

12076
Olivine Basalt
54.5 grams

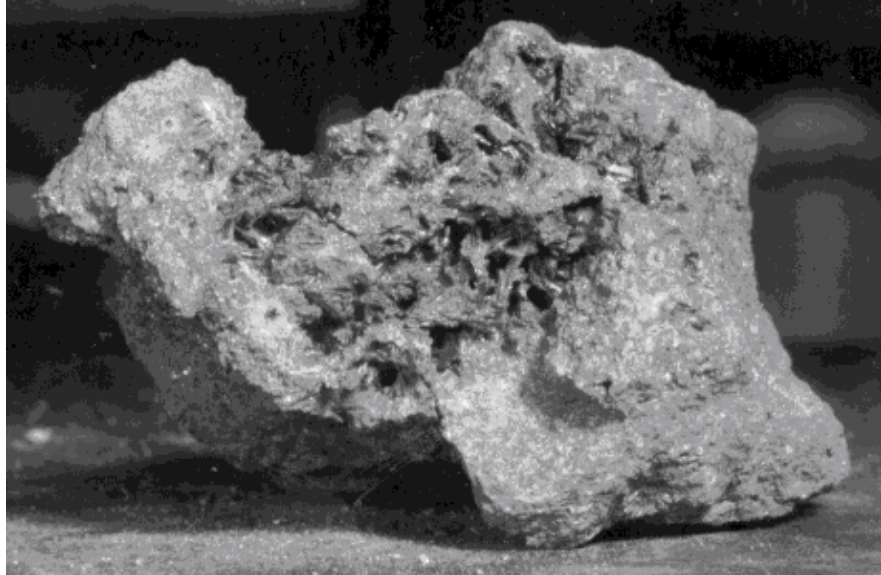


Figure 1: Photo of 12076 illustrating vugs on one side. Sample is 4 cm across. NASA # S69-61717.

Introduction

12076 is a vuggy porphyritic olivine basalt similar to 12075. Although the composition has been determined, it has not been studied petrographically. There are a few micrometeorite craters on one face.

Petrography

Champness et al. (1971) give a brief description of 12076 and compare it with 12075. These rocks are said to be similar, but 12076 has a finer-grained groundmass than 12076 (figure 3).

Large crystals (pyroxene?) define the inner surfaces of large vugs.

Chemistry

Rhodes et al. (1977) and Neal et al. (1994) have determined the chemical composition.

Other Studies

Bogard et al. (1971) reported the content and isotopic composition of rare gases in 12076.

There are 6 thin sections

List of Photo #s for 12076

S69-61692 – 61739	B & W mug
S70-16776 – 16777	TS color
S70-49825 – 49826	TS
S70-49955 – 49956	TS
S70-49264 – 49265	TS

Mineralogical Mode for 12076

	Neal et al. 1994
Olivine	26.2
Pyroxene	46.8
Plagioclase	14.4
Ilmenite	4
Chromite +Usp	4
mesostasis	3.7
“silica”	0.1

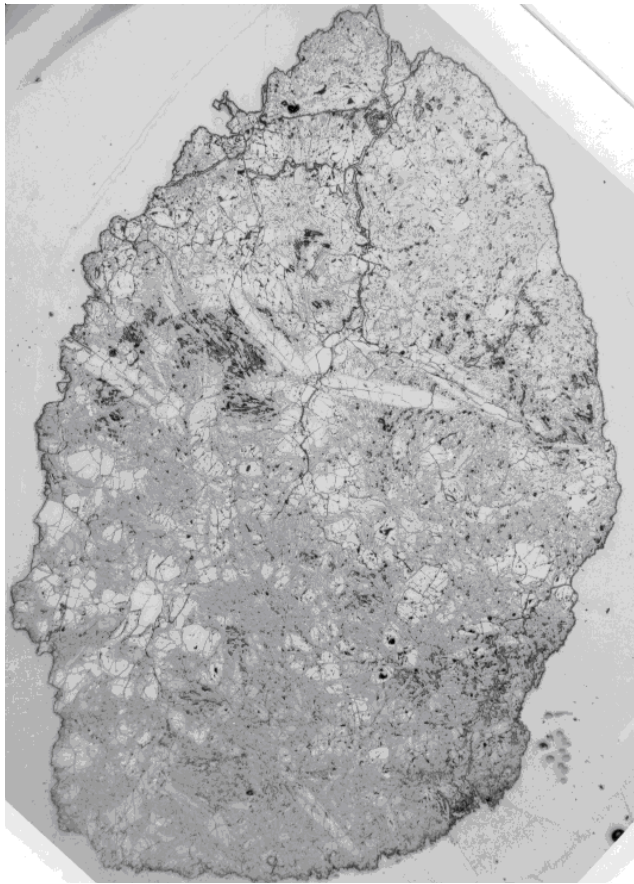


Figure 2: Reflected light photo of 12076,12 showing open spaces (vugs) between crystals. NASA # S70-49412. Length about 2 cm.

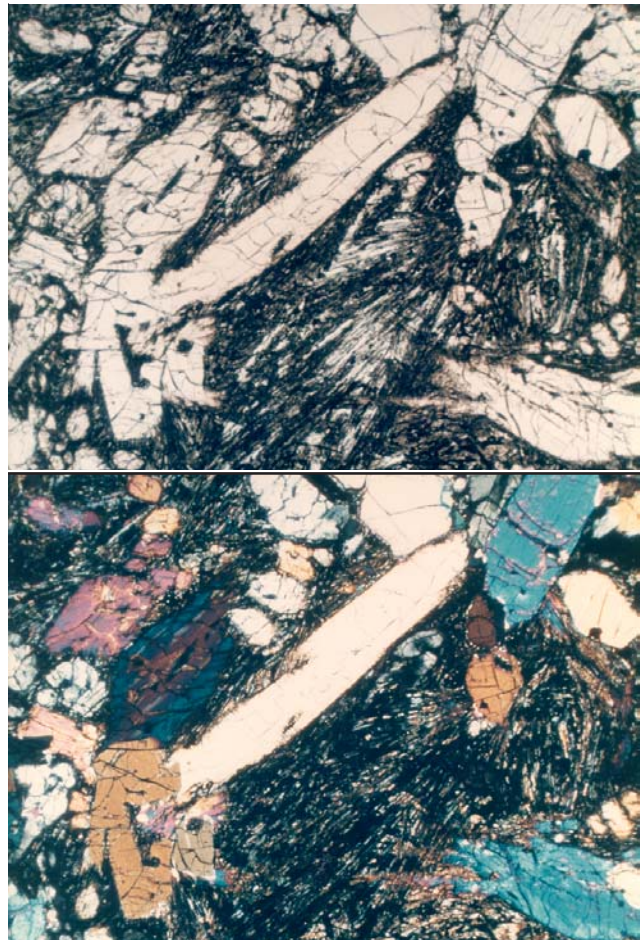


Figure 3: Photomicrographs of thin section 12076,12 (plane-polarized, crossed nicols). Field of view is 2.6 mm. NASA # S70-49264-265.

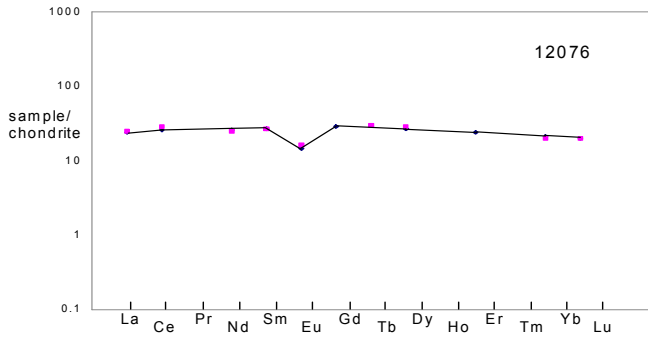


Figure 4: Normalized rare-earth-element diagram for 12076 (IDMS data by Wiesmann et al. 1975 connected by lines).

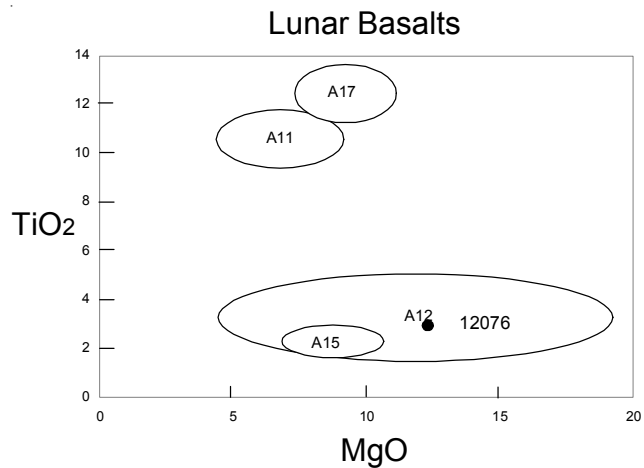


Figure 5: Composition of 12076 compared with that of other lunar basalts.

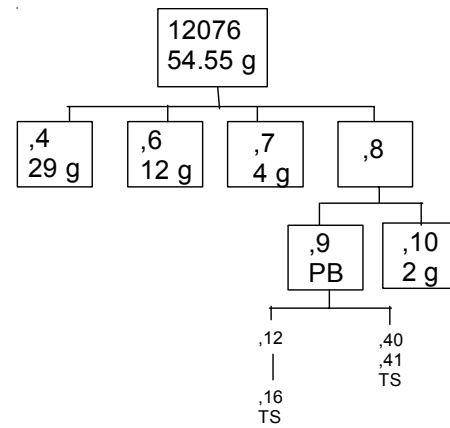
References for 12076

Bogard D.D., Funkhouser J.G., Schaeffer O.A. and Zahringer J. (1971) Noble gas abundances in lunar material-cosmic ray spallation products and radiation ages from the Sea of Tranquillity and the Ocean of Storms. *J. Geophys. Res.* **76**, 2757-2779.

Champness P.E., Dunham A.C., Gibb F.G.F., Giles H.N., MacKenzie W.S., Stumpel E.F. and Zussman J. (1971) Mineralogy and petrology of some Apollo 12 lunar samples. *Proc. 2nd Lunar Sci. Conf.* 359-376.

Table 1. Chemical composition of 12076.

reference weight	Neal94 .561 g	Rhodes77 44.87	Wiesmann75 56 mg	
SiO2 %		(c)		
TiO2	2.8	(a) 2.76	(c)	
Al2O3	8.5	(a) 8.1	(c)	
FeO	21.2	(a) 20.66	(c)	
MnO	0.257	(a) 0.3	(c)	
MgO	14.6	(a) 12.26	(c)	
CaO	9	(a) 9.03	(c)	
Na2O	0.222	(a) 0.21	(a)	
K2O	0.056	(a) 0.06	(c)	0.056 (d)
P2O5		0.03	(c)	
S %				
sum				
Sc ppm	47.2	(a) 46.4	(a)	
V	167	(a)		
Cr	4130	(a) 4640	(a)	
Co	54	(a) 54	(a)	
Ni	73	(a)		
Cu				
Zn				
Ga				
Ge ppb				
As				
Se				
Rb			1.022	(d)
Sr	94	(a) 94	(c) 93.6	(d)
Y				
Zr			108	(d)
Nb				
Mo				
Ru				
Rh				
Pd ppb				
Ag ppb				
Cd ppb				
In ppb				
Sn ppb				
Sb ppb				
Te ppb				
Cs ppm				
Ba	70	(a) 59	(b) 59.4	(d)
La	5.9	(a)	5.68	(d)
Ce	17.5	(a)	15.9	(d)
Pr				
Nd	11.4	(a)	12	(d)
Sm	4	(a) 4.03	(a) 4.03	(d)
Eu	0.92	(a)	0.825	(d)
Gd			5.67	(d)
Tb	1.08	(a)		
Dy	7	(a)	6.52	(d)
Ho				
Er			3.85	(d)
Tm				
Yb	3.3	(a) 3.4	(a) 3.39	(d)
Lu	0.49	(a) 0.51	(a) 0.492	(d)
Hf	3.2	(a)		
Ta	0.53	(a)		
W ppb				
Re ppb				
Os ppb				
Ir ppb				
Pt ppb				
Au ppb				
Th ppm	0.9	(a)	0.87	(d)
U ppm			0.23	(d)
technique	(a) INAA, (b) IDMS, (c) XRF, (d) IDMS			



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