

**76539**  
Vitrophyric Basalt  
14.8 grams



*Figure 1: Photo of 76539 with mm scale bar. S73-19606*

**Introduction**

76539 is a small aphanitic basalt found in the rake sample collected at station 6, Apollo 17 (see sections on 76500 and 76537).

**Petrography**

Polished thin sections of 76539 show that it has numerous tiny phenocrysts of skeletal olivine (figure 2) and fine needles of ilmenite (seen in reflected light). The remainder is “opaque” glass.

**Chemistry**

The chemical composition of 76539 was determined by Rhodes et al. (1976). Trace elements were reported by Wiesmann and Hubbard (1975). Nyquist et al. (1975) reported Rb, Sr and  $\text{Sr}^{87/86}$ .

**Radiogenic age dating**

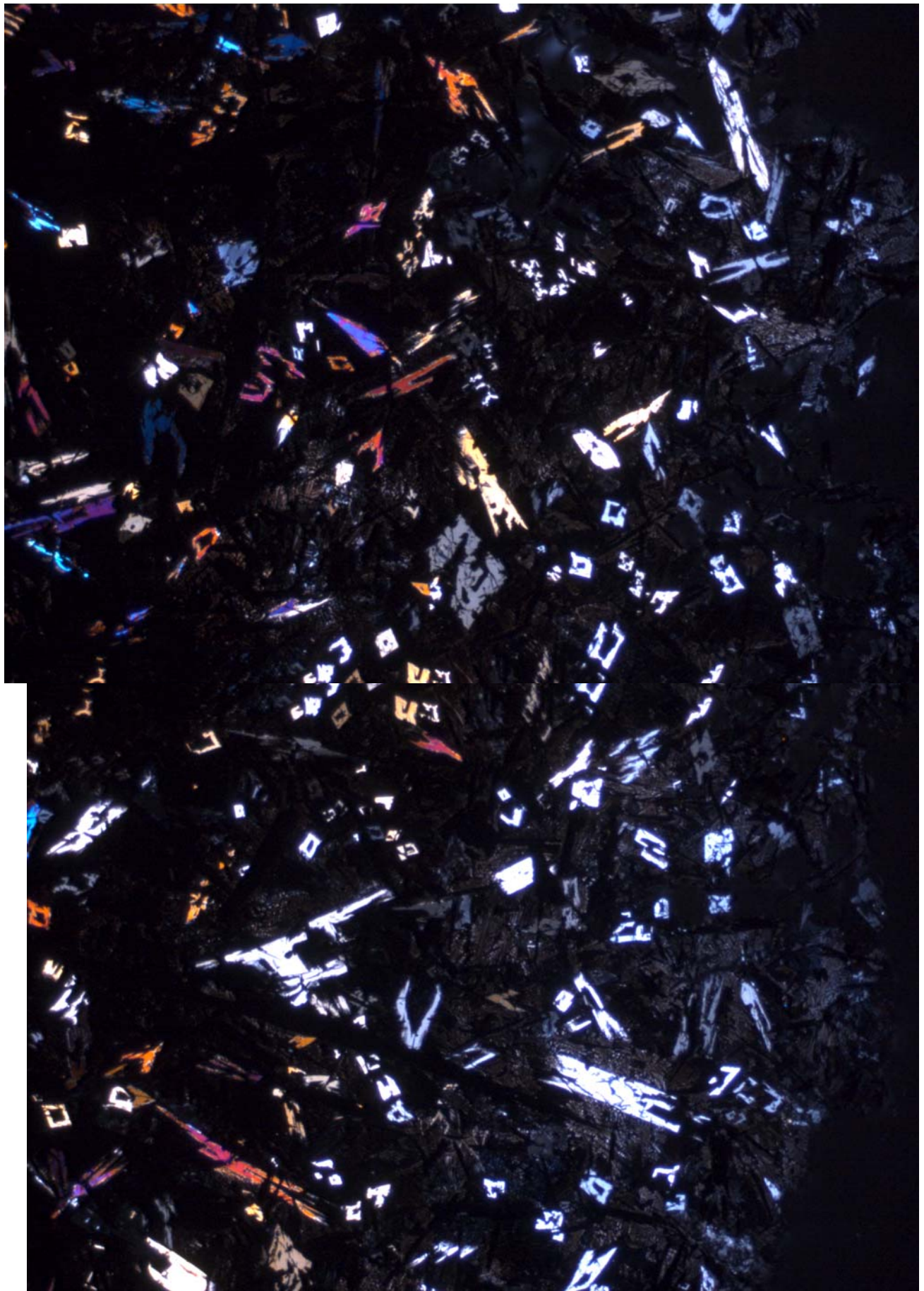
Turner was allocated a piece of 76539 for age dating.

**Processing**

There are 2 thin section.



*Figure 2: Photomicrograph of thin section 76539.9. 2.8 mm across*



Lunar Sample Compendium  
C Meyer 2011

**Table 1. Chemical composition of 76539.**

reference	Shih75	Rhodes76	
weight	Wiesmann75		
SiO <sub>2</sub> %		38.21	(c)
TiO <sub>2</sub>		12.65	(c)
Al <sub>2</sub> O <sub>3</sub>		8.8	(c)
FeO		19.42	(c)
MnO		0.29	(c)
MgO		7.87	(c)
CaO		10.91	(c)
Na <sub>2</sub> O		0.39	(c)
K <sub>2</sub> O	0.052	(a) 0.06	(c)
P <sub>2</sub> O <sub>5</sub>		0.1	(c)
S %		0.16	(c)
sum			
Sc ppm	82	(b)	
V			
Cr		2326	(c)
Co	20	(b)	
Ni			
Cu			
Zn			
Ga			
Ge ppb			
As			
Se			
Rb	0.393	(a)	
Sr	130	(a)	
Y			
Zr	196	(a)	
Nb			
Mo			
Ru			
Rh			
Pd ppb			
Ag ppb			
Cd ppb			
In ppb			
Sn ppb			
Sb ppb			
Te ppb			
Cs ppm			
Ba	65	(a)	
La	5.88	(a)	
Ce	18.6	(a)	
Pr			
Nd	18.3	(a)	
Sm	7.32	(a)	
Eu	1.48	(a)	
Gd	11.3	(a)	
Tb			
Dy	13.3	(a)	
Ho			
Er	8.02	(a)	
Tm			
Yb	7.4	(a)	
Lu			
Hf			
Ta			
W ppb			
Re ppb			
Os ppb			
Ir ppb			
Pt ppb			
Au ppb			
Th ppm			
U ppm			

technique: (a) IDMS, (b) INAA, (c) XRF

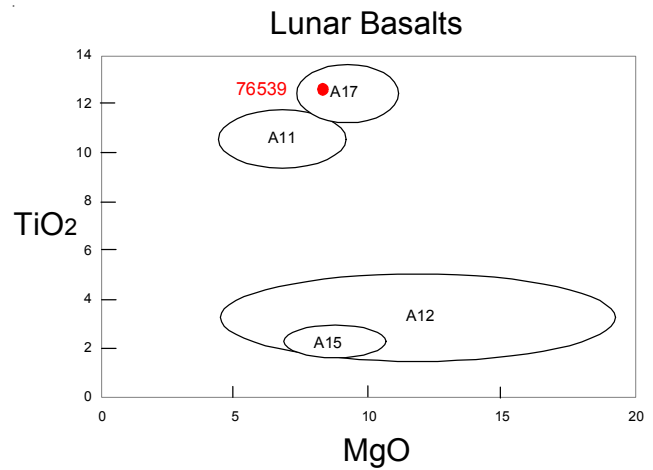


Figure 3: Composition of lunar basalts.

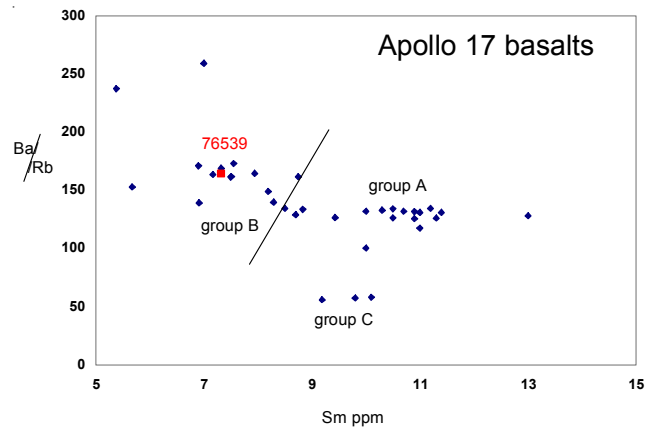


Figure 4: Neal's classification scheme using trace elements.

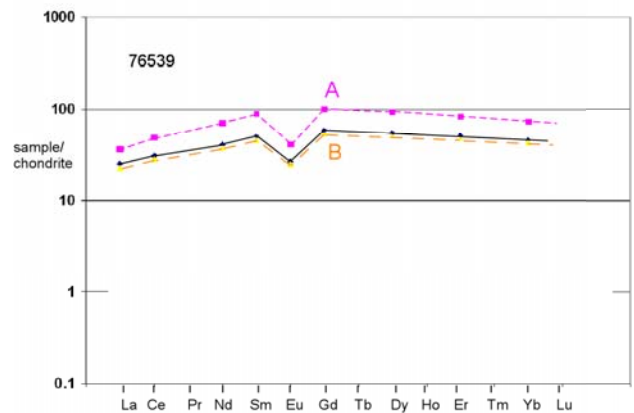
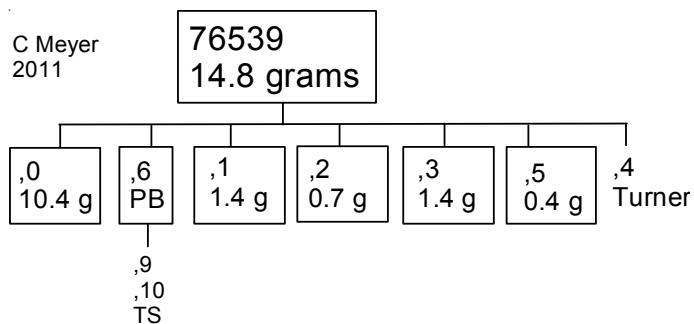


Figure 5: Normalized rare-earth-element diagram for 76539 compared with A and B types of Apollo 17 basalt.



### References for 76539

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.

Meyer C. (1994) Catalog of Apollo 17 rocks. Vol. 4 North Massif

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.

Nyquist L.E., Bansal B.M. and Wiesmann H. (1975a) Rb-Sr ages and initial  $^{87}\text{Sr}/^{86}\text{Sr}$  for Apollo 17 basalts and KREEP basalt 15386. *Proc. 6<sup>th</sup> Lunar Sci. Conf.* 1445-1465.

Rhodes J.M., Hubbard N.J., Wiesmann H., Rodgers K.V., Brannon J.C. and Bansal B.M. (1976a) Chemistry, classification, and petrogenesis of Apollo 17 mare basalts. *Proc. 7<sup>th</sup> Lunar Sci. Conf.* 1467-1489.

Shih C.-Y., Haskin L.A., Wiesmann H., Bansal B.M. and Brannon J.C. (1975a) On the origin of high-Ti mare basalts. *Proc. 6<sup>th</sup> Lunar Sci. Conf.* 1255-1285.

Usselman T.M., Lofgren G.E., Donaldson C.H. and Williams R.J. (1975) Experimentally reproduced textures and mineral chemistries of high-titanium mare basalts. *Proc. 6<sup>th</sup> Lunar Sci. Conf.* 997-1020.

Wolfe E.W., Bailey N.G., Lucchitta B.K., Muehlberger W.R., Scott D.H., Sutton R.L and Wilshire H.G. (1981) The geologic investigation of the Taurus-Littrow Valley: Apollo 17 Landing Site. US Geol. Survey Prof. Paper, 1080, pp. 280.