15125

Vitrophyric Pigeonite Basalt

6.5 grams

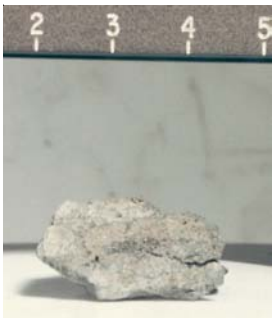

Figure 1: Photo of 15125.
Scale is in cm. S&1-48779.

Mineralogical Mode

Olivine	4 %	3.1
Pyroxene	44	45.3
Plagioclase	-	
Opaques	0.4	0.2
Silica	-	
Matrix	51.6	51.4

Dowty et al. 1973; Grove and Walker 1977

Introduction

Lunar basalt 15125 was collected with the rake sample at station 2, Apollo 15, near the Hadley Rille and St. George Crater. It is a pyroxene-phyric basalt, with numerous skeletal pyroxenes and some olivine embedded in a dark, cryptocrystalline matrix (quench texture). The composition and texture of 15125 are similar to that of larger sample 15597.

Petrography

Dowty et al. (1973, 1974) and Ryder (1985) described 15125 as a pyroxene-phyric basalt with about 50% small skeletal olivine and pyroxene crystals set in a wholly crystalline groundmass (figure 2). The groundmass consists of spherulitic alternating plagioclase and pyroxene needles in a feathery arrangement. The pyroxene phenocrysts are highly zoned (figure 3). Small opaque minerals were analyzed by Nehru et al. (1974).

Lofgren et al. (1975) and Grove and Walker (1977) were able to determine the approximate cooling rate of the basalt using carefully controlled laboratory experiments on synthetic mixtures with same composition.

Chemistry

Helmke et al. (1973) determined the chemical composition of 15125 (figure 4). It is a typical pyroxene basalt for Apollo 15 (figure 5).

Radiogenic age dating

None

Processing

There are only two thin sections.

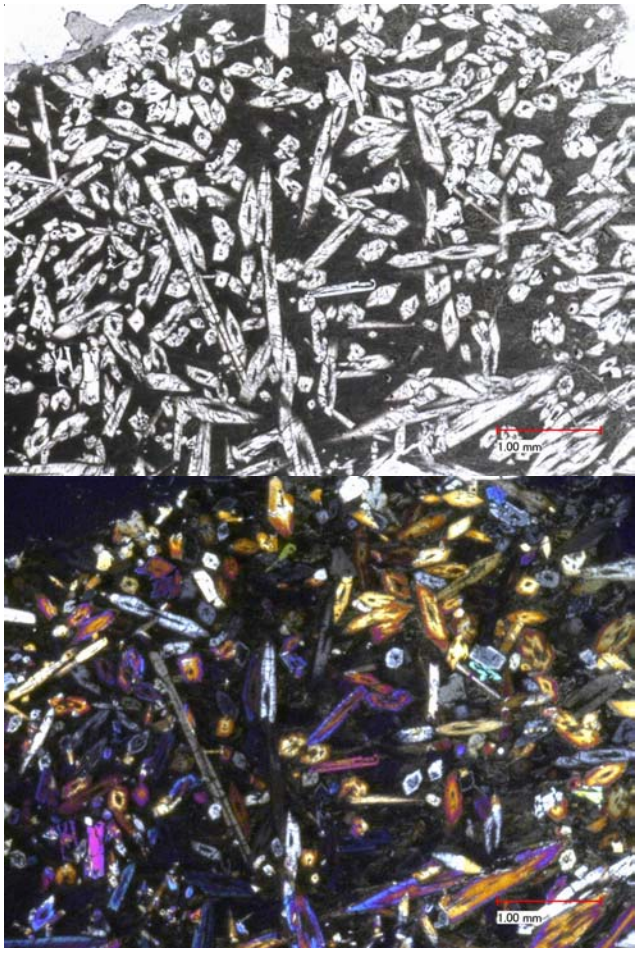

Figure 2: Photomicrgraphs of thin section 15125, 6 by C Meyer @50x.

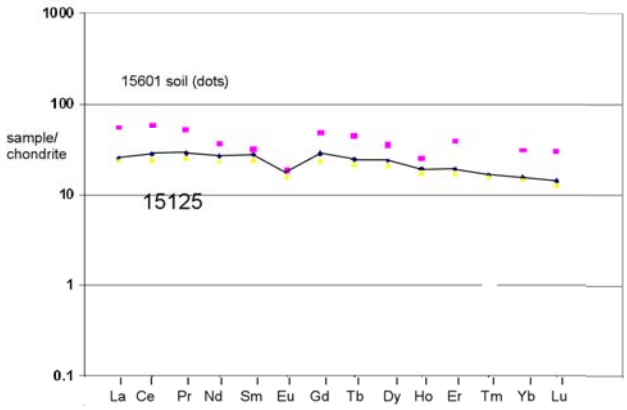

Figure 5: Normalized rare-earth-element diagram for 15115.

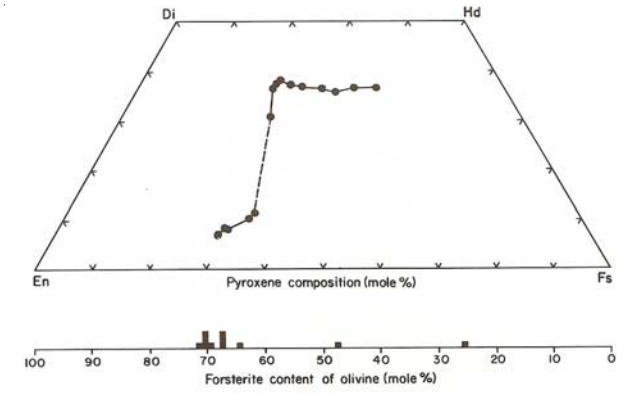

Figure 3: Composition of pyroxene in 15125 by Dowty et al. (1973).

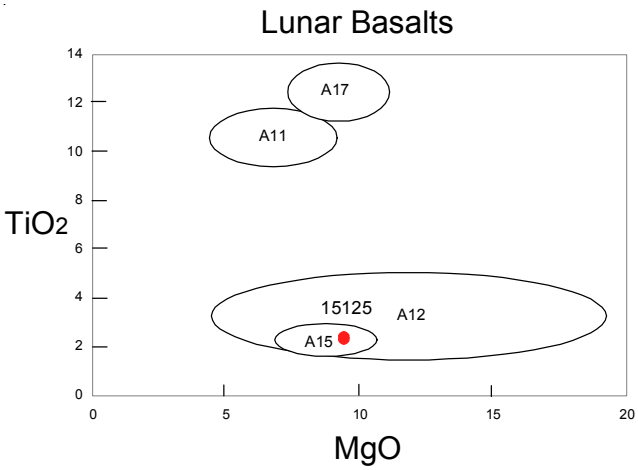

Figure 4: Chemical composition of 15125 compared with other Apollo basalts.

References for 15125

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

Dowty E., Prinz M. and Keil K. (1973b) Composition, mineralogy, and petrology of 28 mare basalts from Apollo 15 rake samples. *Proc. 4th Lunar Sci. Conf.* 423-444.

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 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.

Grove T.L. and Walker D. (1977) Cooling histories of Apollo 15 quartz-normative basalts. *Proc. 8th Lunar Sci. Conf.* 1501-1520.

Table 1. Chemical composition of 15125

reference	Helmke73		Dowty73	
weight				
SiO2 %	48.4	(c)	47.5	(b)
TiO2	1.8	(c)	2.27	(b)
Al2O3	9.11	(c)	8.3	(b)
FeO	20.3	(c)	22.3	(b)
MnO	0.27	(a)	0.27	(b)
MgO	9.19	(c)	9.4	(b)
CaO	8.04	(c)	9.3	(b)
Na2O	0.35	(c)	0.33	(b)
K2O	0.053	(c)	0.05	(b)
P2O5			0.08	(b)
S %				
sum				
Sc ppm	41.5	(a)		
V				
Cr	4140	(a)		
Co	63	(a)		
Ni				
Cu				
Zn				
Ga	3.3	(a)		
Ge ppb				
As				
Se				
Rb	0.8	(a)		
Sr				
Y				
Zr				
Nb				
Mo				
Ru				
Rh				
Pd ppb				
Ag ppb				
Cd ppb				
In ppb				
Sn ppb				
Sb ppb				
Te ppb				
Cs ppm	0.02	(a)		
Ba				
La	5.75	(a)		
Ce	17.1	(a)		
Pr				
Nd	11.7	(a)		
Sm	3.92	(a)		
Eu	1.12	(a)		
Gd	5.1	(a)		
Tb	0.87	(a)		
Dy	6	(a)		
Ho	1.02	(a)		
Er	3.2	(a)		
Tm				
Yb	2.59	(a)		
Lu	0.39	(a)		
Hf	2.1	(a)		
Ta				
W ppb				
Re ppb				
Os ppb				
Ir ppb				
Pt ppb				
Au ppb				
Th ppm				
U ppm				

technique: (a) INAA, (b) broad beam e-probe, (c) AA

Helmke P.A., Blanchard D.P., Haskin L.A., Telander K., Weiss C. and Jacobs J.W. (1973) Major and trace elements in igneous rocks from Apollo 15. *The Moon* **8**, 129-148.

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.

Lofgren G.E., Grove T.L., Brown R.W. and Smith D.P. (1979) Comparison of dynamic crystallization techniques on Apollo 15 quartz normative basalts. *Proc. 10th Lunar Planet. Sci. Conf.* 423-438.

LSPET (1972a) The Apollo 15 lunar samples: A preliminary description. *Science* **175**, 363-375.

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

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). Curatoial Branch Pub. # 72, JSC#20787

Swann G.A., Hait M.H., Schaber G.C., Freeman V.L., Ulrich G.E., Wolfe E.W., Reed V.S. and Sutton R.L. (1971b) Preliminary description of Apollo 15 sample environments. U.S.G.S. Interagency report: 36. pp219 with maps

Swann G.A., Bailey N.G., Batson R.M., Freeman V.L., Hait M.H., Head J.W., Holt H.E., Howard K.A., Irwin J.B., Larson K.B., Muehlberger W.R., Reed V.S., Rennilson J.J., Schaber G.G., Scott D.R., Silver L.T., Sutton R.L., Ulrich G.E., Wilshire H.G. and Wolfe E.W. (1972) 5. Preliminary Geologic Investigation of the Apollo 15 landing site. In Apollo 15 Preliminary Science Rpt. NASA SP-289. pages 5-1-112.