

**70157****High-Ti Mare Basalt****0.57 g, 1.2 x 0.8 x 0.5 cm****INTRODUCTION**

70157 was described as a medium gray, sub- to intergranular basalt (see Fig. 1 of 70156), containing no zap pits and only one miarolitic cavity (Apollo 17 Lunar Sample Information Catalog, 1973). All surfaces are fresh with no discernable exterior faces. This sample was collected from the "Geophone Rock", 50 m south of the ALSEP central station.

**PETROGRAPHY AND MINERAL CHEMISTRY**

70157 was described as a plagioclase-poikilitic basalt by Neal et al. (1989). Anhedral and blocky ilmenite (0.1-0.6 mm) forms an intersertal texture with pyroxene (0.1-1.8 mm) and plagioclase (0.3-1.6 mm).

Ilmenite contains rutile and spinel exsolution lamellae (< 0.005 mm). Armalcolite (~ 0.1 mm) is present as ilmenite-free inclusions in pyroxene and olivine forms 0.05-0.1 mm cores to pyroxene. Native Fe and troilite are interstitial phases. No discrete spinel minerals are present. Point counting reveals that this sample is composed of: 55.2% pyroxene; 24.7% plagioclase; 16% ilmenite; 2.7% native Fe and troilite; 1% armalcolite; and 0.4% olivine.

Olivine exhibits moderate variation, although individual grains are usually homogeneous. Plagioclase shows little zoning or inter-grain variation (An<sub>84-89</sub>). Pyroxene compositions exhibit little Fe enrichment, although there is a continuum of compositions between titan-augite and

pigeonite (Fig. 1). Al/Ti ratios are constant at ~2, and Cr<sub>2</sub>O<sub>3</sub> contents decrease with decreasing pyroxene MG#. Both armalcolite and ilmenite exhibit wide ranges in composition (MG# = 27-46 and 8-29, resp.), but only armalcolite displays core-to-rim zonation Fe enrichment).

**WHOLE-ROCK CHEMISTRY**

The whole-rock chemistry of 70157 has been reported by Neal et al. (1990) (Table 1). These authors described 70157,0 as a Type B Apollo 17 high-Ti mare basalt, using the classification of Rhodes et al. (1976) and Warner et al. (1979). The REE profile of 70157,0 (Fig. 2) is convex-upward, but LREE-depleted. The MREE reach ~ 40 times chondritic values and a small

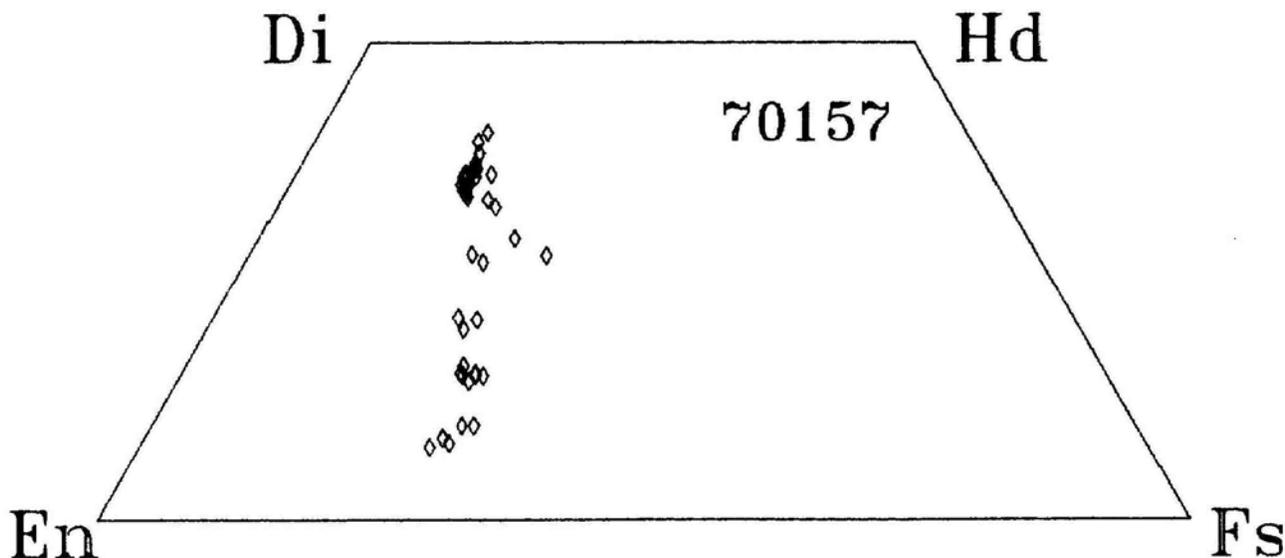


Figure 1: Pyroxene compositions of 70157 represented on a pyroxene quadrilateral.

negative Eu anomaly is present ( $[Eu/Eu^*]_N = 0.68$ ). Neal et al. (1990) used the whole-rock composition of 70157,0 in a comprehensive study of Apollo 17 high-Ti basalt petrogenesis. These authors defined two groups of

Type B basalts - B 1 and B2, on the basis of whole-rock chemistry. Each group is generated by fractional crystallization of observed phenocryst phases. 70157,0 is a Type B1 Apollo 17 high-Ti basalt.

**PROCESSING**

Approximately 0.258 of 70157,0 remains of the original 0.578. 0.31g was irradiated for INAA, and 0.01g was used for thin section 70157,4.

**Table 1: Whole-rock composition of 70157,0.**

Data from Neal et al. (1990).

	70157,0		70157,0
SiO <sub>2</sub> (wt %)	---	Cu	
TiO <sub>2</sub>	13.4	Ni	---
Al <sub>2</sub> O <sub>3</sub>	9.80	Co	19.3
Cr <sub>2</sub> O <sub>3</sub>	0.536	V	136
FeO	17.1	Sc	77
MnO	0.237	La	4.41
MgO	9.1	Ce	16
CaO	11.1	Nd	18
Na <sub>2</sub> O	0.44	Sm	6.77
K <sub>2</sub> O	0.06	Eu	1.90
P <sub>2</sub> O <sub>5</sub>		Gd	
S		Tb	1.93
Nb (ppm)		Dy	13.4
Zr	170	Er	
Hf	6.65	Yb	6.84
Ta	1.41	Lu	0.99
U	---	Ga	
Th	0.21	F	
W		Cl	
Y		C	
Sr	130	N	
Rb	---	H	
Li		He	
Ba	82	Ge (ppb)	
Cs	0.12	Ir	
Be		Au	
Zn		Ru	
Pb		Os	

Analysis by INAA.

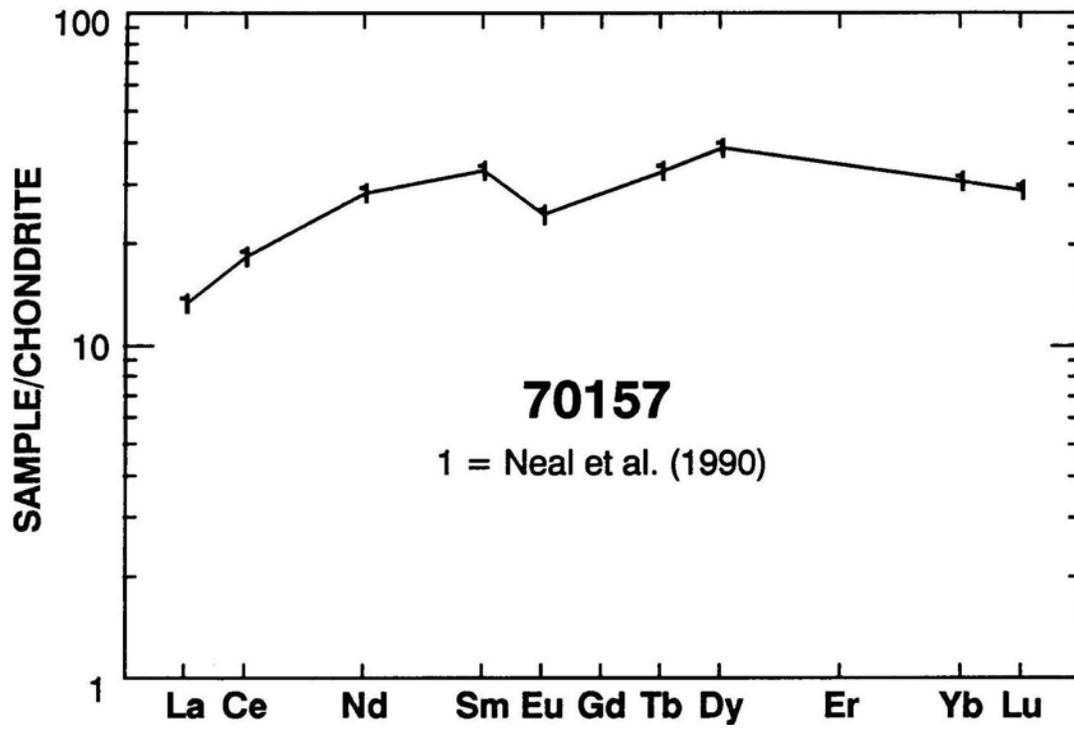


Figure 2: Chondrite-normalized rare-earth element profile of 70157.