

12057
Soil and particles
650 grams



Figure 1: Coarse-fine particles from 12057 on 1 mm sieve. S69-60959.

Introduction

12057 consists of fines and chips from the bottom of the D-ALSRC (Warner 1970). As such it is probably not a typical soil, because it contains chips and fragments from the large samples returned in the same box. In any case it is soil that was collected from throughout the entire traverse.

Petrography

The maturity index for 12057 (fines) is $I_s/FeO = 40$ (Morris 1987). King et al. (1971) and Quaide et al. (1971) determined the grain size distribution with average grain size 72 and 84 microns, respectively. Frondel et al. (1971) determined the mineral mode, but did not specify agglutinates. McKay et al. (1971) reported 24 % “glazed aggregates”.

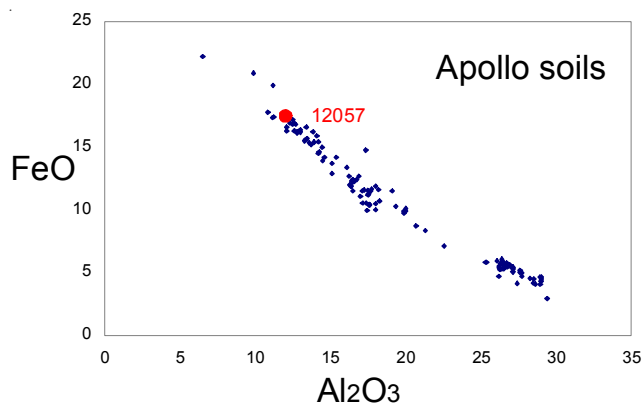


Figure 2: Composition of 12057 fines compared with other Apollo soils.

Mineralogical Mode

Frondel et al. 1971

Olivine +	
Pyroxene	56.3 %
Plagioclase	26.1
Opauques	7.5
Glass, angular	6.1
Glass, rounded	3.4
Silica	0.7

Mineralogical Mode (250-1000 microns)

McKay et al. (1971)

Glazed	
Aggregates	24 %
Single xtl.	26
Glasses	32
Rocks	9
Breccias	7
Spherules	0.7



Figure 3: Close-up photo of coarse-fines from 12057 (figure 1). S69-60961.



Figure 4: Largest (> 1 cm) particles from 12057 (from bottom of rock box). S69-60962.

Keil et al. (1971), Bunch et al. (1972) and Busche et al. (1971) studied small lithic particles and glasses from 12057.

Dence et al. (1971) studied the textures and mineral chemistry of a large basalt particle from 12057 (figure 5). Carter et al. (1971), Sclar (1971) and Engelhardt

et al. (1971) all reported on the shock features of basalt particles from 12057.

Billy Glass (1971) carefully studied the glass particles from different size fractions of 12057.



Figure 5: Thin section photo of 12057, 35 (Dence et al. 1971).

The carbon and nitrogen contents of 12057 have not been reported.

Other Studies

Arrhenius et al. (1971) studied the frequency of grains with high fossil nuclear tracks in 12057 (and all other Apollo 12 soil and core samples).

Processing

The D-ALSRC leaked air and was at about 0.5 atmosphere when opened in the LRL. The samples were then studied in nitrogen.

Chemistry

Compston et al. (1971) found that 12057 was high in FeO (figure 2). Frondel et al. (1971) reported an analysis of a finer fraction. A proper analysis of the REE content has not been made.

Several large chips of basalt were separated from the fines. It is not known if they were pieces of the large rocks returned in the D-ALSRC, or whether they are separate samples.

There are a large number of thin sections of the basalt particles – see flow diagram.

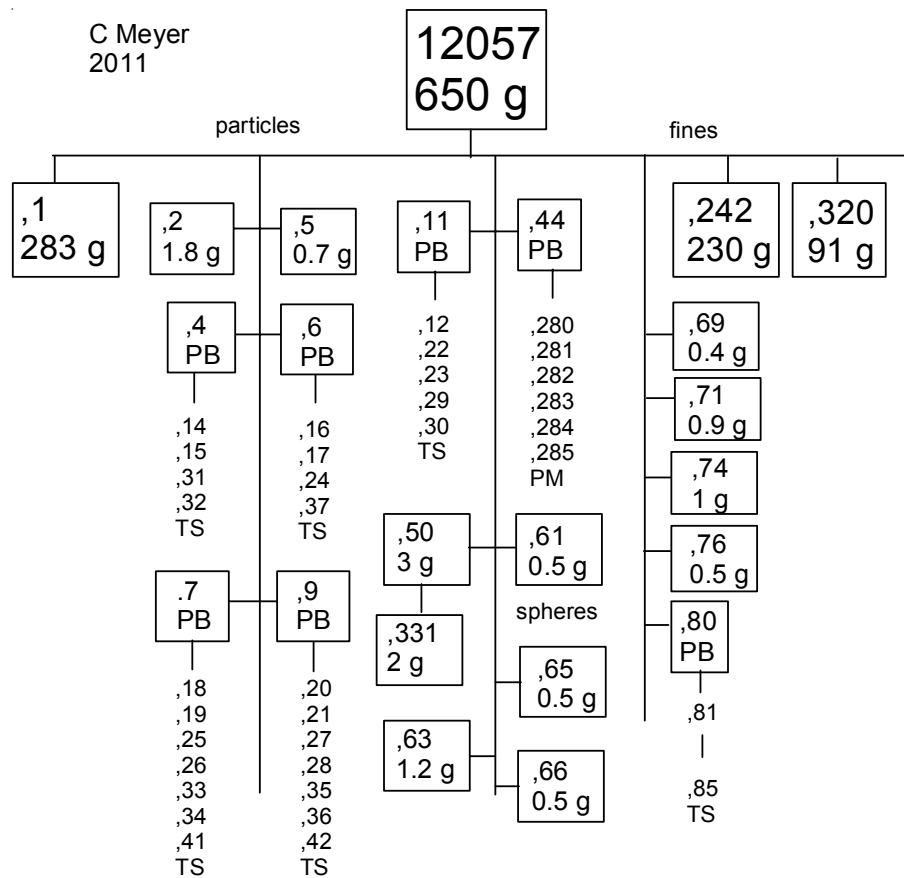


Table 1. Chemical composition of 12057.

reference weight	Compston71	Frondel71	Laul71
SiO ₂ %	45.74 (a)	45.8 (b)	
TiO ₂	2.91 (a)	2.9 (b)	
Al ₂ O ₃	12.13 (a)	14.5 (b)	
FeO	17.43 (a)	15.4 (b)	
MnO	0.23 (a)	0.23 (b)	
MgO	9.9 (a)	9.5 (b)	
CaO	10.44 (a)	10.8 (b)	
Na ₂ O	0.45 (a)	0.45 (b)	
K ₂ O	0.25 (a)	0.26 (b)	
P ₂ O ₅	0.26 (a)		
S %	0.07 (a)		
sum			
Sc ppm			
V	97 (a)		
Cr	2410 (a)	1984 (b)	
Co	40 (a)		125 (c)
Ni	158 (a)		
Cu	7 (a)		
Zn	8 (a)		6.9 (c)
Ga	2.4 (a)		3.5 (c)
Ge ppb			
As			
Se			0.19 (c)
Rb	6.36 (a)		5.1
Sr	142.8 (a)		
Y	114 (a)		
Zr	497 (a)		
Nb	29 (a)		
Mo			
Ru			
Rh			
Pd ppb			
Ag ppb			43 (c)
Cd ppb			34 (c)
In ppb			1280 (c)
Sn ppb			
Sb ppb			
Te ppb			60 (c)
Cs ppm			0.22 (c)
Ba	370 (a)		
La	33 (a)		
Ce	90 (a)		
Pr			
Nd			
Sm			
Eu			
Gd			
Tb			
Dy			
Ho			
Er			
Tm			
Yb			
Lu			
Hf			
Ta			
W ppb			
Re ppb			
Os ppb			
Ir ppb			5 (c)
Pt ppb			
Au ppb			5.7 (c)
Th ppm	5.8 (a)		
U ppm	1.2 (a)		
technique:	(a) XRF, (b) wet, (c) RNAA		

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