

168-1025B-11X-CC (Piece 2, 028-040 cm)

ROCK NAME: Aphyric plagioclase-pyroxene-olivine basalt
 GRAIN SIZE: Aphanitic: microcrystalline
 TEXTURE: Sheaf-spherulitic to intersertal.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	Tr	Tr	0.1-0.4		Sub- to euhedral	Replaced by secondary minerals.
Plagioclase	Tr	Tr	≤0.8		Euhedral laths	Unzoned to oscillatory zoned.
Clinopyroxene	Tr	Tr	0.8		Euhedral	One crystal, attached to a plagioclase lath.
GROUNDMASS						
Plagioclase	14.0	14.0	0.1-0.2		Microclitic laths	Equant and elongate laths, commonly hollow and skeletal; radiating clusters intergrown with clinopyroxene and/or olivine.
Olivine	0.0	2.0	0.1-0.4		Subhedral-euhedral	See comments above.
Clinopyroxene	9.4	9.4	0.1-0.2		Anhedral granular	Intergrown with radiating plagioclase.
Mesostasis	71.4	71.4				Sheaf-spherulitic plagioclase and clinopyroxene with interstitial skeletal magnetite (10-20 microns across) and numerous 2-10 microns (and one 250 microns) diameter pyrite globules.
Pyrite/pyrrhotite	Tr	Tr	≤0.02		Granular	In mesostasis; one grain, 0.12mm across, is a lamellar pyrite-pyrrhotite(? , anisotropic) intergrowth.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Clay	2.0	Olivine, veinlets and vesicles.		Mg-saponite + celadonite	Fibrous.	Olivine is apparently completely replaced by green-orange clay followed by pale brown clay; veinlets are several microns wide and filled with pale green to green-orange clay; whilst vesicles are thinly lined by pale brown to colorless clay.
VESICLES/CAVITIES						
	PERCENT	DISTRIBUTION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
Vesicles	2.2	Even	0.2-0.6	Clay lining	Round to irregular.	

COMMENTS:

168-1025B-11X-CC (Piece 3, 028-040 cm)

ROCK NAME: Sparsely phyric plagioclase-pyroxene-olivine basalt

GRAIN SIZE: Aphanitic: microcrystalline to cryptocrystalline

TEXTURE: Variolitic to subvariolitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0.0	1.0	0.2-0.4		Euhedral	Replaced by secondary minerals.
Plagioclase	0.6	0.6	≤1.5		Subhedral laths	Normal zoning and rare oscillatory zoning. Some have straight edges whilst others appear to be partially resorbed with respect to groundmass glass.
Clinopyroxene	0.2	0.2	1.9		Euhedral	One crystal; simply zoned and twinned, partially encloses plagioclase phenocrysts; the rim encloses euhedral plagioclase and magnetite microlites.
Pigeonite	0.8	0.8	0.1-0.3		Euhedral	Concentrated in one area of the thin section (could potentially be cpx). Low birefringence, biaxial positive 2V~30°.
GROUNDMASS						
Plagioclase	9.0	9.0	0.1-0.2		Microlite laths	Hollow, swallowtail and skeletal; radiating clusters intergrown with clinopyroxene.
Olivine	0.0	0.2	0.2-0.4		Euhedral	See comments above
Clinopyroxene	5.6	5.6	≤0.1		Euhedral to equant	Individual crystals and granular aggregates with plagioclase and altered olivine.
Mesostasis	80.4	80.4				Subvariolitic. Trace amount of pyrite globules (≤20 microns).
Glass	0.8	0.8				Fresh quenched margin (1-2mm thick) with varioles. Medium to dark brown.
Pyrite	Tr	Tr	≤0.05		Granular	In mesostasis, plagioclase.
Chalcopyrite	Tr	Tr	≤0.05		Granular	In mesostasis.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite	1.2	Olivine, veinlets and vesicles			Fibrous to granular	Olivine is replaced by granular to fibrous green-orange to yellow-brown clay. Veinlets (≤30 microns wide) are filled with pale brown clay. Vesicles are thinly lined by brown-orange clay followed by pale brown clay.
Iddingsite	Tr	Olivine, veinlets and vesicles				One vesicle is thickly lined with iddingsite followed by green-orange clay followed by pale clay.
Calcite	Tr	Olivine				
Pyrite	Tr	Clay veins and vesicles	0.1-0.2			Concentrated near the glassy rim. Also occurs along microcracks and some vesicles. Postdates the clay linings of vesicles.
VESICLES/CAVITIES						
	PERCENT	DISTRIBUTION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
Vesicles	1.4		0.1-0.2			

COMMENTS:

168-1025C-1R-01 (piece 3, 15-20cm)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Aphanitic; cryptocrystalline

TEXTURE: Intersertal; vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	Tr	Tr	≤1.4		Euhedral	Simply zoned.
GROUNDMASS						
Plagioclase	24.3	24.3	0.2-0.6		Euhedral-subhedral	Present as euhedral-subhedral laths, as well as quench crystals (swallowtails, hollow crystals etc.).
Olivine	0	2.4	0.1-0.3		Euhedral	Completely replaced by clay (saponite?).
Clinopyroxene	16.3	16.3	0.1-0.3		Anhedral	Anhedral intergrowths with plagioclase.
Opaque oxide	1.8	1.8	≤0.1		Skeletal	Present in the mesostasis.
Pyrite	Tr	Tr	≤0.005		Blebs	Occurs as round globules inside plagioclase crystals and the mesostasis.
Mesostasis	52.3	54.9				Cryptocrystalline mass.
SECONDARY MINERALOGY						
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite	5.2	Olivine; mesostasis; vesicles				Pseudomorphs olivine microphenocrysts; lines vesicles (0.005-0.02mm layers).
Pyrite	Tr	Vesicles				Very thin (≤0.003mm) partial vesicle lining before clay in one vesicle.
VESICLES/ CAVITIES						
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
Gas vesicles	0.4	Even	≤0.3	None	Round	
Segregation vesicles	0.4	Even	≤0.5	Mesostasis	Round	

COMMENTS:

168-1025C-1R-01 (piece 8, 48–59cm)

ROCK NAME: Aphyric basalt (from near quenched margin)

GRAIN SIZE: Aphanitic; cryptocrystalline

TEXTURE: Locally glomeroporphyritic; quench microphenocrysts in intersertal mesostasis.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	1	1	0.5-0.8		Euhedral	Single laths isolated in mesostasis and associated with small agglomerates of granular pyroxene; present as glomerocrysts.
GROUNDMASS						
Plagioclase	7.3	7.3	≤0.6 (Ave 0.3)		Euhedral-subhedral	Present as euhedral-subhedral laths and stubby crystals, as well as quench crystals (swallowtails, hollow crystals etc.). Occurs as single grains or within glomerocrysts with pyroxene.
Olivine	0	1.3	0.2-0.4		Euhedral	Completely replaced by clay (saponite?). The crystals are present as pseudomorphed outlines ± bands of fibrous-granular clay within an otherwise empty shape.
Clinopyroxene	4.3	4.3	0.1-0.3		Euhedral-anhedral	Present as euhedral microphenocrysts as well as anhedral intergrowths with plagioclase.
Pyrite/Pyrrhotite	Tr	Tr			Skeletal-anhedral	Occurs as discrete skeletal laths (≤0.06mm), round globules inside plagioclase crystals and angular grains in the mesostasis.
Mesostasis	86.1	86.1				Varies from dense, brown sub-isotropic material, to a gray-brown cryptocrystalline mass.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Clays	1.3	Olivine				Pseudomorphs olivine microphenocrysts; most has been ground away during polishing, although a fine lining is still present along the grain boundary.
Pyrite	Tr	Mesostasis; olivine				Forms granular grains in mesostasis, as well as occurring within the clay pseudomorphing olivine.
VESICLES/CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
Gas vesicles	0.9	Even	≤0.35	None	Round	

COMMENTS: The mesostasis texture varies from being dense and sub-isotropic at the quenched margin, passing down into a subvariolic section with a weak honeycomb to sheaf-spherulitic texture. Around 37% of all phenocrysts and groundmass minerals are part of glomerocrysts.

168-1025C-1R-02 (piece 3, 16–20cm)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Aphanitic; microcrystalline

TEXTURE: Intergranular-intersertal; vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	Tr	0.3-0.5		Euhedral	Completely replaced by cryptocrystalline brown clay (saponite?).
Plagioclase	1.1	1.1	0.5-0.8		Anhedral - subhedral	Stubby, irregular crystals exhibiting simple zoning.
GROUNDMASS						
Plagioclase	43.2	43.2	0.2-0.5 (Ave 0.4)		Subhedral-anhedral	Elongate laths; majority of crystals are subhedral, forming a network of laths as well as stellate clusters. Some hollow/skeletal small laths occur.
Olivine	0	1.8	≤0.2		Euhedral-subhedral	Completely altered to cryptocrystalline brown clay (saponite?). Occur interstitially to plagioclase. Minor opaque inclusions occur in some grains.
Clinopyroxene	28.4	28.4	0.15-0.4 (Ave 0.2)		Subhedral-anhedral	Pale brown color in PPL; occurs interstitially to plagioclase laths, as well as at the center of stellate plagioclase clusters. Some grains contain minor opaque inclusions.
Opaques	9.1	9.1	≤0.2 (Ave 0.05)		Euhedral-skeletal	Majority of opaques are magnetite and ilmenite (≤0.2mm), along with a trace amount of pyrite (≤0.03mm), occurring as discrete grains and small rods (≤0.04mm) in the mesostasis. Ilmenite typically forms skeletal laths.
Mesostasis	3.1	13.2				Occur as irregular gray-brown cryptocrystalline patches with minor feathery px(?) plumes.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite	15.1	Olivine; vesicles				Brown, cryptocrystalline to fibrous; completely pseudomorphs olivine and lines vesicles.
Zeolite	Tr	Vesicles				Forms small (≤0.09mm), euhedral, colorless crystals ± a fine (≤0.05mm) band infilling parts of some vesicles. The zeolite has then been sequentially lined by pale brown fibrous saponite.
Pyrite	Tr	Vesicles				Occurs as discrete grains (c.0.001mm) within the clay lining of vesicles.
VESICLES/CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
Gas vesicles	6.4		0.6-1.6	Clay	Round	Majority of round vesicles are lined by a ≤0.05mm layer of fibrous saponite.
Vesicles/cavities	1.6		0.3-0.7	Clay + zeolite	Irregular - ovoid	Many contain a partial fill of mesostasis ± a ≤0.05mm layer of zeolite ± euhedral zeolite crystals in clay ± a ≤0.05mm layer of fibrous saponite.

COMMENTS:

168-1025C-2R-01 (piece 17, 143-147cm)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Aphanitic, microcrystalline

TEXTURE: Intergranular, locally intersertal

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	0.2	0.2	0.6-1.4		Euhedral	Stubby laths in monomineralic glomeroporphyritic clots; strongly zoned at edges.
GROUNDMASS						
Plagioclase	45.8	48.6	0.5-1.0		Subhedral-anhedral	Microlaths; strongly zoned.
Olivine	0	3.6	0.5-1.2		Euhedral-subhedral	Partially encloses plagioclase + clinopyroxene clots; completely replaced by brown clay (saponite).
Clinopyroxene	27.1	27.1	0.3-0.5		Euhedral-anhedral	Intergranular, occurring as discrete (0.3-0.5mm) grains, as well as a granular mass (≤ 0.1 mm) within glomeroporphyritic clots with plagioclase laths.
Magnetite	7.2	7.2	0.05-0.3 (Ave 0.1)		Anhedral	Scant lamellae of ilmenite enclosed in magnetite grains.
Pyrite/pyrrhotite	Tr	Tr	0.03-0.05		Anhedral-globular	Accounts for c.10% of all opaque grains.
Mesostasis	0	13.3				Interstitial aggregates of microcrystalline to cryptocrystalline material with microcrysts of plagioclase + opaques + clay; some feathery cryptocrystalline plumes (cpx?).
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite (brown)	19.7	Olivine; mesostasis, skeletal plagioclase				Dark olive brown, massive clay with masked interference colors; granular to cryptocrystalline texture.
Saponite (green)	Tr	Olivine; mesostasis				Pale yellow-green; fibrous to granular, surrounds brown saponite-replaced olivine microphenocryst.
VESICLES/ CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
None						
COMMENTS:	Some pale yellow-green clay (saponite?) occurs in one corner forming a band around some mesostasis and an olivine microphenocryst which have been replaced by brown saponite.					

168-1025C-2R-02 (piece 11b, 139–142cm)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained.

TEXTURE: Intersertal to intergranular.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	Tr	Tr	0.6-1.6		Euhedral	Stubby laths (much less elongate than groundmass laths); strongly zoned.
GROUNDMASS						
Plagioclase	40.6	40.6	0.2-1.2		Subhedral-anhedral	Microlaths and prisms; strongly zoned.
Olivine	0	3.6	0.1-0.4		Euhedral-subhedral	Completely replaced by olive-brown clay (saponite).
Clinopyroxene	27	28.6	0.1-0.3		Anhedral-subhedral	Intergranular, occurring as discrete grains.
Opaques	7.8	7.8	0.05-0.3		Skeletal-subhedral	Interstitial magnetite/maghemite + some globular sulfides.
Mesostasis	1.9	19.4				Interstitial; mostly replaced by clay.
SECONDARY MINERALOGY						
SECONDARY MINERALOGY	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite	22.7	Olivine; mesostasis				Massive to cryptocrystalline aggregates.
Carbonate	Tr	Olivine				
Quartz		Vein				Not included in point count; chalcedony to drusy quartz.
Pyrite	Tr					Associated almost exclusively with clay alteration.
VESICLES/ CAVITIES						
VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
None						

COMMENTS: Composite vein (1.5mm) with orange-brown mixture of clay and iddingsite in the outer rim of the vein, and quartz in the center. Quartz occurs as aggregates of euhedral crystals increasing in size towards the middles of open vugs. In these, chalcedonic quartz forms near the margin, changing to euhedral and drusy quartz in the middle (≤ 0.3 mm). Patches (0.2-0.3mm) of pale brown clay are mixed with the quartz. Spots of dark orange iddingsite are widespread within the veins.

168-1025C-2R-04 (piece 12, 54-58cm)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Aphanitic, cryptocrystalline to microcrystalline

TEXTURE: Hypocrystalline; intersertal; patches of sheaf-spherulitic to plumose mesostasis.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	Tr	0.4-0.8 (Ave 0.6)		Euhedral	Completely replaced by fibrous brown clay (saponite?). The clay preserves the outline of the crystals as well as forming fibrous bands within the crystal (following fracture planes?).
Plagioclase	Tr	Tr	0.6-1.6 (Ave 0.8)		Euhedral	Laths and stubby crystals occur singly and within crystal clots; minor simple zoning.
GROUNDMASS						
Plagioclase	26.4	26.4	0.1-0.6 (Ave 0.2)		Subhedral-anhedral	Forms microphenocrysts which occur singly and within stellate clusters.
Olivine	0	0.8	≤0.2 0.2-0.3 (Ave 0.2)		Euhedral Euhedral	Forms whole and quenched (swallowtail; hollow) microlaths and microlites. Completely replaced by brown clay (see comments above).
Clinopyroxene	22	22	0.1-0.3 (Ave 0.1)		Anhedral-subhedral	Occurs singly and at the center of microglomeroporphyritic clots of plagioclase + opaques; some bowtie structures with plagioclase.
Opaques	4.6	4.6	0.01-0.08 (Ave 0.05)		Euhedral-skeletal	Mostly magnetite plus some minor pyrite (≤0.04mm); some skeletal laths of magnetite (ilmenite?) extend up to 0.15mm.
Mesostasis	36	45.2				Brown, intersertal, cryptocrystalline patches. Some areas have a sheaf-spherulitic ± plumose texture, with feathery plumes of cryptocrystalline cpx(?).
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite	10	Olivine; vesicles; mesostasis				Brown, fibrous; replaces olivine and partially lines vesicles. Some vesicles contain rods of saponite (fibers extend perpendicular to rod axis), extending into the center of the vesicle.
Carbonate	Tr	Vesicles				Aragonite needles (≤0.28mm long) extend into the center of some vesicles. These needles are lined by fine fibers of saponite.
Zeolites	Tr	Vesicles				Forms a discontinuous layer (≤0.01mm thick) of blocky crystals at the outer edge of some vesicles, which has then been coated by a layer of fibrous clay (saponite?)
VESICLES/CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
Gas vesicles	1		0.3-0.5	Clay ± carbonate	Round-irregular	Lined by ≤0.03mm fibrous saponite ± rods of saponite extending into center. Some have semicircular stellate clusters of aragonite needles attached to the rim.
Segregation vesicles	Tr		≤0.4	Mesostasis ± clay	Round	Partially to completely filled by mesostasis ± opaque rods. Partially filled vesicles have ≤0.02mm layer of fibrous saponite after the mesostasis fill.

COMMENTS: Irregular gas vesicles/cavities (≤0.8mm) are empty.

168-1025C-3R-01 (piece 5, 19–27cm)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Aphanitic to fine grained.

TEXTURE: Hypocrystalline; intersertal; sheaf-spherulitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	0.2	0.2	0.4-1.6 (Ave 0.8)		Euhedral-subhedral	Laths and stubby crystals; some oscillatory zoning.
GROUNDMASS						
Plagioclase	18.4	18.4	0.05-0.6 (Ave 0.3)		Subhedral-skeletal	Micro-laths and microlites, plus some quench crystals form patches of intersertal texture; granular pyroxene commonly occurs the edges of the large plagioclase
Olivine	0	2.2	0.15-0.4 (Ave 0.25)		Euhedral-subhedral	Completely replaced by brown-green granular to fibrous saponite; center of all grains have been plucked out (by polishing?).
Clinopyroxene	15	15	0.05-0.3 (Ave 0.2)		Subhedral-anhedral	Present as discrete subhedral (0.1-0.3mm) crystals, granular (≤ 0.05 mm) grains in the groundmass and granular crystals (0.05-0.15mm) in glomeroporphyritic clots.
Opaques			0.01-0.1 (Ave 0.05)		Granular-skeletal	(Abundance has been included in mesostasis count.) Mostly magnetite with minor granular and globular pyrite (≤ 0.01 mm), disseminated throughout the groundmass and within and between crystals.
Mesostasis	63.2	63.2				Feathery sheafs of cryptocrystalline material (cpx?), as well as dark brown, massive areas; forms patches throughout the section.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite	2.2	Olivine; vesicles				Massive saponite is brown; fibrous saponite is brown-green. Massive saponite replaces the margins and along fractures in olivine, whilst fibrous saponite replaces the center of olivine and lines vesicles.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
Gas vesicles	1	Even	0.4-0.5	Clay	Round-ovoid	Lined by fibrous brown-green saponite (≤ 0.04 mm layers).
Segregation vesicles	(incl. above)	Even	≤ 0.6	Mesostasis + clay	Round	Partially to completely filled by mesostasis. Partially filled vesicles have gas bubble inside lined by fibrous saponite, as above.

COMMENTS: A continuum exists between the segregation and gas vesicles from: i) completely filled segregation vesicles, filled by mesostasis + opaque needles + microlites of plagioclase + pyroxene; ii) partially filled segregation vesicles, as in (i); iii) geopetel infills of mesostasis (≤ 0.1 mm thick) within vesicles, most of which occur at base of vesicle according to the way-up direction on the section (some however, are discordant). The geopetel infill and rest of the vesicle is then lined by a ≤ 0.04 mm layer of fibrous brown-green saponite; and iv) empty gas vesicles, lined by a ≤ 0.04 mm layer of fibrous brown-green saponite. Minor crystal clots of plagioclase + pyroxene occur within the section.

168-1025C-3R-01 (piece 7, 30-34cm)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Aphanitic; cryptocrystalline.

TEXTURE: Intersertal; hyalopilitic

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	0.4	0.4	≤1.7		Euhedral-subhedral	Stubby laths; weak zoning.
GROUNDMASS						
Plagioclase	9.9	9.9	0.1-0.7 (Ave 0.3)		Subhedral-skeletal	Microlaths and microlites, plus some quench crystals.
Olivine	1	2.2	0.1-0.3		Euhedral	Partially replaced by brown saponite and carbonate.
Clinopyroxene	4	4	0.1-0.3		Anhedral	Intergrown with plagioclase.
Opaques	0.8	0.8	≤0.01		Granular-skeletal	Mostly magnetite with minor pyrite/pyrrhotite disseminated throughout the groundmass.
Mesostasis	82.1	82.1				Cryptocrystalline material with granular pyroxene + opaques.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite	1.4	Olivine; vesicles				Filamentous, open mats partially fill vesicles and replace olivine.
Carbonate	Tr	Olivine				
Pyrite/pyrrhotite	Tr	Vesicles				Associated with clay; ≤0.03mm composite grains.
VESICLES/CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
Gas vesicles	0.8	Even	≤0.6	Filamentous clay	Round	

COMMENTS:

168-1025C-4R-01 (piece 4, 19–27cm)

ROCK NAME: Aphyric pyroxene-plagioclase-olivine basalt

GRAIN SIZE: Aphanitic: microcrystalline to cryptocrystalline.

TEXTURE: Intersertal to intergranular; vesicular.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	Tr	Tr	≤0.75 (Ave 0.6)		Subhedral-euhedral stubby laths	Strong zoning which may be oscillatory. Many euhedral phenocrysts have subhedral to oval shaped cores.
GROUNDMASS						
Plagioclase	26	26	≤0.6		Subhedral-anhedral laths	Seriate texture; hollow and swallowtail crystals are common.
Olivine	0	2.2	0.25-0.4 (Ave 0.3)		Euhedral	Totally replaced by pale brown clay (saponite), with a granular to fibrous texture.
Clinopyroxene	32.2	32.2	0.05-0.2		Subhedral-anhedral	Granular grains, intergrown with plagioclase, as well as intergranular grains.
Opaque oxides	7.8	7.8	≤0.1 (Ave 0.05)		Anhedral-skeletal	Isotropic; magnetite ± maghemite (based on palaeomagnetism).
Pyrite	Tr	Tr	≤0.03		Globular	Globules in the mesostasis.
Mesostasis	26.8	30.4				Cryptocrystalline with granular cpx(?) + opaque rods and dendrites; patchy alteration to brown clay (saponite?).
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite	5.8	Olivine; vesicles; mesostasis				Brown granular saponite and olive to tan brown fibrous saponite are present replacing olivine and patches of mesostasis, and lining the vesicles (see below).
Pyrite	Tr	Vesicles; olivine				Occurs as globular grains within clay replacing olivine, as well as in the clay which lines some vesicles.
VESICLES/CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
Gas	1.4	Even	0.2-0.75	Clay	Round	Thinly lined by fibrous clay.
Segregation	Tr	Even	0.4-0.5	Mesostasis	Round	Varying from partial (meniscus) fill to completely filled.
Cavities	Tr	Even	≤0.5	Clay	Irregular	Thinly lined by fibrous clay, identical to the gas vesicles. One cavity is connected to a vesicle by a tiny inlet.

COMMENTS: The typical vesicle/cavity lining consists of a 0.015mm layer of dark brown fibrous clay (with dark brown-orange birefringence), followed by a <0.005mm layer of pale tan brown fibrous clay (first order birefringence). Pyrite is generally absent, although one or two grains were observed in the mesostasis layer underlying the clay.

168-1025C-4R-01 (piece 16a, 123-125cm)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Aphanitic: microcrystalline to fine grained.

TEXTURE: Intergranular to intersertal.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
None						
GROUNDMASS						
Plagioclase	42.8	42.8	0.3-1.5 (Ave 0.3)		Subhedral	Elongate laths; strongly zoned.
Olivine	Tr	2.4	0.1-0.3 (Ave 0.3)		Subhedral	Completely to partially replaced by massive to cryptocrystalline olive-brown to olive-green clay; some relict, fresh olivine remains in a few grains.
Clinopyroxene	31.4	31.4	0.1-0.6 (Ave 0.2)		Anhedral-subhedral	Intergranular.
Opaques	6.2	6.2	0.05-0.5 (Ave 0.2)		Euhedral-anhedral	Mostly subhedral magnetite, with a trace amount of globular pyrite/pyrrhotite. Pyrite/pyrrhotite is only present within the mesostasis.
Mesostasis	4.3	17.2				Interstitial cryptocrystalline brown-gray material partially altered to brown clay (saponite?).
SECONDARY MINERALOGY						
Clay (saponite?)	PERCENT 15.3	REPLACING/ FILLING Olivine; mesostasis				COMMENTS: The saponite is more massive and olive-green to brown when replacing olivine, compared to that which replaces the mesostasis, where it is fibrous and brown-gray.
VESICLES/CAVITIES						
None	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:

COMMENTS:

168-1025C-4R-03 (piece 1d, 24-28cm)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Aphanitic: microcrystalline to fine grained.

TEXTURE: Intergranular to intersertal.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Plagioclase	Tr	Tr	0.6-1.6 (Ave 0.8)		Euhedral-subhedral	Mostly euhedral laths + stubby crystals; simple zoning.
GROUNDMASS						
Plagioclase	37.4	37.4	0.2-0.7 (Ave 0.45)		Euhedral-subhedral	Elongate laths form an intergranular network; some simple zoning.
Olivine	0	2.8	0.2-0.4 (Ave 0.2)		Euhedral	Completely replaced by cryptocrystalline brown-green saponite. Some crystals contain an abundance of ≤ 0.02 mm blebs of opaques.
Clinopyroxene	35.6	35.6	0.1-0.4 (Ave 0.2)		Subhedral-anhedral	A few euhedral crystals; glass inclusions occur in some crystals forming trails parallel to the crystal margins, or irregular patches within the core.
Opaques	8.8	8.8	≤ 0.3 (Ave 0.2)		Euhedral-anhedral	Majority are magnetite, some of which are euhedral and skeletal. There is also a trace amount of globular pyrite (≤ 0.04 mm) within the mesostasis.
Mesostasis	3.7	15.4				Brown-gray cryptocrystalline material; partially replaced by saponite.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite	14.1	Olivine; mesostasis				Brown-green to brown-gray cryptocrystalline clay replacing olivine and interstitial mesostasis material, respectively.
Carbonate	Tr	Olivine				Accessory to saponite, replacing olivine.
Zeolites	0.4	Mesostasis				Clear, fibrous aggregates replace interstitial mesostasis (\pm olivine), enclosing 0.002-0.005mm anhedral sulfide grains.
VESICLES/ CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
None						

COMMENTS:

168-1025C-5R-01 (piece 7, 38-42cm)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Fine grained.

TEXTURE: Intergranular to intersertal; vesicular

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
Olivine	0	0.7	≤1.6 (Ave 1.2)		Subhedral-euhedral	Completely replaced by fibrous saponite ± talc (only near talc vein).
Plagioclase	0.5	0.5	0.8-1.2 (Ave 0.8)		Anhedral-subhedral	Stubby crystals and laths; some simple zoning.
GROUNDMASS						
Plagioclase	39.4	39.4	0.2-0.8 (Ave 0.4)		Subhedral laths	Minor parallel orientation perpendicular to the way up. Some stellate clusters with pyroxene at core.
Olivine	0	3.5	0.2-0.4 (Ave 0.4)		Subhedral-interstitial	Completely replaced by fibrous-granular olivine-brown saponite ± fibrous talc ± zeolites.
Clinopyroxene	26.4	26.4	0.1-0.4 (Ave 0.3)		Subhedral-anhedral	Grains occur singly and intergrown with plagioclase; interstitial.
Opaque oxides	9.2	9.2	0.02-0.1 (Ave 0.04)		Subhedral-anhedral	Occur in groundmass + pyroxene + olivine; contain lamellae of ilmenite.
Opaque sulfides	Tr	Tr	0.3-0.5 (Ave 0.3)		Subhedral-anhedral	Occurs in groundmass; one grain has a triangular 0.05mm chalcopyrite grain in it.
Mesostasis	0	20.3				Interstitial, all replaced by brown to olive brown saponite + colorless zeolite ± chlorite/smectite.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite	24.5	Olivine; mesostasis				Brown to olive-brown color; fibrous to granular. Only replaces pyroxene next to talc-filled fracture.
Zeolites	Tr	Mesostasis ± olivine				Forms colorless, spherulitic masses, replacing the mesostasis ± olivine. 0.005-0.015mm opaque oxides are held in zeolite.
Chlorite/smectite	Tr	Mesostasis				Blue-green fibrous patches in the mesostasis; blue-gray birefringence.
Talc	Tr	Vein; olivine				Small patch in fracture; fibrous. Also replaces olivine near the fracture.
Pyrite/Pyrrhotite	Tr	Vesicles				≤0.4mm subhedral-anhedral grains in some vesicles.
VESICLES/ CAVITIES						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
Gas	14.2	Even	0.9-3.2 (Ave 0.9)	Empty; pyrite	Round-irregular	Some have minor rim of clay; others contain some sulfide grains.

COMMENTS: In the olivine pseudomorphs, saponite ± talc forms circular bundles of fibers. Some crystals are replaced by granular saponite. Saponite has generally been plucked out by polishing.

168-1025C-5R-02 (piece 3, 41-45cm)

ROCK NAME: Aphyric basalt

GRAIN SIZE: Aphanitic; microcrystalline

TEXTURE: Intergranular to glomeroporphyritic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
PHENOCRYSTS						
None						
GROUNDMASS						
Plagioclase	39	39	0.3-1.5		Euhedral laths	Strongly zoned; forms randomly orientated laths as well as stellate clusters.
Olivine	0	3	0.2-0.4		Subhedral	Completely altered to olive-green to olive-brown clay (saponite?).
Clinopyroxene	31.8	31.8	0.1-0.5		Subhedral-anhedral	Intergranular; occurs as anhedral granules (≤ 0.1 mm) at the center of plagioclase stellate clusters.
Opaque oxides	8.8	8.8	0.1-0.5		Subhedral	Interstitial; magnetite and/or maghemite.
Opaque sulfides	Tr	Tr	≤ 0.05		Globular	Occurs in the mesostasis; pyrite and/or pyrrhotite.
Mesostasis	4.4	17.4				Interstitial, brown to brown-gray cryptocrystalline, feathery material.
SECONDARY MINERALOGY						
	PERCENT	REPLACING/ FILLING				COMMENTS:
Saponite	16	Olivine; mesostasis				Brown to brown-gray color. Olivine is replaced by brown to brown-green cryptocrystalline saponite, whilst the mesostasis is replaced by brown to brown-gray cryptocrystalline clay.
Zeolites	Tr	Mesostasis \pm olivine				Forms colorless, granular to spherulitic, isotropic masses, replacing the mesostasis \pm olivine.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS:
None						

COMMENTS: The mesostasis forms larger, irregular patches (maximum length ≤ 4 mm; average 0.8mm), than in the thin section from 1025C-4R. The texture is influenced by ≤ 1.6 mm ovoid masses of granular (≤ 0.1 mm) pyroxene + plagioclase, with larger (0.3-0.8mm) plagioclase laths (\pm subhedral pyroxenes) radiating out from the center.