

**70075****High-Ti Mare Basalt****5.64 g, 3 x 1.7 x 1 cm****INTRODUCTION**

70075 is a grayish-black, fine-grained, microporphyratic, olivine-ilmenite basalt (Figs. 1,2), containing no zap pits (Apollo 17 Lunar Sample Information Catalog, 1973). Narrow slit-like cavities (< 1%) 1-4 mm in length, <0.2 mm wide, occur throughout the rock. These are lined with plagioclase, pyroxene, and possibly ilmenite. Two areas on the surface probably represent the lining of a large vesicle. Plates of minor ilmenite/pyroxene coat these surfaces. The slit-like vesicular zones are replaced by small, randomly oriented vugs in the vicinity of these large vesicles. This sample was collected during an EVA east of the Lunar Module (EVA-1). 70075 is a high-Ti basalt containing 12 wt% TiO<sub>2</sub>.

**PETROGRAPHY AND MINERAL CHEMISTRY**

70075 is a fine-grained, vitrophyric basalt with

microphenocrysts of olivine (0.5mm), armalcolite (0.2-0.4mm), and skeletal ilmenite (0.5mm) (Fig. 2 a,b). Minor chromite-ulvospinel (<0.1mm) are included in the olivine microphenocrysts and are locally present in the groundmass (Warner et al., 1979). The opaque glass which forms most of the matrix is locally denitrified with plagioclase, pyroxene, and ilmenite crystallites (Fig. 2 a, b). Armalcolite has mantles of ilmenite (<0.1mm wide) which are usually continuous (Fig. 3). The Apollo 17 Lunar Sample Information Catalog (1973) gave an approximate mode of 5% olivine, 35% plagioclase, 45% clinopyroxene, and 15% opaque minerals. Olivines are ~Fo<sub>70</sub>, and Mg- and Ca-rich pyroxenes trend toward Fe enrichment. Plagioclase exhibits little variation (~An<sub>85</sub>). Armalcolites are Mg-rich (MG# ~50), as are the ilmenites (MG# ~12) and spinels (MG# ~20).

**CHEMISTRY**

Mineral and whole-rock chemical analyses are reported in Table 1. Warner et al. (1979) described 70075 as a Type A Apollo 17 high-Ti basalt, after the classification of Rhodes et al. (1976). The REE profile is LREE-depleted, with a flattening of the HREE at ~50 times chondritic values (Fig. 4). A negative Eu anomaly is present ( $[Eu/Eu^*]_N = 0.53$ ). 70075,1 was used in a comprehensive petrogenetic study of Apollo 17 high-Ti basalts by Warner et al. (1979), who concluded that their compositional range was produced by fractionation of phenocryst phases.

**PROCESSING**

Little work has been conducted upon 70075. One thin section (70075,4) has been made, and 5.218 of 70075,0 remains.



Figure 1a: Pre chip.

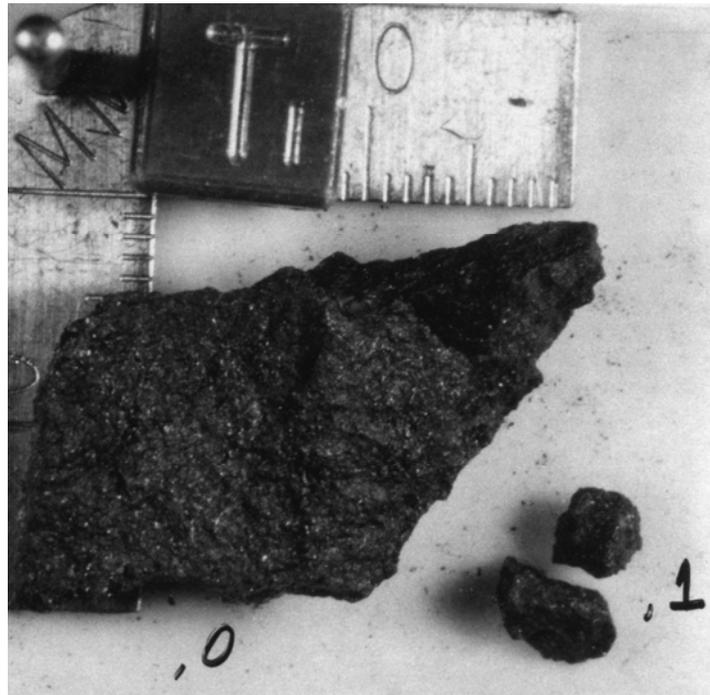


Figure 1: Hand specimen photographs of 70075, 0.



Figure 2a: Photomicrograph showing microphenocrysts of olivine, armalcolite, and skeletal ilmenite.

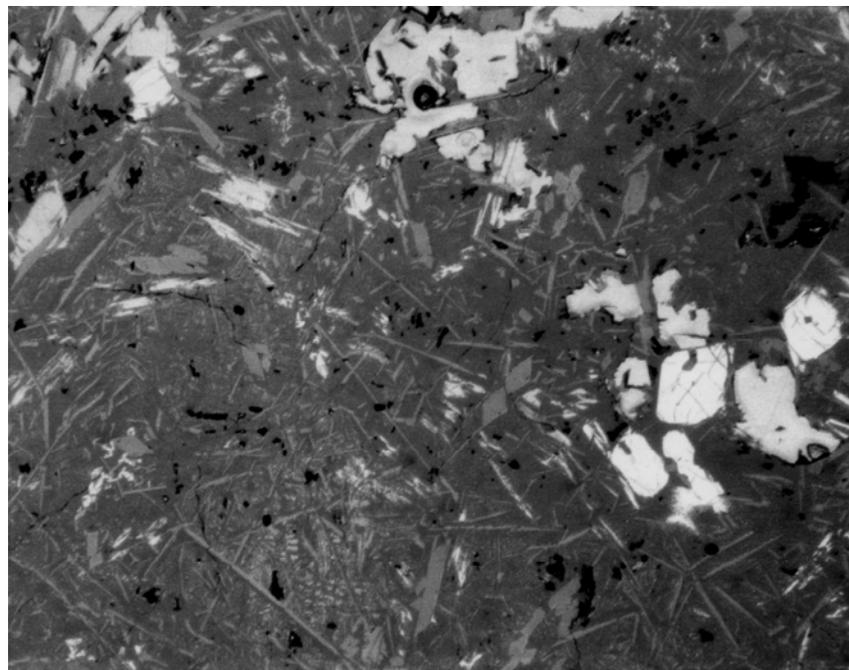


Figure 2b: Photomicrograph showing opaque glass with plagioclase, pyroxene, and ilmenite crystallites.

Figure 2: Photomicrographs of 70075, 4. Field of view in both cases is 2.5 mm.

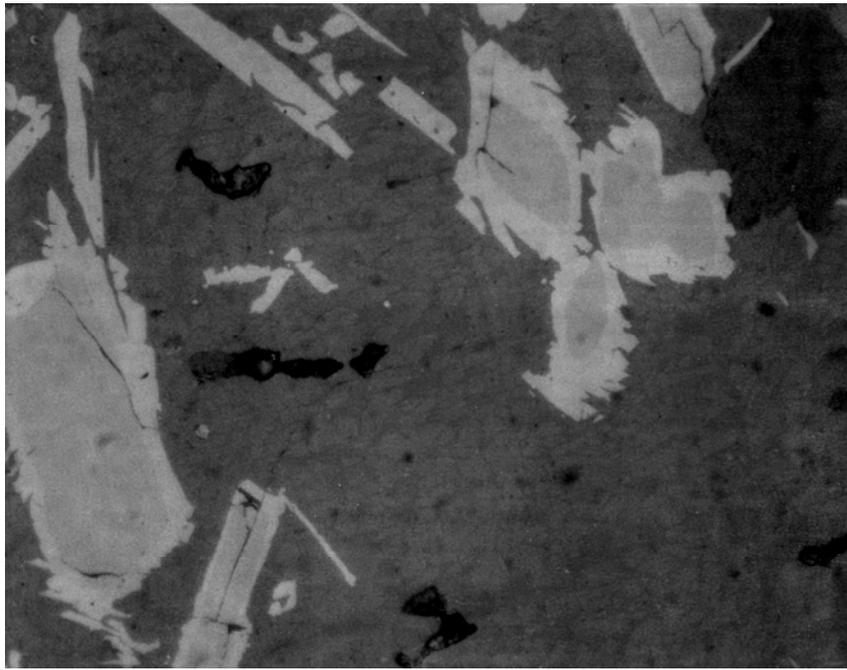


Figure 3: Photomicrograph of 70075,4, showing armalcolite rimmed with ilmenite.

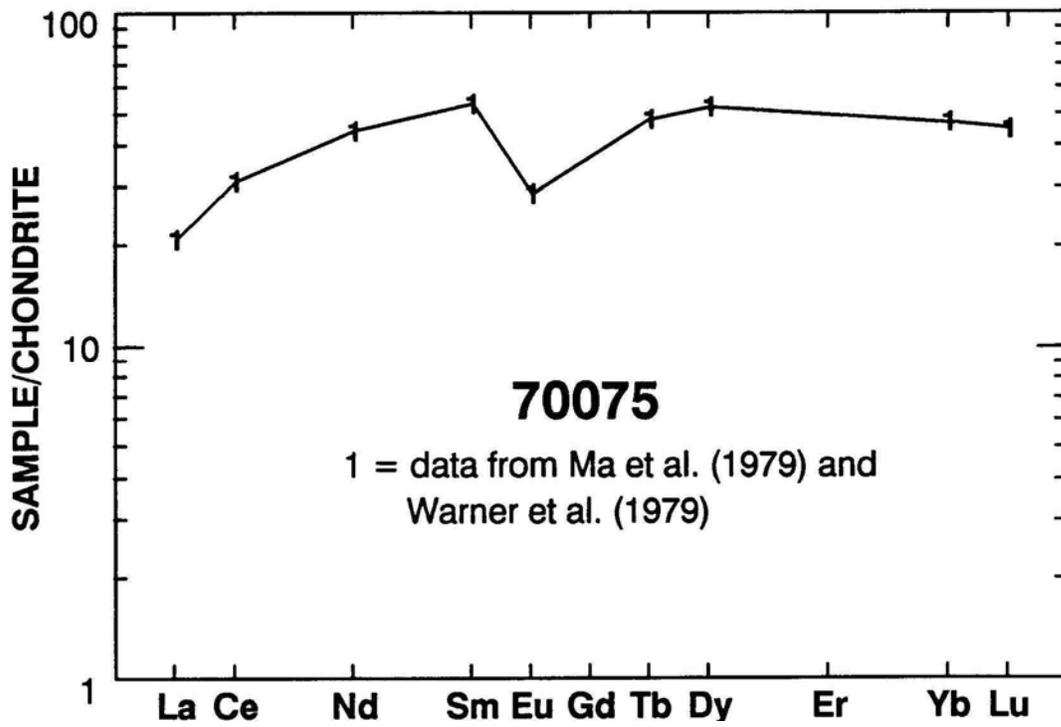


Figure 4: Chondrite-normalized rare-earth element profile of 70075.

Table 1: Whole-rock chemical composition of 70075.

	70075,1		70075,1
SiO <sub>2</sub> (wt%)		Zn	
TiO <sub>2</sub>	12.1	Pb	
Al <sub>2</sub> O <sub>3</sub>	9.3	Cu	
Cr <sub>2</sub> O <sub>3</sub>	0.409	Ni	
FeO	19.4	Co	19
MnO	0.253	V	86
MgO	8	Sc	86
CaO	10.3	La	6.9
Na <sub>2</sub> O	0.417	Ce	27
K <sub>2</sub> O	0.067	Nd	28
P <sub>2</sub> O <sub>5</sub>		Sm	10.9
S		Eu	2.21
Nb (ppm)		Gd	
Zr		Tb	2.8
Hf	9.0	Dy	18
Ta	2.1	Er	
U		Yb	10.4
Th		Lu	1.53
W		Ga	
Y		F	
Sr		Cl	
Rb		C	
Li		N	
Ba		H	
Cs		He	

References and Methods: 1) Warner et al. (1979a); Ma et al. (1979); INAA.