15012

Trench Soil (vacuum container)

312.2 grams

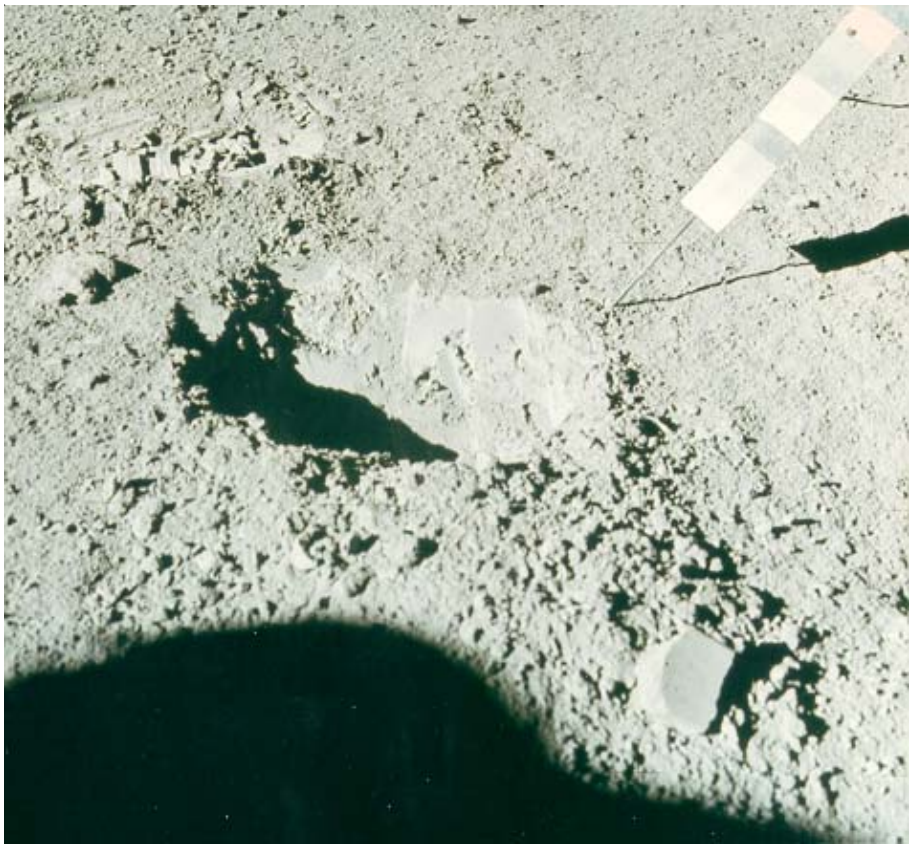


Figure 1: Trench at Apollo 15, station 6 . AS15-86-11643. 15012 and 15260 were collected from the bottom of this trench (~25 cm?).

Introduction

15012 was collected from the bottom of a small trench at station 6 – along with sample 15260 (Swann et al. 1972, 1973). It was returned in a special environmental sample container (SESC). The trench is ~20-25 cm deep, but some slumping may have occurred (figure 1). The trench was dug in the rim of a 12 meter crater.

Samples of 15012 and 15260 have never been directly compared to see what difference there is with respect to the processing done at Berkeley and the LRL. 15012 was not sieved and should be drier.

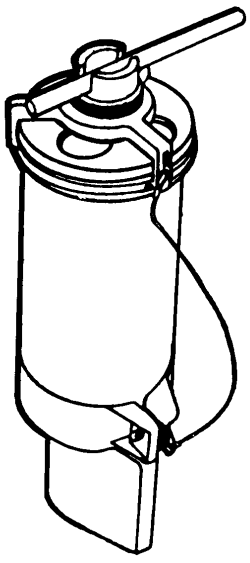


Figure 2: SESC used to collect 15012 from bottom of trench (drawing from Allton 1989).

Petrography

15012 is a mature soil based on I_s/FeO = 66. The maturity of 15261, from the same trench, was 77 (Morris 1978). The agglutinate content of 15261 was

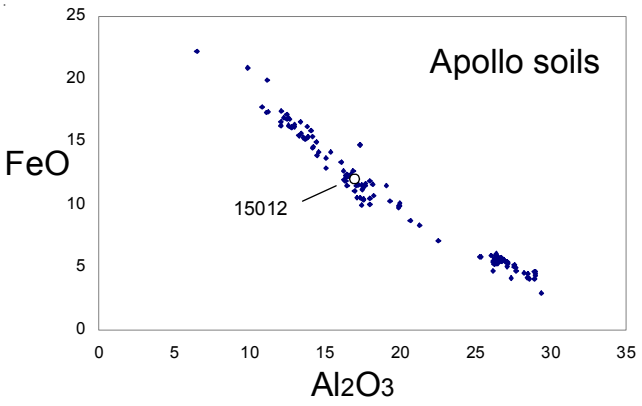


Figure 3: Composition diagram for all Apollo soil samples, with composition of 15012 indicated.

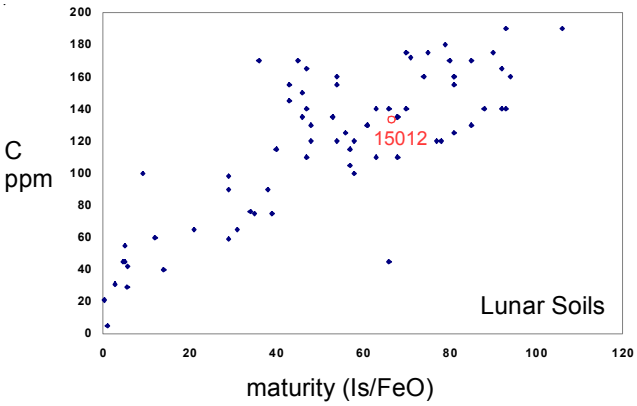
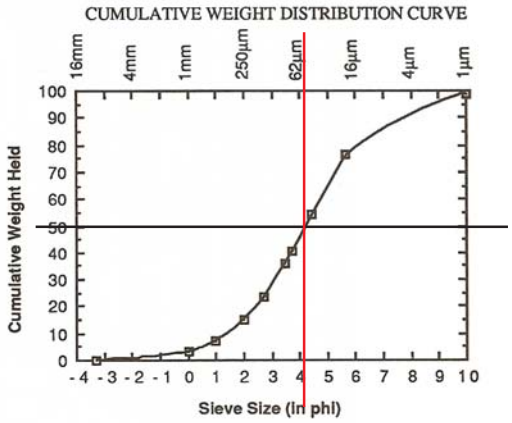


Figure 4: Carbon content and maturity of 15012 compared with that of other lunar soils. Data from Kaplan et al. (1976) and Morris (1977).



Average grain size = 53 microns

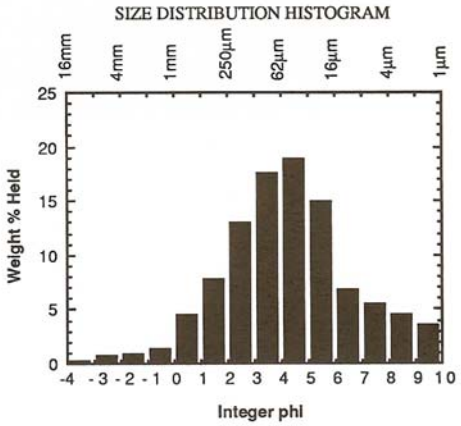


Figure 5: Grain size distribution for 15012 (Graf 1993).

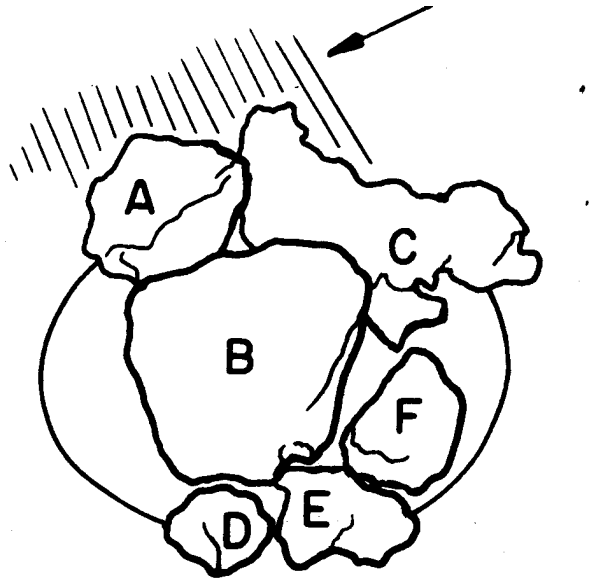


Figure 6a: Sketch of particles found in 15012 . The scratches are 1 mm apart (from Burlingame et al. 1972).

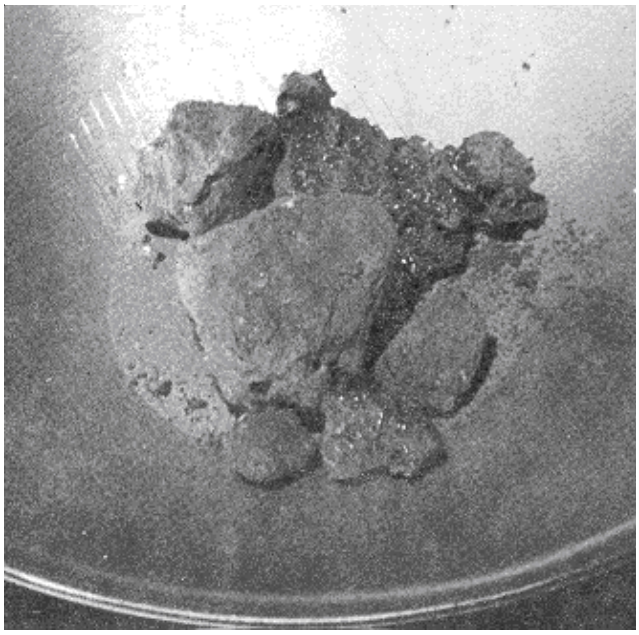


Figure 6b: Photo of particles found in 15012 (from Burlingame et al. 1972).

Figure 7: The largest particle 15012,B

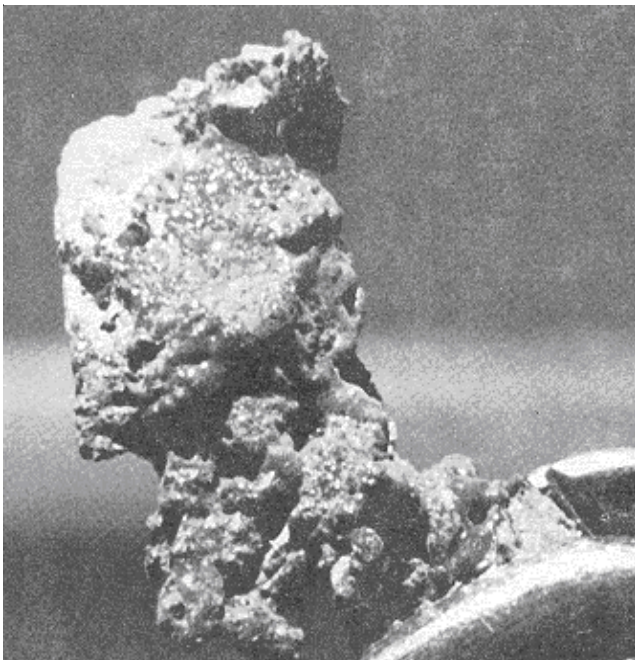


Figure 8: Another large particle 15012,C

Figure 9a: Additional particles found in 15012 (from Burlingame 1972).

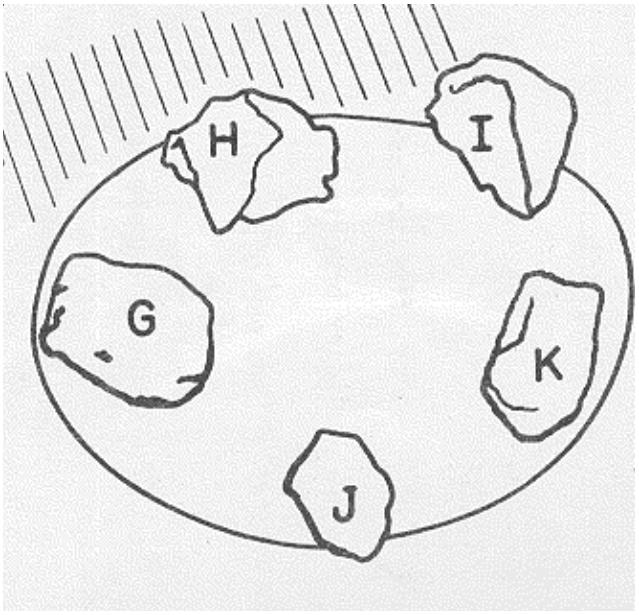


Figure 9b: Sketch of additional particles found in 15012 (mm scale). Also Burlingame et al. 1972.

~50%. The grain size analysis (figure 5) shows the average grain size is 53 microns.

Eleven small pebbles were encountered and separated from the SESC 15012 fines material (Burlingame 1972). These are illustrated here as figures 6 – 9 and were all placed in UCB #96. They do not seem to have been studied further.

Mineralogical Mode

Not determined –see 15261.

Chemistry

The only bulk chemical analysis of 15012 is by Christian et al. (1976), which seems to match that of 15260 collected from the bottom of the same trench

Table 1. Chemical composition of 15012.

reference	Christian76		Korotev87	
weight			15260 for comparison	
SiO2 %	46.77	(a)		
TiO2	1.46	(a)	1.5	(b)
Al2O3	16.75	(a)	16.4	(b)
FeO	12.4	(a)	12.3	(b)
MnO	0.17	(a)	0.16	(b)
MgO	10.35	(a)	10.7	(b)
CaO	10.95	(a)	11	(b)
Na2O	0.45	(a)	0.44	(b)
K2O	0.21	(a)		
P2O5	0.22	(a)		
S %				
sum				
Sc ppm			23.8	(b)
V				
Cr	2053	(a)	2260	(b)
Co			40.9	(b)
Ni			247	(b)
Cu				
Zn				
Ga				
Ge ppb				
As				
Se				
Rb				
Sr			150	(b)
Y				
Zr			330	(b)
Nb				
Mo				
Ru				
Rh				
Pd ppb				
Ag ppb				
Cd ppb				
In ppb				
Sn ppb				
Sb ppb				
Te ppb				
Cs ppm			0.29	(b)
Ba			251	(b)
La			25.4	(b)
Ce			66	(b)
Pr				
Nd			38	(b)
Sm			11.9	(b)
Eu			1.39	(b)
Gd				
Tb			2.33	(b)
Dy				
Ho				
Er				
Tm				
Yb			8.1	(b)
Lu			1.2	(b)
Hf			9.2	(b)
Ta			1.13	(b)
W ppb				
Re ppb				
Os ppb				
Ir ppb			7.5	(b)
Pt ppb				
Au ppb			107	(b)
Th ppm			4.2	(b)
U ppm			1.13	(b)

technique: (a) mcirochemical, (b) INAA

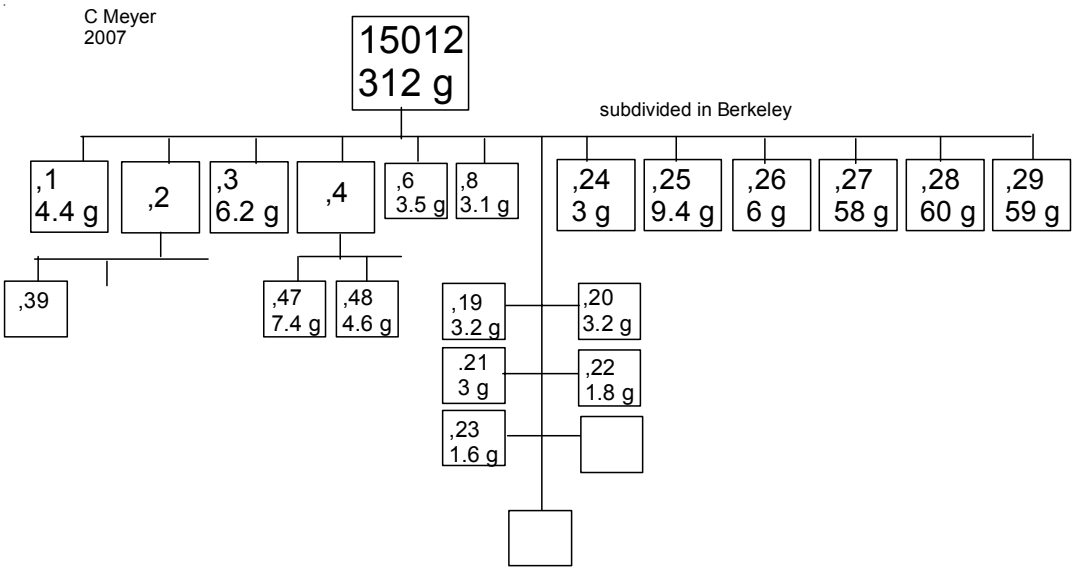
(table 1). Moore et al. (1972), Des Marais et al. (1974), Kothari and Goel (1973), Chang et al. (1994) and Kaplan et al. (1976) determined the C and N content (and isotopic ratios). These values are similar to those of 15261 and consistent with the maturity (figure 4). Moore et al. reported 140 ppm C while Des Marais et al. reported 74 ppm C. Muller (1973) and Kothari and Goel (1973) reported 106 ppm and 110 ppm nitrogen, respectively.

Other Studies

Fox et al. (1973) reported trace amounts of amino acids (?) in 15012.

Processing

SESC container 15012 was returned in ALSRC#2 – which leaked N_2. It was transferred directly to Burlingame and opened in He cabinet in Berkeley (Simoneit et al. 1971). Subsamples of 15012 were widely distributed to PIs directly from the Berkeley Lab (Burlingame et al. 1971).



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