

153-922A-1R-1 (Piece 2, 9 cm)

Observer: CAN

Rock Name: METAGABBRO OR METATROCTOLITE

Grain size: Medium.

Texture: Cataclastic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	55	60	0.1-0.2 1-3	Euhedral.	Bimodal grain size due to partial recrystallization of igneous plagioclase into neoblasts.
Clinopyroxene.	1	?	1-4	Anhedral.	Only three relics of clinopyroxene in thin section. All the mafic minerals have been replaced by a fine-grained actinolite-chlorite mesh.
Olivine	0	?	?	?	
ACCESSORY MINERAL NAME					
Iron oxide minerals.	<< 1	<<1	0.2	Anhedral.	
SECONDARY MINERAL NAME					
Actinolite.	19	REPLACING/ FILLING Mafic minerals.	0.04	Euhedral.	
Chlorite.	20	Mafic minerals.	0.04	Euhedral.	
Brown amphibole.	<1	Clinopyroxene(?).	0.2-1	Interstitial to euhedral.	Surrounds altered pyroxene.
VEIN/FRACTURE FILLING					
Chlorite.	PERCENT 90		SIZE <0.04	ORIENTATION	These veins are commonly subparallel to one another.

COMMENTS: #209

It is unclear if actinolite replaces olivine or clinopyroxene or both. No association of talc, oxide minerals, and chlorite to suggest possible original olivine. Thin chlorite-actinolite veins commonly show displacement. These veins are throughout the rock.

STRUCTURE

Plagioclase is the only primary phase which is not completely altered. The magmatic texture is well preserved; elongated plagioclase laths have an essentially random orientation, and show magmatic twins with a minor development of deformation twins. The rock has suffered moderate cataclasis characterized by: microfaults with possible development of gouges (now altered). This brittle deformation predates the alteration.

153- 922A-1R-1 (Piece 9, 130 cm)

Observer: PAM

Rock Name: META-OLIVINE GABBRO

Grain size: Medium.

Texture: Cumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	45	50		Anhedral.	10% recrystallized.
Clinopyroxene.	4	15		Anhedral.	
Olivine(?).	0	35		Anhedral.	Completely altered, identification uncertain.
SECONDARY MINERAL NAME					
Brown hornblende.	4	REPLACING/ FILLING Clinopyroxene.		Anhedral.	Pale brown. Replacing clinopyroxene and as discrete crystals in or near veins.
Tremolite-actinolite	32	Olivine and clinopyroxene.		Acicular, radiating.	
Chlorite.	15	Olivine, plagioclase, and clinopyroxene.			Rims or coronas around replaced clinopyroxene and olivine.
Titanite.	Trace.	Fe-Ti oxide minerals.			
VEIN/FRACTURE FILLING					
Chlorite microveinlets. Chlorite and actinolite.	PERCENT		SIZE <0.01	ORIENTATION	

COMMENTS: #210

STRUCTURE

Plagioclase and, to a lesser extent, clinopyroxene are the only primary phases not completely altered. The original igneous texture is overprinted by moderate recrystallization. Typical plagioclase recrystallized grain size is 300 micrometers. Plagioclase shows extensive development of deformation twins. Clinopyroxene crystals recrystallize into brown amphibole along their margin. Microcracks cut both the magmatic and recrystallized crystals. They largely predate the alteration event.

SITE 922

153-922A-2R-1 (Piece 8, 122 cm)

Observer: KIY

Rock Name: TROCTOLITE

Grain size: Coarse.

Texture: Heteradcumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	79	79	0.2-7.2	Euhedral/subhedral.	
Olivine.	16	17	0.1-6.0	Subhedral-anhedral.	
ACCESSORY MINERAL NAME					
Clinopyroxene.	2.5	3		Anhedral.	Intercumulus and poikilitic.
Fe-Ti oxide minerals.	<0.5	<0.5			
SECONDARY MINERAL NAME					
Brown hornblende.	PERCENT 0.5	REPLACING/FILLING Clinopyroxene.		Anhedral.	Rims around clinopyroxene and interstitial. Could be late magmatic, deuteric alteration or high-temperature hydrothermal alteration.
Talc.	<1	Olivine.			
Magnetite.	<1	Olivine.			
Tremolite.	<1	Olivine.			
Chlorite.	<1	Olivine.			
VEIN/FRACTURE FILLING					
Actinolite-chlorite vein.	PERCENT		SIZE <0.1	ORIENTATION	

COMMENTS: #211

Hornblende crystallization follows the latest crystallization of interstitial clinopyroxene, accompanied by recrystallization of plagioclase, clinopyroxene, and hornblende along grain boundaries.

STRUCTURE

The primary igneous texture is beautifully preserved. Plagioclase laths define a weakly developed preferred orientation and a moderate lattice fabric. Some of the olivine interstitial grains are elongated parallel to the plagioclase laths. Plagioclase shows minor development of deformation twins and olivine shows moderate development of subgrain boundaries.

153-922A-2R-1 (Piece 8, 125 cm)

Observer: KIY

Rock Name: OLIVINE GABBRO

Grain size: Coarse.

Texture: Heteradcumulate to mesocumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	58	58	0.4-4.4	Subhedral.	Cumulus phase.
Olivine.	27	28	0.2-6.3	Anhedral.	Cumulus phase. Oikocrysts enclosing small plagioclase euhedral to subhedral laths.
Clinopyroxene.	11.5	12	0.3-4.2	Anhedral.	Intercumulus and poikilitic. Commonly rimmed by hornblende.
ACCESSORY MINERAL NAME					
Fe-oxide minerals.	<0.5	<0.5		Anhedral.	Titanomagnetite.
SECONDARY MINERAL NAME					
Brown hornblende.	PERCENT 1%	REPLACING/FILLING Clinopyroxene.		Anhedral.	Rims or overgrowths on clinopyroxene. Secondary or deuteric alteration?
Tremolite-actinolite.	<0.5	Olivine.			
Talc.	<1.0	Olivine.			
Chlorite.	<1.0	Olivine.			
Magnetite.	<1.0	Olivine.			
Sulfide minerals.					

COMMENTS: #212

STRUCTURE

The primary igneous texture is beautifully preserved. Plagioclase laths define a weakly developed preferred orientation and a moderate lattice fabric. Some of the olivine interstitial grains are elongated parallel to the plagioclase laths. Plagioclase shows minor development of deformation twins and olivine shows moderate development of subgrain boundaries.

153-922A-2R-2 (Piece 1C, 38 cm)
 Rock Name: TROCTOLITE
 Grain size: Medium.
 Texture: Adcumulate to mesocumulate.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	60	65	0.4-6	Subhedral/anhedra.	Elongate, some mechanical twinning, some undulatory extinction and primary zoning. Preferred magmatic orientation.
Olivine.	22	31	0.2-6	Anhedra.	Amoeboid, some subgrain development, kink bands.
ACCESSORY MINERAL NAME					
Clinopyroxene.	2	3	0.2-1.0	Anhedra.	Interstitial, often rimmed or partially replaced by brown hornblende.
Cr-spinel.	1	1	0.1-1.8	Anhedra.	Could be primary magnetite.
SECONDARY MINERAL NAME					
Tremolite.	6	REPLACING/FILLING			Olivine and plagioclase.
Chlorite.	4				Olivine and plagioclase.
Brown hornblende.	2				Clinopyroxene.
Talc.	1				Olivine.
Magnetite.	<<1				Olivine.
VEIN/FRACTURE FILLING					
Actinolite and chlorite.	PERCENT		SIZE	ORIENTATION	
Green hornblende.			1.4 0.04		Pleochroic: blue-green to pale green.

COMMENTS: #217

Preferred orientation of elongate plagioclase and olivine appears to be of magmatic origin.

STRUCTURE

Well-preserved primary igneous texture. Plagioclase and olivine show a moderately defined preferred crystal shape orientation. No evidence for dynamic recrystallization. Plagioclase shows a moderate development of deformation twins. The larger plagioclase crystals are slightly twisted. Olivine shows well-developed subgrain boundaries at high angle to their elongation.

153-922A-2R-2 (Piece 2, 106 cm)
 Rock Name: SHEARED OXIDE NORITE IN OLIVINE GABBRONORITE
 Grain size: Coarse to fine.
 Texture: Porphyroclastic submylonitic.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	62	62	0.05-6	Anhedra.	Porphyroclasts and neobalasts. Mechanical twins.
Olivine.	15	15	0.05-1.6	Anhedra.	Recrystallized in host rock.
Orthopyroxene.	10	10	0.1-6	Subhedral/anhedra.	Some orthopyroxene appears undeformed.
Clinopyroxene.	4	6	0.05-4	Anhedra.	Most clinopyroxene is in host rock.
Fe-Ti oxide mineral.	6.	6.	0.1-1.0	Anhedra.	Concentrated in schlieren within sheared zone.
ACCESSORY MINERAL NAME					
SECONDARY MINERAL NAME					
Actinolite.	<1.0	REPLACING/FILLING			Clinopyroxene.
Brown hornblende.	<1.0				Clinopyroxene.
Sulfide minerals.	<<1.0				
Talc.	<<1.0				Olivine.
Magnetite.	<<1.0				Olivine.

COMMENTS: #213

STRUCTURE

Fine grain size (200-500 micrometers) results from extensive (about 90%) recrystallization of a coarse-grained protolith. Rare relics of large (more than 5 mm) euhedral orthopyroxene and anhedra plagioclase are still preserved. Apart from these relics and from the fine-grained recrystallized matrix, plagioclase occurs as 1-mm-size subhedral porphyroclasts showing a moderate preferred orientation of their deformation twins. An oxide mineral-rich horizon is parallel to plagioclase twins preferred orientation. Olivine occurs as more or less elongated clusters of recrystallized porphyroclasts, or as small grains scattered in the plagioclase recrystallized matrix.

SITE 922

153-922A-2R-3 (Piece 1A, 15 cm)

Observer: ROS

Rock Name: TROCTOLITE

Grain size: Medium.

Texture: Heteradcumulate to mesocumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	62	72	0.04–4.0	Subhedral/anhedral.	Locally deformed, mechanical twins. Complex zoning with anorthitic core and rim and more albitic intermediate zone.
Olivine.	16	21	0.1–1.8	Anhedral.	Kink banded.
ACCESSORY MINERAL NAME					
Clinopyroxene.	2	4		Anhedral.	Interstitial and poikilitic.
Fe-oxide minerals.	3	3	0.1–2.8	Anhedral.	Several large grains near strongly altered patch of rock. Also intergrown with clinopyroxene. Black and opaque, no color observable in transmitted light.
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Actinolite-tremolite	6	Clinopyroxene, plagioclase, and olivine.			
Chlorite.	4	Clinopyroxene, plagioclase, and olivine.			
Talc.	5	Olivine.			
Magnetite.	0.5	Olivine.			
Sulfide minerals.	<0.5				
Brown hornblende.	1	Clinopyroxene.			

COMMENTS: #214

This section has an irregular patch that is totally altered to tremolite-actinolite plus chlorite. This patch occupies ~15% of the thin section.

STRUCTURE

The primary igneous texture is well preserved. Large plagioclase laths define a weak preferred orientation. Olivine occurs as medium-sized interstitial grains, locally elongated along a plagioclase lath. A large clinopyroxene oikocryst is totally altered into actinolite and other alteration minerals. The primary igneous texture is slightly overprinted by recrystallization (a few percent), taking place along grain boundaries and microcracks. Moderate development of deformation twins in plagioclase and of subgrain boundaries in olivine.

153-922A-2R-4 (Piece 1, 33 cm)

Observer: ROS

Rock Name: META-OLIVINE GABBRO

Grain size: Coarse.

Texture: Cumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	48	58	1.5–9	Subhedral/anhedral.	Cores of large zoned grains partially replaced by green hornblende.
Clinopyroxene.	3	30	1–4	Anhedral.	Almost completely replaced by fine-grained intergrowths of actinolite, chlorite, and brown hornblende.
Olivine.	0	10	2–8.5	Anhedral.	Amoeboid, elongate, pseudomorphed by tremolite, talc, magnetite, and chlorite.
ACCESSORY MINERAL NAME					
Fe-Ti oxide minerals.	1	2	0.2–1.0	Subhedral-euhedral.	Exsolution features pseudomorphed in partially altered grains. Replacement of ilmenite(?) by actinolite and titanite.
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Tremolite.	5	Olivine.	<0.1–0.5	Anhedral.	Radiating acicular habit.
Actinolite.	18	Clinopyroxene.	0.01–0.2	Anhedral.	Finely intergrown with chlorite? in zones altered after clinopyroxene.
Brown hornblende.	2	Clinopyroxene.	0.2–1.8	Anhedral.	Pleochroic red-brown to tan.
Green hornblende.	6	Plagioclase, clinopyroxene?	0.1–1	Anhedral.	Pleochroic green to blue green.
Talc.	3	Olivine.			
Magnetite.	0.2	Olivine.			
Iddingsite(?).	0.5	Olivine.			
Sulfide minerals.	0.2				

COMMENTS: #218

STRUCTURE

Only microstructures are microcracks and vein/alteration zones.

153-922A-2R-5 (Piece 1A, 2 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium.
 Texture: Heteradcumulate.

Observer: PAM

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	60	65	0.5–3.0	Subhedral.	Crosscut by chlorite and actinolite microveinlets.
Olivine.	0	20	0.5–3.0	Anhedral.	Elongate.
Clinopyroxene.	10	15	Up to 5	Anhedral.	Interstitial and poikilitic.
ACCESSORY MINERAL NAME					
Iron oxide minerals.	Trace.	Trace.	<1.5	Anhedral.	Rimmed by hornblende, interstitial.
SECONDARY MINERAL NAME					
Tremolite-actinolite.	PERCENT 15	REPLACING/ FILLING Olivine.			Fibrous, radiating, and acicular. Totally replacing olivine and perhaps some clinopyroxene. Rimmed in all cases by chlorite rinds.
Chlorite.	8	Olivine and plagioclase.			Rims, mats of tremolite after olivine.
Brown hornblende.	1	Clinopyroxene.			
Sulfide minerals.					
VEIN/FRACTURE FILLING					
Chlorite and actinolite.	PERCENT		SIZE 0.02–2.0	ORIENTATION	

COMMENTS: #215 and #216

Two thin sections taken side by side from bottom of XRF minicores.

STRUCTURE

Well-preserved primary igneous texture. Plagioclase laths define (especially in thin section #216) a moderate shape preferred orientation. Clinopyroxene forms large (1 cm) oikocrysts. No evidence for dynamic recrystallization. Weak development of deformation twins in plagioclase. Moderate abundance of microcracks filled with alteration minerals (actinolite, chlorite).

153-922A-2R-5 (Piece 1, 30 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Heteradcumulate-crescumulate.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	55	60	0.2–7	Anhedral.	Mechanical twins.
Clinopyroxene.	15	20	Up to 10	Anhedral.	Poikilitically enclosing plagioclase laths.
Olivine.	8	20	Up to 10.	Anhedral.	Kink banded. Encloses plagioclase laths.
Orthopyroxene.	<1	<1	0.5–1.3	Anhedral.	Adjacent to olivine.
ACCESSORY MINERAL NAME					
Cr-spinel.	<1	<1		Anhedral.	Could be primary titanomagnetite.
SECONDARY MINERAL NAME					
Tremolite-Actinolite	PERCENT 6	REPLACING/ FILLING Olivine, clinopyroxene.			
Chlorite.	3	Olivine, clinopyroxene, and plagioclase.			
Talc.	4	Olivine.			
Magnetite.	2	Olivine.			
Brown hornblende.	3	Clinopyroxene.			

COMMENTS: #221

STRUCTURE

Static alteration overprints primary igneous texture. Plagioclase is subhedral and exhibits evidence of minor grain-size reduction at grain margins. Twins are magmatic and deformational. Portions of the slide contain networks of parallel microveins filled with chlorite.

SITE 922

153-922A-2R-5 (Piece 1B, 50 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Crescumulate-heteradcumulate.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	51	59	0.5-5.0	Anhedral-subhedral.	Elongate, mechanical twins, magmatic preferred orientation.
Olivine.	8	26	1-6	Anhedral.	Amoeboid, elongate.
Clinopyroxene.	12	14	1-8	Anhedral.	Interstitial, poikilitic.

ACCESSORY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Fe-oxide minerals.	1	1	0.1-0.6	Anhedral.	Titanomagnetite.

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Tremolite-actinolite.	15	Olivine-clinopyroxene-plagioclase.
Chlorite.	8	Olivine-plagioclase.
Talc.	3	Olivine.
Brown hornblende.	2	Clinopyroxene.
Magnetite.	0.2	Olivine.

COMMENTS: #219

Elongate amoeboid olivine and elongate plagioclase is suggestive of crescumulate-like textures. Olivine is not skeletal but does show dendritic growth patterns with lobate branches.

STRUCTURE

Pervasive static alteration. Only microstructures are microcracks and a possible moderate shape fabric of plagioclase.

153-922A-3R-1 (Piece 4B, 104 cm)
 Rock Name: OXIDE GABBRONORITE
 Grain size: Medium to fine.
 Texture: Porphyroclastic, submylonitic.

Observer: PAM

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	55	60	0.1-6	Anhedral.	Recrystallized to a fine-grained matrix in oxide mineral-rich region. Large grains are strained porphyroclasts with mechanical twins.
Orthopyroxene.	10	12	0.5-5.0	Subhedral.	Concentrated in or near oxide mineral-rich portion of section.
Iron oxide minerals.	10	10	<2	Anhedral.	Oxide minerals are concentrated in strongly sheared zone, surrounding plagioclase and actinolite after clinopyroxene.
Clinopyroxene.	5	15	0.5-2.5	Anhedral.	In places, totally replaced by actinolite and chlorite.
Olivine.	1	3	<4	Anhedral.	Present only in one corner of slide, distant from oxide mineral-rich region.

ACCESSORY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	DESCRIPTION
Apatite.	Trace.	Trace.	Associated with oxide mineral-rich zones.

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Actinolite-tremolite.	13	Clinopyroxene and plagioclase.
Chlorite.	5	Clinopyroxene, olivine, and plagioclase.
Magnetite.	Trace.	Olivine.

VEIN/FRACTURE

FILLING
 Actinolite.

COMMENTS: #220

STRUCTURE

Pervasive static alteration overprints strongly recrystallized plagioclase. Average grain size of recrystallized plagioclase is about 100 micrometers. The rock is cut by evenly distributed sets of microveins. Vein width is about 20 micrometers and these are more obvious when cutting plagioclase.

153-922B-1W-1 (Piece 2B, 37 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium.
 Texture: Adcumulate-mesocumulate.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	59	60	0.4-4	Subhedral/anhedral	Tabular, magmatic alignment of elongate grains. Mild deformation but with magmatic twinning preserved. Complex zoning.
Clinopyroxene.	24	25	0.5-3	Anhedral.	
Olivine.	12	15	0.5-3	Anhedral.	Olivine grains show weak alignment parallel to plagioclase preferred shape orientation.

ACCESSORY MINERAL NAME

Iron oxide minerals.	<1	<1	0.1-0.3	Anhedral.	Titanomagnetite.
----------------------	----	----	---------	-----------	------------------

SECONDARY MINERAL NAME

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Magnetite.	<1	Olivine.
Chlorite.	2	Olivine and plagioclase.
Tremolite-actinolite	1	Olivine and clinopyroxene.
Talc.	1	Olivine.
Brown hornblende.	1	Clinopyroxene.

COMMENTS: #222

STRUCTURE

Contact between medium-grained olivine gabbro and anorthosite. Very strong plagioclase shape fabric and moderate lattice fabric. Plagioclase laths are subhedral and show little recrystallization. Slight overprint of plastic deformation seen by undulose extinction and minor development of deformation twins in plagioclase and subgrain boundaries in olivine.

153-922B-1W-1 (Piece 3, 51 cm)

Rock Name: TROCTOLITE

Grain size: Coarse.

Texture: Cumulate.

Observer: CJS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	60	74	0.2-12	Subhedral.	Optical anorthite determination in plagioclase. An ₆₀₋₇₀ .
Olivine.	10	20	2-4	Anhedral.	

ACCESSORY MINERAL NAME

Clinopyroxene.	1	3	1-3	Anhedral.
Orthopyroxene.	1	3	2-4	Subhedral.
Zircon.	Trace.	Trace.		Euhedral.
Fe-oxide minerals.	<1	<1	<0.2	

SECONDARY MINERAL NAME

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Tremolite-actinolite.	10	Olivine, plagioclase, clinopyroxene.
Talc.	8	Olivine.
Iddingsite.	2	Olivine.
Chlorite.	6	Olivine, plagioclase, clinopyroxene.
Brown hornblende.	2	Clinopyroxene.

COMMENTS: #223

This section includes a patch of pervasively altered material at one corner of the slide. This area consists of elongate tremolite-actinolite needles and clay minerals. One large zircon crystal occurs at the boundary between these two rock types. The "host" troctolite is more altered close to this patch.

STRUCTURE

Static alteration overprints igneous crystallization fabric. Minor microcracks and veining. Plagioclase laths are subhedral, elongated, and weakly aligned. No lattice preferred orientation. Crystals are bent and show undulatory extinction. Olivine grains contain subgrain boundaries.

SITE 922

153-922B-1W-1 (Piece 5, 66 cm)

Observer: ROS

Rock Name: OLIVINE GABBRO WITH SHEARED OXIDE GABBRO

Grain size: Coarse to fine.

Texture: Varitextured.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	60	61	0.1-4.6	Anhedral.	Recrystallized in sheared zone, mechanical twins elsewhere.
Olivine.	21	25	0.2-5	Anhedral.	Strongly kink-banded.
Clinopyroxene. in host. Twinned crystals in	7	11	8	Anhedral/subhedral.	Elongate subhedral crystals in oxide mineral-rich zone. Intergranular and poikilitic oxide mineral-rich zone.
ACCESSORY					
MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	3	3	0.2-1.6	Anhedral.	
Zircon.	0.1	0.1	0.6		Euhedral in oxide mineral-rich zone.
Orthopyroxene.	<1	1	0.3-2.4		
SECONDARY					
MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Brown hornblende.	4	Clinopyroxene.			
Tremolite.	2	Olivine and plagioclase.			
Chlorite.	1.5	Olivine and plagioclase.			
Magnetite.	0.5	Olivine.			
VEIN/FRACTURE					
FILLING	PERCENT	PERCENT ORIGINAL	SIZE (mm)	ORIENTATION	DESCRIPTION
Chlorite.			0.1		

STRUCTURE

Shear zone separates rocks with two lithologies with two different grain sizes and modal composition. On one side of the shear zone, most of the plagioclase is subhedral and shows a preferred shape fabric at a moderate angle to the shear zone. On the other side of the shear zone, plagioclase is subhedral with no preferred shape orientation. Fine (100µm) recrystallized plagioclase occurs around margins of subhedral plagioclase in both lithologies. In the shear zone, plagioclase and pyroxene are extensively recrystallized.

153-922B-1W-1 (Piece 8, 105 cm)

Observer: ROS

Rock Name: AUGEN OLIVINE GABBRO WITH OXIDE GABBRO AND MYLONITIC AMPHIBOLITE

Grain size: Coarse to fine.

Texture: Porphyroclastic mylonitic to augen gneissic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	62	62	0.01-8	Anhedral.	Mechanical twins, recrystallized and stretched.
Olivine.	22	24	0.02-6	Anhedral.	Kink banded, recrystallized, and stretched.
Clinopyroxene	7	9	0.1-3.2	Anhedral	Recrystallized and stretched.
ACCESSORY					
MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	3	3	0.2-8.0	Anhedral.	
Orthopyroxene.	2	2	0.5-5.6	Subhedral.	
SECONDARY					
MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Hornblende	2	Clinopyroxene.	0.1-0.6	Anhedral.	
Talc.	1.8	Olivine.	<0.2	Anhedral.	
Magnetite.	0.2	Olivine.	<0.1	Anhedral.	

Coarse-grained oxide-rich band is adjacent to amphibolitized mylonite zone. Host olivine gabbro/troctolite also contains amphibole and is recrystallized.

STRUCTURE

Extensively dynamically recrystallized. Grain-size reduction is nonpenetrative, except in a 4-mm-thick mylonitic to ultramylonitic shear zone. Overall throughout the slide, mineral grain-size distribution is trimodal for olivine, pyroxene, and plagioclase. Relict magmatic grains are 1 to 5 mm, mylonitic recrystallized grains are 100 to 300 micrometers in size. Ultramylonitic recrystallized grains are less than 50 micrometers. Recrystallization takes place along an anastomosing network of shear zones. Beautifully developed recrystallized tails after plagioclase and olivine, showing dextral shear sense. Brown amphiboles aligned parallel to the shear zone margins and are apparently deformed in the ultramylonitic zone.

153-922B-1W-1 (Piece 10, 134 cm)

Observer: CJS

Rock Name: OLIVINE GABBRO

Grain size: Coarse.

Texture: Allotriomorphic granular.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Olivine.	0	20	Up to 20		
Clinopyroxene.	0	20	Up to 5		
Plagioclase.	55	60	0.1–25	Subhedral/anhedral.	

ACCESSORY

MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Fe-oxide minerals.	<1	<1	<0.5	Subhedral.	
Zircon.	<<1	<<1		Euhedral.	

SECONDARY

MINERAL NAME	PERCENT	REPLACING/FILLING
Actinolite.	25	Clinopyroxene, olivine, and plagioclase.
Chlorite.	10	Olivine, clinopyroxene, and plagioclase.
Brown hornblende.	4	Clinopyroxene.
Green hornblende.	3	Clinopyroxene.

STRUCTURE

Static alteration overprints and accompanies nonpenetrative dynamic recrystallization of plagioclase. Dynamic recrystallization of plagioclase occurs mainly in one small curved shear zone (2 to 4 mm thick) and between grain boundaries. Secondary actinolite is aligned parallel to the shape fabric and nonrecrystallized plagioclase crystals contain deformation twins and undulatory extinction. Plagioclase is compositionally zoned and some of the recrystallization is hydrothermal and not dynamic.

153-922B-1W-2 (Piece 2, 41 cm)

Observer: ROS

Rock Name: SHEARED OLIVINE-OXIDE GABBRO

Grain size: Coarse to fine.

Texture: Porphyroclastic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	59	59	0.05–6.0	Anhedral.	Mechanically twinned porphyroclasts. Recrystallized matrix.
Olivine.	3	18	0.1–3	Anhedral.	Replaced by talc, tremolite, and chlorite.
Clinopyroxene.	5	11	0.1–3.2	Anhedral.	Porphyroclasts.
Fe-Ti oxide minerals	5	5	0.05–0.4	Anhedral.	Disseminated in sheared fine-grained recrystallized plagioclase and clinopyroxene.

ACCESSORY

MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Sulfide minerals.	3	3	0.1–1	Anhedral.	Chalcopyrite? and pyrite? Not in veins, disseminated in recrystallized matrix. Some large grains included in silicates.
Orthopyroxene.	2	4	0.3–5.1	Subhedral.	Elongate grains.

SECONDARY

MINERAL NAME	PERCENT	REPLACING/FILLING
Cummingtonite.	1	Orthopyroxene.
Chlorite.	2	Olivine and clinopyroxene.
Brown hornblende.	3	Clinopyroxene.
Talc.	10	Olivine.
Tremolite-actinolite	6	Olivine and clinopyroxene.

COMMENTS: #225

STRUCTURE

Strongly overprinted by nonpenetrative dynamic recrystallization of plagioclase and pyroxene. Neoblasts are between 50 and 100 micrometers in size and polygonal. Clinopyroxene is also altered to actinolite which occurs as tails in the matrix. Alteration is mainly post-tectonic.

153-922B-1W-2 (Piece 4, 51 cm)

Observer: NOR

Rock Name: OLIVINE GABBRO

Grain size: Coarse.

Texture: Crescumulate to heteradcumulate (but strongly strained).

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	74	79	0.2-8	Anhedral.	Sheared and bent. 35% are recrystallized into subgrains (<0.3 mm).
Clinopyroxene.	5	10	0.2-8	Anhedral.	Optically continuous anhedral clinopyroxene is filling the interstices of plagioclase grains. Those could be a large poikilitic clinopyroxene. Some grains are deformed and coexist with recrystallized plagioclase.
Olivine.	0	10	to 9	Anhedral.	Enclosing plagioclase laths poikilitically.
ACCESSORY MINERAL NAME					
Iron oxide minerals.	1	1	0.2-1	Anhedral.	
SECONDARY MINERAL NAME					
MINERAL NAME	PERCENT	REPLACING/ FILLING			
Chlorite.	6	Plagioclase, olivine.			
Clay minerals.	4	Plagioclase, clinopyroxene, olivine.			
Actinolite.	3	Clinopyroxene.			
Brown Hornblende.	1	Clinopyroxene.			
Tremolite.	6	Olivine.			

COMMENTS: #22L

Crescumulate or heteradcumulate composed of plagioclase, clinopyroxene, olivine, and iron oxide minerals, deformed by shearing stress.

STRUCTURE

Extensively but nonpenetratively dynamically recrystallized. Microcracks filled with polygonal recrystallized plagioclase (weak sinistral block rotation across tensile microcracks). Recrystallization overprints preferred orientation of subhedral plagioclase laths. Neoblasts are 150-200 micrometers. Laths have undulose are strongly bent, especially near recrystallized zones. Plagioclase twins are drag folded into subgrain necklaces.

153-922B-2R-1 (Piece 1A, 12-0 cm)

Observer: ROS

Rock Name: OLIVINE GABBRO

Grain size: Coarse.

Texture: Crescumulate-adcumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	61	63	0.1-12	Subhedral/anhedral.	Elongation parallel to elongate olivine.
Olivine.	22	28	0.8->13.0	Anhedral.	Elongate amoeboid grains (quasi-dendritic).
Clinopyroxene.	7	8	>4.2	Anhedral.	Poikilitic and subophitic, in some cases rimming margins between olivine and plagioclase.
ACCESSORY MINERAL NAME					
Cr-spinel.	1	1			Apparently two different primary oxide phases. Different reflectivities in reflected light microscopy. One is distinctly gray, the other is white. No apparent exsolution texture in either phase.
Fe-Ti oxide minerals.	0.5	0.5			
SECONDARY MINERAL NAME					
MINERAL NAME	PERCENT	REPLACING/ FILLING			
Tremolite/actinolite	1	Olivine.			
Talc.	2.5	Olivine.			
Chlorite.	1	Olivine.			
Sulfide minerals.	0.5				
Brown hornblende.	1	Clinopyroxene.			
Magnetite.	<0.5	Olivine.			

COMMENTS: #226

Margins between oxide minerals and plagioclase are lined by tremolite, magnetite, and chlorite coronas. Tremolite is adjacent to olivine and chlorite bounds plagioclase. This relationship is seen repeatedly in Site 922 thin sections. Coarse-grained elongate plagioclase and olivine grains apparently grew parallel to one another. Quasi-dendritic structure in olivine noted in hand specimens and in thin sections. Elongate olivine has lobate, bulbous branches. This texture is similar to what has been called crescumulate or "harrisitic" textures in cumulate rocks from layered intrusions.

STRUCTURE

Extensively but nonpenetratively dynamically recrystallized. Microcracks filled with polygonal recrystallized plagioclase (weak sinistral block rotation across tensile microcracks). Recrystallization overprints preferred orientation of subhedral plagioclase laths. Neoblasts are 150-200 micrometers. Laths have undulose are strongly bent, especially near recrystallized zones. Plagioclase twins are drag folded into subgrain necklaces.

153-922B-2R-1 (Piece 1B, 27 cm)

Observer: ROS

Rock Name: META-OXIDE GABBRONORITE

Grain size: Coarse to fine.

Texture: Porphyroclastic submylonitic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	56	58	<0.1–2.8	Anhedral.	Mechanical twins, recrystallized.
Clinopyroxene.	5	26		Anhedral.	Almost entirely replaced by actinolite.
Orthopyroxene.	2	8	0.4–3.0	Subhedral.	
Fe-Ti oxide minerals.	5	5	0.1–1.2	Anhedral.	

ACCESSORY

MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY
Zircon.	0.2	0.2	1.0	Euhedral.
Apatite.	3.0	3.0	0.2–1.0	Subhedral.

SECONDARY

MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Tremolite-actinolite.	15	Clinopyroxene.	0.05–0.5	Anhedral.	
Brown amphibole.	5	Clinopyroxene.	0.1–1.0	Anhedral.	Pleochroic in brown and tan.
Epidote.	3	Plagioclase.	0.2–0.5	Anhedral.	
Cummingtonite.	5	Orthopyroxene.	<0.2	Anhedral.	
Chlorite.	2	Clinopyroxene, plagioclase, orthopyroxene.	<0.2		
Green hornblende.	1.0	Clinopyroxene.			Pleochroic in green to blue green.

VEIN/FRACTURE

FILLING	PERCENT	SIZE	ORIENTATION
Epidote and prehnite.		0.5	

COMMENTS: #227

Fluid inclusions with vapor, brine, and NaCl daughter crystals in apatite. Hydrothermal clinopyroxene?

STRUCTURE

Average grain size is 100 to 200 micrometers. Overprinted by weak microcracking, veining, and static alteration.

153-922B-2R-1 (Piece 3, 128 cm)

Observer: NOR

Rock Name: OLIVINE GABBRO WITH SHEARED GABBRONORITE

Grain size: Coarse.

Texture: Crescumulate to heteroadcumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	50	65	0.5–7	Anhedral/subhedral.	Tabular to lath shaped.
Clinopyroxene.	10	20	?–8	Anhedral.	Oikocrysts enclosing the plagioclase grains.
Olivine	0	15	?–10	Anhedral.	Oikocrysts enclosing the plagioclase grains.

ACCESSORY

MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Magnetite.	<1	<1	0.05–0.8	Anhedral.	Interstitial between plagioclase grains.
Ilmenite.	<1	<1	0.05–0.8	Anhedral.	Interstitial.

SECONDARY

MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING
Clay minerals.	7	Plagioclase and olivine.
Chlorite.	6	Plagioclase and olivine.
Iron oxide minerals.	2	Olivine.
Tremolite.	3	Olivine.
Cummingtonite.	2	Olivine.
Brown hornblende.	5	Clinopyroxene.
Actinolite.	5	Clinopyroxene.

COMMENTS: #228

Within 5 mm of one edge of the thin section, highly sheared oxide gabbro can be found. Plagioclase has recrystallized into subgrains, 0.1–0.5 mm in size, surrounding subhedral clinopyroxene (~2.4 mm) and sometimes elongated orthopyroxene (4–9 mm). Iron oxide minerals fill the interstices of plagioclase subgrains.

STRUCTURE

Shear zone separates gabbro from anorthositic gabbro. Anorthositic gabbro has primary igneous texture. Plagioclase is subhedral and strongly aligned. The alignment of plagioclase is perpendicular to the shear zone boundary. Recrystallized plagioclase (50 µm) makes up <1% of slide. Relatively dense network of cracks in slide. Gabbro: nonpenetrative grain-size reduction of plagioclase into a fine-grained matrix (200–300 micrometers) embedding the pyroxene porphyroclasts.

SITE 922

153-922B-2R-2 (Piece 3, 20 cm)

Observer: NOR

Rock Name: GABBRONORITE

Grain size: Coarse.

Texture: Heteradcumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	57	60	0.1-9	Anhedral.	40% has been recrystallized at the margin. Bent twins.
Clinopyroxene.	15	30	0.2-8	Anhedral.	Elongated. Commonly recrystallized into subgrains.
Orthopyroxene.	1	7	0.2-4	Subhedral.	Elongated.

ACCESSORY MINERAL NAME

Magnetite.	2	2	0.2-15	Anhedral.	Containing ilmenite lamellae. 75% recrystallized into subgrains.
Ilmenite.	1	1	0.2-0.3	Anhedral.	Containing magnetite lamellae. 80% recrystallized into subgrains.
Zircon.	<1	<1	0.3-0.6	Subhedral.	In the recrystallized phases.
Apatite.	<<1	<<1	0.1-0.3	Anhedral/subhedral.	Included in clinopyroxene.

SECONDARY

MINERAL NAME	PERCENT	REPLACING/ FILLING
Brown hornblende.	3	Clinopyroxene.
Actinolite.	6	Clinopyroxene.
Clay minerals.	9	Clinopyroxene, orthopyroxene, and plagioclase.
Chlorite.	4	Orthopyroxene and plagioclase.
Tremolite.	2	Orthopyroxene.

VEIN/FRACTURE

FILLING	PERCENT	SIZE	ORIENTATION
Actinolite.	100	<0.1	

COMMENTS: #229

STRUCTURE

Plagioclase is extensively recrystallized but strain is not penetrative through the slide. Plagioclase neoblasts have irregular to polygonal grain boundaries and are between 50 and 250 micrometers. Plagioclase has a distinct lattice fabric. Pyroxene is locally dynamically recrystallized where two grains make contact.

153-922B-2R-2 (Piece 5, 45 cm)

Observer: ROS

Rock Name: OLIVINE GABBRO

Grain size: Coarse to fine.

Texture: Submylonitic porphyroclastic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	60	62	0.1-10	Euhedral/anhedral.	Recrystallized in submylonitic matrix.
Clinopyroxene.	15	23	0.05-16	Euhedral/anhedral.	Mechanical twins in porphyroclasts.
Olivine.	7	12	0.1-4.8	Anhedral.	Recrystallized-subgrains in porphyroclasts.
Orthopyroxene.	2	2	1-4	Subhedral.	

ACCESSORY

MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY
Zircon.	0.2	0.2	0.1-0.6	Euhedral.
Iron oxide minerals.	1	1	0.1-1.8	Anhedral.

SECONDARY

MINERAL NAME	PERCENT	REPLACING/ FILLING	MORPHOLOGY
Brown hornblende.	2	Clinopyroxene.	Anhedral.
Actinolite-tremolite	8	Clinopyroxene and olivine.	Anhedral/subhedral.
Magnetite.	1	Olivine.	Anhedral.
Chlorite.	2	Olivine and clinopyroxene.	Anhedral.

COMMENTS: #23L

Thin section shows contact between intrusive(?) gabbro and submylonitic olivine gabbro host rock. Olivine in both, zircon in host, most clinopyroxene in intrusive vein, orthopyroxene in host.

STRUCTURE

Nonpenetrative grain-size reduction of all phases. Plagioclase, pyroxene, and olivine show polygonal neoblasts 100 to 300 micrometers in size. Olivine and pyroxene subgrains are strongly sutured. Nonrecrystallized plagioclase contains microcracks that often end in neoblast necklaces.

153-922B-2R-2 (Piece 8, 87 cm)
 Rock Name: GABBRONORITE
 Grain size: Coarse.
 Texture: Cumulate (strongly recrystallized).

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	70	73	0.1-15	Subhedral/anhedral.	Primary size is not distinct because the marginal part of all plagioclase is recrystallized (30% recrystallized).
Clinopyroxene.	10	15	0.5-9	Anhedral.	
Orthopyroxene.	2	10	0.5-3	Subhedral.	Highly altered.
ACCESSORY MINERAL NAME					
Magnetite.	1	1	0.2-10	Anhedral.	Coexists with ilmenite.
Ilmenite.	1	1	0.2-12	Anhedral.	Usually contains magnetite exsolution lamellae. 70% recrystallized.
Zircon.	<<1	<<1	0.2	Anhedral.	
Sulfide minerals.	<<1	<<1	0.1-0.8	Euhedral.	
SECONDARY MINERAL NAME					
Sulfide minerals.	<<1	REPLACING/ FILLING Orthopyroxene.	0.1-0.8	Anhedral.	
Chlorite.	2	Plagioclase.			
Clay minerals.	3	Plagioclase and clinopyroxene.			
Brown hornblende.	2	Clinopyroxene.			
Actinolite.	1	Clinopyroxene.			

COMMENTS: #230
 STRUCTURE

Plagioclase shows nonpenetrative recrystallization. Neoblasts are polygonal. Grain size is 50 to 150 micrometers. Neoblasts show extreme lattice preferred orientations. Newest sutured neoblasts have roughly the same lattice orientation as their host. Older neoblasts show a different crystallographic orientation. Nonrecrystallized plagioclase shows undulatory extinction, and neoblast necklaces and microcracks in neoblast-rich zone. Slide is overprinted by microcracks, microveins, and static alteration.

153-922B-3R-1 (Piece 3, 44 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Heteradcumulate (crescumulate?)

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	57	60	0.2-7	Subhedral.	Elongated laths to blocky crystals.
Clinopyroxene.	17	24	0.4-15	Anhedral.	Poikilitic to subophitic. Encloses olivine and plagioclase. Some elongation parallel to plagioclase.
Olivine.	6	15	2-6	Anhedral.	Amoeboid to elongated shape.
ACCESSORY MINERAL NAME					
Spinel.	1	1		Anhedral.	
SECONDARY MINERAL NAME					
Sulfide minerals.	1	REPLACING/ FILLING	0.2	Anhedral.	
Hornblende.	3	Clinopyroxene.	< 1	Anhedral.	
Tremolite-actinolite	8	Olivine and clinopyroxene.	0.1-0.8	Subhedral.	
Magnetite.	2	Olivine.	0.1-0.2	Anhedral.	
Chlorite.	5	Olivine, plagioclase, and clinopyroxene.	0.05-0.2	Anhedral.	
Talc(?)	1	Olivine.	?	Anhedral.	
VEIN/FRACTURE FILLING					
Actinolite and chlorite.	PERCENT		SIZE	ORIENTATION	
			0.1		Microveinlets cutting all phases.

COMMENTS: #231 and #232
 STRUCTURE

Retains primary igneous texture. Strong overprint of static alteration. Olivine is nearly totally altered to serpentine, amphibole, and Fe-oxide minerals and contains coronas of chlorite. Plagioclase is subhedral with almost no dynamic recrystallization. Clinopyroxene and olivine form oikocrysts.

SITE 922

153-922B-3R-2 (Piece 1, 0 cm)
 Rock Name: GABBRO
 Grain size: Coarse.
 Texture: Heteroadcumulate.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	65	70	0.5-8	Anhedral.	Tabular in shape.
Clinopyroxene.	8	28	1-15	Anhedral.	Large clinopyroxene (15 mm in size) encloses tabular plagioclase subophitically.
Olivine.	0	2	2-6	Anhedral.	Totally altered to talc, chlorite, iron oxide and clay minerals, and brown hornblende.

ACCESSORY MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY
Magnetite.	<1	<1	0.8	Anhedral.
Ilmenite.	<1	<1	0.8	Anhedral.

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Talc.	1	Olivine.
Tremolite.	5-6	Olivine and clinopyroxene.
Clay minerals.	5-6	Olivine, plagioclase, and clinopyroxene.
Iron oxide minerals.	<1	Olivine.
Brown hornblende.	5-6	Olivine.
Chlorite.	3	Plagioclase.
Actinolite.	5	Clinopyroxene.

COMMENTS: #233

STRUCTURE

Retains primary igneous texture. Strong overprint of static alteration. Olivine is nearly totally altered to serpentine, amphibole, and Fe-oxide minerals and contains coronas of chlorite. Plagioclase is subhedral with almost no dynamic recrystallization. Clinopyroxene and olivine form oikocrysts. Microcracks and microveins are distributed throughout all the thin section.

153-922B-3R-2 (Piece 3A, 54 cm)

Observer: ROS

Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Heteradcumulate or crescumulate(?)

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	64	66	0.04-14	Subhedral/anhedral.	Elongated.
Olivine.	10	23	12	Anhedral.	Elongated to amoeboid.
Clinopyroxene.	8	10	7.5	Anhedral.	Interstitial to poikilitic.

ACCESSORY MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Oxide minerals.	1	1	0.2-1.0	Anhedral.	Spinel?

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE (mm)
Tremolite.	6	Olivine and plagioclase.	0.01-0.5
Talc.	2	Olivine.	<0.2
Magnetite.	2	Olivine.	<0.1
Chlorite.	6	Olivine and plagioclase.	<0.2
Brown hornblende.	1	Clinopyroxene.	<0.4
Sulfide minerals.	0.2		

VEIN/FRACTURE FILLING	PERCENT	SIZE	ORIENTATION
Actinolite and chlorite.		0.05-0.4	

COMMENTS: #234

STRUCTURE

Retains primary igneous texture. Strong overprint of static alteration. Olivine is nearly totally altered to amphibole, Fe-oxide minerals, and chlorite. Plagioclase is subhedral with a moderate development of dynamic recrystallization. Clinopyroxene and olivine form oikocrysts.

153-922B-4R-1 (Piece 4, 20 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse,
 Texture: Heteradcumulate.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	61	65	0.2-8	Subhedral/euhedral.	Lath-shaped euhedral grains enclosed in clinopyroxene.
Clinopyroxene.	11	16	0.8-10	Anhedral.	Interstitial and poikilitic, enclosing euhedral plagioclase.
Olivine(?)	0	18	1-4	Anhedral.	Completely replaced by tremolite with chlorite rims.
ACCESSORY					
MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE	MORPHOLOGY	DESCRIPTION
Fe-oxide minerals.	0.2	1		Anhedral.	Exsolved.
SECONDARY					
MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE	MORPHOLOGY	DESCRIPTION
Tremolite-actinolite	11	Olivine, clinopyroxene, and plagioclase.			
Magnetite.	1	Olivine			
Chlorite.	8	Olivine, plagioclase, and clinopyroxene.			
Brown hornblende.	3	Clinopyroxene.			
VEIN/FRACTURE					
FILLING	PERCENT	PERCENT ORIGINAL	SIZE	ORIENTATION	DESCRIPTION
Green hornblende.					Green hornblende is pleochroic in blue green to pale green. Chlorite and actinolite.

COMMENTS: #24L

Extremely altered. Unclear if tremolite with chlorite rims was olivine or clinopyroxene or both.

STRUCTURE

Strong overprint of static alteration. Microcracks and microveins are present.

153-922B-4R-1 (Piece 6A, 59 cm)

Observer: NOR

Rock Name: TROCTOLITE
 Grain size: Coarse.
 Texture: Cumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	60	65	0.5-6	Anhedral.	Tabular.
Olivine.	0	31	2-6	Anhedral.	
ACCESSORY					
MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE	MORPHOLOGY	DESCRIPTION
Clinopyroxene.	2	4	1-3	Anhedral	Interstitial between plagioclase tabular crystals.
Iron oxide minerals.	<1	<1			
SECONDARY					
MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE	MORPHOLOGY	DESCRIPTION
Chlorite.	13	Plagioclase and olivine.			
Clay minerals.	2	Plagioclase.			
Iron oxide minerals.	1	Olivine.			
Tremolite.	5	Olivine.			
Talc.	5	Olivine.			
Brown hornblende.	6	Olivine.			
Actinolite.	6	Olivine and clinopyroxene.			
VEIN/FRACTURE					
FILLING	PERCENT	PERCENT ORIGINAL	SIZE	ORIENTATION	DESCRIPTION
Actinolite and brown hornblende.			0.2		

COMMENTS: #235

There is a sheared olivine gabbro zone at the lower right portion of thin section, where plagioclase and olivine have been deformed into subgrains. The size of plagioclase subgrains decreases from 0.1 to 0.05 mm with distance from the undeformed part. Less deformed clinopyroxene and plagioclase porphyroclasts are oriented. Euhedral to anhedral zircon can be found. Iron oxide mineral content is low.

STRUCTURE

Composite thin section. Part one is made of coarse-grained troctolite which preserves its primary igneous texture. No plagioclase preferred orientation. Other part is a shear zone with extensive but nonpenetrative dynamic recrystallization. A mm-thick vein contains brown green amphibole; it crosscuts the coarse-grained facies. Green and brown amphibole replaces pyroxene in the shear zone and are aligned parallel to the shear fabric and are apparently deformed.

SITE 922

153-922B-4R-2 (Piece 1A, 16 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Poikilitic.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	60	65	0.1-4	Anhedral.	Tabular. Partially recrystallized into subgrains.
Clinopyroxene.	5	23	0.5-8	Anhedral.	Optically continuous clinopyroxene interstitial between tabular plagioclase.
Olivine.	0	10	1-2.5	Anhedral.	Totally altered to tremolite, chlorite, and clay minerals.
ACCESSORY MINERAL NAME					
Zircon.	<<1	<<1	0.1-0.3	Euhedral/subhedral	Occurring in the subgranulated plagioclase zone.
Ilmenite.	2	2	0.1-1.5	Anhedral.	
Magnetite.	<1	<1	0.01-0.1	Anhedral.	Small patches in the ilmenite grains.
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Titanite.	<1	Ilmenite.			
Brown hornblende.	6	Clinopyroxene.			
Actinolite.	6	Clinopyroxene.			
Clay minerals.	11	Clinopyroxene, olivine, and plagioclase.			
Tremolite.	3	Olivine.			
Chlorite.	7	Olivine and plagioclase.			

COMMENTS: #236 and #237

STRUCTURE

Moderate microcracking of subhedral plagioclase. Dynamic recrystallization is highly localized and found in the vicinity of microcracks.

153-922B-4R-3 (Piece 1, 0 cm)

Observer: ROS

Rock Name: GABBRO
 Grain size: Coarse.
 Texture: Cumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	50	62	0.5-7	Anhedral.	Mechanical twinning.
Clinopyroxene.	10	37	0.5-3.8	Anhedral.	Interstitial.
Olivine(?)	0	?			
ACCESSORY MINERAL NAME					
Iron oxide minerals.	1	1		Anhedral.	Exsolution of ilmenite-titanomagnetite.
Zircon.	0.1	0.1			
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Tremolite-actinolite	23	Clinopyroxene and plagioclase(?).	0.01-1.2		
Chlorite.	12	Clinopyroxene and plagioclase.	<0.3		
Brown/green hornblende.	5	Clinopyroxene, plagioclase, and orthopyroxene.	0.1-1.2		
VEIN/FRACTURE FILLING					
	PERCENT		SIZE	ORIENTATION	
Actinolite and chlorite.			2		
Chlorite.			0.8		

COMMENTS: #25L

STRUCTURE

Strong overprint of static alteration. Microcracks and microveins are present. Weak olivine recrystallization at grain boundaries. Two mesoscale chlorite veins, 1.5 to 2 mm in size, and lots of microveins around 70 micrometers thick crosscut the section.

153-922B-4R-3 (Piece 4B, 70 cm)

Observer: NOR

Rock Name: GABBRO

Grain size: Coarse

Texture: Cumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	60	65	1-5	Anhedral.	
Clinopyroxene.	1	25	1-4	Anhedral.	Highly altered.
Olivine.	0	10		Anhedral.	

ACCESSORY

MINERAL NAME

Magnetite.	0.5	0.5
Ilmenite.	0.3	0.5

SECONDARY

MINERAL NAME

MINERAL NAME	PERCENT	REPLACING/ FILLING
Titanite.	0.2	Ilmenite.
Clay minerals.	10	Clinopyroxene, plagioclase, and olivine.
Tremolite.	8	Olivine and clinopyroxene.
Brown hornblende.	4	Clinopyroxene.
Actinolite.	5	Clinopyroxene.
Chlorite.	11	Clinopyroxene, olivine, and plagioclase.
Iron oxide minerals.	1	Olivine.

COMMENTS: #238 and #239

STRUCTURE

The primary igneous texture is overprinted by microcracks and microveins.