71136

High-Ti Mare Basalt
25.39 g, 4 x 2 x 2cm

INTRODUCTION

71136 (Fig. 1) was described as a gray, homogeneous, intergranular basalt (Apollo 17 Lunar Sample Information Catalog, 1973). It contains zap pits on all surfaces except B and 20% vugs (up to 20 mm) lined with crystals. 1% rounded vesicles open into vugs. These vugs are lined with crystals of plagioclase, ilmenite, pyroxene, and olivine. Plagioclase in places makes long columnar needles with their stubby ends in the vugs. Such plagioclases are 0.1 mm in cross section and up to 10mm long. They are transparent and probably vapor grown. There is a small percentage of a blood-red mineral in these vugs, which is probably spinet. Basalt 71136 has an angular shape with penetrative fracturing, and was collected from Station 1A.

PETROGRAPHY AND MINERAL CHEMISTRY

The petrography and mineral chemistry of 71136 has only been briefly discussed by Warner et at. (1975). During the preparation of this catalog, we examined thin section 71136, 8, finding it to be a medium-grained (0.8-1.5mm) ilmenite basalt. "Bowtie" intergrowths (up to 1.5mm) of pyroxene and plagioclase dominate. No olivine is present. llmenite (up to 1mm long) exhibits "sawtooth" margins. No armalcolite or spinet was noted. Silica, native Fe, and troilite form interstitial phases.

WHOLE-ROCK CHEMISTRY

Rhodes et al. (1976) and Warner et al. (1975) analyzed 71136, 1 and 71136,3, respectively, for major and trace elements

Figure 1: Hand specimen photograph of 71136,0, bottom surface. Cubic scale = 1 cm.^{3}.

(Table 1). Rhodes et al. (1976) classified 71136 as a Type B Apollo 17 high-Ti basalt, containing 11.12 wt% TiO_2 (identical to the result of Warner et al., 1975 - Table 1) with a MG# of 40.5. 71136 can be further classified as a Type B2 Apollo 17 basalt using the criteria of Neal et al. (1990). The REE profile (Fig. 2) is LREE-depleted, but with an overall convex-upward appearance. Both analyses (Warner et al., 1975; Rhodes et al., 1976) are almost identical, and both give the same $(Eu/Eu^*)_N$ of 0.51 for the negative Eu anomaly. Gibson et al. (1976a,b) reported whole-rock sulfur abundances of 1720 ± 60 ug S/g with an equivalent wt% Fe^o of 0.114 for 71136.

ISOTOPES

Nyquist et al. (1976ab) reported the whole-rock Sr isotope composition of 71136 (Table 2). Other isotope work has concentrated on cosmogenic and primordial radionuclide abundances (Table 3) in 71136 (Eldridge et al., 1974a,b; O'Kelley et al., 1974a,b; Yokoyama et al., 1974).

PROCESSING

Of the original 25.39g of 71136,0, approximately 23.1g remains. 1.378 of 71136,1 is the largest subsample. Three thin sections were taken: 71136,8 and ,9 from 71136,5; 71136,11 from 71136,3.

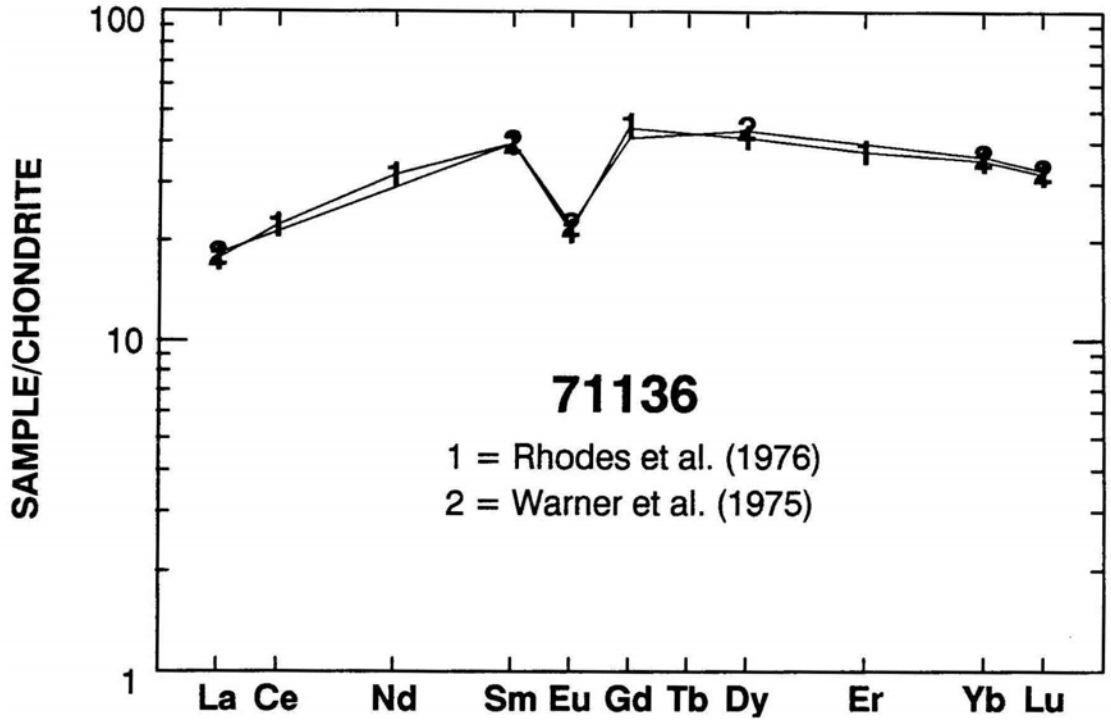

Figure 2: Chondrite -normalized rare-earth element plots for 71136. Data from Warner et al. (1975) and Rhodes et al. (1976).

Table 1: Whole-rock chemistry of 71136.

	Sample 71136,1 Reference 1 Method X,I,N	Sample 71136,3 Reference 2 Method N		Sample 71136,1 Reference 1 Method X,I,N	Sample 71136,3 Reference 2 Method N
SiO_2 (wt %)	40.30		Cu		
TiO_2	11.12	11.1	Ni		
Al_2O_3	10.21	10.9	Co	15.7	15.9
Cr_2O_3	0.28	0.296	V		89
FeO	18.44	19.3	Sc	82	87
MnO	0.28	0.224	La	5.72	5.9
MgO	7.03	7.5	Ce	19.0	
CaO	11.73	11.4	Nd	19.8	
Na_2O	0.37	0.374	Sm	7.94	8.0
K_2O	0.03	0.05	Eu	1.63	1.70
P_2O_5	0.06		Gd	12.3	
S	0.17		Tb		
K (ppm)			Dy	14.0	15
Nb			Er	8.34	
Zr			Yb	7.65	7.9
Hf	6.8		Lu	1.07	1.1
Ta			Ga		
U			F		
Th			Cl		
W			C		
Y			N		
Sr	147		H		
Rb	0.40		He		
Li	8.4		Ge (ppb)		
Ba	65.9		Ir		
Cs			Au		
Be			Ru		
Zn			Os		
Pb					

Analysis by: X = XFR; I = Isotope dilution; N = INAA.

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

Table 2: Rb-Sr isotope date from 71136.
Data from Nyquist et al. (1975).

	Sample 71136,1
wt (mg)	54
Rb (ppm)	0.397
Sr (ppm)	147
$^{87}Rb/^{86}Sr$	0.0078 ± 3
$^{87}Sr/^{86}Sr^{b}$	0.69959 ± 5
T_B	4.38 ± 0.62
T_L	4.99 ± 0.64

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

Table 3: Concentrations of Primordial Radioelements (Eldridge et al., 1974) and Cosmogenic Radionuclides (O'Kelley et al., 1974) in 71136.
Cosmogenic Radionuclide Decay corrected to 2300 GMT, Dec. 14,1972.

	Sample 71136
K (ppm)	370 ± 100
Th (ppm)	0.46 ± 0.06
U (ppm)	0.22 ± 0.05
Th/U	2.1
K/U	1680
^{26}Al (dpm/Kg)	90 ± 8
^{22}Na	93 ± 9
^{54}Mn	160 ± 60
^{56}Co	300 ± 70
^{46}Sc	70 ± 30