15388

Porphyritic Pigeonite Basalt

9.0 grams

Figure 1: Photo of 15388. Sample is 2 cm. NASA S71-49197.

Introduction

Lunar sample 15388 was collected as a rake sample from the rim of Spur Crater (part way up the Apennine Front). It is a pigeonite basalt with long pyroxene crystals. It has not been dated.

Petrography

Dowty et al. (1973) and Ryder (1985) describe 15388 as a coarse-grained, mare basalt with an apparent abundance of plagioclase (figure 2). However, Nehru et al. (1974), Ryder (1989) and Ryder and Steele (1987) suggest that it may be significantly different from the majority of the Apollo 15 basalts and may be unique.

Mineralogy

Olivine: none

Pyroxene: Dowty et al. (1973) reported the pyroxene composition (figure 4).

Plagioclase: Plagioclase is calcic (An_{90-95}).

Ilmenite: Nehru et al. (1974) studied the opaque minerals in 15388.

Chemistry

The composition of 15388 is low in FeO and high in TiO_2 (figure 5), but sample size was small for such a coarse grained-sample.

Other Studies

Bhandari et al. (1973) determined the density of solar flare tracks in the surface of 15388 and give a "suntan" exposure age of less than 1 m.y.

Processing

15388 has been sawn to create splits.

Mineralogical Mode of 15388

	Dowty et al. 1973
Olivine	- -
Pyroxene	51
Plagioclase	36
Opaque	6
Silica	0.5

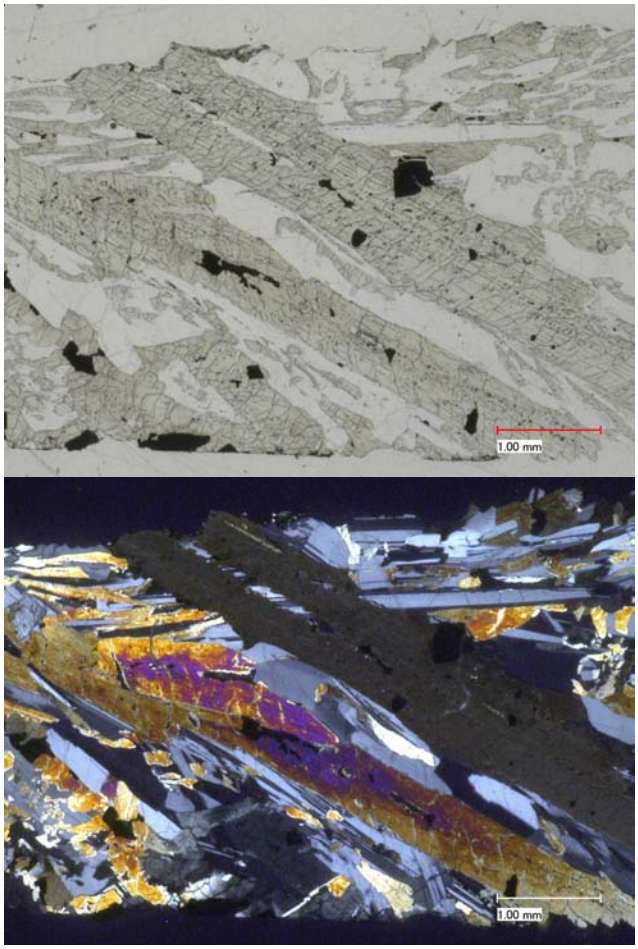

Figure 2: Photomicrographs of thin section 15388,11 by C Meyer @ 50 x (bottom is crossed nicols).

Figure 3: Photomicrograph of matrix of 15388 (from Dowty et al. 1973).

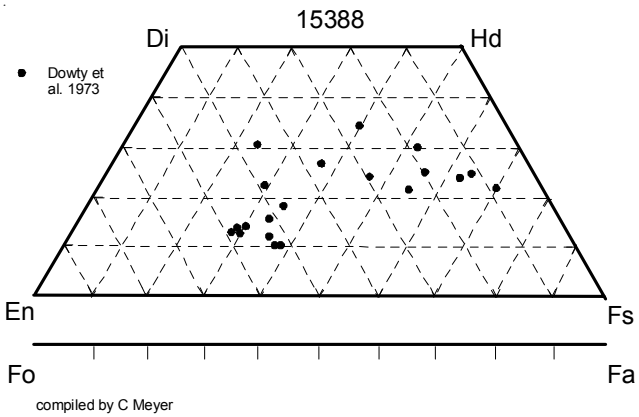

Figure 4: Composition of pyroxene in 15388 (from Dowty et al. 1973).

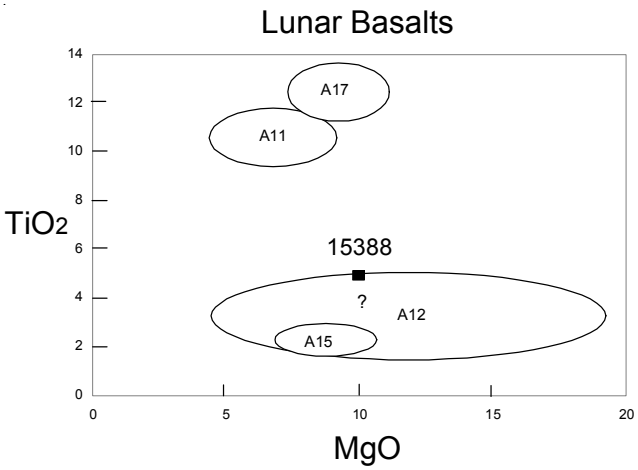

Figure 5: Composition of 15388 compared with that of other lunar basalt types.

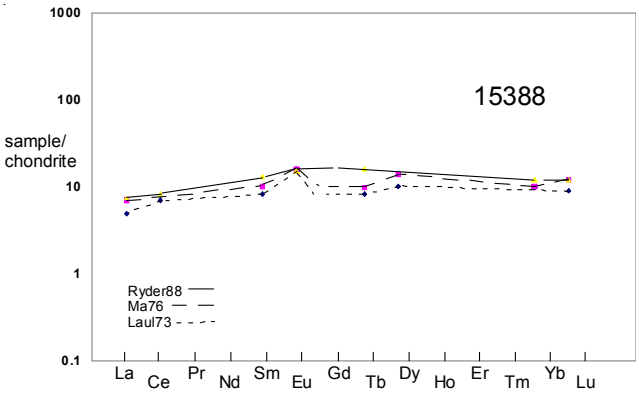

Figure 6: Normalized rare-earth-element diagram for 15388.

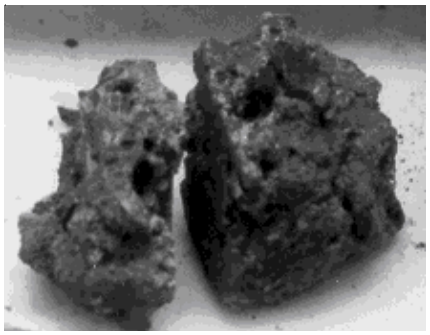

Figure 7: Photo of 15388 after first wire saw cut. NASA S71-59082.

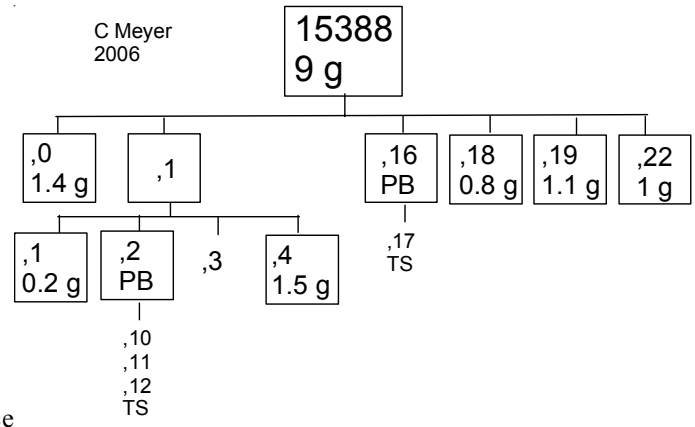

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Table 1. Chemical composition of 15388.

reference	Laul73	Ma 76		Ryder88		Dowty73	
weight				628 mg			
SiO2 %				44.2	(b)	45.7	(c)
TiO2	1.1	5.1	(a)	5.91	(b)	2.57	(c)
Al2O3	15.4	12.8	(a)	11.1	(b)	10.9	(c)
FeO	15.1	17.6	(a)	19.1	(b)	17.2	(c)
MnO	0.2	0.22	(a)	0.35	(b)	0.2	(c)
MgO	10	7.7	(a)	8	(b)	10.1	(c)
CaO	11.7	10.5	(a)	10.2	(b)	9.7	(c)
Na2O	0.43	0.42	(a)	0.32	(b)	0.39	(c)
K2O	0.024	0.032	(a)				
P2O5				0.06	(b)	0.02	(c)
S %							
sum							
Sc ppm	42	43	(a)	48.6	(a)		
V	180	150	(a)				
Cr	2700	2350	(a)	2323	(a)	2000	(c)
Co	37	27	(a)	41.9	(a)		
Ni							
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		29	(a)				
La	1.2	1.6	(a)	1.75	(a)		
Ce	4.2		(a)	5	(a)		
Pr							
Nd							
Sm	1.2	1.5	(a)	1.89	(a)		
Eu	0.89	0.91	(a)	0.841	(a)		
Gd							
Tb	0.3	0.36	(a)	0.58	(a)		
Dy	2.5	3.4	(a)				
Ho							
Er							
Tm							
Yb	1.6	1.6	(a)	1.98	(a)		
Lu	0.22	0.29	(a)	0.3	(a)		
Hf	0.9	1.2	(a)	1.82	(a)		
Ta							
W ppb							
Re ppb							
Os ppb							
Ir ppb							
Pt ppb							
Au ppb							
Th ppm				0.43	(a)		
U ppm							

technique: (a) INAA, (b) fused bead elec. Probe, (c) broad beam elec. Probe