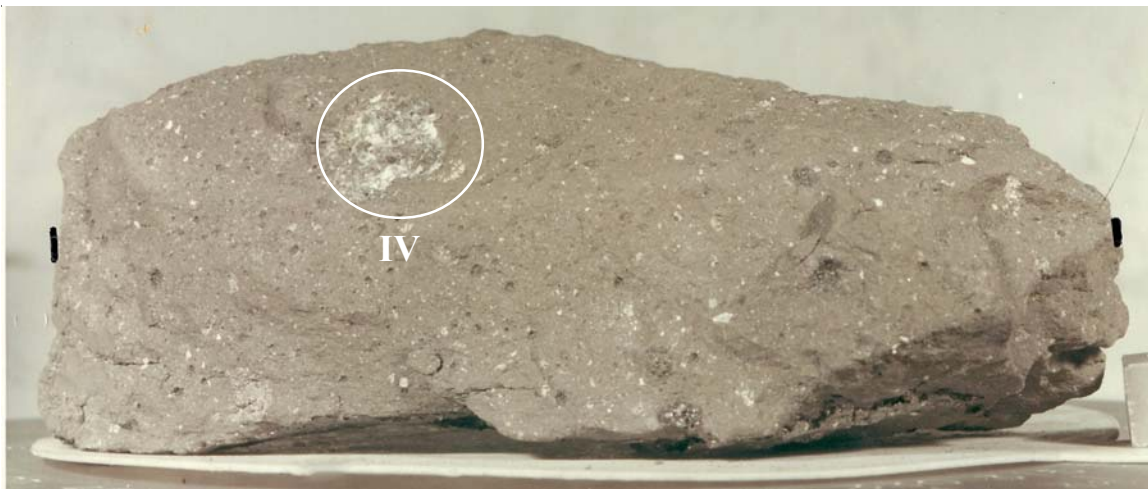


**70295**  
Regolith Breccia  
361.2 grams



*Figure 1: Photo of 70295 showing thin glass coating. Cube is 1 cm. S73-17192*



*Figure 2: Photo of 70295 showing white clast (IV). Edge of cube is 1 cm. S73-17193*

### **Introduction**

70295 is a grab sample that was collected near the surface electrical properties experiment transmitter (SEP)(figure 3). It was not photographed on the surface. It is coated with a thin layer of glass on one side (bottom) and has zap pits on the other sides (figure 1 and 2).

### **Petrography**

Fruland (1983) and Simon et al. (1990) included 70295 in the official Regolith Breccia Initiative. They found it contained about 56 % matrix, with about 6 % mare basalt clasts. It also contains 10 % glass with recognizable agglutinates. Jerde et al. (1978) reported that the maturity index of 70295 was  $I_s/FeO = 43$ . The



Figure 3: Astronaut at SEP station, Apollo 17. 70295 was collected from near this location. ASI7-134-20439.

matrix has a seriate grain size distribution (figures 5 and 6).

Shearer et al. (1991) studied glass beads in 70295. There is an abundance of orange glass of presumed volcanic origin.

### **Significant clasts**

Several clasts (IV, VI and VII) were sampled and sent to Paul Warren for analysis. They are not listed in Paul's compilation of "pristine rocks".

### **Chemistry**

The chemical composition has been reported twice and is in agreement except for U, Cs and Zr (table 1).

Carr et al. (1985) determined the isotopic composition of nitrogen (figure 8) and stated that nitrogen had low concentration.

### **Processing**

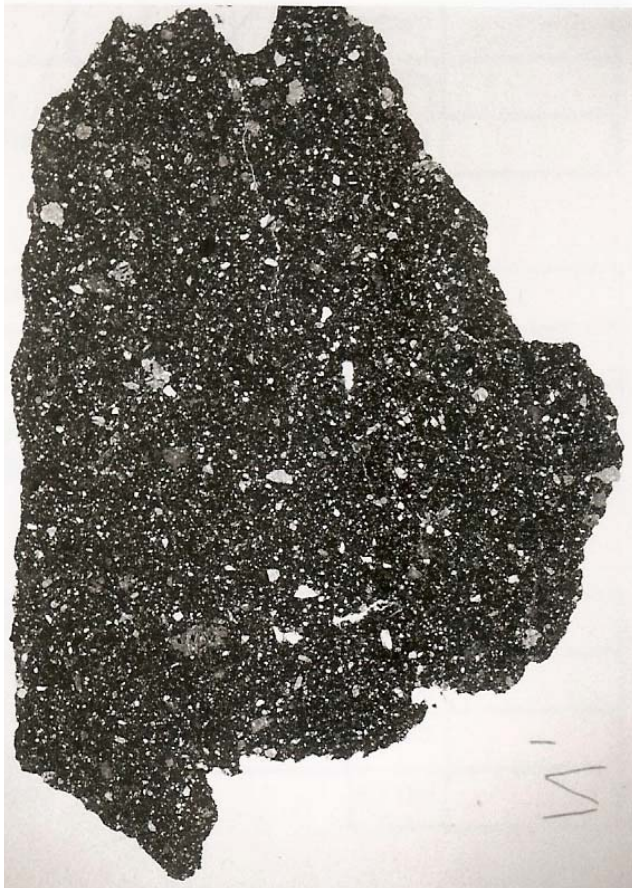
70295 was collected and returned with 70290 - which may contain pieces of it. There are 5 thin sections.

### **Mineralogical Mode for 70295**

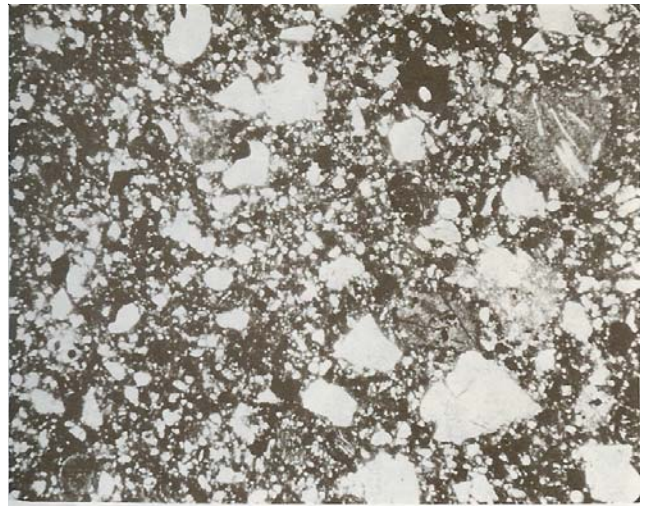
	(Simon et al. 1990)	
Matrix	56.2 %	
	20-90 micron	90-100 micron
Mare Basalt	1.0	6.5
KREEP Basalt		
Feld. Basalt		
Plutonic	0.4	0.6
Granulitic		0.6
Breccia	0.6	1.4
Olivine	1.3	0.2
Pyroxene	7.9	0.9
Plagioclase	3.3	1.1
Opaques	3.1	0.5
Glass	7.4	2.7
Agglutinate	2.6	1.5



*Figure 4: Processing photo of 70295 showing interior. Scale unknown. S84-35248*



*Figure 5: Photo of thin section 70295,15. About 1 inch, top to bottom.*



*Figure 6: Thin section photo of 70295. Scale is 2 cm.*

**Table 1. Chemical composition of 70295.**

reference weight	Simon90	Jerde87	
SiO2 %		41.5	(a)
TiO2	7.85	(a) 7.7	(a)
Al2O3	12	(a) 12.5	(a)
FeO	17.3	(a) 16	(a)
MnO	0.218	(a) 0.24	(a)
MgO	9.6	(a) 10	(a)
CaO	10.9	(a) 10.8	(a)
Na2O	0.42	(a) 0.42	(a)
K2O	0.07	(a) 0.09	(a)
P2O5			
S %			
sum			
Sc ppm	58	(a) 54	(a)
V	92	(a)	
Cr	3050	(a) 2890	(a)
Co	36	(a) 34.8	(a)
Ni	150	(a) 137	(a)
Cu			
Zn	40	(a)	
Ga		6.4	(a)
Ge ppb			
As			
Se			
Rb	6.4	(a) <12	(a)
Sr	170	(a) 190	(a)
Y			
Zr	130	(a) 240	(a)
Nb			
Mo			
Ru			
Rh			
Pd ppb			
Ag ppb			
Cd ppb			
In ppb			
Sn ppb			
Sb ppb			
Te ppb			
Cs ppm	0.15	(a) 0.71	(a)
Ba	90	(a) 89	(a)
La	8.07	(a) 8.4	(a)
Ce	23.3	(a) 24	(a)
Pr			
Nd	20.4	(a) 19	(a)
Sm	7.43	(a) 7.4	(a)
Eu	1.8	(a) 1.5	(a)
Gd	11.3	(a)	
Tb	1.9	(a) 2.5	(a)
Dy	11.3	(a) 16.3	(a)
Ho			
Er			
Tm	0.98	(a)	
Yb	6.3	(a) 8.7	(a)
Lu	0.97	(a) 1.32	(a)
Hf	6.3	(a) 8.6	(a)
Ta	1.2	(a) 0.93	(a)
W ppb			
Re ppb			
Os ppb			
Ir ppb	5	(a) 5.2	(a)
Pt ppb			
Au ppb	6.3	(a) <4	(a)
Th ppm	0.81	(a) 1.1	(a)
U ppm	0.18	(a) 0.59	(a)

technique: (a) INAA

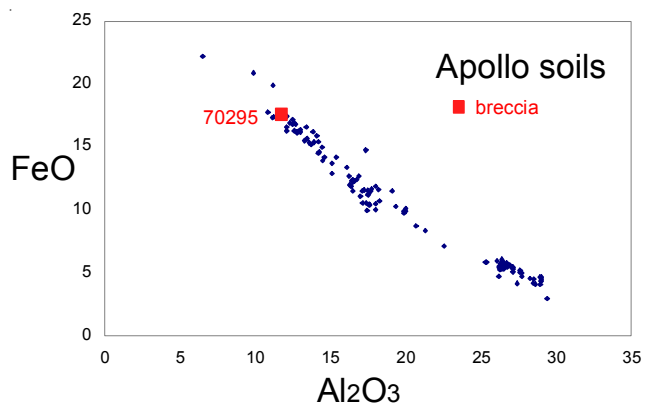


Figure 7: Composition of 70295 compared with lunar soil data.

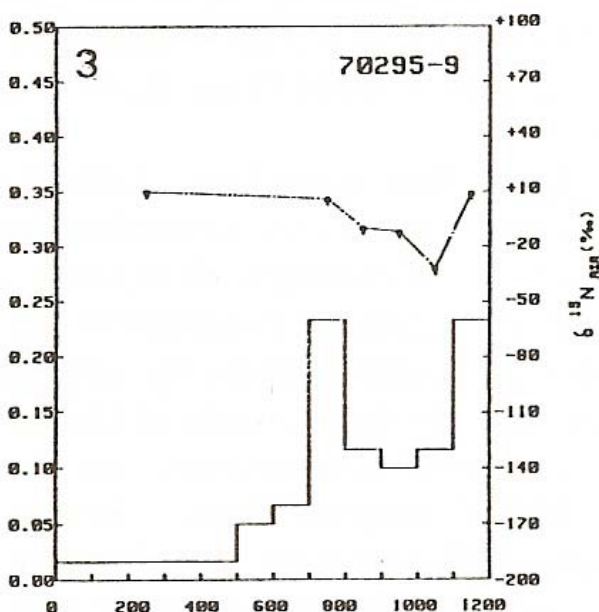
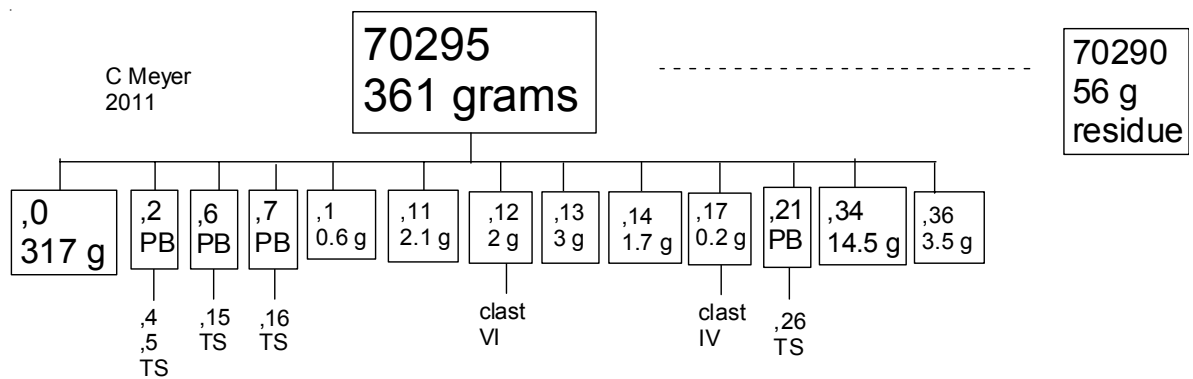


Figure 8: Nitrogen isotopes and nitrogen content as function of release temperature (Carr et al. 1985).



### References for 70295

Butler P. (1973) Lunar Sample Information Catalog Apollo 17. Lunar Receiving Laboratory. MSC 03211 Curator's Catalog. pp. 447.

Carr L.P., Wright I.P. and Pillinger C.T. (1985) Nitrogen abundance and isotopes in lunar breccias - a progress report (abs). *Lunar Planet. Sci.* **XVI**, 115-116. Lunar Planetary Institute, Houston.

Fruiland R.M. (1983) Regolith Breccia Workbook. Curatorial Branch Publication # 66. JSC 19045.

Jerde E.A., Warren P.H., Morris R.V., Heiken G.H. and Vaniman D.T. (1987) A potpourri of regolith breccias: "New" samples from the Apollo 14, 16 and 17 landing sites. *Proc. 17<sup>th</sup> Lunar Planet. Sci. Conf.* in *J. Geophys. Res.* **92**, E526-E536.

LSPET (1973a) Apollo 17 lunar samples : Chemical and petrographic description. *Science* **182**, 659-690.

LSPET (1973c) Preliminary examination of lunar samples. Apollo 17 Preliminary Science Report. NASA SP-330, 7-1—7-46.

Shearer C.K., Papike J.J., Galbreath K.C. and Shimizu N. (1991) Exploring the lunar mantle with secondary ion mass spectrometry: A comparison of lunar picritic glass beads from the Apollo 14 and Apollo 17 sites. *Earth Planet. Sci. Lett.* **102**, 134-147.

Simon S.B., Papike J.J. and Laul J.C. (1981) The lunar regolith: Comparative studies of the Apollo and Luna sites. *Proc. 12<sup>th</sup> Lunar Planet. Sci. Conf.* 371-388.

Wolfe E.W., Bailey N.G., Lucchitta B.K., Muehlberger W.R., Scott D.H., Sutton R.L and Wilshire H.G. (1981) The geologic investigation of the Taurus-Littrow Valley: Apollo 17 Landing Site. US Geol. Survey Prof. Paper, 1080, pp. 280.