

70165

High-Ti Mare Basalt
2.143 g, 1.7x 1.5 x 0.8 cm

INTRODUCTION

70165 was described as a brownish gray, medium- to coarse-grained glomeroporphyritic basalt (Fig. 1), containing no zap pits and < 10% small, irregular cavities. This sample was collected from the ALSEP central station.

PETROGRAPHY AND MINERAL CHEMISTRY

70165 was described as a plagioclase-poikilitic basalt by Neal et al. (1989). Anhedral and blocky ilmenite (0.1-0.6 mm) is set interstitially to pyroxene (0.1-1.0 mm) and plagioclase (0.4-1.8 mm). Chromite and rutile exsolution lamellae (< 0.005 mm) are present in ilmenite. No armalcolite or discrete spinels are present. Olivine (< 0.1mm) forms cores to pyroxene and discrete inclusions in plagioclase. Silica, native Fe, and troilite form interstitial phases. Opaque mesostasis glass is present. Point counting reveals that this sample is composed of 40.3% pyroxene; 33.8% plagioclase; 13.71% ilmenite; 6.3% native Fe and troilite; 2.3% silica; 2.8% glass; and 0.9% olivine.

Olivine is usually unzoned, but exhibits a wide compositional range due to inter-grain variations (Fo_{49-64}). Plagioclase exhibits moderate core-to-rim and inter-grain variations (An_{78-92}). Both pigeonite and

titan-augite are present, with compositional intermediates (Fig. 2). Both exhibit core-to-rim Fe enrichment (Fig. 2). Al/Ti ratios are constant at ~ 2,

and Cr_2O_3 contents decrease with decreasing pyroxene MG#. Ilmenite exhibits significant inter-grain variation (MG# = 3-19).

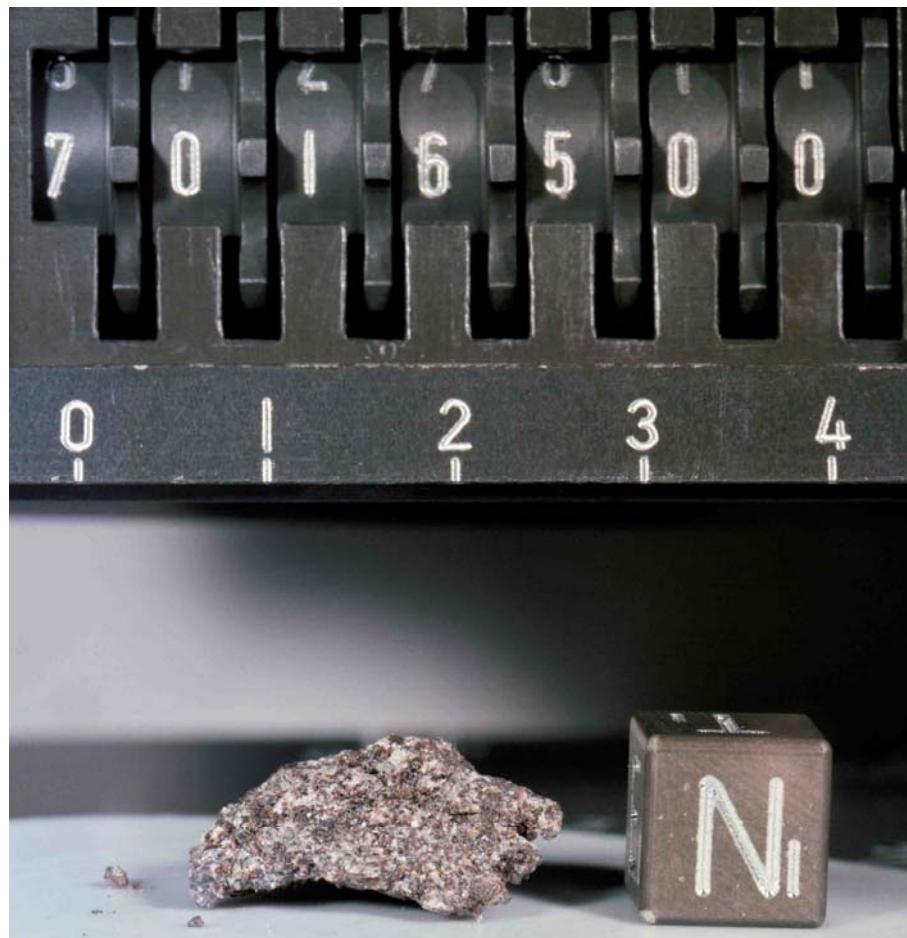


Figure 1: Hand specimen photograph of 70165,0.

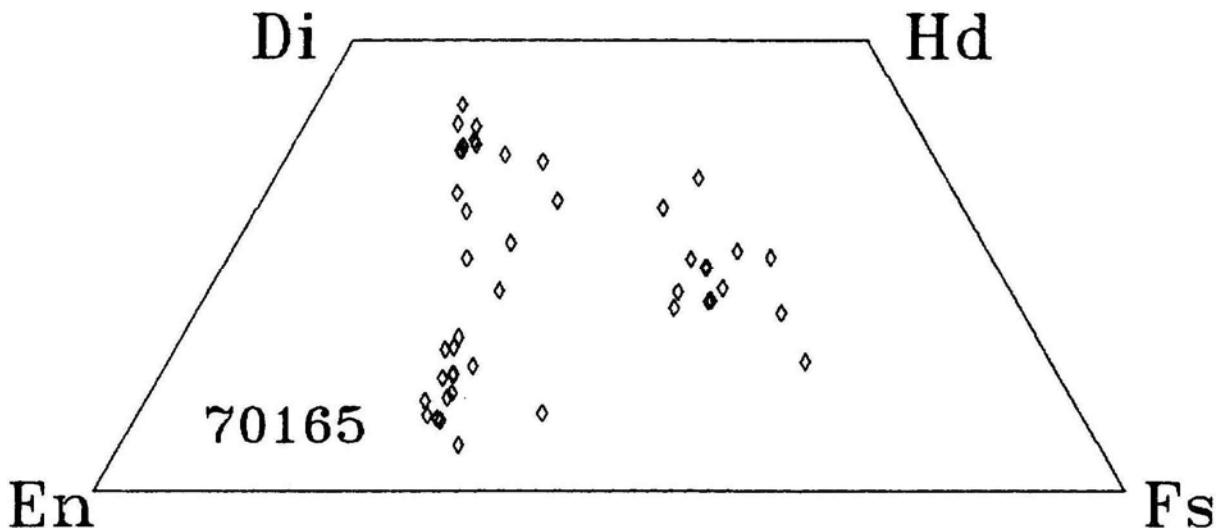


Figure 2: Pyroxene compositions of 70165 represented on a pyroxene quadrilateral.

WHOLE-ROCK CHEMISTRY

70165 was described as a Type A Apollo 17 high-Ti mare basalt (Table 1) by Neal et al. (1990), using the classification of Rhodes et al. (1976) and Warner et al. (1979). The REE profile of 70165, 4 is LREE-depleted, although it possesses an overall

convex-upward shape (Fig. 3). The MREE reach ~50 times chondritic values and a negative Eu anomaly is present ($[Eu/Eu^*]_N = 0.51$). Neal et al. (1990) have used the whole-rock composition of 70165, 4 to refine previous petrogenetic models and formulate a new one for the Type A Apollo 17 high-Ti basalts.

PROCESSING

Approximately 1.6g of 70165,0 remains of the original 2.1438. 0.531g was irradiated for INAA, and 0.01g was used for thin section 70165,3.

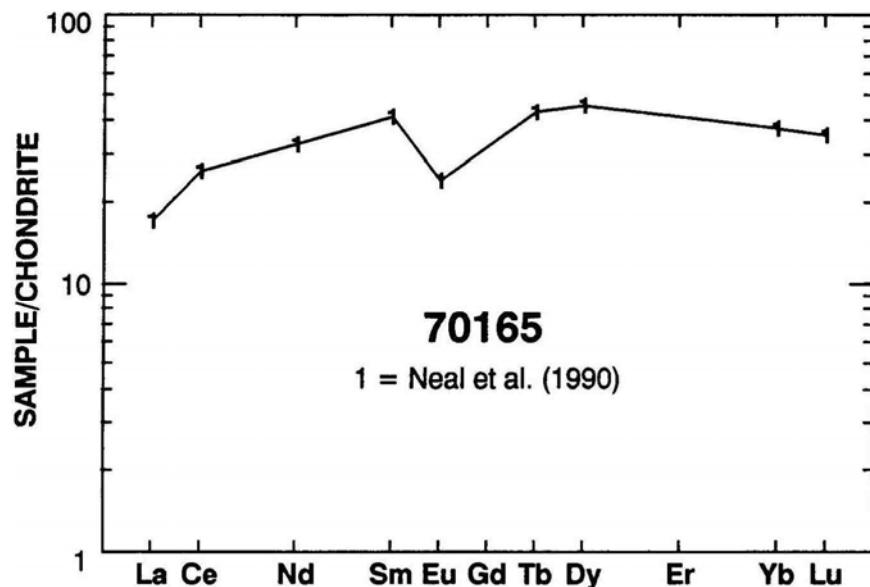


Figure 3: Chondrite-normalized rare-earth element profile of 70165.

Table 1: Whole-rock composition of 70165,4.
Data from Neal et al. (1990).

	70165,4		70165,4
SiO ₂ (wt%)	---	Cu	
TiO ₂	12.7	Ni	---
Al ₂ O ₃	8.40	Co	18.0
Cr ₂ O ₃	0.459	V	114
FeO	17.9	Sc	82
MnO	0.247	La	5.74
MgO	8.7	Ce	23
CaO	10.2	Nd	21
Na ₂ O	0.38	Sm	8.56
K ₂ O	0.06	Eu	1.89
P ₂ O ₅		Gd	
S		Tb	2.55
Nb (ppm)		Dy	15.9
Zr	130	Er	
Hf	7.94	Yb	8.38
Ta	1.50	Lu	1.22
U	0.14	Ga	
Th	0.14	F	
W		Cl	
Y		C	
Sr	160	N	
Rb	---	H	
Li		He	
Ba	111	Ge (ppb)	
Cs	0.13	Ir	
Be		Au	
Zn		Ru	
Pb		Os	

Analysis by INAA.