75015

Ilmenite Basalt

1006 grams

Figure 1: Photo of 75015 showing sap pits on exterior surface. NASA S73-16676. Cube is 1 cm. for scale.

Introduction

Camelot Crater at the Apollo 17 site (650 meter diameter) had an abundance of rocks in the rim extending down into the crater (Wolfe et al. 1981). Sample 75015 was chipped from one of the smaller boulders, 75035 and 75055 from others (see excerpt of transcript in 75035). These samples are similar and also, remarkably, similar to the ophitic Apollo 11 samples from many kilometers away.

Figure 2: Thin section photomicrograph of 75015. Field of view is 3 cm. NASA S76-29483.

75015 is a vuggy ilmenite basalt with only a few micrometeorite craters (figure 1). It has not been carefully studied and no age is available.

Petrography

Brown et al. (1975) give the modal mineralogy for 75015 and found trace olivine (see table). Neal and Taylor (1993) described it as a coarse-grained (1-2 mm) ophitic basalt with pink pyroxene, plagioclase and ilmenite crystals up to 2 mm in length (figure 2). Silica is the most abundant accessory mineral.

Mineralogical Mode of 75015

	Brown et al. 1975
Olivine	0.2
Pyroxene	50.7
Plagioclase	28.6
Ilmenite	16.7
Silica	3.4
Mesostasis	0.4

Mineralogy

No detailed mineral data are reported.

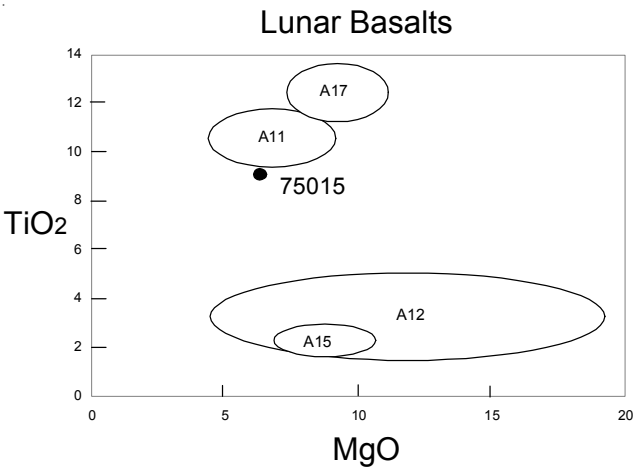

Figure 3: Composition of 75015 compared with that of other lunar basalts.

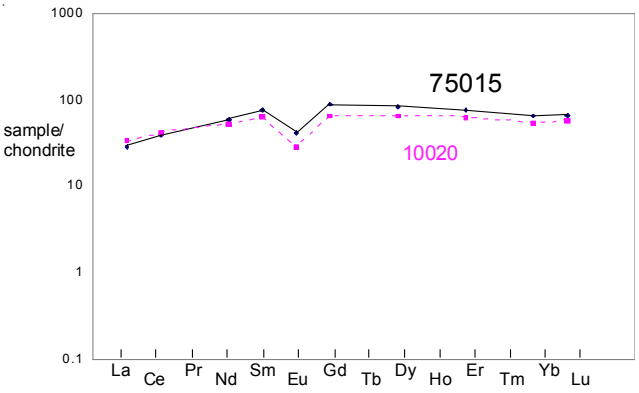

Figure 4: Normalized rare-earth-element diagram for 75015 compared with that of Apollo 11 sample (data from Rhodes et al. 1976).

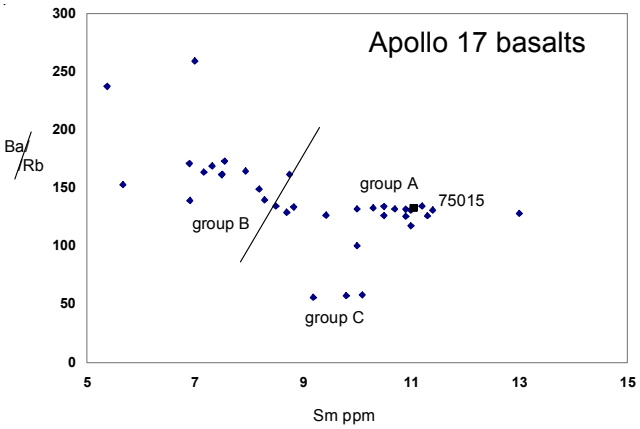

Figure 5: 75015 is a group A, Apollo 17 basalt.

Chemistry

The chemical composition of 75015 has been determined by Rhodes et al. (1976) and Warner et al. (1975). It is generally similar to Apollo 11 sample 10020 (figures 3 and 4). Gibson et al. (1976) reported 2205 ppm sulfur. Paces et al. (1991) classify it as a type A, Apollo 17 basalt (see figure 5).

Radiogenic age dating

Nyquist et al. (1976) reported Rb, Sr and $^{87}Sr/^{86}Sr$ for sample 75015, but it has not been dated, presumably because it is similar to 75035 and 75055.

Cosmogenic isotopes and exposure ages

Arvidson et al. (1976) reported a cosmic ray exposure age of 92 ± 4 m.y. (determined by Niemeyer using ^{81}Kr technique).

Processing

Two pieces of 75015 are used for public display (figure 6). There are 5 thin sections.

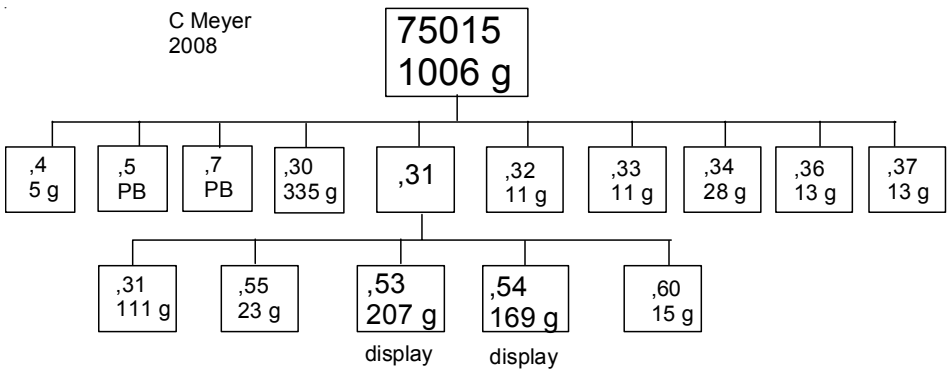

Table 1. Chemical composition of 75015.

reference	Wiesmann 75		Rhodes 76		Warner 75	
weight	Nyquist 76					
SiO2 %			41.92	(b)		
TiO2			9.56	(b)	8.7	(c)
Al2O3			10.06	(b)	9.9	(c)
FeO			18.77	(b)	21.2	(c)
MnO			0.29	(b)	0.26	(c)
MgO			6.2	(b)	5.4	(c)
CaO			12.15	(b)	11.6	(c)
Na2O			0.48	(b)	0.47	(c)
K2O	0.074	(a)	0.06	(b)	0.05	(c)
P2O5			0.05	(b)		
S %			0.2	(b)		
sum						
Sc ppm			77	(b)	79	(c)
V					24	(c)
Cr			1490	(b)	822	(c)
Co			14.7	(b)	15.2	(c)
Ni						
Cu						
Zn						
Ga						
Ge ppb						
As						
Se						
Rb	0.646	(a)	0.65			
Sr	215	(a)	215			
Y						
Zr						
Nb						
Mo						
Ru						
Rh						
Pd ppb						
Ag ppb						
Cd ppb						
In ppb						
Sn ppb						
Sb ppb						
Te ppb						
Cs ppm						
Ba	87.5	(a)	87.5			
La	6.74	(a)	6.74		12.2	(c)
Ce	23.8	(a)	23.8			
Pr						
Nd	26.5	(a)	26.5			
Sm	11.2	(a)	11.2		16.7	(c)
Eu	2.34	(a)	2.34		3.15	(c)
Gd	17.7	(a)	17.7			
Tb						
Dy	20.1	(a)	20.1		29	(c)
Ho						
Er	12.2	(a)	12.2			
Tm						
Yb	10.8	(a)	10.8		15.6	(c)
Lu			1.62		2.2	(c)
Hf			9.6			
Ta						
W ppb						
Re ppb						
Os ppb						
Ir ppb						
Pt ppb						
Au ppb						
Th ppm						
U ppm						

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

Figure 6: Sample 75015,53 on display at the Tycho Brache Planetarium in Copenhagen. NASA S-91-36670.

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