



corrected

77538

Unusual Fragmental Breccia

47.2 grams

Figure 1: Photo of 77538. Edge of 1 cm cube at bottom. NASA S73-19065.

Introduction

77538 is a trace-element-rich breccia sample. It is a fragmental breccia with a light-colored matrix (figure 2) It has patina and zap pits on all sides.

Petrography

Warner et al. (1977, 1978) reported that the olivine and some of the pyroxene in 77538 were Fe-rich (figure 4).

Taylor et al. (1980) reported granite clasts and suggested an origin by silicate-liquid immisibility.

Mineralogy

Olivine: Olivine is minor, but Fe-rich

Pyroxene: Some pyroxene is very iron rich (figure 4).

Plagioclase: Most plagioclase is An₈₅₋₉₈, but some is An₆₂.

Significant Clasts:

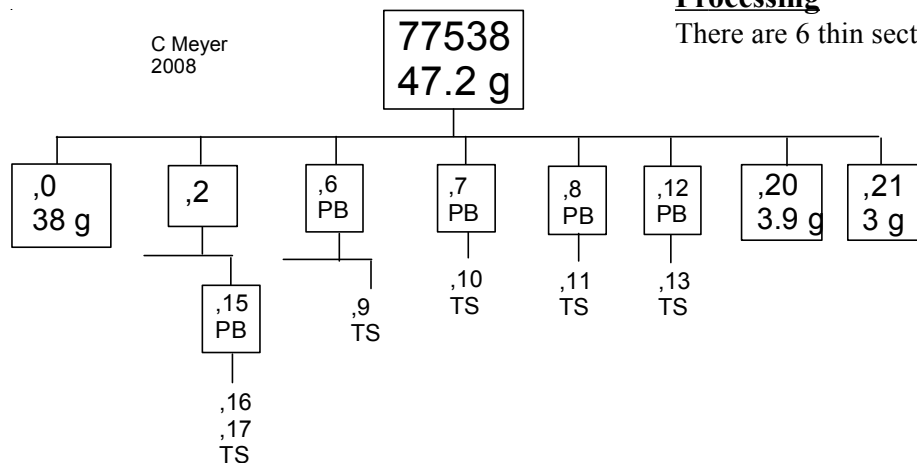
Granite clasts with intergrown K-spar and silica are present (figure 3).

Chemistry

Laul and Schmitt (1975) reported the composition in an abstract to the LPSC (table 1, figure 5). They found this sample had high Fe/Mg ratio and was very Zr – rich.

Processing

There are 6 thin sections.



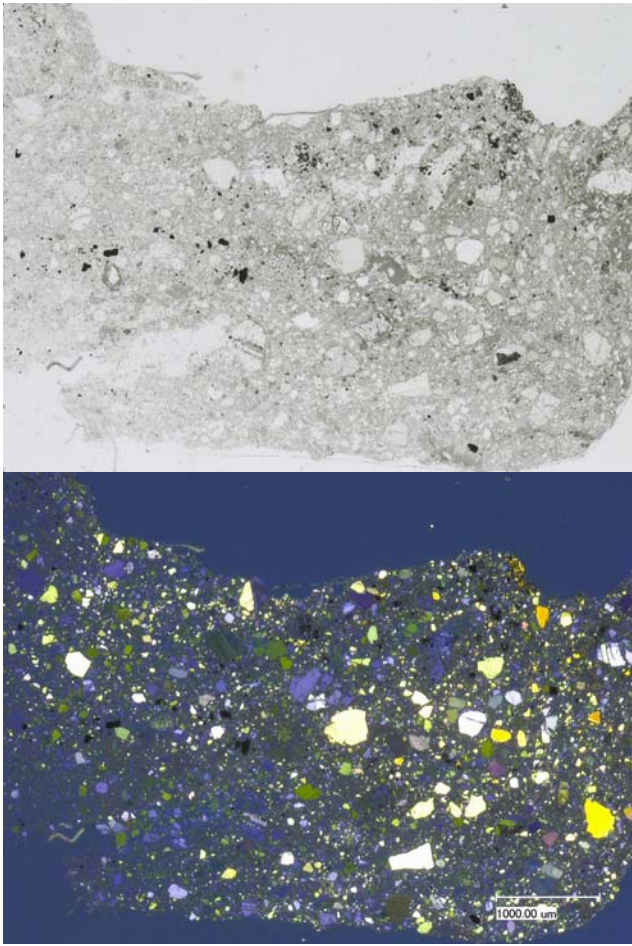


Figure 2: Photomicrographs of thin section 77538,17 by C.Meyer.

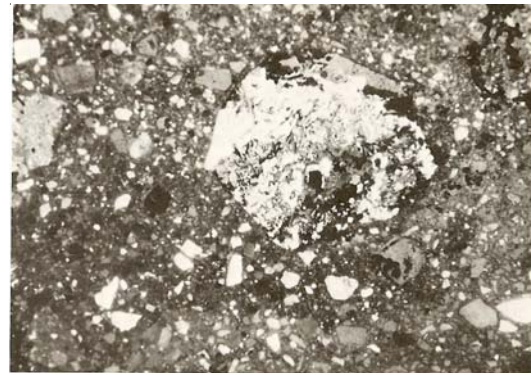


Figure 3: Thin section photomicrograph of "granite" clast in 77538 (from Warner et al. 1978). Field of view about 2 mm.

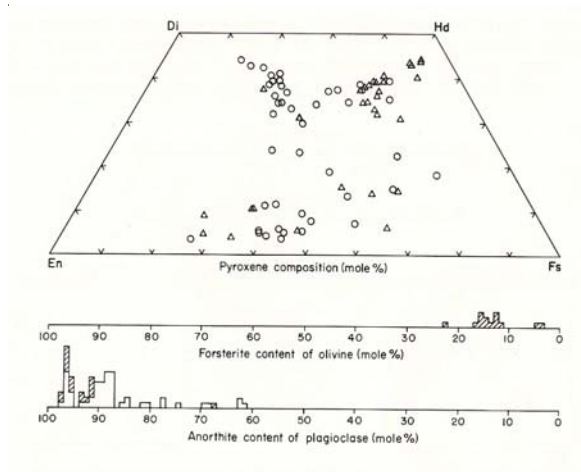


Figure 4: Pyroxene, olivine and plagioclase diagram for 77538 (from Warner et al. 1978).

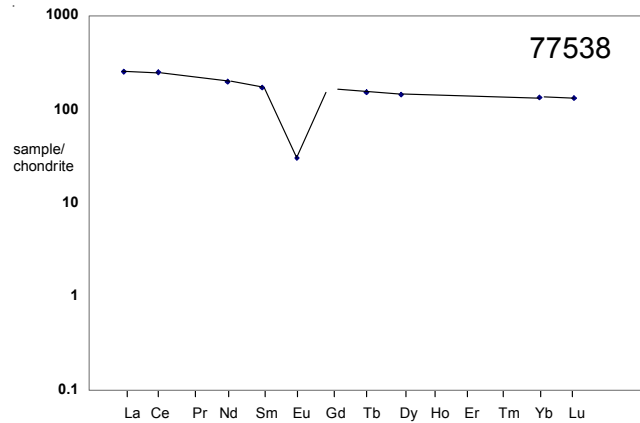


Figure 5: Normalized rare-erath-element diagram for 77538 (data from Laul and Schmitt 1975).

Table 1. Chemical composition of 77538.

reference weight	Warner 77	Laul 75	Warner 78		
SiO ₂ %			50.3	74	(b)
TiO ₂	1.2	(a) 1.2	(a) 2.82	0.54	(b)
Al ₂ O ₃	14.5	(a) 14.5	(a) 0.96	12.5	(b)
FeO	10.6	(a) 10.6	(a) 31.3	2.21	(b)
MnO	0.15	(a) 0.15	(a)		
MgO	5	(a) 5	(a) 4.3	0.8	(b)
CaO	10.3	(a) 10.3	(a) 9.8	1.86	(b)
Na ₂ O	0.75	(a) 0.75	(a) 0.12	0.9	(b)
K ₂ O	1.04	(a) 1.04	(a) 0.29	7.6	(b)
P ₂ O ₅			0.28	0.07	(b)
S %					
sum					
Sc ppm		22	(a)		
V		40	(a)		
Cr	1642	(a) 1642	(a) 1163		(b)
Co		13.5	(a)		
Ni					
Cu					
Zn					
Ga					
Ge ppb					
As					
Se					
Rb					
Sr					
Y					
Zr		730	(a)		
Nb					
Mo					
Ru					
Rh					
Pd ppb					
Ag ppb					
Cd ppb					
In ppb					
Sn ppb					
Sb ppb					
Te ppb					
Cs ppm					
Ba		700	(a)		
La		59	(a)		
Ce		150	(a)		
Pr					
Nd		90	(a)		
Sm		25.1	(a)		
Eu		1.7	(a)		
Gd					
Tb		5.5	(a)		
Dy		35	(a)		
Ho					
Er					
Tm					
Yb		21.7	(a)		
Lu		3.2	(a)		
Hf		21.5	(a)		
Ta		3.3	(a)		
W ppb					
Re ppb					
Os ppb					
Ir ppb					
Pt ppb					
Au ppb					
Th ppm		16	(a)		
U ppm		4.2	(a)		

technique: (a) INAA, (b) broad beam electron probe.

References for 77538

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