78597

Ilmenite Basalt

319 grams

Figure 1: Photo of 78597. Scale in cm. S73-21421

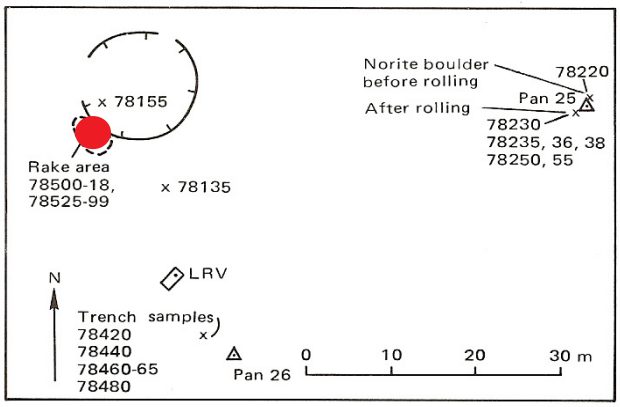


Figure 2: Location where 78597 was found.

Introduction

78597 is a vuggy, medium-grained high-Ti basalt (figure 1 and 3). It was collected as part of a rake sample and large comprehensive sample at station 8, Apollo 17 (figure 2).

Petrography

78597 is an olivine-microporphritic ilmenite basalt with large olivine grains set in a predominantly variolitic groundmass (figure 5). Plagioclase laths in the groundmass have hollow cores (interfaciculate) and are bundled in sheaths with intergrown pyroxene. Ilmenite occurs in chains. Trace tranquillityite has been reported (Warner et al. 1978).

Chemistry

Warner et al. (1975) and Rhodes et al. (1976) reported the chemical composition of 78597 (table 1, figures 6,

Figure 3: Phot of 78597. Scale in cm. S73-21422

7 and 8). Note that the Rb content is low, compared with other Apollo 17 basalts.

Gibson et al. (1976) reported 1990 ppm S.

Radiogenic age dating

Nyquist et al. (1976) studied the Rb-Sr isotope system, but did not determine an age. However, the age of Apollo 17 basalt is 3.72 b.y.

Cosmogenic isotopes and exposure ages

O'Kelley et al. (1974) determined the cosmic-ray-induced activity of ^{22}Na = 33 dpm/kg., ^{26}Al = 48 dpm/kg., ^{46}Sc = 25 dpm/kg., ^{54}Mn = 80 dpm/kg and ^{56}Co = 80 dpm/kg.

Processing

There is only one (small) thin section of 78597.

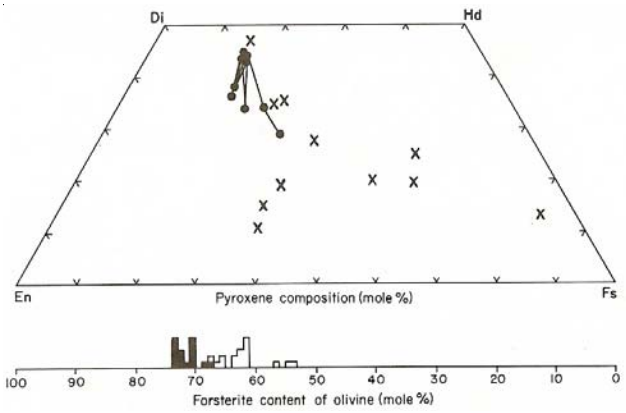


Figure 4: Composition of olivine and pyroxene in 78597 (Warner et al. 1978).

Mineralogical Mode

Olivine	5.9
Pyroxene	42.2
Plagioclase	29.5
Opaques	16.5
Silica	5.4
Meostasis	0.5

Figure 5: Photomicrgraph of thin section 78597,11. 2.8 mm across

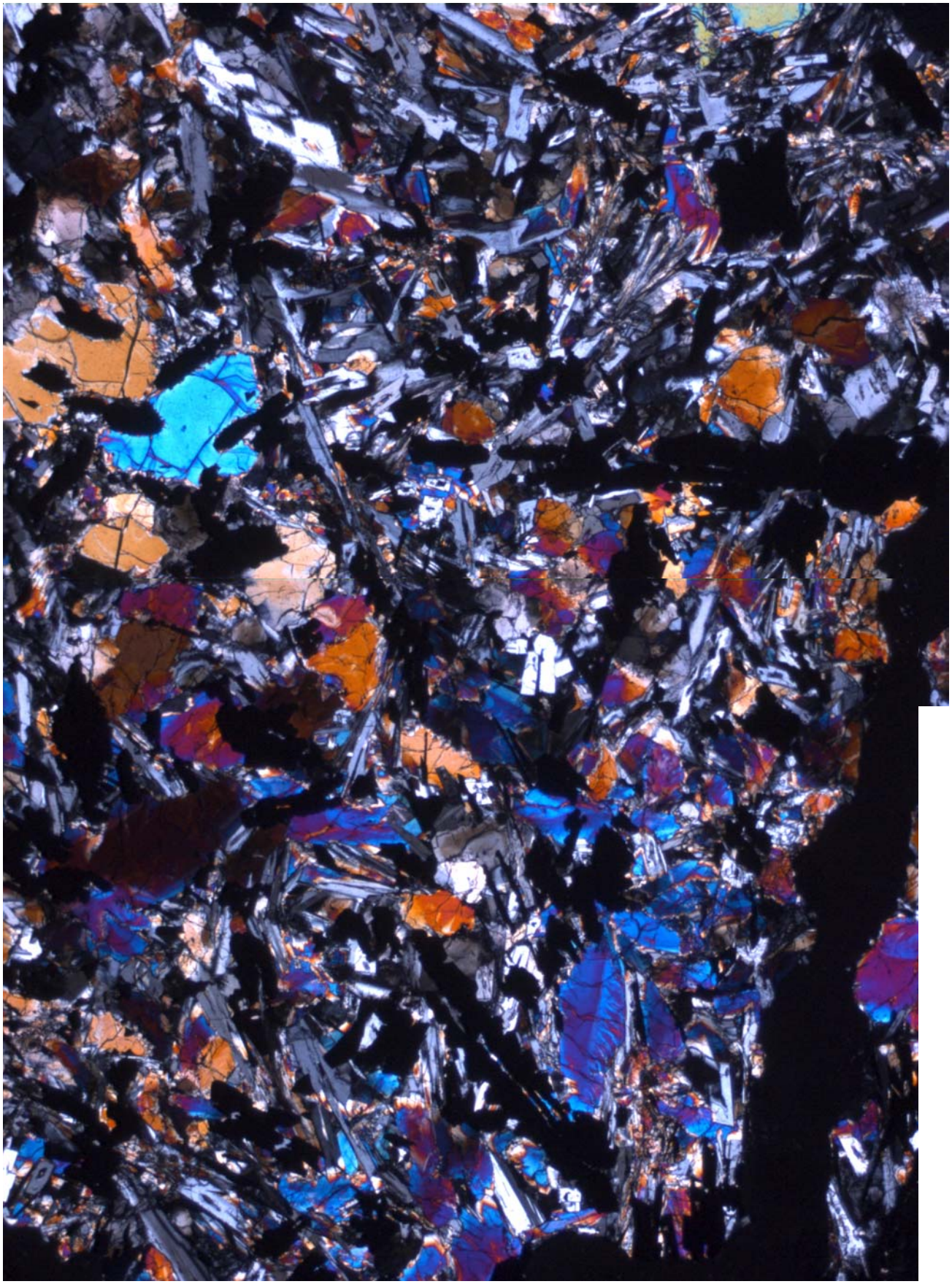


Table 1. Chemical composition of 78597.

reference	Eldridge74		Rhodes76		Warner75	
weight			Nyquist76			
SiO2 %			38.54	(d)		
TiO2			12.39	(d)	11.8	(b)
Al2O3			8.85	(d)	9	(b)
FeO			19.67	(d)	18	(b)
MnO			0.29	(d)	0.24	(b)
MgO			7.83	(d)	7.1	(b)
CaO			10.94	(d)	10.7	(b)
Na2O			0.39	(d)	0.42	(b)
K2O	0.046	(a)	0.04	(d)	0.06	(b)
P2O5			0.11	(d)		
S %			0.19	(d)		
sum						
Sc ppm			85	(b)	75	(b)
V					100	(b)
Cr			2190	(d)		
Co			20.7	(b)	18.5	(b)
Ni						
Cu						
Zn						
Ga						
Ge ppb						
As						
Se						
Rb			0.37	(c)		
Sr			130	(c)		
Y						
Zr						
Nb						
Mo						
Ru						
Rh						
Pd ppb						
Ag ppb						
Cd ppb						
In ppb						
Sn ppb						
Sb ppb						
Te ppb						
Cs ppm						
Ba			60.6	(c)		
La			5.67	(c)	5.3	(b)
Ce			17.9	(c)	18	(b)
Pr						
Nd			18.8	(c)		
Sm			7.17	(c)	7.3	(b)
Eu			1.48	(c)	1.4	(b)
Gd			11.2	(c)		
Tb					1.9	(b)
Dy			13	(c)	12	(b)
Ho						
Er			7.94	(c)		
Tm						
Yb			7.37	(c)	6.7	(b)
Lu			1.07	(b)	1	(b)
Hf			6.8	(b)	6.2	(b)
Ta					1.5	(b)
W ppb						
Re ppb						
Os ppb						
Ir ppb						
Pt ppb						
Au ppb						
Th ppm	0.38	(a)				
U ppm	0.11	(a)				

technique: (a) radiation count., (b) INAA, (c) IDMS, (d) XRF

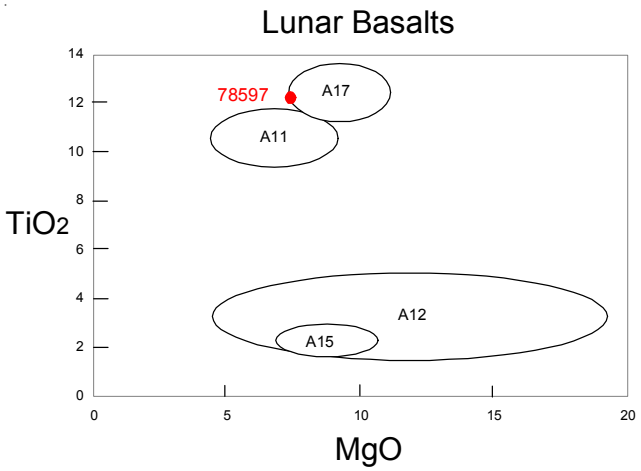


Figure 6: Composition of lunar basalts.

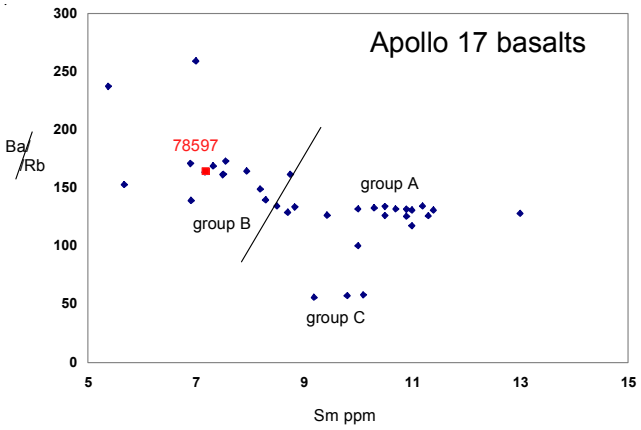


Figure 7: Trace element characteristics of Apollo 17 basalts.

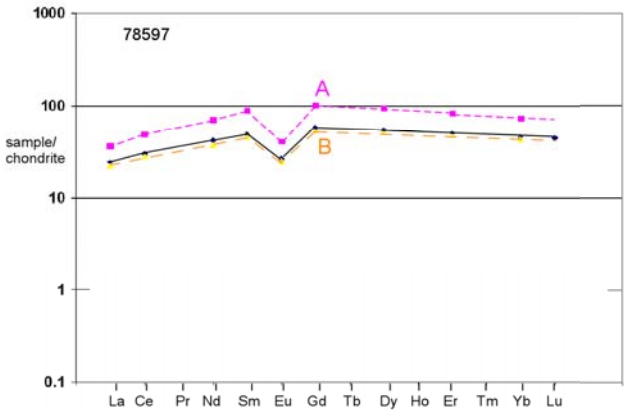
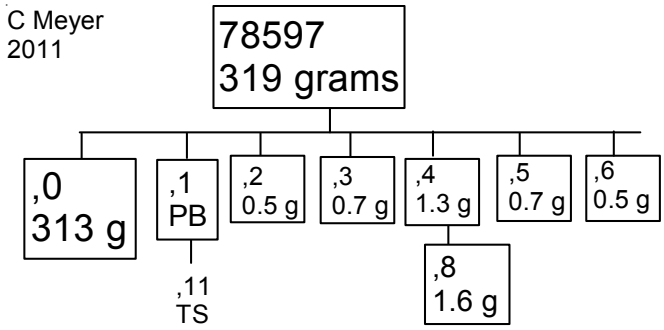


Figure 8: Normalized rare-earth-element diagram for 78597 compared with A and B types of Apollo 17 basalt.



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