

**71577****High-Ti Mare Basalt****234.7 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 71577. Warner et al. (1975c) described 71577 as a microporphyratic ilmenite basalt, but only

described it in general terms within the context of this petrographic group. During the preparation of this catalog, we examined thin section 71577,12 and found it to be a fine- to medium-grained (0.05-0.35mm) basalt. Olivine phenocrysts (up to 0.7mm) are reasonably euhedral with occasional embayments. Euhedral chromite inclusions (~0.005mm) are found in the olivines. Plagioclase-pyroxene "bow-tie" intergrowths are occasionally present (Fig. 2). Ilmenite also

forms a phenocryst phase (Fig. 2), but is generally smaller than olivine (maximum = 0.5mm). However, ilmenite is more commonly a groundmass phase. Rare rutile and chromite exsolution is seen in the ilmenite. Minor opaque glass is associated with ilmenite. Native Fe and troilite (<0.1mm) are usually, but not exclusively, associated with ilmenite. Small (~0.05mm) areas of interstitial glass are conspicuous. No armalcolite was observed.

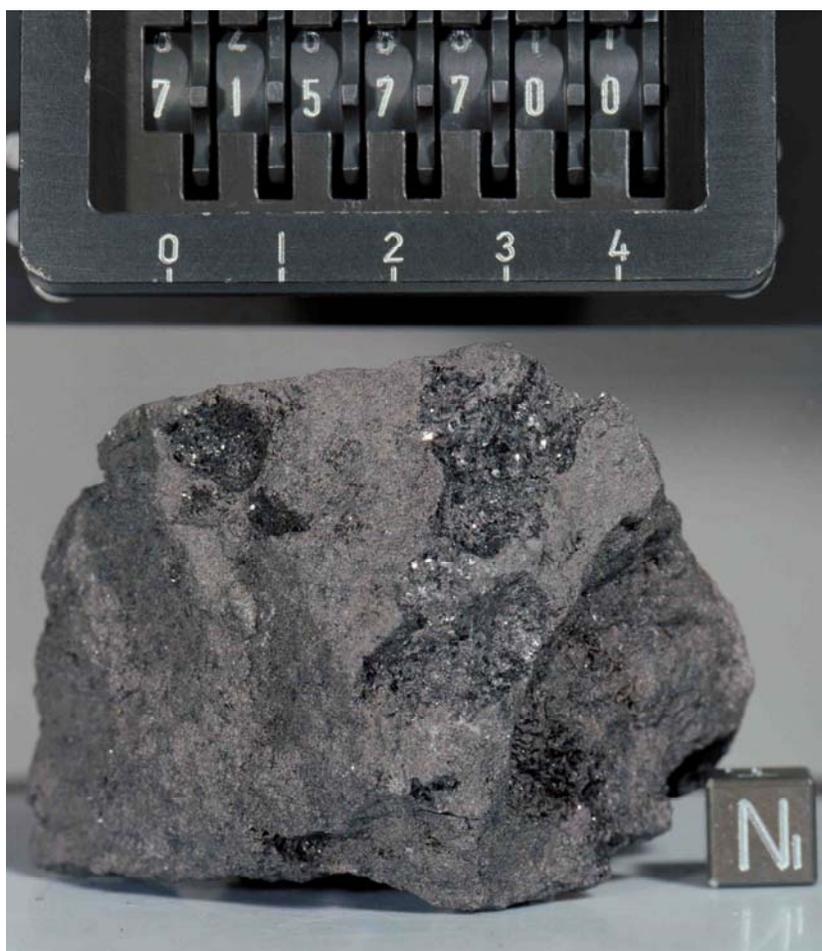


Figure 1: Hand specimen photograph of 71577,0. Cubic scale = 1 cm<sup>3</sup>.

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**WHOLE-ROCK CHEMISTRY**

Laul et al. (1975) and Warner et al. (1975) reported the same whole-rock analysis of 71577,1 in a study of Apollo 17 rake samples (Table 1). These authors reported a TiO<sub>2</sub> content of 12.8 wt%, with a MG# of 41.9. Rhodes et al. (1976) classified 71577,4 as a Type A Apollo 17 high-Ti basalt and reported a TiO<sub>2</sub> content of 12.04 wt% for 71577,4, with a MG# of 43.5. Both REE patterns are LREE depleted with a maximum in the MREE (Fig. 3). The analysis of Rhodes et al. (1976) is more complete and reported lower LREE but higher middle and heavy REE abundances than that of Warner et al. (1975) and Laul et al. (1975) (Table 1);

Fig. 3). Both profiles exhibit a decrease in HREE over the MREE and have negative Eu anomalies (Fig. 3). The profile of Warner et al. (1975) and Laul et al. (1975) exhibits  $(Eu/Eu^*)_N = 0.57$ , compared to a value of 0.49 defined by the analysis of Rhodes et al. (1976). Gibson et al. (1976) reported a sulfur content of  $1880 \pm 20$  ugS/g for 71577 with an equivalent of 0.121 wt% Fe<sup>o</sup>.

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**RADIOGENIC ISOTOPES**

Nyquist et al. (1976) reported the whole-rock Rb-Sr composition of 71577,4 (Table 2). This analysis was undertaken as part of a large study of the Rb-Sr compositions of Apollo 17 high-Ti basalts.

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**PROCESSING**

Of the original 234.7g of 71577,0, a total of 230.88 remains. 71577,4 weighs 1.348 and ,1 was used for INAA. 71577,1 has been renumbered to ,9001, and thin section,12 has been taken from this irradiated sample. Three other thin sections have been made



Figure 2: Photomicrograph of 71577,8. Olivine and ilmenite phenocrysts (sawtooth margins are present). Phenocrysts are set in a sub-variolitic to variolitic groundmass. Field of view = 2.5 mm.

Table 1: Whole-rock chemistry of 71577.

	Sample ,1 Method N Reference 1	Sample ,4 Method X,N,I Reference 2		Sample ,1 Method N Reference 1	Sample ,4 Method X,N,I Reference 2
SiO <sub>2</sub> (wt %)		39.18	Cu		
TiO <sub>2</sub>	12.8	12.04	Ni		
Al <sub>2</sub> O <sub>3</sub>	8.8	8.92	Co	20.6	18.4
Cr <sub>2</sub> O <sub>3</sub>	0.460	0.41	V	110	
FeO	20.5	18.90	Sc	79	81
MnO	0.256	0.28	La	6.8	6.9
MgO	8.3	8.15	Ce	28	23.8
CaO	10.4	10.95	Nd	28	26.5
Na <sub>2</sub> O	0.44	0.39	Sm	10.4	11.0
K <sub>2</sub> O	0.070	0.06	Eu	2.14	2.17
P <sub>2</sub> O <sub>5</sub>		0.05	Gd		16.8
S		0.17	Tb	2.6	
K (ppm)		583	Dy	18	19.5
Nb			Er		11.4
Zr			Yb	9.3	10.4
Hf	9.2	10.4	Lu	1.4	1.43
Ta	1.7		Ga		
U			F		
Th			Cl		
W			C		
Y			N		
Sr			H		
Rb		0.64	He		
Li		10.4	Ge (ppb)		
Ba		83.9	Ir		
Cs			Au		
Be			Ru		
Zn			Os		
Pb					

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

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

**Table 2: Rb-Sr composition of 71577.**  
Data from Nyquist et al. (1976).

Sample	71577,9
wt (mg)	59
Rb (ppm)	0.637
Sr (ppm)	191
$^{87}\text{Rb}/^{86}\text{Sr}$	$0.0096 \pm 2$
$^{87}\text{Sr}/^{86}\text{Sr}^b$	$0.69967 \pm 5$
$T_B$	$4.15 \pm 0.45$
$T_L$	$4.64 \pm 0.46$

b = Uncertainties correspond to last two figures and are 2 sigma - normalized to  $^{88}\text{Sr}/^{86}\text{Sr} = 8.37521$ ; B = Model age assuming  $I = 0.69910$  (BABI + JSC bias); L = Model age assuming  $I = 0.69903$  (Apollo 16 anorthosites for  $T = 4.6$  Ga).

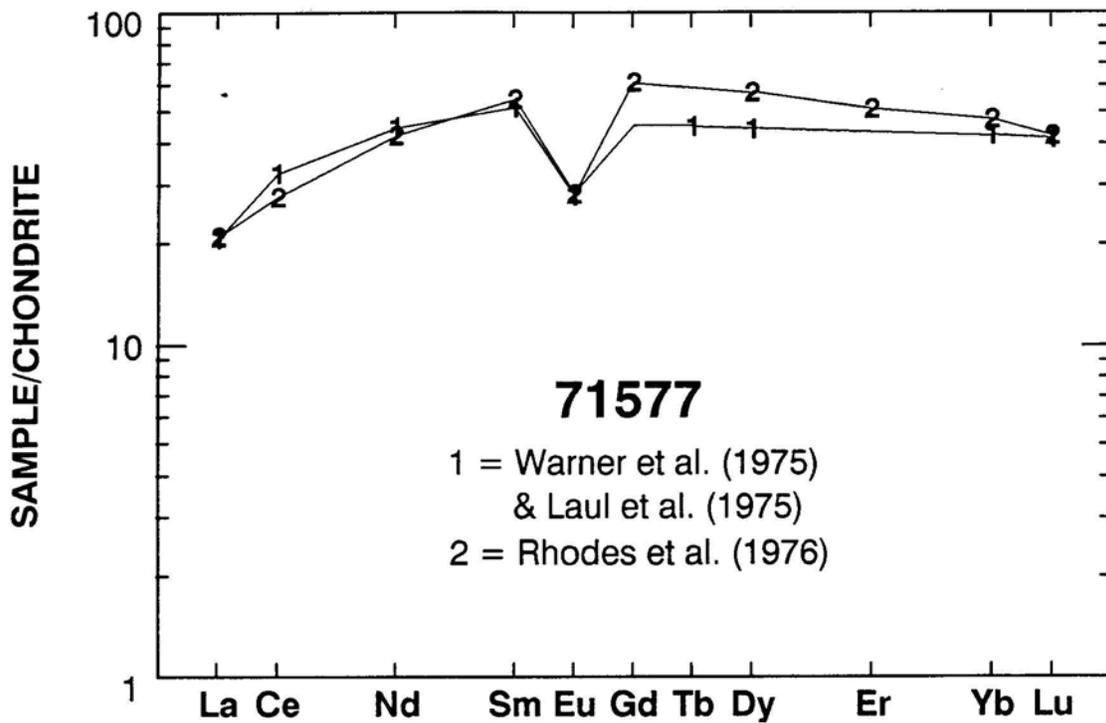


Figure 3: Chondrite-normalized rare-earth element profile of 71577. The same analysis was reported by Warner et al. (1975) and Laul et al. (1975). A second analysis is from Rhodes et al. (1976).