75086

High-Ti Mare Basalt
2.323 g, 1 x 1 x 2 cm

INTRODUCTION

75086 was described as a gray, equigranular basalt, with no penetrative fractures (Apollo 17 Lunar Sample Information Catalog, 1973). Thirty percent of the surface is covered with welded dirt (Fig. 1), and 20% is covered with 2 mm vugs. No zap pits were identified.

PETROGRAPHY AND MINERAL CHEMISTRY

75086,3 is a thin section of a medium- to coarse-grained plagioclase-poikilitic to subophitic basalt. It is composed of subhedral to anhedral plagioclase (0.1-1.6 mm), anhedral pink-brown pyroxene (0.04-2 mm), anhedral ilmenite (0.04-1.6 mm) with sawtooth margins. Olivine forms 0.06-0.08 mm inclusions to the larger pyroxenes. Armalcolite is present as 0.1-0.2 mm inclusions in plagioclase. Spinel and rutile exsolution features were observed in ilmenite and ilmenite also contains plagioclase, pyroxene, and melt

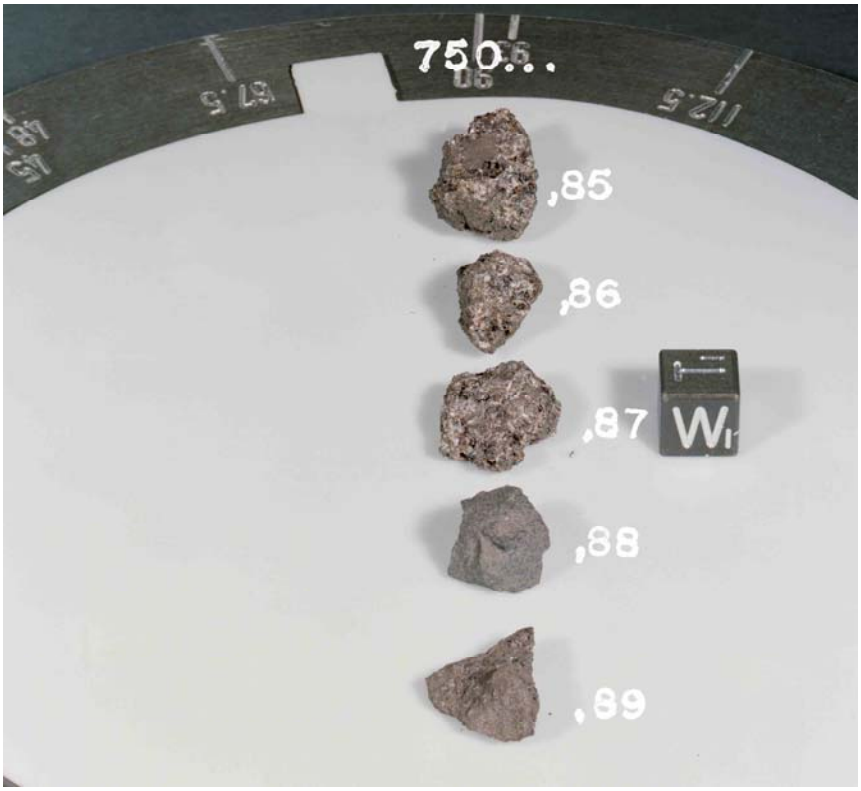

Figure 1: Hand specimen photograph of 75086,0.

inclusions (0.02-0.06 mm). Troilite and FeNi metal form interstitial phases (< 0.01 mm), with FeNi metal blebs occasionally present in troilite. Neal et al. (1989) reported the modal mineralogy of 75086 as 1.3% olivine, 51.3% pyroxene, 26.3% plagioclase, 18.2% ilmenite, 1.3% armalcolite, and 1.6% FeNi metal & troilite.

The mineral chemistry of 75086 was also reported by Neal et al. (1989). Olivine exhibits much inter- and intra-grain variation ($Fo_{67.58}$), probably due to vain attempts to equilibrate with the melt. The variation in plagioclase is explained almost totally by core-to-rim zonation (An_{88-79}: Fig. 2). There is little K-enrichment. Pyroxenes vary from Ca-rich cores (augite) to Mg-rich rims (pigeonite), with little Fe-enrichment (Fig. 3). Armalcolite is relatively homogeneous (MG# = 43-46), whereas ilmenite exhibits a larger range (MG# = 19-13). The variation is both within and between grains.

WHOLE-ROCK CHEMISTRY

The whole-rock chemistry of 75086 was reported by Neal et al. (1990), who described it as a Type A Apollo 17 high-Ti -mare basalt. This basalt contains 12.5 wt% TiO_2 (Table 1) and has a MG# of 48.2. The REE profile (Fig. 4) is LREE-depleted, with a maximum (relative to chondrites) at Tb. Although Dy appears to be the maximum in Fig. 4, the errors associated with this element are large (± 10-15%). The negative Eu anomaly has a magnitude of $(Eu/Eu^*)_N$ = 0.56.

PROCESSING

Of the 2.323g of 75086,0, approximately 1.7g remains; 0.507g was used for the INA analysis and 0.01g was used to make thin section ,3.

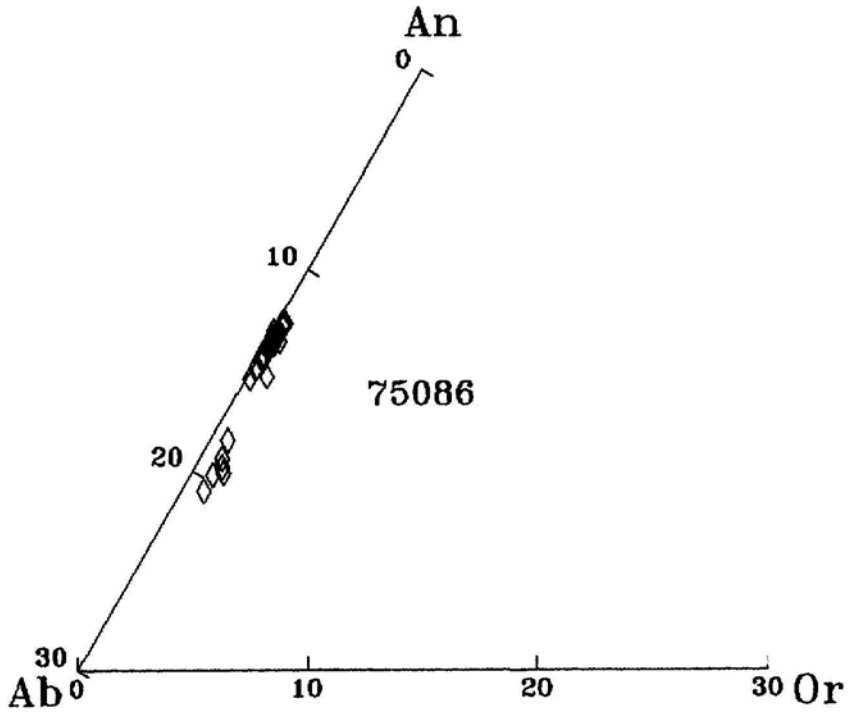

Figure 2: Plagioclase compositions from 75086.

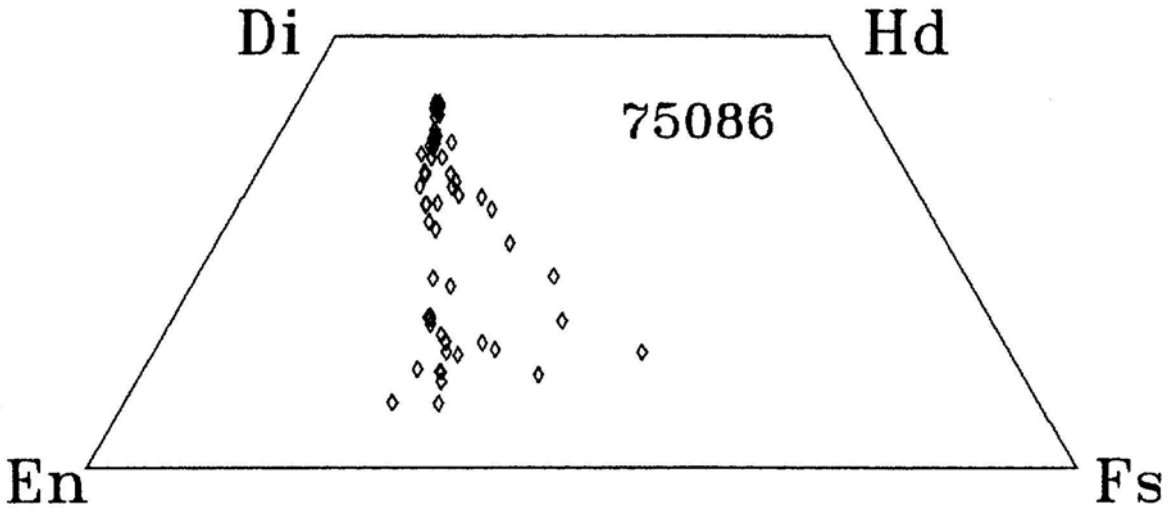

Figure 3: Pyroxene compositions of 75086 represented on a pyroxene quadrilateral.

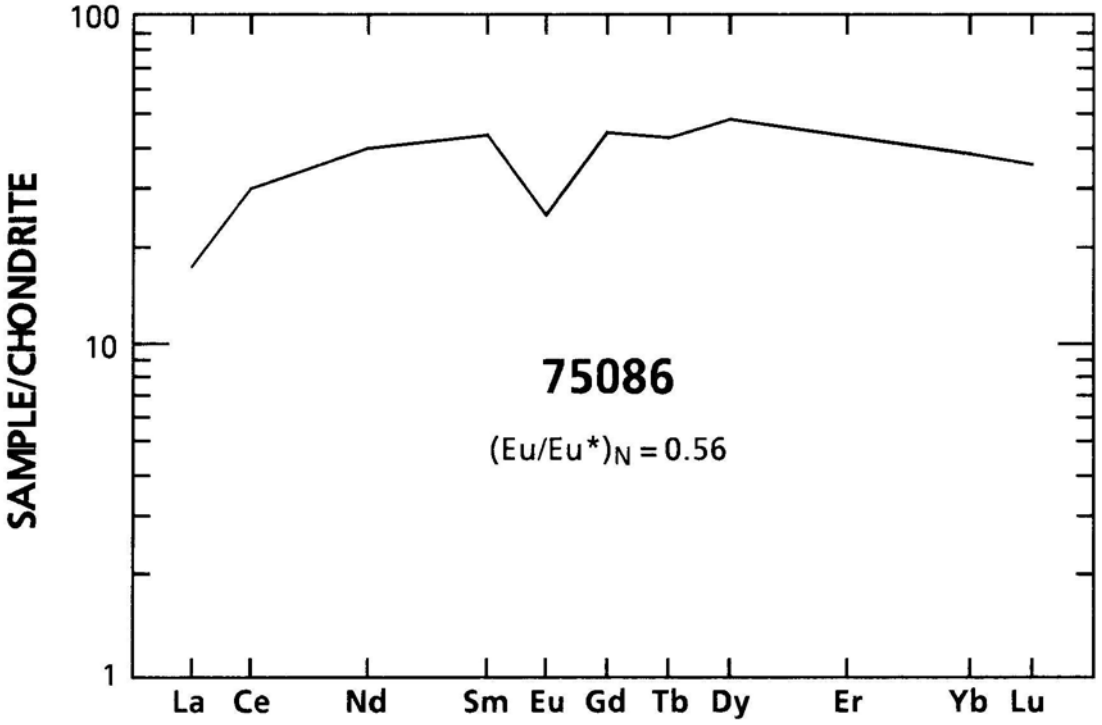

Figure 4: Chondrite -normalized rare-earth-element profile of 75086.

Table 1: Whole-rock chemistiry of 75086.
Data from Neal et al. (1990).

	Sample 75086,4 Method N		Sample 75086,4 Method N
SiO_2		Ni	7
TiO_2	12.1	Co	23.2
Al_2O_3	8.02	V	143
Cr_2O_3	0.566	Sc	80.2
FeO	19.3	Cr	3870
MnO	0.245	La	5.75
MgO	10.1	Ce	26
CaO	9.1	Nd	25
Na_2O	0.36	Sm	8.62
K_2O	0.09	Eu	1.91
P_2O_5		Gd	
S		Tb	2.51
Nb (ppm)		Dy	17.0
Zr	150	Er	
Hf	8.12	Yb	8.54
Ta	1.60	Lu	1.22
U	0.15	Ga	
Th		F	
W		Cl	
Y		C	
Sr	160	N	
Rb	0.8	H	
Li		He	
Ba	64	Ge (ppb)	
Cs	0.15	Ir	
Be		Au	
Zn		Ru	
Pb		Os	
Cu			

Analysis by: N = INAA.