

72536**Microsubophitic Impact Melt Breccia
St. 2, 52.3 g****INTRODUCTION**

72536 is a fine-grained clast-bearing impact melt with a subophitic groundmass texture. Its chemistry is similar to the common low-K Fra Mauro melts that dominate the Apollo 17 highlands samples.

72536 was one of several blue-gray breccias (LSIC 17, 1973) collected in the first rake sample from Station 2, adjacent to Boulder 2. It is 2.1 x 2.9 x 5.5 cm and medium dark gray (N4) (Keil et al., 1974). It is subrounded (Fig. 1) and coherent, with a few non-penetrative fractures. It lacks cavities but has many zap pits on most surfaces. It contains more and larger clasts than most other blue-gray breccias.

Matrix material (less than 1 mm grain size) was estimated to compose 94% of the rock (Keil et al., 1974).

PETROGRAPHY

The groundmass of 72536 is a very fine-grained crystallized melt very similar to 72535, with small clasts quite distinct from the groundmass (Fig. 2). It is a little more heterogeneous than 72535, with patches of finer material. Warner et al. (1977b, c; 1978f) described 72536 as a microsubophitic matrix breccia. Their modal data (Table 1) shows a high proportion of melt groundmass (83%) and a clast population dominated by plagioclase, similar to many other

impact melt samples at the Apollo 17 site. Warner et al. (1977b, c; 1978f) described the dark porous groundmass as basaltic-textured, with plagioclase laths less than 30 microns long subophitically enclosed by irregular mafic crystals. Opaque minerals (mainly ilmenite) occur as irregular discrete rods less than 5 microns wide and up to 20 microns long. Tiny grains of Fe-metal and troilite are widely disseminated. Microprobe analyses (Warner et al., 1978f) are shown in Figure 3. Engelhardt (1979) tabulated ilmenite paragenetic features, inferring that Ilmenite crystallization started after plagioclase but before pyroxene.

Both mineral and lithic clasts tend to be subrounded to subangular;



Figure 1: Sample 72536 S-73-20438. Scale divisions in centimeters.

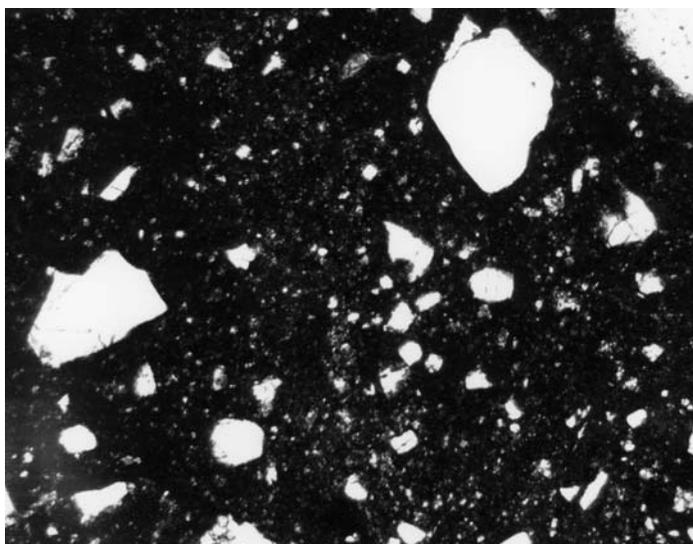


Figure 2: Photomicrograph of 72536, 8, showing general groundmass. White phases are plagioclase clasts and some vugs. Plane transmitted light; width of field about 1 mm.

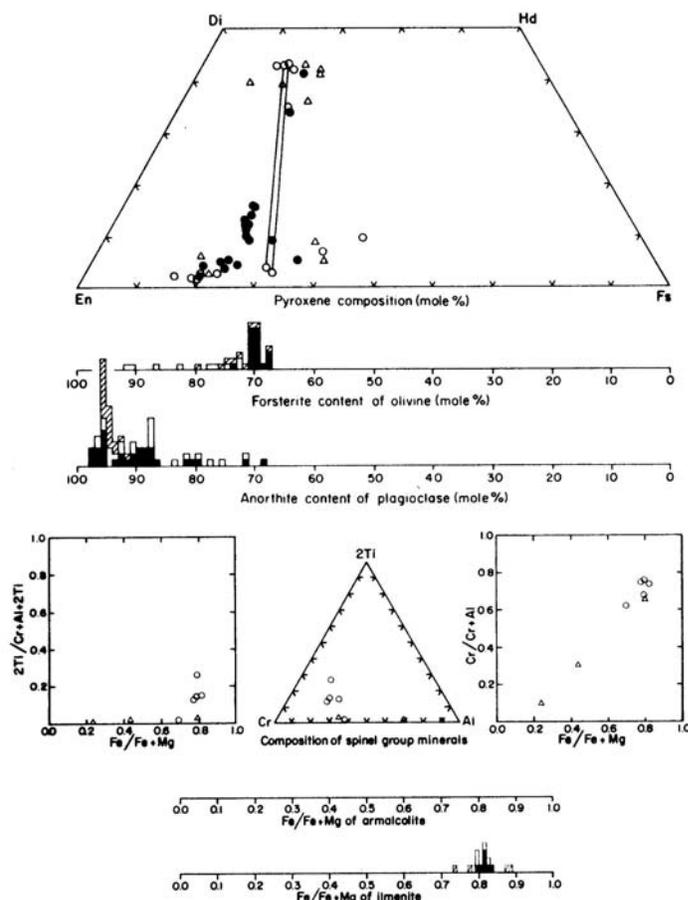


Figure 3: Microprobe analyses of minerals in 72536 (Warner et al., 1978.). Filled symbols = matrix phases. In histograms, open symbols = mineral clasts and cross-hatched = minerals in lithic clasts. In other diagrams, open circles = mineral clasts and open triangles = minerals in lithic clasts.

they tend to be larger than those in other blue-gray breccias. Calcic plagioclases dominate the mineral clasts; mafic mineral clasts also tend to be more refractory than the groundmass counterparts (Fig. 3). Some of the pyroxene contains exsolution lamellae. The lithic clasts are common highlands lithologies, including several fine-grained crystalline feldspathic breccias, a granoblastic anorthosite, devitrified anorthositic material, and a tiny intersertal basaltic fragment. Two lithic fragments are broadly granitic.

CHEMISTRY

A 630 mg sample was analyzed by Murali et al. (1977a) (Table 2; Fig. 4). The chemistry is fairly similar to that of other Apollo 17 impact melts, and demonstrates meteoritic contamination (about 3% C1 equivalent). A defocused beam analysis for the major elements (Table 3) agrees well with the neutron activation analysis.

PROCESSING

A few exterior chips were taken from a single area of the sample in section and chemical analysis; other chips remain unallocated.

Figure 4: Chondrite-normalized rare earths in 72536 (solid line; Murali et al., 19774) and average of Boulder 2 at Station 2 (dashed line: Laul and Schmitt, 1974a).

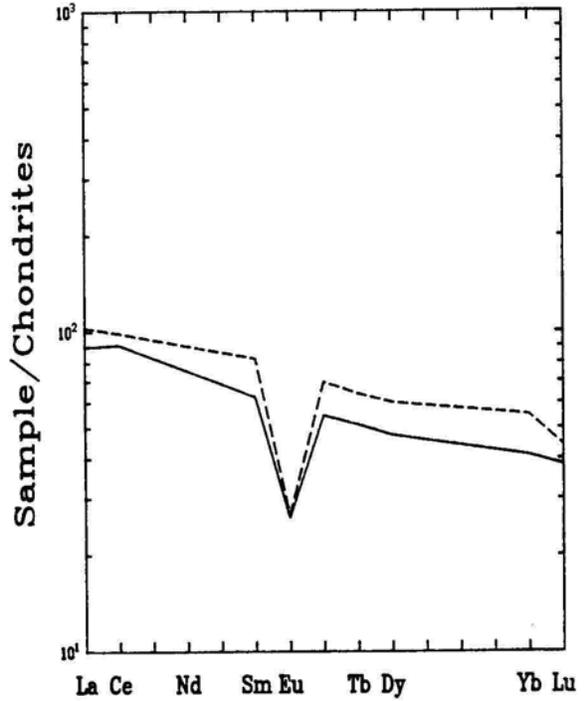


Table 1: Modal analysis of 72536, 8 (Warner et al., 1977b).

Points counted	3496
Matrix	82.9
Mineral clasts	12.9
Lithic clasts	4.2
Mineral clasts	
Plagioclase	8.9
Olivine/pyroxene	3.9
Opaque oxide	tr
Metal/troilite	0.1
Other	—
Total	<u>12.9</u>
Lithic clasts	
ANT	2.6
Devitrified anorthosite	1.0
Breccia	0.6
Other	tr
Total	<u>4.2</u>
Percent of matrix (normalized to 100)	
Plagioclase	52.3
Olivine/pyroxene	44.3
Opaque oxide	3.0
Metal/troilite	0.3
Other	tr

**Table 2: Chemical analysis
of bulk sample 72536**

Split	,3
wt %	
SiO ₂	
TiO ₂	1.4
Al ₂ O ₃	17.1
Cr ₂ O ₃	0.286
FeO	10.0
MnO	0.120
MgO	11
CaO	10.6
Na ₂ O	0.53
K ₂ O	0.21
P ₂ O ₅	
ppm	
Sc	19
V	60
Co	32
Ni	320
Rb	
Sr	
Y	
Zr	320
Nb	
Hf	9.6
Ba	290
Th	2.5
U	
Cs	
Ta	1.5
Pb	
La	29.5
Ce	80
Pr	
Nd	
Sm	11.3
Eu	1.8
Gd	
Tb	2.4
Dy	15
Ho	
Er	
Tm	
Yb	8.2
Lu	1.3
Li	
Be	
B	
C	
N	
S	
F	
Cl	
Br	
Cu	
Zn	
ppb	
Au	1.5
Ir	4
	(1)

**Table 3: Microprobe defocused
beam analysis of matrix of 72536
(from Warner et al., 1977b).**

wt %	
SiO ₂	46.7
TiO ₂	1.63
Al ₂ O ₃	18.2
Cr ₂ O ₃	0.16
FeO	8.8
MnO	0.13
MgO	11.1
CaO	11.5
Na ₂ O	0.57
K ₂ O	0.21
P ₂ O ₅	0.30
Sum	99.3

References and methods:

(1) Murali et al. (1977a); INAA