

77516**High-Ti Mare Basalt**
103.7 g, 6 x 4 x 2.5cm**INTRODUCTION**

Sample 77516 is a rake sample from soil 77510 at Station 7. It is a medium-grained, high-Ti mare basalt that is similar to other Apollo 17 basalts (Fig. 1).

PETROGRAPHY

Warner et al. (1975) describe this rock as olivine-microporphyritic ilmenite basalt. The texture of the matrix is variolitic, with well-developed sheaves of alternating plagioclase and pyroxene (Fig. 2). Large ilmenite phenocrysts extend up to 5 mm. The mode is 47% pyroxene, 5% olivine, 24% plagioclase, and 19% ilmenite. A silica phase is present.

MINERAL CHEMISTRY

The compositions of the minerals in 77516 are given in Fig. 3 (from Warner et al., 1978).

WHOLE-ROCK CHEMISTRY

Warner et al. (1975) and Laul et al. (1975b) have determined the chemical composition of 77516 (Table I and Fig. 4). This basalt has very high TiO_2 content (13.7%).

Classification of Apollo 17 basalts has been discussed by Rhodes et al. (1976), Lindstrom and Haskin (1978), and Pratt et al. (1978) (see appendix). Pratt et al. give it a Type B2 classification.

RADIOGENIC ISOTOPES

Paces et al. (1991) have studied the Rb-Sr and Sm-Nd for whole-rock samples of 77516 and classify it as a Type B2 Apollo 17 mare basalt because the Sr and Nd isotopes do not fall on the whole-rock isochrons for other Apollo 17 mare basalt samples (Table 2). This may indicate a different source region for this basalt sample.

SURFACE STUDIES

There are micrometeorite craters on all surfaces.



Figure 1: Photograph of 77516. Cube is 1 cm. S73-19409.

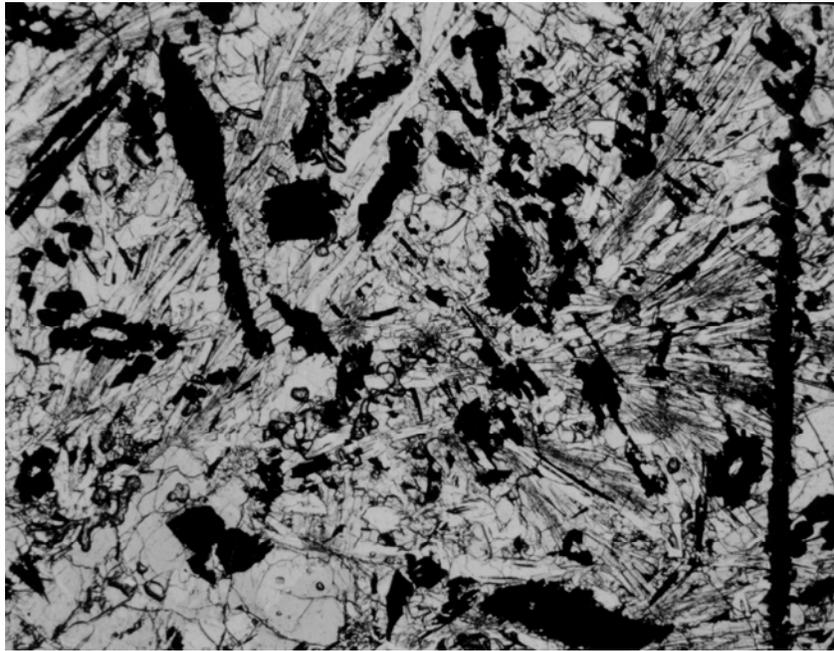


Figure 2: Photomicrograph of thin section 77516,13, showing ilmenite phenocrysts and variolitic texture. Field of view is 3 x 4 min.

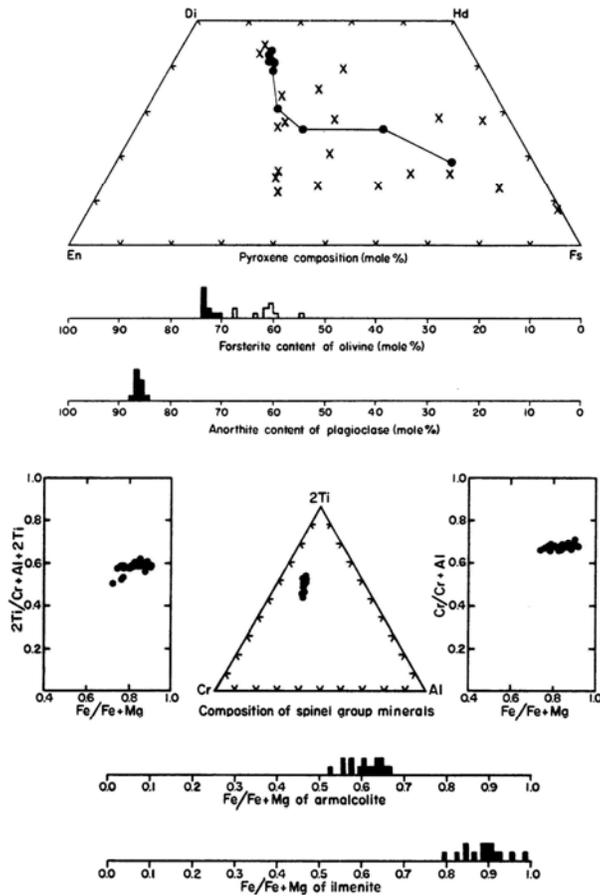


Figure 3: Pyroxene, olivine, and plagioclase composition for 77516. From Warner et al. (1978).

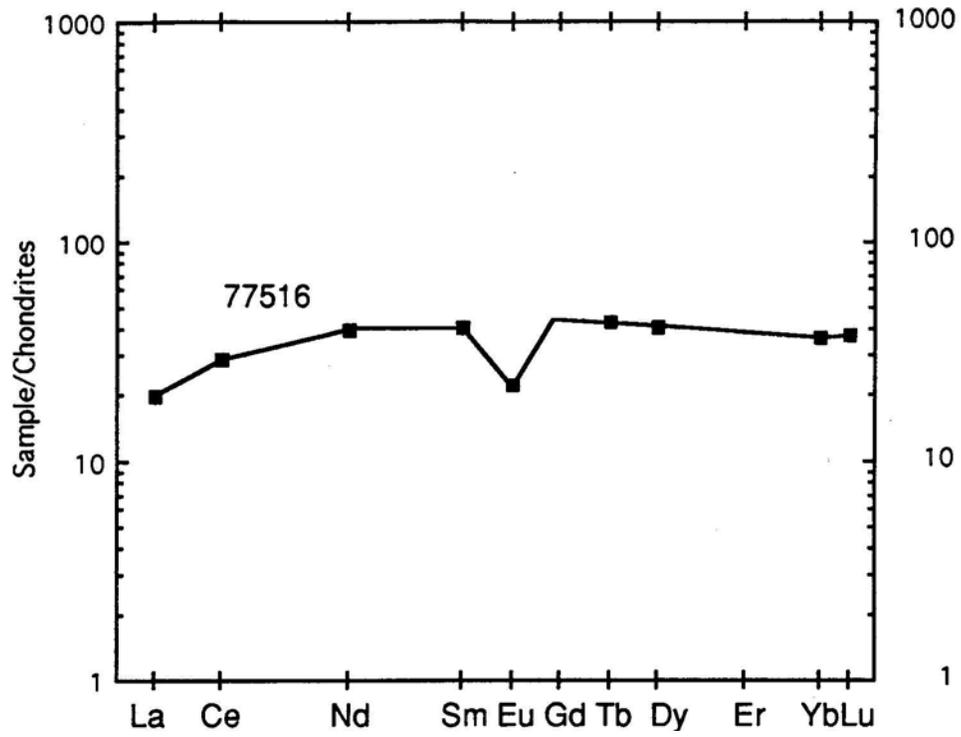


Figure 4: Normalized rare earth element diagram for 77516. Data from Warner et al. (1975).

Table 1: Whole-rock chemistry of 77516.
From Warner et al. (1975).

Split Technique	2 INAA	Split Technique	2 INAA
SiO ₂ (wt %)	–	La	4.7
TiO ₂	13.7	Ce	18
Al ₂ O ₃	7.8	Nd	18
Cr ₂ O ₃	0.48	Sm	6
FeO	20.2	Eu	1.25
MnO	0.25	Gd	
MgO	9.4	Tb	1.6
CaO	9.4	Dy	10
Na ₂ O	0.33	Er	
K ₂ O	0.04	Yb	6
Nb (ppm)		Lu	0.91
Hf	6.2	Ge (ppb)	
Ta	1.4	Ir	
Co	24.6	Au	
Sc	80		

Table 2: Rb-Sr and Sm-Nd composition of 77516.
Data from Paces et al. (1991).

Sample	77516,19
wt (mg)	46.77
Rb (ppm)	0.340
Sr (ppm)	110
⁸⁷ Rb/ ⁸⁶ Sr	0.008913 ± 89
⁸⁷ Sr/ ⁸⁶ Sr	0.699619 ± 17
Sm (ppm)	6.39
Nd (ppm)	15.5
¹⁴⁷ Sm/ ¹⁴⁴ Nd	0.24944 ± 48
¹⁴³ Nd/ ¹⁴⁴ Nd	0.514130 ± 60