

**10064**  
Regolith Breccia  
65 grams



Figure 1: Photo of 10064,6 showing abundant clasts in fine matrix. Sample is 5 cm across. NASA S76-20398.

**Introduction**

10064 is a typical Apollo 11 regolith breccias made up out of components found in the local soil.

**Petrography**

Simon et al. (1984) included breccia 10064 in their comprehensive study of Apollo 11 regolith breccias – their mode is given in the table. They calculated that it had about 19% highland component, but couldn't directly identify that many clasts of highland rock.

**Significant clast**

Simon et al. (1984) picture a nice clast of poikilitic rock in thin section 10064,30 (figure 5).

**Chemistry**

Rhodes and Blanchard (1981) found that the composition of 10064 was different from the other regolith breccias and 10084 (figure 3).

**Other Studies**

The total organic carbon content of 10064 was determined by hydrogen flame ionization pyrolysis (Ponnamperuma et al. 1970).

**Processing**

Apollo 11 samples were originally described and cataloged in 1969 and “recataloged” by Kramer et al. (1977). There are 4 thin sections.

**Simon's Mode for 10064**

	<b>S</b>	<b>L</b>
Mare Basalt	5.6	18.2
Highland Component	0.8	0.2
Regolith breccia	1.5	3
Agglutinate	3.6	2.2
Pyroxene	4.8	
Olivine	0.5	
Plagioclase	1.2	0.2
Ilmenite	1.2	
Orange glass	3	0.5
Other glass	1.4	1.2
Matrix	50.8 %	

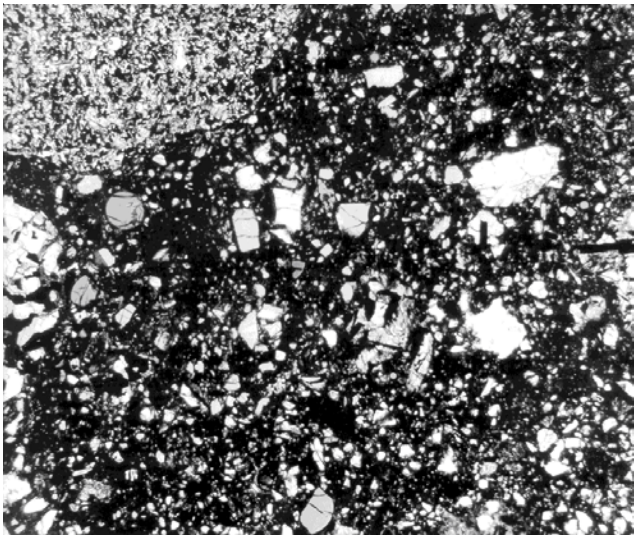


Figure 2: Photomicrograph of thin section 10064,25 showing basalt clasts, mineral fragments and glass bead in fine matrix. NASA S76-26320. Scale is 2.5 mm.

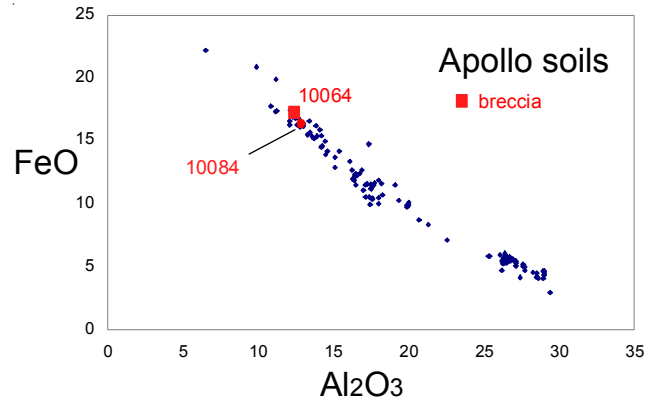


Figure 3: Composition of 10064 compared with 10084 and other Apollo soil samples.

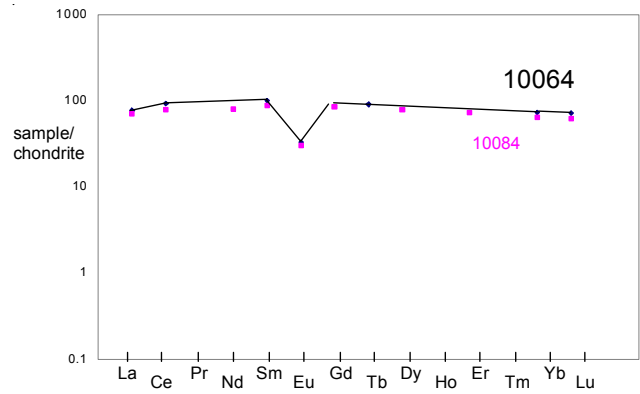


Figure 4: Normalized rare earth element diagram for breccia 10064 compared with soil 10084 (data from Rhodes et al. 1981).

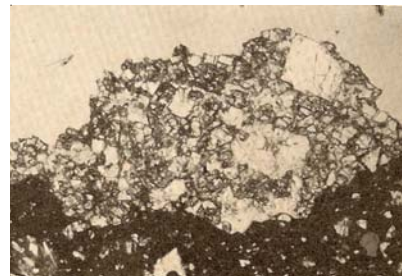
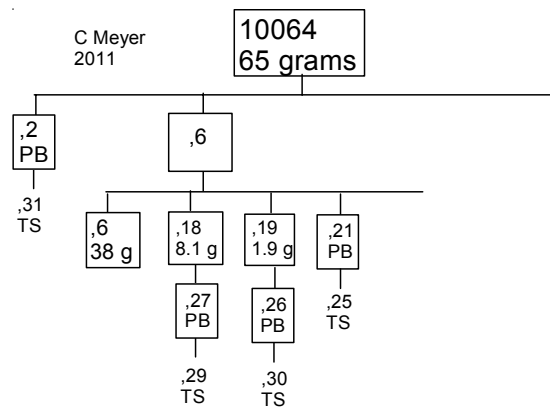


Figure 5: Poikilitic clast in 10064 (Simon et al. 1984).



**Table 1. Chemical composition of 10064.**

reference weight	Goles70	Rhodes81	
SiO <sub>2</sub> %	41.5	41.7	(b)
TiO <sub>2</sub>	9.3	8.55	(b)
Al <sub>2</sub> O <sub>3</sub>	10.9	11.61	(b)
FeO	16.5	16.99	(b)
MnO	0.21	(a) 0.25	(b)
MgO	7.1	7.91	(b)
CaO		11.52	(b)
Na <sub>2</sub> O	0.49	(a) 0.48	(b)
K <sub>2</sub> O		0.18	(b)
P <sub>2</sub> O <sub>5</sub>		0.11	(b)
S %			
sum			
Sc ppm	60.5	(a) 66	(a)
V	73	(a) 48	
Cr	1850	(a) 2230	
Co	29	(a) 28	
Ni		123	
Cu			
Zn		57	
Ga		8	
Ge ppb			
As			
Se			
Rb		4	
Sr		159	
Y		118	
Zr	520	(a) 363	
Nb		23	
Mo			
Ru			
Rh			
Pd ppb			
Ag ppb			
Cd ppb			
In ppb			
Sn ppb			
Sb ppb			
Te ppb			
Cs ppm			
Ba	290	(a) 250	
La	19.6	(a) 18.1	
Ce	59	(a) 57	
Pr			
Nd			
Sm	15.5	(a) 14.9	(a)
Eu	1.77	(a) 1.84	(a)
Gd			
Tb	3.7	(a) 3.3	(a)
Dy			
Ho	5.5	(a)	
Er			
Tm			
Yb	14.8	(a) 12	(a)
Lu	2.46	(a) 1.74	(a)
Hf	13.9	(a) 12	(a)
Ta	1.7	(a) 1.7	(a)
W ppb			
Re ppb			
Os ppb			
Ir ppb			
Pt ppb			
Au ppb			
Th ppm		2.4	(a)
U ppm	0.65	(a)	

technique : (a) INAA, (b) XRF

**References for 10064**

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