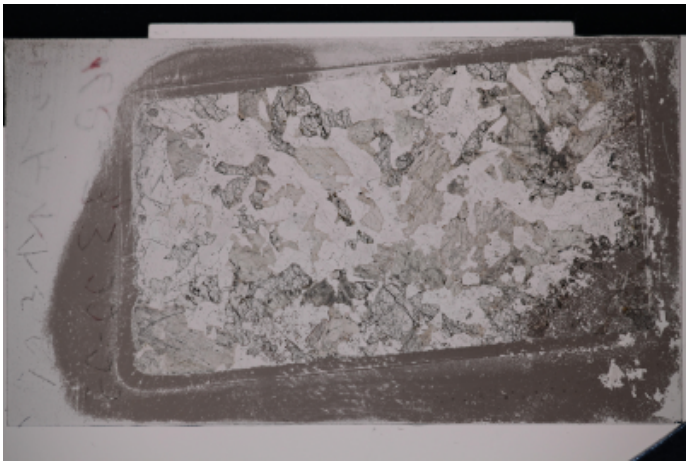
Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	weak	1
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	mylonitic [CPF_fabric]	4
Fracture abundance:	rare	n/a

Type	Comment
Olivine:	fine and anehdral, curved grain boundaries, regular undulose extinction, fractured and partially altered
Plagioclase:	fine anhedral-rounded crystals, straight to curved grain boundaries, mechanical twinning, undulose extiction and subgrain observed. Completly recrystallized, define plastic fabric
Clinopyroxene:	medium relict grains to fine recrystallized. Relicts have serrate grain boundaries and undulose extinction; recrystallized grains not deformed.

THIN SECTION LABEL ID: **179-1105A-16R-3-W 22/25-TSB-TSS** Piece no.: #03 TS no.:

Group	Summary
Igneous petrology:	Coarse grained granular olivine gabbro. Olivine grains are commonly rimmed by brown amphibole and orthopyroxene (less commonly by clinopyroxene). Late magmatic brown amphibole also rims some clinopyroxene grains.
Structure:	Pristine olivine gabbro with adcumulate texture and no preferred orientation

Plane-polarized



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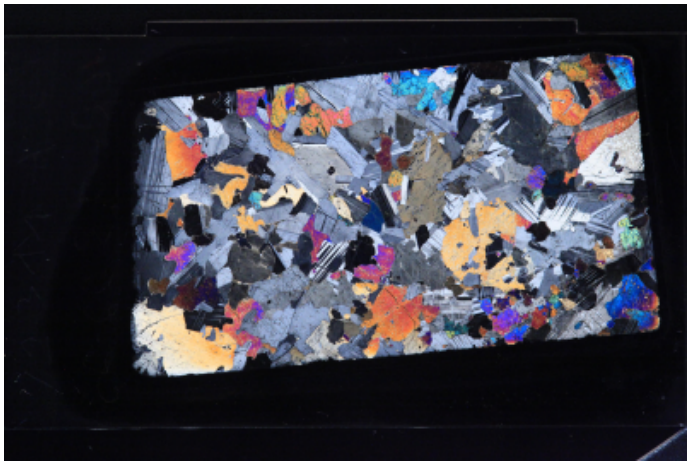
Cross-polarized



32842331

IGNEOUS PETROLOGY

Lithology: **olivine gabbro** Observer:

Texture: granular Ave. grain size: coarse grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	20	0.3	0.3	2.5	subhedral	subequant	
Plagioclase	40	0.3	6	3	subhedral	tabular	
Clinopyroxene	40	0.3	8	2.5	anhedral	interstitial	
Amphibole	0.2			0.15	anhedral	interstitial	
Sulfide	0.3						

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: magmatic

Pristine igneous adcumulate texture. Lacks preferred dimensional orientation. This specimen is nearly unaltered; alteration is confined only to the peripheries of olivine crystals. Plagioclase is slightly zoned. Clinopyroxene shows a fringe of pale brown hornblende. Some crystals of clinopyroxene poikilitically enclose olivine and plagioclase crystals.

Observer: OP

Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0

Type	Comment
Olivine:	Grain size: coarse- to medium-grained; Grain shape: subhedral to anhedral; Grain boundary: straight to curved; Undulose extinction: weak to absent;
Plagioclase:	Grain size: medium- to coarse-grained; Grain shape: subhedral to anhedral; Grain boundary: straight to curved; Undulose extinction: irregular;
Clinopyroxene:	Grain size: coarse- to medium-grained; Grain shape: subhedral to anhedral; Grain boundary: straight to curved; Texture: clinopyroxene with exsolution lamellae
Oxide:	interstitial oxide

THIN SECTION LABEL ID: **179-1105A-17R-2-W 23/26-TSB-TSS** Piece no.: #02 TS no.:

Group	Summary
Igneous petrology:	Medium-grained olivine gabbro; chadacrysts of olivine and plagioclase within clinopyroxene oikocryst; olivine grains are commonly rimmed by brown amphibole and orthopyroxene (less commonly by clinopyroxene). Late magmatic brown amphibole also rims some clinopyroxene grains. Olivine and clinopyroxene are partially altered.
Structure:	undeformed olivine gabbro with dispersed coarse plag grains. Cpx and olivine are in curved contact with other phases.

Plane-polarized

32842351

Cross-polarized

32842371

IGNEOUS PETROLOGY

Lithology: **olivine-rich gabbro medium grained** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	14	0.4	0.4	1	subhedral	subequant	
Plagioclase	50	0.5	8	3	subhedral	tabular	
Clinopyroxene	35	0.2	5	3	anhedral	subequant	
Opaques	1						
Magnetite	1						

MICROSTRUCTURES

Microstructure: magmatic Observer: GV

Detailed description undeformed olivine gabbro with dispersed coarse plag grains. Cpx and olivine are in curved contact with other phases.

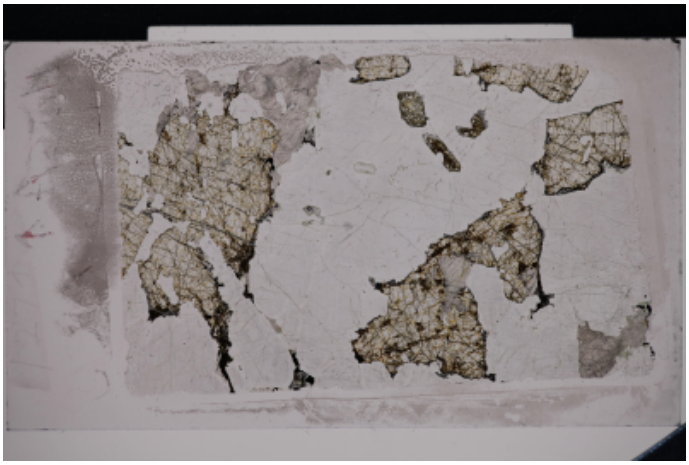
Feature type	Observation	Intensity rank
CPF dynamic recrystallization:	absent	n/a
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	rare	n/a

Type	Comment
Olivine:	size: medium to fine shape: anhedral boundaries: curved undulose extinction: rare subgrains: not observed texture: medium grains, partially altered, commonly in contact with cpx.
Plagioclase:	size: coarse to medium shape: subhedral boundaries: straight twinning: tapered undulose extinction: irregular texture: coarse grains randomly distributed.
Clinopyroxene:	size: medium shape: subhedral to anhedral boundaries: straight to curved fractures: common texture: medium anhedral grains in curved contacts with other phases.

THIN SECTION LABEL ID: **179-1105A-19R-2-W 65/68-TSB-TSS** Piece no.: #06 TS no.:

Group	Summary
Igneous petrology:	Coarse-grained troctolite, with small amount of clinopyroxene; olivine occurs as chadacryst within both plagioclase and clinopyroxene; clinopyroxene is interstitial between olivine and plagioclase
Structure:	Coarse-grained troctolitic gabbro. Minor marginal plagioclase recrystallization. Coarse-grained olivine shows subgrain boundary development.

Plane-polarized



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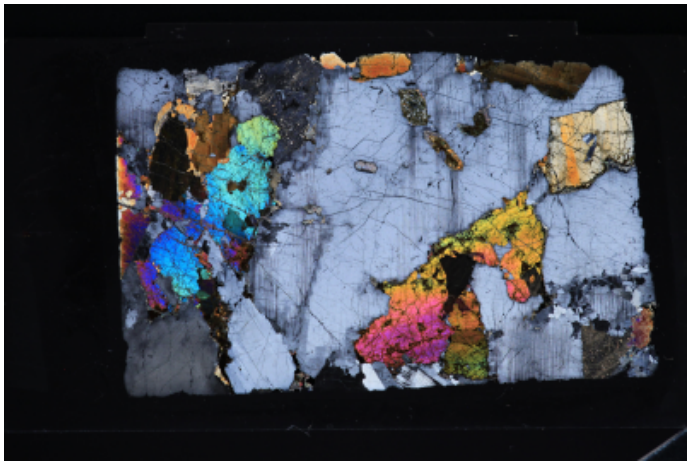
Cross-polarized



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IGNEOUS PETROLOGY

Lithology: **disseminated oxide troctolite coarse grained** Observer:

Texture: poikilitic Ave. grain size: coarse grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	30	1	1	4	subhedral	subequant	
Plagioclase	60	1	7	5	anhedral	subequant	
Clinopyroxene	9.5	0.2	4	1	anhedral	interstitial	
Opaques	0.5						
Magnetite	0.5						

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: magmatic

The secondary minerals as a whole constitute 7% in mode. Largely igneous mesocumulate textures. Plagioclase shows strongly zoned rims locally, typical of mesocumulates. Plagioclase grain size, however, is bimodal. Plagioclase shows minor marginal recrystallization locally. Predominantly it is coarse grained but chains and clusters of 1-2 mm grains are common. Plagioclase occurs rarely as inclusions in olivine and clinopyroxene. Plagioclase shows strong zoning. Minor alteration to chlorite along fractures. Olivine is bimodal as well. 1-2 mm euhedral crystals occur as inclusions in plagioclase, nearly completely altered to magnetite, rusty brown iddingsite, chlorite, small blades of antigorite, and chlorite. Coarser olivines show distinct development of subgrain boundaries and are altered along fractures to magnetite, chlorite, talc, chlorite, and iddingsite. Thin orthopyroxene and clinopyroxene rims on olivine are rare but present Sulfides are rare and poorly polished, but appear to be predominantly pyrite. Olivine is highly strained and kinked.

Observer: OP

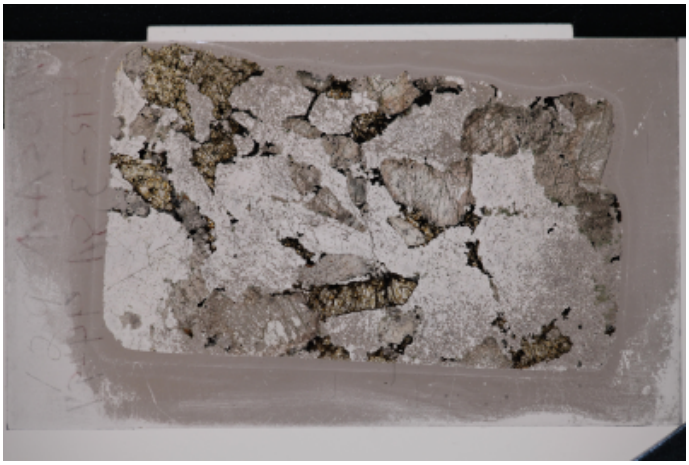
Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	weak	n/a
Fracture abundance:	common	n/a

Type	Comment
Olivine:	Grain size: coarse-grained; Grain shape: euhedral to subhedral; Grain boundary: straight to curved; Undulose extinction: straight; Subgrain boundaries: straight; Texture: highly strained and kinked olivine
Plagioclase:	Grain size: coarse-grained; Grain shape: subhedral to anhedral; Grain boundary: straight to curved; Undulose extinction: irregular; Twinning: tapered;
Oxide:	interstitial oxide

THIN SECTION LABEL ID: **179-1105A-19R-3-W 94/97-TSB-TSS** Piece no.: #08 TS no.:

Group	Summary
Igneous petrology:	A medium-grained olivine gabbro, with 50% pl, 34% cpx, 15% ol and 1% opaque minerals. Olivine is in a subhedral shape. Clinopyroxene is coarser than plagioclase. Intergrowth between ilmenite and magnetite is common.
Structure:	Granular-porphyroclastic olivine gabbro

Plane-polarized



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Cross-polarized

32842901

IGNEOUS PETROLOGY

Lithology: **disseminated oxide olivine gabbro** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	15	0.4	0.4	2	subhedral	subequant	Overgrowth by orthopyroxene at the rim
Plagioclase	50	0.2	6	2	anhedral	subequant	Occasionally deformed and occur as chadacryst within clinopyroxene
Clinopyroxene	34	0.4	8	5	anhedral	subequant	With blebs of brown amphibole and opaque minerals; rimmed by green amphibole
Opaques	1						
Magnetite	0.5						
Ilmenite	0.5						

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: crystal-plastic

Specimen shows development of porphyroclastic to coarse granular texture. Plagioclase porphyroclasts dominated by undulatory extinction, deformation twins and kinking. Approximately 60% of plagioclase is recrystallized. Olivine is strongly strained, kinked and in places forms subgrains or is recrystallized to polygonal clots. Very locally clinopyroxene is strained with bent lamellae and can also be partly recrystallized . Pyroxene show little sign of replacements. Part of the olivine is altered to fine-grained clays and magnetite. Igneous grains of plagioclase preserved, show strong core-rim zoning.

Observer: OP

Feature type	Observation	Intensity rank
Recrystallization grain size:	medium grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	porphyroclastic/protomylonitic [CPF_fabric]	3

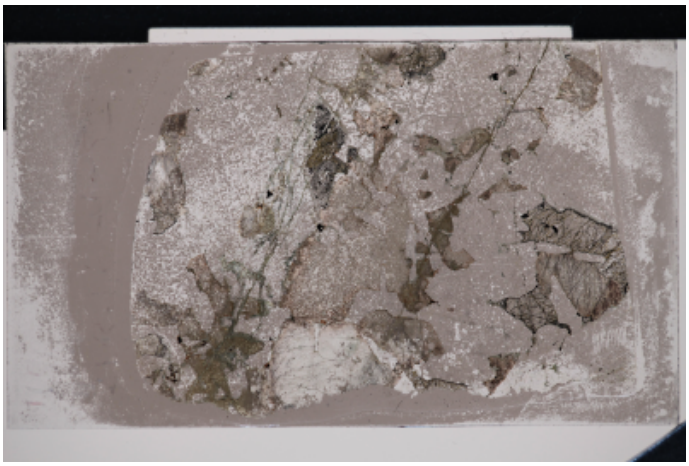
Type	Comment
Olivine:	Grain size: medium- to fine-grained; Grain shape: subhedral to anhedral; Grain boundary: straight to curved; Undulose extinction: Subgrains: Texture: kinked olivine porphyroclasts with neocrystallization to fine-grained granular aggregates
Plagioclase:	Grain size: coarse- to medium-grained; Grain shape: anhedral; Grain boundary: straight to curved; Undulose extinction: irregular; Twinning: tapered; Texture: Plagioclase porphyroclasts with neoblasts
Clinopyroxene:	Grain size: coarse-grained; Grain shape: anhedral Grain boundary: straight to curved: Texture: largely undeformed porphyroblasts with minor local recrystallization

THIN SECTION LABEL ID: **179-1105A-21R-1-W 49/52-TSB-TSS** Piece no.: #06 TS no.:

Group **Summary**

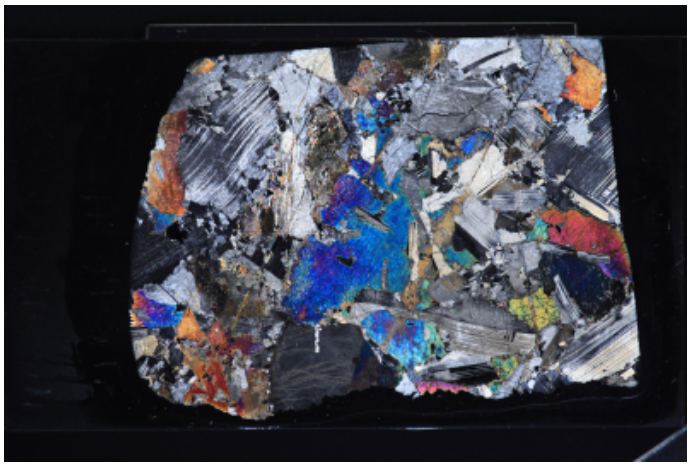
Structure: Undeformed, coarse-grained, poikilitic olivine gabbro

Plane-polarized



32842921

Cross-polarized



32842941

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 35 Observer(s): QM

Comment type	Comment
Vein 1 minerals:	amp

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	25	40	70	8
Amphibole, brown	n/a	10	n/a	n/a
Amphibole, colorless			15	
Amphibole, green	40	85	60	
Chlorite	5	5	5	98
Clay minerals				2
Oxide	30		15	n/a
Talc	15	n/a		n/a
Subtotals replaced	100	100	100	100

MICROSTRUCTURES

Interval domain no: Domain rel. abundance (%): Domain name: microfabric

Microstructure: magmatic

The specimen displays an igneous texture. Coarse-grained and poikilitic olivine gabbro with olivine, plagioclase and augite as major constituents. Augite grains poikilitically include euhedral to subhedral plagioclase and olivine. Some plagioclase grains included in augite show recrystallization. Moderate extent of alteration with some minor crystal-plastic deformation. Olivine is kinked, but not recrystallized. Elongate plagioclase igneous grains show random orientation. Plagioclase shows moderate marginal and intergrain deformation and recrystallization.

Observer: OP

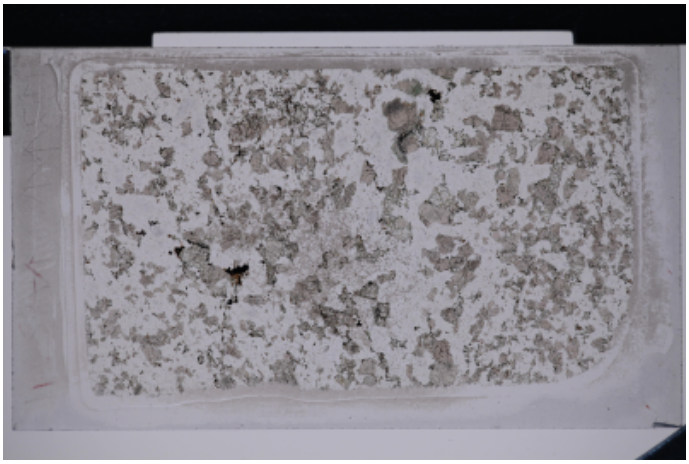
Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF dynamic recrystallization:	weak	n/a

Type	Comment
Olivine:	Grain size: coarse-grained; Grain shape: anhedral; Grain boundary: straight to curved; Undulose extinction: regular; Texture: coarse-grained olivine with minor neoblasts
Plagioclase:	Grain size: coarse-grained; Grain shape: anhedral; Grain boundary: straight to curved; Twinning: tapered; Texture: coarse-grained plagioclase with some neoblasts
Clinopyroxene:	Grain size: coarse-grained; Grain shape: anhedral; Grain boundary: straight to curved; Texture: mostly large oikocrysts poikilitically including euhedral to subhedral plagioclase and olivine

THIN SECTION LABEL ID: **179-1105A-22R-3-W 130/133-TSB-TSS** Piece no.: #08 TS no.:

Group	Summary
Igneous petrology:	Medium grained granular amphibole- and oxide bearing olivine gabbro. Olivine grains are commonly rimmed by brown amphibole and orthopyroxene (less commonly by clinopyroxene). Late magmatic brown amphibole also rims some clinopyroxene grains and is often associated to oxides.
Structure:	Weakly deformed, locally single grains show undulose extinction and subgrains. Plagioclase is partially and locally recrystallized. A weak magmatic fabric defined by plagioclase and clinopyroxene is observed.

Plane-polarized



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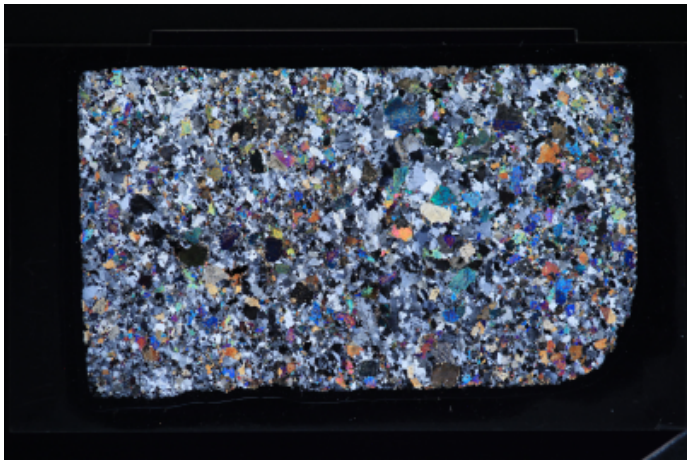
Cross-polarized



32853971

IGNEOUS PETROLOGY

Lithology: **amphibole- and oxide-bearing olivine gabbro** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	10	0.06	0.06	1	subhedral	elongate	
Plagioclase	50	0.04	3	0.7	subhedral	subequant	1
Clinopyroxene	35	0.15	3	1.2	anhedral	subequant	3
Orthopyroxene	0.5	0.02	0.15	0.05			4
Amphibole	1.5	0.03	0.6	0.1	anhedral	interstitial	
Opaques	2						
Sulfide	0.1						

MICROSTRUCTURES

Microstructure: magmatic Observer: CF

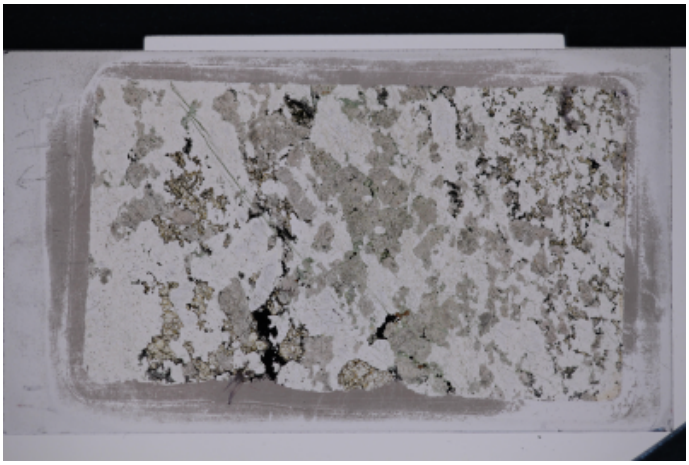
Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
Intensity of dynamic recrystallization:	absent	n/a
Magmatic fabric intensity:	weak	1
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	weak	n/a
CPF fabric intensity:	weakly foliated/lineated [CPF_fabric]	1
Fracture abundance:	rare	n/a

Type	Comment
Olivine:	Grain size: medium Grain shape: anhedral Grain boundary: curved Undulose extinction: common and regular Subgrains weakly develpped Texture: partially altered
Plagioclase:	Grain size: medium porphyroclasts and fine recrystallized Grain shape: subhedral to anhedral Grain boundary: curved Twinning: tapered Undulose extinction: regular Texture: partially and locally recrystallized along grain boundaries
Clinopyroxene:	Grain size: medium Grain shape: subhedral to anhedral Grain boundary: curved Texture: in association with plg define the weak magmatic fabric

THIN SECTION LABEL ID: **179-1105A-23R-1-W 94/98-TSB-TSS** Piece no.: #08 TS no.:

Group	Summary
Igneous petrology:	Medium grained granular amphibole- and oxide-bearing olivine gabbro. Brown amphibole is late magmatic. Texture is equilibrated and plastic deformation is recognized. One domain is finer grained. Olivine is often present as neoblasts at clinopyroxene rims.
Structure:	porphyroclastic oxide-olivine gabbro. Olivine is partially recrystallized and alteration seems to be associated with oxides. Plag is recrystallized into a fine-grained matrix. Cpx is fractured and shows a weak preferred orientation that defines a porphyroclastic fabric.

Plane-polarized



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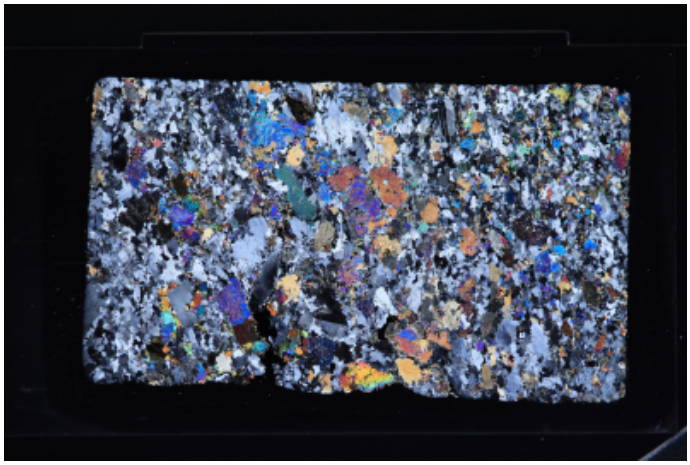
Cross-polarized



32854011

IGNEOUS PETROLOGY

Lithology: **amphibole- and oxide-bearing olivine gabbro** Observer:

Texture: granular Ave. grain size: medium grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	20	0.3	0.3	0.5			
Plagioclase	43	0.06	5	1	subhedral	elongate	
Clinopyroxene	33	0.05	5	1.2	anhedral	subequant	
Amphibole	1	0.03	1	0.2	anhedral	interstitial	
Opaques	3						
Sulfide	0.2						

MICROSTRUCTURES

Microstructure: crystal-plastic Observer: GV

Detailed description porphyroclastic oxide-olivine gabbro. Olivine is partially recrystallized and alteration seems to be associated with oxides. Plag is recrystallized into a fine-grained matrix. Cpx is fractured and shows a weak preferred orientation that defines a porphyroclastic fabric.

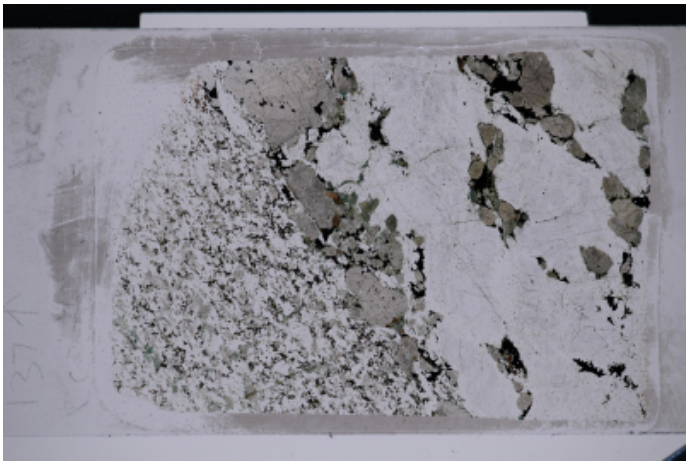
Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	porphyroclastic/protomylonitic [CPF_fabric]	3
Fracture abundance:	common	n/a

Type	Comment
Olivine:	size: medium to fine shape: anhedral boundaries: curved undulose extinction: irregular subgrains: curved boundaries texture: altered and partially recrystallized grains commonly associated with oxides.
Plagioclase:	size: medium to fine shape: anhedral boundaries: curved twinning: tapered undulose extinction: irregular texture: recrystallized grains forming fine-grained aggregates.
Clinopyroxene:	size: coarse to medium shape: subhedral to anhedral boundaries: straight to curved fractures: common texture: porphyroclasts immersed in the fine-grained plag matrix.
Oxide:	geometry: pods aligned in the direction of the foliation, typically associated with olivine.

THIN SECTION LABEL ID: **179-1105A-25R-1-W 26/30-TSB-TSS** Piece no.: #02 TS no.:

Group	Summary
Igneous petrology:	This thin section contains two domains, coarse-grained oxide-bearing gabbro and fine-grained oxide-disseminated gabbro mylonite. The coarse-grained domain mainly consist of plagioclase and clinopyroxene porphyroblasts, with narrow bands of plagioclase neoblasts. Clinopyroxenes have been variably replaced by green amphiboles in most cases and also occasionally by brown amphiboles. Opaque minerals are mainly composed of ilmenites. In the mylonite domain, plagioclase and clinopyroxene neoblasts have similar sizes. Plagioclase commonly show discontinuous zoning. Opaque minerals mainly consist of ilmenites and are commonly associated with green amphiboles. Brown amphiboles are occasionally occurred.

Plane-polarized



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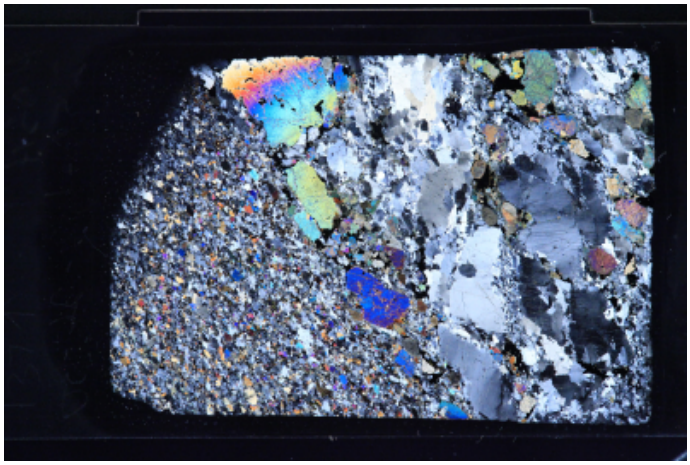
Cross-polarized



32853421

IGNEOUS PETROLOGY

Interval domain no: **1** Domain rel. abundance (%): 60 Domain name: 1

Lithology: **oxide-bearing gabbro coarse grained** Observer:

Texture: granular Ave. grain size: coarse grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	65	1	7	3	anhedral	elongate	Plagioclase phorphyroblasts are surrounded by bands of plagioclase neoblasts
Clinopyroxene	30	1	7	1.6	anhedral	subequant	With blebs of opaque minerals
Opaques	5						
Ilmenite	5						

Interval domain no: **2** Domain rel. abundance (%): 40 Domain name: 2

Lithology: **disseminated oxide gabbro cataclasite** Observer:

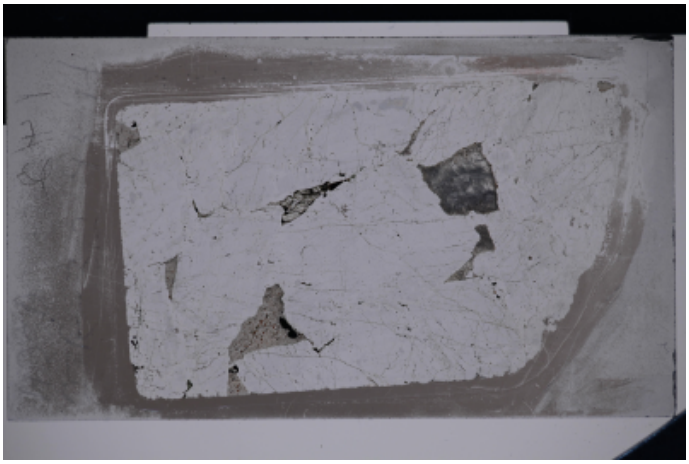
Texture: granular Ave. grain size: fine grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	50	0.02	0.8	0.4	anhedral	subequant	
Clinopyroxene	42	0.1	1.2	0.6	anhedral	subequant	Rimmed by amphibole
Amphibole	5	0.02	0.8	0.3	anhedral	interstitial	Brown amphile is occasionally occurred
Opaques	3						
Ilmenite	3						

THIN SECTION LABEL ID: **179-1105A-27R-3-W 93/94-TSB-TSS** Piece no.: #02 TS no.:

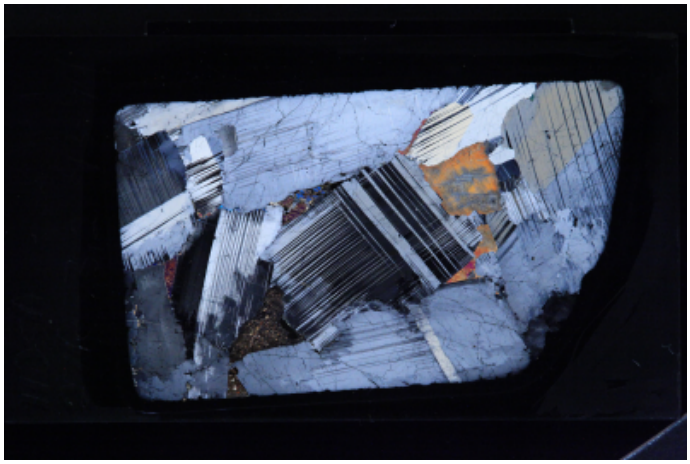
Group	Summary
Igneous petrology:	Coarse-grained olivine-bearing gabbro, with 94% plagioclase. Olivine is overgrown by cpx. Cpx is insterstitial among plagioclase, with well-developed exsolution lamallae. Blebs of brown amphibole and ilmenite occur within clinopyroxene.
Structure:	Preserved magmatic texture with isotropic fabric. Deformation is loclaized in single grains: plagioclase shows tapered twins and subgrains.

Plane-polarized



32854331

Cross-polarized



32854351

IGNEOUS PETROLOGY

Lithology: **olivine-bearing gabbro coarse grained** Observer:

Texture: ophitic Ave. grain size: coarse grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	1	1	1	2	anhedral	subequant	with overgrowth of clinopyroxene
Plagioclase	94	1	14	7	subhedral	tabular	
Clinopyroxene	4	0.6	5	3	anhedral	subequant	Samll cpx interstitial between pl; with blebs of brown amphibole and ilmenite
Amphibole	0.5	0.01	0.4	0.2	anhedral	interstitial	
Opaques	0.5						
Ilmenite	0.5						

MICROSTRUCTURES

Microstructure: magmatic Observer: CF

Feature type	Observation	Intensity rank
Magmatic fabric intensity:	isotropic	0
CPF fabric intensity:	undeformed [CPF_fabric]	0
Fracture abundance:	rare	n/a

Type	Comment
Olivine:	Grain size: medium to coarse Gain shape: anhedal and interstitial Grain boundary: curved Texture: partially altered, interstitial betweeen coarse grained plagioclase
Plagioclase:	Grain size: coarse Grain shape: euhedral Grain boundary: straight Twinnig: igneous and tapered Undulose extinction: not observed Subgrain: curved Texture: preserved primary texture
Clinopyroxene:	Grain size: coarse Grain shape: subhedral to anhedral Grain boundary: curved Undulose extinction: regular Texture: interstitial between plagioclase
Oxide:	interstitial

THIN SECTION LABEL ID: **179-1105A-29R-1-W 102/106-TSB-TSS** Piece no.: #04 TS no.:

Group **Summary**

Structure: Ultramylonitic with oxides in bands parallel to foliation. Band shows complete recrystallized equigranular olivine.

Plane-polarized

32843161

Cross-polarized

32843181

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): Observer(s): RT

Comment type	Comment
Mylonite comments:	mylonite, with Cpx, Pl, Ol, Ox and brown Amp neoblasts. Frequent Cpx porphyroclasts and rare Pl and Ol porphyroclasts. Neoblastic amphibole is brown hornblende and preferentially localized in: (i) ultra-mylonite bands and (ii) neoblastic Cpx aggregates.

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	10	5		5
Amphibole, green		100		
Chlorite				85
Clay minerals	50			
Oxide	10			n/a
Plagioclase, sec.	n/a	n/a	n/a	15
Talc	40	n/a		n/a
Subtotals replaced	100	100		100

MICROSTRUCTURES

Interval domain no: 1 Domain rel. abundance (%): 5 Domain name: microfabric

Microstructure: crystal-plastic Observer: JD

Detailed description Oxide-rich ultramylonite with extremely fine grained plagioclase, olivine, and pyroxene. The oxide pods consisting of several crystals of ilmenite and magnetite are partly elongate parallel to the shear zone but also form equidimensional pods.

Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	equigranular	n/a
CPF subgrain boundary shape:	serrate	n/a
CPF dynamic recrystallization:	complete	n/a
CPF fabric intensity:	ultramylonitic [CPF_fabric]	5
Fracture abundance:	absent	n/a

Type	Comment
Olivine:	Grain size: 0.05 to 0.15 mm. Grain shape: elongate to equigranular. Grain boundary: curved to irregular. Undulose extinction: none. Subgrains: none Isolated crystals of olivine that are strain free (do not have undulose extinction).
Plagioclase:	Grain size: 0.01 to 0.1 mm. Grain shape: anhedral and equigranular. Grain boundary: very irregular. Twinning: none. Undulose extinction: common. Subgrains: rare. Very fine grained recrystallized plagioclase.
Clinopyroxene:	Grain size: 0.05 to 0.1 mm. Grain shape: subhedral and elongate to equigranular. Grain boundary: curved. Forms isolated recrystallized grains elongate parallel to the shear zone.
Oxide:	Isolated pods of oxides that are separated by plagioclase and pyroxene. Where pyroxene has a larger grain size the oxide pod is bigger. The oxide pods have some alignment with the shear zone, but some are equidimensional.

Interval domain no: 2 Domain rel. abundance (%): 10 Domain name: microfabric

Microstructure: crystal-plastic Observer: JD

Detailed description Recrystallized band of olivine. The boundary between this domain and the oxide-poor ultramylonite domain is a thin veneer of oxide.

Feature type	Observation	Intensity rank
Recrystallization grain size:	medium grained [BGS]	n/a
Recrystallization grain shape:	equigranular	n/a
CPF subgrain boundary shape:	straight	n/a
CPF dynamic recrystallization:	complete	n/a
CPF fabric intensity:	porphyroclastic/protomylonitic [CPF_fabric]	3
Fracture abundance:	rare	n/a

Type	Comment
Olivine:	Grain size: 0.1 to 0.15 mm. Grain shape: equigranular. Grain boundary: straight to curved. Undulose extinction: in larger grains, more rare in finer grains.

Interval domain no: 3 Domain rel. abundance (%): 15 Domain name: microfabric

Microstructure: crystal-plastic Observer: JD

Detailed description Oxide-poor ultramylonite. There is alteration in some zones.

Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	equigranular	n/a
CPF subgrain boundary shape:	straight	n/a
CPF dynamic recrystallization:	complete	n/a
CPF fabric intensity:	ultramylonitic [CPF_fabric]	5
Fracture abundance:	rare	n/a

Type	Comment
Olivine:	Grain size: 0.1 mm. Grain shape: subhedral and equigranular. Grain boundary: curved. Undulose extinction: absent. Isolated crystallized grains of olivine.
Plagioclase:	Grain size: 0.05 to 0.15 mm. Grain shape: anhedral and equigranular, some elongate parallel to the foliation. Grain boundary: curved to straight. Some undulose extinction and subgrain development. Completely recrystallized plagioclase with a minor preferred orientation parallel to the shear zone.
Clinopyroxene:	Grain size: One medium-grained porphyroclast, 0.1 to 1 mm. Grain shape: subhedral and elongate parallel to the shear zone. Grain boundary: irregular to curved. Some oxide pods form near larger clinopyroxene crystals.
Oxide:	Small pods of oxides parallel to the shear zone. Oxide pods are larger near larger pyroxene crystals.

Interval domain no: 4 Domain rel. abundance (%): 30 Domain name: microfabric

Microstructure: crystal-plastic Observer: JD

Detailed description Porphyroclast that is strongly recrystallized but does not have a strong preferred orientation. Plagioclase and olivine form core and mantle structures whereas pyroxene forms kinked crystals. Alteration present.

Feature type	Observation	Intensity rank
Recrystallization grain size:	medium grained [BGS]	n/a
Recrystallization grain shape:	equigranular	n/a
CPF subgrain boundary shape:	serrate	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	porphyroclastic/protomylonitic [CPF_fabric]	3
Fracture abundance:	common	n/a

Type	Comment
Olivine:	Grain size: porphyroclasts ~1.2 mm; recrystallized ~ 0.1 mm. Grain shape: elongate to equigranular. Grain boundary: serrate. Undulose extinction: common in porphyroclasts; rare in recrystallized. Core and mantle structure.
Plagioclase:	Grain size: porphyroclasts: ~3 mm; recrystallized grains: 0.1 to 0.15 mm. Grain shape: anhedral, elongate parallel to the foliation. Grain boundary: serrate. Twinning: limited, but tapered. Undulose extinction: common. Porphyroclasts of plagioclase with mostly recrystallized grains forming a core and mantle structure.
Clinopyroxene:	Grain size: porphyroclasts are ~2.1 mm; recrystallized grains are ~0.1 mm. Grain shape: subhedral. Grain boundary: irregular. Undulose extinction: common. Mostly altered and kinked grains.

Interval domain no: 5 Domain rel. abundance (%): 40 Domain name: microfabric

Microstructure: crystal-plastic Observer: JD

Detailed description Porphyclastic shear zone with completely recrystallized plagioclase and olivine with some porphyroclasts of clinopyroxene. The plagioclase has polygonal grain shapes and does not define the foliation. The olivine forms elongate bands of recrystallized grains that do define a weak fabric. The clinopyroxene is party recrystallized in bands, but does not form sigma clasts.

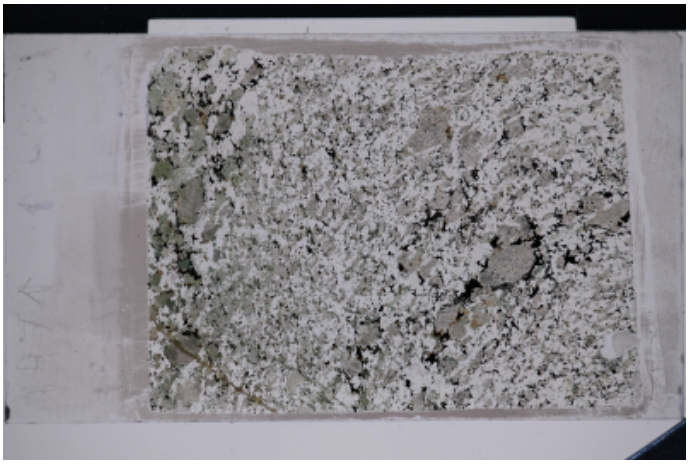
Feature type	Observation	Intensity rank
Recrystallization grain size:	medium grained [BGS]	n/a
Recrystallization grain shape:	equigranular	n/a
CPF subgrain boundary shape:	straight	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	strongly foliated/lineated [CPF_fabric]	2
Fracture abundance:	rare	n/a

Type	Comment
Olivine:	Grain size: 0.15 to 1 mm. Grain shape: anhedral and equigranular. Grain boundary: straight. The larger crystals have undulose extinction with subgrains. The smaller crystals have straight extinction. All of the crystals are highly fractured. The recrystallized grains occur in bands parallel to the foliation.
Plagioclase:	Grain size: 0.15 to 1.5 mm. Grain shape: subhedral and equigranular. Grain boundary: straight. Twinning: tapered twinning. Undulose extinction: most crystal are undulose. Subgrains: some crystals have subgrain development, but there is no core-mantle structure. The plagioclase crystals do not define a strong foliation even though they are recrystallized.
Clinopyroxene:	Grain size: 0.15 to 3.6 mm. Grain shape: anhedral to subhedral. Grain boundary: curved to straight. More highly fractured than surrounding plagioclase. The clinopyroxene forms porphyroblasts and have zones of recrystallized grains, but do not form well developed sigma clasts. However, some crystals are kinked and have undulose extinction.
Oxide:	Mostly present as an alteration phase of olivine.

THIN SECTION LABEL ID: **179-1105A-30R-1-W 27/31-TSB-TSS** Piece no.: #03 TS no.:

Group	Summary
Igneous petrology:	Oxide-bearing gabbro mylonite. Plagioclase and clinopyroxene are foliated. Plagioclase commonly display discontinuous zoning and clinopyroxene is rimmed by brown amphibole and ilmenite. Small amount of sulfides are also present.
Structure:	mylonitic fine-grained oxide gabbro. Plagioclase is recrystallized into a fine grained matrix and cpx forms medium-grained porphyroclasts. Oxides occur as pods associated with amphibole

Plane-polarized



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Cross-polarized

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IGNEOUS PETROLOGY

Lithology: **oxide-bearing gabbro mylonite** Observer:

Texture: granular Ave. grain size: fine grained [345]

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Plagioclase	50	0.2	2	0.8	anhedral	equant	
Clinopyroxene	43	0.2	4	1	anhedral	subequant	rimmed by brown amphibole and ilmenite; partly replaced by green amphibole
Amphibole	3	0.1	0.4	0.2	subhedral	subequant	together with ilmenite occurring at the rim of clinopyroxene
Opaques	4						
Ilmenite	4						

METAMORPHIC PETROLOGY

Total rock alteration estimate (%): 30 Observer(s): QM

Comment type	Comment
Vein 1 minerals:	amphibole

Mineral	OL replaced (%)	CPX replaced (%)	OPX replaced (%)	PL replaced (%)
Mineral alteration (%)	8	40	20	8
Amphibole, brown	n/a	35	n/a	n/a
Amphibole, green		60	90	20
Chlorite		5	10	80
Clay minerals	60			
Oxide	25			n/a
Subtotals replaced	100	100	100	100

MICROSTRUCTURES

Microstructure: crystal-plastic Observer: GV

Detailed description mylonitic fine-grained oxide gabbro. Plagioclase is recrystallized into a fine grained matrix and cpx forms medium-grained porphyroclasts. Oxides occur as pods associated with amphibole

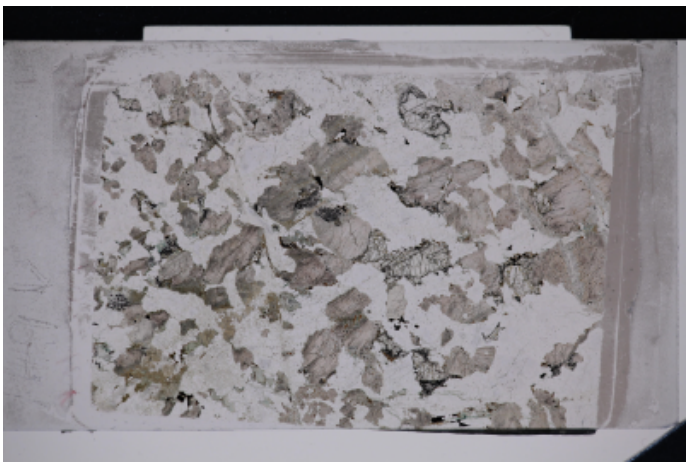
Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
Intensity of dynamic recrystallization:	absent	n/a
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	mylonitic [CPF_fabric]	4
Fracture abundance:	common	n/a

Type	Comment
Plagioclase:	size: fine shape: anhedral boundaries: curved twinning: tapered (rarely observed) undulose extinction: irregular subgrains: rare texture: recrystallized fine-grained matrix.
Clinopyroxene:	size: medium to fine shape: subhedral to anhedral boundaries: straight to curved fractures: common texture: medium-grained porphyroclasts.
Oxide:	geometry: pods associated with cpx and amphibole.

THIN SECTION LABEL ID: **179-1105A-30R-3-W 102/106-TSB-TSS** Piece no.: #09 TS no.:

Group	Summary
Igneous petrology:	Medium-grained oxide-disseminated olivine gabbro. Olivine is commonly rimmed or occasionally replaced by ilmenite and brown amphibole. Plagioclase porphyroblasts commonly display a discontinuous zoning, and sometimes patchy zoning. Clinopyroxene displays well-developed lamallae and its rim has been commonly replaced by amphibole with or without ilmenite. Opaque minerals mainly consist of ilmenite, but sulfides are also present.
Structure:	porphyroclastic olivine gabbro. Olivine is altered and has anhedral shapes. Plagioclase is recrystallized and forms a fine-grained matrix where aggregates are in straight contact with trails or bands of fine-grained material; the latter ones may be mixed with amphibole. Cpx is fractured and forms porphyroclasts.

Plane-polarized



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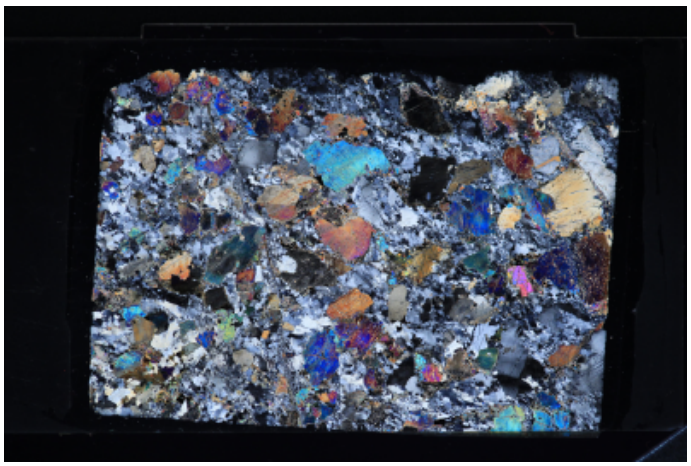
Cross-polarized



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IGNEOUS PETROLOGY

Lithology: **disseminated oxide olivine gabbro medium grained** Observer:

Texture: granular Ave. grain size: medium grained [345]

Texture comment: Deformed

Mineral	Original (%)	Size min. (mm)	Size max. (mm)	Size mode (mm)	Shape	Habit	Comments
Olivine	5	0.8	0.8	2.8	anhedral	subequant	
Plagioclase	50	0.01	2.8	0.4	anhedral	subequant	occasionally occurs as chadacryst within clinopyroxene
Clinopyroxene	40	0.8	4.4	2.8	anhedral	subequant	opaque inclusions along the lamallae
Amphibole	3	0.01	0.4	0.1	anhedral	interstitial	
Opaques	2						
Ilmenite	1.8						
Sulfide	0.2						

MICROSTRUCTURES

Microstructure: crystal-plastic Observer: GV

Detailed description porphyroclastic olivine gabbro. Olivine is altered and has anhedral shapes. Plagioclase is recrystallized and forms a fine-grained matrix where aggregates are in straight contact with trails or bands of fine-grained material; the latter ones may be mixed with amphibole. Cpx is fractured and forms porphyroclasts.

Feature type	Observation	Intensity rank
Recrystallization grain size:	fine grained [BGS]	n/a
Recrystallization grain shape:	anhedral	n/a
CPF subgrain boundary shape:	curved	n/a
CPF dynamic recrystallization:	strong	n/a
CPF fabric intensity:	porphyroclastic/protomylonitic [CPF_fabric]	3
Fracture abundance:	common	n/a

Type	Comment
Olivine:	size: medium shape: anhedral boundaries: curved undulose extinction: irregular subgrains: rare texture: anhedral grains, partially altered
Plagioclase:	size: medium to fine shape: subhedral to anhedral boundaries: straight to curved twinning: tapered undulose extinction: irregular subgrains: curved to straight boundaries texture: recrystallized grains forming aggregates and as fine-grained bands locally mixed with alteration products (amphibole)
Clinopyroxene:	size: coarse to medium shape: subhedral to anhedral boundaries: straight to curved fractures: common texture: coarse grains as porphyroclasts immersed in the recrystallized plagioclase matrix.