

**169-1037B-57R-1, Piece 8b (44-48 cm)****Thin section:** #74**ROCK NAME:** Fine-grained, plagioclase-olivine-clinopyroxene-phyric basalt**GRAIN SIZE:** Microcrystalline to fine-grained (seriate).**TEXTURE:** Variolitic to subophitic.

PRIMARY MINERALOGY PHENOCRYSTS	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	COMMENTS
Plagioclase	25	25	0.5-2	Laths, acicular.	Generally fresh, common zoning, inclusions of mesostasis.
Olivine	1	7	0.2-2	Euhedral..	Completely altered(?) to talc, stilpnomelane(?), and rims of magnetite.
Clinopyroxene	1	3	0.4-1.5	Stubby or "ophites".	Partly altered to amphibole.
GROUNDMASS					
Plagioclase	38	38	0.04-0.5	Acicular, prismatic.	Fresh, minor alteration along cracks.
Clinopyroxene	10	10-21	0.02-0.4	Ophitic.	Partly altered to amphibole, talc, Fe(O,OH)x.
Magnetite	4	3	0.01-0.03	Ragged granular, acicular.	
Mesostasis	10-21	10-21			Partly altered to amphibole, talc, Fe(O,OH)x.
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING			COMMENTS
Actinolite/Mg-hornblende	10-20	Mesostasis, clinopyroxene.			Intergrown, felted mats.
Talc	5	Olivine.			Inner rims of olivine.
Stilpnomelane(?)	2	Olivine.			Inner cores of replaced olivine.
Magnetite	1	Olivine.			Opaque rims around replaced olivine.

**COMMENTS:** Identification of stilpnomelane is tentative. A green, brownish-yellow pleochroic mineral is commonly present at the cores of many replaced olivine(?) phenocrysts. The out rims are surrounded by talc and armoring of secondary magnetite. This mineral is uniaxial negative, with high second order birefringence. The presence of 2 orthogonal cleavages supports the identification as stilpnomelane as opposed to biotite. Presence of high temperature K-bearing phases is unusual in ocean floor rocks, in which K is normally quantitatively stripped at elevated temperatures (>200°C). This may indicate a secondary event of hydrothermal activity that overprints seafloor (low-temperature) weathering, resulting in K-enriched basalts.

**169-1037B-58R-1, Piece 6 (61-64 cm)****Thin section:** #75**ROCK NAME:** Fine-grained basalt.**GRAIN SIZE:** Microcrystalline to fine-grained (seriate).**TEXTURE:** Intersertal to subophitic.

PRIMARY MINERALOGY PHENOCRYSTS	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	COMMENTS
Plagioclase	10	10	1-2	Laths, acicular.	Generally fresh, some corroded margins.
Olivine (?)	Tr	5	0.5-1	Prismatic.	Trace of remnant grains, altered to green mica, amphibole, talc, agetite, amorphous silica(?), calcite.
GROUNDMASS					
Plagioclase	40	40	0.04-1	Laths, acicular.	Fresh, minor clay alteration along cracks.
Clinopyroxene	5	15	0.04-1	Ophitic, subhedral.	Mostly altered to amphibole.
Magnetite	7	5	0.01-0.1	Granular, acicular.	Commonly in orthogonal or 120° criss-cross pattern.
Mesostasis	10-25	25			Amphibole, secondary magnetite.
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING			COMMENTS
Actinolitic hornblende	10-35	Clinopyroxene, mesostasis.			
Iron-oxyhydroxides/ Clay minerals	5-10	With amphibole, after olivine and groundmass.			
Talc	Trace	Olivine.			
Magnetite	7	Mesostasis, olivine.			
Calcite	Trace	Olivine.			
Amorphous silica	Trace	Olivine.			
VESICLES/ CAVITIES	PERCENT	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	1	1	Amphibole.	Rounded.	Filled with actinolitic hornblende.

**COMMENTS:** Thin section crosscut by two thin (<0.5 mm) actinolitic-hornblende veinlets with a 1-2 mm envelope of amphibole- and iron-oxyhydroxide-rich groundmass, altered clinopyroxene and olivine phenocrysts.

*N.B. - Each side of the chilled margin is described separately.*

**169-1037B-58R-2, Piece 3 (21-24 cm), first half**

Thin section: #76

**ROCK NAME:** Chilled margin between cryptocrystalline plagioclase-olivine basalt and microcrystalline to fine-grained plagioclase-olivine-phyric basalt

**ROCK NAME:** Plagioclase-olivine-phyric basalt

**GRAIN SIZE:** Cryptocrystalline-glassy.

**TEXTURE:** Porphyritic, quenched.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>					
Plagioclase	20	20	0.1-2	Laths.	
Olivine	4	5	0.5-1	Sub- to euhedral.	Rims of Fe(O,OH) <sub>x</sub> and clays.
<b>GROUNDMASS</b>					
Mesostasis	73			Quenched to variolitic.	Varioles along chill, incipient plagioclase and clinopyroxene.
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING			COMMENTS
Amphibole	3	Olivine, vesicles.			With Fe(O,OH) <sub>x</sub> .
VESICLES/ CAVITIES	PERCENT	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	2	0.2-1	Amphibole.	Rounded.	More common towards chill.

**COMMENTS:** Varioles along chilled margin. A number of very fine (0.1 mm) amphibole veins along margin and into the quench zone. Quenched zone approximately 2 mm wide.

**169-1037B-58R-2, Piece 3 (21-24 cm), second half**

Thin section: #76

**ROCK NAME:** Plagioclase-olivine-phyric basalt.

**GRAIN SIZE:** Microcrystalline to fine-grained

**TEXTURE:** Intersertal.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>					
Plagioclase	15	15	0.4-2	Prismatic.	Glomerocrystic.
Olivine	1	3	0.2-0.5	Subhedral.	With plagioclase. Mostly rimmed and corroded by amphibole.
<b>GROUNDMASS</b>					
Plagioclase	25	25	0.04-0.4		
Clinopyroxene	10-25	25	0.04-0.5	Stubby, ophitic.	
Magnetite	5	5	0.01-0.08	Granular or acicular.	
Mesostasis	10-25	25		Irregular patches.	Irregular patches (>1 mm).
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING			COMMENTS
Actinolite	15-30	Mesostasis, olivine, clinopyroxene, veins, vesicles.			Probably with associated clay minerals and Fe(O,OH) <sub>x</sub> .
Calcite	Trace	Olivine cores.			
VESICLES/ CAVITIES	PERCENT	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	2	0.5-1	Actinolite	Subrounded.	

**COMMENTS:** A number of 0.5 mm amphibole veins. This side of the chilled margin is also finer grained towards the chill and apparently quenched. Quenched zone 1-2 mm wide. Some merging of magmas?

**169-1037B-58R-2, Piece 9b (65-70 cm)****Thin section:** #77**ROCK NAME:** Plagioclase-olivine-phyric basalt.**GRAIN SIZE:** Cryptocrystalline-glassy.**TEXTURE:** Porphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>					
Plagioclase	15	15	0.1-2.5	Acicular laths.	Scattered throughout groundmass, commonly glomerocrystic.
Olivine	2	4	0.5-1	Stubby, prismatic.	Mostly fresh; commonly with red ragged alteration rims (Clays + Fe(O,OH)x(?)).
<b>GROUNDMASS</b>					
Mesostasis	76	76		Glassy, varioles.	Glassy to cryptocrystalline. Incipient crystals of plagioclase.
Magnetite	5	5	0.01-0.03	Granular.	
<b>SECONDARY MINERALOGY</b>					
Actinolite	}	PERCENT	<b>REPLACING/ FILLING</b>		<b>COMMENTS</b>
Clays					
Talc					
Fe(O,OH)x					
					All minerals are after olivine, replacing mesostasis and filling veins, irregular patches, and vesicles.
<b>VESICLES/ CAVITIES</b>					
Vesicles	PERCENT	SIZE (mm)	FILLING	SHAPE	COMMENTS
	2	0.5-1	Actinolite.	Subrounded to irregular.	

**COMMENTS:** Thin (0.1-0.5 mm) actinolite vein cuts across section; margin of discontinuous magnetite grains. Vein pinches and swells along length, necking at sinistral jogs and dilating on length sections in between.

**169-1037B-60R-1, Piece 11c (118-125 cm)****Thin section:** #78**ROCK NAME:** Fine-grained basalt (N.B. desiccating rock).**GRAIN SIZE:** Fine-grained.**TEXTURE:** Intersertal to subophitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	COMMENTS
<b>GROUNDMASS</b>					
Plagioclase	40	40	0.04-3	Laths.	Plagioclase framework, commonly radiating.
Clinopyroxene	20-33	33	0.05-2	Subophitic, prismatic.	Generally fresh or altered to actinolite.
Olivine (?)	0	2	0.2-0.8	Prismatic.	Completely altered to clays, micas, talc, amphibole, and Fe(O,OH)x.
Magnetite	5	5	0.01-0.05	Granular.	
Mesostasis	0	10			Irregular interstitial patches altered to clay minerals and actinolite.
<b>SECONDARY MINERALOGY</b>					
Actinolite	}	PERCENT	<b>REPLACING/ FILLING</b>		<b>COMMENTS</b>
Clays					
Fe(O,OH)x					
Talc					
					All Minerals 15-30 After groundmass, filling vesicles and replacing olivine and clinopyroxene.
<b>VESICLES/ CAVITIES</b>					
Vesicles	PERCENT	SIZE (mm)	FILLING	SHAPE	COMMENTS
	10	0.5-3	Fibrous amphibole.	Subrounded to irregular	

**COMMENTS:** This sample is from the zone of unusual desiccation, where on drying coherent pieces of basalt collapsed into flaky powder. The reason for the decay is still not obvious from this section, though large portions of the slice are completely plucked out. Presumably plucking is most intense in regions that were most altered. XRD confirms presence of smectite in rock.

**169-1037B-61R-1, Piece 2 (104-112 cm)****Thin section:** #79**ROCK NAME:** Plagioclase-clinopyroxene-olivine basalt**GRAIN SIZE:** Fine- to medium-grained.**TEXTURE:** Intersertal to ophitic, diabasic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	COMMENTS
Plagioclase	47	48	0.2-3	Laths, prismatic.	Rare, anhedral plagioclase co-crystallized with clinopyroxene.
Clinopyroxene	25-30	37	0.2-3	Subhedral, ophitic.	Generally fresh.
Olivine	1	5	0.2-1	Prismatic.	Mostly altered, some relict cores.
Magnetite	5	5	0.05-1	Subhedral, prismatic.	
Mesostasis	0	5			

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clay minerals + Fe(O,OH)x Talc	} 5-15 }	Mesostasis, olivine, some clinopyroxene.	

VESICLES/ CAVITIES	PERCENT	SIZE (mm)	FILLING	SHAPE	COMMENTS
Vesicles	1				

**COMMENTS:** Generally a very fresh rock. Some alteration of groundmass, olivines, and clinopyroxenes.**169-1037B-62R-1, Piece 5b (126-128 cm)****Thin section:** #80**ROCK NAME:** Plagioclase-clinopyroxene diabase**GRAIN SIZE:** Medium-grained.**TEXTURE:** Ophitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	COMMENTS
Plagioclase	47	48	0.5-4	Laths.	
Clinopyroxene	15-25	37	0.2-3	Ophitic.	
Olivine	0	3	0.2-0.5	Prismatic.	Altered to green-brown pleochroic mica.
Magnetite	5	5	0.05-3	Granular, needles.	
Mesostasis	0	7			Altered to secondary minerals.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clay minerals ±Fe(O,OH)x Actinolite Green mica Talc	} 20-30 } } } }	Olivine(?), clinopyroxene (partial), mesostasis.	

**169-1037B-62R-3, Piece 6 (82-86 cm)****Thin section:** #81**ROCK NAME:** Plagioclase-clinopyroxene-olivine basalt**GRAIN SIZE:** Medium- to coarse-grained.**TEXTURE:** Holocrystalline; microgabbroic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	MORPHOLOGY	COMMENTS
Plagioclase	40	41	0.5-5	Laths.	
Clinopyroxene	45	47	0.5-6	Large subhedral patches.	
Olivine	2	5	0.2-1	Prismatic.	Partly to completely altered to secondary minerals.
Magnetite	4	5	0.2-1	Euhedral.	Some Fe(O,OH)x.
Mesostasis	0	2		Interstitial patches.	Completely altered to secondary minerals.

SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING	COMMENTS
Clay minerals +Fe(O,OH)x Talc	} 10-20 } }		

**COMMENTS:** Coarse-grained basalt. Beyond ophitic in texture. Clinopyroxene now makes up the structure of the rock with plagioclase laths isolated within large clinopyroxene grains. A "microgabbro."