

71589**High-Ti Mare Basalt****6.86 g****INTRODUCTION**

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

PETROGRAPHY AND MINERAL CHEMISTRY

Warner et al. (1978) reported the petrography and mineral chemistry of 71589. During the preparation of this catalog, we examined thin section 71589,4 and found it to be a fine-grained (0.05-0.25mm) basalt. It is comprised of interwoven "bow-tie" plagioclase-pyroxene intergrowths (Fig. 2). Ilmenite is also present in this groundmass material (Fig. 2), as

well as a phenocryst phase (up to 1mm with "sawtooth" margins). Rutile and chromite exsolution lamellae (<0.001mm wide) are present in both groundmass and phenocrystic ilmenite. Corroded olivine microphenocrysts (up to 0.6mm) are mantled by reaction rims of pink pyroxene. These olivines contain euhedral chromite inclusions (~0.005mm) (Fig. 2). Native Fe and troilite (< 0.05mm) are disseminated throughout the thin section as interstitial phases. No armalcolite was observed.

WHOLE-ROCK CHEMISTRY

Murali et al. (1977) reported the whole-rock composition of

71589,1 in a study of Apollo 17 rake samples (Table 1). 71589 is classified as a Type 132 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 10.7 wt% TiO₂, with a MG# of 41.6. The REE profile (Fig. 3) is LREE-depleted, but Ce has not been included. Murali et al. (1977) reported 37 ppm Ce, but in parentheses, and inclusion of it in this profile would produce a positive Ce anomaly. The high uncertainties associated with analyzing Ce by INA, coupled with the overall LREE-depleted nature of Apollo 17 high-Ti basalts, suggests that the

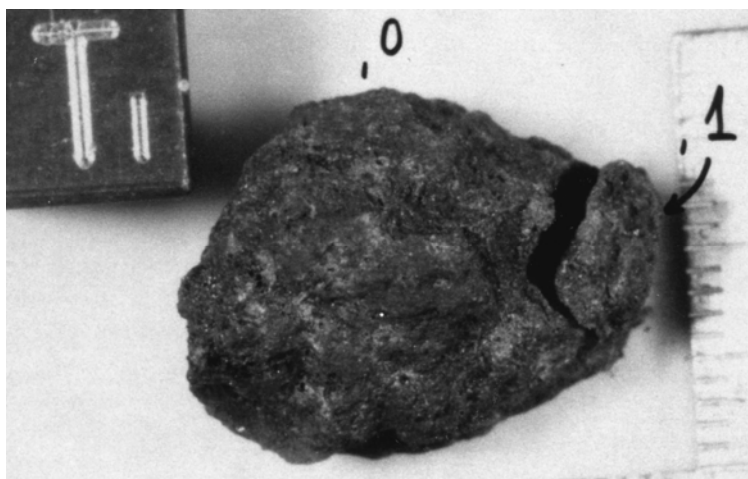


Figure 1: Hand specimen photograph of 71589,0. Small divisions on scale are in millimeters.



Figure 2: Photomicrograph of 71589,4. Olivine and ilmenite phenocrysts set in a sub-variolitic to variolitic ground mass. Field of view = 2.5 mm.

37 ppm Ce quoted by Murali et al. (1977) is probably spurious. In reality, this value is probably lower. The HREE exhibit a slight decrease from Tb and Dy (Fig. 3). A negative Eu anomaly is present $[(Eu/Eu^*)_N = 0.57]$.

PROCESSING

Of the original 6.86g of 71589,0, a total of 6.648 remains. 71589,1 was used for INAA, and

thin section ,4 was taken from this irradiated sample.

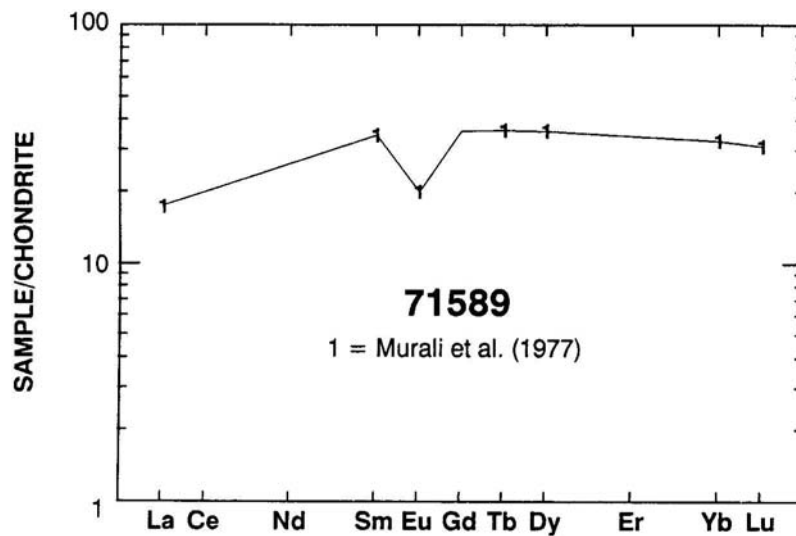


Figure 3: Chondrite- normalized rare-earth element profile of 71589. Data from Murali et al. (1977).

Table 1: Whole-rock chemistry of 71589.
Data from Murali et al. (1977).

Sample 71589,1 Method N		Sample 71589,1 Method N	
SiO ₂ (wt %)		Cu	
TiO ₂	10.7	Ni	
Al ₂ O ₃	9.2	Co	19.5
Cr ₂ O ₃	0.428	V	114
FeO	20.0	Sc	79
MnO	0.247	La	5.7
MgO	8.0	Ce	(37)
CaO	10.5	Nd	
Na ₂ O	0.34	Sm	7.0
K ₂ O	0.050	Eu	1.54
P ₂ O ₅		Gd	
S		Tb	2.1
Nb (ppm)		Dy	13
Zr		Er	
Hf	7.4	Yb	7.2
Ta	1.4	Lu	1.05
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.