15298

Regolith Breccia

1731 grams

Figure 1: PET photograph of 15298. Cube is 1 inch. S71-43041

Introduction

15298 is a brown glass matrix breccia from station 6, Apollo 15, broadly similar to 15295 and 15299 and numerous other breccias returned from this site. Fractures in 15298 have slickensides (figure 1).

Petrography

A careful modal analysis of both the coarse and fine fractions of 15298 is provided by McKay et al. (1989) and compared with other regolith breccias. They report 13% agglutinates in the coarse fragments and 53% vitric component in the fine fraction (<500 microns). They also disaggregated the sample by freeze-thaw cycles and performed a grain size analysis. A small chip (8 mg) was used to determine the rare gas content and maturity index (I_s/FeO = 59). The high solar-wind, rare-gas content, high I_s/FeO and agglutinate content show that this breccia, and the others like it, was formed from compressed lunar soil. Since the chemical composition matches the local soil, the breccia probably was locally derived (Spur Crater?).

The Apollo 15 catalog by Ryder (1985) contains additional information.

Chemistry

Christian et al. (1976) and Korotev in McKay et al. (1989) have provided an analysis of the matrix of 15298 (table 1, figure 8). The high KREEP component was noted by the analysts.

Moore et al. ('1973) determined 130 – 160 ppm carbon for 15298 (figure 6).

Other Studies

Moore et al. (1973) reported 145 ppm carbon in 15298, verifying that it is a soil breccia. Flory et al. (1972) studied the release of carbon compounds in 15298.

Mineralogical Mode for 15298

	(McKay et al. 1989)	
	20-500 mciron	500-1000 micron
Mare Basalt	2.7 %	18.4 %
KREEP basalt	1	0
Plutonic	0	0
Breccias	4	12.3
Olivine	0.7	-
Pyroxene	28	7.9
Plagioclase	16.3	-
Opaques	-	0
Glass	12.7	21
Agglutinates	13	0

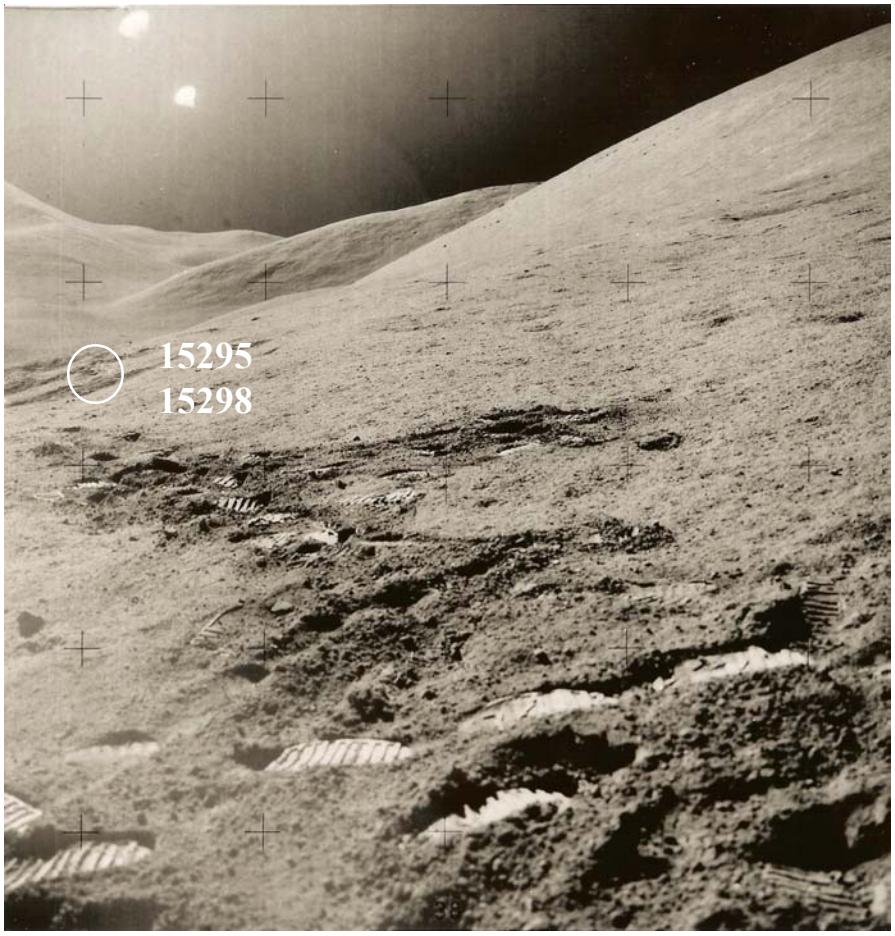


Figure 2: Surface photo showing location of 15298. AS15-85-11516

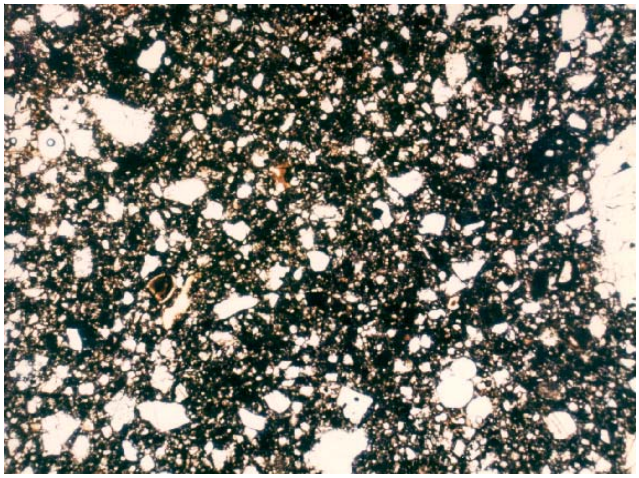


Figure 3: Photomicrograph of thin section of 15298. Field of view is 2.4 mm.

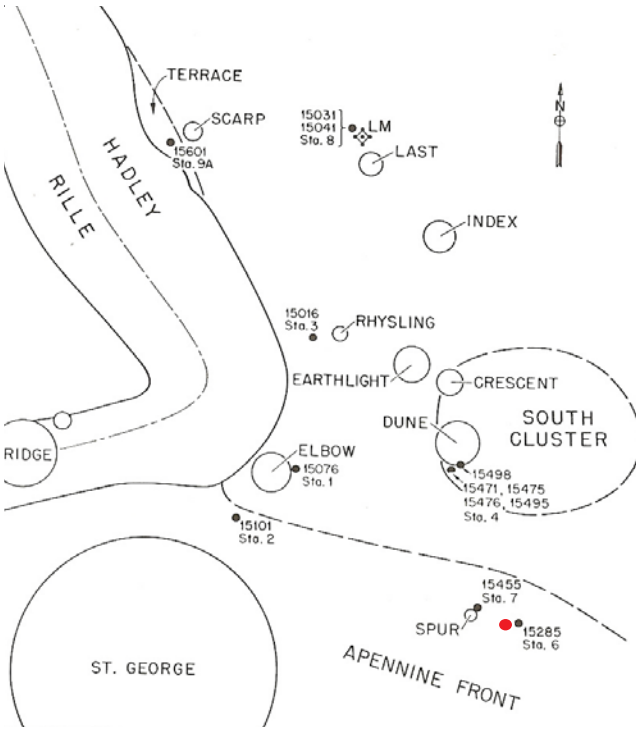


Figure 4: Location of 15298 on map of Apollo 15 site.

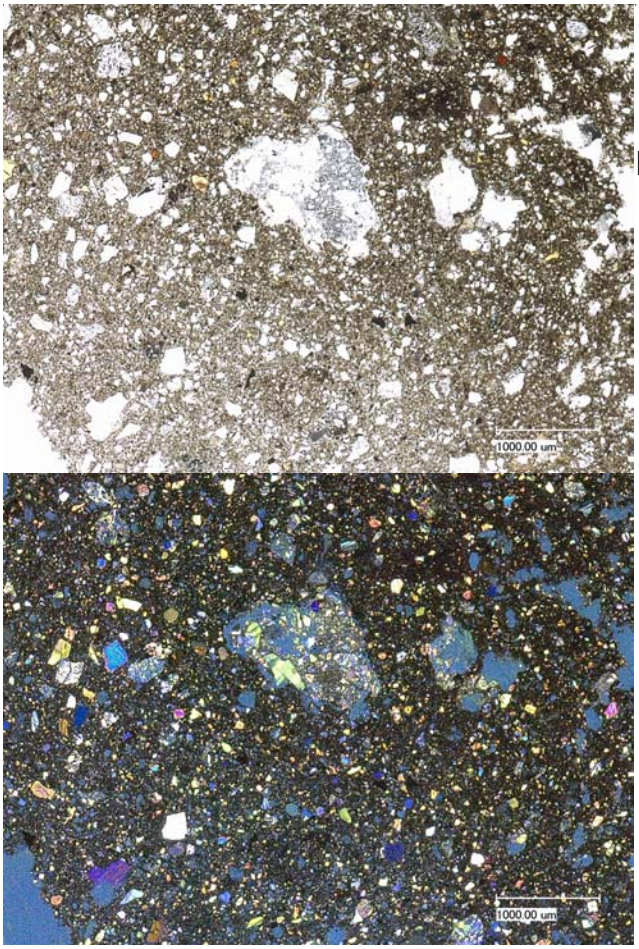


Figure 5: Photomicrographs of thin section of 15298.

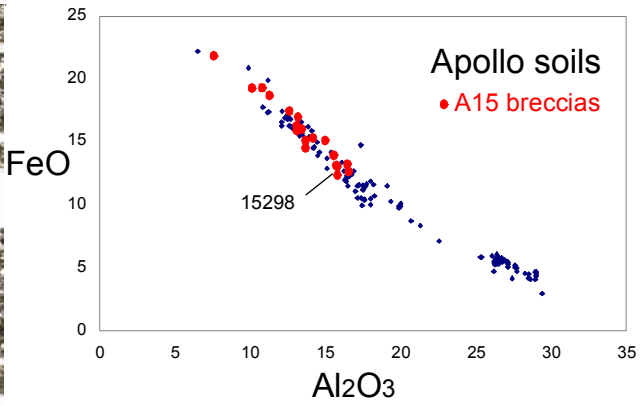


Figure 7: Composition of 15298 compared with Apollo soils and Apollo 15 breccias.

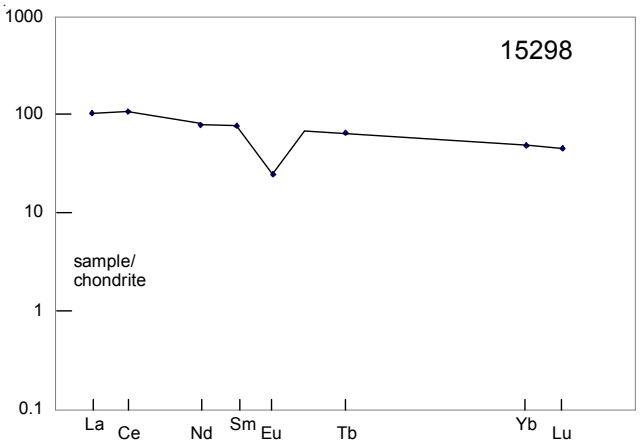


Figure 8: Normalized rare-earth-element composition diagram for 15298 (data from Korotev, see McKay et al. 1989).

Bogard and Nyquist (1972) and Bogard in McKay et al. (1989) reported detail rare gas analysis and concluded that "15298 must have existed on the surface for most of its exposure" due to high ^{131}Xe.

Processing

There are 6 thin sections of 15298.

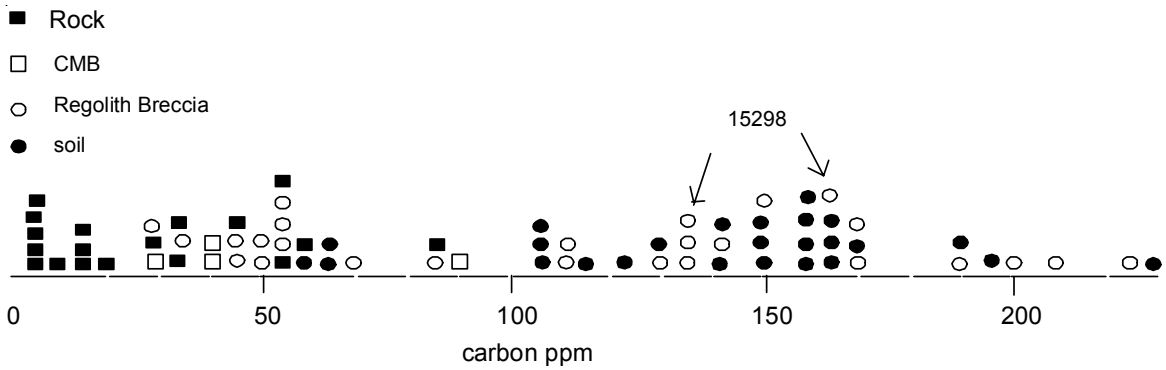
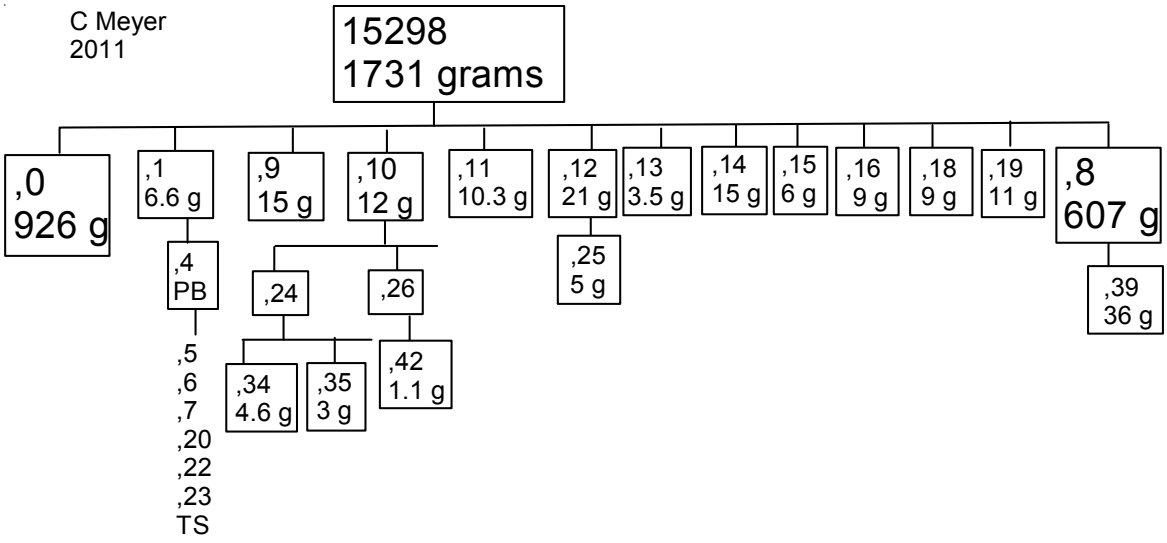


Figure 6: Carbon contnet of Apollo 15 samples.

Table 1. Chemical composition of 15298.

reference	McKay 89		Christian 76	
weight				
SiO2 %			45.97	(b)
TiO2	1.5	(a)	1.52	(b)
Al2O3	15.8	(a)	15.93	(b)
FeO	13.1	(a)	12.96	(b)
MnO	0.17	(a)	0.2	(b)
MgO	11.1	(a)	10.96	(b)
CaO	10.5	(a)	11.03	(b)
Na2O	0.46	(a)	0.8	(b)
K2O			0.17	(b)
P2O5			0.15	(b)
S %				
sum				
Sc ppm	24.4	(a)	25	(b)
V	85	(a)	62	(b)
Cr	2390	(a)	1984	(b)
Co	42.5	(a)	44	(b)
Ni	243	(a)	200	(b)
Cu			12	(b)
Zn			13	(b)
Ga			4.3	(b)
Ge ppb				
As				
Se				
Rb			5.3	(b)
Sr	150	(a)	140	(b)
Y			90	(b)
Zr	390	(a)	440	(b)
Nb			25	(b)
Mo				
Ru				
Rh				
Pd ppb				
Ag ppb				
Cd ppb				
In ppb				
Sn ppb				
Sb ppb				
Te ppb				
Cs ppm	0.26	(a)		
Ba	246	(a)	330	(b)
La	24.7	(a)	15	(b)
Ce	66	(a)		
Pr				
Nd	36	(a)		
Sm	11.5	(a)		
Eu	1.4	(a)		
Gd				
Tb	2.4	(a)		
Dy				
Ho				
Er				
Tm				
Yb	8	(a)	12	(b)
Lu	1.12	(a)		
Hf	9.2	(a)		
Ta	1.11	(a)		
W ppb				
Re ppb				
Os ppb				
Ir ppb	8	(a)		
Pt ppb				
Au ppb	1.8	(a)		
Th ppm	5.2	(a)		
U ppm	1.2	(a)		

technique (a) INAA, (b) combined XRF, semimicro chem., emission spec.



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