

12042
Soil
255 grams

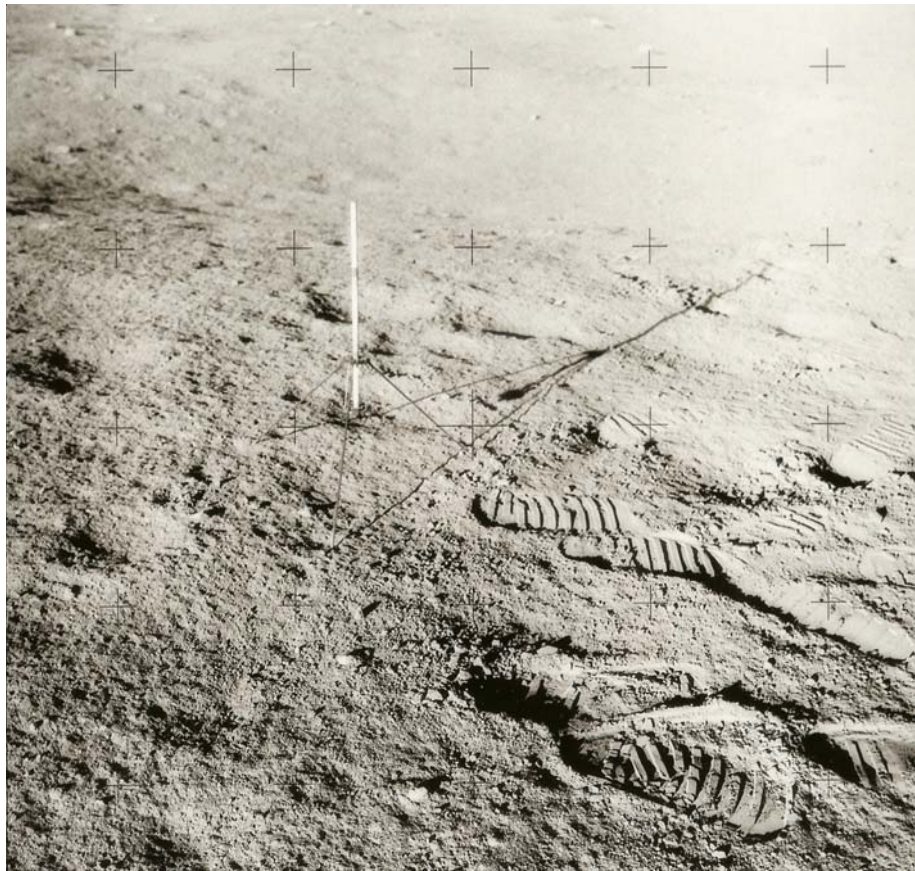


Figure 1: Photo of location of 12042 (Halo Crater). AS12-48-7072

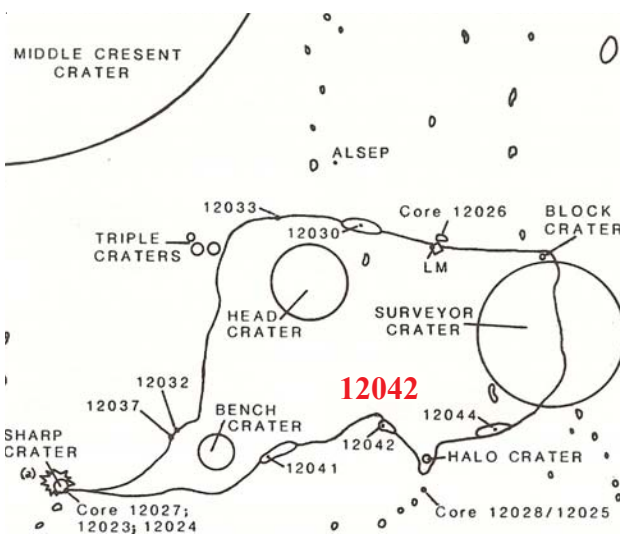


Figure 2: Location of 12042 on Apollo 12 map.

Introduction

12042 are fines collected in documented bag 12. They were from the outer flank of Surveyor Crater (figure 2).

Petrography

The maturity index for 12042 is $I_s/FeO = 61$ (Morris 1987). Frondel et al. (1971) determined the mineral mode, but did not specify agglutinates. The average grain size is 58 or 95 microns, depending on who sieved the sample (figure 5 a,b).

Marvin (1978) cataloged the coarse particles. Simon and Papike (1985) describe one particles from 12042.

Chemistry

The chemical composition is summarized in figures 3 and 6.

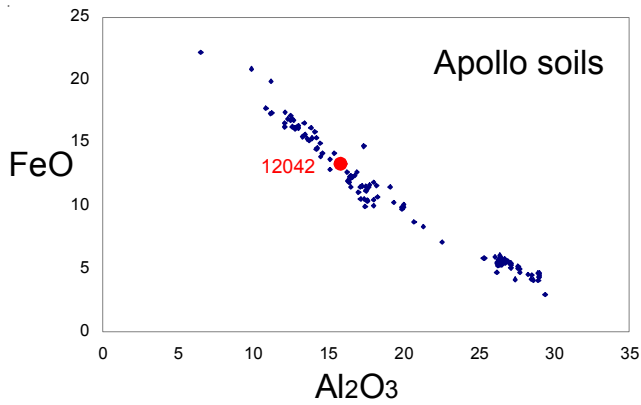


Figure 3: Composition of 12042 compared with that of other Apollo soils samples.

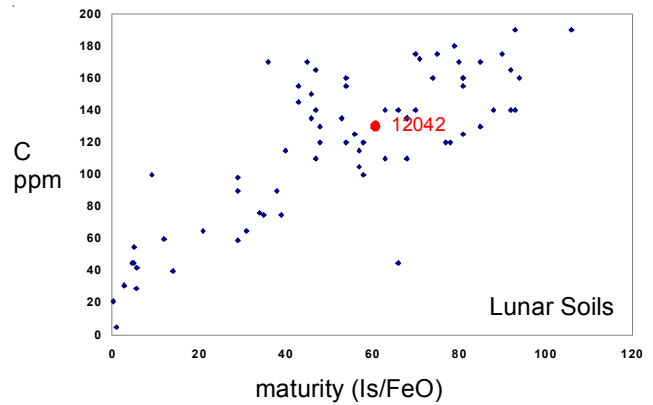


Figure 4: Carbon content and maturity index of 12042 compared with other Apollo soil samples.

The total carbon content of 12042 was reported by Epstein and Taylor (1971) as 125 ppm. Moore et al. (1971) determined 130 ppm C in two splits (figure 4). They also found 130 ppm nitrogen in 12042. Kaplan and Petrowski (1971) found 111 ppm C. Kerridge et al. (1978) found 121 ppm C and 74 ppm N, while

Other Studies

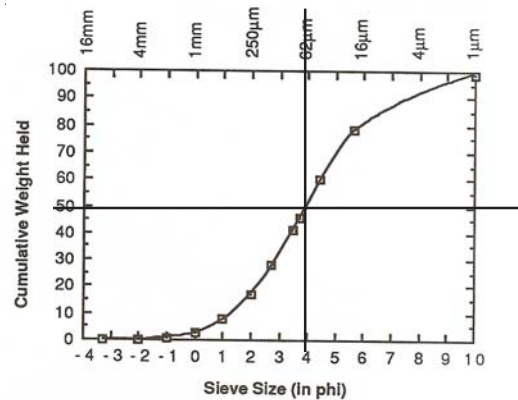
Heymann et al. (1972) reported rare gas content and isotopic ratios of 12042.

Arrhenius et al. (1971) studied the frequency of grains with high fossil nuclear tracks in 12042 (and all other Apollo 12 soil and core samples)(see diagram in 12070).

Mineralogical Mode

Frondel et al. 1971

Olivine +	
Pyroxene	63.2 %
Plagioclase	11.6
Opakes	14.3
Glass, angular	8.2
Glass, rounded	1.6
Silica	1.1



average grain size = 58 microns

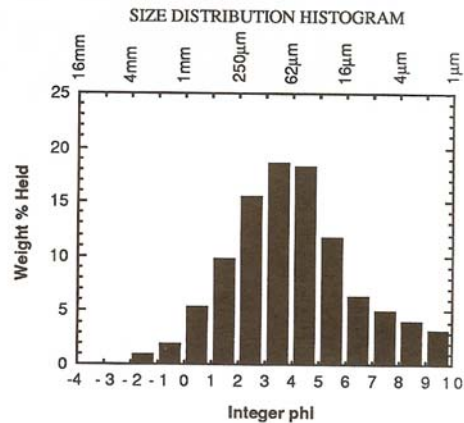


Figure 5a: Grain size distribution for 12042 (Graf 1993, from data by McKay et al. 1971).

Table 1. Chemical composition of 12042.

reference weight	Morrison71	Frondel71	Cuttitta71	Haskin71	
SiO ₂ %		46.1	(a) 45.7	(a)	
TiO ₂	2.33	(d) 3.2	(a) 2.71	(a)	
Al ₂ O ₃	13.23	(d) 15.1	(a) 13	(a)	
FeO	17.6	(d) 14.1	(a) 16.2	(a)	
MnO	0.22	(d) 0.21	(a) 0.24	(a)	
MgO	8.23	(d) 9.8	(a) 10.4	(a)	
CaO	12.2	(d) 10.9	(a) 10.6	(a)	
Na ₂ O	0.35	(d) 0.41	(a) 0.54	(a)	
K ₂ O	0.17	(d) 0.26	(a) 0.25	(a)	
P ₂ O ₅			0.33	(a)	
S %					
sum					
Sc ppm	34	(d)	38	(b)	
V	150	(d)	108	(b)	
Cr	2700	(d) 2258	(a) 2668	(a)	
Co	52	(d)	52	(b)	
Ni			235	(b)	
Cu	10	(d)	10	(b)	
Zn	8.5	(d)	7.5	(b)	
Ga	4	(d)	4.4	(b)	
Ge ppb					
As	0.03	(d)			
Se					
Rb	9.9	(d)	5.5	(b)	
Sr			110	(b)	
Y			128	(b)	
Zr	390	(d)	482	(b)	
Nb			26	(b)	
Mo					
Ru					
Rh					
Pd ppb					
Ag ppb					
Cd ppb					
In ppb					
Sn ppb					
Sb ppb	35	(d)			
Te ppb					
Cs ppm	0.2	(d)			
Ba	510	(d)	445	(b)	
La	42	(d)	48	(b) 36.8	(c)
Ce	110	(d)		111	(c)
Pr					
Nd	67	(d)		79	(c)
Sm	24	(d)		19.7	(c)
Eu	2.3	(d)		2.03	(c)
Gd	30	(d)		22.5	(c)
Tb	4.7	(d)		3.87	(c)
Dy				25.8	(c)
Ho	6.1	(d)		4.46	(c)
Er				14	(c)
Tm					
Yb	18	(d)	14	(b) 13.8	(c)
Lu	2.1	(d)		2.09	(c)
Hf	11	(d)			
Ta	1.4	(d)			
W ppb	970	(d)			
Re ppb					
Os ppb					
Ir ppb					
Pt ppb					
Au ppb					
Th ppm	6.1	(d)			
U ppm	1	(d)			

technique: (a) wet, (b) OES, (c) INAA, (d) various

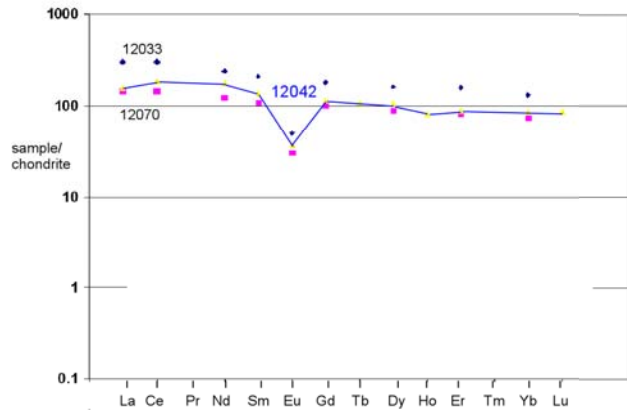
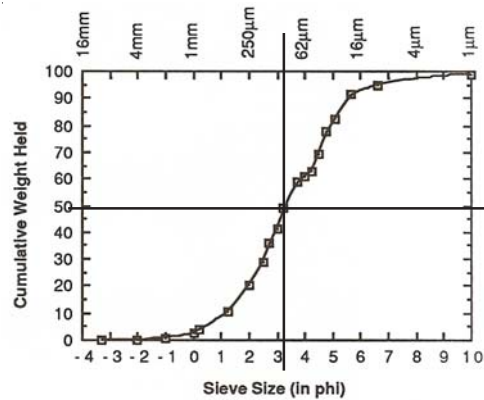


Figure 6: Normalized rare-earth-element diagram for 12042 (data by Haskin et al. 1971).



average grain size = 95 microns

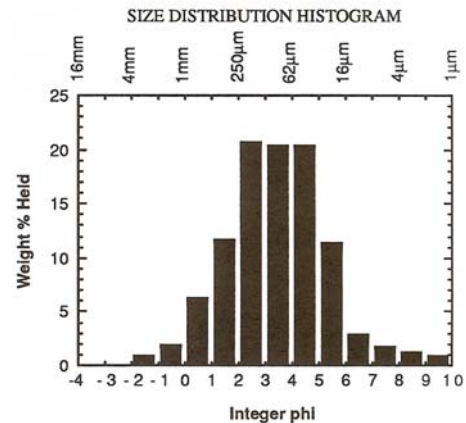
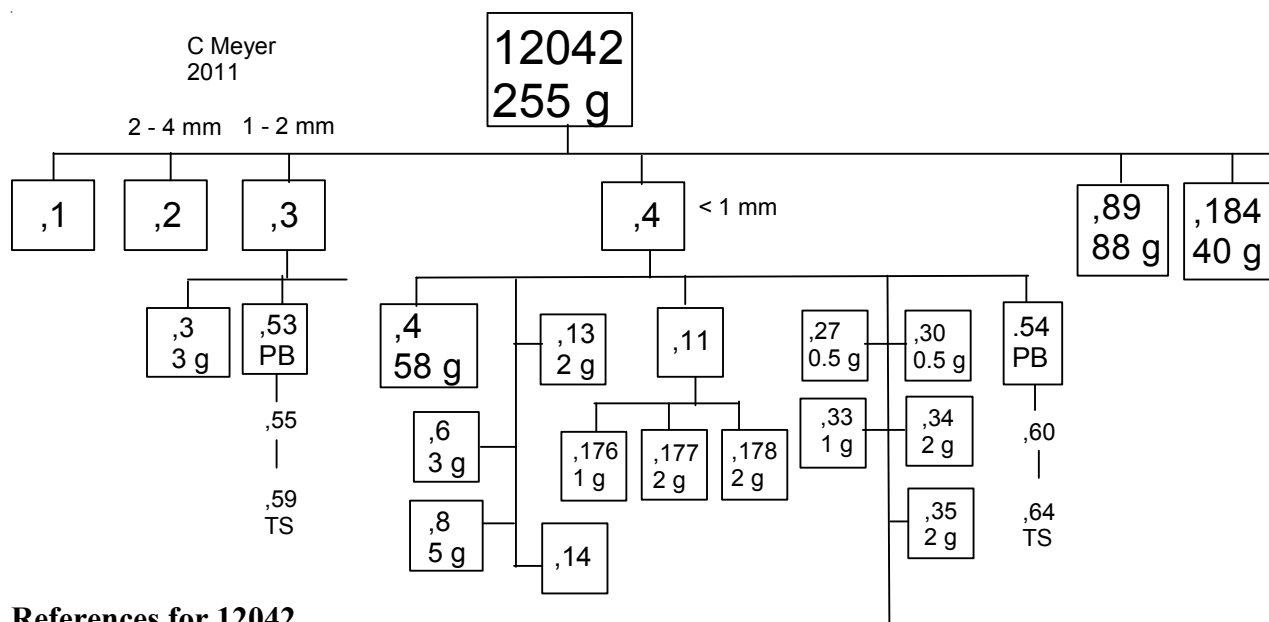


Figure 5b: Grain size distribution for 12042 (Graf 1993, from data by King et al. 1971).



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