71545

High-Ti Mare Basalt
17.26 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 71545. During the preparation of this catalog we examined thin section 71545,3 and found it to be a fine- to medium-grained basalt (Fig. 2). It is comprised of blocky areas of pink pyroxene (~0.4mm) as well as interlocking "bow-tie" intergrowths of pyroxene and plagioclase (up to 0.6mm). Olivine is present as corroded phenocrysts (up to 0.6mm - Fig. 2), as well as cores to larger, pink pyroxenes. Rarely does olivine contain euhedral inclusions of chromite. Ilmenite phenocrysts are also present (> 1 mm - Fig. 2) and these often exhibit "sawtooth" margins. Minor rutile and chromite exsolution features are present in the ilmenite. There is little ilmenite in the groundmass which is dominated by plagioclase, pyroxene, and an opaque glass. Native Fe and troilite (<0.05mm) are disseminated throughout as interstitial phases.

WHOLE-ROCK CHEMISTRY

Murali et al. (1977) reported the whole-rock composition of 71545,1 in a study of Apollo 17 rake samples (Table 1). 71545 is classified as a Type B2 Apollo 17 high-Ti basalt, based on the whole-rock classification of Rhodes et al. 0976) and Warner et al. (1979), plus the criteria of Neal et al. (1990). This sample contains 13.0 wt% TiO_2 with a MG# of 43.2. The REE profile (Fig. 3) is LREE-depleted with a maximum at Sm. The Ce analysis suggests that the pattern is flat except for La. However, consideration of the REE patterns of other Apollo 17 basalts suggests that the Ce abundance reported by Murali et al. (1977) is probably imprecise, due to the errors inherent in analyzing Ce by INA. The HREE form a flat pattern at ~31 times chondritic abundances. A negative Eu anomaly is present f $(Eu/Eu^*)_N$ = 0.54].

ISOTOPE CHEMISTRY

Paces et al. (1991) reported whole-rock Rb-Sr and Sm-Nd data for 71545,4 (Tables 2 and 3). 71545 was studied as part of a larger isotopic investigation of the Apollo 17 high-Ti basalts.

PROCESSING

Of the original 17.26g of 71545,0, approximately 16.95g remains. 71545,1 was used for INAA and the thin section,3 was taken from this irradiated sample.

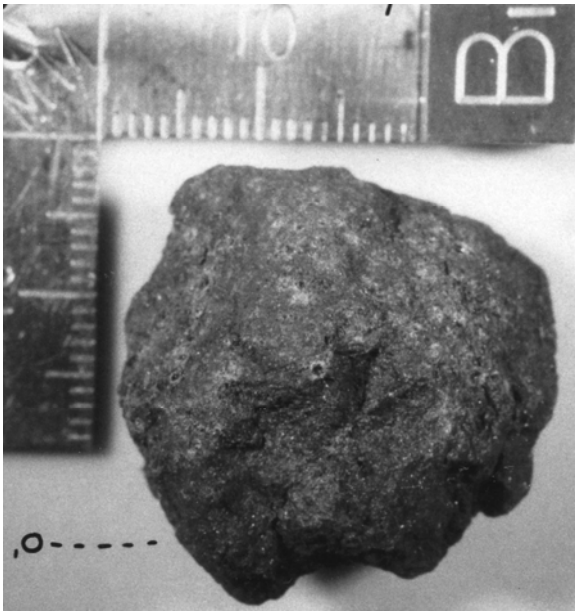

Figure 1: Hand specimen photograph of 71545,0. Small divisions on scale are in millimeters.

Table l: Whole-rock chemistry of 71545.
Data from Murali et al. (1977).

	71545,1 N		71545,1 N
SiO_2 (wt %)		Cu	
TiO_2	13.0	Ni	
Al_2O_3	8.9	Co	19.6
Cr_2O_3	0.350	V	99
FeO	20.6	Sc	79
MnO	0.260	La	6.4
MgO	8.8	Ce	29
CaO	10.9	Nd	
Na_2O	0.41	Sm	6.9
K_2O	0.055	Eu	1.36
P_2O_5		Gd	
S		Tb	1.8
Nb (ppm)		Dy	11
Zr		Er	
Hf	6.2	Yb	6.9
Ta	1.5	Lu	1.08
U		Ga	
Th		F	
W		Cl	
Y		C	
Sr		N	
Rb		H	
Li		He	
Ba		Ge (ppb)	
Cs		Ir	
Be		Au	1.3 ± 0.6
Zn		Eu	
Pb		Os	

Analysis by: N = INAA.

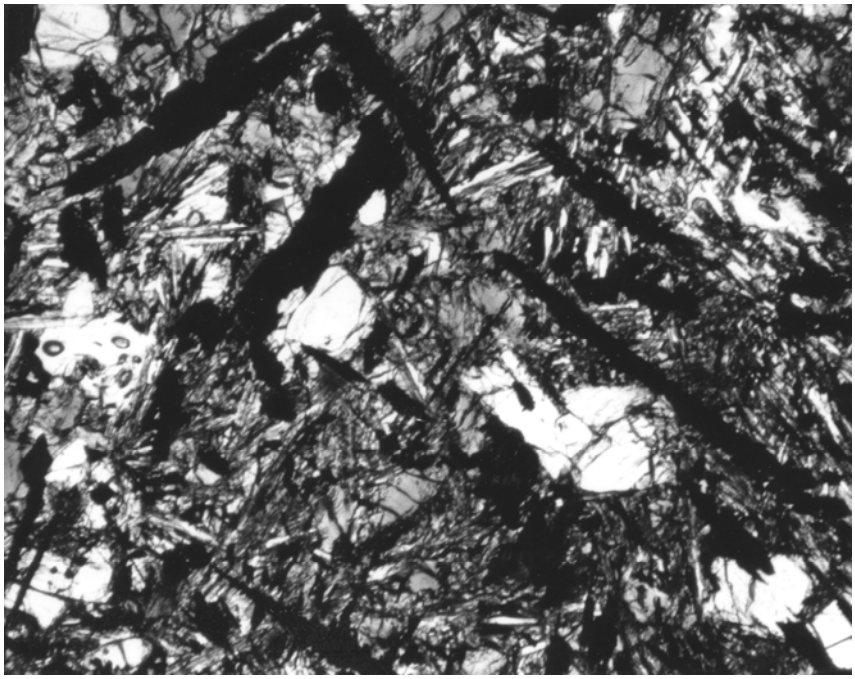

Figure 2- Photomicrograph of 71545, 3. Ilmenite and olivine phenocrysts are set in a variolitic and glassy matrix. Field of view = 2.5 mm.

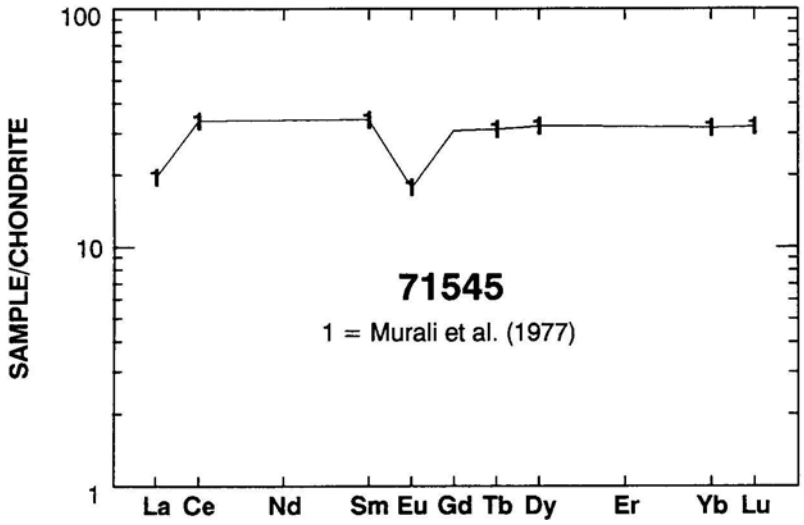

Figure 3: Chondrite-normalized rare-earth element plot of 71545. Data from Murali et al. (1977).

Table 2: Rb-Sr data for 71545,4.
Data from Paces et al. (1991).

Rb (ppm)	0.354
Sr (ppm)	120
$^{87}Rb/^{86}Sr$	0.008497 ± 84
$^{87}Sr/^{86}Sr$	0.699676 ± 12
I(Sr)[a]	0.699219 ± 17
T_{LUNI}[b](Ga)	5.2

[a]Initial Sr isotopic ratios calculated at 3.69 Ga using ^{87}Rb decay constant = 1.42×10^{-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: Rb-Sr data for 71545,4.
Data from Paces et al. (1991).

Sm (ppm)	6.67
Nd (ppm)	16.5
$^{147}Sm/^{144}Nd$	0.24519 ± 49
$^{143}Nd/^{144}Nd$	0.514057 ± 11
I(Nd)[a]	0.508068 ± 23
ε_{Nd}[b]	4.6 ± 0.4
T_{CHUR}[c](Ga)	4.4

[a]Initial Nd isotopic ratios calculated at 3.69 Ga using ^{147}Sm decay constant = 6.54×10^{-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. $T_{CHUR} = 1/\lambda*[((^{143}Nd/^{144}Nd - 0.512638)/(^{147}Sm/^{144}Nd - 0.1967)) + 1]$.