

**71049****High-Ti Mare Basalt****1.86 g, 1 x 1 x 1 cm****INTRODUCTION**

71049 was described as a medium dark gray (with brownish tint), equigranular, blocky basalt (Apollo 17 Lunar Sample Information Catalog, 1973), containing no zap pits and 1-2% irregular vugs (Fig. 1) up to 0.5mm. It has a blocky, angular shape with an equigranular fabric. This basalt was collected at Station 1A.

**PETROGRAPHY AND MINERAL CHEMISTRY**

Neal et al. (1989) described 71049 as a plagioclase poikilitic

basalt, comprised of: 41.6% pyroxene; 31.0% plagioclase; 22.5% ilmenite; 2.7% native Fe and troilite; 2.0% silica; and 0.2% olivine. Plagioclase (up to 2.2mm) poikilitically encloses pyroxene (up to 1mm) and ilmenite (up to 0.8mm). Ilmenite is blocky, occasionally interstitial, and contains chromite and rutile exsolution lamellae (<0.005mm). Olivine (~0.1mm) forms cores to pyroxene. No armalcolite or discrete spinel phases were observed. Silica, native Fe, and troilite are interstitial phases.

Olivine exhibits little core-to-rim zonation, but variation

between grains is evident ( $FO_{57-67}$ ). Plagioclase exhibits little overall compositional variation ( $An_{79-89}$ ), although the rims are usually more sodic. Both pigeonite and titan-augite are present, zoning toward more Fe-rich compositions (Fig. 2). Al/Ti ratios are constant at ~2, and  $Cr_2O_3$  contents decrease with decreasing pyroxene MG#. Ilmenite exhibits little overall variation (MG# = 6-11).

**WHOLE-ROCK CHEMISTRY**

Neal et al. (1990) described 71049 as a Type A Apollo 17 high-Ti basalt (Table 1) using



Figure 1: Hand specimen photograph of 71049,0.

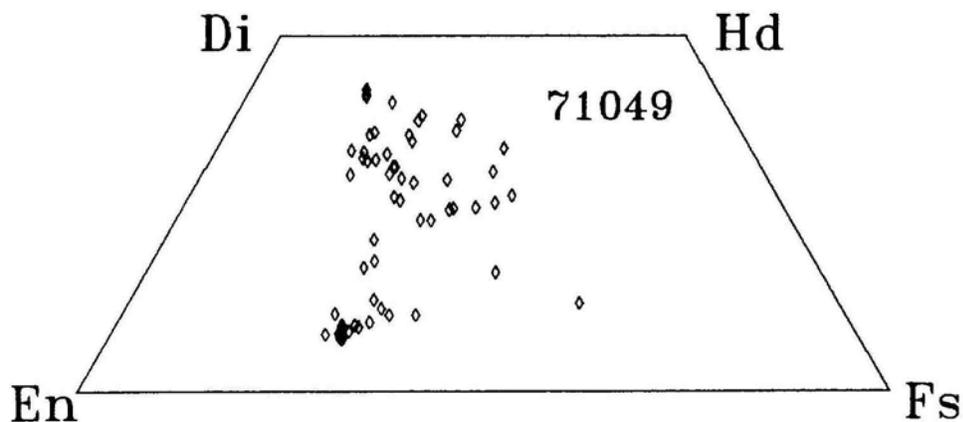


Figure 2: Pyroxene compositions of 71049 represented on a pyroxene quadrilateral.

the classification of Rhodes et al. (1976) and Warner et al. (1976). This basalt contains 12.5 wt% TiO<sub>2</sub> with a MG# of 44.6 (Table 1). Although the REE profile (Fig. 3) is LREE-depleted, the HREE also show a depletion relative to the MREE. The MREE reach 45-55 times

chondritic levels. A negative Eu anomaly is present ( $[Eu/Eu^*]_N = 0.50$ ).

0.52g was used for INAA, and 0.01g was used for thin section 71049,3.

**PROCESSING**

Of the original 1.868 of 71049,0, approximately 1.33g remains.

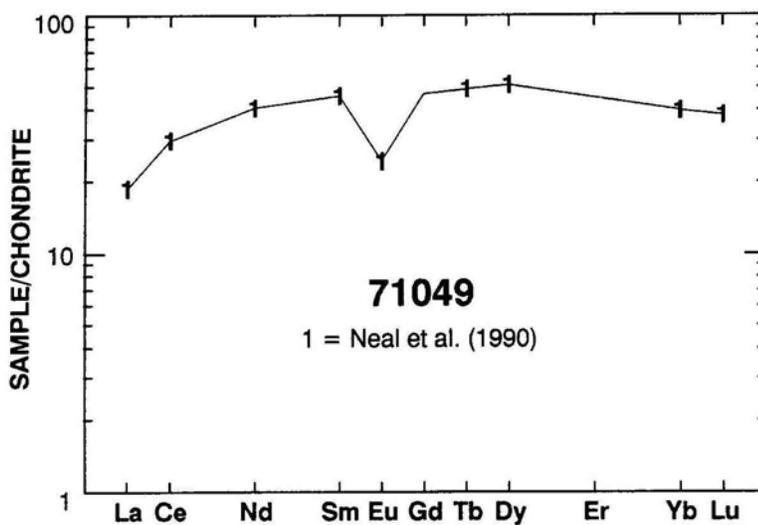


Figure 3: Chondrite -normalized rare-earth element profile of 71049.

**Table 1: Whole-rock chemistry of 71049.**  
Data from Neal et al. (1990).

	71049,4 I		71049,4 I
SiO <sub>2</sub> (wt %)		Cu	
TiO <sub>2</sub>	12.5	Ni	11
Al <sub>2</sub> O <sub>3</sub>	8.18	Co	19
Cr <sub>2</sub> O <sub>3</sub>	0.214	V	125
FeO	17.8	Sc	77
MnO	0.249	La	6.23
MgO	8.3	Ce	26
CaO	9.8	Nd	26
Na <sub>2</sub> O	0.39	Sm	9.42
K <sub>2</sub> O	0.07	Eu	1.90
P <sub>2</sub> O <sub>5</sub>		Gd	
S		Tb	2.89
Nb (ppm)		Dy	17.8
Zr	168	Er	
Hf	8.18	Yb	8.84
Ta	1.65	Lu	1.31
U	0.33	Ga	
Th	0.23	F	
W		Cl	
Y		C	
Sr	159	N	
Rb		H	
Li		He	
Ba	104	Ge (ppb)	
Cs	0.15	Ir	
Be		Au	
Zn		Ru	
Pb		Os	

I = analysis by INAA.