

**10070**  
Regolith Breccia  
60.1 grams



*Figure 1: Photo of 10070,4. Scale is 5 cm across. NASA S75-34241.*

**Introduction**

10070 is a typical Apollo 11 regolith breccia. It has more matrix than most and a higher content of rare gas than the soil.

**Petrography**

Simon et al. (1984) included breccia 10070 in their comprehensive study of Apollo 11 regolith breccias – their mode is given in the table. They calculated that it had about 27 % highland component, but couldn't directly identify that many clasts of highland rock.

**Chemistry**

Rhodes and Blanchard (1981) found that the composition of 10070 was similar to that of the other regolith breccias and 10084 (figures 3 and 4).

**Other Studies**

Funkhouser et al. (1970) and Bogard et al. (1971) reported the abundance and isotopic composition of rare gases from 10070.

**Processing**

Apollo 11 samples were originally described and cataloged in 1969 and “recataloged” by Kramer et al. (1977). There are 3 thin sections. Some parts of 10070 were renumbered 10999, apparently because they are samples of an unknown basalt.

**Simon's Mode for 10070**

	<b>S</b>	<b>L</b>
Mare Basalt	6.4	6.3
Highland Component	0.7	
Regolith breccia	3.6	2.2
Agglutinate	7.8	3.8
Pyroxene	4.2	
Olivine	0.1	
Plagioclase	1.1	
Ilmenite	0.6	
Orange glass	1.8	0.2
Other glass	1.5	
Matrix	59.7 %	

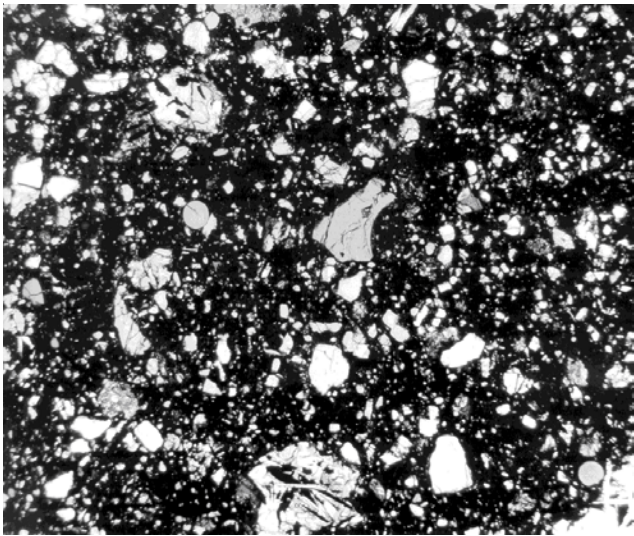


Figure 2: Photomicrograph of 10070,22. NASA S76-26308.

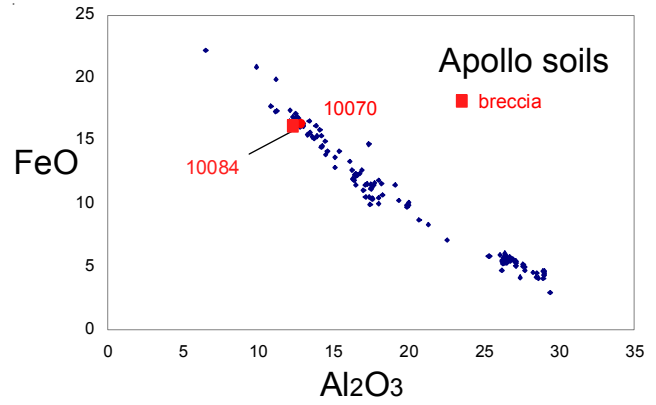


Figure 3: Composition of 10070 and 10084 compared with that of Apollo soil samples.

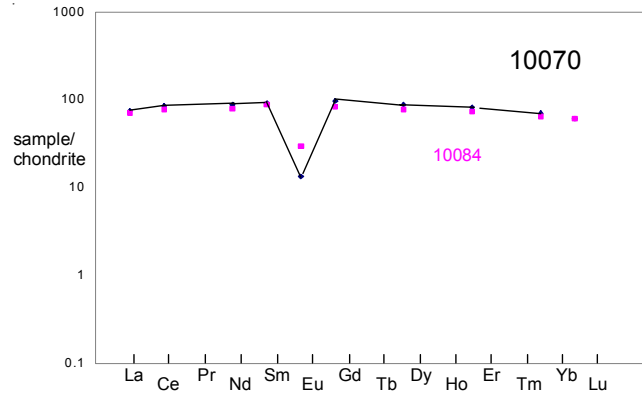
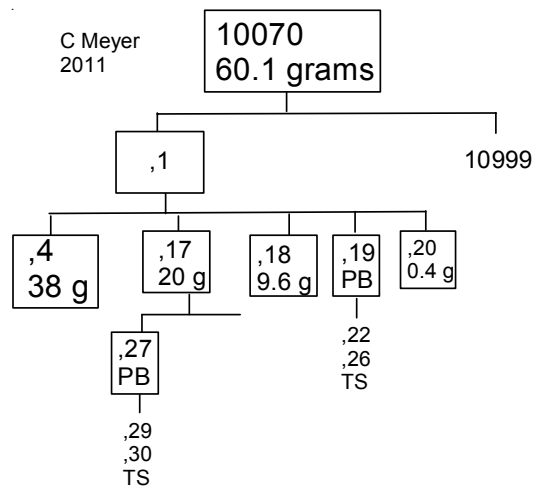


Figure 4: Normalized rare earth element diagram for breccia 10070 compared with soil 10084 (data from Wiesmann et al. 1975).



**Table 1. Chemical composition of 10070.**

reference weight	Rhodes81	Wiesmann75 51 mg	Goles70	
SiO2 %	42	(a)	44	
TiO2	7.47	(a)	8.3	
Al2O3	13.01	(a)	14	
FeO	15.71	(a)	16.2	
MnO	0.21	(a)	0.2	(c)
MgO	7.99	(a)	8.6	
CaO	11.81	(a)	12.3	
Na2O	0.44	(a)	0.5	(c)
K2O	0.19	(a) 0.18	(b)	
P2O5	0.14	(a)		
S %				
sum				
Sc ppm			57.4	(c)
V			82	(c)
Cr	2050	(a) 2100	(b) 1860	(c)
Co			37.3	(c)
Ni				
Cu			12	(c)
Zn				
Ga				
Ge ppb				
As				
Se				
Rb		3.73	(b)	
Sr		166	(b)	
Y				
Zr		344	(b) 360	(c)
Nb				
Mo				
Ru				
Rh				
Pd ppb				
Ag ppb				
Cd ppb				
In ppb				
Sn ppb				
Sb ppb				
Te ppb				
Cs ppm				
Ba		192	(b) 310	(c)
La		17.9	(b) 17.3	(c)
Ce		51.8	(b) 56	(c)
Pr				
Nd		40.2	(b)	
Sm		13.7	(b) 13.1	(c)
Eu		1.77	(b) 1.74	(c)
Gd		19.2	(b)	
Tb			3.1	(c)
Dy		21.6	(b)	
Ho			5.8	(c)
Er		13.1	(b)	
Tm				
Yb		11.5	(b) 14	(c)
Lu		1.5	(b) 1.8	(c)
Hf			12.8	(c)
Ta			1	(c)
W ppb				
Re ppb				
Os ppb				
Ir ppb				
Pt ppb				
Au ppb				
Th ppm				
U ppm		0.71	(b) 0.62	(c)

technique: (a) XRF, (b) IDMS, (c) INAA

**References for 10070**

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