78505 - 506.3 grams
78506 – 56 grams
78507 – 23.4 grams
78509 – 8.7 grams
Ilmenite Basalt

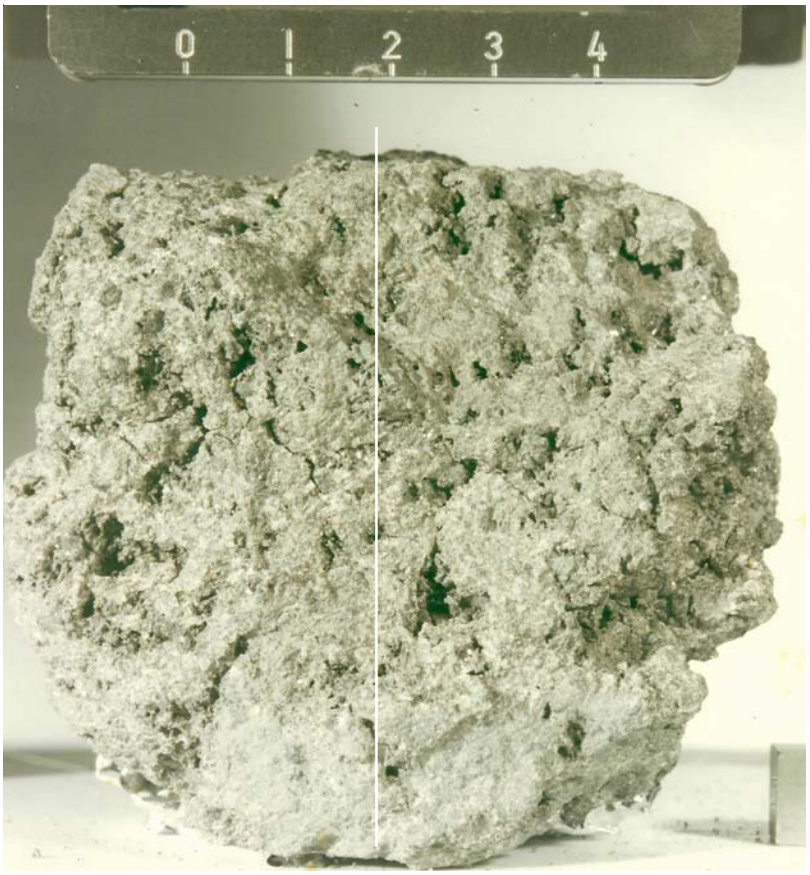


Figure 1: Photo of 78505. Scale and cube are in cm. S73-15386. White line shows approximate position of saw cut.

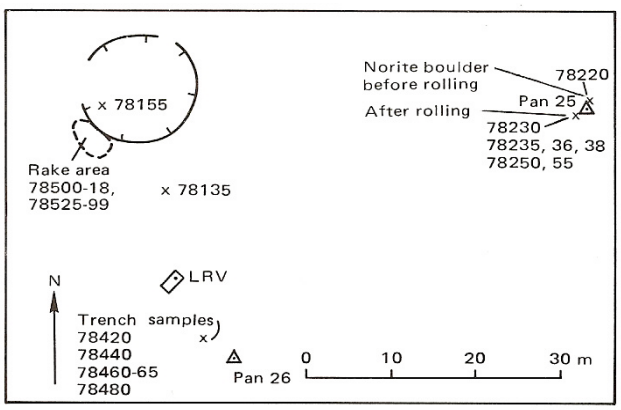


Figure 2: Map of station 8 showing location of soil 78500 and rake sample 78525-78599.

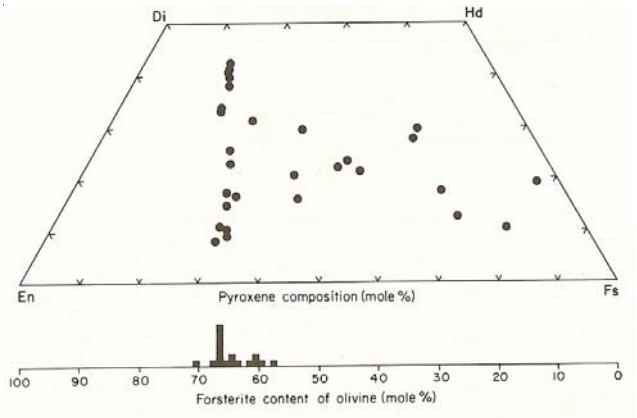


Figure 3: Composition of pyroxene and olivine in 78505 (Warner et al. 1978).

Figure 4: Photo of 78506. Scale in cm. S73-15468.

Figure 5: Photo of 78509. About 2 cm across. S73-18608

Table 2: Zr-rich mineral 78506.
(Brown et al. 1975)

TiO2	28.8
FeO	9.71
MgO	0.22
CaO	3.15
Zr02	35.13
Y2O3	8.31
NbO5	2.7

Mineralogical Mode

	Warner	Brown
Olivine	0.5	0.5
Pyroxene	45.7	47.7
Plagioclase	35.7	27.7
Opaques	15.3	21
Silica	1.5	1.9
Meostasis	1.1	1.2

Introduction

According to Warner et al. (1978) 78505 is a plagioclase-poikilitic ilmenite basalt similar to 71565, 71567 and 71509. It has a coarse grain size (1 mm) with abundant pigeonite and blocky ilmenite (figures 6 and 7).

78505 – 78509 were collected as part of a comprehensive soil sample (78500) at station 8, Apollo 17. A large rake sample collected adjacent to 78500 also returned abundant mare basalt fragments.

Petrography

Brown et al. (1975) and others studied the Apollo 17 mare basalts including 78505 finding that they are all ilmenite-rich because of their high Ti content. 78505 is slightly different because of it proportion of low-Ca pigeonite (figure 3).

Warner et al. (1978) reported tranquillityite and zirconolite in 78505. Brown et al. (1975) reported a Zr-rich mineral in 78506 (table 2). Roedder (1979) discusses the low-K inclusions in ilmenite in 78505.

Usselman et al. (1975) and others experimentally reproduced the textures and mineral chemistries of high-titanium mare basalts from Apollo 17 and discussed cooling rates.

Chemistry

The chemical compositons of 78505, 78506, 78507 and 78509 are tabulated in table 1. These samples are typical of other Apollo 17 mare basalts (figures 10, 11 and 12).

Cosmogenic isotopes and exposure ages

Drozd et al. (1977) determined the cosmic ray exposure age to be 121 m.y.

Keith et al. (1974) reported the cosmic-ray-induced activity of 78505.

Other Studies

Stephenson et al. (1975) reported studies of the magnetic properties of 78505.

Processing

78505 was sawn in half (figure 8) but it broke in pieces. There are 12 thin sections of 78505, 3 for 78506 and one each for 78507 and 78509.

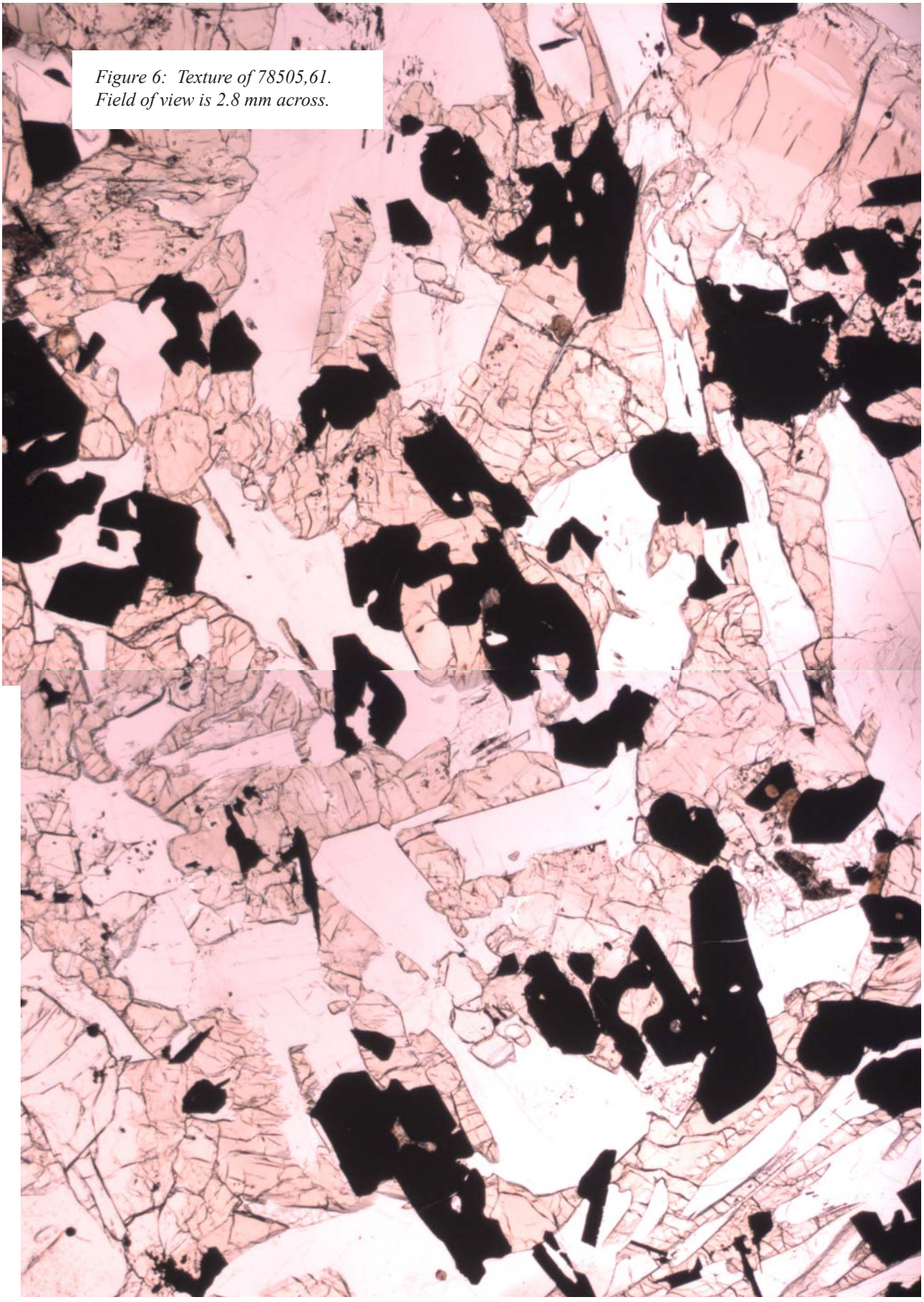


Figure 6: Texture of 78505,61. Field of view is 2.8 mm across.

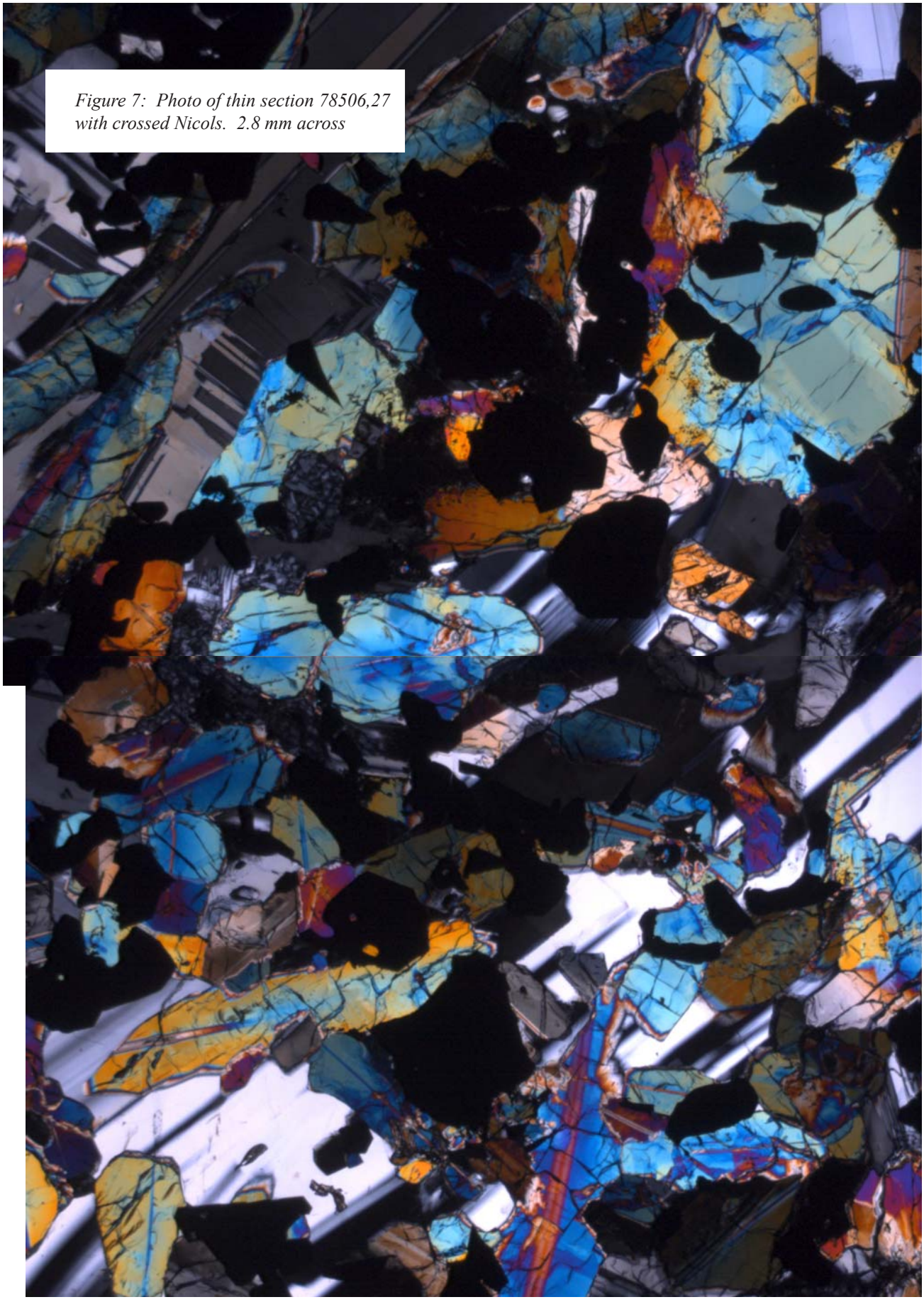


Figure 7: Photo of thin section 78506,27 with crossed Nicols. 2.8 mm across

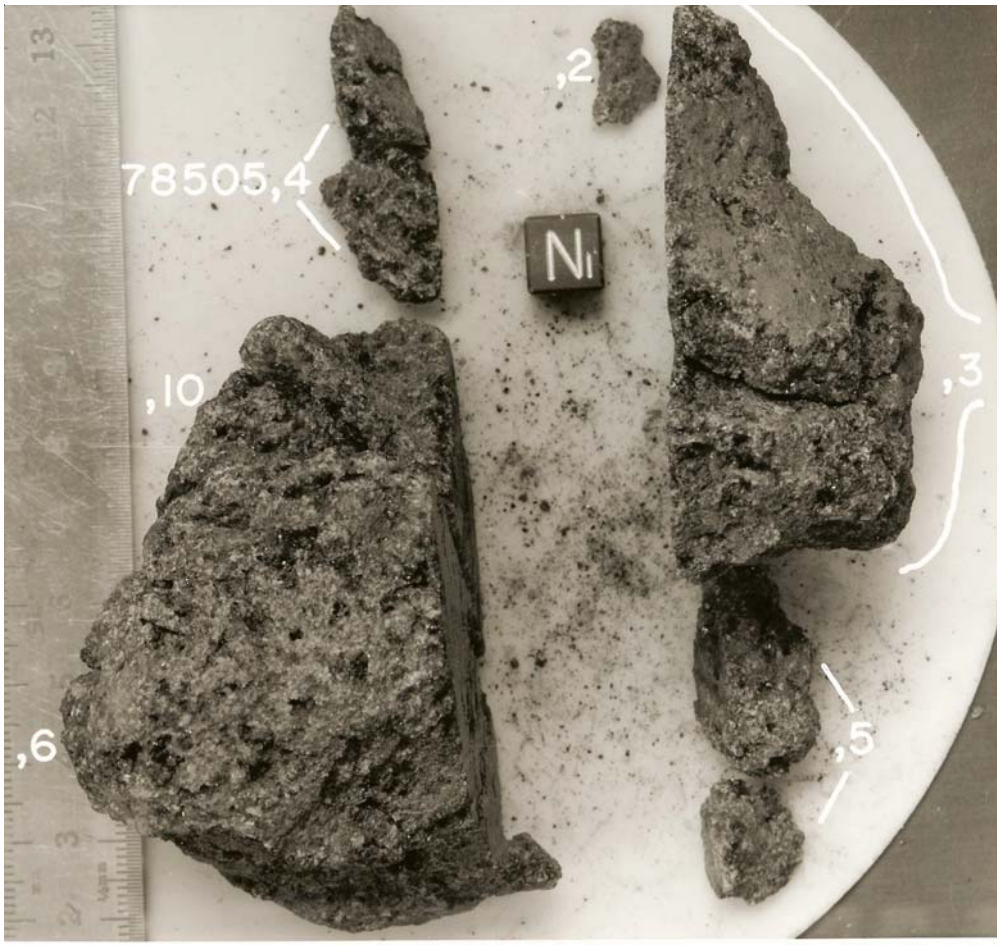
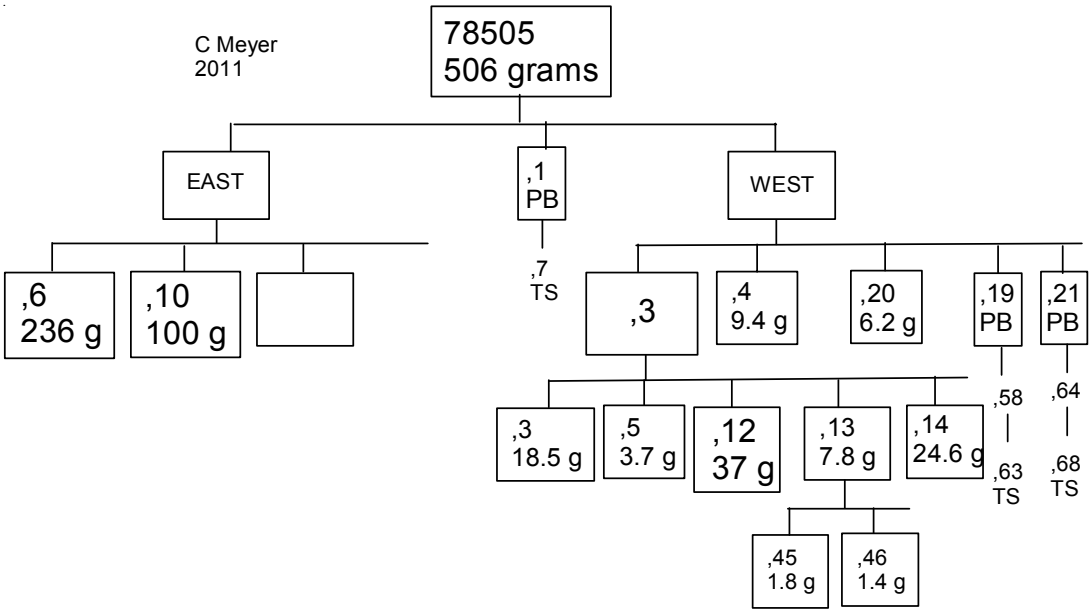


Figure 8: Processing photo for 78505. S74-19019 Cube is 1 cm3.



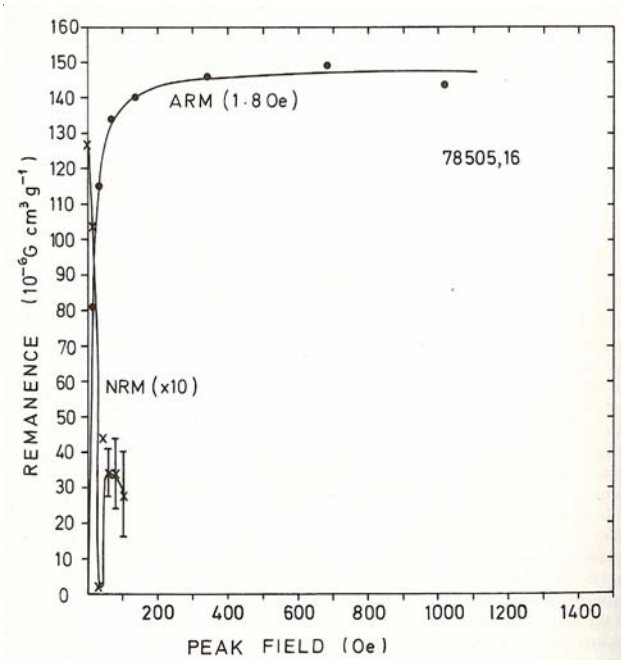


Figure 9: Magnetic properties of 78505 (Stephenson et al. 1975).

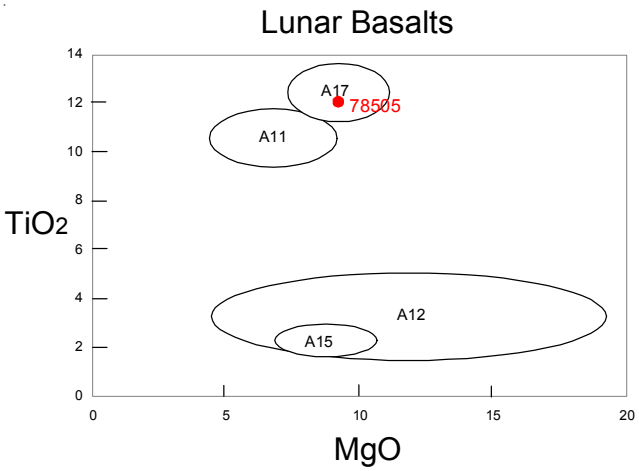


Figure 10: Composition of 78505 compared with other Apollo basalts.

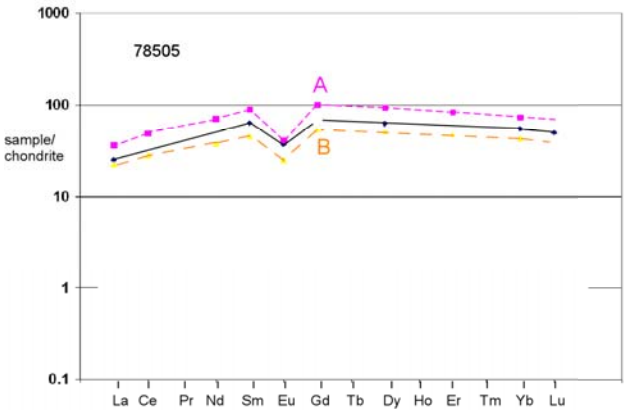


Figure 11: Normalized rare-earth-element diagram for 78505 compared with A and B types of Apollo 17 basalt.

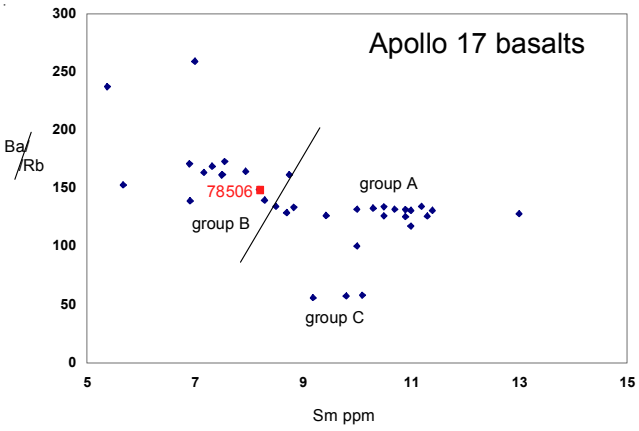


Figure 12: Trace element ratios for 78506 compared with that of other Apollo 17 basalts.

Table 1. Chemical composition of 78505.

	78505				78506		78507	78509	
reference	Warner75		Keith 74		Rhodes76		Warner79	Warner79	
weight					Nyquist76				
SiO2 %					38.55	(d)			
TiO2	12	(a)			12.93	(d)	11.9	12.3	(a)
Al2O3	10.6	(a)			8.99	(d)	8.8	9.2	(a)
FeO	18.6	(a)			19.36	(d)	18	19	(a)
MnO	0.227	(a)			0.27	(d)	0.222	0.252	(a)
MgO	9.5	(a)			9.59	(d)	10	8	(a)
CaO	9.9	(a)			9.94	(d)	9.7	10.9	(a)
Na2O	0.458	(a)			0.39	(d)	0.407	0.414	(a)
K2O	0.07	(a)	0.061	(b)	0.05	(d)	0.037	0.04	(a)
P2O5					0.02	(d)			
S %					0.16	(d)			
sum									
Sc ppm	74	(a)			73	(b)	79	89	(a)
V	108	(a)					130	101	(a)
Cr	2983	(a)			3489	(d)	3856	2657	(a)
Co	18.7	(a)			17.6	(b)	21	22	(a)
Ni									
Cu									
Zn									
Ga									
Ge ppb									
As									
Se									
Rb					0.44	(c)			
Sr					175	(c)			
Y									
Zr									
Nb									
Mo									
Ru									
Rh									
Pd ppb									
Ag ppb									
Cd ppb									
In ppb									
Sn ppb									
Sb ppb									
Te ppb									
Cs ppm									
Ba					66	(c)			
La	5.9	(a)			5.1	(c)	3.4	3.9	(a)
Ce					17.8	(c)	13	14	(a)
Pr									
Nd					19.6	(c)	16	16	(a)
Sm	9.4	(a)			8.19	(c)	6	5.8	(a)
Eu	2.1	(a)			1.85	(c)	1.59	1.22	(a)
Gd					12.9	(c)			
Tb							1.4	1.3	(a)
Dy	15	(a)			14.9	(c)	10	9	(a)
Ho									
Er									
Tm									
Yb	8.9	(a)			7.99	(c)	5.8	5.5	(a)
Lu	1.2	(a)			1.11	(b)	0.86	0.8	(a)
Hf					8.2	(b)	5.5	5.1	(a)
Ta							1.3	1.3	(a)
W ppb									
Re ppb									
Os ppb									
Ir ppb									
Pt ppb									
Au ppb									
Th ppm			0.39	(b)					
U ppm			0.135	(b)					

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

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