

10060

Sample 10060 is a rounded to sub-rounded, medium dark grey, fine breccia. This sample originally weighed 722 gm and measured 5 x 5 x 4.5 cm. It was originally returned in ALSRC # 1004 (Documented Sample Container).

BINOCULAR DESCRIPTIONS BY: Twedell DATE: 5-27-76

ROCK TYPE: Fine Breccia SAMPLE: 10060,5 WEIGHT: 112 gm

COLOR: Med. dark grey DIMENSIONS: 3.5 x 4.3 x 2.6 cm

SHAPE: Rounded to sub-rounded; angular/tabular with dreikanter appearance (PET)

COHERENCE: Intergranular - coherent  
Fracturing - few - non-penetrative; planar fractures occur parallel to flattest side (PET)

FABRIC/TEXTURE: Anisotropic/Fine Breccia

VARIABILITY: Homogeneous

SURFACE: Smooth on pitted surface to irregular on non-pitted surfaces; Granular (PET).

ZAP PITS: Few on E<sub>1</sub>, T<sub>1</sub>, N<sub>1</sub>, B<sub>1</sub>. None on any others. Pits are glass lined, up to 2.5 mm in diameter.

CAVITIES: Absent

<u>COMPONENT</u>	<u>COLOR</u>	<u>% OF ROCK</u>	<u>SHAPE</u>	<u>SIZE(MM)</u> <u>DOM. RANGE</u>	
Matrix	Med.Dk.Grey	97%	-----	-----	-----
Basalt Clast	Brn/Wht/Blk	1%	Angular	2	.5-5.
White Clast	White	<1%	Angular	.9	.2-.3
BrownClast <sub>1</sub>	Brown	<1%	Angular	<.1	<.1-.2
Grey & White Clast	Blk& Wht	<1%	Angular	<.1	2.1
Grey Clast <sub>2</sub>	Grey	<1%	Angular	<.1	<.1

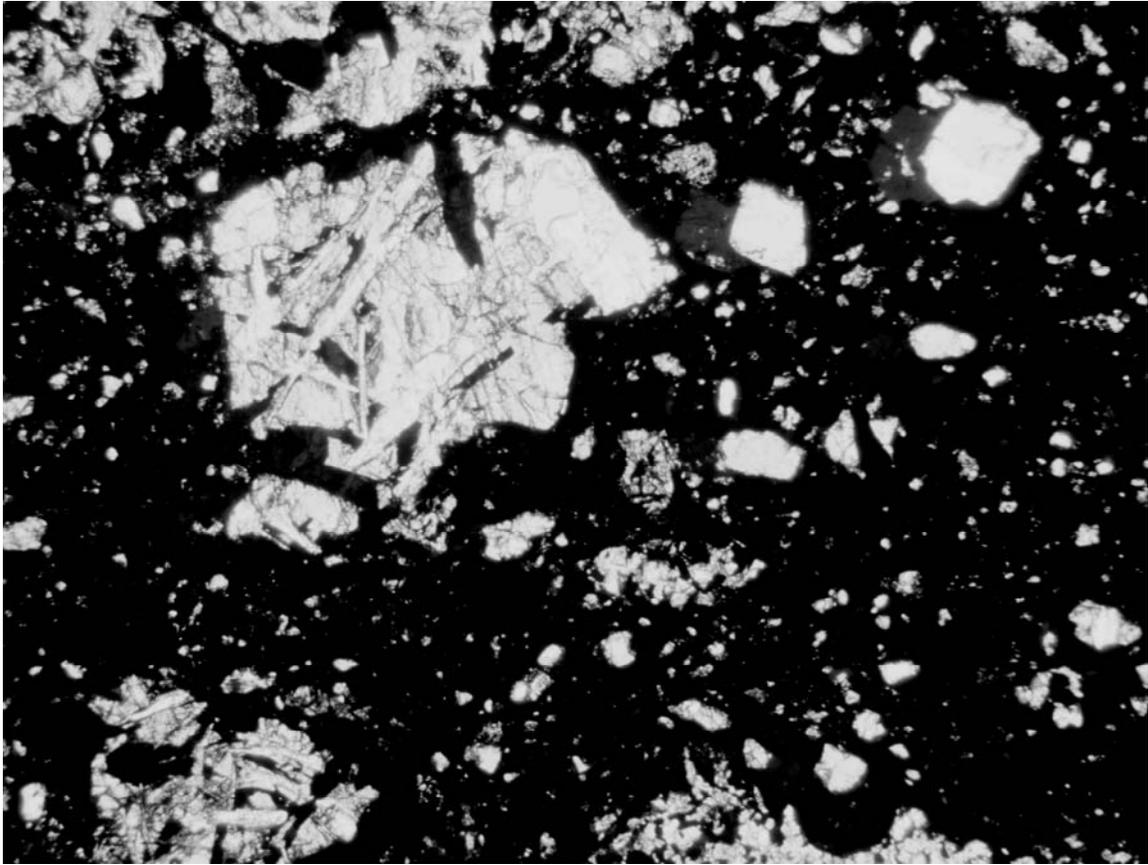
- 1) Crushed pyroxene
- 2) Only one on surface



10060,0 Original PET Photo S-69-46497



10060,5 S-76-25888



S-76-26323

SECTION 10060,49

Width of field 2.72 mm plane light

THIN SECTION DESCRIPTION

BY: Walton

DATE: 6-23-76

SUMMARY: Partly devitrified typical breccia with several large clasts. The matrix appears to be filled with cryptocrystalline material and shards of the clasts present. Minor variation in the amount of devitrification is seen from one part of the section to another.

Matrix 57% of Rock

<u>PHASE</u>	<u>%Section</u>	<u>Shape</u>	<u>Size (mm)</u>	<u>Comments:</u>
Dk.Brown	100%	-	<0.001	High glass content with abundant cryptocrystalline material.

Mineral Clasts 21% of Rock

<u>Phase</u>	<u>Relative Abundance</u>	<u>Shape</u>	<u>Size (mm)</u>
Pyroxene <sub>1</sub>	Very abundant	Angular to irregular	0.001-0.3
Plagioclase <sub>2</sub>	Few	Blocky to irregular	0.001-0.2
Opakes <sub>3</sub>	Few	Skeletal to irregular	0.001-0.3

1) Poor extinctions and highly fragmented.

- 2) Poor optical characteristics.
- 3) Most in clasts.

Lithic Clasts 19% of Rock

<u>Type</u>	<u>Relative Abundance</u>	<u>Shape</u>	<u>Size (mm)</u>
Small	Very Abundant	Rounded to irregular	0.001-1.0
Large <sub>4</sub>	Eight present	Rounded to irregular	>1.0

- 4) a. Coarse-grained basalt consisting of pyroxene, plagioclase and ilmenite with a glass coating.
- b. Coarse-grained basalt consisting of pyroxene, plagioclase and ilmenite.
- c. Glass-rich matrix hosting small pyroxene and plagioclase crystallites.
- d. Random array of plagioclase crystals hosting small euhedral pyroxene/olivine crystals.
- e. Coarse-grained basalt consisting of pyroxene, plagioclase and ilmenite.
- f. Fine-grained basalt composed of pyroxene, plagioclase and ilmenite.
- g. Crystal aggregation consisting of pyroxene, plagioclase and ilmenite with a minimum glass phase.
- h. Fine-grained glass-rich matrix hosting small mineral fragments and small rock fragments.

Glass Clasts 3% of Rock

<u>Type</u>	<u>Relative Abundance</u>	<u>Shape</u>	<u>Size (mm)</u>
Yellow-Orange <sub>5</sub>	Very abundant	Angular to spherical	00001-0.4
Red-Orange <sub>6</sub>	Moderate	Angular to spherical	0.001-0.1
Colorless <sub>7</sub>	Present	Angular	0.001-0

- 5) Mostly angular shards: few part spheres.
- 6) Mostly angular shards; a few spherical masses.
- 7) Rare: only a few shards.

Selected References: Agrell et al. (1970), Cameron (1970).

HISTORY AND PRESENT STATE OF SAMPLES - 6/25/76

10060 was removed from the Documented Sample container and split in the Vac Lab. A 2 gm. sample was sent to PCTL for PET analysis. A 582 gm. piece was transferred to the Bio Prep Lab for preparation of a 479 gm display sample. Remaining pristine samples were re-examined in SSPL.

PRISTINE SAMPLES (all VAC-BP-SSPL)

5	112 gm	Piece. Few pits on four surfaces. See binocular description.
42	2.30 gm	Chip. 1.4 x 1.2 x 1.0 cm. No pits or patina.
47	2.56 gm	Fines.
48	1.90 gm	Fines.

RETURNED SAMPLES

38	28.52 gm	Chip. Pitted on two surfaces.
46	4.99 gm	Three Chips. Largest chip is pitted on one surface.

CHEMICAL ANALYSES

<u>Element</u>	<u>Number of Analyses</u>	<u>Mean</u>	<u>Units</u>	<u>Range</u>
SiO <sub>2</sub>	7	42.17	PCT	4.8
Al <sub>2</sub> O <sub>3</sub>	9	11.43	PCT	2.02
TiO <sub>2</sub>	8	8.65	PCT	1.48
FeO	8	17.10	PCT	2.72
MnO	7	.211	PCT	.057
MgO	7	8.01	PCT	2.43
CaO	6	12.62	PCT	4.19
Na <sub>2</sub> O	7	.484	PCT	.054
K <sub>2</sub> O	6	.188	PCT	.045
P <sub>2</sub> O <sub>5</sub>	2	.104	PCT	.068
H	1	22.0	PPM	0
Li	2	8.7	PPM	3.40
Rb	4	4.33	PPM	1.00
Cs	2	.195	PPM	.01
Be	1	3.00	PPM	0
Sr	4	172.75	PPM	16.0
Ba	5	215.6	PPM	88.0
Sc	5	66.9	PPM	9.50

<u>Element</u>	<u>Number of Analyses</u>	<u>Mean</u>	<u>Units</u>	<u>Range</u>
V	4	66.0	PPM	36.0
Cr <sub>2</sub> O <sub>3</sub>	7	.314	PCT	.143
Co	6	29.92	PPM	4.60
Ni	3	129.74	PPM	91.99
Cu	3	8.7	PPM	5.00
Zn	3	27.33	PPM	5.00
Y	2	168.5	PPM	83.0
Zr	5	434.82	PPM	635.0
Nb	2	30.5	PPM	29.00
Mo	1	.7	PPM	0
Pd	1	.006	PPM	0
Ag	1	.01	PPM	0
Cd	1	.3	PPM	0
Ta	4	1.86	PPM	.4
W	1	.35	PPM	0
Hf	5	12.79	PPM	2.0
Ir	1	5.40	PPB	0
Au	1	1.40	PPB	0
La	7	20.67	PPM	7.3
Ce	7	59.36	PPM	6.0
Pr	1	13.0	PPM	0
Nd	4	55.75	PPM	37.00
Sm	7	16.69	PPM	10.2
Eu	7	2.00	PPM	.99
Gd	2	26.00	PPM	4.0
Tb	6	4.23	PPM	3.11
Dy	5	27.84	PPM	19.3
Ho	5	6.56	PPM	5.20
Er	3	20.17	PPM	15.5

Element	Number of			
	Analyses	Mean	Units	Range
Tm	1	1.8	PPM	0
Yb	7	14.13	PPM	11.1
Lu	7	1.91	PPM	.73
Th	2	2.51	PPM	.976
U	4	0.586	PPM	.153
B	1	3.0	PPM	0
Ga	3	5.0	PPM	.5
In	3	0.711	PPM	1.10
C	1	135.0	PPM	0
Ge	3	0.68	PPM	1.16
Pb	2	2.43	PPM	1.14
N	1	20.0	PPM	0
As	2	0.05	PPM	.08
Sb	1	0.005	PPM	0
O	3	41.0	PCT	1.10
S	2	0.131	PCT	.038
Se	1	0.9	PPM	0
F	1	80.0	PPM	0
Cl	1	15.5	PPM	0
Br	1	0.3	PPM	0

Analysts: Agrell et al., (1970); Ehmann & Morgan, (1970); Goles et al., (1970); Morrison et al., (1970); Rose et al., (1970); Wanke et al., (1970); Smales et al., (1971); Smales et al., (1970); Philpotts & Schnetzler, (1970); Friedman et al., (1970); Brown et al., (1970); Wasson & Baedecker (1970); Haskin et al., (1970); Kaplan et al., (1970).

Age References: Silver (1970)