75065

High-Ti Mare Basalt
1.263 g, 1 x 1 x 1 cm

INTRODUCTION

75065 was described as a gray, angular basalt, containing no penetrative fractures (Apollo 17 Lunar Sample Information Catalog, 1973). It was originally well covered in soil (Fig. 1). After dusting, the surface was found to be covered with 10% vugs, but because of the intense soil covering, minerals inside these vugs could not be discerned. Zap pits were not evident.

PETROGRAPHY AND MINERAL CHEMISTRY

Neal et al. (1990) described 75065 as a plagioclase-poikilitic basalt, containing 49.9% yellow to pink pyroxene, 23.4% plagioclase, 20.4% ilmenite, 1.8% silica, 1.5% FeNi metal, 1.1% chromite ulvospinel, 1.0% olivine, and 0.9% armalcolite. Thin section 75065,4 contains anhedral plagioclase (up to 1mm), pyroxene (up to 1.2 mm), ilmenite (up to 0.9 mm). No phenocrysts were evident, and the rock is coarse- to medium-grained. The overall texture is plagioclase-poikilitic, but variolitic in places. Olivine (0.12-0.14 mm) forms the cores to some of the larger pyroxenes. Armalcolites without ilmenite rims are found as inclusions (up to 0.14 mm) in pyroxene. Pyroxene, plagioclase, and glass (0.02-0.08 mm) inclusions are present in ilmenite. Ilmenite exhibits sawtooth margins.

Figure 1: Hand specimen photograph of 75065, 0 and 75066,0.

Euhedral and subhedral chromite-ulvospinel inclusions are present in both olivine and pyroxene.

The mineral chemistry of 75065,4 was also reported by Neal et al. (1989). Olivines exhibit extreme zonation because of resorption, and all olivines analyzed yield a range in Fo contents from 70 to 45. Plagioclase also exhibits core-torim zonation (An_{89-71}, as does pyroxene (Wo_{43-7},En_{61-31}). The pyroxene exhibits moderate Fe-enrichment (Fig. 2) and two pyroxene populations appear to exist in this sample. Plagioclase shows a marked K-enrichment (~ Or_{10}), but only in one rim analysis (Fig. 3). Chromiteulvospinel inclusions are relatively unzoned in olivine [100*(Cr/(Cr+Al)) ~68-70; MG# 33-341, but exhibit major zonation in pyroxene [100*(Cr/(Cr+Al)) = 69-49; MG# = 33-201. Ilmenite exhibits a range in MG# (24-6), but this is primarily inter-grain variation, demonstrating that ilmenite crystallized for some while. In contrast, the armalcolite inclusions in pyroxene show little variation, and this coupled with the lack of ilmenite mantles, suggest that armalcolite was included in pyroxene relatively early on, thus inhibiting any reaction with the residual magma.

WHOLE-ROCK CHEMISTRY

Neal et al. (1990) reported the whole-rock study of 75065 as part of their study of Apollo 17 high-Ti mare basalt petrogenesis (Table 1) and classified this sample as a Type A high-Ti Apollo 17 mare basalt. These authors reported a MG# of 46.6 and the high-Ti contents (12.7 wt%TiO_2) classifying 75065 as high-Ti. The REE profile is LREE-depleted (Fig. 4), with a maximum at Sm and a flattening of the profile between the middle and heavy REE at - 33-38 times chondritic levels. A negative Eu anomaly is present [$(Eu/Eu^*)_N$ = 0.6].

PROCESSING

Of the original 1.2638 of 75065, approximately 0.658 remains. One thin section is available - 75065,4.

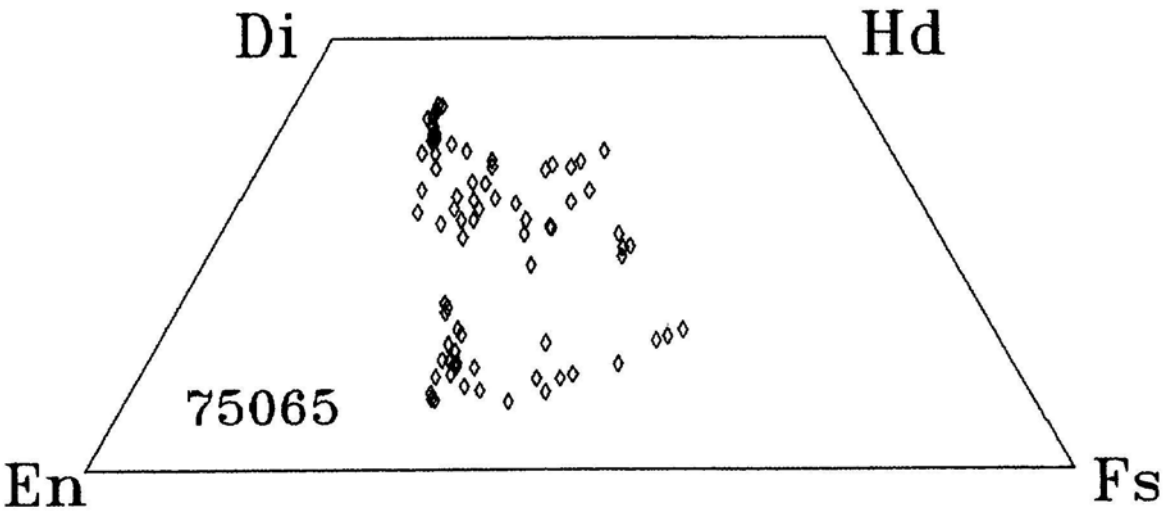

Figure 2: Pyroxene compositions of 75065,4 represented on a pyroxene quadrilateral.

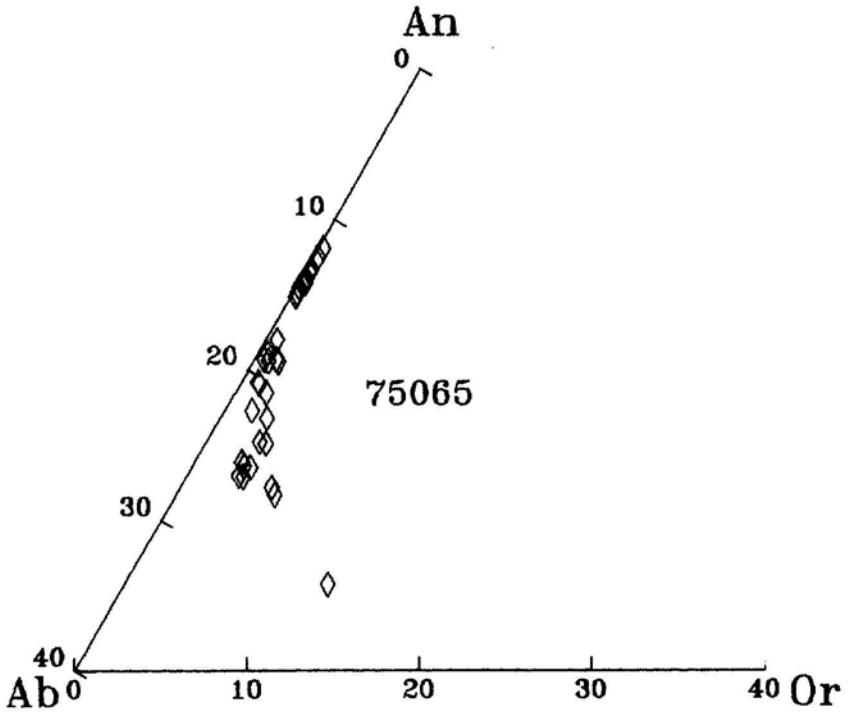

Figure 3: Plagioclase compositions from 75065,4.

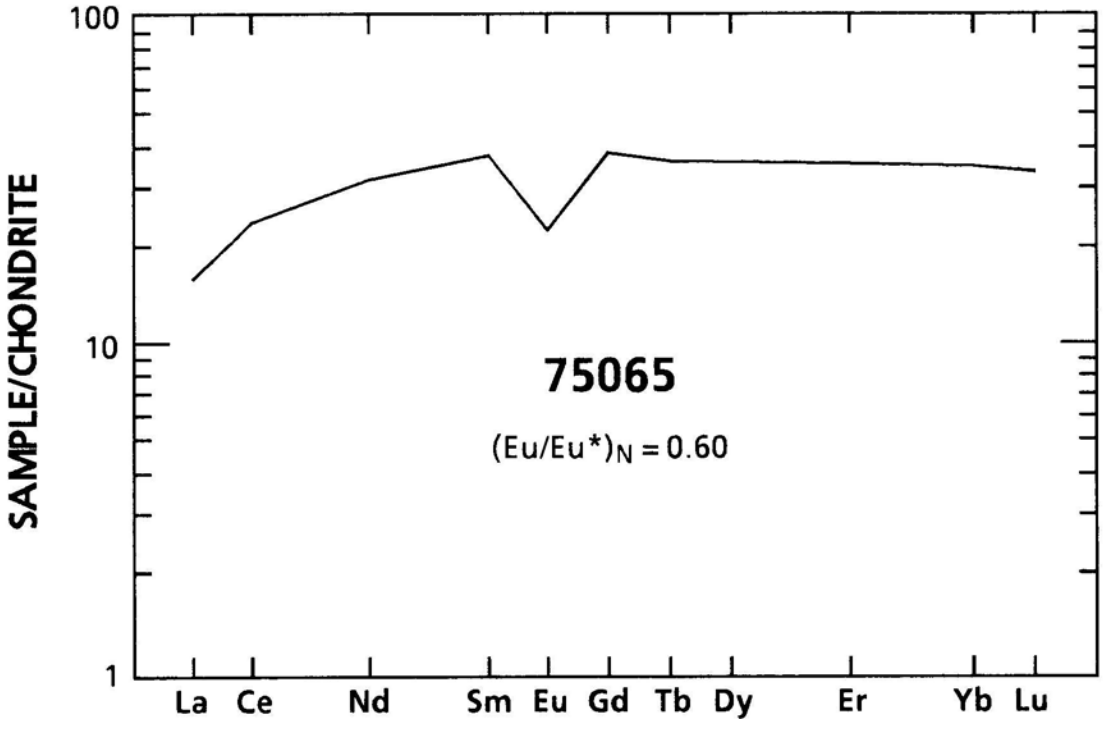

Figure 4: Chondrite -normalized rare-earth-element profile of 75065.

Table 1: Whole-rock chemistry of 75065.
Data from Neal et al. (1990).

	Sample 75065,0 Method N		Sample 75065,0 Method N
SiO_2		Cu	
TiO_2	12.7	Ni	14
Al_2O_3	8.33	Co	21.5
Cr_2O_3	0.49	V	131
FeO	18.4	Sc	80.8
MnO	0.247	La	5.15
MgO	9.0	Ce	20
CaO	9.7	Nd	20
Na_2O	0.38	Sm	7.72
K_2O	0.06	Eu	1.75
P_2O_5		Gd	
S		Tb	2.13
Nb (ppm)		Dy	15.2
Zr	120	Er	
Hf	7.41	Yb	7.74
Ta	1.57	Lu	1.14
U	0.21	Ga	
Th	0.28	F	
W		Cl	
Y		C	
Sr	200	N	
Rb		H	
Li		He	
Ba	128	Ge (ppb)	
Cs	0.09	Ir	
Be		Au	
Zn		Ru	
Pb		Os	

Analysis by: N = INAA.