71576

High-Ti Mare Basalt
23.54 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 71576. During the preparation of this catalog, we examined thin section 71576,3 and found it to be a fine- to medium-grained (average grain size ~0.2-0.3mm) basalt. It is dominated by "bow-tie" intergrowths of plagioclase and pyroxene. Some areas contain much opaque interstitial glass. Better-crystallized areas contain pink-brown, blocky pyroxene. Subhedral olivine phenocrysts (up to 0.6mm) are present, along with ilmenites up to 1.5mm long. The ilmenite phenocrysts contain armalcolite cores. Ilmenite generally exhibits rutile and chromite exsolution lamellae. These are not present in the armalcolite. Native Fe and troilite (<0.1mm) form interstitial phases and are disseminated throughout.

WHOLE-ROCK CHEMISTRY

Murali et al. (1977) reported the whole-rock composition of 71576,1 in a study of Apollo 17 rake samples (Table 1). 71576 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. (2979), plus the criteria of Neal et al. (1990). This sample contains 11.8 wt% TiO_2 with a MG# of 37.7. The REE profile (Fig. 2) flat, except for La. However, the uncertainties associated with analyzing Ce b

Figure 1: Hand specimen photograph of 71576,0. Cubic scale = 1 cm^3.

INA, coupled with the overall LREE-depleted nature of Apollo 17 high-Ti basalts, suggests that the 31 ppm Ce quoted by Murali et al. (1977) is probably a maximum. In reality, this value is probably lower. The HREE are relatively flat at approximately 35 times chondritic levels (Fig. 2). A negative Eu anomaly is present [$(Eu/Eu^*)_N = 0.59$].

ISOTOPE CHEMISTRY

Paces et al. (1991) reported whole-rock Rb-Sr and Sm-Nd data for 71576,4 (Tables 2 and 3). 71576 was studied as part of a larger isotopic investigation of the Apollo 17 high-Ti basalts.

PROCESSING

Of the original 23.54g of 71575,0, a total of ~23.19g remains. 71575,1 was used for INAA and the thin section ,3 was taken from this irradiated sample.

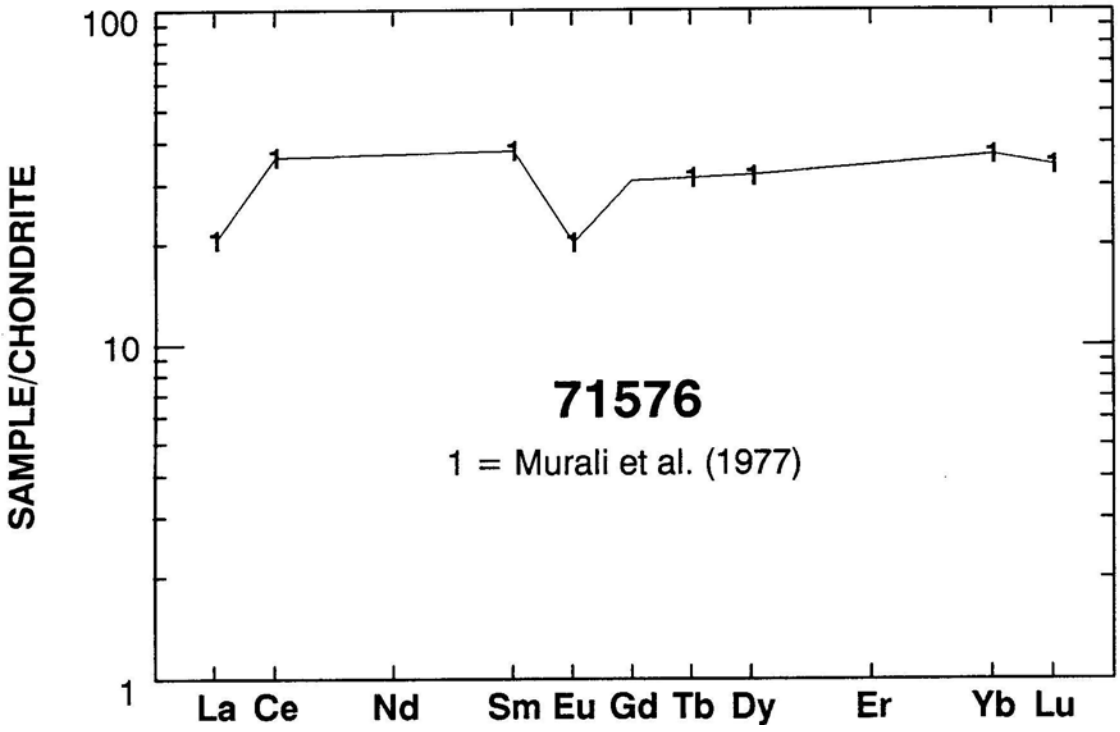

Figure 2: Chondrite -normalized rare-earth element profile of 71576. Data from Murali et al. (1977).

Table 1: Whole-rock chemistry of 71576.
Data from Murali et al. (1977).

	Sample 71576,1 Method N		Sample 71576,1 Method N
SiO_2 (wt %)		Cu	
TiO_2	11.8	Ni	
Al_2O_3	8.9	Co	19.2
Cr_2O_3	0.335	V	85
FeO	20.0	Sc	80
MnO	0.242	La	6.7
MgO	6.8	Ce	31
CaO	10.6	Nd	
Na_2O	0.39	Sm	7.6
K_2O	0.053	Eu	1.54
P_2O_5		Gd	
S		Tb	1.8
Nb (ppm)		Dy	12
Zr		Er	
Hf	7.0	Yb	8.0
Ta	1.5	Lu	1.15
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.

Table 2: Rb-Sr data for 71576,4. Data from Paces et al. (1991).

Rb (ppm)	0.382
Sr (ppm)	127
$^{87}Rb/^{86}Sr$	0.008658 ± 86
$^{87}Sr/^{86}Sr$	0.699669 ± 13
I(Sr)[a]	0.699203 ± 18
T_{LUNI}[b](Ga)	5.1

[a]Initial Sr isotopic ratios calculated at 3.69 Ga using ^{87}Rb decay constant = $1.42 \times 10^{-11} yr^{-1}$.

[b]Model age relative to I(Sr) = LUNI = 0.69903 (Nyquist et al., 1974; Shih et al., 1986). $T_{LUNI} = 1/\lambda * \ln[((^{87}Sr/^{86}Sr - 0.69903) ^{87}Rb/^{86}Sr) + 1]$.

Table 3: Sm-Nd data for 71576,4. Data from Paces et al. (1991).

Sm (ppm)	7.25
Nd (ppm)	18.2
$^{147}Sm/^{144}Nd$	0.24154 ± 48
$^{143}Nd/^{144}Nd$	0.513996 ± 9
I(Nd)[a]	0.508096 ± 21
ε_{Nd}[b]	5.2 ± 0.4
T_{CHUR}[c](Ga)	4.6

[a]Initial Nd isotopic ratios calculated at 3.69 Ga using ^{147}Sm decay constant = $6.54 \times 10^{-12} yr^{-1}$.

[b]Initial ε_{Nd} calculated at 3.69 Ga using present-day chondritic values of $^{143}Nd/^{144}Nd$ = 0.512638 and $^{147}Sm/^{144}Nd$ = 0.1967.

[c]Model age relative to CHUR reservoir using present-day chondritic values listed above. $T_{CHUR} = 1/\lambda * [((^{143}Nd/^{144}Nd - 0.512638)/(^{147}Sm/^{144}Nd - 0.1967)) + 1]$.