12047

Ilmenite Basalt

193 grams

Figure 1: Photo of 12047,6 and ,25 showing zap pits and large vesicle. NASA # S86-38618. Cube is 1 cm.

Introduction

12047 is a very flat rock (figure 1). According to Hörz and Hartung (1971), rock 12047 displayed various crater densities on all surfaces, indicating multiple orientations during its history on the lunar surface.

Petrography

Dungan and Brown (1977) briefly describe 12047 as medium-grained, equigranular, with lath-shaped plagioclase and equant to slightly elongate pyroxene intergrown suggestive of coetectic crystallization. Elongate ilmenite and small segregations of "symplectoid mesostasis" are common features.

Mineralogy

Mineral compositions are not available for this rock.

Chemistry

The chemical composition was reported by Rhodes et al. (1977) and Nyquist et al. (1977).

Figure 2: Reflected light photograph of thin section 12047,9 showing radom orientation of abundant ilmenite and large vesicles. NASA #S70-49365. about 3 cm

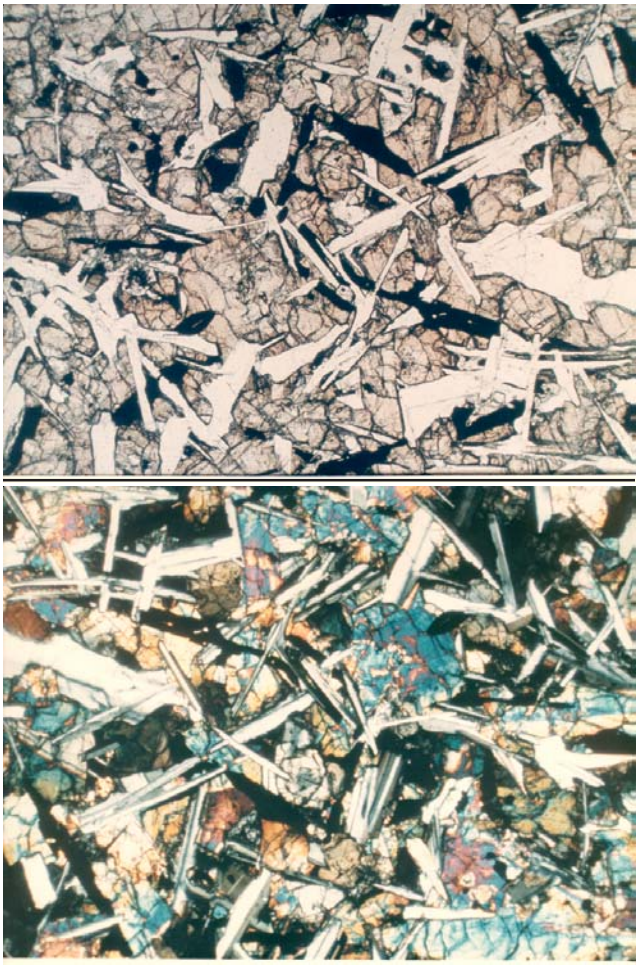


Figure 3: Photomicrographs of thin section 12047,8. NASA # S70-49260-261. 2.2 mm

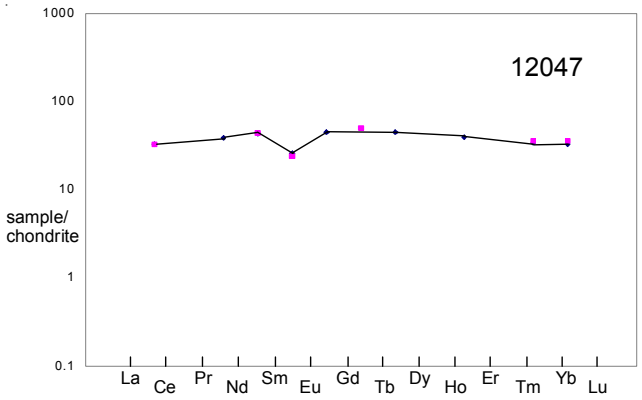


Figure 4: Normalized rare-earth-element composition of 12047 (data from Nyquist et al. 1977).

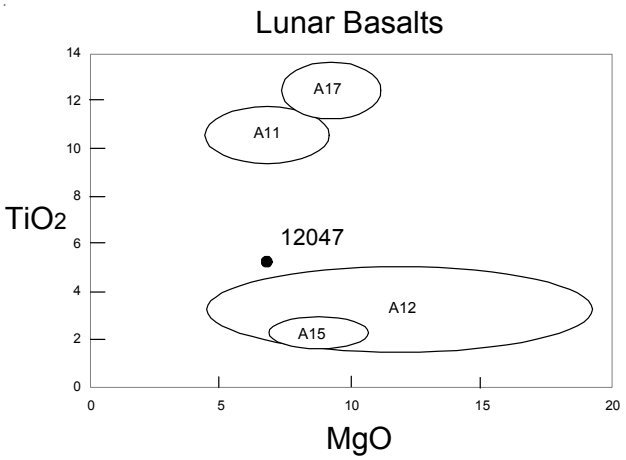


Figure 5: Composition of 12047 compared with other lunar basalts.

Radiogenic age dating

Note dated.

Processing

12047,6 is on public display at the Museum of Flight, Seattle. There are 8 thin sections.

List of Photo #s for 12047

S69-63110 – 133	color mug
S69-62711 – 734	B & W mug
S69-61764 – 787	B & W
S70-19039 – 048	B & W
S70-49817 – 822	TS color
S70-48856 – 865	color mug
S70-49260 – 261	TS
S74-27040	display
S86-38613	
S86-38618	nice color
S92-44063 – 44066	display

Mineralogical Mode for 12047

	Neal et al. 1994	Dungan and Brown 1977
Olivine	- -	
Pyroxene	48.4	48.4
Plagioclase	38	38
Ilmenite	5.3	5.3
Chromite +Usp	1	1
mesostasis	2	2
"silica"	5.3	5.3

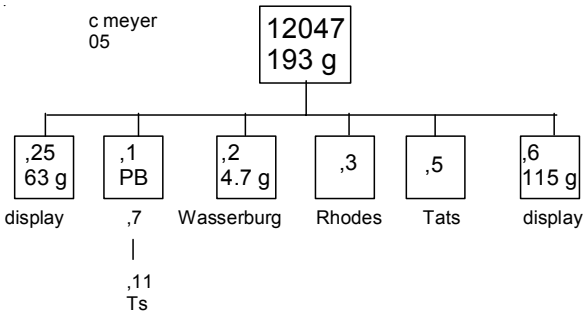
Table 1. Chemical composition of 12047.

reference	Rhodes77		Nyquist77	
weight				
SiO2 %	45.13	(c)		
TiO2	5.2	(c)		
Al2O3	10.1	(c)		
FeO	20.5	(c)		
MnO	0.29	(c)		
MgO	6.59	(c)		
CaO	11.32	(c)		
Na2O	0.31	(a)		
K2O	0.08	(c)	0.0725	(b)
P2O5	0.08	(c)		
S %	0.12	(c)		
sum				
Sc ppm	61	(a)		
V				
Cr	2190	(a)		
Co	32	(a)		
Ni				
Cu				
Zn				
Ga				
Ge ppb				
As				
Se				
Rb			0.99	(b)
Sr	171	(c)	164	(b)
Y	57	(c)		
Zr	141	(c)		
Nb	7	(c)		
Mo				
Ru				
Rh				
Pd ppb				
Ag ppb				
Cd ppb				
In ppb				
Sn ppb				
Sb ppb				
Te ppb				
Cs ppm				
Ba	69	(b)	69.2	(b)
La				
Ce	20.1	(a)	20.1	(b)
Pr				
Nd			17.5	(b)
Sm	6.5	(a)	6.39	(b)
Eu	1.36	(a)	1.45	(b)
Gd			8.95	(b)
Tb	1.8	(a)		
Dy			10.9	(b)
Ho				
Er			6.4	(b)
Tm				
Yb	5.9	(a)	5.54	(b)
Lu	0.89	(a)	0.798	(b)
Hf	5.1	(a)		
Ta				
W ppb				
Re ppb				
Os ppb				
Ir ppb				
Pt ppb				
Au ppb				
Th ppm				
U ppm				
technique	*(a) INAA, (b) IDMS, (c) XRF*			

Figure 6: Display sample 12047,6. NASA S92-44066.

Figure 7: Early display case.

Figure 8: 12047 is a flat rock only 3 - 4 cm thick. NASA # S69-61784.



References for 12047

Dungan M.A. and Brown R.W. (1977) The petrology of the Apollo 12 basalt suite. *Proc. 8th Lunar Sci. Conf.* 1339-1381.

Hörz F. and Hartung J.B. (1971c) The lunar-surface orientation of some Apollo 12 rocks. *Proc. 2nd Lunar Planet. Sci. 2629*-2638.

James O.B. and Wright T.L. (1972) Apollo 11 and 12 mare basalts and gabbros: Classification, compositional variations and possible petrogenetic relations. *Geol. Soc. Am. Bull.* **83**, 2357-2382.

LSPET (1970) Preliminary examination of lunar samples from Apollo 12. *Science* **167**, 1325-1339.

Nyquist L.E., Bansal B.M., Wooden J. and Wiesmann H. (1977) Sr-isotopic constraints on the peterogenesis of Apollo 12 mare basalts. *Proc. 8th Lunar Sci. Conf.* 1383-1415.

Nyquist L.E., Shih C.-Y., Wooden J.L., Bansal B.M. and Wiesmann H. (1979) The Sr and Nd isotopic record of Apollo 12 basalts: Implications for lunar geochemical evolution. *Proc. 10th Lunar Planet. Sci.* Conf. 77-114.

Papike J.J., Hodges F.N., Bence A.E., Cameron M. and Rhodes J.M. (1976) Mare basalts: Crystal chemistry, mineralogy and petrology. *Rev. Geophys. Space Phys.* **14**, 475-540.

Rhodes J.M., Blanchard D.P., Dungan M.A., Brannon J.C., and Rodgers K.V. (1977) Chemistry of Apollo 12 mare basalts: Magma types and fractionation processes. *Proc. 8th Lunar Sci. Conf.* 1305-1338.