12043

Pigeonite Basalt

60 grams

Figure 1: Lunar basalt 12043,0 showing zap pits and rounded surface. Sample is 4 cm. NASA # S94-035810.

Introduction

All sides of this little potato have numerous micrometeorite craters (figure 1). It has not been dated.

Petrography

The petrology of 12043 is discussed in Baldridge et al. (1979). 12043 is a medium-grained pigeonite basalt with 10% large (3 mm), prismatic phenocrysts of pyroxene and olivine set in a subophitic to variolitic groundmass of pyroxene, plagioclase, ilmenite, chromite, cristobalite, metallic iron and mesostasis. Olivine phenocrysts are embayed, and overgrown by pyroxene.

Mineralogy

Olivine: The composition of olivine is Fo_{70-65} (ave. Fo_{66}).

Pyroxene: The pyroxene composition of 12043 is given in Baldridge et al. (1979)(figure 2).

Plagioclase: The composition of plagioclase is An_{78-88} (ave. An_{84}).

Metallic iron: Found attached to chromite.

Mineralogical Mode for 12043

	Neal et al. 1994	Baldridge et al. 1979
Olivine	0.9	0.9
Pyroxene	57.7	57.7
Plagioclase	32.9	32.9
Ilmenite	3.5	3.5
Chromite +Usp	0.2	0.3
mesostasis	0.8	0.6
"silica"	3.7	3.7

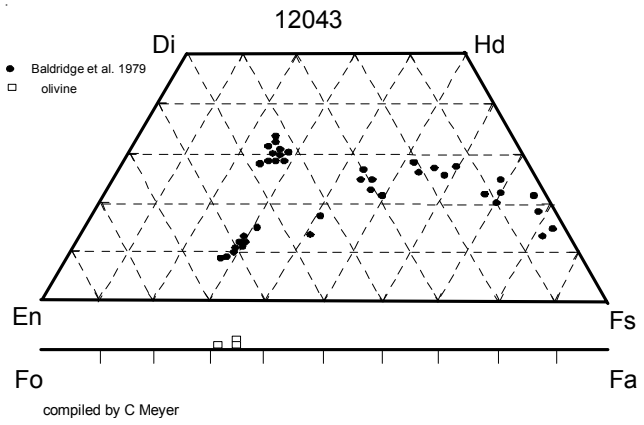

Figure 2: Composition of pyroxene in 12043 (from Baldridge et al. 1979).

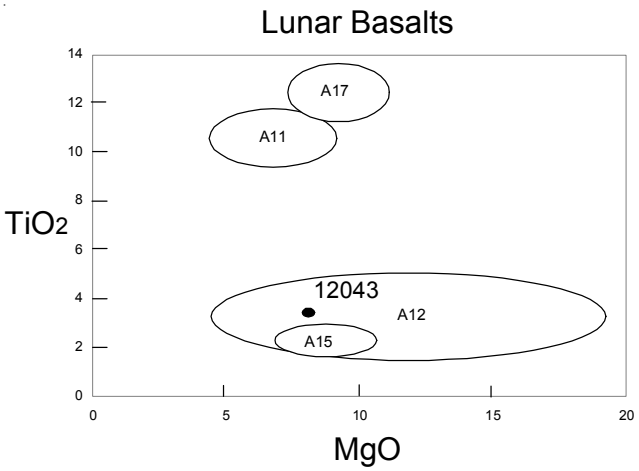

Figure 3: Composition of 12043 compared with that of other lunar basalts.

Chemistry

Rhodes et al. (1977) and Snyder et al. (1997) determined the chemical composition of 12038 (table 1 and figures 3 and 4).

Radiogenic age dating

Not dated.

There are 4 thin sections.

List of Photo #s for 12043

S69-61562 – 61585 B & W mug
S69-63823 – 63826
S70-22460 – 22467
S94-035810

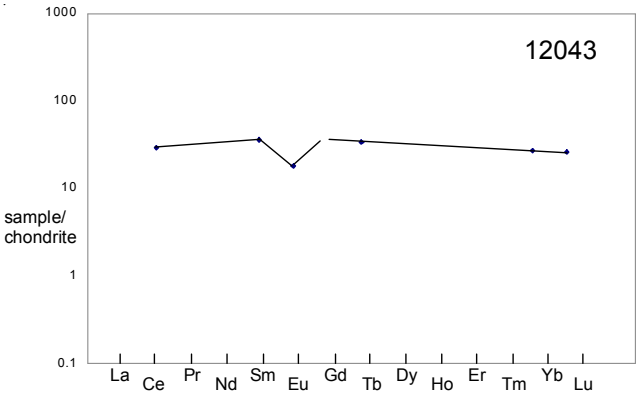

Figure 4: Normalized rare-earth-element pattern for 12043 (data from table).

Table 1. Chemical composition of 12043.

reference	Rhodes77		Baldridge79		Snyder97	
weight						
SiO2 %	46.77	(c)	47.11	(d)	46.8	
TiO2	3.38	(c)	3.39		3.38	
Al2O3	10.09	(c)	10.56		10.1	
FeO	19.5	(c)	19.52		19.5	
MnO	0.29	(c)	0.25		0.29	
MgO	7.68	(c)	7.9		7.68	
CaO	10.96	(c)	11.15		11	
Na2O	0.27	(a)	0.27		0.27	
K2O	0.06	(c)	0.02		0.06	
P2O5	0.06	(c)	0.06		0.06	
S %	0.07	(c)	0.11			
sum						
Sc ppm	52.4	(a)				
V						
Cr	3300	(a)			2270	(e)
Co	37	(a)			36.4	(e)
Ni					18.2	(e)
Cu					10.1	(e)
Zn					9.02	(e)
Ga					3.15	(e)
Ge ppb						
As						
Se						
Rb					2.497	(e)
Sr	117	(c)			117.2	(e)
Y	40	(c)			42.1	(e)
Zr	123	(c)			125	(e)
Nb	7.5	(c)			6.85	(e)
Mo						
Ru						
Rh						
Pd ppb						
Ag ppb					150	(e)
Cd ppb						
In ppb						
Sn ppb						
Sb ppb						
Te ppb						
Cs ppm					0.159	(e)
Ba	73	(b)			69.2	(e)
La					6	(e)
Ce	17.7	(a)			16.2	(e)
Pr					2.58	(e)
Nd					13.6	(e)
Sm	5.25	(a)			5.15	(e)
Eu	1	(a)			0.93	(e)
Gd					5.47	(e)
Tb	1.25	(a)			1.03	(e)
Dy					6.65	(e)
Ho					1.42	(e)
Er					3.96	(e)
Tm					0.57	(e)
Yb	4.4	(a)			3.9	(e)
Lu	0.63	(a)			0.51	(e)
Hf	4	(a)				
Ta					0.355	(e)
W ppb						
Re ppb						
Os ppb						
Ir ppb						
Pt ppb						
Au ppb						
Th ppm					0.85	(e)
U ppm					0.258	(e)

technique: (a) INAA, (b) IDMS, (c) XRF, (d) from mode, (e) ICP-MS

References for 12043

Baldridge W.S., Beaty D.W., Hill S.M.R. and Albee A.L. (1979) The petrology of the Apollo 12 pigeonite basalt suite. *Proc. 10th Lunar Planet. Sci. Conf.* 141-179.

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