

74286**High-Ti Mare Basalt****2.102 g, 1.7 x 1.0 x 0.7 cm****INTRODUCTION**

74286 was described as a mottled red/gray, intergranular basalt, with a microdiabasic fabric (Apollo 17 Lunar Sample Information Catalog, 1973). It had an angular, blocky, wedge shape with one penetrative fracture. All surfaces were coated with a fine layer of dust and these surfaces contained < 5% cavities. No zap pits were observed.

PETROGRAPHY AND MINERAL CHEMISTRY

Neal et al. (1989) described 74286,3 as a fine-grained, microphyritic Apollo 17 high-Ti basalt and petrographically classified this sample as Type IA. The main constituents are anhedral

plagioclase (up to 0.8 mm), pink pyroxene (up to 0.65 mm), and ilmenite (up to 1.3 mm). The overall texture is sub-variolithic. Accessory minerals include SiO₂ (cristobalite – < 0.8 mm), troilite (0.02-0.09 mm), and FeNi metal (0.01-0.02 mm). A small amount of interstitial opaque glass present. Olivine often forms anhedral cores to pink pyroxene (< 0.15 mm) and chromite-ulvospinel inclusions (< 0.05 mm) are present in the olivine and pyroxene. The largest ilmenites exhibit sawtooth margins and spinel and rutile exsolution lamellae are present in most ilmenites. Ilmenite (0.05-0.2 mm) inclusions are present in pyroxene. Pyroxene forms phenocrysts, but appear to be a product of olivine reacting with the melt. Ilmenite also forms a phenocryst phase. Thin section

74286,3 is composed of: 43.5% pyroxene, 25.9% plagioclase, 22.7% ilmenite, 2.1% olivine, 3.1% FeNi metal, 2.5% chromite-ulvospinel, and 0.1% SiO₂; 0.1% glass.

The mineral chemistry for 74286 has been reported by Neal et al. (1989). Olivines exhibit some core-to-rim variation, as well as inter-grain differences (F₀₇₁₋₆₃). Plagioclase exhibits a relatively wide range of compositions, most of which can be accounted for by zonation (An₉₀₋₇₈), although the majority of compositions are between An₈₆₋₈₁ (Fig. 1). Pyroxenes are zoned from augite to pigeonite in response to olivine resorption, with occasional Fe-enrichment (Fig. 2). Chromite-ulvospinel inclusions exhibit moderate core-to-rim zonation

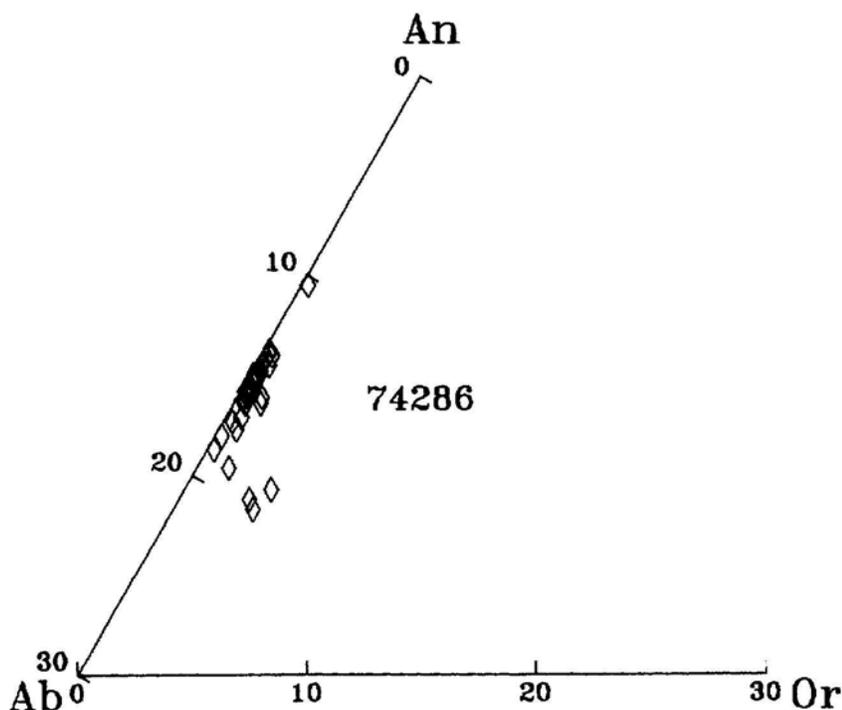


Figure 1: Plagioclase compositions from 74286,3.

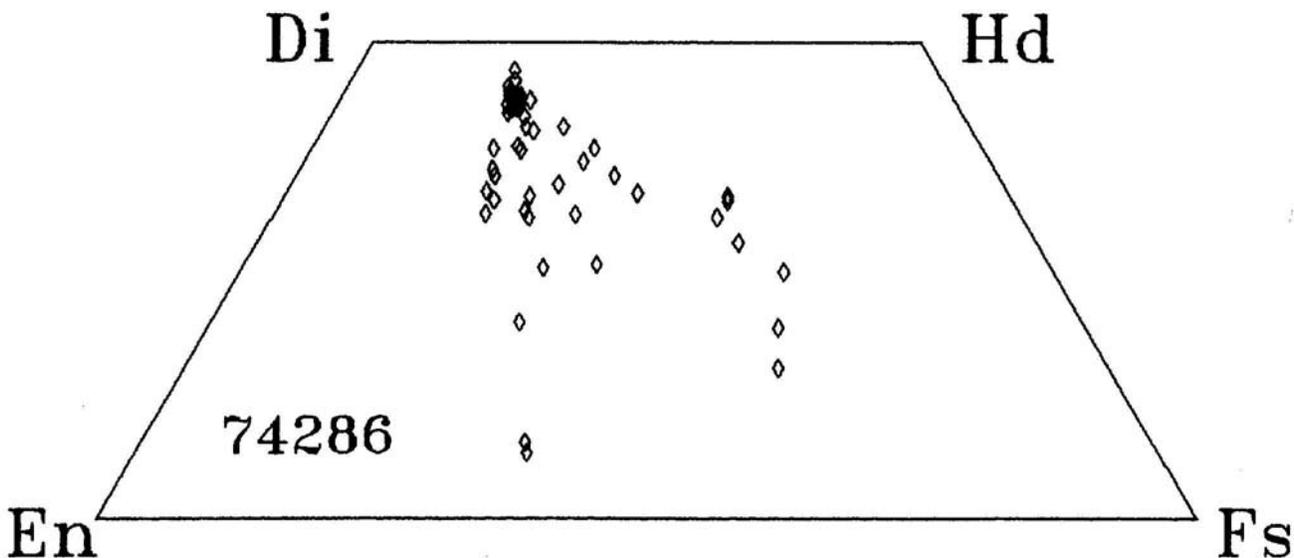


Figure 2: Pyroxene compositions of 74286,3 represented on a pyroxene quadrilateral.

[100*(Cr/(Cr+Al)) = 77-69; MG# = 20-31 in pyroxene, but have restricted compositions in olivine [100*(Cr/(Cr+Al)) ~77; MG# 201. Ilmenites also exhibit a range of compositions (MG# = 5-24), with the largest being the most Mg-rich.

WHOLE-ROCK CHEMISTRY

The whole-rock chemistry of 74286 has been reported by

Neal et al. (1990a). These authors described 74286,4 as a Type A Apollo 17 high-Ti mare basalt. 74285,4 has a MG# of 43.8 and is classified as "high-Ti" because of 12.2 wt% TiO₂ in the whole-rock analysis (Table 1). The REE profile exhibits a depletion of the LREE over the HREE, but the maximum is at Sm (Fig. 3). A negative Eu anomaly is present [(Eu/Eu*)_N = 0.59].

PROCESSING

Of the original 2.1028 of 74286,0, approximately 1.5g remains. 0.578 was used for INAA, and 0.01g used for making thin section 74286,3.

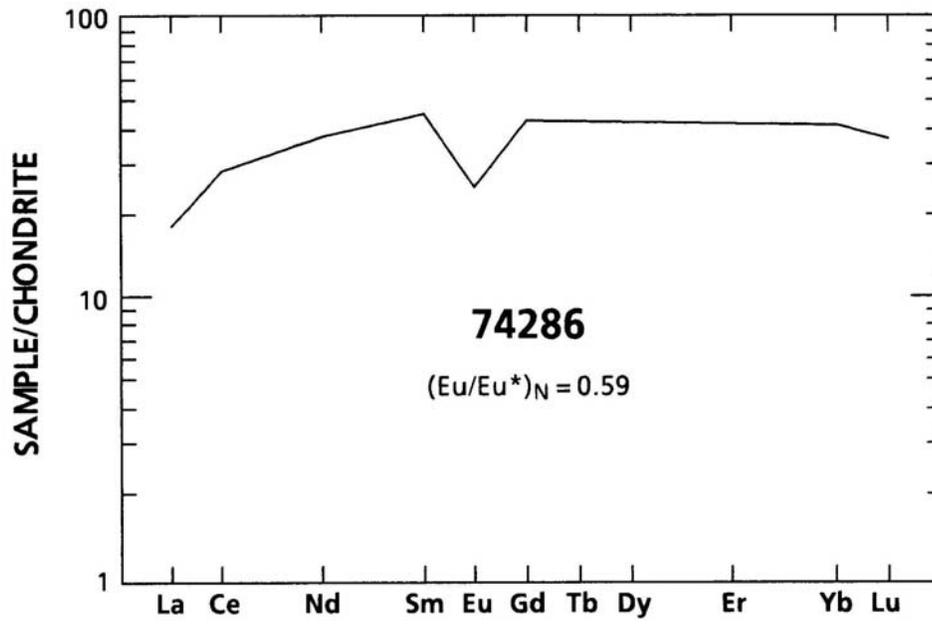


Figure 3: Chondrite-normalized rare-earth-element profile of 74286,4.

Table 1: Whole-rock chemistry of 74286.

Sample 74286,4 Method N REF 1		Sample 74286,4 Method N REF 1	
SiO ₂		Ni	13
TiO ₂	12.2	Cr	3080
Al ₂ O ₃	8.66	Co	19.7
Cr ₂ O ₃	0.45	V	106
FeO	19.2	Sc	84.8
MnO	0.255	La	6.13
MgO	8.4	Ce	24
CaO	10.7	Nd	24
Na ₂ O	0.38	Sm	9.13
K ₂ O	0.06	Eu	1.99
P ₂ O ₅		Gd	
S		Tb	2.49
Nb (ppm)		Dy	
Zr	210	Er	
Hf	8.45	Yb	8.93
Ta	1.64	Lu	1.28
U	0.15	Ga	
Th	0.02	F	
W		Cl	
Y		C	
Sr	230	N	
Rb		H	
Li		He	
Ba	101	Ge (ppb)	
Cs	0.10	Ir	
Be		Au	
Zn		Ru	
Pb		Os	
Cu			

Analysis by: N = INAA

1 = Neal et al. (1990a)