

71048**High-Ti Marc Basalt****2.457 g, 1.25 x 1 x 0.5 cm****INTRODUCTION**

71048 was described as a medium dark gray, fine-grained basalt (Apollo 17 Lunar Sample Information Catalog, 1973), containing no zap pits and 1-2% of 1-2mm diameter vugs (Fig. 1) lined with ilmenite. It has an equigranular fabric and surfaces are very finely hackly. This sample was collected from Station 1A.

PETROGRAPHY AND MINERAL CHEMISTRY

Neal et al. (1989) described 71048 as a fine-grained, sub-variolithic, olivine porphyritic

basalt containing anhedral pyroxene (<0.2mm) and plagioclase (<0.4mm) in the groundmass. Pyroxene and plagioclase form "bow-tie" textures. Olivine (0.4mm) and ilmenite (1.8mm) phenocrysts occur. Olivine exhibits some degree of reaction with the groundmass, although pyroxene overgrowths are not well developed. Ilmenite contains "sawtooth" margins, with no exsolved phases present. Ilmenite also forms a groundmass phase. No armalcolite is present. Cr-ulvospinel occurs as inclusions in olivine and pyroxene. Native Fe and troilite are interstitial phases. Point counting reveals

that this basalt is comprised of. 39.5% pyroxene; 20.4% plagioclase; 28.4% ilmenite; 7.5% olivine; 2.8% native Fe and troilite; 0.9% glass, and 0.4% spinel.

Olivine exhibits minor core-to-rim zonation ($Fe_{0.66-63}$), as does plagioclase (An_{86-78}). The first pyroxenes to crystallize were titan-augites which are zoned toward more Fe-rich compositions (Fig. 2). No pigeonite is present (Fig. 2). Al/Ti ratios are constant at ~2, and Cr_2O_3 abundances decrease as pyroxene MG# decreases. Spinel exhibit moderate core to-rim zonation ($Cr/(Cr+Al) = 70-78$; MG# = 6-9), but ilmenite



Figure 1: Hand specimen photograph of 71048,0.

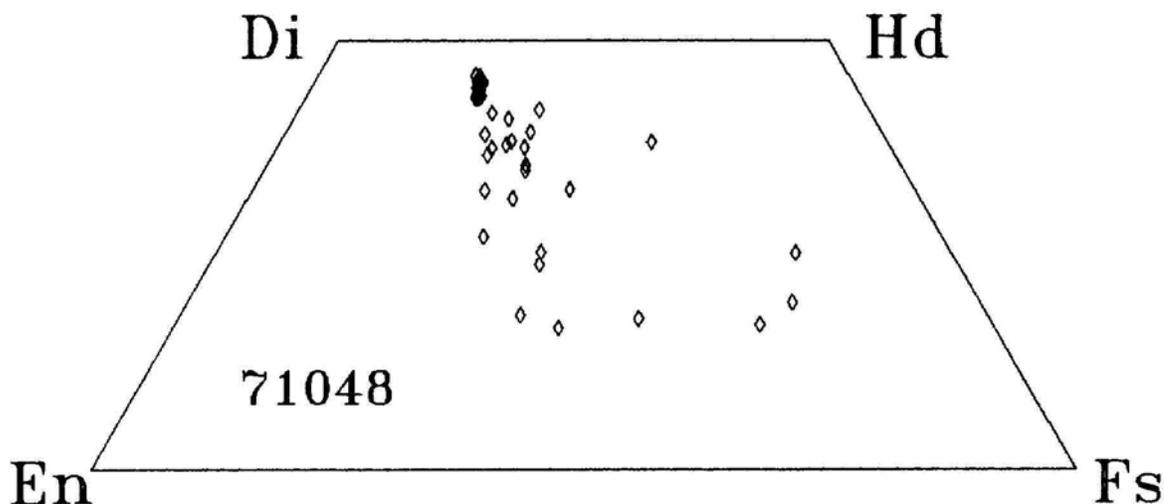


Figure 2: Pyroxene compositions of 71048 represented on a pyroxene quadrilateral.

exhibits relatively little variation either within or between grains (MG# = 7-12)

WHOLE-ROCK CHEMISTRY

Neal et al. (1990) described 71048 as a Type A Apollo 17 high-Ti basalt (Table 1) using the classification of Rhodes et al. (1976) and Warner et al. (1979).

This basalt contains 12.9 wt% TiO₂ with a MG# of 44.6. The REE profile (Fig. 3) is LREE-depleted, but convex-upward. The MREE reach > 50 times chondritic abundances. A negative Eu anomaly is present ([Eu/Eu*]_N = 0.53).

PROCESSING

Of the original 2.457g of 71048,0, approximately 2.11g remains. 0.338 was used for INAA, and 0.01g was used for thin section 71048,3.

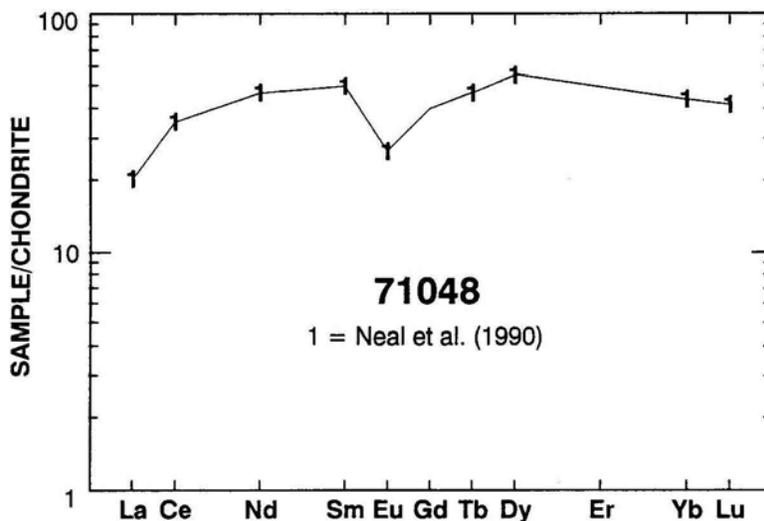


Figure 3: Chondrite-normalized rare-earth element profile of 71048.

Table 1: Whole-rock chemistry of 71048.
Data from Neal et al. (1990).

	71048,4 I		71048,4 I
SiO ₂ (wt %)		Cu	
TiO ₂	12.9	Ni	80
Al ₂ O ₃	8.68	Co	19
Cr ₂ O ₃	0.201	V	105
FeO	18.3	Sc	79
MnO	0.253	La	6.57
MgO	8.0	Ce	30
CaO	10.2	Nd	29
Na ₂ O	0.39	Sm	9.94
K ₂ O	0.07	Eu	2.01
P ₂ O ₅		Gd	
S		Tb	2.66
Nb (ppm)		Dy	18.7
Zr	74	Er	
Hf	8.52	Yb	9.48
Ta	1.86	Lu	1.39
U	0.09	Ga	
Th	0.34	F	
W		Cl	
Y		C	
Sr	148	N	
Rb		H	
Li		He	
Ba	129	Ge (ppb)	
Cs	0.67	Ir	
Be		Au	
Zn		Eu	
Pb		Os	

I = Analysis by INAA.