

71157**High-Ti Mare Basalt
1.466g, 1.2 x 1 x 0.8 cm****INTRODUCTION**

71157 was described as a dark gray, blocky, aphanitic to vitrophyric basalt (Apollo 17 Lunar Sample Information Catalog, 1973). It contains a few zap pits and 2-5% vugs < 1mm). This basalt has a blocky to subangular shape with a few penetrative fractures. 71157 was collected from Station 1A.

**PETROGRAPHY AND
MINERAL CHEMISTRY**

Neal et al. (1989a) described 71157 as a olivine porphyritic vitrophyre, containing 2.7% olivine, 27.9% pyroxene, 7.2% plagioclase, 13.7% ilmenite, 7.5% armalcolite, 2.5% ulvöspinel, 1.1 native Fe and troilite, and 37.4% opaque glass. Olivine exhibits minor to moderate core-to-rim zonation (up to 8 Fo units) with slight

compositional differences between olivine grains (F0₆₃₋₇₅). The plagioclase laths are too small to probe. Pyroxene compositions vary little (Fig. 1), but are distinct in that the Al/Ti ratio is not constant (> 2; Fig. 2). There is also little variation of Cr₂O₃ contents. Armalcolite exhibits the greatest compositional range of the opaque phases (MG# = 37-50). Much of this variation is between grains, although moderate core-to-rim zonation is observed. Chromite-ulvöspinel grains exhibit little zonation [$100 \cdot (\text{Cr}/(\text{Cr}+\text{Al})) = 67-69$; MG# = 15-17]. Ilmenite is usually homogeneous, most of the compositional variability being between grains (MG# 8-13).

WHOLE ROCK CHEMISTRY

Neal et al. (1989b) described 71157 as a Type B Apollo 17

high-Ti basalt, on the basis of the whole-rock classification of Rhodes et al. (1976) and Warner et al. (1979), and 71157 can be further classified as a Type B2 Apollo 17 basalt using the criteria of Neal et al. (1990). This sample contains 12.6 wt% TiO₂ with a MG# of 40.9. The REE profile (Fig. 3) is LREE depleted with a negative Eu anomaly [(Eu/Eu*)_N = 0.531]. The HREE are approximately constant at 32-35 times chondritic values.

PROCESSING

Of the original 1.466g of 71157,0, approximately 1g remains. 0.41g was used for INAA and 0.01g used in the preparation of thin section 71157,4.

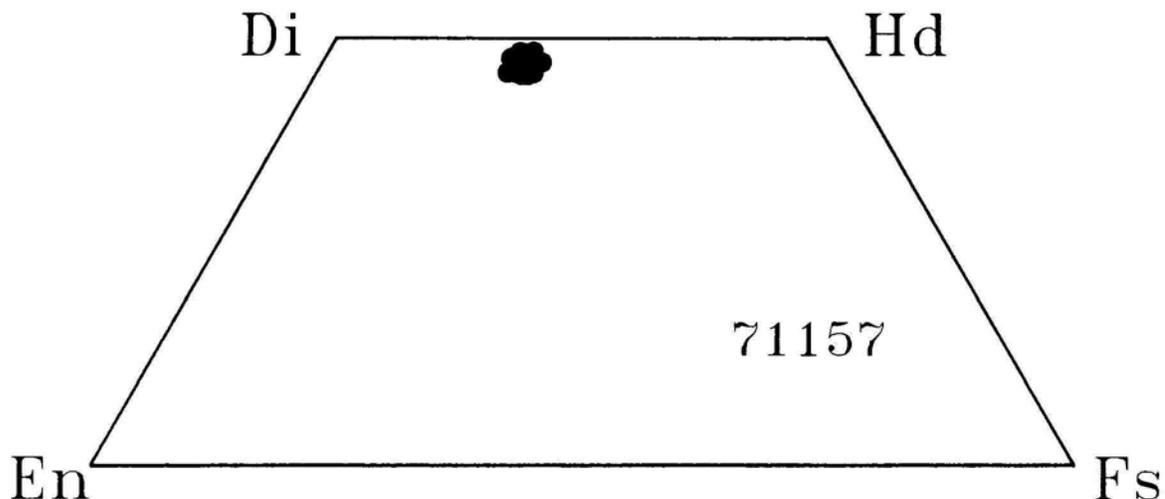


Figure 1: Pyroxene quadrilateral demonstrating the restricted compositional range of high-Ca pyroxene in thin section 71157, 4.

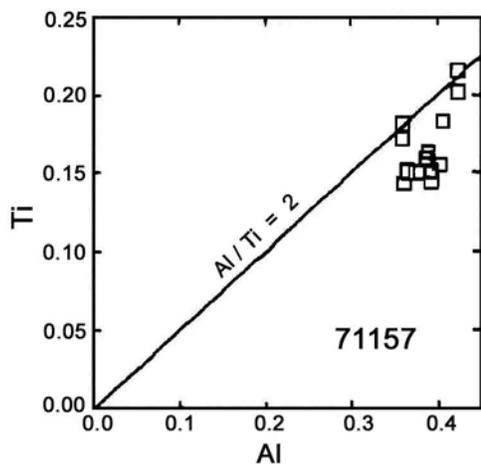


Figure 2: Al versus Ti for pyroxenes from 71157, 4. Note the deviation from the typical Apollo 17 high-Ti basalt Al/Ti ratio of ~2.

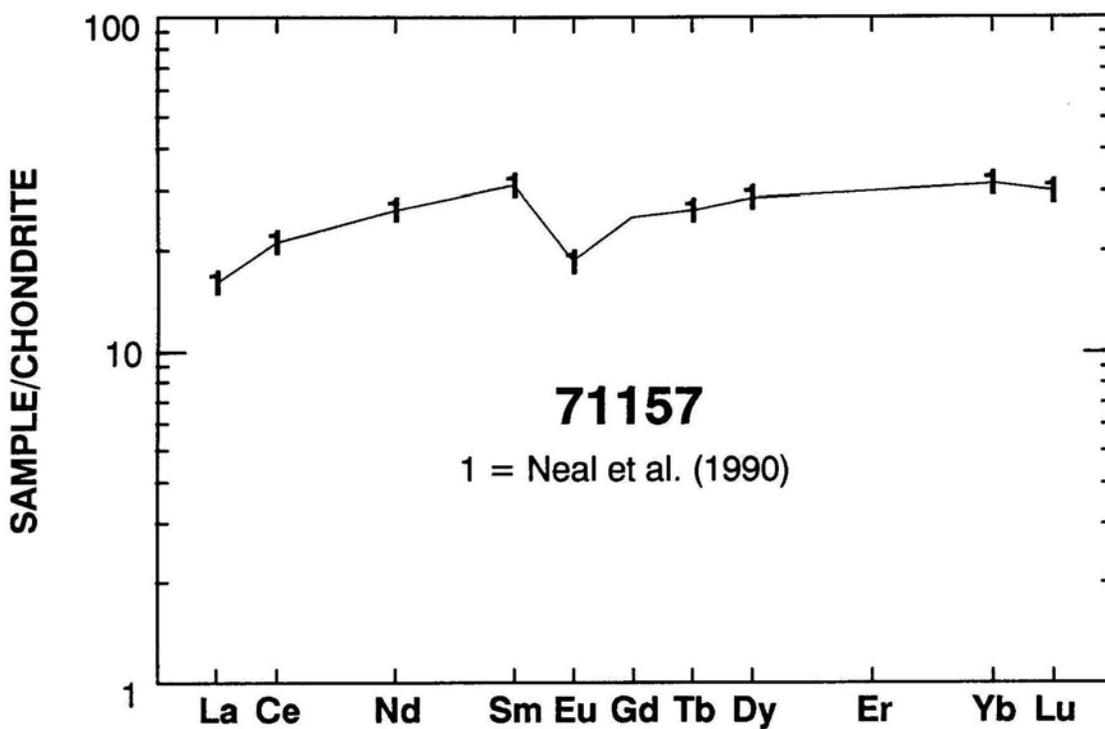


Figure 3: Chondrite-normalized rare earth element plot for 71157. Data from, Neal et al. (1990).

Table 1: Whole-rock chemistry of 71157.
Data from Neal et al. (1990).

Sample 71157,5 Method N		Sample 71157,5 Method N	
SiO ₂ (wt %)		Cu	
TiO ₂	12.6	Ni	16
Al ₂ O ₃	8.46	Co	22
Cr ₂ O ₃	0.191	V	114
FeO	19.5	Sc	84
MnO	0.259	La	5.20
MgO	7.5	Ce	18
CaO	10.7	Nd	21
Na ₂ O	0.36	Sm	6.24
K ₂ O	0.03	Eu	1.40
P ₂ O ₅		Gd	
S		Tb	1.50
Nb (ppm)		Dy	12.6
Zr	274	Er	
Hf	6.14	Yb	6.84
Ta	1.44	Lu	1.00
U		Ga	
Th	0.49	F	
W		Cl	
Y		C	
Sr	138	N	
Rb		H	
Li		He	
Ba	82	Ge (ppb)	
Cs	0.34	Ir	
Be		Au	
Zn		Ru	
Pb		Os	

Analysis by: N = INAA.