

153-921A-2R-1 (Piece 3, 18 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium.
 Texture: Allotriomorphic granular.

Observer: PAM

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	57	60	0.2-7	Anhedral.	
Clinopyroxene.	23	25	0.1-3	Anhedral.	Exhibits complex intergrowth/exsolution textures; some oikocrysts enclose plagioclase.
Olivine.	0	15	0.2-3	Anhedral.	

ACCESSORY MINERAL NAME

Iron oxide minerals. Trace. Trace.

SECONDARY MINERAL NAME

MINERAL NAME	PERCENT	REPLACING/ FILLING	DESCRIPTION
Brown amphibole.	1	Clinopyroxene.	
Chlorite.	15	Olivine and plagioclase.	Replaces plagioclase along thin veins.
Iron oxide minerals.	1	Olivine.	
Clay minerals.	2	Olivine.	
Actinolite/tremolite.	1	Clinopyroxene.	

VEIN/FRACTURE FILLING

PERCENT	SIZE	ORIENTATION
Chlorite ± clay minerals.	<0.1	Crosscutting plagioclase.

COMMENTS: #140

Plagioclase was probably the first cumulus phase followed by clinopyroxene and olivine with clinopyroxene continuing as an intercumulus phase.

STRUCTURE

Plagioclase shows weak undulatory extinction with deformation twins and rare subgrain development; however, magmatic twins are predominant. Some plagioclase grains show intracrystalline microfaults with up to 40 micrometer displacement. Strain-free, small recrystallized plagioclase crystals have well-developed triple junctions. Clinopyroxene contains magmatic twins. Intercrystalline fractures are filled with a light green alteration mineral.

153-921A-2R-1 (Piece 5, 34 cm)

Rock Name: OLIVINE GABBRO
 Grain size: Fine to medium.
 Texture: Heteradcumulate.

Observer: HW

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	55	55	0.5-5	Euhedral.	
Clinopyroxene.	30	30	1-7	Subhedral to euhedral.	
Olivine.	15	15	0.5-5	Anhedral.	

ACCESSORY MINERAL NAME

Iron oxide minerals. <1 <1 <1 Anhedral.

SECONDARY MINERAL NAME

MINERAL NAME	PERCENT	REPLACING/ FILLING
Talc.	<1	Olivine.
Chlorite.	<1	Olivine.
Iron oxide minerals.	<1	Olivine.

COMMENTS: #141

The top of the piece is composed of fine-grained gabbro. Euhedral plagioclase and subhedral clinopyroxene are cumulus phases. Anhedral olivine and clinopyroxene are intercumulus and poikilitically enclose the cumulus phases. Clinopyroxene exhibits complex intergrowth/exsolution textures, associated with brown amphibole.

STRUCTURE

The primary igneous texture is well preserved. Grain-size variation is likely attributable to crystallization. Plagioclase shows weak undulose extinction with rare deformation twins and subgrain development. Magmatic twins are predominant. Clinopyroxene contains magmatic twins and has no preferred orientation. Some clinopyroxene grains have brown amphibole overgrowths around them.

SITE 921

153-921A-2R-1 (Piece 12, 119 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Orthocumulate.

Observer: HW

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Olivine.	3	5	2-5	Anhedral.	Exhibits subgrain boundary development.
Clinopyroxene.	30	32	2-10	Anhedral.	One 10-mm-long crystal encloses plagioclase. Clinopyroxene is subophitic with no preferred orientation, and locally kinked.
Plagioclase.	63	63	1-10	Euhedral.	
ACCESSORY MINERAL NAME					
Iron oxide minerals.	0.5	0.5			
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Chlorite.	0.5	Clinopyroxene.	<2		Occurs in the shear zone.
Tremolite.	0.5	Clinopyroxene.	<2		
Actinolite.	0.5	Clinopyroxene.	<2		Rims clinopyroxene and is associated with iron oxide minerals.
Brown amphibole.	0.5	Clinopyroxene.	<2		Rims clinopyroxene and is associated with iron oxide minerals.
Iron oxide minerals.	0.5	Olivine.	<1		
Talc.	0.5	Olivine.	<1		
VEIN/FRACTURE FILLING					
	PERCENT		SIZE	ORIENTATION	
Poikilitic plagioclase, quartz, and carbonate minerals.					
Epidote, chlorite, and actinolite.					Actinolite and chlorite replacing clinopyroxene and growing on plagioclase.
Fine-grained anhedral plagioclase.			<5		Grain boundaries meet at triple junctions.

COMMENTS: #142
 STRUCTURE

The primary igneous texture is preserved except within a 3-mm-wide shear zone that is largely composed of recrystallized and fine-grained plagioclase, chlorite, and brown amphibole. One clinopyroxene grain adjacent to the shear zone has an undeformed brown amphibole overgrowth protruding into the shear zone, implying post-shearing development. Microcracks that are oriented oblique to the shear zone are locally defined by trails of recrystallized subgrains. Large plagioclase laths (>1cm) show moderate grain-size reduction to medium-grained neoblasts. The kink axis apparent in clinopyroxene is oblique to and/or at a high angle to the shear zone. The deformation is prior to actinolite and chlorite (no shear fabric in the chlorite), and probably late anhedral plagioclase. Calcite occurs in recrystallized plagioclase (<1%) and secondary clinopyroxene occurs after clinopyroxene. It contains fluid inclusions. Secondary plagioclase contains liquid-dominated to vapor dominated fluid inclusions with rare daughter minerals.

153-921B-1W-1 (Piece 7A, 45 cm)
 Rock Name: CATACLASTIC GABBRO
 Grain size: Fine to medium.
 Texture: Cataclastic.

Observer: CDW

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	40	65	<2		Elongated and/or cataclastic to mylonitic, deformed, but obvious compositional changes.
Clinopyroxene.	20	25	<2		Mainly crushed to mylonitic, variably altered to tremolite/actinolite.
Olivine.	5	10			
ACCESSORY MINERAL NAME					
Iron oxide minerals.	<<1	<<1	<0.1		
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Tremolite/actinolite.		Clinopyroxene.			
Brown amphibole.		Clinopyroxene.			
Talc.					
Chlorite.					
VEIN/FRACTURE FILLING					
	PERCENT		SIZE	ORIENTATION	
Chlorite.	30		0.01		Chlorite, zeolite, and iron oxide mineral coatings, small amounts of clay minerals in undeformed veins cutting cataclastite.
Zeolite.	40		0.001-0.1		
Carbonate minerals.	20		0.02-0.1		Mainfilling for one vein that cuts the cataclastic rock.
Oxide minerals.	5-8		0.001?		Coatings in all veins
Clay minerals.	2-5		0.001		Variable amounts mixed in with chlorite and carbonate mineral veins.

COMMENTS: #147
 STRUCTURE

Variably developed cataclastic texture overprinting a magmatic texture. A shape preferred orientation of the plagioclase laths is still evident. The different cataclastic zones are oriented parallel to the dominant fracture orientation. The highest degree of cataclasis occurs in the rock that is predominantly composed of cryptocrystalline gouge with tiny (10's μm) clasts of identifiable primary minerals. The lowest degree of cataclasis is characterized by discrete microfaults that have spacings of the order of 100 micrometers. Porphyroclasts in the cataclasis are made of polymineralic rock fragments containing plagioclase, clinopyroxene, and olivine. Undeformed carbonate mineral, zeolite, and sulfide mineral-filled veins cut the cataclastic fabric.

153-921B-1W-1 (Piece 9, 64 cm)
 Rock Name: DEFORMED GABBRO
 Grain size: Fine to medium.
 Texture: Recrystallized.

Observer: JAN

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	45	75-80	0.5-5.0	Anhedral.	Dusty alteration, strained; crushed to smaller grain size in cataclastic zone.
Clinopyroxene.	5	15-20	0.3-3.0	Anhedral.	In the gabbro protolith, plagioclase was probably a cumulate phase. Clinopyroxene is 100% replaced by amphibole in the deformed areas, but fresh relics are preserved in dynamically recrystallized areas. Fresh relics have bent cleavage and preserve an early, finger-like replacement mineral as well as green and brown amphibole. In the protolith, clinopyroxene may have been intercumulus; in deformed areas it may have been prismatic originally.
ACCESSORY MINERAL NAME					
Apatite.	<0.2	<0.5	0.3-0.7	Subhedral.	
Magnetite.	1-2	5		Anhedral.	Ilmenite exsolution.
Zircon.	Trace.				Occurs as inclusions in brown amphibole.
SECONDARY MINERAL NAME					
Pyrite.	Trace.	REPLACING/ FILLING Clinopyroxene.	0.4		Associated with chlorite.
Iron oxide minerals.	Trace.	Clinopyroxene.			Very fine grained.
Actinolite.	10	Clinopyroxene.		Anhedral.	
Brown amphibole.	15	Clinopyroxene.	0.4-1.5	Anhedral.	
Clinopyroxene.	5	Recrystallized	0.1-0.3	Anhedral.	Equant crystals, recrystallized, from clinopyroxene frequently associated with relict clinopyroxene. Lacks cleavage and has spotty replacement by brown amphibole.
Plagioclase.	30-35	Plagioclase.	0.02-0.4		Recrystallized, has a less "dusty" appearance. Different domains within the deformed zone have different grain sizes.
Chlorite.	1	Clinopyroxene and plagioclase.			
Clay minerals.		After plagioclase.			
VEIN/FRACTURE FILLING					
Chlorite.	PERCENT 0.1		SIZE	ORIENTATION	Microveinlets crosscutting plagioclase.

COMMENTS: #135

STRUCTURE

Section contains domains of differing amounts of grain-size reduction. Domain 1-Subhedral plagioclase and clinopyroxene are bent or exhibit undulatory extinction. Domain 2-Strongly dynamically recrystallized plagioclase and clinopyroxene. Clinopyroxene cleavages are strongly folded and show drag relationships along microcracks. Brittle microfaults strongly associated with dynamic recrystallization of plagioclase. Low-grade secondary phases like chlorite, prehnite, and actinolite are distributed throughout both deformed and undeformed domains. In the deformed domain, Secondary phases are common along microfaults, together with finely "crushed" primary phases but they show rather random fiber orientations. This suggests that they grew after the main deformation event responsible for primary phases recrystallization. In one microcrack, chlorite shows curved fibers oblique to the crack walls and may have been affected by the very last movements along the microcracks.

SITE 921

153-921B-1W-1 (Piece 12, 97 cm)

Observer: JG

Rock Name: CATACLASTIC GABBRO AND DIABASE

Grain size: Variable.

Texture: Cataclastic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	60	75			Fractured and recrystallized grain. Grain size ranges from <1mm (recrystallized) to several mm (fractured, bent grains). Strained, bent cleavage planes, highlighted by alteration. Several crystals are fractured.
Clinopyroxene.	10	20	2-3		
ACCESSORY MINERAL NAME					
Iron oxide minerals.	2	?	<1	Anhedral.	In stringers and patches, winding along boundaries of larger crystals.
SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING			
Brown/green amphibole.	10	Clinopyroxene			
Fault gouge.	15				

COMMENTS: #155

Bottom third of this section is a diabase. Contact is faulted. This section represents the Unit 1/2 contact. Diabase contains 15% plagioclase with two distinct populations, microlitic groundmass crystals with a felty, subparallel alignment, and mm-sized, elongate laths. Also contains xenoliths of the cataclasite. Subparallel alignment of groundmass plagioclase is roughly perpendicular to the contact. Alteration minerals in the diabase include clay minerals, chlorite, and epidote?. Matrix of diabase is completely altered to dark brown clay minerals. STRUCTURE

The rock contains high-temperature crystal-plastic deformation, strong cataclasis and a tectonic contact between cataclastic gabbro and diabase. Cataclasis is predominantly restricted to gabbro. Contact is faulted and about 1-mm-wide. Cataclasis varies in intensity. Highest intensity corresponds to cryptocrystalline gouge. Lowest intensity represented by microcracks in plagioclase. Some microcrack networks in plagioclase are filled with a colorless, low birefringent mineral.

153-921B-1W-2 (Piece 2, 5 cm)

Observer: PAM

Rock Name: VERY SPARSELY PORPHYRITIC DIABASE

Crystallinity: Holocrystalline.

Texture: Intergranular to subophitic.

Phenocryst MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	~1	1	1-3.5	Subhedral.	Contains tiny (0.01mm) melt inclusions (now altered). Zoned with resorbed rims, overgrown by a second generation of plagioclase. Generally tabular shapes; slightly altered along thin fractures and microveinlets.
Olivine.	0	0.5	0.5-2.0	Euhedral.	Now altered to chlorite and magnetite.
Groundmass MINERAL NAME					
Plagioclase.	48	49	<1	Subhedral.	Zoned, lath shapes; minor dusty alteration.
Clinopyroxene.	43	44.5	<1	Anhedral.	
Iron oxide minerals.	1	2	<0.1	Anhedral.	Partially altered.
Olivine.	0	3	<0.1	Subhedral.	Totally altered to chlorite.
SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING			
Chlorite.	6	Olivine.			Minor replacement of plagioclase and clinopyroxene locally; pseudomorphs after olivine.
Iron oxide minerals.	1	Olivine.			
OPENING TYPE		REPLACING/FILLING			
No vesicles.					

COMMENTS: #148

STRUCTURE

The rock is an undeformed porphyritic diabase with randomly oriented plagioclase laths. Plagioclase laths display intracrystalline microfaults with ~50-60 micrometers displacement. Late-stage chlorite veins with oblique fibers cut across the rock.

153-921B-1W-2 (Piece 4, 26 cm)

Observer: PAM

Rock Name: MICROGABBRO

Grain size: Fine.

Texture: Foliated/lineated.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	68	70	<1.5	Anhedral.	Equant crystals with equilibrated grain boundaries, 60° triple junctions; twinned with sweeping extinction, but not zoned.
Clinopyroxene.	22	24	<1.5	Anhedral.	A few twinned crystals.
ACCESSORY					
MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Olivine.	3	4	<1.5	Anhedral.	Contains kink bands.
Iron oxide minerals.	2	2	<0.6	Equant	
Brown amphibole.	1	?		Anhedral.	Occurs interstitially at edges of clinopyroxene, but not surrounding it. Also associated with oxide minerals.
SECONDARY					
MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Chlorite.	0.5	Veins.			
Actinolite.	2.5	Clinopyroxene, in veins.			
Talc.	0.5	Olivine.			
Iron oxide minerals.	0.5	Olivine.			
VEIN/FRACTURE					
FILLING	PERCENT	PERCENT ORIGINAL	SIZE (mm)	ORIENTATION	DESCRIPTION
Chlorite and actinolite.			<0.05		Oblique to foliation and grain-size layering.

COMMENTS: #149

The slide contains a contact between two layers of different grain size, but roughly equivalent mineral proportions. Grain-size layering is oblique to foliation at a shallow angle (about 20°–30°). Small yellow-brown minerals with high birefringence, high relief, pleochroic in yellow-brown, associated with granular (tiny) opaques may be titanite.

STRUCTURE

The rock shows strong shape fabric and two domains with different pyroxene grain sizes. Domain 1 displays a grain size between 0.5 to 1.5 mm (1.5 mm size dominates), whereas in Domain 2 the grain size ranges from 100 to 500 micrometers (100 μm size dominates). The grain-size variation may be either a primary igneous texture or a result of deformation. Plagioclase grain size does not change as much as pyroxene grain size, and plagioclase shows a strong lattice preferred orientation in both domains. Clinopyroxene shows development of subgrains. The shape fabric in the rock is cut by two orthogonal sets of amphibole-filled veinlets.

153-921B-2R-2 (Piece 1, 16 cm)

Observer: PAM

Rock Name: GABBRO

Grain size: Medium.

Texture: Allotriomorphic granular.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	69	70	0.2–2.5	Anhedral.	Has generally equant grains except where enclosed in pyroxene where it is tabular.
Orthopyroxene.	3	3	1–4	Anhedral.	Poikilitically encloses small subhedral plagioclase laths; locally strained.
Clinopyroxene.	24	25	1–4	Anhedral.	Contains very fine exsolution lamellae of clinopyroxene. Encloses some plagioclase; contains exsolution of orthopyroxene; shows some twinning.
ACCESSORY					
MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	<1	<0.5	0.2–0.9	Anhedral.	
Olivine.	Trace.	1.5	0.4–2.0	Anhedral.	Has an elongate habit with a trace of relict olivine remaining.
Sulfide minerals.	Trace.				
SECONDARY					
MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Talc.	1	Olivine.			
Magnetite.	<1	Olivine.			
Chlorite.	<1	Olivine and magnetite?			Occurs around the rims of olivine.
Brown amphibole.	0.5	Clinopyroxene.			May be late-stage magmatic, occurring interstitially and replacing clinopyroxene.
Actinolite.	0.5	Brown amphibole.			
VEIN/FRACTURE					
FILLING	PERCENT	PERCENT ORIGINAL	SIZE (mm)	ORIENTATION	DESCRIPTION
Actinolite and chlorite.			0.04–0.1		

COMMENTS: #136

Clinopyroxene shows complex blebby intergrowth and exsolution textures and some recrystallization. The plagioclase is partially recrystallized.

STRUCTURE

Shape fabric is well developed and the foliation is defined by pyroxene grain elongations. Plagioclase occurs as equigranular subgrains with lobate grain boundaries. Lattice preferred orientation is very well developed and boundaries of original magmatic grains are not visible. Clinopyroxene shows less dynamic recrystallization and some porphyroclasts have undergone rigid boudinage: separated clasts often have margin morphologies that fit together. Several subparallel microveins, ≈40 to 60 micrometers wide, that are filled with actinolite and chlorite. These branching veins cut across the pyroxene foliation at an angle of 90°.

SITE 921

153-921B-2R-2 (Piece 8, 113 cm)
 Rock Name: GABBRO
 Grain size: Medium.
 Texture: Hypidiomorphic granular.

Observer: JAN

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	55	60	0.1-5	Subhedral.	Zoned, twinned, patchy recrystallization. Alteration varies across thin section. On melt dominated side, alteration is more intense. Grain size in melt pathway is 8 mm.
Clinopyroxene.	12	40	0.2-6	Anhedral.	Some totally altered (could have been some orthopyroxene). Encloses small plagioclase laths and magmatic twins are common. Some blebby intergrowths of brown amphibole with alteration to green amphibole.
ACCESSORY MINERAL NAME					
Apatite.	0.5	0.5	0.2-1.5	Subhedral to anhedral.	Three types of crystals: 1. Possible primary to inclusions in relatively fresh plagioclase (large, rounded to subhedral grains). 2. Interstitial? 3. Small (0.2-0.5 mm) associated with magnetite, ilmenite, chlorite, and smectite.
Magnetite and ilmenite.	1	1	<0.1-2	Anhedral.	Ilmenite is fresh, magnetite is altered, with some isolated fresh magnetite.
SECONDARY MINERAL NAME					
Brown/green amphibole.	14	REPLACING/ FILLING		Replacing clinopyroxene.	Replacing cumulate clinopyroxene but brown/green amphibole also occurs interstitially (after clinopyroxene). This include two varieties of amphibole, one green/brown, and one green/blue.
Chlorite.	10	REPLACING/ FILLING		Replacing clinopyroxene and plagioclase.	Primarily in area of magmatic vein, background alteration, and veinlets.
Smectite.	5				Possible iron hydroxide minerals.
Unidentified brown.	1				Associated with magmatic vein. Epidote interstitially disseminated through rock associated with chlorite, smectite, and blue green amphibole.
Epidote, zircon.	1				Associated with magmatic vein.
Quartz.	1				
Hematite/talc.	Trace.				
VEIN/FRACTURE FILLING					
Chlorite and talc.	PERCENT		SIZE	ORIENTATION	Quartz.
			<0.01-0.08		

COMMENTS: #150

There are some 100% replaced, equant stubby laths, probably mafic, associated with melt channel (originally clinopyroxene? 0.5-1mm). This slide includes a magmatic vein and a host gabbro. Boundaries are too diffuse to identify clearly.

STRUCTURE

Primary igneous texture with randomly oriented plagioclase laths. Large clinopyroxene grains contain magmatic twins. Plagioclase shows primary magmatic twins and weakly developed mechanical twins. It occurs as large, euhedral grains and as mosaics of anhedral, finer (1 mm) grains with variably developed crystallographic preferred orientation.

153-921B-3R-1 (Piece 2, 16-0 cm)

Observer: PAM

Rock Name: OLIVINE MICROGABBRO
 Grain size: Fine.
 Texture: Allotriomorphic granular.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Olivine.	9	10	0.1-1.5	Anhedral.	
Clinopyroxene.	33.5	34.5	0.1-2.0	Anhedral.	Rarely encloses plagioclase; some twinned; minor thin exsolution lamellae.
Plagioclase.	55	55	0.2-2.0	Anhedral.	Deformed twins; sweeping extinction, but no obvious compositional zoning.
ACCESSORY MINERAL NAME					
Iron oxide minerals.	0.5-0.5	<0.3		Anhedral.	
SECONDARY MINERAL NAME					
Clay minerals.	0.5	REPLACING/ FILLING		Olivine.	
Iron oxide minerals.	0.5			Olivine.	
Brown amphibole.	1			Interstitial material.	
Talc.	Trace.			Olivine.	
Chlorite.	Trace.				Occurs in thin veins, in interstitial areas and after olivine.

COMMENTS: #151

Although no longer crystallographically continuous, the slide contains textures that may be indicative of original poikilitic crystals of clinopyroxene.

STRUCTURE

The rock shows a strong recovery after extensive grain-size reduction. Olivine tends to show the higher aspect ratio and weak subgrain development. Clinopyroxene is more equant and displays locally "magmatic" twins. Plagioclase shows a weak shape preferred orientation of likely magmatic origin, and a well-developed lattice preferred orientation. There is one set of clay mineral-filled veinlets in the sample.

153-921B-3R-1 (Piece 4A, 33 cm)
 Rock Name: FOLIATED OXIDE GABBRONORITE
 Grain size: Medium to coarse.
 Texture: Porphyroclastic.

Observer: KIY

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	53	53	0.1–7.8	Anhedral.	Strongly deformed porphyroclasts with deformation twins; polygonal grains in the matrix.
Clinopyroxene.	28.5	32	0.1–11.5	Subhedral to anhedral.	Small alteration patches of brown hornblende.
Orthopyroxene.	5	6	0.2–5.8	Euhedral to subhedral.	
Iron oxide minerals.	8	8	0.1–2.0	Anhedral.	Includes ilmenite and magnetite with magnetite being slightly more abundant than ilmenite.
ACCESSORY MINERAL NAME					
Olivine.	1	1	0.2–1.0	Anhedral.	
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Sulfide minerals.					
Brown amphibole.	<0.5				Possibly late-stage magmatic.
Smectite.	3	Pyroxene.			
Chlorite.	1	Pyroxene.			
Actinolite.	<0.5	Pyroxene.			
Talc.	Trace.	Pyroxene.			

COMMENTS: #152
 STRUCTURE

Mylonitic texture overprinting a coarse-grained magmatic texture. Plagioclase shows the most extensive grain-size reduction into small grains of about 200 micrometers. Only a few cores of original host grains remain in the rock that show patchy extinction and strongly bent deformation twins. Plagioclase neoblasts show extreme development of lattice preferred orientation. Hypersthene is found as uninked porphyroclasts with little grain-size reduction. Oxide minerals seem to be more concentrated on the pressure shadow side of the pyroxene porphyroclasts, and they form trails through the dynamically recrystallized fine-grained matrix. Some of these asymmetric porphyroclasts and their pressure shadows show a sinistral sense of shearing. There are several localized shear zones with a cataclastic texture.

153-921B-3R-1 (Piece 13, 134 cm)
 Rock Name: GABBRO
 Grain size: Coarse.
 Texture: Accumulate to mesocumulate.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Clinopyroxene.	33	34	1–6	Anhedral.	Rare twins, exsolution.
Plagioclase.	63	63	0.4–5	Anhedral.	Twinned, occasionally zoned.
ACCESSORY MINERAL NAME					
Iron oxide minerals.	0.1	0.1	0.2–0.5	Anhedral.	
Olivine.	2	3	0.3–1.8	Anhedral.	
Orthopyroxene.	<1	<1		Anhedral.	Occurs as small interstitial crystals and as exsolution in clinopyroxene.
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Sulfide minerals.					
Hornblende.	<1	Clinopyroxene.	0.1–0.3	Anhedral.	Pleochroic in brown to tan.
Talc.	<0.5	Olivine.	<0.4	Anhedral.	
Magnetite.	<0.2	Olivine.	<0.3	Anhedral.	

COMMENTS: # 137

Recrystallized veinlet contains primary minerals and hornblende and cuts across the entire thin section, possibly a small shear zone.

STRUCTURE

Coarse-grained primary igneous texture. This rock does not exhibit any shape preferred orientation, but all primary phases show imprints of deformation. Plagioclase shows deformation twins, undulose extinction, and grain-size reduction of some large (10 mm) grains into finer grains (1 mm) with triple junctions. Clinopyroxene is locally kinked. Olivine shows subgrain boundaries and undulose extinction. Strain is localized along an intercrystalline 0.5-mm-thick shear zone. It is defined by recrystallization of the host primary phase it crosses, without any obvious associated phase change. The zone does not offset grain boundaries in this section.

SITE 921

153-921B-3R-2 (Piece 4, 33 cm)

Observer: KIY

Rock Name: OLIVINE GABBRO MYLONITE

Grain size: Fine to coarse.

Texture: Mylonitic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	65	65	0.1–8.4	Anhedral.	Deformed porphyroclasts with deformation twins.
Clinopyroxene.	28	29	0.1–8.6	Anhedral.	Deformed.
Olivine.	5.5	6	0.1–4.3	Anhedral.	

ACCESSORY

MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	<0.5	<0.5	<0.6	Anhedral.	

SECONDARY

MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING	MORPHOLOGY	DESCRIPTION
Brown amphibole.	1	Clinopyroxene.	Blebs.	Occurs in equilibrium with clinopyroxene.
Actinolite.	<<1	Clinopyroxene.	Fibrous.	
Talc.	<1	Olivine.	Fibrous.	
Iron oxide minerals.	<1	Clinopyroxene and olivine.		
Cummingtonite.	<1		Fibrous.	
Chlorite.	<1	Plagioclase and iron oxide minerals.		

COMMENTS: #153

Sample exhibits very small percent age of retrograde alteration; only talc and iron oxide minerals after olivine are important secondary phases. Porphyroclastic texture is composed of porphyroclasts of plagioclase, clinopyroxene, and olivine and small polygonal recrystallized matrix of plagioclase, clinopyroxene, olivine, and hornblende. Hornblende crystallization and mylonitization seems to have occurred at the same time.

STRUCTURE

The rock is a submylonitic gabbro displaying a strong shape fabric and extensive grain-size reduction. A coarse-grained protolith can be inferred from coarse relics of primary igneous phases.

153-921B-4R-1 (Piece 6A(2), 40 cm)

Observer: KIY

Rock Name: TROCTOLITE WITH OLIVINE GABBRO VEIN

Grain size: Medium.

Texture: Cumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	74	74	0.1–6.8	Subhedral to anhedral.	
Olivine.	21	23	0.1–2.2	Anhedral.	
Clinopyroxene.	2	2	0.1–1.2	Anhedral.	

ACCESSORY

MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	<0.5	<0.5			

SECONDARY

MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING	MORPHOLOGY	DESCRIPTION
Brown amphibole.	<0.5			
Sulfide minerals.	Trace.			
Talc.	0.5	Olivine.		
Magnetite.	0.5	Olivine.		
Smectite.	0.5	Olivine.		
Actinolite.	<0.5			

COMMENTS: #156

Since this thin section is comprised of two very distinctive domains, the description has been divided into two entries. The other entry is recorded as Sample 153-921B-4R-1, Piece 6A(1). The troctolite contains a 0.5-mm-wide olivine gabbro vein composed of 50% plagioclase, 30% clinopyroxene, and 20% olivine.

STRUCTURE

Contact between troctolite and gabbro vein. In both lithologies, plagioclase laths are euhedral and elongate and occur with a well-defined shape preferred orientation, except where the crystals form intergrowths with pyroxene. Interstitial olivine also shows a well-developed shape preferred orientation. Alignment is probably a cumulus texture. A shear zone occurs within the lower part of the coarse-grained gabbro and the finer grained troctolite. It is 10 mm thick and is characterized by grain-size reduction of plagioclase and a preferred shape and crystallographic orientation in the pyroxene. Plagioclase neoblasts are 200–500 µm, except in a few submillimeter-sized shear zones where very fine-grained (<10 micrometers) plagioclase neoblasts are observed. At the lithological contact, the plagioclase shape preferred orientation is parallel to the shear zone.

153-921B-4R-1 (Piece 6A(1), 40 cm)

Observer: KIY

Rock Name: GABBRONORITE

Grain size: Coarse.

Texture: Cumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	56	56	0.1-5.5	Anhedral.	
Clinopyroxene.	30	32	0.1-9.4	Anhedral.	
Orthopyroxene.	7	8	0.8-7.2	Anhedral to subhedral.	

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Iron oxide minerals.	3	
Brown amphibole.	0.5	
Biotite.	<0.5	
Sulfide minerals.	Trace.	
Actinolite.	1	Clinopyroxene.
Chlorite.	<0.5	Clinopyroxene.
Smectite.	1.5	Clinopyroxene.
Magnetite.	0.2	Olivine.
Talc.	0.3	Olivine.

COMMENTS: #156

The thin section contains a contact between two lithologies, a gabbronorite, and a troctolite. The troctolite is described on a separate form (see Sample 153-921B-4R-1, Piece 6A(2)). All primary phases are partly recrystallized into subgrains along grain boundaries.

153-921B-4R-1 (Piece 6B, 59 cm)

Observer: NOR

Rock Name: OLIVINE GABBRO

Grain size: Medium to coarse.

Texture: Allotriomorphic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	65	65	0.2-4	Anhedral.	Some show reverse zoning at the rim.
Clinopyroxene.	19	20	0.2-7	Anhedral.	Edges of large clinopyroxene enclose subhedral plagioclase and have jagged boundaries against other clinopyroxene grains.
Olivine.	14	15	0.2-3	Anhedral.	Spinel blebs can be identified in clinopyroxene which is partially replaced by brown amphibole.

ACCESSORY

MINERAL NAME	PERCENT	PERCENT	SIZE	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	<<1	<<1	<0.5	Anhedral.	
Sulfide minerals.	<1	<1	<0.8	Anhedral.	Two different sulfide minerals commonly coexist, may be chalcopyrite and pyrrhotite.
Brown hornblende.	<1	<1		Anhedral.	Commonly rimming clinopyroxene. Probably igneous.

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Iron oxide minerals.	<1	Clinopyroxene.
Chlorite.	<1	Plagioclase, clinopyroxene.
Actinolite.	1	Clinopyroxene.
Clay minerals.	1	Olivine.
Talc.	<1	Olivine.

COMMENTS: #157-#158

STRUCTURE

Plagioclase is dominantly euhedral and shows a weak shape preferred orientation. Most grains show magmatic twins but some deformation twins are present. All minerals show an undulose extinction. Most clinopyroxene grains have weakly curved cleavage traces. Grain size is lower (500 μm) and grain boundaries are anhedral in one corner of the slide.

SITE 921

153-921B-4R-1 (Piece 9, 137 cm)
 Rock Name: OIKOCRYSITIC OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Oikocrystic.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	55	60	0.2-6.0	Subhedral to anhedral.	Plagioclase is tabular, but anhedral, except those enclosed by clinopyroxene.
Clinopyroxene.	22	25	0.2-10	Anhedral.	Large clinopyroxene grains (10 mm) enclose subhedral plagioclase laths.
Olivine.	12	15	0.2-3	Anhedral.	Usually occurs as irregularly shaped crystals marginal to plagioclase, but equant (rarely euhedral) grains occur and may be mantled by clinopyroxene and plagioclase.

ACCESSORY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	<1	<1	≈0.7	Anhedral.	
Sulfide minerals.	<<1	<<1	≈0.1	Anhedral.	Possibly chalcopyrite.
Brown amphibole.	<1	<1	0.02-0.05	Interstitial.	Forms rims around olivine?

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Smectite/chlorite.	7	Plagioclase, olivine, clinopyroxene.
Actinolite.	3	Clinopyroxene.
Iron oxide minerals.	<1	Olivine, clinopyroxene.
Talc.	<1	Olivine.
Brown amphibole.	<<1	Brown amphibole, plagioclase.
Secondary plagioclase.	1	Plagioclase.

VEIN/FRACTURE FILLING	PERCENT	SIZE	ORIENTATION
Actinolite.	1	≈2	
Albite.		1-2	Steeply dipping, undeformed.
Quartz.			

COMMENTS: #159

The thin section contains evidence for grain-size layering in that one end of the slide is distinctly finer grained than the other. The fine-grained area is clinopyroxene poor, composed of plagioclase (0.1-3 mm), olivine (0.2-3 mm), and clinopyroxene (0.1-2 mm). The plagioclase in this area is characteristically anhedral.

STRUCTURE

Well-preserved igneous texture, almost devoid of any sign of deformation. Beautiful magmatic twins in plagioclase.

153-921B-4R-2 (Piece 2, 50 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium.
 Texture: Heteradcumulate.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	65	65	0.2-4.5	Subhedral to anhedral.	Lath shaped with mutual interference margins, twinned; some are zoned.
Olivine.	20	25	0.4-2.5	Anhedral.	Partially altered; some kink banded.
Clinopyroxene.	9.5	10	0.3-10	Anhedral.	Poikilitically encloses plagioclase. Oikocryst grains separated by 2.5 mm have common extinction angles.

ACCESSORY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY
Iron oxide minerals.	Trace.	Trace.	0.02-0.7	Anhedral.

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Talc.	1	Olivine.
Iron oxide minerals.	1	Olivine.
Clay minerals/smectite.	3	Olivine.
Brown amphibole.	0.5	Clinopyroxene.
Carbonate minerals.	Trace.	

COMMENTS: #138

Olivine gabbro name based on total mode. The rock is a cumulate troctolite with post-cumulus oikocrysts of clinopyroxene. Small plagioclase laths are enclosed poikilitically in some clinopyroxene grains.

STRUCTURE

Coarse-grained primary igneous texture with little crystal-plastic deformation overprint; plagioclase displays undulatory extinction, mechanical twins, and kink bands, and olivine has subgrains. Open intercrystalline fractures are common in the rock.

153-921B-4R-2 (Piece 5, 88 cm)
 Rock Name: TROCTOLITE
 Grain size: Medium
 Texture: Plagioclase heteradcumulate.

Observer: CDW

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	80	80	0.2-4	Anhedral.	Twinned.
Olivine.	13	17	0.1-5.0	Anhedral.	Alteration along cracks.
Clinopyroxene.	2	3	0.1-2.5	Anhedral.	Partially altered to tremolite.
ACCESSORY MINERAL NAME					
Iron oxide minerals.	<<1	<<1	0.02-0.6		Occurs in veins particularly in fractures in altered olivine. Magnetite >> ilmenite.
SECONDARY MINERAL NAME					
Talc.	3	REPLACING/ Olivine.			
Iron oxide minerals.	1	Olivine.			
Tremolite.	1	Clinopyroxene.			
Sulfide minerals.					Interstitial, rare exsolution of hematite (deep red jagged lamellae).

COMMENTS: #160

Olivine and clinopyroxene are present in separate layers.

STRUCTURE

The primary igneous texture is largely preserved. Olivine is almost completely altered to a mesh of chlorite, amphibole, and possibly other phases. Plagioclase occurs as large (5 mm) subhedral grains that show no grain-size reduction. Deformation microstructures are limited to undulose extinction and subgrain boundaries in olivine.

153-921B-4R-3 (Piece 8, 77 cm)
 Rock Name: TROCTOLITE
 Grain size: Coarse.

Observer: KIY

Texture: Plagioclase heteradcumulate with poikilitic olivine and clinopyroxene.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	81	81	0.2-4.5	Subhedral to anhedral.	Slightly zoned core.
Olivine.	12	15	0.4-3.8	Anhedral.	Intercumulus.
Clinopyroxene.	3	3.5	0.3-13.0	Anhedral.	Intercumulus.
ACCESSORY MINERAL NAME					
Magnetite.	<0.5	<0.5			
SECONDARY MINERAL NAME					
Sulfide minerals.	0.1	REPLACING/			
Chlorite.	2.0	Magnetite, clinopyroxene, serpentine?.			
Magnetite.	0.5	Olivine.			
Talc.	0.5	Olivine.			
Hornblende.	0.5				

COMMENTS: #161 and #162

Igneous

The modal values entered on this form are an average of two thin sections. Although these two thin sections were taken adjacent to one another, their modal mineralogies are very different. #161 originally had 78% plagioclase and 20% olivine; whereas #162 had 86% plagioclase, 9% olivine, and 5% clinopyroxene. This demonstrates the heterogeneity of this rock.

STRUCTURE

The primary igneous texture is well preserved. Plagioclase laths display a weak shape preferred orientation. Olivine is interstitial to subophitic, and shows pervasive undulose extinction and a few subgrain boundaries.

153-921B-4R-4 (Piece 1, 16 cm)

Observer: CDW

Rock Name: OLIVINE GABBRO

Grain size: Medium.

Texture: Heteradcumulate to mesocumulate (poikilitic).

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	55	55	0.1-4.0	Anhedral to subhedral.	Twinned.
Olivine.	22	30	0.2-3.0	Anhedral.	Some kink bands.
Clinopyroxene.	14	14.5	0.1-3.2	Anhedral.	Partially altered to brown amphibole on the margins.
ACCESSORY					
MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	<<1	<<1	0.02-0.2		
Orthopyroxene.	0.5	0.5	0.2-1.0	Anhedral.	
SECONDARY					
MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING			
Brown amphibole	<<1	Clinopyroxene.		Anhedral.	Brown-yellow pleochroic.
Sulfide minerals.	<<1			Anhedral.	Gold and yellow in reflected light.
Talc.	1	Olivine.			
Magnetite.	<0.5	Olivine.			
Smectite.	6.5	Olivine.			
Unidentified mineral.					Green pleochroic mineral, high birefringence, after olivine.

COMMENTS: #139

STRUCTURE

The rock shows a coarse-grained primary igneous texture with little deformation. Weak undulose extinction in olivine and deformation twins and undulose extinction in plagioclase are common. Olivine and clinopyroxene occur as elongated subophitic grains and show optical continuity greater than the dimensions of the thin section. The grain elongation of olivine and clinopyroxene shows a preferred dimensional orientation. Intercrystalline hairline fractures are common and form a braided pattern in the rock.

153-921C-1R-1 (Piece 3, 29 cm)

Observer: JF

Rock Name: CATACLASTIC OLIVINE GABBRO

Grain size: Medium.

Texture: Cataclastic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	40	65	5-10		
Clinopyroxene.	20	25	0.5-1		
Olivine.	0	10			
ACCESSORY					
MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	1	1	2-3		Elongate in shear zones.
SECONDARY					
MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING			
Chlorite.	6	Olivine and clinopyroxene.			
Actinolite.	22	Clinopyroxene, plagioclase and olivine.			
Brown amphibole.	1	Clinopyroxene.			
Fault gouge.	10	Plagioclase.		Cryptocrystalline.	

COMMENTS: #163

STRUCTURE

Brittle-ductile shear zone overprints primary igneous texture which is preserved in part of the thin section. Very low-grade ductile deformation takes place in the form of kinking and folding of clinopyroxene cleavage planes. There is very little recrystallization of plagioclase as seen in other brittle-ductile shear zones. Cataclastic fabric varies from ultracataclastic to discrete microcracks. Traces of asymmetric plagioclase augen in the shear zone. Several sets of low-angle, synthetic shear bands.

153-921C-2R-1 (Piece 1, 7 cm)
 Rock Name: SPARSELY PHYRIC DIABASE
 Crystallinity: Holocrystalline.
 Texture: Intergranular to subophitic.

Observer: PAM

Phenocryst MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	=1	1	1-3.5	Subhedral.	
Olivine.	0	0.5	0.5-1.5	Euhedral	Crystal outlines are blurred by extensive replacement by clay minerals.
Groundmass					
MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	43	48	<1	Subhedral.	
Clinopyroxene.	35	44.5	<1.5	Anhedral.	Most are less than 1 mm in size, but one large crystal occurs that is subophitic.
Iron oxide minerals.	1	2	<0.4	Anhedral.	
Olivine.	0	4	<0	Subhedral(?).	Altered to chlorite and clay and iron oxide minerals.
SECONDARY					
MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Chlorite.	14	Olivine.			
Clay minerals.	5	Chlorite(?).			
Iron oxide minerals.	1	Olivine.			
Actinolite.	Trace.				

COMMENTS: #164

153-921C-2R-1 (Piece 14, 113 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium.
 Texture: Allotriomorphic granular.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	62	62	0.1-2	Anhedral.	Bent twins, kink bands, recrystallized, undulatory extinction, some zoned crystals preserved.
Clinopyroxene.	20	21	0.2-4.0	Anhedral.	Partly poikilitic, strained, recrystallized.
Olivine.	12	16	0.1-1.3	Anhedral.	Kink banded, recrystallized, undulatory extinction.
ACCESSORY					
MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	1	1	0.1-0.6	Anhedral.	Elongate.
SECONDARY					
MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Talc.	2	Olivine.	0.2		
Magnetite.	0.5	Olivine.	<0.1		
Hornblende.	0.5	Clinopyroxene.	<0.3		
Sulfide minerals.	0.2		<0.3		
Serpentine.	0.2	Olivine.	<0.1		
Tremolite.	0.5	Clinopyroxene.	<0.1		
VEIN/FRACTURE					
FILLING	PERCENT	PERCENT	SIZE	ORIENTATION	DESCRIPTION
Serpentine.					
Chlorite.					

COMMENTS: #143

STRUCTURE

This olivine gabbro is strongly deformed and shows significant annealing after crystal plastic deformation. Plagioclase occurs as equant grains with a strong lattice preferred orientation. Twin planes are oriented at a low angle to the foliation. Average grain size is 0.5 mm. Most crystals show bent deformation twins. Olivine shows a very weak shape fabric with undose extinction. Clinopyroxene also shows a very weak preferred orientation and weak to strong grain-size reduction along rims and in tails around porphyroclasts. There are two sets of orthogonal microvein systems that are filled with chlorite and talc. The veins are irregular in shape and geometry.

SITE 921

153-921C-2R-1 (Piece 15, 127 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium.
 Texture: Elongate porphyroclastic.

Observer: JFG

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	64	65	0.1–0.3	Anhedral.	More than 70% recrystallized, polygonal neoblasts.
Clinopyroxene.	23	26	0.2–0.3	Anhedral.	Partly recrystallized.
Olivine.	5	8	0.2–0.4	Anhedral.	Partly recrystallized.
Orthopyroxene.	1	1	0.1–0.5	Anhedral.	Partly recrystallized.
ACCESSORY MINERAL NAME					
Iron-titanium oxide minerals.	<1	<1	0.2	Anhedral.	
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Brown amphibole.	1	Clinopyroxene.	0.1–0.2	Anhedral	May be partially magmatic, some however clearly replaces clinopyroxene.
Actinolite.	2	Clinopyroxene.	0.04		
Chlorite-smectite.	2	Plagioclase, clinopyroxene.	0.01		Near chlorite-smectite filled veins and microcracks.
Talc.	<2	Olivine.	0.04		
Oxide minerals.	<<1	Olivine, clinopyroxene	0.02		
VEIN/FRACTURE FILLING					
Chlorite-smectite	PERCENT		SIZE	ORIENTATION	
	100		0.01–0.4		Set of subparallel microcracks with slightly lower dip than crystal-plastic fabric.

COMMENTS: #165

STRUCTURE

About 70% of the plagioclase occurs as small polygonal neoblasts implying intense dynamic recrystallization. Plagioclase and olivine show a strong preferred shape orientation. Some grains of plagioclase have a core-mantle microstructure. Average recrystallized grain size is 0.3–0.4 mm. Clinopyroxene shows less extensive grain-size reduction and a weak alignment.

153-921C-2R-2 (Piece 1, 6 cm)

Rock Name: GABBRO
 Grain size: Medium.
 Texture: Linedated.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	52	53	0.1–4.1	Anhedral.	
Clinopyroxene.	30	47	0.1–3.4	Anhedral.	Some exsolution of orthopyroxene.
ACCESSORY MINERAL NAME					
Iron oxide minerals.	0.3	0.3		Anhedral.	
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Actinolite.	9	Clinopyroxene.	0.02–0.8		Occurs with clay minerals after plagioclase.
Chlorite.	3	Clinopyroxene.	<0.3		
Hornblende.	1	Clinopyroxene.	<0.5		
Smectite?	4	Clinopyroxene.	<0.2		Pleochroic, orange to yellow, high birefringence.
Sulfide minerals.	0.1		<0.2		
VEIN/FRACTURE FILLING					
Actinolite.	PERCENT		SIZE	ORIENTATION	
Smectite.			<0.8		
			<0.5		

COMMENTS: #166

The rock has a preferred grain shape orientation. Sample is crosscut by numerous orange veinlets and patches of smectite that creates the iron staining described in the macroscopic observations of the core.

STRUCTURE

The texture is characterized by a well-developed shape and lattice preferred orientation in plagioclase and pyroxene with moderate grain-size reduction of plagioclase. A few plagioclase grains show deformation twins. All grains present undulatory extinction. Clinopyroxene fabrics, however, are variably developed throughout the slide.

153-921C-2R-2 (Piece 7, 61 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium.
 Texture: Poikilitic.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	55	56	0.2-3.0	Anhedral.	Twinned; some zoning; lath-shaped grains enclosed in clinopyroxene.
Clinopyroxene.	23	30	0.4-4.2	Anhedral.	Poikilitic; both cumulus and post cumulus, some show simple twins; contains exsolution.
Olivine.	12	14	0.2-1.8	Anhedral.	Some kink bands, undulatory extinction.
ACCESSORY MINERAL NAME					
Iron oxide minerals.	0.2	0.2			
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Actinolite.	5	Clinopyroxene.			
Chlorite.	0.2	Clinopyroxene.			
Talc.	1.6	Olivine.			
Magnetite.	0.3	Olivine.			
Hornblende.	1.8	Clinopyroxene.			
Sulfide minerals.	0.1				
VEIN/FRACTURE FILLING					
Actinolite.	PERCENT		SIZE	ORIENTATION	
			0.6		

COMMENTS: #169

The section is oriented; the lower part is troctolite, the upper part olivine gabbro.

STRUCTURE

The primary igneous texture is well preserved. Very weak development of deformation twins and undulose extinction. Two small hydrothermal veins cut the slide that show minor dynamic recrystallization.

153-921C-2R-2 (Piece 10, 114 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium to coarse.
 Texture: Plagioclase heteradcumulate.

Observer: CDW

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	56	56	0.3-7		Twinned.
Clinopyroxene.	36	36	0.2-5		Rare brown amphibole on rims and in blebs.
Olivine.	6	8	0.1-4		Partially altered.
ACCESSORY MINERAL NAME					
Iron oxide minerals.	<<1	<<1	0.1-0.6		
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Talc.	1	Olivine.			
Iron oxide minerals.	0.5	Olivine.			
Clay minerals.	0.25	Olivine.			
Chlorite.	0.25	Olivine.			
Brown amphibole.	Trace.	Clinopyroxene.			

COMMENTS: #144

STRUCTURE

No preferred orientation of the primary minerals. Clinopyroxene is subophitic with no preferred orientation but presents weak undulatory extinction. Plagioclase shows both primary magmatic twins and rare mechanical twins in addition to the kink bands. Olivine has well-developed subgrain boundaries. Rare clay mineral-filled veinlets occur in the rock.

SITE 921

153-921C-3R-1 (Piece 5B, 83 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium.
 Texture: Plagioclase heteradcumulate.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	50	50	0.2-4.1	Anhedral to subhedral.	Some zoning.
Clinopyroxene.	42.5	43	1.0-5.6	Anhedral.	Some poikilitic textures.
Olivine.	6	7	0.6-3.1	Anhedral.	Some poikilitic textures.
ACCESSORY MINERAL NAME					
Iron oxide minerals.	0.1	0.1	0.3	Anhedral.	Magnetite and ilmenite.
SECONDARY MINERAL NAME					
Sulfide minerals.	0.2	REPLACING/ FILLING	0.3	Anhedral.	Could be partly or mostly primary; includes pyrite, chalcopyrite, and pyrrhotite.
Talc.	0.3	Olivine.	0.3	Anhedral.	
Smectite.	0.5	Olivine.	0.2	Anhedral.	
Magnetite.	0.1	Olivine.	0.1	Anhedral.	
Hornblende.	0.5	Clinopyroxene.	0.5	Anhedral.	

COMMENTS: #170
 STRUCTURE

Randomly oriented primary igneous texture. Clinopyroxene is oikocrystic. Olivine is interstitial. A few grains present deformation twins and undulose extinction.

153-921C-3R-1 (Piece 5B, 86 cm)
 Rock Name: OLIVINE-BEARING GABBRO
 Grain size: Medium to coarse.
 Texture: Plagioclase heteradcumulate.

Observer: CDW

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	61	62	0.2-5.5		Some bent; some zoned.
Clinopyroxene.	31	32	0.2-7.0		Poikilitic; simple twins; brown amphibole on rims.
Olivine.	3	6	0.3-3.0		Partially altered; may be rimmed by orthopyroxene?
ACCESSORY MINERAL NAME					
Iron oxide minerals.	<<1	<<1			
SECONDARY MINERAL NAME					
Talc.	2	Olivine.			
Clay minerals.	0.5	Olivine.			
Iron oxide minerals.	0.5	Olivine.			
Amphibole.	≈1	Clinopyroxene.			Brown and colorless.
Chlorite.	≈1	Plagioclase.			Adjacent to thin veinlets.
VEIN/FRACTURE FILLING					
Chlorite.	PERCENT		SIZE	ORIENTATION	Small veinlets crossing plagioclase.

COMMENTS: #145
 STRUCTURE

Preserves coarse-grained primary igneous texture with randomly oriented plagioclase laths. Clinopyroxene is subophitic with no preferred orientation but presents weak undulatory extinction. Plagioclase shows primary magmatic twins and rare weakly developed deformation twins. Olivine has well-developed subgrain boundaries. Clay mineral-filled microveins cut across the primary minerals.

153-921C-3R-2 (Piece 13, 136 cm)

Observer: CDW

Rock Name: OLIVINE GABBRO

Grain size: Medium to coarse.

Texture: Plagioclase heteradcumulate/mesocumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	62	62	0.2-7		Twinned; enclosed by clinopyroxene.
Clinopyroxene.	27	28	0.2-9		Replaced by brown amphibole on rims; shows complex intergrowth/replacement textures; poikilitically encloses plagioclase.
Olivine.	5	10	0.1-4		Has orthopyroxene rims. Partially altered.

ACCESSORY

MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL
Iron oxide minerals.	<<1	<<1

SECONDARY

MINERAL NAME	PERCENT	REPLACING/ FILLING
Talc.	3	Olivine.
Clay minerals.	1	Olivine.
Iron oxide minerals.	1	Olivine.
Brown amphibole.	1	Clinopyroxene.

VEIN/FRACTURE

FILLING	PERCENT	SIZE	ORIENTATION
Actinolite ± chlorite.			
Clay minerals.			

COMMENTS: #146

STRUCTURE

Magmatic texture slightly overprinted by crystal-plastic deformation. Clinopyroxene is subophitic and presents weak undulatory extinction and subgrain boundaries. Some grains contain magmatic twins. Plagioclase shows undulose extinction and bent mechanical twins. Olivine has weak undulose extinction and subgrain boundaries. The rock contains clay mineral-filled veinlets.

153-921D-2R-1 (Piece 6, 55 cm)

Observer: KIY

Rock Name: GABBRO

Grain size: Coarse.

Texture: Allotriomorphic granular with plagioclase subgrains.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	66	66	0.1-10.5	Subhedral to anhedral.	Recrystallized subgrains on grain boundaries of primary plagioclase.
Clinopyroxene.	29	30	0.3-6.2	Anhedral.	
Orthopyroxene.	3.5	4	3.0-5.1	Anhedral.	Prismatic, two grains can be observed.

ACCESSORY

MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL
Ilmenite.	<0.5	<0.5
Magnetite.	<0.5	<0.5

SECONDARY

MINERAL NAME	PERCENT	REPLACING/ FILLING
Hornblende.	<0.5	Clinopyroxene.
Actinolite.	<0.5	Clinopyroxene.
Chlorite.	1	

COMMENTS: #171

STRUCTURE

Primary igneous texture is well present. However, the rock contains patches and zones of crystal-plastic deformation and grain-size reduction. Plagioclase and pyroxene have bent and kinked lattices and both contain networks of neoblasts with sutured grain boundaries.

153-921D-2R-1 (Piece 6, 57 cm)
 Rock Name: GABBRO
 Grain size: Medium.
 Texture: Equigranular.

Observer: DEB

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	79	80	0.2-12	Anhedral.	Tabular; igneous zoning is unclear due to the distortion by some strain.
Clinopyroxene.	14	16	0.5-5.0	Anhedral.	
Orthopyroxene.	3	4	0.5-5.0	Anhedral.	Contains exsolution of clinopyroxene.

ACCESSORY MINERAL NAME

ACCESSORY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY
Magnetite.	<1	<1	0.5-2.0	Anhedral.
Ilmenite.	<<1	<<1	0.1	
Sulfide minerals.	<<1	<<1	0.1	

SECONDARY MINERAL NAME

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING	MORPHOLOGY
Chlorite.	<1	Clinopyroxene and plagioclase.	
Actinolite.	<1	Clinopyroxene and plagioclase.	Fibrous.
Talc.	<1	Orthopyroxene.	Fibrous.
Cummingtonite.	1-2	Orthopyroxene.	Fibrous.
Brown amphibole.	<1	Clinopyroxene.	Blebs.
Iron oxide minerals.	<1	Clinopyroxene.	Round inclusions.

VEIN/FRACTURE

FILLING	PERCENT	SIZE	ORIENTATION
Actinolite and chlorite.	<1	<1	
Chlorite and clay minerals.	<<1	<<1	

COMMENTS: #154

Cummingtonite and talc form fine rims around orthopyroxene, occur in highly altered (up to 90%) fine grains, and are also associated with clay minerals. Brown- to green-zoned amphibole is after clinopyroxene. Fluid inclusion rich secondary clinopyroxene in trace amounts after primary clinopyroxene.

STRUCTURE

Primary igneous texture with randomly oriented plagioclase crystals. Plagioclase shows primary magmatic twins and less commonly deformation twins.

153-921D-2R-1 (Piece 9, 83 cm)

Observer: ROS

Rock Name: GABBRO
 Grain size: Medium to coarse.
 Texture: Hypidiomorphic granular.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	56	57	0.2-8.4	Anhedral.	Undulatory extinction; some mechanical twins.
Clinopyroxene.	22	42	0.4-9	Anhedral.	Magmatic twins.

ACCESSORY MINERAL NAME

ACCESSORY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL
Iron oxide minerals.	1	1

SECONDARY MINERAL NAME

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE	MORPHOLOGY	DESCRIPTION
Sulfide minerals.	1.5				
Actinolite.	7	Clinopyroxene.	<0.01		Extremely fine-grained mixture of actinolite and chlorite, completely replace and/or pseudomorph approximately half of the clinopyroxene in the sample.
Chlorite.	5	Clinopyroxene/ plagioclase.	<0.02		
Hornblende.	0.5	Clinopyroxene.	<0.05		
Talc.	5	Clinopyroxene.			
Smectite.	2	Clinopyroxene/ plagioclase.			

VEIN/FRACTURE

FILLING	PERCENT	SIZE	ORIENTATION
Chlorite-smectite.	100	0.01-0.05	

COMMENTS: #172

STRUCTURE

Predominantly shows a primary igneous texture.. Grain-size reduction is patchy. Plagioclase and pyroxene have bent and kinked lattices and both contain networks of neoblasts with sutured grain boundaries. Rock contains a hydrothermal vein with strong recrystallization (subgrains have sutured grain boundaries).

153-921D-3R-1 (Piece 7B, 74 cm)
 Rock Name: GABBRO
 Grain size: Coarse.
 Texture: Heteradcumulate.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	61	65	0.1-11	Anhedral.	Some zoning, also undulatory extinction due to strain.
Clinopyroxene.	20	24	0.3-3.6	Anhedral.	Coarse exsolution lamellae.
ACCESSORY MINERAL NAME					
Olivine.	1	3	0.4-1.6		
Iron oxide minerals.	4	4	0.1-4.2		Titanomagnetite-ilmenite intergrowth, coarse grained.
Orthopyroxene.	1	4			
SECONDARY MINERAL NAME					
Actinolite.	4	REPLACING/ FILLING Clinopyroxene.	1		
Brown amphibole.	3	Clinopyroxene.	0.2-1.0		Pleochroic, green, brown, tan; replacing clinopyroxene and rimming oxides.
Chlorite.	1	Clinopyroxene and orthopyroxene.	<0.5		
Talc.	1	Olivine, clinopyroxene.			
Magnetite.	0.2	Olivine.			
Cummingtonite?	1	Orthopyroxene.			
Sulfide minerals.	<1				Could be secondary or primary.
Quartz.	<1	In vein.			
Epidote.	Trace.	In vein.			
Carbonate minerals.	Trace.	In vein.			
Secondary plagioclase		Plagioclase.			
VEIN/FRACTURE FILLING					
Chlorite.	PERCENT		SIZE	ORIENTATION	
Quartz, epidote, secondary plagioclase, actinolite, chlorite, and carbonate minerals.			<1 2-3		

COMMENTS: #173

The thin section possibly contains 2 or 3 distinct lithologies, olivine gabbro, gabbro and oxide gabbronorite. Locally recrystallized and tectonized.

STRUCTURE

Grain-size reduction and hydrothermal alteration of plagioclase and pyroxene occurs in a discrete zone in the middle of the slide. Plagioclase shows strongly sutured grain boundaries in this zone. Plagioclase and pyroxene have bent and kinked lattices and both contain networks of neoblasts with sutured grain boundaries.

153-921D-4R-1 (Piece 4, 28 cm)
 Rock Name: GABBRO
 Grain size: Medium.
 Texture: Cataclastic.

Observer: CAN

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Clinopyroxene.	27	35	2-6	Anhedral.	Extensively recrystallized and kinked.
Plagioclase.	60	64	1-5	Anhedral.	Fractured. Locally granulated in cataclastic zones.
ACCESSORY MINERAL NAME					
Iron titanium oxide minerals.	<1	<1	1-2	Anhedral.	
SECONDARY MINERAL NAME					
Brown amphibole.	<1	REPLACING/ FILLING Clinopyroxene.	0.2	Interstitial.	Some grains clearly replace clinopyroxene, others are of ambiguous origin and may be igneous.
Actinolite.	7	Clinopyroxene	0.4		
Chlorite.	4	Plagioclase.	0.4		
Secondary plagioclase.	2	Plagioclase.			Replacement near cataclastic zones.
Iron oxide minerals.	<1	Clinopyroxene.	0.2	Anhedral.	
VEIN/FRACTURE FILLING					
Actinolite.	PERCENT		SIZE	ORIENTATION	
Chlorite.			0.4 0.4		Irregular, microsheared.

COMMENTS: #174

STRUCTURE

Rock is cut by many irregularly oriented fractures, some of which are clearly sheared. Shearing has produced cataclasis of the minerals, with granulation of plagioclase, and locally clinopyroxene (fragments <0.4 mm) in a chlorite, actinolite, and fault gouge matrix.

SITE 921

153-921D-4R-1 (Piece 6B, 59 cm)

Observer: ROS

Rock Name: DEFORMED OXIDE GABBRO

Grain size: Coarse.

Texture: Porphyroclastic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	40	44	0.04-9	Anhedral.	
Clinopyroxene.	31	40	0.04-10	Anhedral.	
Iron oxide minerals.	15	16	0.04-4.6	Anhedral.	Titanomagnetite and ilmenite probable.

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE	MORPHOLOGY	DESCRIPTION
Actinolite.	7	Clinopyroxene.	0.01-0.3	Anhedral.	
Chlorite.	1	Clinopyroxene.	0.02-0.2	Anhedral.	
Hornblende.	2	Clinopyroxene.	0.2-3.0	Anhedral.	Pleochroic in brown, green, and tan.
Sulfide minerals.	3		0.01-1.0	Anhedral.	

VEIN/FRACTURE FILLING	PERCENT	SIZE	ORIENTATION
Chlorite.		Up to 0.2	Perpendicular to elongation-cataclastic fabric.

COMMENTS: #175

STRUCTURE

The thin section contains a brittle-ductile fault zone at a contact between an oxide gabbro and a gabbro. Intracrystalline fracture in plagioclase is closely associated with grain-size reduction so that the deformation mechanisms seem to be transitional between brittle and ductile. Plagioclase is partly altered to chlorite along microcracks. Chlorite is variably sheared. Clinopyroxene shows little grain-size reduction and is strongly fractured, folded, and altered to both green and brown amphibole. The brown amphibole is more likely associated with the shear zone, while the actinolite is radiating and associated to post tectonic alteration. Brittle pull-aparts in clinopyroxene are filled with feldspar, block-rotated; synthetic offset of feldspar twins suggest dextral shear. Oxide minerals occur in altered clinopyroxene, associated with other alteration products, and are commonly deformed and strung out in the shear zones.

153-921D-5R-1 (Piece 12C, 118 cm)

Observer: KIY

Rock Name: OLIVINE GABBRO

Grain size: Coarse.

Texture: Adcumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	66	66	0.1-2.8	Subhedral to anhedral.	
Clinopyroxene.	27	28	0.1-4.0	Anhedral.	Rare simple twinning; contains exsolution lamellae of orthopyroxene.
Olivine.	5.5	6	0.4-2.7	Anhedral.	Partly rimmed by orthopyroxene.

ACCESSORY MINERAL NAME	PERCENT
Magnetite.	<0.5

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Sulfide minerals.		
Hornblende.	<0.5	Replacing clinopyroxene.
Chlorite.	<0.5	Olivine.
Magnetite.	Trace.	Olivine.
Talc.	<0.5	Olivine.

COMMENTS: #176

Section contains composite clinopyroxene grains with a low birefringence part.

STRUCTURE

Plagioclase laths are randomly oriented. Clinopyroxene and olivine form large oikocrysts. Primary igneous texture of plagioclase crystals is slightly overprinted by grain-size reduction. Neoblasts range from 500 micrometers to 1 mm in size. Weak development of deformation twins in plagioclase, subgrain boundaries in olivine, and of undulatory extinction in all minerals.

153-921D-5R-1 (Piece 12C, 121 cm)

Observer: KIY

Rock Name: OLIVINE GABBRO

Grain size: Coarse.

Texture: Heteradcumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	67	67	0.5-5.5	Subhedral to anhedral.	
Clinopyroxene.	24	25	0.2-7.6	Anhedral.	
Olivine.	5	7	0.2-2.3	Anhedral.	Partly rimmed by clinopyroxene.

ACCESSORY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL
Magnetite.	<0.5	<0.5

SECONDARY MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING
Sulfide minerals.	<0.5	
Hornblende.	1	
Chlorite.	2	
Serpentine/magnetite	<0.5	
Talc.	1	

COMMENTS: #167

STRUCTURE

Well-preserved primary igneous texture. Clinopyroxene is oikocrystic. Olivine is interstitial.

153-921D-5R-2 (Piece 5, 56 cm)

Observer: KIY

Rock Name: TROCTOLITE

Grain size: Coarse.

Texture: Heteradcumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	73	73	0.2-7.8	Subhedral to anhedral	
Olivine.	22	25	0.4-8.2	Anhedral.	Rimmed by clinopyroxene.
Clinopyroxene.	2	2	0.4-6.5	Anhedral.	All interstitial.

ACCESSORY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL
Magnetite.	<0.5	<0.5

SECONDARY MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING
Sulfide minerals.	<0.5	
Hornblende.	0.5	Clinopyroxene.
Chlorite.	1.5	Olivine.
Talc.	0.5	Olivine.
Serpentine/magnetite	Trace.	Olivine.
Clay minerals.	1-2	Olivine.

COMMENTS: #168

Clinopyroxene is the only obvious intercumulus phase; olivine and plagioclase probably crystallized together.

STRUCTURE

Plagioclase laths are randomly oriented. Olivine forms large oikocrysts or occurs as an interstitial phase. Rare clinopyroxene occurs either as interstitial crystals or as rims around olivine crystals. Clusters of anhedral plagioclase 1 mm in size might either result from dynamic recrystallization or correspond to final crystallization of the melt phase. Weak development of deformation twins in plagioclase, subgrain boundaries in olivine, and of undulatory extinction in all minerals.

SITE 921

153-921D-5R-2 (Piece 5, 60 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Heteradcumulate.

Observer: KIY

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	67	67	0.2–8.8	Euhedral to subhedral	
Olivine.	15	18	0.2–7.0	Anhedral.	
Clinopyroxene.	14	14	0.2–13.0	Anhedral.	Slightly pink color; occurs as rims on olivine.
ACCESSORY MINERAL NAME					
Magnetite.	1	1	<1		
Brown amphibole.					Rims clinopyroxene, may be primary.
Sulfide minerals.					These may be primary as well.
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Sulfide minerals.	0.5				
Hornblende.	1	Clinopyroxene.			
Chlorite.	1	Serpentine and magnetite.			
Serpentine.	0.5	Olivine.			
Talc.	0.5	Olivine.			
Actinolite.	<1	Olivine, plagioclase.			
Clay minerals.		Olivine.			Oxidized.

COMMENTS: #177

STRUCTURE

Well-preserved primary igneous texture. Clinopyroxene is oikocrystic. Olivine is interstitial.

153-921E-1R-1 (Piece 3, 34 cm)

Rock Name: MYLONITIZED OLIVINE GABBRO

Grain size: Fine to coarse.

Texture: Mylonitic to porphyroclastic.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	85	85	0.04–15.5	Anhedral.	Strong grain-size reduction, undulose extinction; large porphyroclasts in mylonitic bands.
Olivine.	4	5	0.04–3.4	Anhedral.	Neoblasts and subgrain boundaries.
Clinopyroxene.	5	8	0.05–0.5	Anhedral.	Bent grains; undulose extinction.
ACCESSORY MINERAL NAME					
Orthopyroxene.	1.5	1.5	2–4.5	Anhedral.	
Iron oxide minerals.	0.5	0.5		Anhedral.	Highly elongated, rimmed in most cases by hornblende.
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Hornblende.	1	Clinopyroxene.			Rims iron oxide minerals.
Talc.	0.8	Olivine.			
Magnetite.	0.2	Olivine.			
Chlorite.	0.2	Clinopyroxene.			
Actinolite.	0.5	Clinopyroxene.			
Sulfide minerals.	Trace.				

COMMENTS: #185

STRUCTURE

Pegmatitic texture overprinted by thin shear zones defined by small subhedral to polygonal grains of mainly plagioclase. Average grain size is uniform and about 100 micrometers. Olivine forms mosaic of recrystallized grains with sutured grain boundaries. Larger grains have straight subgrain boundaries at high angle to the shear zone. Clinopyroxene shows moderate to high development of neoblasts along shear zone margins.

153-921E-2R-2 (Piece 1, 24 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Subpegmatitic.

Observer: KIY

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	56	56	0.1–11.4	Subhedral to anhedral.	Bent by deformation, has deformation twinning and small neoblasts along grain boundaries.
Clinopyroxene.	36	37	0.2–15.2	Anhedral.	Pervasive alteration to brown hornblende within clinopyroxene. Commonly rimmed by hornblende.
Olivine.	5	6	0.4–4.8		

ACCESSORY MINERAL NAME
 Magnetite.

1 1

SECONDARY MINERAL NAME
 Sulfide minerals.

PERCENT

REPLACING/
 FILLING

Hornblende. 1.2
 Magnetite + other minerals. 1

Clinopyroxene.
 Olivine.

Alteration minerals after olivine: magnetite + serpentine + chlorite + tremolite + actinolite + talc.

COMMENTS: #178 and #179 (Two thin sections)

STRUCTURE

Pegmatitic texture. Plagioclase laths and large olivine crystals locally show grain-size reduction. Neoblasts are about 1 mm in size. A few plagioclase present deformation twins. Some large olivine crystals show close spaced subgrain boundaries. Moderate development of undulose extinction in all minerals.

153-921E-2R-2 (Piece 7, 78 cm)

Rock Name: OLIVINE GABBRO

Grain size: Coarse.

Texture: Partly recrystallized cumulate.

Observer: KIY

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	60	60	0.1–7.5	Euhedral to anhedral.	Grain-size reduction along grain boundaries.
Clinopyroxene.	30	32	0.1–13.8	Anhedral.	Slightly zoned at the rim. Rimmed by brown hornblende. Contains numerous tiny specks of brown hornblende and fluid inclusions.
Olivine.	6	7	0.1–3.6	Anhedral.	

ACCESSORY MINERAL NAME

Iron oxide minerals.
 Apatite.
 Hornblende.

0.5 0.5
 0.1 0.1
 0.4 0.4

<1.8

Anhedral.

Ilmenite (0.3%) and magnetite (0.2%). Rimmed by hornblende.

SECONDARY MINERAL NAME
 Hornblende.

PERCENT

REPLACING/
 FILLING

Sulfide minerals. Trace.
 Actinolite. 1.6
 Chlorite. 0.3
 Talc and magnetite. 1

Clinopyroxene.
 Clinopyroxene.
 Olivine.

COMMENTS: #180

STRUCTURE

The pegmatitic texture is extensively overprinted by grain-size reduction. The most frequent neoblast size of plagioclase is 200 micrometers, although 1 mm recrystallized grain sizes are also observed. Grain-size reduction occurs along a network of high-strain zones that anastomose around cores of primary plagioclase. The cores are elongated with aspect ratios of about 4:1 and they show a much stronger crystal lattice preferred orientation than the neoblasts. Clinopyroxene shows much less grain-size reduction: neoblasts are not voluminous and are only found along margins. Porphyroclasts show incipient alteration to hornblende(?). Olivine is strongly recrystallized and neoblasts are 1 mm with triple junctions and typically shows patchy undulose extinctions. Some neoblast have straight boundaries whereas others keep strongly lobated ones. A plagioclase grain preserved as a euhedral inclusion in a clinopyroxene is totally unstrained.

SITE 921

153-921E-3R-1 (Piece 5, 37 cm)
 Rock Name: OXIDE GABBRO
 Grain size: Coarse.
 Texture: Mylonitic-porphyroclastic.

Observer: JFY

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	60	64	1-10	Subhedral.	
Clinopyroxene.	20	30	1-8	Euhedral-subhedral.	
Oxide minerals.	5	6			
SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE	MORPHOLOGY	DESCRIPTION
Green/brown amphibole.	10	Clinopyroxene.	2-3	Anhedral.	
Iron oxide minerals.	1	Iron oxide minerals.		Anhedral.	
Prehnite.	4	Plagioclase.	?		

COMMENTS: #181
 STRUCTURE

The pegmatitic texture is overprinted by discrete anastomosing shear zones that are mainly composed of 100 µm neoblasts of feldspar and minor clinopyroxene. Shear zones show little evidence for brittle cataclasis. Feldspar cores contain deformation twins and necklaces of neoblasts. Plagioclase recrystallization may be associated with or initiated along microcracks. Possible sinistral shear sense deduced from asymmetry of tails around plagioclase augen.

153-921E-3R-1 (Piece 12, 107 cm)
 Rock Name: GABBRO
 Grain size: Coarse.
 Texture: Poikilitic.

Observer: CAN

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	40	60	0.1-5	Anhedral.	Partial grain-size reduction.
Clinopyroxene.	20	37	0.4-7	Anhedral.	Some enclose subhedral to anhedral plagioclase.
ACCESSORY MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE	MORPHOLOGY	DESCRIPTION
Olivine.	2	2	0.2-2.5	Anhedral.	Possible grain-size reduction.
Magnetite.	1	1	0.1-2.5	Anhedral.	Exsolution texture. Secondary titanite overgrowths.
Ilmenite.	<<1	<<1	0.1-0.7	Anhedral.	Brown hornblende overgrowths. Finer grained than magnetite.
Sulfide minerals.	<<1	<<1	<0.3	Anhedral.	Two varieties, possibly chalcopyrite and pyrrhotite. Chalcopyrite is less than 0.1 mm and also occurs as lamellae in pyrrhotite.
Orthopyroxene.	<1	<1			Only two grains.
SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE	MORPHOLOGY	DESCRIPTION
Actinolite.	15	Orthopyroxene, clinopyroxene, olivine.			
Brown/green amphibole.	2-3	Clinopyroxene.			Also occurs in microcracks cutting through clinopyroxene, locally with quartz, suggesting that microcracks may be related to quartz, secondary plagioclase veining.
Smectite/chlorite.	5	Olivine, orthopyroxene, olivine, plagioclase.			
Secondary plagioclase.	1	Plagioclase.			
Titanite.	Trace.	Oxide minerals.			
Epidote.	Trace.	Plagioclase.			
VEIN/FRACTURE FILLING	PERCENT	PERCENT ORIGINAL	SIZE	ORIENTATION	DESCRIPTION
Quartz.					8% of vein material.
Plagioclase (sodic).					80% of vein material.
Brown/green amphibole material.					5% of vein material. Unidentified alteration phases filling void space. 7% of vein
Zircon and titanite.	Trace.				

COMMENTS: #182

Quartz and sodic plagioclase veins boundaries are either sharp or diffuse, with quartz and plagioclase (commonly in rectangular crystals about 0.5-1 mm) occurring as infiltrations in the host gabbro.

STRUCTURE

Composite thin section made of a coarse-grained olivine gabbro and magmatic veins. Plagioclase is compositionally zoned and occurs as both large (5 mm) subhedral and anhedral grains and smaller (1 mm) anhedral grains. Magmatic veins are thickest when they crosscut clinopyroxene and are reduced to thin seams or inclusion trails through plagioclase. Brown amphibole nucleates and grows off of clinopyroxene along the margins of magmatic veins. Deformation microstructures include deformation twins and undulose extinction in plagioclase and clusters of plagioclase and pyroxene neoblasts.

153-921E-3R-1 (Piece 15, 138 cm)

Observer: NOR

Rock Name: OLIVINE GABBRO

Grain size: Coarse.

Texture: Poikilitic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	62	65	0.2-7.0	Anhedral.	Very weak normal to oscillatory zoning can sometimes be seen.
Clinopyroxene.	18	20	0.2-8.0	Anhedral.	
Olivine.	12	15	0.2-5.0	Anhedral.	

ACCESSORY

MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY
Magnetite.	<1	<1	0.5	Anhedral.

SECONDARY

MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY
Talc.	1	Olivine.		
Iron oxide minerals.	1	Olivine.		
Clay minerals.	1	Olivine, plagioclase.		
Actinolite.	1	Clinopyroxene.		
Brown hornblende.	1	Clinopyroxene.		
Plagioclase.	3	Plagioclase.	0.1-1	Anhedral.

COMMENTS: #183 and #184

Plagioclase and clinopyroxene are present as large anhedral tabular to equant grains. Smaller plagioclase grains are enclosed by clinopyroxene.

STRUCTURE

Plagioclase occurs as both large (5 mm) subhedral and anhedral grains and smaller (1 mm) anhedral grains. Deformation microstructures are limited to deformation twins and undulose extinction in plagioclase, subgrain boundaries, and undulose extinction in olivine.

153-921E-4R-1 (Piece 5, 44 cm)

Observer: ROS

Rock Name: OLIVINE GABBRO

Grain size: Medium.

Texture: Heteradcumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	63	66	0.3-5.2	Anhedral.	Some deformation/mechanical twins. Undulose extinction. Altered in one of the two thin sections. Poikilitically encloses plagioclase and some olivine.
Clinopyroxene.	23	26	0.3-5.8	Anhedral.	
Olivine.	5	7	0.4-3.8	Anhedral.	Has kink bands and undulose extinction.

ACCESSORY

MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY
Iron oxide minerals.	1	1	0.2-1.4	Anhedral.

SECONDARY

MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY
Talc.	0.8	Olivine.		
Magnetite.	0.2	Olivine.		
Smectite.	1	Olivine.		
Hornblende.	1	Clinopyroxene.		
Actinolite.	1.5	Clinopyroxene.		
Chlorite.	0.5	Clinopyroxene.		
Sulfide minerals.	0.1			

COMMENTS: #186 and #187

The different modal proportions of the minerals in these two thin sections, which were taken adjacent to each other, demonstrates the heterogeneous distribution of minerals in the rock. The modes on this form are an average of the two thin sections.

STRUCTURE

Plagioclase occurs as large (5 mm) subhedral grains that show no grain-size reduction. Deformation microstructures are limited to undulose extinction and subgrain boundaries in olivine.

SITE 921

153-921E-4R-2 (Piece 1B, 26 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Heteradcumulate.

Observer: CDW

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	70	70	0.2-9		Twinned.
Clinopyroxene.	20	24	0.5-7.0		
Olivine.	3	6	0.2-4.0		
ACCESSORY					
MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Sulfide minerals.	<1	<1	0.05-1.5		Pyrrhotite and lesser amounts of chalcopyrite.
Iron oxide minerals.	<1	<1	0.05-1.5		Mainly ilmenite.
SECONDARY					
MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Brown amphibole.	<1	Clinopyroxene.			
Tremolite + talc.	4	Clinopyroxene.			
Magnetite + other minerals.	3	Olivine.			Secondary minerals after olivine: magnetite + talc + serpentine.
VEIN/FRACTURE					
FILLING	PERCENT	PERCENT ORIGINAL	SIZE (mm)	ORIENTATION	DESCRIPTION
Talc, chlorite, serpentine, and prehnite.			0.5		

COMMENTS: #188
 STRUCTURE

Plagioclase occurs as large (5 mm) subhedral grains that show no grain-size reduction. Deformation microstructures are limited to undulose extinction and of subgrain boundaries in olivine.

153-921E-5R-1 (Piece 1, 0 cm)
 Rock Name: GABBRO
 Grain size: Fine to coarse.
 Texture: Mylonitic porphyroclastic.

Observer: SDH

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	30	55	0.5-6	Subhedral-laths	Undulose extinction and wavy twins.
Clinopyroxene.	20	30	0.4-7	Anhedral.	Exsolution lamellae.
Olivine.	8	10	0.4-3	Anhedral.	Network alteration to iron oxide minerals.
ACCESSORY					
MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Oxide minerals.	5	5	<0.1	Anhedral.	Interstitial to all phases in localized zones and rimming clinopyroxene-rich areas.
SECONDARY					
MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	20	Plagioclase.	0.03-0.1	Polygonal.	Aligned small elongate polygonal crystals in anastomosing zones, mixed with similar grains of clinopyroxene surrounding larger clasts.
Clinopyroxene.	10	Clinopyroxene.	0.03-0.1	Anhedral-polygonal.	Same as plagioclase.
Brown amphibole.	1	Clinopyroxene.	0.05-0.2	Anhedral.	Rimming and small grains enclosed in clinopyroxene.
Oxide minerals.	1	Olivine and clinopyroxene.	<0.05	Anhedral.	Rimming olivine and clinopyroxene.
Chlorite/smectite.	<1	Olivine and clinopyroxene.	0.01-0.05	Anhedral.	Rimming, interstitial to olivine, clinopyroxene, and plagioclase.
VEIN/FRACTURE					
FILLING	PERCENT	PERCENT ORIGINAL	SIZE (mm)	ORIENTATION	DESCRIPTION
Plagioclase.	100		0.07		Undeformed vein cutting mylonite. Perpendicular to walls.

COMMENTS: # 18L
 STRUCTURE

Strongly sheared anastomosing horizons inside a pegmatitic olivine gabbro. Boundaries between moderately and strongly sheared horizons are relatively sharp. Moderate grain-size reduction in the less sheared rocks occurs along microfractures and grain boundaries. Average neoblast size is less than 100 micrometers and relatively uniform in the shear zones. There are unrecrystallized mm in size porphyroclasts of plagioclase and clinopyroxene embedded in the mylonitic zones. Clinopyroxene porphyroclasts are rimmed by fine grains of amphibole which also make tails that connect boudinage segments. Plagioclase contains a weak to moderate lattice preferred orientation in the mylonite zone. Porphyroclast cores have a strong lattice preferred orientation which suggests that they may have been derived from the same host grain.

153-921E-5R-2 (Piece 1A, 14 cm)

Observer: CDW

Rock Name: TROCTOLITE

Grain size: Variable.

Texture: Cumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	78	78	0.2-10		Twinned.
Olivine.	13	18	0.2-2.0		
Clinopyroxene.	2	4	1-5		Poikilitic.
ACCESSORY					
MINERAL NAME	PERCENT	PERCENT	SIZE	MORPHOLOGY	DESCRIPTION
Magnetite.	<<1	<<1	0.05-0.6		
Sulfide minerals.	<<1	<<1	0.05-0.6		Pyrrhotite and chalcopyrite.
SECONDARY					
MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE	MORPHOLOGY	DESCRIPTION
Amphibole.	2	Clinopyroxene.			
Clay/talc/magnetite.	5	Olivine.			

COMMENTS: #189

Igneous

Grain size: This thin section is mainly coarse grained but a small part is fine grained.

STRUCTURE

Plagioclase occurs mainly as large (>5 mm) subhedral grains minor patches of small 1 mm anhedral grains. Deformation microstructures are limited to undulose extinction and formation of subgrain boundaries in olivine. Olivine is almost completely altered to mesh of chlorite amphibole and possibly other phases.

153-921E-5R-2 (Piece 7, 125 cm)

Observer: CDW

Rock Name: OLIVINE GABBRO

Grain size: Coarse.

Texture: Cumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	69	69	0.2-15		Twinned.
Olivine.	16	20	0.2-10		
Clinopyroxene.	8	11	0.2-3.5		
ACCESSORY					
MINERAL NAME	PERCENT	PERCENT	SIZE	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	<<1	<<1	0.05-0.6		Mostly ilmenite.
Sulfide minerals.	<<1	<<1	0.05-0.6		Pyrrhotite and chalcopyrite.
SECONDARY					
MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE	MORPHOLOGY	DESCRIPTION
Mt + other minerals.	4	Olivine.			
Brown amphibole.	1.5	Clinopyroxene.			Secondary minerals after olivine: magnetite + talc + clay + chlorite.
Clay minerals.	0.5	Clinopyroxene.			

COMMENTS: #190 and #191

STRUCTURE

Plagioclase is subhedral to anhedral and shows a moderate crystal shape preferred orientation parallel to a gradational grain-size layering. Plagioclase shows a weak lattice preferred orientation of likely magmatic origin.

SITE 921

153-921E-6R-1 (Piece 7, 50 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium.
 Texture: Cumulate.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	65	65	0.2-5.0	Anhedral.	Some grains show oscillatory zoning.
Clinopyroxene.	19	20	0.2-5.0	Anhedral.	
Olivine.	13	15	0.4-1.8	Anhedral.	
ACCESSORY MINERAL NAME					
Magnetite.	<<1	<<1	0.05	Anhedral.	
Sulfide minerals.	<<1	<<1	0.05	Anhedral.	
Brown hornblende.	<1	<1			Interstitial.
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Brown amphibole.	0.5	Clinopyroxene.			
Smectite.	2	Clinopyroxene, olivine, plagioclase.			
Talc.	0.3	Olivine.			
Iron oxide minerals.	0.2	Olivine.			
VEIN/FRACTURE FILLING					
Chlorite and smectite.	PERCENT		SIZE	ORIENTATION	
			0.01-0.5		Mutually crosscutting.

COMMENTS: #192
 STRUCTURE

The magmatic texture includes a weakly developed shape preferred orientation in plagioclase, clinopyroxene, and olivine. Very little sign of deformation or grain-size reduction. Array of parallel veins running through the limb of the thin section. The vein filling material is fibrous perpendicular to the walls. Vein mineralogy changes depending to the mineralogy of the host crystal through which they cross, amphibole in clinopyroxene and chlorite in plagioclase.

153-921E-6R-1 (Piece 11B, 97 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Pegmatitic.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	68	68	0.4-10.0	Subhedral to anhedral.	Has preferred orientation. Twinned. Some complex zoning with core and rim having the same extinction angle.
Olivine.	21	24	0.3-10.0	Anhedral.	Has kink bands and undulose extinction.
Clinopyroxene.	6	7	0.8-3.6	Anhedral.	Interstitial and poikilitic.
ACCESSORY MINERAL NAME					
Iron oxide minerals.	1	1	0.2-1.0	Anhedral.	
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Talc.	1	Olivine.			
Magnetite.	0.2	Olivine.			
Smectite.	2	Olivine/clinopyroxene.			
Chlorite.	0.2	Clinopyroxene.			
Serpentine.	0.5	Olivine.			
Brown amphibole.	0.2	Clinopyroxene.			
Sulfide minerals.	0.1				

COMMENTS: #193
 STRUCTURE

Apart from a moderate development of subgrain boundaries in olivine, deformation microstructures are nonexistent. Plagioclase and olivine show a weak shape preferred orientation.

153-921E-6R-2 (Piece 4, 45 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium.
 Texture: Cumulate.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	65	65	0.2-2.2	Anhedral.	Tabular. Some bent twins.
Clinopyroxene.	24	25	0.2-2.2	Anhedral.	
Olivine.	9	10	0.2-2.0	Anhedral.	
ACCESSORY MINERAL NAME					
Ti-magnetite.	<<<1	<<<1	0.2	Anhedral.	Less abundant than the sulfide minerals.
Sulfide minerals	<<1	<<1	0.2	Anhedral.	Chalcopyrite and pyrrhotite.
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Plagioclase.	<1	Plagioclase.			
Brown amphibole.	1	Clinopyroxene.			
Talc.	0.5	Olivine.			
Clay minerals.	0.2	Olivine.			
Iron oxide minerals.	0.3	Olivine.			

COMMENTS: #194

Igneous

There is a melt infiltration vein (<0.2 mm in width) crosscutting the thin section. Along the vein minerals have reacted with the fluid: plagioclase is albitized (?no open fracture), olivine has reacted to form clinopyroxene, and clinopyroxene is replaced by hornblende. Where the vein was open in olivine and clinopyroxene grains, it has a plagioclase core.

STRUCTURE

The primary igneous texture includes a moderate to weak shape preferred fabric in plagioclase .

153-921E-7R-1 (Piece 4, 25 cm)
 Rock Name: ANORTHOSITE
 Grain size: Medium.
 Texture: Adcumulate.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	85	90	0.2-5.5	Subhedral.	Preferred orientation, compositionally zoned near margin. Low maximum extinction angle suggests oligoclase composition.
Clinopyroxene.	1	4	0.5-1	Anhedral to subhedral.	
ACCESSORY MINERAL NAME					
Clinopyroxene.	1	4	0.5-1	Anhedral.	Relics in amphibole.
Quartz.	1	1	0.1-0.08	Anhedral.	Interstitial between plagioclase.
Magnetite.	3	3	2	Anhedral.	No exsolution texture.
Ilmenite.	<<1	<<1	0.2	Anhedral.	Usually associated with magnetite.
Zircon.	<<1	<<1	0.3	Euhedral-subhedral.	
SECONDARY MINERAL NAME					
	PERCENT	REPLACING/ FILLING			
Brown amphibole.	2	Clinopyroxene.			As overgrowths.

COMMENTS: #195

STRUCTURE

Minor cataclastic deformation superimposed on the primary igneous texture. Plagioclase is still subhedral and forms long rectangular crystals with aspect ratios of 3 to 1. It still shows a moderate shape preferred orientation but no strong lattice preferred orientation.

SITE 921

153-921E-7R-1 (Piece 6B(1), 52 cm)

Observer: KIY

Rock Name: TRONDHEMITE

Grain size: Medium.

Texture: Allotriomorphic granular with graphic intergrowth of quartz and plagioclase.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	59	69	0.4-7.0	Anhedral.	
Quartz.	15	15	0.5-5.5	Anhedral.	
Hornblende.	5	15	0.2-3.5	Anhedral.	

ACCESSORY

MINERAL NAME

Iron oxide minerals. 1 1

SECONDARY

MINERAL NAME

MINERAL NAME	PERCENT	REPLACING/ FILLING
Albite.	10	Plagioclase.
Prehnite.	3	Plagioclase.
Chlorite.	5	Plagioclase and hornblende.
Epidote.	1	Hornblende.
Actinolite.	5	Hornblende.
Clay minerals.	5	Plagioclase and hornblende.

COMMENTS: #196

Igneous

This is one of two thin section descriptions for this slide. This one describes the trondhemite vein, the other the olivine gabbro host rock. See (Sample 153-921E-7R-1, 52 Piece 6B(2)).

153-921E-7R-1 (Piece 6B(2), 52 cm)

Observer: KIY

Rock Name: OLIVINE GABBRO

Grain size: Medium.

Texture: Cumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	40	55	0.2-6	Anhedral.	
Clinopyroxene.	25	30	0.2-4.0	Anhedral.	
Olivine.	0	15	0.2-3.8	Anhedral.	

SECONDARY

MINERAL NAME

MINERAL NAME	PERCENT	REPLACING/ FILLING	DESCRIPTION
Talc.	6	Olivine.	
Actinolite.	15	Clinopyroxene, olivine, and plagioclase.	
Green-brown hornblende.	1	Clinopyroxene.	Rims clinopyroxene.
Chlorite.	10	Olivine and plagioclase.	
Plagioclase.	<1	Plagioclase.	Anhedral. Near trondhemite vein.
Chlorite/smectite.	2	Mafic mineral.	

COMMENTS: #196

Igneous

There are two descriptions for this thin section. The other one describes a trondhemite vein which comprises almost half of the thin section. (Sample 153-921E-7R-1, 52 Piece 6B(1)).

STRUCTURE

Strong static alteration. Albitized feldspar shows undulose extinction. No other sign of deformation except a sinuous vein array at one end of slide.

153-921E-7R-1 (Piece 9A, 92 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Poikilitic.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	54	55	0.5-12	Anhedral.	Zoned at margins.
Clinopyroxene.	29	30	0.5-20	Anhedral.	Oikocrystic clinopyroxene poikilitically encloses plagioclase grains.
Olivine.	14	15	0.4-9	Anhedral.	

ACCESSORY

MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	<1	<1	0.5		
Sulfide minerals.	<1	<1	1		Pyrrhotite and chalcopyrite.

SECONDARY

MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING	MORPHOLOGY	DESCRIPTION
Talc/clays/oxide minerals.	1	Olivine.		
Chlorite.	<1	Olivine, plagioclase.		
Actinolite.	<1	Clinopyroxene, olivine, plagioclase.		
Brown amphibole.	<1		Interstitial.	Possibly primary.

COMMENTS: #197

STRUCTURE

Plagioclase laths are randomly oriented. Olivine forms large oikocrysts or occurs as an interstitial phase. Rare clinopyroxene occurs either as interstitial crystals, either as rims around olivine crystals. Clusters of anhedral plagioclase 1 mm in size might either result from dynamic recrystallization or correspond to final crystallization of the melt phase. Weak development of deformation twins in plagioclase, subgrain boundaries in olivine, and of undulatory extinction in all minerals.

153-921E-7R-2 (Piece 1A, 4 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Cumulate.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	70	70	0.5-16	Anhedral.	Tabular. Normal zoning.
Clinopyroxene.	18	20	0.5-14	Anhedral.	
Olivine.	7	10	0.8-12	Anhedral.	

ACCESSORY

MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Ti-magnetite.	<1	<1	2		
Sulfide minerals.	<<1	<<1	0.2		

SECONDARY

MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING	MORPHOLOGY	DESCRIPTION
Sericite.	<<1	Plagioclase.		
Chlorite.	<<1	Plagioclase.		
Talc.	1	Olivine.		
Iron oxide minerals.	1	Olivine.		
Clay minerals.	1	Olivine.		
Brown amphibole.	2	Clinopyroxene.		
Actinolite.	<<1	Clinopyroxene.		

COMMENTS: #198

There is a vein containing small secondary orthopyroxene, partially altered to actinolite, chlorite, and smectite. The adjacent plagioclase contains an amphibole vein with secondary plagioclase. Secondary orthopyroxene clearly predates the amphibole vein.

STRUCTURE

Strong static alteration overprinting the primary igneous texture.

SITE 921

153-921E-7R-2 (Piece 2, 70 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium to coarse.
 Texture: Cumulate.

Observer: JFY

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	68	69	0.01-4.0	Subhedral-anhedral.	Generally fresh, twinned, ophitic texture.
Clinopyroxene.	23	25	0.1-6.0	Subhedral.	In part altered.
Olivine.	4	6	0.1-3.5	Anhedral.	Partly altered to chlorite and serpentine.

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Actinolite.	2	Clinopyroxene, olivine.
Iron oxide minerals.	1	Clinopyroxene, olivine.
Clay minerals.	1	Clinopyroxene, olivine, plagioclase.
Talc.	<1	Olivine.
Chlorite.	<1	Plagioclase.

VEIN/FRACTURE FILLING	PERCENT	SIZE	ORIENTATION
Chlorite-smectite.	100	0.05-0.1	

COMMENTS: #199

Oriented thin section. Minerals dynamically recrystallized in mylonitic shear zone include: Plagioclase, clinopyroxene, brown hornblende, apatite, colorless to pale green amphibole.

STRUCTURE

Composite thin section. A straight mylonitic shear zone a few hundred micrometers thick separates a recrystallized gabbro from an undeformed olivine gabbro. Average neoblast size is 50 µm. Microfractures and neoblast necklaces occur in cores of plagioclase porphyroclasts. Chlorite veins crosscut patches of neoblasts and porphyroclasts. Shear sense is sinistral in the mylonite, based on the obliquity of the elongate plagioclase crystals in the mylonite relative to amphibole bearing microshears. The rotation of foliation in the less deformed recrystallized gabbro within 1.5 cm from the mylonite is compatible with this shear sense.

153-921E-7R-2 (Piece 3, 77 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Poikilitic.

Observer: NOR

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	65	65	1-13	Anhedral to subhedral.	One large grain shows oscillatory zoning.
Clinopyroxene.	10	30	1-10	Anhedral.	Sometimes poikilitically encloses euhedral plagioclase laths.
Olivine.	4	5	3-7	Anhedral.	

ACCESSORY MINERAL NAME	PERCENT	PERCENT ORIGINAL	SIZE (mm)
Ti-magnetite.	<1	<1	0.05-0.5
Sulfide minerals.	<<1	<<1	0.05

SECONDARY MINERAL NAME	PERCENT	REPLACING/ FILLING
Clay minerals.	< 1	Plagioclase, olivine.
Talc.	0.4	Olivine.
Iron oxide minerals.	0.2	Olivine.
Actinolite.	0.3	Clinopyroxene.
Brown amphibole.	3	Clinopyroxene.
Clay minerals.	17	Clinopyroxene.

COMMENTS: #200 and #201

STRUCTURE

Static alteration overprints the primary igneous texture. Minor microfracturing, but is otherwise undeformed, with no orientation shape preferred orientation.

153-921E-7R-3 (Piece 1A, 35 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium to coarse.
 Texture: Poikilitic.

Observer: PAM

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	64.5	65	0.2-4	Subhedral.	
Clinopyroxene.	24.5	25	5-25	Anhedral.	Oikocrysts enclose subhedral plagioclase laths and some olivine. Occasionally complex intergrowth textures.
Olivine.	8.5	10	0.2-2	Anhedral.	Alteration along cracks. Encloses some plagioclase laths.

ACCESSORY MINERAL NAME

Orthopyroxene.	Trace				Occurs as thin rims around olivine.
Iron oxide minerals.	Trace.	Trace.			

SECONDARY MINERAL NAME

MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING			
Actinolite.	Trace.	Clinopyroxene.			Replacing on rims.
Smectite.	1	Olivine.			Olive green color.
Talc.	Trace.	Olivine.			
Iron oxide minerals.	1	Olivine.			
Brown amphibole.	0.5	Clinopyroxene.			

VEIN/FRACTURE FILLING

FILLING	PERCENT	SIZE	ORIENTATION
Talc? and smectite.		<1	

COMMENTS: #202

Igneous

The complex clinopyroxene intergrowth and blebby exsolutions are associated with pale red brown amphibole. Order of crystallization was probably plagioclase, followed by olivine ± clinopyroxene with clinopyroxene continuing after olivine.

STRUCTURE

Plagioclase euhedral laths are randomly oriented. Clinopyroxene forms large centimeter-sized oikocrysts and olivine occurs as an interstitial phase. Very weak development of deformation twins in plagioclase, of subgrain boundaries in olivine, and of undulatory extinction in all minerals.

153-921E-7R-3 (Piece 2, 83 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Coarse.
 Texture: Poikilitic.

Observer: ROS

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	57	57	0.2-3.6	Anhedral.	Subhedral-euhedral when included in clinopyroxene oikocrysts.
Clinopyroxene.	29	30	1-10	Anhedral.	Poikilitic.
Olivine.	10	12	0.2-1.8	Anhedral.	Kink banded.

ACCESSORY MINERAL NAME

Iron oxide minerals.	1	1	0.2-2.0		Some are rimmed by amphibole.
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SECONDARY MINERAL NAME

MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING			
Hornblende.	1	Clinopyroxene.		Anhedral.	
Talc.	0.5	Olivine.		Anhedral.	
Smectite.	1.3	Olivine.		Anhedral.	
Chlorite.	0	Olivine.		Anhedral.	
Magnetite.	0.2	Olivine.		Anhedral.	
Actinolite.	0.5	Clinopyroxene.		Anhedral.	
Sulfide minerals.	Trace.				

COMMENTS: #203

STRUCTURE

Plagioclase euhedral crystals are randomly oriented. Clinopyroxene forms large oikocrysts and olivine occurs as an interstitial phase. Very weak development of deformation twins in plagioclase, of subgrain boundaries in olivine, and of undulatory extinction in all minerals.

153-921E-7R-3 (Piece 2, 93 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	60	0.2–10	Anhedral.	Some show normal zoning.
Olivine.	18	20	0.3–2.5	Anhedral.	
Clinopyroxene.	19	20	0.4–9	Anhedral.	Large oikocrysts enclose large amount of euhedral to subhedral plagioclase grains.
ACCESSORY					
MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Magnetite.	<<1	<<1	0.1	Anhedral.	
Ilmenite.	<<1	<<1	0.1	Anhedral.	Usually associated with magnetite.
Sulfide minerals.	<<1	<<1	0.05	Anhedral.	
SECONDARY					
MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Brown amphibole.	1	Clinopyroxene.		Anhedral.	
Talc.	1	Olivine.		Anhedral.	
Clay.	1	Olivine.		Anhedral.	

COMMENTS: #204
 STRUCTURE

Plagioclase euhedral crystals are randomly oriented. Clinopyroxene forms large oikocrysts and olivine occurs as an interstitial phase. Very weak development of deformation twins in plagioclase, of subgrain boundaries in olivine, and of undulatory extinction in all minerals.

153-921E-7R-3 (Piece 3, 99 cm)
 Rock Name: OLIVINE GABBRO
 Grain size: Medium.
 Texture: Cumulate.

Observer: SDH

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	80	80	0.5–5	Subhedral-euhedral.	Laths with preferred alignment.
Olivine.	11	12	0.3–4	Anhedral.	Interstitial to plagioclase.
Clinopyroxene.	7	8	0.8–8	Anhedral.	Interstitial with enclosed small plagioclase laths.
SECONDARY					
MINERAL NAME	PERCENT PRESENT	REPLACING/ FILLING	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Iron oxide minerals.	1	Olivine.	<<0.1	Anhedral.	Network and rimming olivine.
Brown amphibole.	<1	Clinopyroxene, olivine.	0.01–0.1	Anhedral.	Adjacent to clinopyroxene and olivine and interstitial.
Chlorite	<1	Olivine.	0.01–0.1	Anhedral.	Adjacent to clinopyroxene, olivine
Clays	<1	Olivine.	<0.01–0.01	Anhedral.	Rimming olivine, clinopyroxene, and plagioclase.
VEIN/FRACTURE					
FILLING	PERCENT	SIZE (mm)	ORIENTATION		
Prehnite.	100	<0.1		Microcracks and microveins in plagioclase.	

COMMENTS: #19L

Plagioclase generally has good twinning and no undulatory extinction. Locally, some relatively small polygonal, untwinned plagioclase crystals are interstitial to plagioclase laths.

STRUCTURE

Well-preserved igneous texture. Euhedral plagioclase laths, olivine grains, and clinopyroxene grains show a well-developed shape preferred orientation. Plagioclase shows a strong lattice preferred orientation. Plagioclase shows minor development of deformation twins. Olivine shows moderate development of subgrain boundaries.

153-921E-8R-1 (Piece 8, 56 cm)

Observer: NOR

Rock Name: SHEARED GABBRONORITE

Grain size: Coarse.

Texture: Sheared and recrystallized, originally cumulate.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	50	60	6-12	Anhedral.	Partial grain-size reduction. Bent twins.
Clinopyroxene.	15	20	1-10	Anhedral.	Partial grain-size reduction.
Orthopyroxene.	19	20	3-18	Subhedral.	Elongate. Contains exsolution lamellae.

ACCESSORY MINERAL NAME

Ilmenite.	<1	<1	1.6		
Magnetite.	<<1	<<1	0.4		

SECONDARY MINERAL NAME

MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE	MORPHOLOGY	DESCRIPTION
Plagioclase.	10	Plagioclase.	0.1-1.4	Anhedral.	
Clinopyroxene.	3	Clinopyroxene.	0.1-1	Anhedral.	
Brown amphibole.	1	Clinopyroxene.		Anhedral.	
Actinolite.	0.5	Clinopyroxene.		Anhedral.	
Clay minerals.	0.5	Clinopyroxene.			
Actinolite.	0.3	Orthopyroxene.			On contacts with plagioclase.
Brown amphibole.	0.3	Orthopyroxene.			On contacts with plagioclase.
Smectite.	0.4	Orthopyroxene.			

COMMENTS: #205

Igneous

Plagioclase, clinopyroxene, and orthopyroxene exhibit a magmatic (cumulate) preferred orientation.

STRUCTURE

The pegmatic primary igneous texture is extensively overprint by plastic deformation: all the magmatic crystals, except some clinopyroxene, are bent or kinked, and show various degrees of grain-size reduction mainly at grain boundaries. Some large plagioclase grains show neoblasts along microcracks. Rock may have contained a previous igneous shape-preferred orientation in plagioclase that was parallel to the PRESENT zones of grain-size reduction. Neoblast size is constant around 200 μm .

153-921E-8R-1 (Piece 13B, 113 cm)

Observer: ROS

Rock Name: GABBRONORITE

Grain size: Coarse.

Texture: Poikilitic.

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	66	68	0.2-7.0	Anhedral.	
Clinopyroxene.	18	22	3-8.5	Anhedral.	Has exsolution of orthopyroxene.
Orthopyroxene.	7	9	4.8	Anhedral.	

ACCESSORY MINERAL NAME

Iron oxide minerals.	1	1			
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SECONDARY MINERAL NAME

MINERAL NAME	PERCENT	REPLACING/ FILLING	SIZE	MORPHOLOGY	DESCRIPTION
Sulfide minerals.			0.1-0.5	Anhedral.	
Hornblende.	2	Clinopyroxene.	0.2-4.0	Anhedral.	
Actinolite.	2	Clinopyroxene.	0.1-4	Anhedral.	
Talc.	2	Orthopyroxene.		Anhedral.	
Chlorite	<0.1	Plagioclase.			
Prehnite.	<0.1	Plagioclase.			

COMMENTS: #206

STRUCTURE

The primary igneous texture is weakly overprinted by brittle deformation. Microfractures in plagioclase contain trails of neoblasts (<100 μm) and albitized halos. Static alteration is not extensive..

SITE 921

153-921E-9R-1 (Piece 9, 52 cm)
 Rock Name: GABBRO
 Grain size: Coarse.
 Texture: Cumulate.

Observer: KIY

PRIMARY MINERAL NAME	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	DESCRIPTION
Plagioclase.	65	65	0.1-7.2	Subhedral to anhedral.	Partial grain-size reduction.
Clinopyroxene.	32.5	33	0.1-12.8	Subhedral to anhedral.	Compositionally zoned rim. Rimmed by brown hornblende.
Olivine.	1.5	2	1.8-2.8	Anhedral.	Associated with interstitial clinopyroxene.
ACCESSORY MINERAL NAME					
Iron oxide minerals.	<0.5	<0.5			Titanomagnetite(?).
SECONDARY MINERAL NAME					
Sulfide minerals.	Trace.	REPLACING/ FILLING			
Hornblende.	0.5				
Actinolite + chlorite.	0.5	Clinopyroxene.			
Magnetite + other minerals.	0.5	Olivine.			Secondary minerals after olivine: magnetite + talc + serpentine.

COMMENTS: #207 & #208

Igneous

One grain of clinopyroxene contains an orthopyroxene.

Recrystallization of plagioclase, clinopyroxene, and hornblende along grain boundaries.

STRUCTURE

About 20% of plagioclase is transformed into neoblasts with an average size of 500-1000 μm. Neoblasts occur in clusters that embay and replace early subhedral plagioclase. Microstructures that are the result of deformation include undulose extinction and deformation twins in plagioclase.