

15105

Olivine-phyric Basalt

5.6 grams



Figure 1: Photo of 15105 with 1 inch cube for scale. S71-43408.

Introduction

According to Swann et al. (1972), lunar basalt 15105 was a small rock (peanut) collected with soil from station 2 at Apollo 15 (figure 1). It is a fine-grained, olivine-normative mare basalt with relic olivine phenocrysts (figure 2).

Petrography

Dowty et al. (1973) determined the composition of minerals in 15105. Plagioclase is An₉₀, relic resorbed olivine phenocrysts are Fo₆₀₋₇₀, while fayalite is found in mesostasis, pyroxene is highly zoned (figure 3). Metallic Ni-Fe grains have 1.5-2.3% Co and 4.4-8.2% Ni. Opaques include ilmenite, chromite and ulvöspinel.

Chemistry

Ma et al. (1976) determined the chemical composition of 15105 (table). It is similar to other Apollo 15 mare basalt samples (figures 4 and 5).

References for 15105

Butler P. (1971) Lunar Sample Catalog, Apollo 15. Curators' Office, MSC 03209

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Dowty E., Keil K. and Prinz M. (1974c) Lunar pyroxene-phyric basalts: Crystallization under supercooled conditions. *J. Petrology* **15**, 419-453.

Dowty E., Conrad G.H., Green J.A., Hlava P.F., Keil K., Moore R.B., Nehru C.E. and Prinz M. (1973a) Catalog of

Mineralogical Mode

Olivine	4
Pyroxene	63
Plagioclase	24
Opaques	8
Silica	0.4
Mesostasis	0.6

Apollo 15 rake samples from stations 2 (St. George), 7 (Spur Crater) and 9a (Hadley Rille). *Inst. Meteoritics Spec. Publ. No 11*, 51-73. Univ. New Mex. ABQ.

Lofgren G.E., Donaldson C.H. and Usselman T.M. (1975) Geology, petrology and crystallization of Apollo 15 quartz-normative basalts. *Proc. 6th Lunar Sci. Conf.* 79-99.

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LSPET (1972b) Preliminary examination of lunar samples. Apollo 15 Preliminary Science Report. NASA SP-289, 6-1—6-28.

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Nehru C.E., Prinz M., Dowty E. and Keil K. (1974) Spinel-group minerals and ilmenite in Apollo 15 rake samples. *Am. Mineral.* **59**, 1220-1235.

Ryder G. (1985) Catalog of Apollo 15 Rocks (three volumes). Curatorial Branch Pub. # 72, JSC#20787

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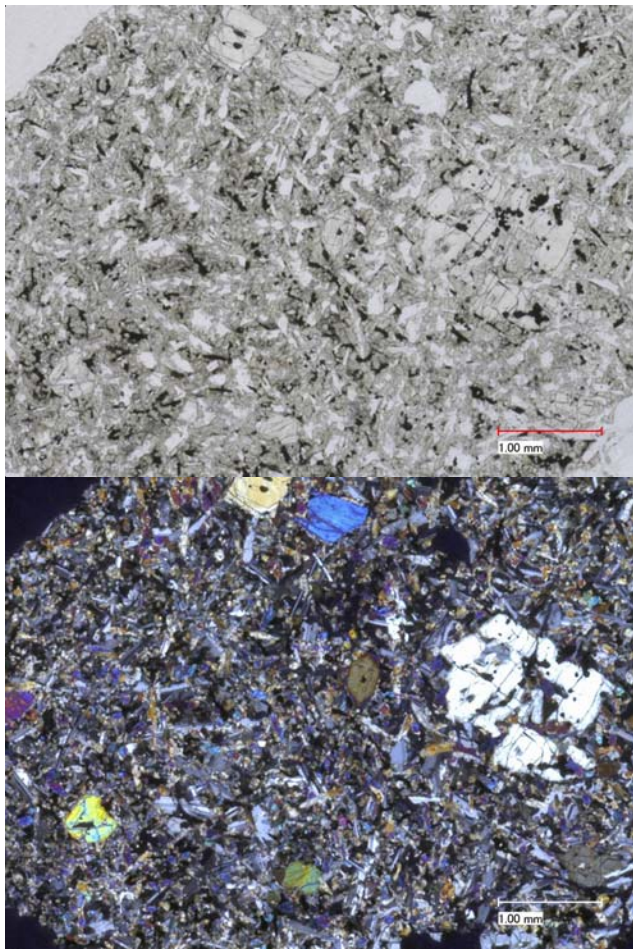


Figure 2: Photomicrographs of thin section 15105,6 by C Meyer @50x. Note ragged olivine phenocryst.

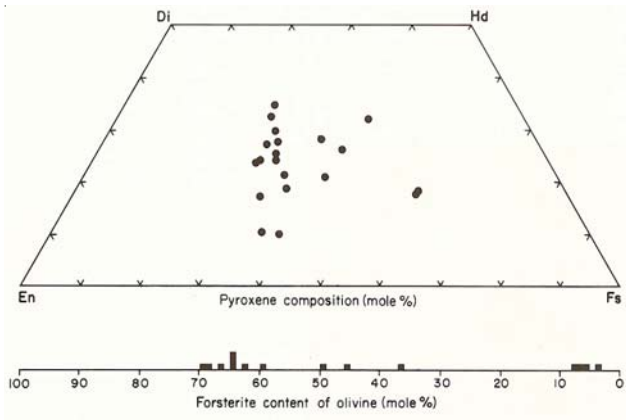


Figure 3: Pyroxene and olivine in 15105 (Dowty et al. 1973).

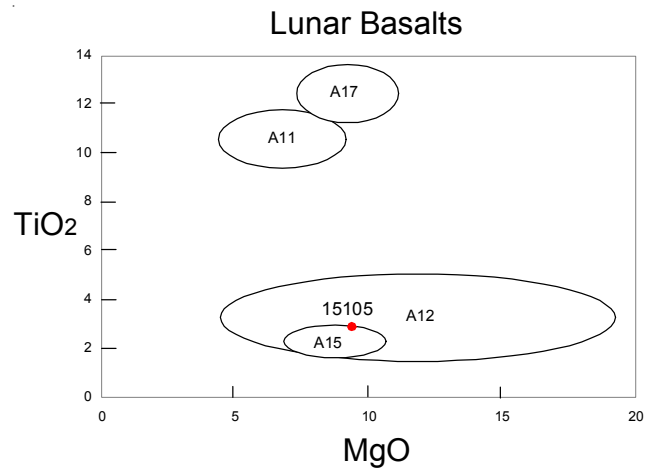


Figure 4: Composition of 15105 compared with other Apollo basalts.

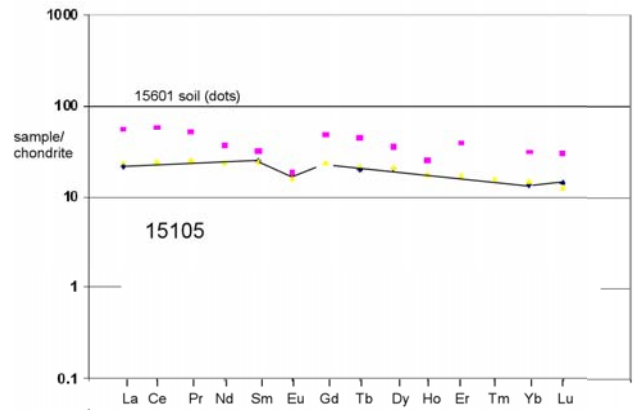


Figure 5: Normalized rare-earth-element diagram for 15105, with 15601 soil for comparison.

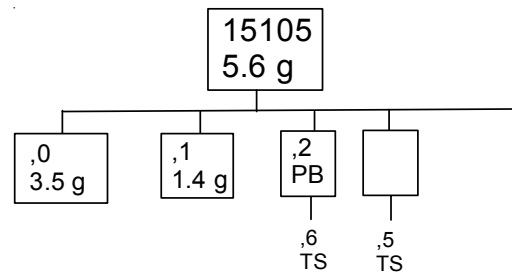


Table 1. Chemical composition of 15105.

reference	Dowty73	Ma76
<i>weight</i>		
SiO2 %	45.9	(b)
TiO2	2.97	(b) 3 (a)
Al2O3	8.2	(b) 8.5 (a)
FeO	21.7	(b) 21.8 (a)
MnO	0.24	(b) 0.28 (a)
MgO	9	(b) 9.3 (a)
CaO	10.2	(b) 8.9 (a)
Na2O	0.32	(b) 0.358 (a)
K2O	0.03	(b) 0.047 (a)
P2O5	0.09	(b)
<i>S %</i>		
<i>sum</i>		

Sc ppm	42	(a)
V	204	(a)
Cr	4037	(a)
Co	44	(a)
Ni	<66	(a)
Cu		
Zn		
Ga		
Ge ppb		
As		
Se		
Rb		
Sr		
Y		
Zr		
Nb		
Mo		
Ru		
Rh		
Pd ppb		
Ag ppb		
Cd ppb		
In ppb		
Sn ppb		
Sb ppb		
Te ppb		
Cs ppm		
Ba	80	(a)
La	5	(a)
Ce		
Pr		
Nd		
Sm	3.6	(a)
Eu	0.97	(a)
Gd		
Tb	0.71	(a)
Dy	4.9	(a)
Ho		
Er		
Tm		
Yb	2.2	(a)
Lu	0.34	(a)
Hf	3.1	(a)
Ta	0.45	(a)
W ppb		
Re ppb		
Os ppb		
Ir ppb		
Pt ppb		
Au ppb		
Th ppm		
U ppm		

technique: (a) INAA

