75085 - 75089

DRAFT

High-Ti Basalt

4.3, 2.3, 2.3, 2 and 1.7 grams

Figure 1: Photo of 75089, 75088, 75087, 75086 and 75085. Cube is 1 cm for scale. NASA S73-19401.

Introduction

Samples 75085 to 75089 are chips that were sieved from soil sample 75080, collected near the rim of Camelot crater. They have a range of grain size and texture, but are all fragments of mare basalt (figure 1).

Petrography

Basalts from the same lava flow can have a range of grain size and texture, and these five fragments all have similar composition (figures 2 and 3).

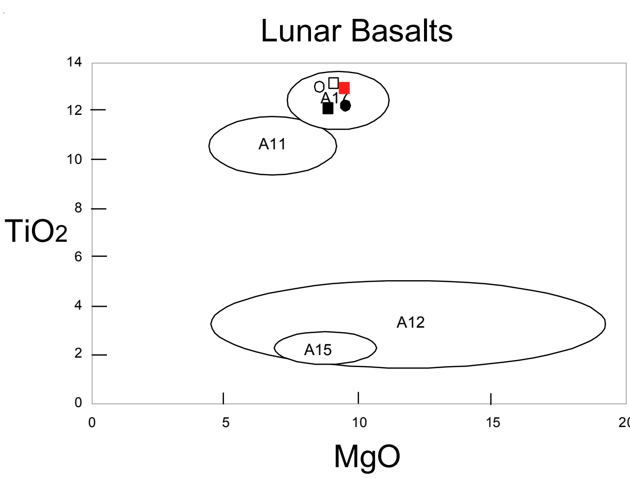

Figure 2: Chemical composition of high-Ti basalts from 75080 compared with other lunar basalts.

75085 is a coarse-grained basalt (figure 4). The mineralogy of 75085 was reported by Warner et al. (1979), Neal et al. (1989) and Neal and Taylor (1992).

75086 is a medium-grained subophitic basalt, made up of plagioclase (up to 1 mm), pink pyroxene (up to 2 mm) and ilmenite laths. There are small inclusions of olivine in pyroxene, armalcolite in plagioclase and iron in troilite. Olivine is Fo(67-58), plagioclase is An(88-79) and pyroxene (figure 6).

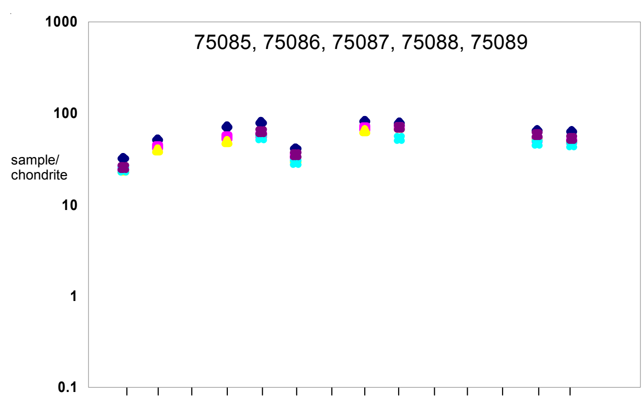

Figure 3: All five basalts have similar REE abundance.

Figure 4: Thin section of 75085. Scale 2 mm.

Figure 5: Thin section of 75088. Scale 2 mm.

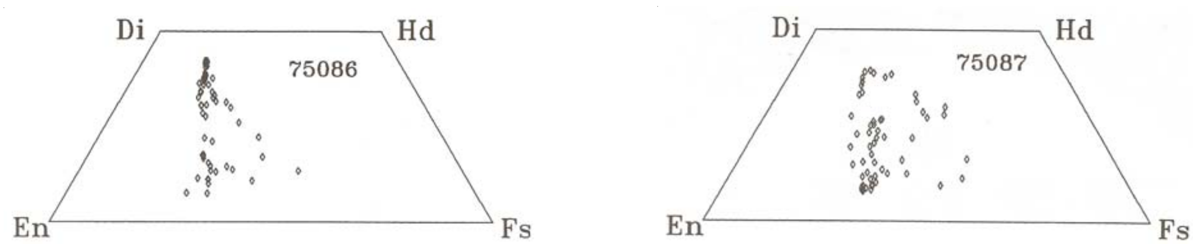

Figure 6: Pyroxene composition of 75086 and 75087 as determined by Neal and Taylor (1993).

75087 is a subophitic basalt with plagioclase (1.4 mm), pyroxene (1.4 mm) and ilmenite (0.8 mm). Pyroxene composition is given in figure 6.

75088 is a fine-grained basalt with olivine and ilmenite phenocrysts (1 mm). The groundmass is very fine (0.1 mm) and made of plagioclase, pyroxene, ilmenite and minor glass (figure 5).

75089 is medium-grained (0.4 mm) equigranular basalt, composed of pink pyroxene, plagioclase and ilmenite (0.6 mm) with no olivine, armalcolite. Troilite iron, silica and glass form interstitial phases.

Mineralogical Mode

	75086	75087
Olivine	1.3 %	0.4
Pyroxene	51.3	48.9
Plagioclase	26.3	21
Ilmenite	18.2	21
Armalcolite	1.3	
Troilite with iron	1.6	6.6
Silica		3.3

Chemistry

The chemical composition of 75085 etc. is given in table 1.

Radiogenic age dating

None

Table 1. Chemical composition of 75085 - 75089.

	75085		75086	75087	75088	75089
reference	Warner79		Neal90	Neal90	Warner75	Warner75
weight	310 mg				226 mg	202 mg
SiO2 %						
TiO2	13.1	(a)	12.1	13.4	11.9	13.2
Al2O3	8.7		8.02	7.37	10.4	8.7
FeO	18.8		19.3	19	20.4	20.6
MnO	0.25		0.245	0.254	0.255	0.24
MgO	9		10.1	9.4	8.9	9.8
CaO	9.9		9.1	9.8	11.8	10
Na2O	0.416		0.36	0.34	0.379	0.394
K2O	0.064		0.09	0.05	0.06	0.065
P2O5						
S %						
sum						
Sc ppm	81		80.2	87	87	87
V	133		153	154	92	117
Cr	3223		3870	3740	2121	3633
Co	19		23	20	18.9	20.7
Ni			7	12		
Cu						
Zn						
Ga						
Ge ppb						
As						
Se						
Rb			0.8			
Sr			160	80		
Y						
Zr			150	240		
Nb						
Mo						
Ru						
Rh						
Pd ppb						
Ag ppb						
Cd ppb						
In ppb						
Sn ppb						
Sb ppb						
Te ppb						
Cs ppm			0.15	0.11		
Ba			64	91		
La	7.5		5.75	5.76	5.7	6
Ce	31		26	24		
Pr						
Nd	32		25	22		
Sm	11.6		8.62	8.78	7.9	9.3
Eu	2.32		1.91	1.74	1.64	1.95
Gd						
Tb	3		2.5	2.37		
Dy	19		17	17.1	13	17
Ho						
Er						
Tm						
Yb	10.6		8.54	8.75	7.7	9.5
Lu	1.54		1.22	1.25	1.1	1.3
Hf	9.7		8.12	8.13		
Ta	2.2		1.6	1.61		
W ppb						
Re ppb						
Os ppb						
Ir ppb						
Pt ppb						
Au ppb						
Th ppm				0.14		
U ppm			0.15	0.19		

technique: (a) INAA

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