

78546 – 42.66 grams
78547 – 29.91 grams
 Speckled Regolith Breccia



Figure 1: Photo of 78546. Cube is 1 cm. S73-21406



Figure 2: Photo of 78547. Cube is 1 cm. S73-21404

Introduction

78546 and 78547 are coherent dark matrix regolith breccias that were collected as rake samples from the base of the Sculptured Hills, Apollo 17 (Wolfe et al. 1981). The B1 side of 78546 has numerous micrometeorite craters. 78535 and related samples may be additional pieces of this rock type. These samples of regolith breccia have a speckled appearance with about 5 % small plagioclase clasts, set in a dark aphanitic matrix.

Petrography

Butler (1973), Keil et al. (1974), Warner et al. (1979, Fruland (1983) and Meyer (1994) included 78546 and 78547 in their catalogs. Both samples have feldspathic

Mineralogical Mode for 78546

	(Simon et al. 1990)	
	20-90 micron	90-100 micron
Matrix	52.6 %	
Mare Basalt	0.1	3.7
KREEP Basalt		
Feld. Basalt		0.1
Plutonic	0.1	1.8
Granulitic	0.2	0.5
Breccia	0.6	4.2
Olivine	1.4	0.4
Pyroxene	3.8	1.2
Plagioclase	4.2	3.4
Opaques	0.8	
Glass	8.7	7.7
Agglutinate	0.7	3.5

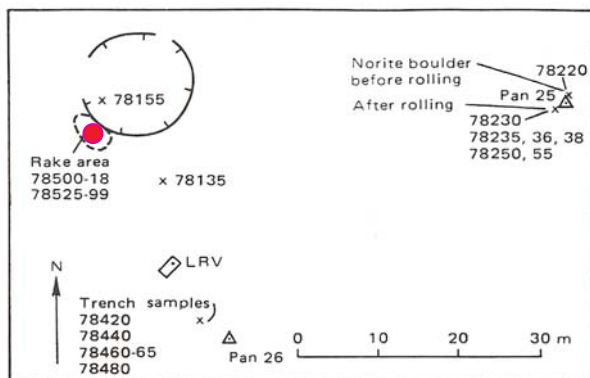


Figure 3: Map of station 8, Apollo 17 showing location of rake samples.

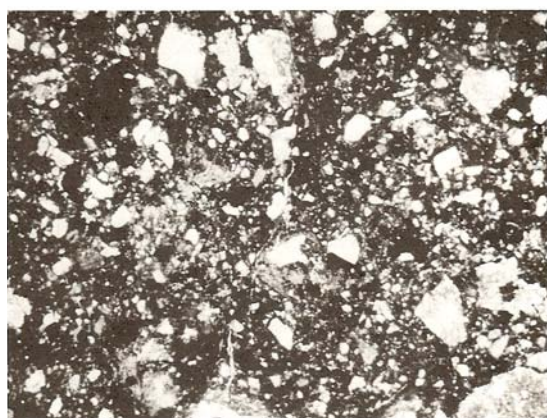


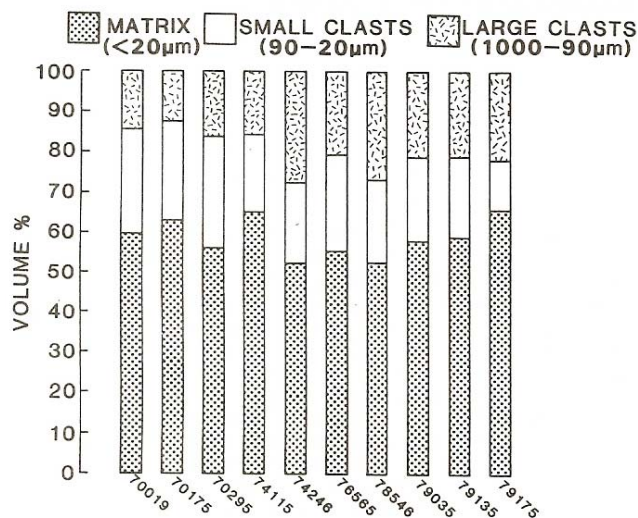
Figure 4: Photomicrograph of thin section 78546.8. Field of view is 3 x 4 mm.

clasts about 5 mm across (figures 1 and 2). Simon et al. (1990) determined the mode and compared 78546 with other regolith breccias from Apollo 17.

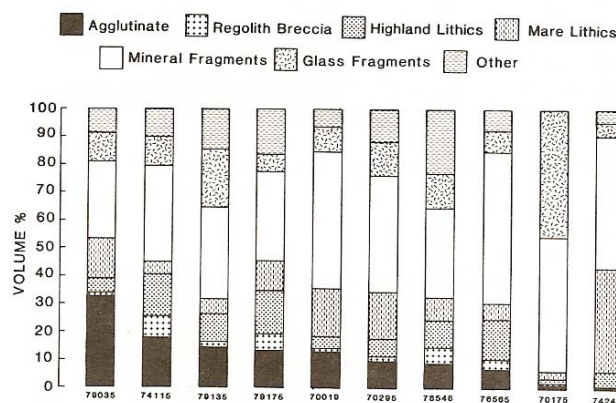
The matrix is primarily dark brown glass and is lacking in void space. The clastic portion has seriate grain size and made up of minerals from mare basalt.

Glass (especially glass beads) from these regolith breccias have been studied by Warner et al. (1979) and Shearer et al. (1991). Some of the glass beads were found to be poor in silica and sodium (rock rain?). Other glass beads appear analogous to the volcanic orange glass from Shorty Crater. Some glass is agglutinate.

CLAST SIZE DISTRIBUTION IN APOLLO 17 REGOLITH BRECCIAS



APOLLO 17 REGOLITH BRECCIAS MODAL PETROLOGY (1000-20 µm fraction)



summary diagrams from Simon et al. 1990

Chemistry

Laul and Schmitt (1975) determined the chemical composition (figures 5 and 6).

Processing

There are 4 thin sections of 78546, but only one for 78547. The white clasts remain unstudied.

Table 1. Chemical composition of 78546.

	reference	Simon90	78546 Laul75	78547	
<i>weight</i>					
SiO ₂ %					
TiO ₂	4.33	(a)	4.2	2.2	(a)
Al ₂ O ₃	13.9	(a)	15.3	16.3	(a)
FeO	13.6	(a)	13.2	11.8	(a)
MnO	0.18	(a)	0.16	0.16	(a)
MgO	10.6	(a)	10	11	(a)
CaO	11.5	(a)	11	11.1	(a)
Na ₂ O	0.47	(a)	0.45	0.36	(a)
K ₂ O	0.11	(a)	0.1	0.085	(a)
P ₂ O ₅					
S %					
<i>sum</i>					
Sc ppm	40	(a)	31	30	(a)
V			70	90	(a)
Cr	2805	(a)	2258	2463	(a)
Co	37	(a)	35.3	33	(a)
Ni	100	(a)	150	150	(a)
Cu					
Zn	60	(a)			
Ga					
Ge ppb					
As					
Se					
Rb	10.8	(a)			
Sr	150	(a)			
Y					
Zr	110	(a)			
Nb					
Mo					
Ru					
Rh					
Pd ppb					
Ag ppb					
Cd ppb					
In ppb					
Sn ppb					
Sb ppb					
Te ppb					
Cs ppm	0.13	(a)			
Ba	110	(a)	100		(a)
La	8.62	(a)	7.8	6.4	(a)
Ce	22.7	(a)	22	18	(a)
Pr					
Nd	17.8	(a)	16		(a)
Sm	5.8	(a)	5.5	4.2	(a)
Eu	1.4	(a)	1.4	0.94	(a)
Gd	7.3	(a)			
Tb	1.3	(a)	1.2	0.8	(a)
Dy	8.6	(a)	7.6	5	(a)
Ho					
Er					
Tm	0.71	(a)			
Yb	4.42	(a)	3.9	3.4	(a)
Lu	0.66	(a)	0.56	0.48	(a)
Hf	4.7	(a)	4.7	2.9	(a)
Ta	0.76	(a)	0.67	0.47	(a)
W ppb					
Re ppb					
Os ppb					
Ir ppb	4.5	(a)	6		(a)
Pt ppb					
Au ppb	6	(a)	1		(a)
Th ppm	1.15	(a)	0.8	1	(a)
U ppm	0.33	(a)			

technique: (a) INAA

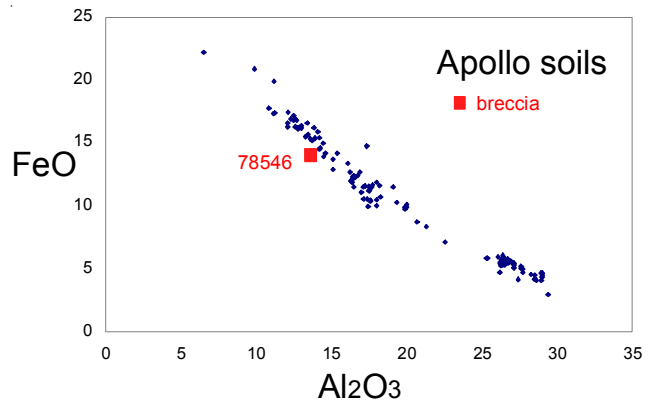


Figure 5: Composition of 78546 compared with lunar soils.

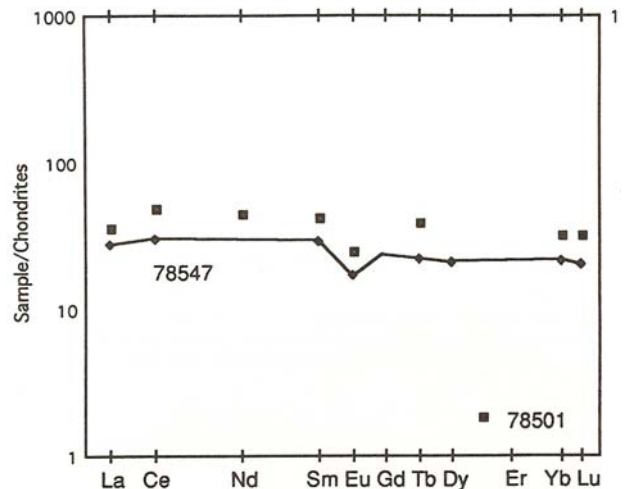
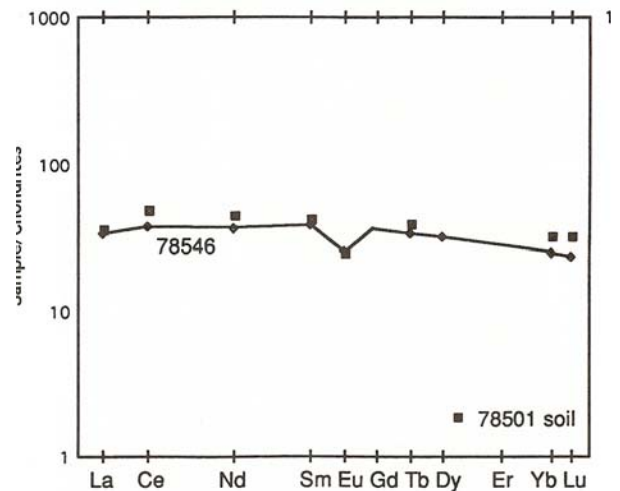
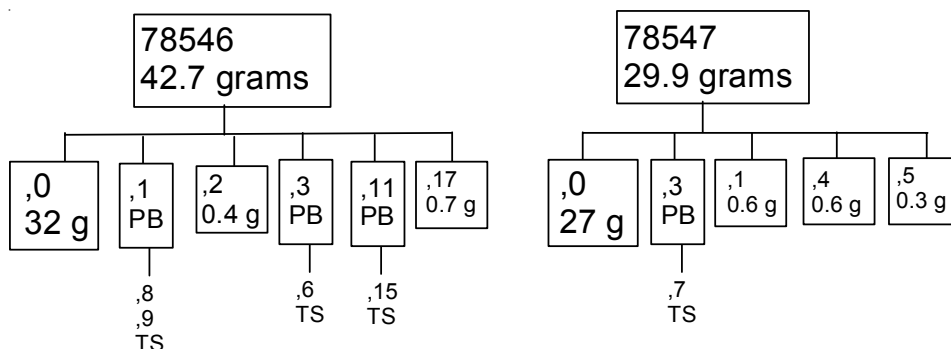


Figure 6 a, b: Normalized rare-earth-element diagrams for 78546 and 78547.



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