72141

Soil

352 grams

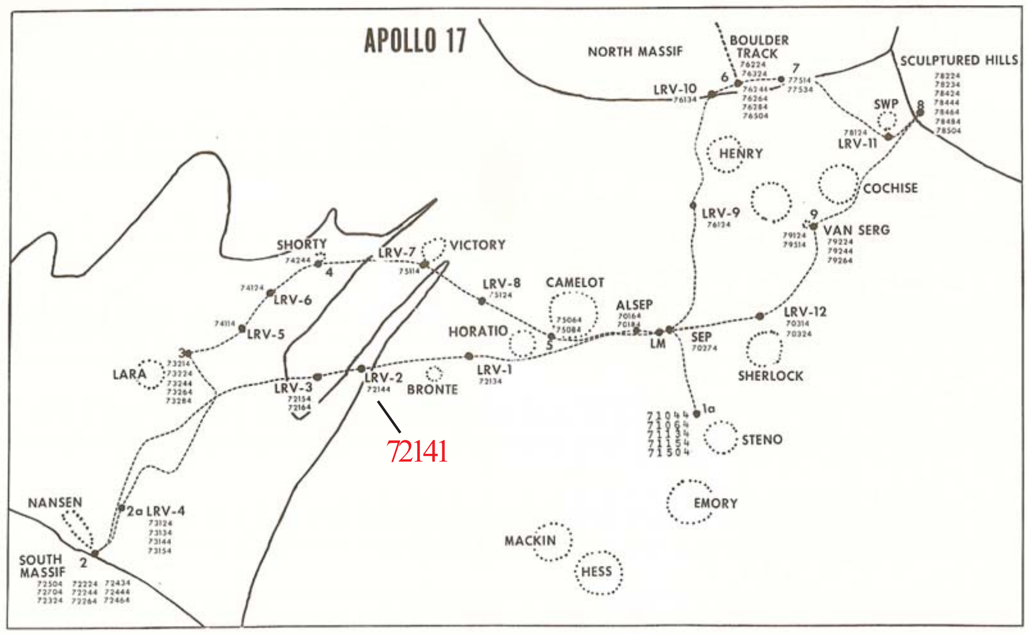


Figure 1: Location of soil sample 72140 at LRV-2 on Apollo 17 map (Meyer 1973). S73-24071

CDR You can't see the contact as you cross it but we know we're coming into something lighter – you can obviously see it.

LMP Yes. We ought to sample the rim of one of these craters when we get our LRV sample, because that's what's distinctly lighter. Can you get on the rim of that crater? Right to the right there. Right here – that light stuff.

CDR Yes. I can get there. We are in the light mantle. It's not a contrasting light like you might expect, or like we're looking at on the scarp as the sun shines on it - -

LMP Yes. The craters that penetrate into it are definitely different. However, the surface texture is unchanged. There may be fewer blocks.

Introduction

72140 – 72144 was collected when the astronauts first reached the "light mantle" (figure 1). It was from a rim of a small carter at LRV – 2 (see transcript).

Petrography

The maturity index of 72141 is $I_s/FeO = 81$ and the average grain size is 48 microns (Morris 1978, Graf 1993). The agglutinate count is 51% (Heiken and McKay 1974).

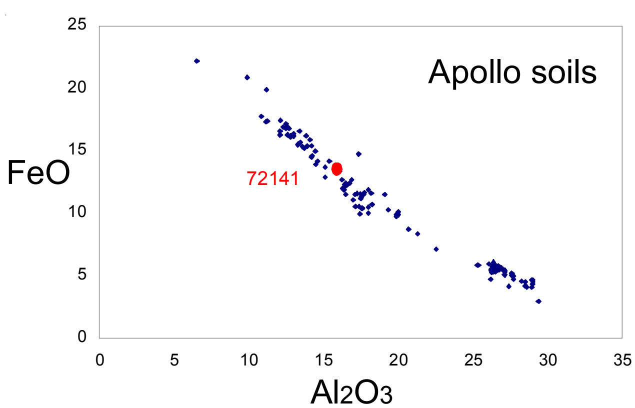


Figure 2: Chemical composition of 72141 compared with other lunar soils.

Modal content of soil 72141 (90-150 micron).

From Heiken and McKay 1974.

	72141
Agglutinates	50.6
Basalt	7.2
Breccia	9.6
Anorthosite	1.3
Norite	0.3
Gabbro	0.3
Plagioclase	9
Pyroxene	7
Olivine	
Ilmenite	0.6
Orange glass	1.3
Glass other	11.8

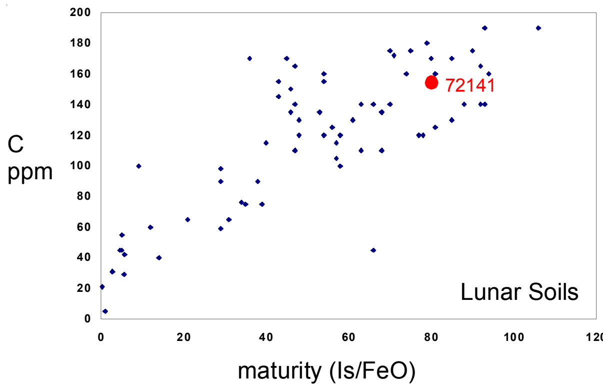


Figure 3: Carbon content and maturity index for 72141 compared with other lunar soils.

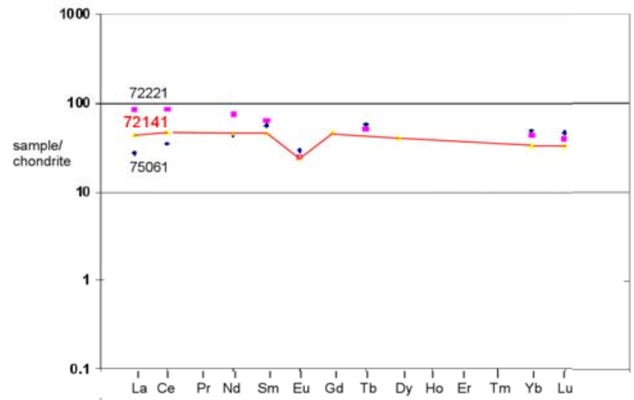


Figure 4: Normalized rare-earth-element diagram for 72141 - showing slight contribution of highland component.

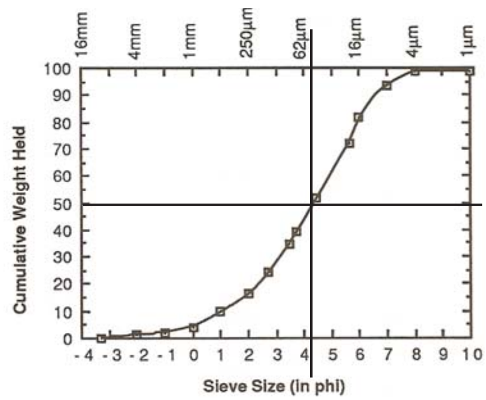
Chemistry

The FeO content (13.5%) of 72141 is only slightly less than for 72131 (16.5%) from the previous stop, and is intermediate in composition between mare and highland material (figures 2 and 4).

Moore et al. (1974) determined 155 ppm carbon (figure 3).

Other Studies

Heymann et al. (1974) reported the rare gas content.



average grain size = 48 microns

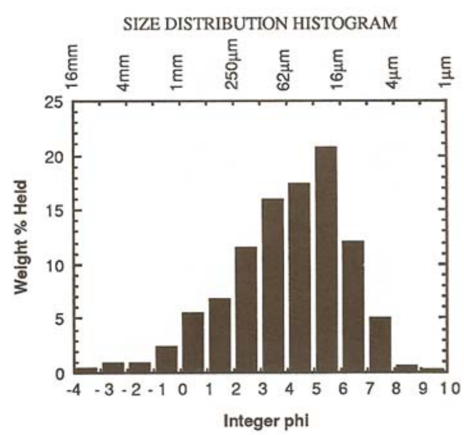
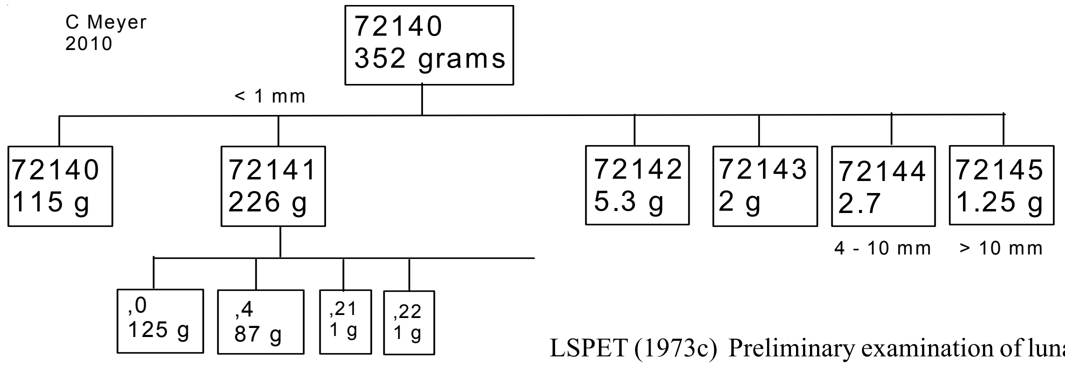


Figure 5: Grain size distribution for 72140 (Graf 1993, data by McKay).

Table 1. Chemical composition of 72141.

reference	Rhodes74		Rhodes74		Philpotts74		Wanke74		Miller74
weight			Wiesmann76						
SiO2 %	43.11	(a)					43	(c)	44.3
TiO2	4.37	(a)					4.39	(c)	4.5
Al2O3	16.1	(a)					15.8	(c)	16
FeO	13.45	(a)					13.35	(c)	13.4
MnO	0.19	(a)					0.177	(c)	0.17
MgO	10.25	(a)					9.88	(c)	9.9
CaO	11.83	(a)					11.75	(c)	11.76
Na2O	0.4	(a)					0.4	(c)	0.4
K2O	0.12	(a)	0.106	(b)	0.101	(b)	0.106	(c)	
P2O5	0.1	(a)					0.096	(c)	
S %	0.09	(a)							
sum									
Sc ppm							35.8	(c)	
V									
Cr	2531	(a)					2370	(c)	
Co							38.2	(c)	
Ni	271	(a)					230	(c)	
Cu									
Zn	50	(a)							
Ga									
Ge ppb									
As									
Se									
Rb	2.2	(a)	2.263	(b)	2.19	(b)			
Sr	153	(a)	156	(b)	154	(b)	180	(c)	
Y	53	(a)							
Zr	197	(a)	175	(b)	191	(b)			
Nb	15	(a)							
Mo									
Ru									
Rh									
Pd ppb									
Ag ppb									
Cd ppb									
In ppb									
Sn ppb									
Sb ppb									
Te ppb									
Cs ppm									
Ba			119	(b)	120	(b)			
La			10.2	(b)			10.9	(c)	
Ce			28.2	(b)	27.7	(b)	28	(c)	
Pr							4.2	(c)	
Nd			20.7	(b)	20.7	(b)			
Sm			6.71	(b)	6.69	(b)	6.78	(c)	
Eu			1.35	(b)	1.41	(b)	1.39	(c)	
Gd			9	(b)	8.66	(b)	9.9	(c)	
Tb							1.5	(c)	
Dy			9.82	(b)	9.73	(b)	11	(c)	
Ho							2.5	(c)	
Er			5.72	(b)	5.68	(b)	6.3	(c)	
Tm									
Yb			5.28	(b)	5.29	(b)	5.62	(c)	
Lu					0.819	(b)	0.74	(c)	
Hf							5.64	(c)	
Ta							0.77	(c)	
W ppb									
Re ppb									
Os ppb									
Ir ppb							25	(c)	
Pt ppb									
Au ppb							10	(c)	
Th ppm									
U ppm			0.45	(b)			0.3	(c)	

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



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