

71566**High-Ti Mare Basalt
414.4 g****INTRODUCTION**

See "Rake Sample Descriptions" and "Table of Rake Samples", as well as Fig. 1.

**PETROGRAPHY AND
MINERAL CHEMISTRY**

Warner et al. (1975bc,1976ab, 1978) reported the petrography and mineral chemistry of 71566 Warner et al. (1975c) described 71566 as a poikilitic ilmenite basalt. However, they did not specifically mention the petrography or mineral

chemistry of this sample in their study of Apollo 17 rake samples, except for the zonation observed in the pyroxenes (Fig. 2). These exhibit core-to-rim zonations from titanaugite, through pigeonite toward pyroxferroite (Fig. 2).

During the preparation of this catalog, we examined thin sections 71566,16 and ,18. 71566 is a coarse-grained (0.5-1.5mm), plagioclase-poikilitic basalt which contains pyroxene aggregates up to 2 mm. Ilmenite usually forms an intersertal texture with pyroxene and can

reach up to 1.5mm. Rutile and chromite exsolution is present in the ilmenites. Olivine is only found as rounded cores (~0.1-0.2mm) in the pyroxenes. These olivines contain 0.005mm euhedral chromite inclusions. Discrete Cr-ulvospinel is rare. Troilite and native Fe form 0.1mm interstitial phases, and occasionally troilite contains small grains of native Fe. Troilite is occasionally found as 0.1 mm inclusions in ilmenite. Interstitial SiO₂ (~0.1-0.2mm) is usually associated with ilmenite.



Figure 1: Hand specimen photograph of 71566,0. Cubic scale = 1 cm³.

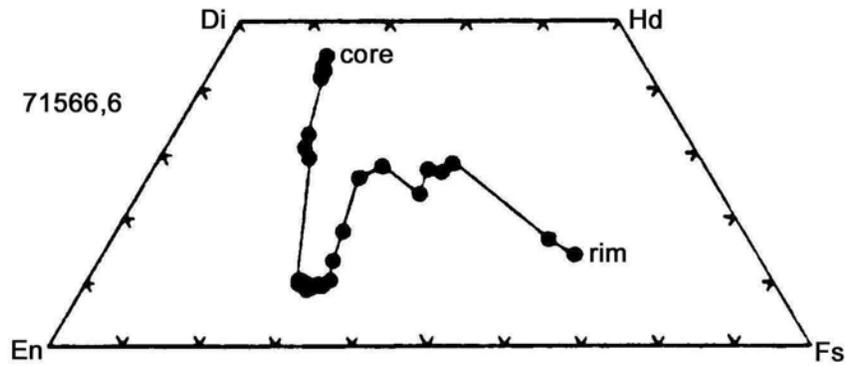


Figure 2: Pyroxene quadrilateral demonstrating compositional zonation in a pyroxene from 71566,6.

WHOLE-ROCK CHEMISTRY

Laul et al. (1975) and Warner et al. (1975) reported the same whole-rock analysis of 71566,6 in a study of Apollo 17 rake samples (Table 1). These authors reported a TiO₂ content of 11.5 wt%, with a MG# of 44.3. Rhodes et al. (1976) classified 71566 as a Class U Apollo 17 high-Ti basalt and reported a TiO₂ content of 12.01 wt% for 71566,10, with a MG# of 44.4. REE patterns are LREE depleted with a maximum in the MREE (Fig. 3). The analysis of Rhodes et al. (1976) only reports abundances of La, Ce, Sm, Eu, Yb, and Lu, but by

extrapolation, an (Eu/Eu*)_N = 0.61 is defined, compared to a value of 0.67 defined by the analysis of Laul et al. (1975) and Warner et al. (1975). Both analyses are in reasonable agreement for the LREE, but the profile of Rhodes et al. (1976) contains greater HREE abundances (Fig. 3).

Gibson et al. (1976) reported a sulfur content of 1760 ± 40, ugS/g for 71566 with an equivalent of 0.147 wt% Fe^o. Eldridge et al. (1974) reported the primordial radioelement concentrations of 71566 (Table 1). These authors calculated a Th/U ratio of 3.4 and a K/U ratio of 4890.

COSMOGENIC RADIONUCLIDES

O'Kelley et al. (1974) reported the cosmogenic radionuclide abundances of 71566 (Table 2). All decays were corrected to 2300 GMT, 14 December 1972.

PROCESSING

71566,0 has been entirely subdivided. The largest subsamples remaining are: ,4 (west end = 230.7g); ,5 (east end = 178.8g); ,10(1.30g). Four thin sections have been made of this sample - 71566,14-16, and,18. 71566,6 has been renumbered to,9001.

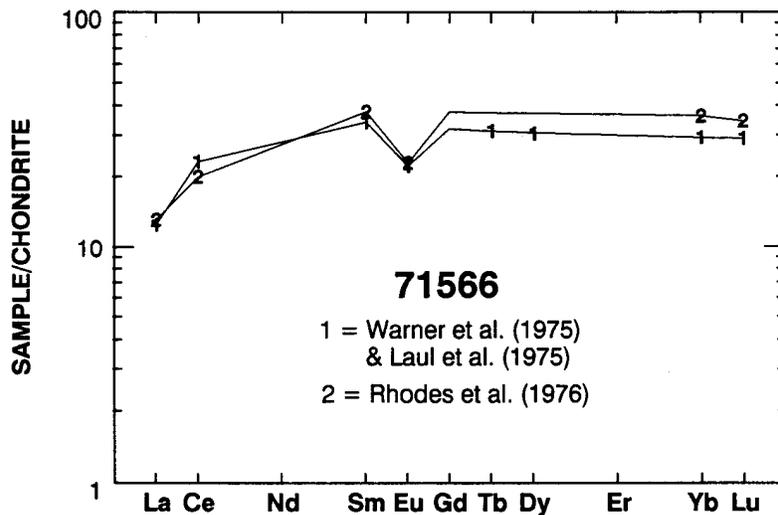


Figure 3: Chondrite-normalized rare-earth element profile of 71566. The same analysis was reported by Warner et al. (1975) and Laul et al. (1975). A second analysis is from Rhodes et al. (1976).

Table 1: Whole-rock chemistry of 71566.

	Sample ,6 Method N Reference 1	Sample ,10 Method X,N Reference 2	Method G Reference 3
SiO ₂ (wt %)		39.27	
TiO ₂	11.5	12.01	
Al ₂ O ₃	9.4	9.22	
Cr ₂ O ₃	0.390	0.38	
FeO	18.4	18.73	
MnO	0.232	0.27	
MgO	8.2	8.4	
CaO	11.0	10.89	
Na ₂ O	0.44	0.40	
K ₂ O	0.046	0.03	
P ₂ O ₅		0.03	
S		0.16	
K (ppm)			450 ± 20
Nb			
Zr			
Hf	6.6	7.8	
Ta	1.3		
U			0.092 ± 0.008
Th			0.31 ± 0.01
W			
Y			
Sr			
Rb			
Li			
Ba			
Cs			
Be			
Zn			
Pb			
Cu			
Ni			
Co	20.0	18.1	
V	90		
Sc	73	78	
La	4.1	4.29	
Ce	20	17.2	

Table 1: (Concluded).

	Sample ,6 Method N Reference 1	Sample ,10 Method X,N Reference 2	Method G Reference 3
Nd	18		
Sm	6.9	7.62	
Eu	1.70	1.75	
Gd			
Tb	1.8		
Dy	12		
Er			
Yb	6.4	7.9	
Lu	0.98	1.16	
Ga			
F			
Cl			
C			
N			
H			
He			
Ge (ppb)			
Ir			
Au			
Ru			
Os			

Analysis by: N = INAA; X = XRF; G + Gamma-ray Spectroscopy.

References: 1 = Warner et al. (1975) and Laul et al. (1975) (same analysis); 2 = Rhodes et al. (1976);
3 = Eldridge et al. (1974).

Table 2: Cosmogenic Radionuclide abundances of 71566.
Data from O'Kelley et al. (1974).

	Sample 71566
^{26}Al (dpm/kg)	50 ± 2
^{22}Na	49 ± 3
^{54}Mn	95 ± 8