

# 10071

Sample 10071 is an angular medium light grey, fine-grained basalt. This sample originally weighed 190 gm and measured 10 x 4.5 x 3.8 cm. It was originally returned in ALSRC # 1004 (Documented Sample Container).

BINOCULAR DESCRIPTIONS

BY: Twedell

DATE: 6-9-76

ROCK TYPE: Fine Grained Basalt

SAMPLE: 10071,5

WEIGHT: 117. gm

COLOR: Medium light grey

DIMENSIONS: 5.5 x 4.5 x 3.8 cm

SHAPE: Angular

COHERENCE: Intergranular - friable

Fracturing - Absent

FABRIC/TEXTURE: Isotropic/Equigranular- fine grained.

VARIABILITY: Homogeneous

SURFACE: All surfaces have a small amount of adhering soil. E<sub>1</sub> is a fresh surface.

ZAP PITS: Many on all but E<sub>1</sub>. None on E<sub>1</sub>. Pits are glass lined up to .5mm.

CAVITIES: 20% Vesicular surface coverage.

<u>COMPONENT</u>	<u>COLOR</u>	<u>% OF ROCK</u>	<u>SHAPE</u>	<u>SIZE(MM) DOM. RANGE</u>	
Pyroxene <sub>1</sub>	Blk to Drk. Brn.	58%	Angular to subangular	<.1	<.1
Plagioclase <sub>2</sub>	White	5%	---	<.1	<.1
Plagioclase <sub>3</sub>	White	20%	Angular	<.1	<.1
Black <sub>4</sub>	Black	10%	Platy	<.1	<.1-.2

1) Dark honey brown to black crystals are well defined inside vesicles.

2) Powdered white texture.

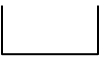
3) Crystalline in appearance.

4) Large platy crystals appear to be ilmenite. Usually associated with powdery white plagioclase.

Special Features: This sample differs from most Apollo 11 basalts in that it has a high number of large vesicles throughout its surface; Olivine is sparse but large and conspicuous up to 1mm. <1% of rock (PET).



10071,0 Original PET Photo S-69-47292

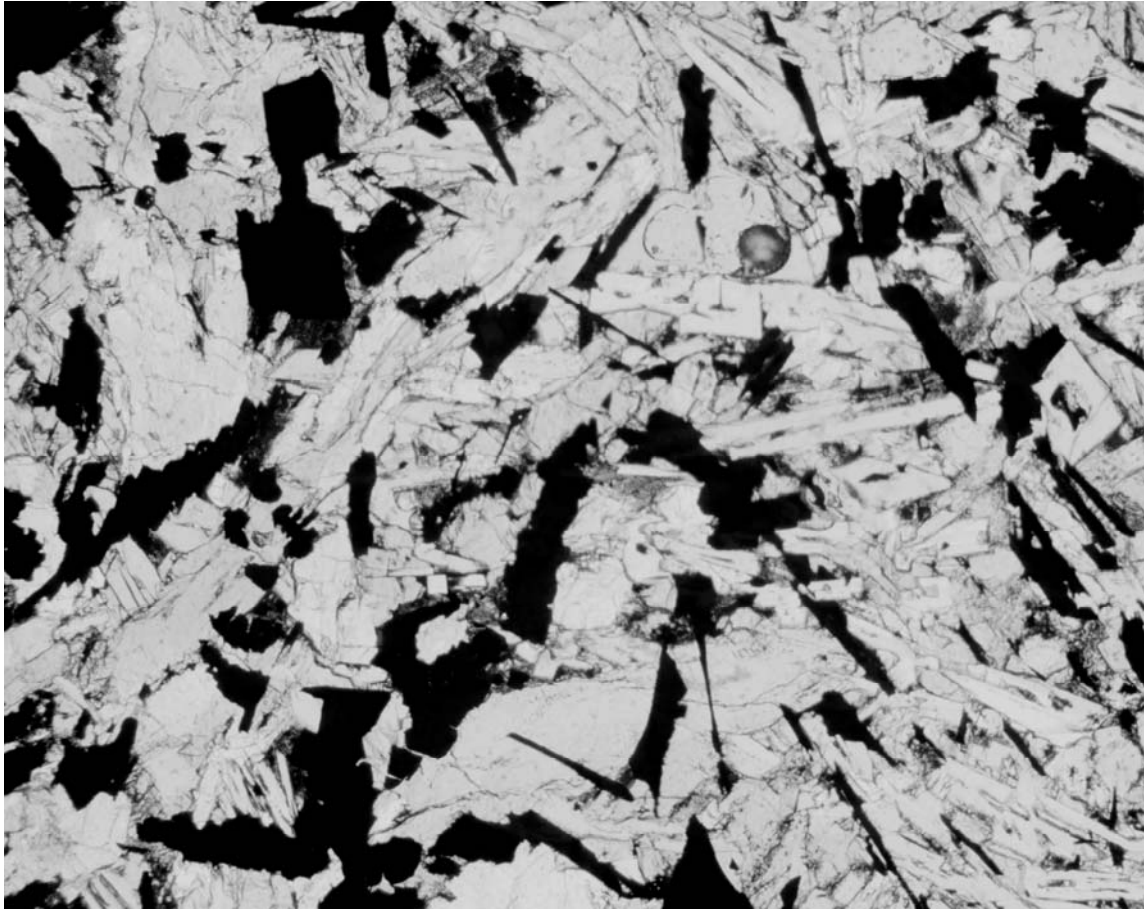


1 cm



10071,5

10071,5 S-76-22607



S-76-26321

SECTION 10071,34

Width of field: 1.39 mm. Plane light

THIN SECTION DESCRIPTION

BY: Walton

DATE: 9-9-76

SECTION: 10071,34

SUMMARY: Medium-grained intersertal basalt composed of clinopyroxene, plagioclase, and ilmenite with subordinate mesostasis. Many of the plagioclase crystals form somewhat radiating masses. Both the ilmenite and the plagioclase are rather skeletal in development. There is glass present in some of the crystals plus a glass-rich mesostasis between the crystalline phases.

<u>PHASE</u>	<u>% OF SECTION</u>	<u>SHAPE</u>	<u>SIZE (MM)</u>
Pyrox	45	Anhedral, irregular	0.1 - 0.8
Plag	26.5	Anhedral to skeletal	0.01- 0.6
Opaq	24.5	Anhedral to Subhedral	0.001-0.8
Meso	4	Irregular	0.001-0.3

## COMMENTS:

Pyroxene - The clinopyroxene forms large pinkish tan anhedral crystals which form an almost continuous array within the rock. Grouped within the array are somewhat radiating masses of plagioclase crystals. The pyroxene crystals show some degree of zoning and only a very poor cleavage pattern. Most crystals have a well developed fracture pattern. A few crystals have olivine inclusions.

Plagioclase - Two major types of plagioclase crystals occur within the rock. The larger anhedral are skeletal, poorly formed, and form intersertal masses between the pyroxene crystals. The smaller more tabular crystals are more blocky and some have hollow centers which are filled with glass. Some lineation within this type of crystal is seen, but it is not pronounced.

Intermingled among the pyroxene and plagioclase crystals are patches of a glass-rich mesostasis. The color varies from nearly colorless to a brown.

Opaques - Two generations of ilmenite crystals are present in the rock. The first generation crystals are larger, highly skeletal and rather blocky in appearance. Most have a sieve texture with the silicate phases filling the holes in the crystal. Several of the crystals show rutile and chromite exsolution.

The second generation crystals are small lath-like subhedral crystals. These are far less common than the first generation crystals. Several of this second generation crystal also show slight skeletal development.

Scattered throughout the section are small masses (0.005-0.1mm) of troilite and troilite with iron-nickel. Many of these masses are associated with the ilmenite, while others are isolated in the silicate network.

TEXTURE: Somewhat porphyritic intersertal basalt consisting of a network of pyroxene phenocrysts that are intergrown with large anhedral ilmenite prisms. Occurring interstitial to the pyroxene-ilmenite, and masses of mesostasis. Contacts are sharp, for the most part, but many edges are very eroded and uneven.

NOTE: Some textural variation was noted in this rock. See Drake and Weill (1971) for further discussion.

Additional References: Haggerty et al. (1970).

## HISTORY AND PRESENT STATUS OF SAMPLES - 6-9-76

10071 was removed from the Documented Sample container (ALSRC # 1004) and split in the Vac Lab. A 12 gm chip was sent to PCTL for PET analysis. This chip was then sent to the Gas Analysis Lab. Remaining pristine samples were re-examined in SSPL.

### PRISTINE SAMPLES (all VAC-SSPL)

- |   |   |
|---|---|
| 5 | 115.65 gm piece. Pitted on five surfaces.                                     |
| 7 | 15.34 gm consisting of 2 large pieces, chips and fines<br>No pitted surfaces. |

RETURNED SAMPLES

- 11 13.28 gm chip. Four surfaces are pitted.  
13 5.51 gm chip. Three pitted surfaces.

CHEMICAL ANALYSES

<u>Element</u>	<u>Number of Analyses</u>	<u>Mean</u>	<u>Units</u>	<u>Range</u>
SiO <sub>2</sub>	2	41.53	PCT	1.34
Al <sub>2</sub> O <sub>3</sub>	3	8.02	PCT	.491
TiO <sub>2</sub>	2	12.01	PCT	.66
FeO	2	18.05	PCT	2.25
MnO	2	.242	PCT	.075
MgO	1	7.30	PCT	0
CaO	1	10.07	PCT	0
Na <sub>2</sub> O	3	.477	PCT	.112
K <sub>2</sub> O	3	.307	PCT	.057
Li	1	17.0	PPM	0
Rb	3	5.71	PPM	.73
Cs	1	.17	PPM	0
Be	1	3.0	PPM	0
Sr	3	157.2	PPM	30.6
Ba	5	359.0	PPM	220
Sc	4	79.91	PPM	24.55
V	3	86.33	PPM	14
Cr <sub>2</sub> O <sub>3</sub>	3	.359	PCT	.134
Cr	1	2290	PPM	0
Co	4	28.64	PPM	6.55
Ni	1	7.0	PPM	0
Cu	2	12.5	PPM	3.0
Y	1	162.0	PPM	0
Zr	4	494.7	PPM	434

Element	Number of Analyses	Mean	Units	Range
Nb	1	24.0	PPM	0
Ta	2	2.05	PPM	.1
Hf	3	17.15	PPM	3.35
La	4	26.06	PPM	6.15
Ce	3	81.83	PPM	6.0
Nd	1	64.5	PPM	0
Sm	3	20.23	PPM	4.7
Eu	4	2.14	PPM	.3
Gd	1	29.3	PPM	0
Tb	2	4.88	PPM	1.65
Dy	2	32.25	PPM	2.5
Ho	2	8.6	PPM	1.2
Er	1	21.3	PPM	0
Yb	3	18.98	PPM	5.15
Lu	3	2.8	PPM	.63
Th	1	3.36	PPM	0
U	3	.730	PPM	.219
Ga	1	4.8	PPM	0
Pb	1	1.69	PPM	0
0	1	40.3	PPM	0

Analysts: Ehmman & Morgan, (1970); Goles et al., (1970); Annell & Helz, (1970); Gast et al., (1970); Wanless et al., (1970); Stettler et al., (1973); Stettler et al., (1974); Papanastassiou et al., (1970); Eberhardt et al., (1974); Ehmman et al., (1975); Tatsumoto, (1970).

Age References: Stettler et al., (1973); Stettler et al., (1974); Armstrong and Alsmiller (1971); Boschler,(1971b); Marti et al., (1970); Wanless, (1970); Eberhardt et al., (1974); Eberhardt, (1971b); Tatsumoto, (1970); Papanastassiou, (1970).