

## 10022

Sample 10022 is a medium dark grey vesicular basalt. This sample originally weighed 95 gm, and measured 5 X 4 X 3 cm. Sample was returned in the Contingency Sample Bag.

BINOCULAR DESCRIPTION BY: Twedell DATE: 6-15-76

ROCK TYPE: Vesicular Basalt SAMPLE: 10022,31 WEIGHT: 20.9 gm

COLOR: Medium dark grey DIMENSIONS: 2.4 x 2.2 x 2.2 cm

SHAPE: Irregular

COHERENCE: Intergranular – Tough  
Fracturing – Absent

FABRIC/TEXTURE: Isotropic/Equigranular

VARIABILITY: Homogeneous

SURFACE: Irregular, but dust free. Some patina present.

ZAP PITS: One surface has a few pits.

CAVITIES: Vesicles cover 20% of surface. Cavities are crystal lined.

<u>COMPONENT</u>	<u>COLOR</u>	<u>% OF ROCK</u>	<u>SHAPE</u>	<u>SIZE (MM) DOM. RANGE</u>	
Pyroxene <sub>1</sub>	Dark Brown	60	Subhedral	0.2	<0.1-0.3
Plagioclase <sub>2</sub>	White	25	Lathy to euhedral	<.1	<.1-.1
Ilmenite <sub>3</sub>	Black	15	Anhedral	<.1	<.1

1) Range from dark honey brown to vitreous black.

2) Clear and translucent (crushed) crystals.

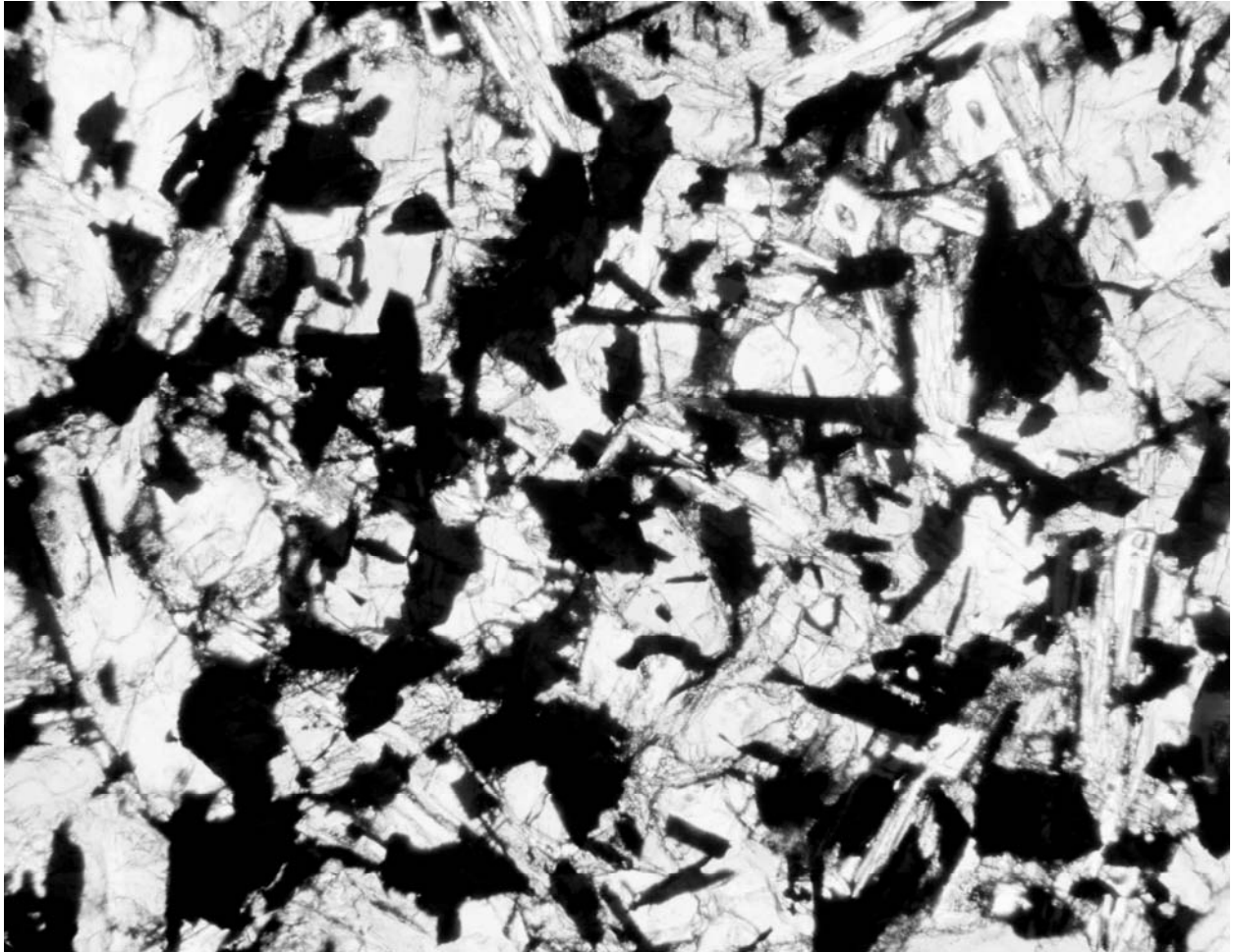
3) Platy to semi-opaque crystals.



10022,0 S-69-45524 Original PET Photo



10022,108 S-76-25426 .



SECTION: 10022,57      Width of Field: 1.39 mm plane light   S-76-26311

THIN SECTION DESCRIPTION    BY: Walton                      DATE: 6/15/76

SUMMARY: Fine-grained vesicular intersertal basalt composed of clinopyroxene, plagioclase, and ilmenite with subordinate mesostasis. The crystals of plagioclase are, for the most part, tabular which appear in the section as thin narrow acicular crystals with poor optical characteristics. Masses of anhedral plagioclase occur as interstitial void fillings in the pyroxene-ilmenite network. Also filling voids in the network are small masses of glass-rich mesostasis.

<u>Phase</u>	<u>% Section</u>	<u>Shape</u>	<u>Size (mm)</u>
Pyrox	43	Anhedral, irregular	0.01-0.1
Plag	11	Anhedral to acicular	0.01-0.3
Opag	39	Subhedral to skeletal	0.001-0.8
Meso	7	Irregular	0.001-0.05

COMMENTS:

Pyroxene – Small pale brown to nearly clear anhedral crystals of pyroxene forms an almost continuous network with the larger ilmenite crystals in the rock. This network then hosts all other phases present. Many of the pyroxene crystals are polygranular, but appear as a monocrystal in plane light. Many of the vesicles are lined with very fractured pyroxene crystals. Many of the subhedral crystals of ilmenite are wholly enclosed in pyroxene crystals.

Plagioclase – The plagioclase crystals in this rock differ somewhat from the typical Apollo 11 intersertal basalt. Nearly every crystal is anhedral and occurs as interstitial void fillings in the pyroxene-ilmenite network. In section, however, many of the crystals appear as acicular crystals sometimes with glass centers. No well defined crystal could be found. Isolated crystals are rare to absent. The twinning is poor and extinctions uneven. A few fan-shaped masses are present, but again are not composed of euhedral crystals.

Isolated patches of a glass-rich mesostasis also occur as an interstitial component in the network. The color is a dark brown. Many of the masses occur near or at a plagioclase-pyroxene interface. The masses are turbid and very irregular in shape.

Opaques – Ilmenite makes up, by far, the most abundant opaque mineral in the rock. Two generations of crystals are present in the rock. The first type forms larger skeletal crystals with several of the crystals having chromite and rutile exsolution. These crystals are very eroded and the embayments are predominately filled with pyroxene.

The second type forms smaller lath-like crystals, some of which are quite thin. In section many of these appear as long thin acicular crystals. Several of these crystals are bent and broken.

TEXTURE: Fine-grained intersertal basalt consisting of a network of pyroxene crystals that are intergrown with larger skeletal ilmenite crystals. Interstitial to the network are crystals of plagioclase and masses of mesostasis. Small subhedral to nearly euhedral crystals of ilmenite occur included in some of the pyroxene grains. The plagioclase is all or nearly all interstitial while appearing as long acicular crystals in the section. Contacts are sharp between all phases.

Selected References: Cameron (1970), Kushiro and Nakamura et al. (1970), Smith, J.V. et al. (1970), Weill et al. (1970).

## HISTORY AND PRESENT STATUS OF SAMPLES – 10/13/76

10022 was removed from the Contingency Sample Container and processed in PCTL. At some time, the sample, or a portion of the sample, was sawed in SPL. Samples were re-examined in SSPL.

### PRISTINE SAMPLES

108	8.01 gm	Chip. Pitted on two surfaces. PCTL-SPL-SSPL
114	1.69 gm	Fines. PCTL-SPL-SSPL

### RETURNED SAMPLES:

31	21.88 gm	Chip. Pitted on two surfaces. Has been heated to 525°C. Possible silicone grease contamination.
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### CHEMICAL ANALYSES

Element	Number of Analyses	Mean	Units	Range
SiO <sub>2</sub>	3	41.6	PCT	3.1
Al <sub>2</sub> O <sub>3</sub>	4	8.19	PCT	0.872
TiO <sub>2</sub>	3	12.24	PCT	0.48
FeO	4	18.97	PCT	2.06
MnO	4	0.23	PCT	0.028
MgO	2	7.27	PCT	.943
CaO	2	10.52	PCT	0.35
Na <sub>2</sub> O	3	.439	PCT	0.110
K <sub>2</sub> O	3	.280	PCT	0.035
Li	1	11.5	PPM	0
Rb	4	5.73	PPM	0.43
Cs	1	0.2	PPM	0
Sr	4	166.48	PPM	9.0
Ba	4	248.75	PPM	57.0
Sc	3	76.97	PPM	2.30
V	2	79.50	PPM	19.0
Cr <sub>2</sub> O <sub>3</sub>	4	0.342	PCT	0.041
Co	3	29.27	PPM	0.80
Ni	1	9.98	PPM	0
Cu	1	5.1	PPM	0
Zn	1	2.9	PPM	0

Element	Number of Analyses	Mean	Units	Range
Y	1	230	PPM	0
Zr	2	360	PPM	460
Ag	1	0.002	PPM	0
Ta	3	1.27	PPM	0.8
Hf	3	19.73	PPM	3.4
Au	1	0.001	PPM	0
La	3	25.37	PPM	2.6
Ce	3	76.63	PPM	12.5
Nd	1	65	PPM	0
Sm	3	20.2	PPM	2.1
Eu	3	2.14	PPM	0.25
Gd	1	23.9	PPM	0
Tb	3	4.91	PPM	1.2
Dy	2	30.05	PPM	0.1
Ho	3	8.37	PPM	2.7
Er	1	15.8	PPM	0
Yb	4	15.85	PPM	14
Lu	3	2.55	PPM	0.22
U	2	0.735	PPM	0.13
Ga	1	2.9	PPM	0
In	1	0.008	PPM	0
As	1	0.063	PPM	0
Sb	1	0.006	PPM	0
O	1	39.3	PCT	0
Se	1	0.7	PPM	0
Cl	1	19.3	PPM	0
Br	1	0.129	PPM	0

Analysts: Ehmann & Morgan, (1970); Goles et al., (1970); Rose et al., (1970); Haskin et al., (1970); Murthy et al., (1970); Gopalon et al., (1970); Hurley et al., (1970); Ehmann and Morgan, (1971);

Age References: Turner (1970); Eberhardt (1971b).