

71546**High-Ti Mare Basalt****150.70 g****INTRODUCTION**

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

PETROGRAPHY AND MINERAL CHEMISTRY

Warner et al. (1975,1976,1978) reported the petrography and mineral chemistry of 71546. These authors classified 71546 as an olivine micro porphyritic ilmenite basalt, but did not specifically mention this sample -during their descriptions of Apollo 17 rake samples. During the preparation of this catalog, we examined thin section 71546, 13 and found it to be a medium-grained (0.2-0.7mm) basalt. It is comprised of interlocking "bow-tie" intergrowths of plagioclase and pyroxene, as well as more blocky plagioclase and pyroxene, as

well as ilmenite (Fig. 2). The grain size is not consistent throughout: some areas are comprised of plagioclasepyroxene intergrowths, while other areas are made up of more blocky and coarser-grained examples of these minerals. Corroded olivine phenocrysts (0.5-0.7mm) are present, often with pink pyroxene over-growths. Ilmenite phenocrysts can exceed 1mm in length and contain minor amounts of rutile and chromite exsolution. Native Fe (< 0.05mm), troilite (< 0.05mm), and opaque glass are disseminated throughout. Minor interstitial SiO₂ is conspicuous. No armalcolite was observed.

WHOLE-ROCK CHEMISTRY

The whole-rock composition of 71546 was reported by Warner et al. (1975) and Rhodes et al.

(1976) (see Table 1). These authors reported a TiO₂ content of 12.1 and 12.33 wt% and a MG# of 43.0 and 43.8, respectively. Rhodes et al. (1976) defined 71546 as a Type A Apollo 17 high-Ti basalt. The REE profiles are presented in Fig. 3, and demonstrate reasonable agreement for La and Ce between the two analyses. For the other REE, the analysis of 71546 by Warner et al. (1975) has lower REE abundances than that of Rhodes et al. (1976) (Fig. 3). The REE analysis reported by Rhodes et al. (1976) is probably the more accurate as it was performed by isotope dilution (Table 1). Both REE profiles are LREE depleted with a maximum at Sm (Warner et al., 1975) and Gd (Rhodes et al, 1976). The HREE show a gentle decrease from the MREE but are still more abundant (relative to chondrites) than the LREE (Fig. 3). Both profiles

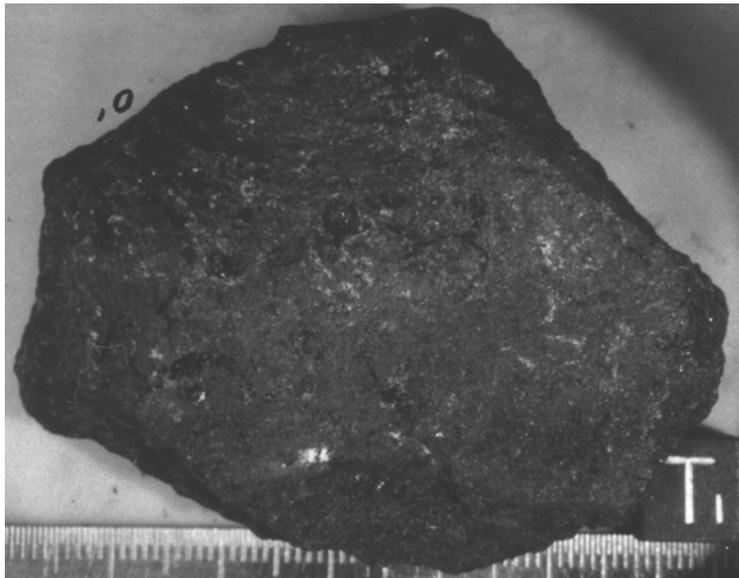


Figure 1: Hand specimen photograph of 71546, 0. Small divisions on scale are in millimeters.

Table 1: Whole-rock chemistry of 71546.

	Sample 71546,1 Ref. 1 Method N	Sample 71546,5 Ref. 2 Method X,I,N	Sample 71546 Ref. 3 Method G
SiO ₂ (wt %)		39.14	
TiO ₂	12.1	12.33	
Al ₂ O ₃	9.2	8.91	
Cr ₂ O ₃	0.405	0.41	
FeO	17.7	19.11	
MnO	0.235	0.28	
MgO	7.5	8.34	
CaO	11.0	10.79	
Na ₂ O	0.38	0.40	
K ₂ O	0.072	0.05	
P ₂ O ₅		0.05	
S		0.19	
K(ppm)		580	500 ± 25
Nb			
Zr			
Hf	9.0	9.4	
Ta	2.1		
U			0.15 ± 0.02
Th			0.40 ± 0.03
W			
Y			
Sr		191	
Rb		0.63	
Li		10.2	
Ba		83.2	
Cs			
Be			
Zn			
Pb			
Cu			
Ni			
Co	18.0	18.4	
V	120		
Sc	77	80	
La	6.5	6.69	
Ce	24	23.8	

Table 1: (Concluded).

	Sample 71546,1 Ref. 1 Method N	Sample 71546,5 Ref. 2 Method X,I,N	Sample 71546 Ref. 3 Method G
Nd		25.9	
Sm	9.5	10.7	
Eu	1.89	2.14	
Gd		16.7	
Tb	2.3		
Dy	15	19.1	
Er		11.2	
Yb	7.8	10.3	
Lu	1.3	1.47	
Ga			
F			
Cl			
C			
N			
H			
He			
Ge(ppb)			
Ir			
Au			
Ru			
Os			

References: 1 = Warner et al. (1975); 2 = Rhodes et al. (1976); 3 = Eldridge et al. (1975).

Analysis by: X = XRF; I = Isotope dilution; N = INAA, G = Gamma-ray spectroscopy.

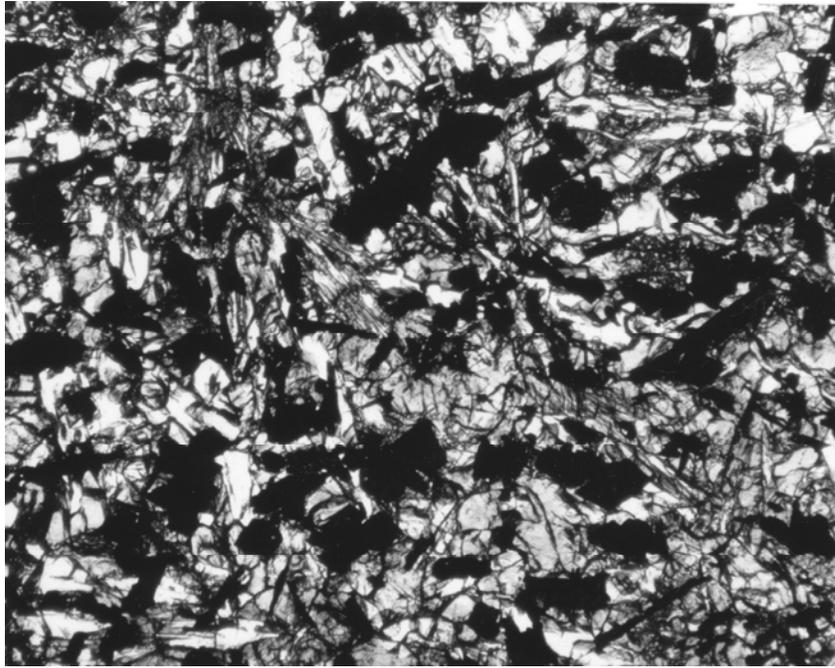


Figure 2: Photomicrograph of 71546,13. A sub-variolitic to interlocking texture predominates. Field of view = 2.5 mm.

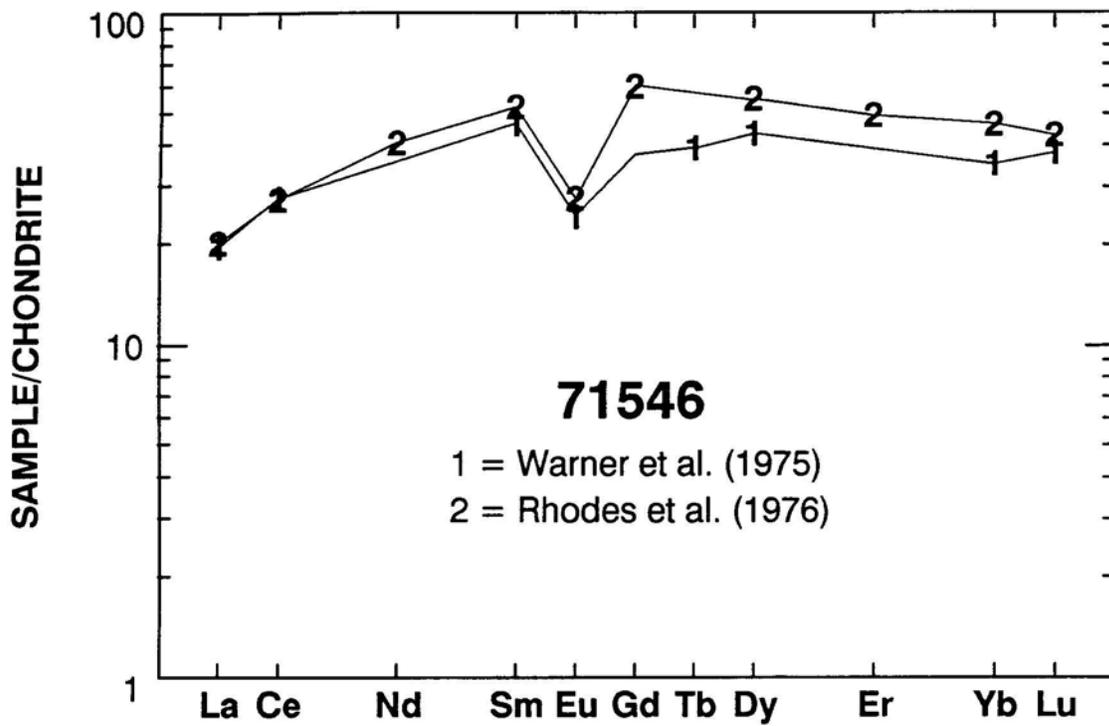


Figure 3: Chondrite-normalized REE profiles of 71546. Data from Warner et al. (1975) and Rhodes et al. (1976).

Contain a negative Eu anomaly, with the analysis of Warner et al. (1975) containing an anomaly more pronounced $[(\text{Eu}/\text{Eu}^*)_{\text{N}} = 0.571]$ than that of Rhodes et al. (1976) $E(\text{Eu}/\text{Eu}^*)_{\text{N}} = 0.49$.

Eldridge et al. (1975) reported the concentration of the primordial radioelements of 71546 (Table 1). These authors also quoted a Th/U ratio of 2.67 ± 0.41 and a K/U ratio of 3333 ± 475 for 71546. Gibson et al. (1976) reported a total

sulphur content of 1810 ± 10 ugS/g with an equivalent wt% Fe^o of 0.122.

RADIOGENIC ISOTOPES

Nyquist et al. (1976) reported the whole-rock Rb-Sr composition of 71546,5 (Table 2). No age dating was undertaken on this sample.

Eldridge et al. (1975) reported the concentration of cosmogenic radionuclides in 71546,0

(Table 3). Concentrations of ²²Na and ⁵⁴Mn were corrected for decay to 14 December, 1972.

PROCESSING

Of the 150.70g of 71546,0, a total of 136.7g remains. Significant sub-samples are ,5 which has a mass of 1.5g and ,8 with a mass of 10.07g. 71546,9001 was irradiated for NAA. Four thin sections have been made of this basalt: 71546,9, ,10, ,11, and ,13.

Table 2: Rb-Sr isotope data from 71546.
Data from Nyquist et al. (1976).

	71546,5
wt(mg)	50
Rb (ppm)	0.632
Sr (ppm)	191
⁸⁷ Rb/ ⁸⁶ Sr	0.0096 ± 3
⁸⁷ Sr/ ⁸⁶ Sr	0.69966 ± 4
T _B	4.08 ± 0.42
T _L	4.57 ± 0.42

B = Model age assuming I = 0.69910 (BABI + JSC bias); L = Model age assuming I = 0.69903 (Apollo 16 anorthosites at 4.6 Ga).

Table 3: Concentrations of Cosmogenic Radionuclides (O'Kelley et al., 1975) in 71546.

Cosmogenic Radionuclide Decay corrected to 2300 GMT, Dec. 14, 1972.

	71546
²⁶ Al (dpm/kg)	70 ± 3
²² Na	94 ± 7
⁵⁴ Mn	165 ± 30