

71595 – 25.2 grams

71576 – 23.5 grams

Ilmenite Basalt



Figure 1: Photo of 71595. Sample is 2 cm. S73-33406

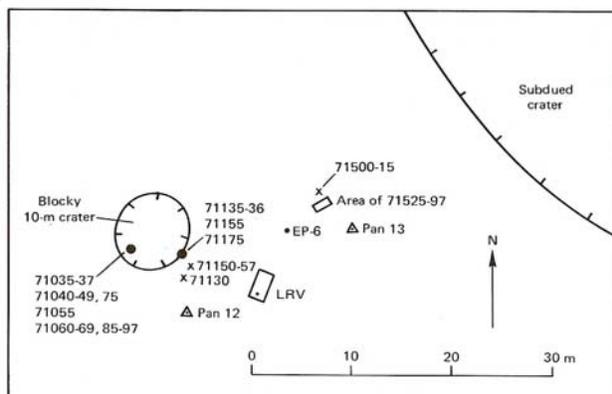


Figure 2: Map of station 1 showing location of rake samples.

Mineralogical Mode

	71595	71576
Olivine	6.8	5.8
Pyroxene	44	43
Plagioclase	27.1	32.7
Opakes	17	16
Silica	4.6	1.4
Meostasis	0.6	0.8

Introduction

71595 is an olivine-microporphyritic ilmenite basalt similar to 71576 (Warner et al. 1978). It has been rounded by micrometeorite bombardment.

71525 - 71596 etc. are rake samples collected as part of a comprehensive sample at station 1, taken near Steno Crater, Apollo 17. They include numerous small ilmenite basalts.

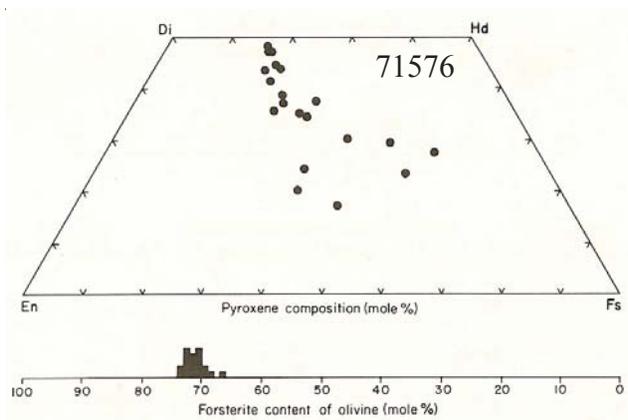
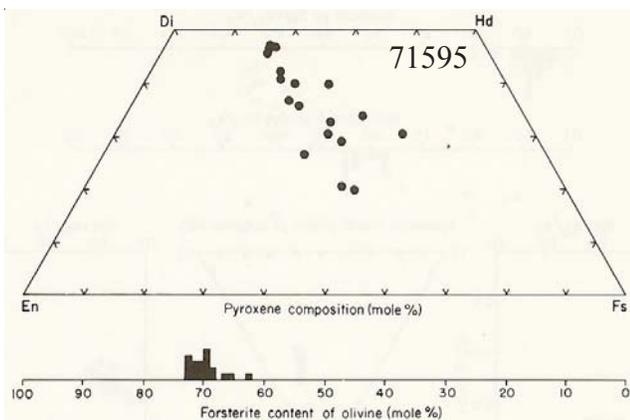


Figure 3: Pyroxene and olivine composition in 71595 and 71576 (Warner et al. 1978).

Petrography

71595 and 71576 are fine-grained basalts with skeletal olivine and ilmenite phenocrysts in a variolitic groundmass (figures 6 and 7). Armalcolite is present, mantled by ilmenite. Ca-rich pyroxene is zoned to Fe-rich (figure 3).

Chemistry

Murali et al. (1977) give the chemical composition of 30 small Apollo 17 basalts including 71595 and 71576 (figures 4 and 5). These samples have been classified as type B2 by Neal and Taylor (1993).

Radiogenic age dating

None

Processing

There is one thin section for each.

References for 71595 and 71576.

Butler P. (1973) **Lunar Sample Information Catalog Apollo 17**. Lunar Receiving Laboratory. MSC 03211 Curator's Catalog. pp. 447.

LSPET (1973) Apollo 17 lunar samples: Chemical and petrographic description. *Science* **182**, 659-672.

LSPET (1973) Preliminary Examination of lunar samples. Apollo 17 Preliminary Science Rpt. NASA SP-330. 7-1 – 7-46.

Muehlberger et al. (1973) Documentation and environment of the Apollo 17 samples: A preliminary report. *Astrogeology* 71 322 pp superceded by *Astrogeology* 73 (1975) and by Wolfe et al. (1981)

Muehlberger W.R. and many others (1973) Preliminary Geological Investigation of the Apollo 17 Landing Site. *In Apollo 17 Preliminary Science Report*. NASA SP-330.

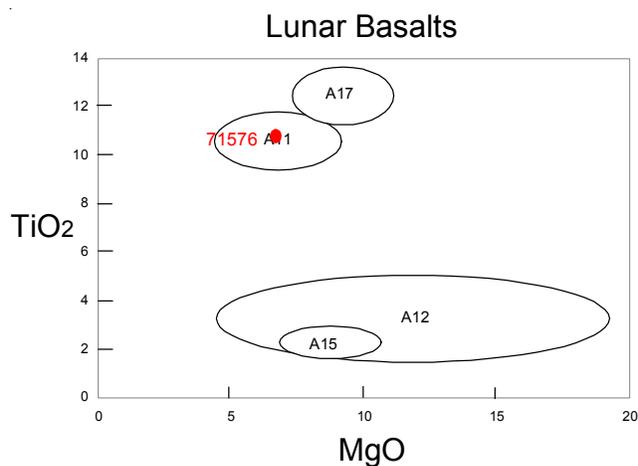


Figure 4: Composition of 71595 compared with that of other lunar basalts.

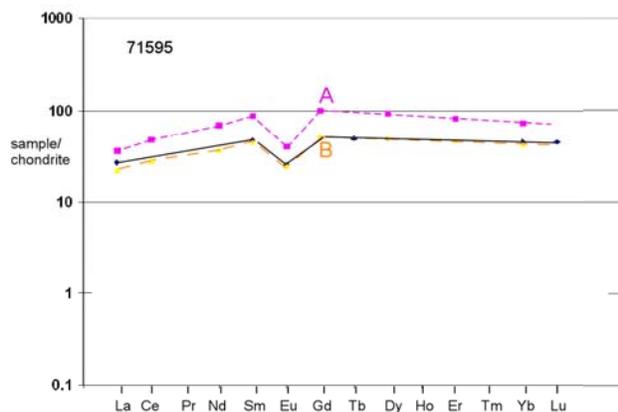
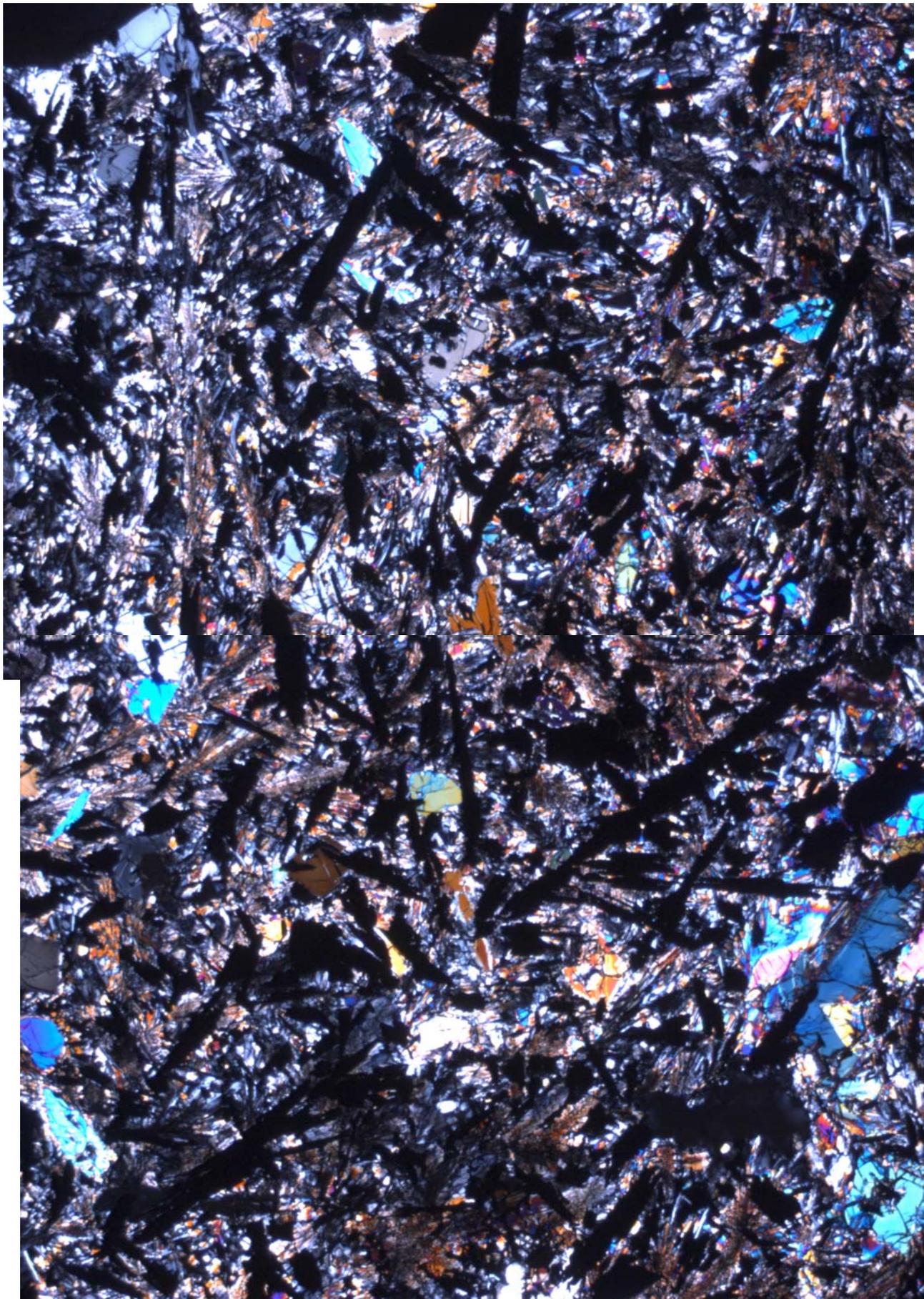


Figure 5: Normalized rare-earth-element diagram for 71595 and type A and B basalts.

Murali A.V., Ma M.-S., Schmitt R.A., Warner R.D., Keil K. and Taylor G.J. (1977b) Chemistry of 30 Apollo 17 rake basalts; 71597 a product of partial olivine accumulation (abs). *Lunar Sci.* **VIII**, 703-705. Lunar Planetary Institute, Houston.



Figure 6: Photomicrograph of thin section 71595,5. 2.8 mm across



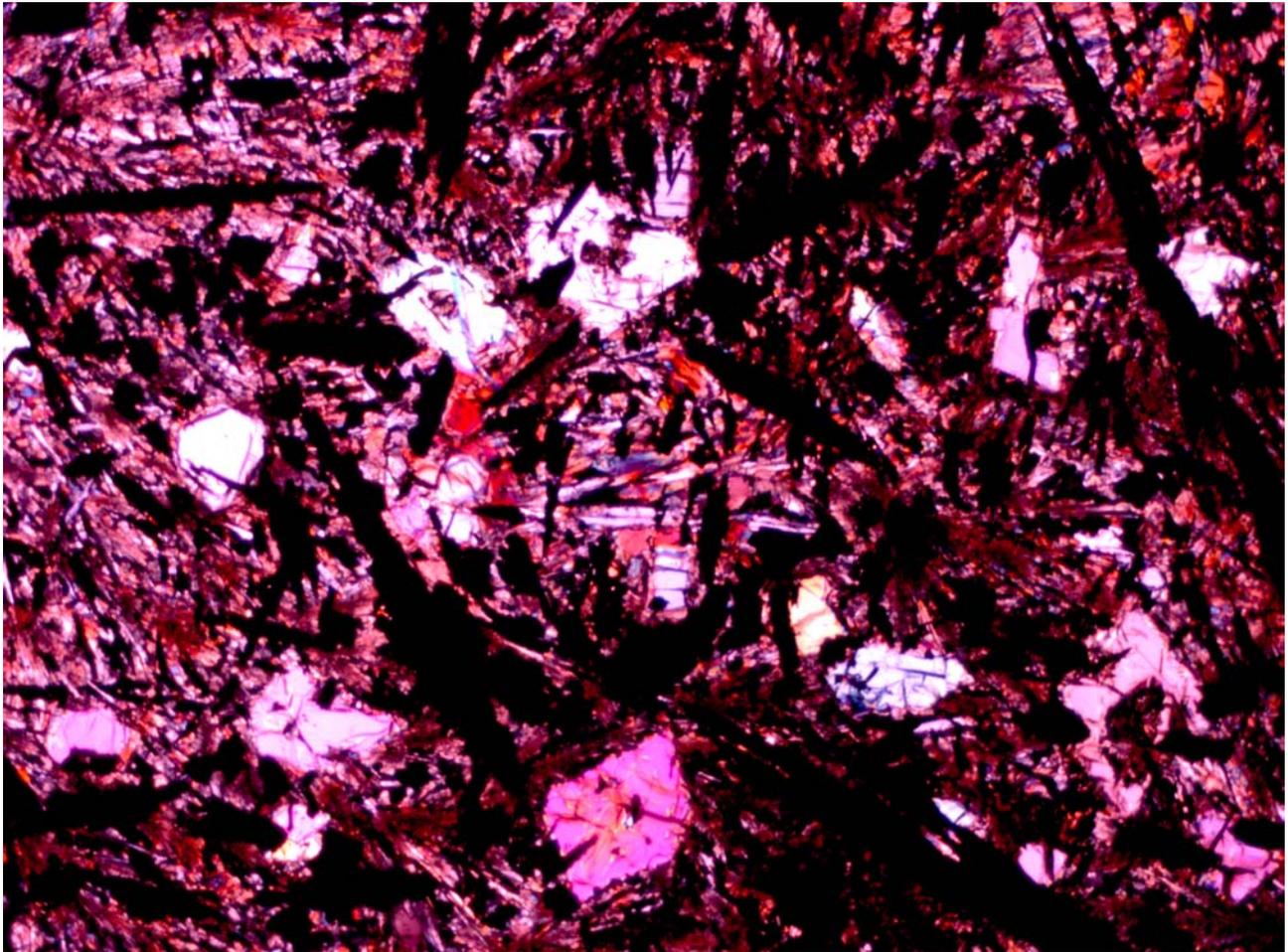
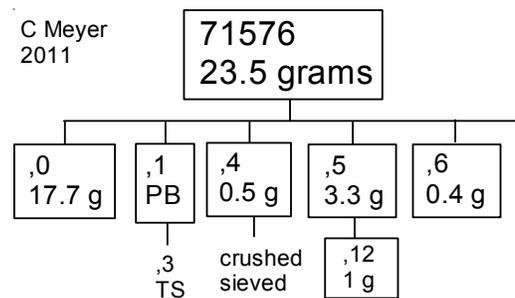
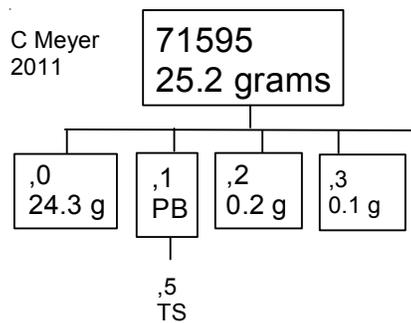


Figure 7: Photomicrograph of thin section 71576,3 (with quartz plate). 2.8 mm across.



Neal C.R. and Taylor L.A. (1993) Catalog of Apollo 17 rocks. Vol. 2 Basalts

Warner R.D., Keil K., Prinz M., Laul J.C., Murali A.V. and Schmitt R.A. (1975b) Mineralogy, petrology, and chemistry of mare basalts from Apollo 17 rake samples. *Proc. 6th Lunar Sci. Conf.* 193-220.

Warner R.D., Keil K., Nehru C.E. and Taylor G.J. (1978) Catalogue of Apollo 17 rake samples from Stations 1a, 2, 7, and 8. Spec. Publ. #18, UNM Institute of Meteoritics, Albuquerque. 88 pp.

Warner R.D., Nehru C.E. and Keil K. (1978g) Opaque oxide mineral crystallization in lunar high-titanium basalts. *Am. Mineral.* **68**, 1209-1224.

Warner R.D., Taylor G.J., Conrad G.H., Northrop H.R., Barker S., Keil K., Ma M.-S. and Schmitt R. (1979a) Apollo 17 high-Ti mare basalts: New bulk compositional data, magma types, and petrogenesis. *Proc. 10th Lunar Planet. Sci. Conf.* 225-247.

Table 1. Chemical composition of 71595.

reference weight	Murali77	
SiO2 %		
TiO2	10.4	(a)
Al2O3	9.3	(a)
FeO	19.6	(a)
MnO	0.25	(a)
MgO	7.4	(a)
CaO	10.6	(a)
Na2O	0.39	(a)
K2O	0.044	(a)
P2O5		
S %		
<i>sum</i>		
Sc ppm	78	(a)
V	100	(a)
Cr	2846	(a)
Co	18	(a)
Ni		
Cu		
Zn		
Ga		
Ge ppb		
As		
Se		
Rb		
Sr		
Y		
Zr		
Nb		
Mo		
Ru		
Rh		
Pd ppb		
Ag ppb		
Cd ppb		
In ppb		
Sn ppb		
Sb ppb		
Te ppb		
Cs ppm		
Ba		
La	6.4	(a)
Ce	29	(a)
Pr		
Nd		
Sm	6.9	(a)
Eu	1.43	(a)
Gd		
Tb	1.8	(a)
Dy	12	(a)
Ho		
Er		
Tm		
Yb	7.5	(a)
Lu	1.11	(a)
Hf	6.5	(a)
Ta	1.5	(a)
W ppb		
Re ppb		
Os ppb		
Ir ppb		
Pt ppb		
Au ppb		
Th ppm		
U ppm		
<i>technique:</i>	(a) INAA	

Table 2. Chemical composition of 71576.

reference weight	Murali77	
SiO2 %		
TiO2	11.8	(a)
Al2O3	8.9	(a)
FeO	20	(a)
MnO	0.242	(a)
MgO	6.8	(a)
CaO	10.6	(a)
Na2O	0.39	(a)
K2O	0.053	(a)
P2O5		
S %		
<i>sum</i>		
Sc ppm	80	(a)
V	85	(a)
Cr	2292	(a)
Co	19	(a)
Ni		
Cu		
Zn		
Ga		
Ge ppb		
As		
Se		
Rb		
Sr		
Y		
Zr		
Nb		
Mo		
Ru		
Rh		
Pd ppb		
Ag ppb		
Cd ppb		
In ppb		
Sn ppb		
Sb ppb		
Te ppb		
Cs ppm		
Ba		
La	6.7	(a)
Ce	31	(a)
Pr		
Nd		
Sm	7.6	(a)
Eu	1.54	(a)
Gd		
Tb	1.8	(a)
Dy	12	(a)
Ho		
Er		
Tm		
Yb	8	(a)
Lu	1.15	(a)
Hf	7	(a)
Ta	1.5	(a)
W ppb		
Re ppb		
Os ppb		
Ir ppb		
Pt ppb		
Au ppb		
Th ppm		
U ppm		
<i>technique:</i>	(a) INAA	