

71577 - 234.7 grams

71578 – 353.9 grams

Ilmenite Basalt

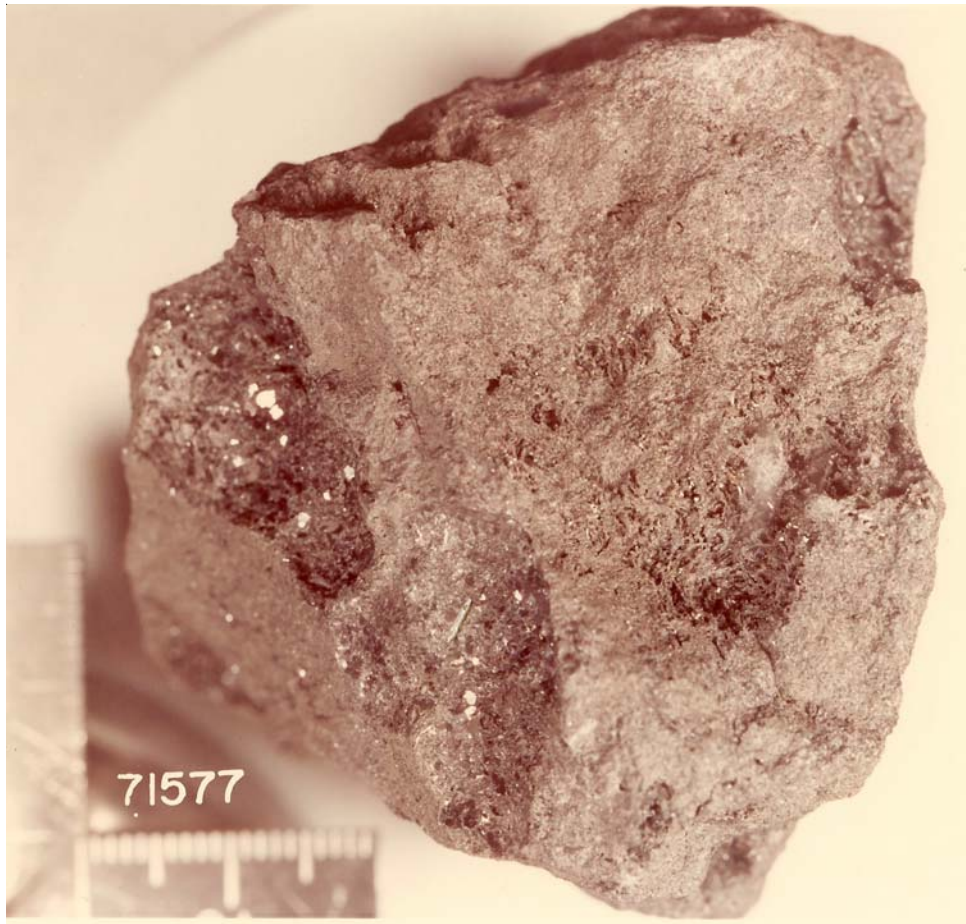


Figure 1: Photo of 71577 with cm scale. S73-31342.

Introduction

Warner et al. (1978) termed 71577 and 71578 olivine-microporphritic ilmenite basalts - similar to 71569. These, rather large, basalt samples have not been carefully studied.

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

Petrography

71577 and 71578 are fine-grained, ilmenite-rich basalts with minor vugs and vesicles (figures 1 and 3). The groundmass is variolitic with bow-tie intergrowths of plagioclase and pyroxene (see also description by Neal

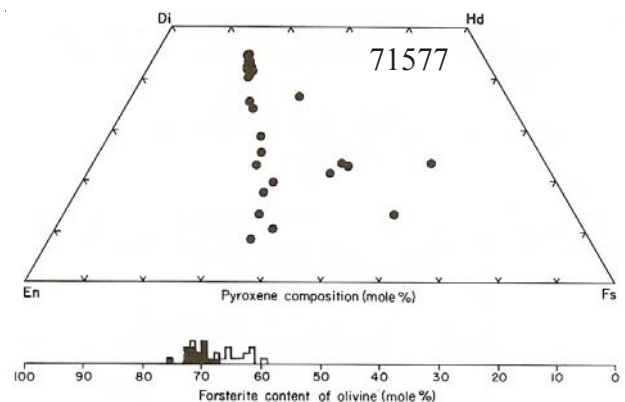


Figure 2: Composition diagrams for pyroxene and olivine in 71577 (Warner et al. 1978).

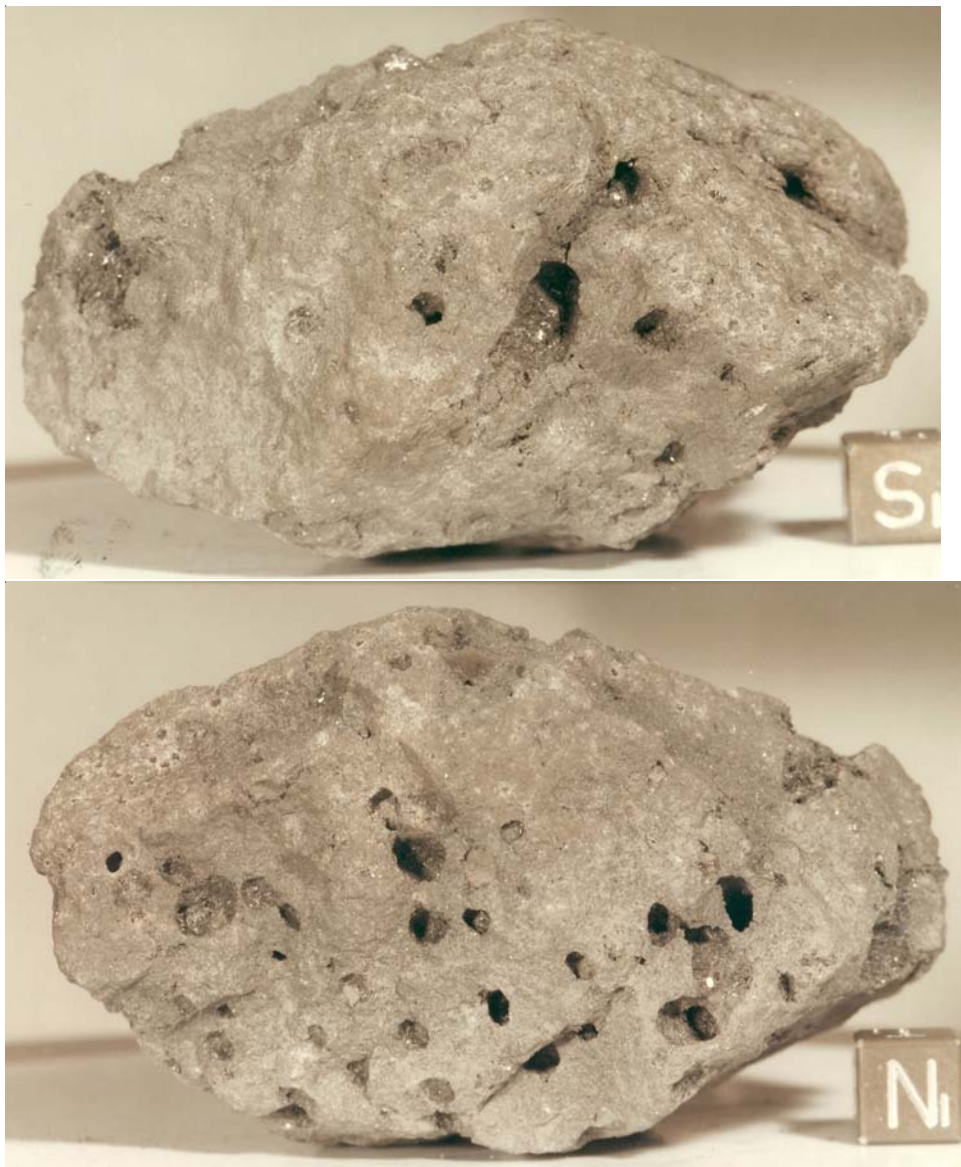


Figure 3: Two sides of 71578. Cube is 1 cm. S73-16593 and S73-16592.

Mineralogical Mode

	71577	71578
Olivine	4.5	6
Pyroxene	45.9	44.9
Plagioclase	28.1	26.5
Opakes	15.2	16.6
Silica	5	4.7
Meostasis	1.2	0.9

and Taylor 1993). Olivine is skeletal, often partially resorbed. Ilmenite is irregular in shape, often acicular, and penetrating other minerals (figures 5 and 6).

There are few zap pits on one side of 71578.

The compositions of olivine, pyroxene, plagioclase, ilmenite, armalcolite and metallic iron were reported

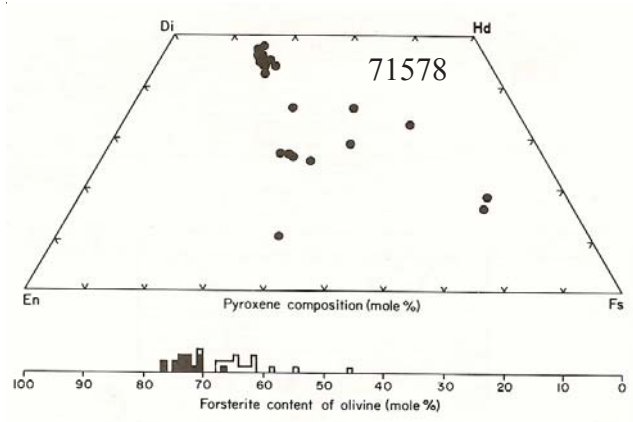
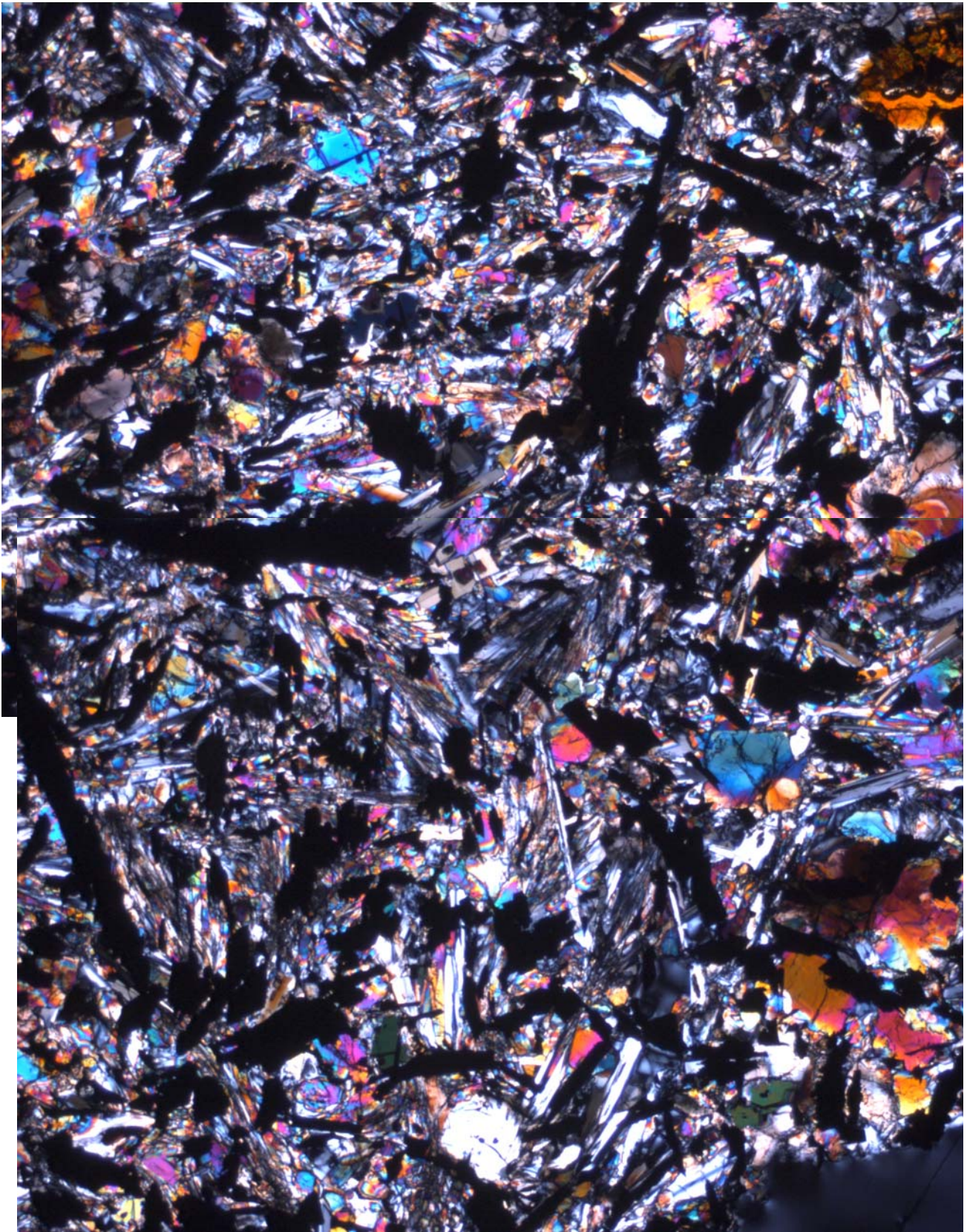


Figure 4: Composition diagrams for pyroxene and olivine in 71578 (Warner et al. 1978).



Figure 5: Photomicrograph of thin section 71577,9. 2.8 mm across

by Warner et al. (1976 a, b, 1978)(figures 2 and 4).
The mineral mode is given in Warner et al. (1978).



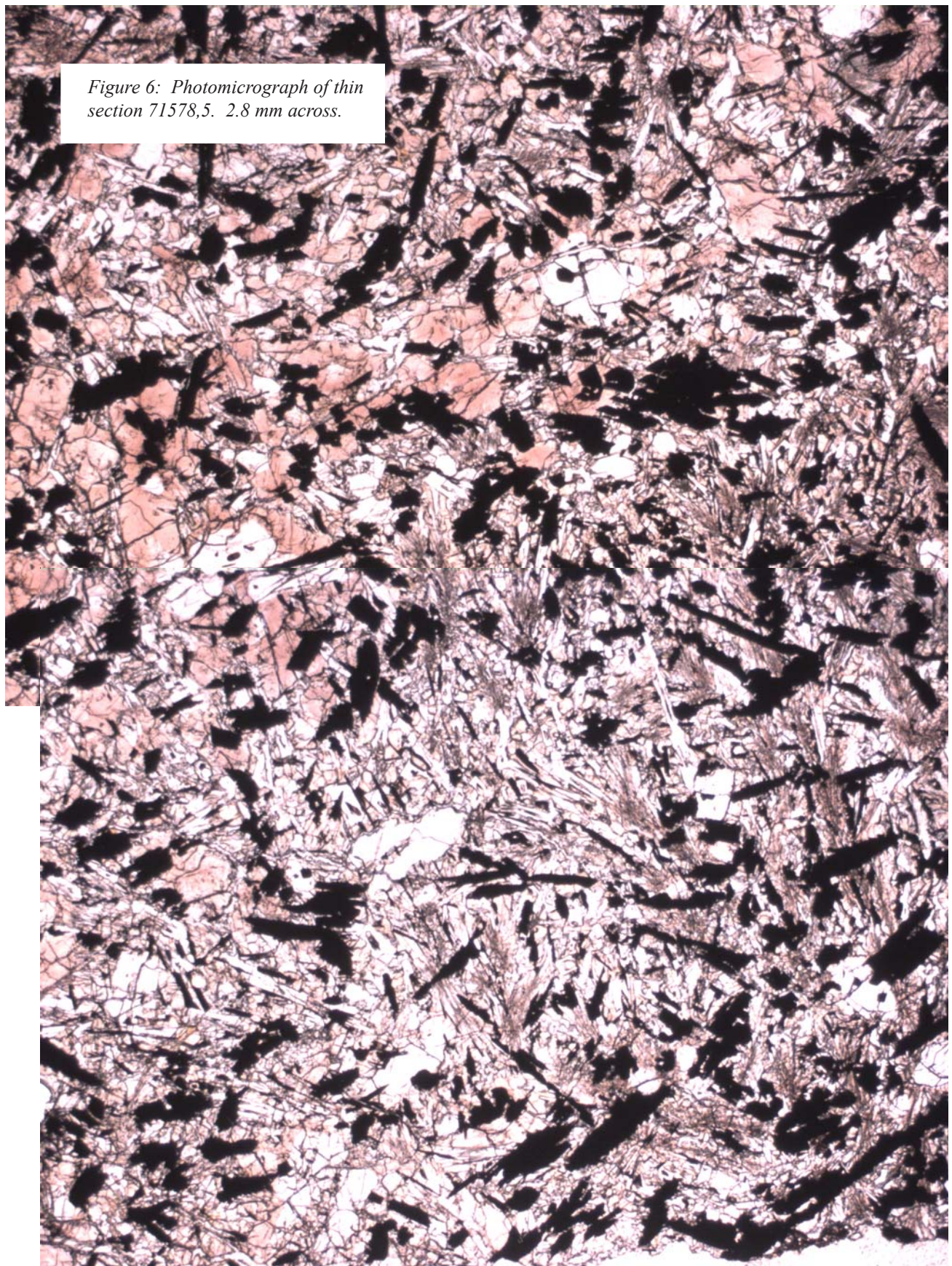


Figure 6: Photomicrograph of thin section 71578,5. 2.8 mm across.

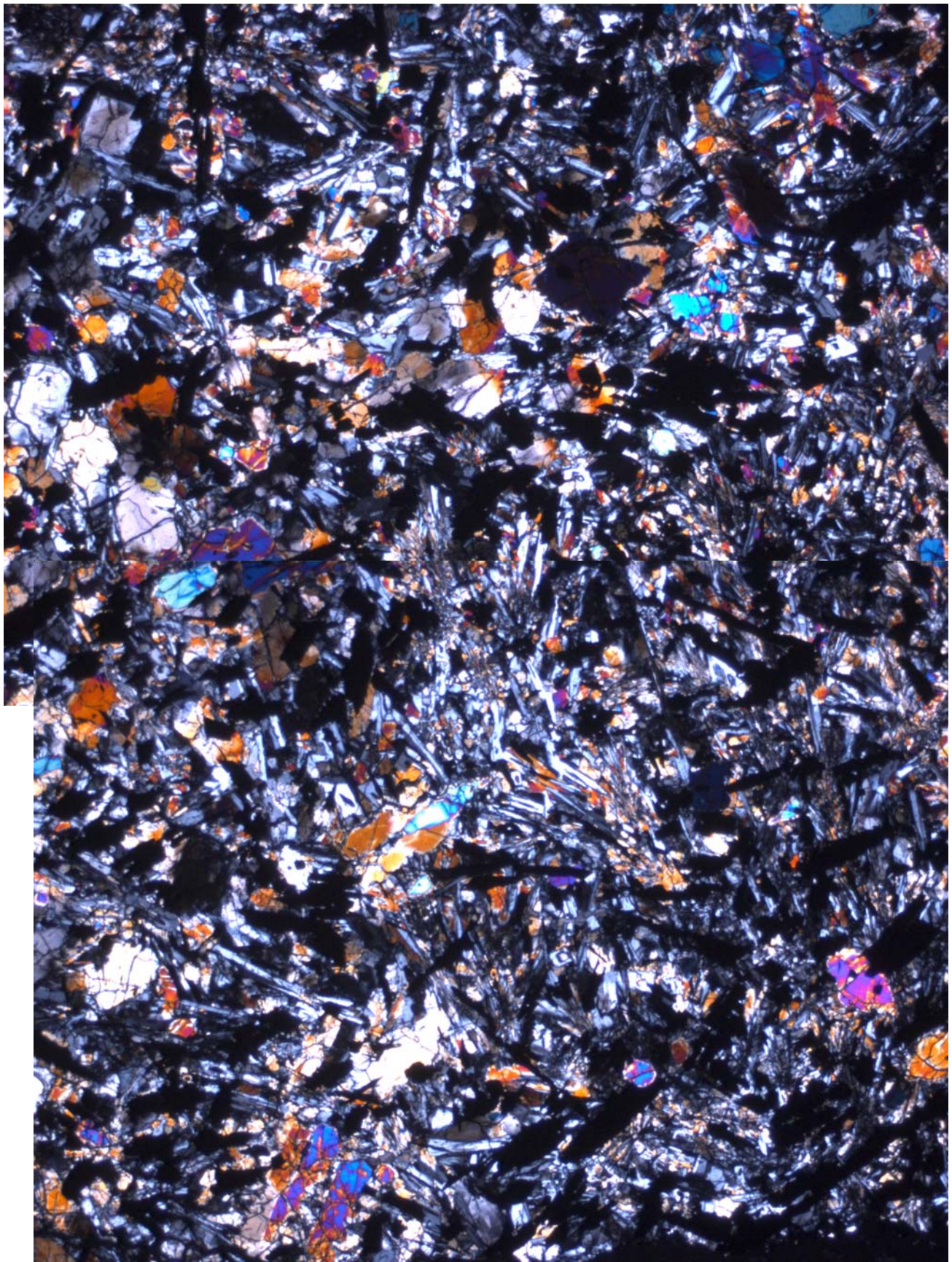


Table 1. Chemical composition of 71577.

<i>reference weight</i>	Warner78 Warner75 Laul75	Rhodes76 Nyquist76		
SiO2 %		39.18	(b)	
TiO2	12.8	(a)	12.04	(b)
Al2O3	8.8	(a)	8.92	(b)
FeO	20.5	(a)	18.9	(b)
MnO	0.26	(a)	0.28	(b)
MgO	8.3	(a)	8.15	(b)
CaO	10.4	(a)	10.95	(b)
Na2O	0.44	(a)	0.39	(b)
K2O	0.07	(a)	0.06	(b)
P2O5			0.05	(b)
S %			0.17	(b)
<i>sum</i>				
Sc ppm	79	(c)	81	(c)
V	110	(c)		
Cr	3147	(c)	2805	(b)
Co	20.6	(c)	18.4	(c)
Ni				
Cu				
Zn				
Ga				
Ge ppb				
As				
Se				
Rb			0.64	(d)
Sr			191	(d)
Y				
Zr				
Nb				
Mo				
Ru				
Rh				
Pd ppb				
Ag ppb				
Cd ppb				
In ppb				
Sn ppb				
Sb ppb				
Te ppb				
Cs ppm				
Ba			84	(d)
La	6.8	(c)	6.9	(d)
Ce	28	(c)	23.8	(d)
Pr				
Nd	28	(c)	26.5	(d)
Sm	10.4	(c)	11	(d)
Eu	2.14	(c)	2.17	(d)
Gd			16.8	(d)
Tb	2.6	(c)		
Dy	18	(c)	19.5	(d)
Ho				
Er			11.4	(d)
Tm				
Yb	9.3	(c)	10.4	(d)
Lu	1.4	(c)	1.43	(c)
Hf	9.2	(c)	9.7	(c)
Ta	1.7	(c)		
W ppb				
Re ppb				
Os ppb				
Ir ppb				
Pt ppb				
Au ppb				
Th ppm				
U ppm				

technique: (a) broad beam e probe, (b) XRF, (c) INAA, (d) IDMS

Table 2. Chemical composition of 71578.

<i>reference weight</i>	Warner78 Laul 75		
SiO2 %			
TiO2	11.7	(a)	
Al2O3	8.4	(a)	
FeO	18.6	(a)	
MnO	0.24	(a)	
MgO	8.1	(a)	
CaO	9.5	(a)	
Na2O	0.42	(a)	
K2O	0.07	(a)	
P2O5			
S %			
<i>sum</i>			
Sc ppm	74	(a)	
V	100	(a)	
Cr	2874	(a)	
Co	18.5	(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	(a)	
Ce	25	(a)	
Pr			
Nd	28	(a)	
Sm	9.8	(a)	
Eu	1.96	(a)	
Gd			
Tb	2.5	(a)	
Dy	17	(a)	
Ho			
Er			
Tm			
Yb	8.5	(a)	
Lu	1.3	(a)	
Hf	8.9	(a)	
Ta	1.6	(a)	
W ppb			
Re ppb			
Os ppb			
Ir ppb			
Pt ppb			
Au ppb			
Th ppm			
U ppm			

technique: (a) INAA

Chemistry

These are Ti-rich basalts typical of Apollo 17 (figure 7). Warner et al. (1975) and Rhodes et al. (1976) found that 71577 and 71578 were type A, Apollo 17 basalts (figures 8 and 9). The analysis by Laul et al. (1975) is apparently the same as by Warner et al. Nyquist et al. (1976) reported Rb, Sr and the $Sr^{87/86}$ ratio.

Radiogenic age dating

none

Processing

There are 4 thin sections of 71577, but only 1 for 71578. Neither rock has been sawn, nor allocated for scientific study.

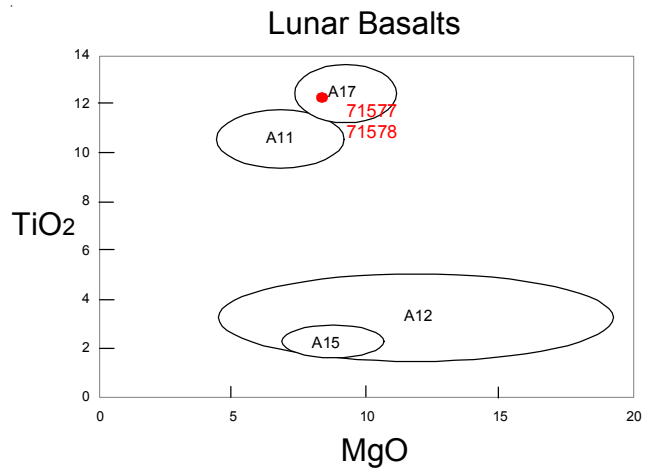
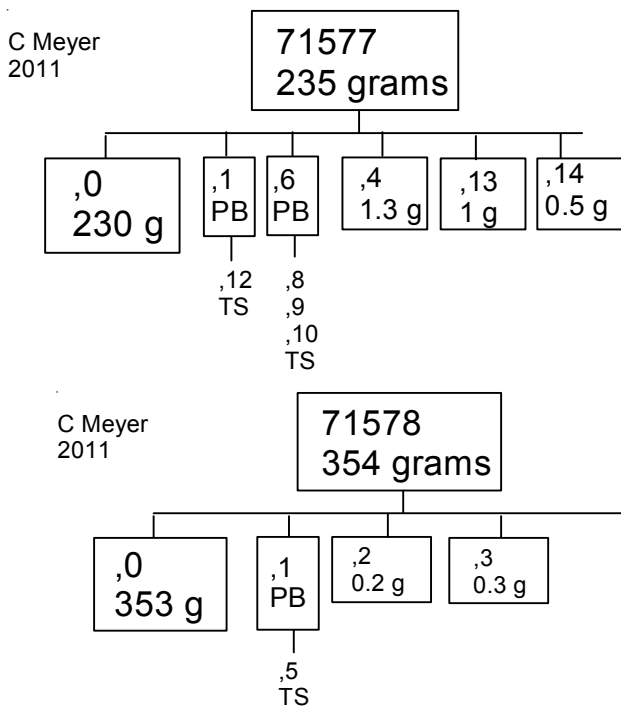


Figure 7: Chemical composition of 71577 and 71578 compared with that of Apollo basalts.

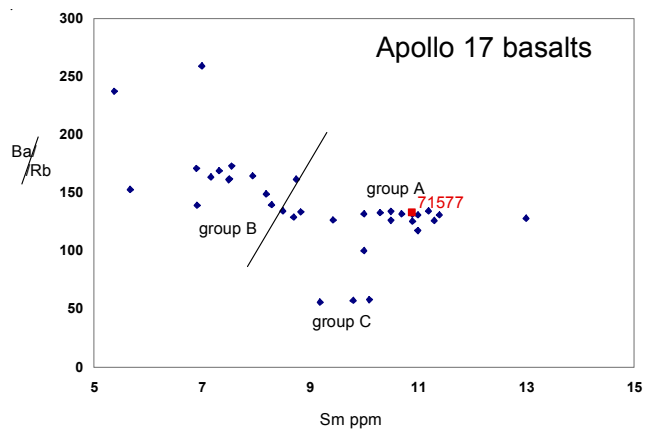


Figure 8: Trace element characteristics of 71577 showing it is a type A basalt.

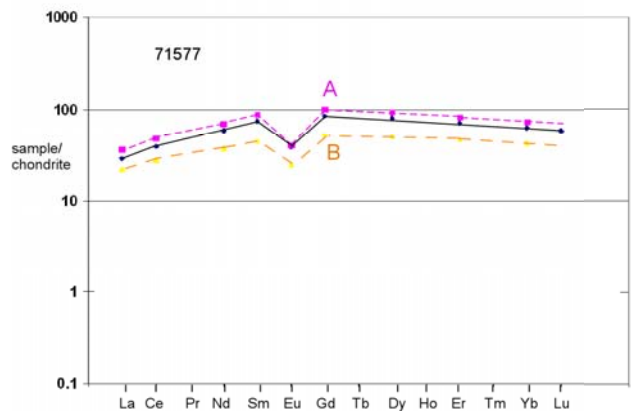


Figure 9: Normalized rare-earth-element diagram for 71577 and type A and B basalts.

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