

71596**High-Ti Mare Basalt****61.05 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 71596. Warner et al. (1975c) described 71596 as a microporphyrritic ilmenite basalt. However, the petrography and mineral chemistry of this sample was not specifically mentioned, only being discussed in the general

description of this basalt group. During the preparation of this catalog, we examined thin section 71596,5 and found it to be a medium-grained (0.2-0.4mm) basalt (Fig. 2). It is comprised of two textural domains: 1) plagioclasepyroxene "bow-tie" intergrowths; and 2) blocky, pink pyroxene and plagioclase in an almost sub-ophitic relationship. Blocky ilmenite is found in both domains, but ilmenite also occurs as phenocrysts (up to 1mm) with "sawtooth" margins (Fig. 2). Both groundmass and phenocrystic ilmenite contain rutile and chromite exsolution

lamellae (~0.001 mm wide). Olivine microphenocrysts are also present (up to 0.6mm) (Fig. 2), and these contain inclusions of euhedral chromite (~0.005mm). The olivines have corroded margins and occasionally have reaction rims of pink pyroxene. Native Fe and troilite (< 0.05mm) are disseminated throughout the sample as interstitial phases. No armalcolite or SiO₂ was observed.

WHOLE-ROCK CHEMISTRY

Laul et al. (1975) and Warner et al. (1975) reported the same



Figure 1: Hand specimen photograph of 71596,0. Small divisions on scale are in millimeters.



Figure 2: Photomicrograph of 71596.5. Olivine microphenocrysts and ilmenite phenocrysts with sawtooth margins are seen set in a sub-variolitic to variolitic groundmass.

whole-rock analysis of 71596.1 in a study of Apollo 17 rake samples (Table 1). 71596 is classified as a Type B2 Apollo 17 high-Ti basalt, based on the whole-rock classification of Rhodes et al. (1976) and Warner et al. (1979), plus the criteria of Neal et al. (1990). This sample contains 11.0 wt% TiO₂, with a

MG# of 42.5. The REE profile (Fig. 3) is LREE-depleted with a maximum at Sm. The HREE exhibit a slight depletion compared to the MREE, but are still enriched (relative to chondrites) over the LREE (Fig. 3). A negative Eu anomaly is present [f(Eu/Eu*)_N = 0.58].

PROCESSING

Of the original 61.05g of 71596.0, a total of 59,888 remains. 71596.1 was used for INAA and renumbered to,9001. Two thin sections (,4 and,5) were taken from this irradiated sample.

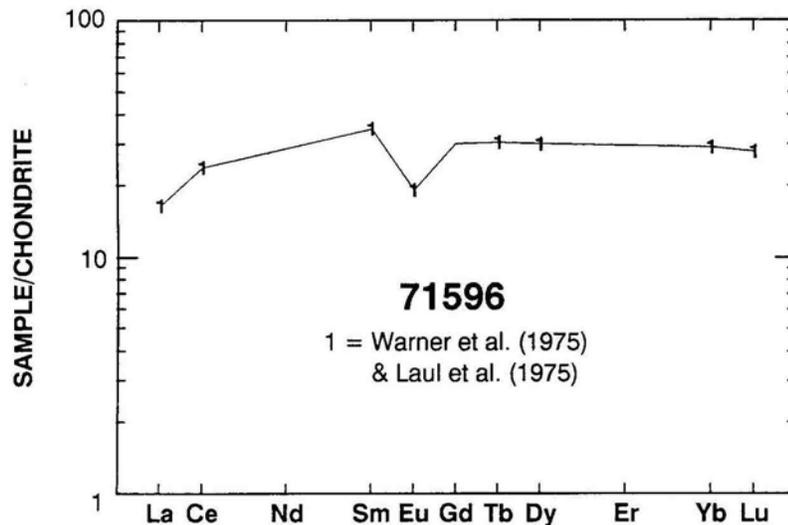


Figure 3: Chondrite -normalized rare-earth element profile of 71596. The same analysis was reported by Warner et al. (1975) and Laul et al. (1975).

Table 1: Whole-rock chemistry of 71596.
 Data from Laul et al. (1975) and Warner et al. (1975) (same analysis).

Sample 71596,1 Method N		Sample 71596,1 Method N	
SiO ₂ (wt %)		Cu	
TiO ₂	11.0	Ni	
Al ₂ O ₃	9.2	Co	20.2
Cr ₂ O ₃	0.400	V	120
FeO	18.8	Sc	75
MnO	0.246	La	5.5
MgO	7.8	Ce	21
CaO	10.3	Nd	20
Na ₂ O	0.38	Sm	7.2
K ₂ O	0.044	Eu	1.50
P ₂ O ₅		Gd	
S		Tb	1.8
Nb (ppm)		Dy	11
Zr		Er	
Hf	6.3	Yb	6.5
Ta	1.3	Lu	0.96
U		Ga	
Th		F	
W		Cl	
Y		C	
Sr		N	
Rb		H	
Li		He	
Ba		Ge (ppb)	
Cs		Ir	
Be		Au	
Zn		Ru	
Pb		Os	

Analysis by: N = INAA.