

# 10069

Sample 10069 is an angular, medium dark grey, vesicular basalt. This sample originally weighed 119 gm, and measured 7 x 5 x 5 cm. It was originally returned in ALSRC #1004 (Documented Sample container).

BINOCULAR DESCRIPTIONS

BY: Twedell

DATE: 2-24-76

ROCK TYPE: Vesicular Basalt

SAMPLE: 10069,4 WEIGHT: 64 gm.

COLOR: Medium dark grey

DIMENSIONS: 5.5 x 4.7 x 3.2 cm.

SHAPE: Angular

COHERENCE: intergranular - friable

fracturing - absent; irregular, mainly re-healed (PET).

VARIABILITY: Homogeneous

FABRIC/TEXTURE: Isotropic/Equigranular

SURFACE: All surfaces are covered with an adhering soil.

ZAP PITS: Few on B<sub>1</sub>, none on all others. Pits are glass lined up to 1 mm in diameter.

CAVITIES: 15% surface coverage. Vesicles are smooth and glass lined. Some are lined with crystals.

<u>COMPONENT</u>	<u>COLOR</u>	<u>% of ROCK</u>	<u>SHAPE</u>	<u>SIZE (MM)</u> <u>DOM. RANGE</u>	
Plagioclase	White	30%	Angular to sub-angular	<0.1	0.1-<0.1
Ilmenite <sub>1</sub>	Black	15%	Angular	0.1	<0.1-1.2
Pyroxene <sub>2</sub>	Black	55%	Subangular to Subrounded	<0.1	<0.1

1) Long platy crystals, approximately 0.1 mm in length.

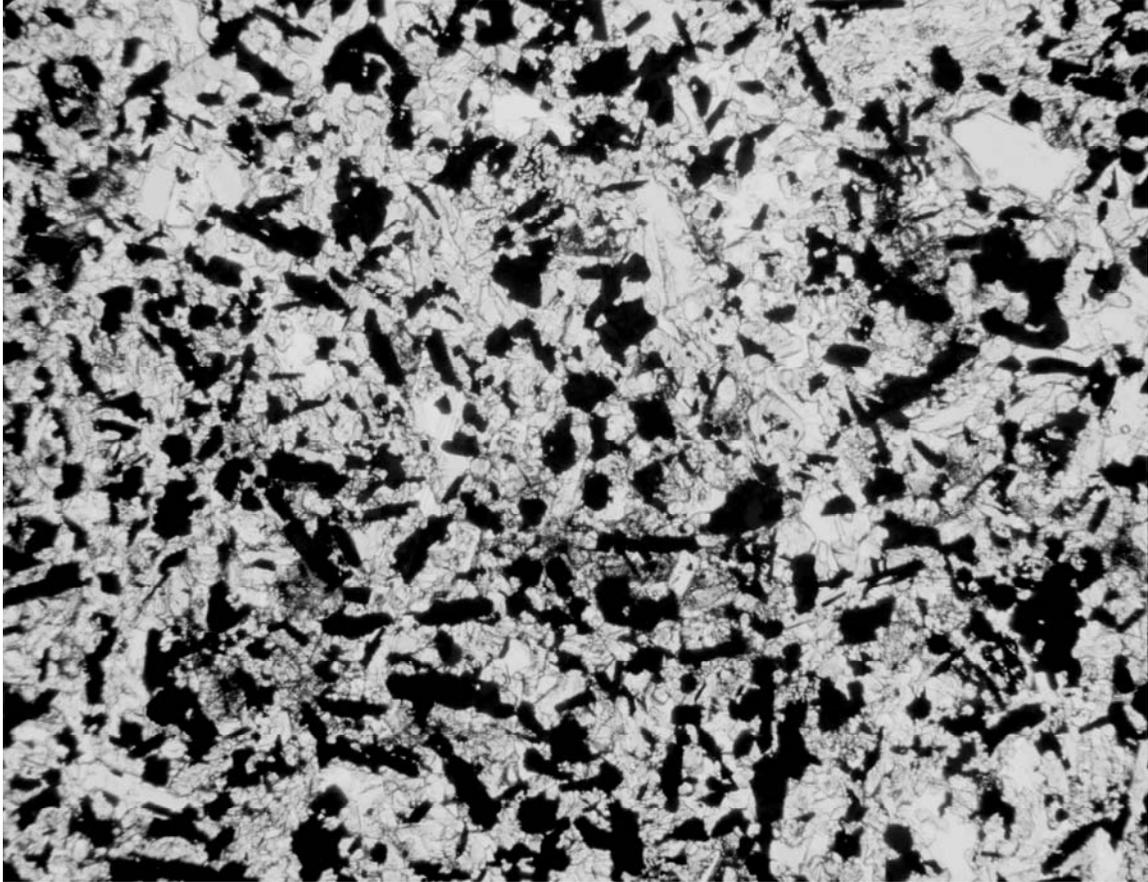
2) Pyroxene appears to be welded in with the plagioclase crystals.



10069,0 Original PET Photo S-69-46661



10069,4 S-76-23287



SECTION: 10069,37 Width of Field: 2.2mm Plane light S-76-2629.

THIN SECTION DESCRIPTION

BY: Walton

DATE: 2-28-76

SECTION: 10069,37

SUMMARY: Fine-grained poikilitic, vesicular basalt composed of clinopyroxene, plagioclase, two generations of ilmenite and subordinate opaques and mesostasis. Some coarseness variation is present in the rock. Approximately one half of the section 10069,33 is a coarse textured equivalent of the remainder of the section. In the coarser portion, the plagioclase crystals are from 0.6mm to 1.2mm in size as compared to 0.08-0.8 for the finer portion. The ilmenite in the coarser portion forms more equant anhedral crystals and are relatively large.

<u>PHASE</u>	<u>%SECTION</u>	<u>SHAPE</u>	<u>SIZE (MM)</u>
Pyrox	46	Euhedral to anhedral	0.03-0.08
Plag	23	Anhedral, interstitial	0.08-0.8
Opaq	14	Subhedral to anhedral	0.01-0.2
Meso	17	Irregular	
Vesicles		Rounded to irregular	0.5-1.5

## COMMENTS:

Pyroxene- small pale brown euhedral to anhedral crystals of clinopyroxene enclose the larger plagioclase crystals. The crystals exhibit uneven extinctions and zoning is present in many crystals. Small subhedral crystals of what appears to be apatite occur in some crystals. The composition of this phase was, however, not verified.

Plagioclase - the poikilitic plagioclase crystals are large and show ill defined twin planes and extinctions. Much of the plagioclase forms featureless patches which are enclosed in the pyroxene-ilmenite network. The optical characteristics suggest that the composition varies to some degree, but there is no marked zoning. In section 10069,33 large subhedral crystals of plagioclase exhibiting well defined twin planes and extinctions were noted. It is assumed these represent a different generation of crystal development than the plagioclase in the rest of the section.

Opaques - the subhedral to anhedral crystals of ilmenite are randomly scattered throughout the rock. A few of the crystals have rutile and chromite exsolution. Most of the crystals show some degree of skeletal growth.

Two distinct generations of crystals are present. The first are the subhedral lath-like crystals which form smaller isolated crystals. The other generation is far more skeletal and anhedral. Many have a sieve texture with glass and silicate inclusions.

Small (0.005-0.06 mm) masses of troilite and troilite with iron-nickel are scattered throughout the rock. Most of the larger masses are essentially troilite. Several spherical masses are present in the section suggesting formation of the masses while there was yet a silicate rich liquid.

Mesostasis - interstitial glassy masses with a turbid appearance occur between the silicate phases. These glassy patches are nearly colorless to brown in color. No extensive devitrification has taken place in any of the masses. A few masses contain what appear to be small cristobalite crystals. This was not confirmed, however.

**TEXTURE:** The rock consists of a random network of intergrown clinopyroxene and ilmenite crystals. Plagioclase and glassy mesostasis occur interstitial to this network. The overall texture is poikilitic intersertal. No preferred orientation was determined for any of the phases present. The occurrence of a much coarser-grained material near the edge of one section could suggest that this rock represents a chilled margin of a larger body of material.

Carter and MacGregor (1970) have reported on section 10069,30. Their modal analysis gave clinopyroxene 56%, plagioclase 19%, opaques 24%, and mesostasis 1% which varies considerably from the above analysis.

Selected References: Carter and MacGregor (1970), Dence et al. (1970).

## HISTORY AND PRESENT STATUS OF SAMPLES- 5/20/76

10069 was removed from the Documented Sample container (ALSRC # 1004) and split in the Vac Lab. Remaining pristine samples were re-examined in SSPL.

PRISTINE SAMPLES: (All VAC-SSPL)

4	64.92 gm	Few pits on one surface.
5	10.08 gm	Chips and fines.

RETURNED SAMPLES

31	6.71 gm	No sawed or pitted surfaces.
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CHEMICAL ANALYSES

<u>Element</u>	<u>Number of Analyses</u>	<u>Mean</u>	<u>Units</u>	<u>Range</u>
SiO <sub>2</sub>	1	39.15	PCT	0
Al <sub>2</sub> O <sub>3</sub>	2	7.09	PCT	.189
TiO <sub>2</sub>	1	12.01	PCT	0
FeO	1	18.14	PCT	0
MnO	3	.275	PCT	.102
MgO	1	6.13	PCT	0
CaO	2	10.0	PCT	.136
Na <sub>2</sub> O	2	.475	PCT	.034
K <sub>2</sub> O	2	.285	PCT	.017
Li	2	17.6	PPM	.8
Rb	5	5.60	PPM	.231
Cs	1	.163	PPM	0
Be	2	2.75	PPM	1.1
Sr	3	150.2	PPM	35.0
Ba	4	308.75	PPM	170
Sc	3	81.47	PPM	21.6
V	2	79.5	PPM	15
Cr <sub>2</sub> O <sub>3</sub>	2	.357	PCT	.092
Cr	1	2270	PPM	0
Co	3	28.00	PPM	4
Ni	1	6.7	PPM	0
Cu	2	10.35	PPM	3.3

Element	Number of			
	Analyses	Mean	Units	Range
Y	1	164.0	PPM	0
Zr	4	560.75	PPM	135
Nb	1	20.0	PPM	0
Ta	1	2.7	PPM	0
Hf	3	15.6	PPM	9.0
Re	1	.001	PPM	0
Os	1	.800	PPB	0
La	2	25.35	PPM	3.3
Ce	1	65.0	PPM	0
Sm	1	18.0	PPM	0
Eu	2	2.12	PPM	.16
Tb	1	4.8	PPM	0
Ho	1	6.9	PPM	0
Yb	1	20.8	PPM	0
Lu	1	2.67	PPM	0
U	1	.78	PPM	0
Ca	1	4.9	PPM	0
0	1	37.6	PCT	0

Analysts: Ehmann & Morgan, (1970); Goles et al., (1970); Annell & Helz, (1970); Tera et al., (1970); Murthy et al., (1970); Pappanastassiou et al., (1970); Sievers et al., (1970); Ehmann et al., (1975); Turekian & Kharkar, (1970); Lovering & Butterfield, (1970).

Age References: Boschler (1971); Eberhardt (1971); Pappanastassiou (1970).