14276
KREEP Basalt
12.75 grams

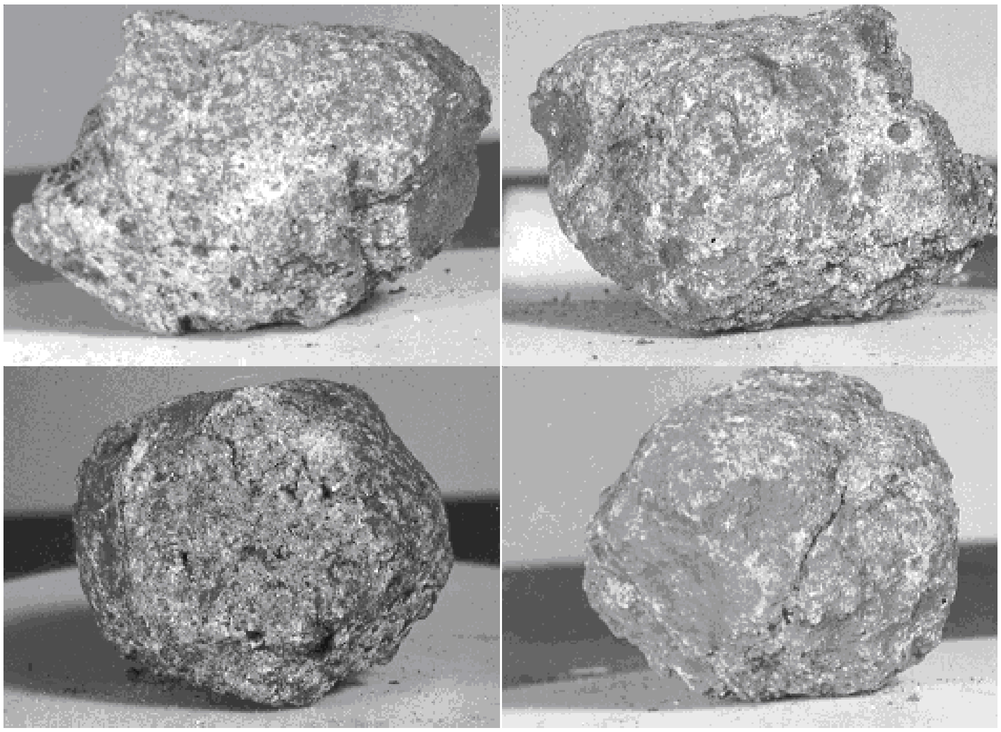

Figure 1: Photos of all sides of 14276. Sample is 2 cm across. NASA S71-26626 - 9.

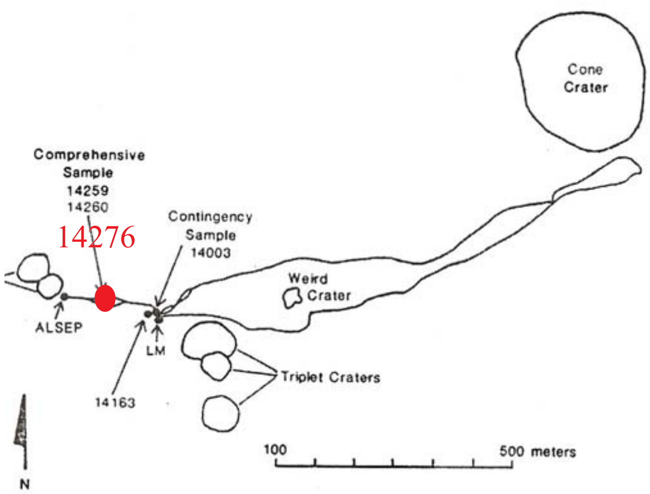

Figure 2: Map of Apollo 14 traverse showing location of comprehensive sample.

Introduction

14276 is from the "comprehensive sample" taken near ALSEP station (see section on 14259). It is rounded on all sides by micrometeorite bombardment (figure 1). It is a feldspathic basalt that is about 3.9 b.y. old.

According to Clayton et al. (1972) and Brunfeldt et al. (1972), "lunar sample 14276 was part of a consortium sample with Professor G.J.Wasserburg as consortium leader".

Mineralogical Mode for 14276

Gancarz et al. 1972

Olivine	-
Pyroxene	33 %
Plagioclase	65
Ilmenite	2
mesostasis	

Petrography

Bence and Papike (1972) and Gancarz et al. (1972) found the texture and mineralogy of 14276 to be identical to 14310. It is a fine-grained subophitic basalt with fine laths of plagioclase interlocking with and penetrating pyroxene grains (figures 3 and 4). Pyroxene cores are low-Ca orthopyroxene, surrounded by progressively higher Ca pyroxene (figure 5).

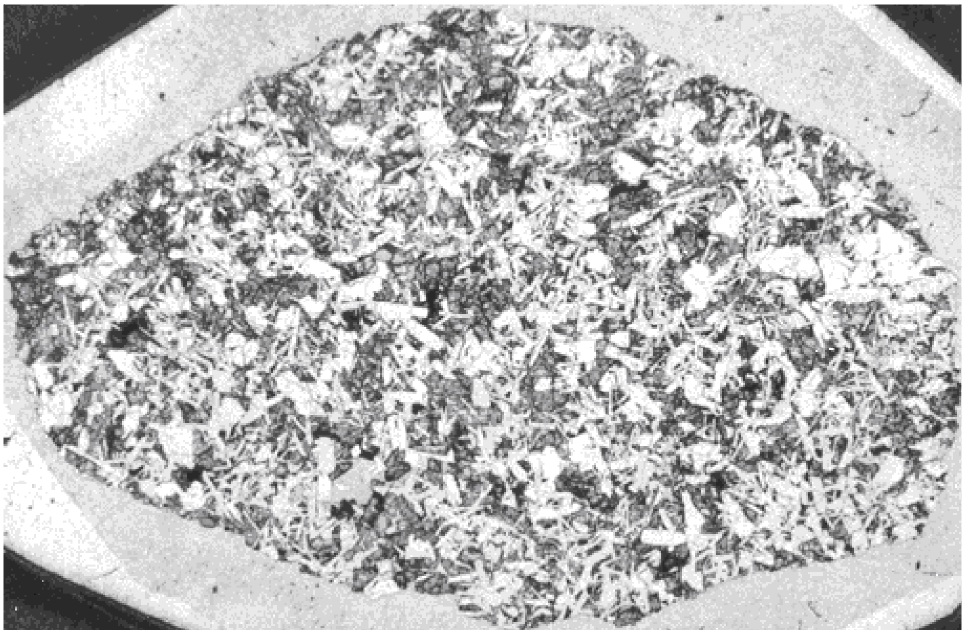

Figure 3: Photomicrograph of thin section of 14276,11. Scale 1.2 cm. NASA S71-43141.

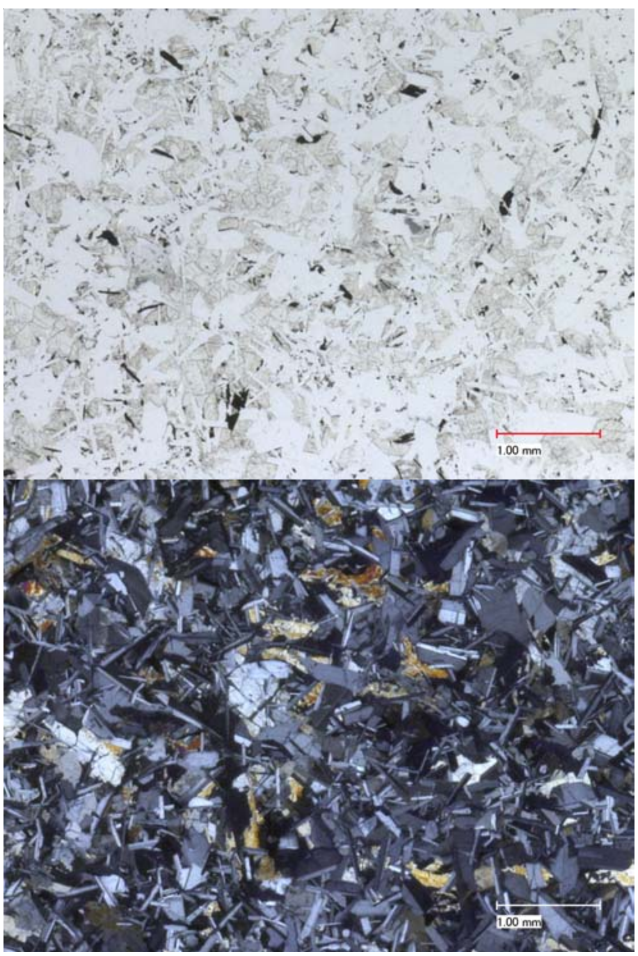

Figure 4a: Photomicrographs of 14276,14 by C Meyer @50x.

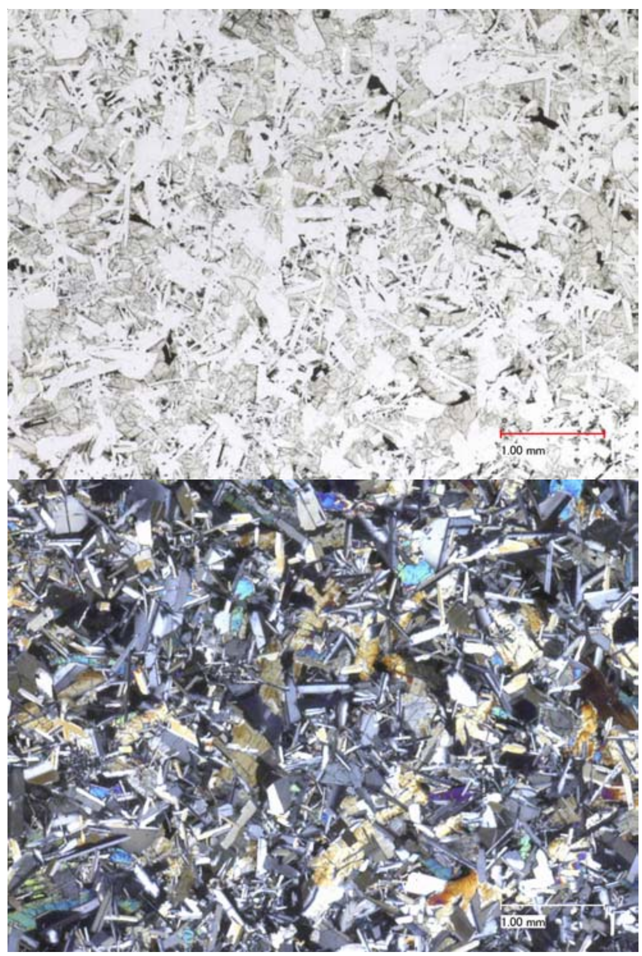

Figure 4b: Photomicrographs of 14276,48 by C Meyer @50x.

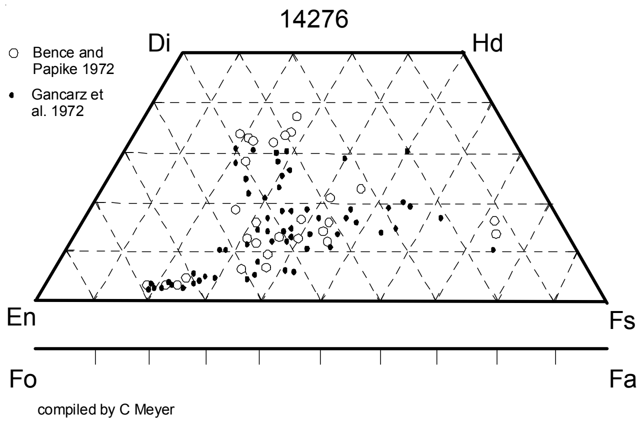

Figure 5: Pyroxene composition of 14276.

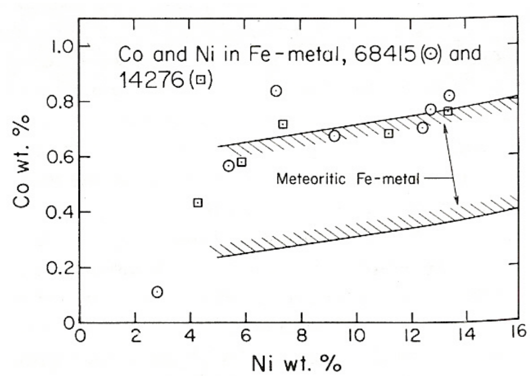

Figure 6: Ni and Co in 14276 and 68415 show that these melts were made by meteorite impact (Gancarz et al. 1973).

Meyer (1977) and McKay et al. (1979) review the petrology of KREEP basalt. Phinney et al. (1975) discussed the statistics of the samples collected as the "comprehensive" suite. Vaniman and Papike (1980) included it in their suite of highland melt rocks.

Chemistry

Rose et al. (1972), Brunfeldt (1972) and Ebihara et al. (1992) analyzed 14076, finding that it is an aluminous basalt with intermediate levels of trace elements and meteoritic siderophiles. The trace element content (figure 8) has the characteristic slope of KREEP. There remains the possibility that Apollo 14 KREEP basalts are recrystallized impact melt rocks and as such are a mixture of components.

Radiogenic age dating

Papanastassiou and Wasserburg (1971) determined the age of 14276 (figure 7), later revised by Wasserburg and Papanastassiou (1971).

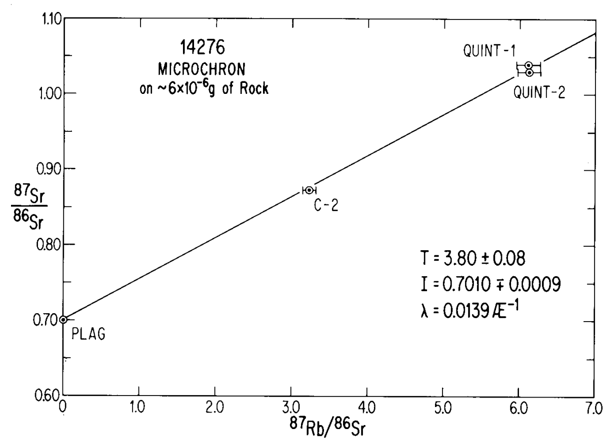

Figure 7: Rb/Sr "Microchron" (by Papanastassiou and Wasserburg 1981).

Summary of Age Data for 14276

	Rb/Sr
Wasserburg 1971	3.88 ± 0.01 b.y.

Processing

This is one of the samples collected as part of the "comprehensive suite".

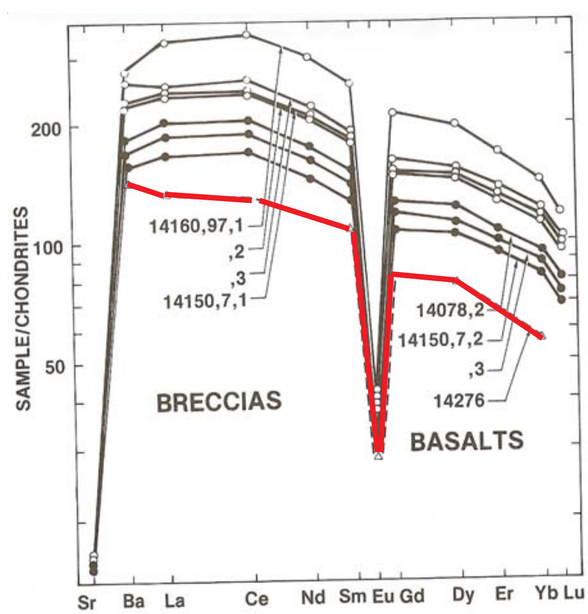

Figure 8: Normalized rare-earth-element diagram for KREEP basalts and breccia (McKay et al. 1979).

Table 1. Chemical composition of 14276.

reference	Ebihara 92		Rose72		Brunfeldt72	
weight						
SiO2 %			47.6	(c)		
TiO2			1.2	(c)	1.1	(b)
Al2O3			21.34	(c)	22.1	(b)
FeO			7.94	(c)	7.77	(b)
MnO			0.12	(c)	0.1	(b)
MgO			7.1	(c)	8.62	(b)
CaO			13.18	(c)	13.3	(b)
Na2O			0.72	(c)	0.7	(b)
K2O			0.48	(c)	0.43	(b)
P2O5			0.4	(c)		
S %						
sum						
Sc ppm			20	(c)	18.2	(b)
V			37	(c)	25	(b)
Cr			1779	(c)	1450	(b)
Co			9	(c)	13	(b)
Ni	106	(a)	113	(c)		
Cu			42	(c)	38	(b)
Zn	1.17	(a)	4	(c)	1.7	(b)
Ga			4.2	(c)	3.8	(b)
Ge ppb	24.9	(a)				
As					0.16	(b)
Se	114	(a)				
Rb	12.5	(a)	13	(c)	14	(b)
Sr			165	(c)	170	(b)
Y			200	(c)		
Zr			620	(c)		
Nb			33	(c)		
Mo						
Ru						
Rh						
Pd ppb	5.62	(a)				
Ag ppb	0.75	(a)				
Cd ppb	7.4	(a)			0.02	(b)
In ppb	33.6	(a)			56	(b)
Sn ppb	0.078	(a)				
Sb ppb	0.73	(a)			0.024	(b)
Te ppb	3.65	(a)				
Cs ppm	0.534	(a)			0.57	(b)
Ba			700	(c)	540	(b)
La			59	(c)	43	(b)
Ce	103	(a)				
Pr						
Nd	69.9	(a)				
Sm					20	(b)
Eu	1.87	(a)			1.9	(b)
Gd						
Tb	4.31	(a)			4.8	(b)
Dy					23	(b)
Ho					7.3	(b)
Er						
Tm						
Yb	13.6	(a)	16	(c)	11.7	(b)
Lu	2.02	(a)				
Hf					16	(b)
Ta					2.1	(b)
W ppb					2.5	(b)
Re ppb	0.66	(a)				
Os ppb	5.02	(a)				
Ir ppb	3.53	(a)				
Pt ppb						
Au ppb	0.941	(a)			0.3	(b)
Th ppm					8	(b)
U ppm	2.51	(a)			2.5	(b)

technique: (a) RNAA, (b) INAA, RNAA, (c) "microchemical"

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