

14073

KREEP Basalt

10.35 grams

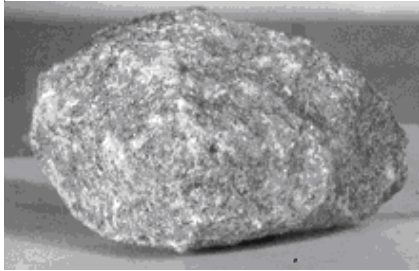
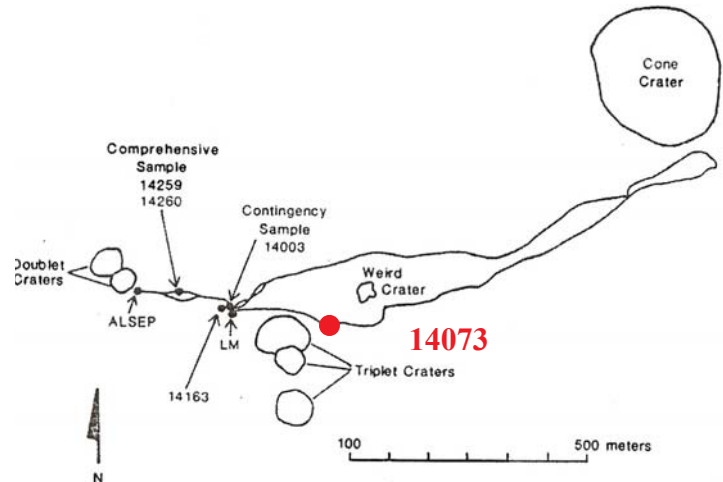


Figure 1: Photo of 14073. Sample is 3 cm across. NASA S71-26078.



Introduction

14073 is from the bottom of the trench at station G (see section on 14149). It is a KREEP basalt very like 14310 (Meyer 1977). It crystallized 3.88 b.y. ago and has been exposed to cosmic rays for 113 m.y.

Petrography

Gancarz et al. (1971) describe 14073 as a subophitic, intergranular to intersertal, orthopyroxene basalt with KREEP “affinity”. It is composed of 50% plagioclase, 25% clinopyroxene, 20% orthopyroxene with minor ilmenite (2%), troilite, Fe-metal, phosphates(2), Fe-Ti-Zr silicates and mesostasis (figure 3 a,b).

14073 may be a clast-free impact melt rock like 14310.

Chemistry

Laul et al. (1972) reported the chemical composition (figure 6), but did not determine the siderophiles. It is similar to the composition of 14310 (table 1) and somewhat low in REE compared with KREEP (McKay et al. 1979).

Radiogenic age dating

Papanastassiou and Wasserburg (1971) determined a Rb/Sr isochron (whole rock, plagioclase and quintessence only) 3.88 ± 0.04 b.y. with $I = 0.70034$. Turner et al. (1972) used the Ar/Ar plateau technique and determined that plagioclase gave the best result (also 3.88 ± 0.05 b.y.).

If 14073 (and 14310) are impact melt rocks, then they might give the best age for the Imbrium impact event.

Cosmogenic isotopes and exposure ages

Turner et al. (1972) calculate an Ar exposure age of 113 m.y., which requires that the sample be at or near the lunar surface for that long or longer. It was found buried about 20 cm, and the age of Cone Crater is younger (Arvidson et al. 1975).

Other Studies

Morrison et al. (1972) reported a “moderate” number of zap pits on 14073.

Burnett et al. (1972) determined the density of solar flare tracks.

Processing

Samples 14073 – 14079 were returned in bag 20N, included in ALSRC 1006. There are 6 thin sections for 14073. Gerry Wasserburg is listed as consortium chief for 14073.

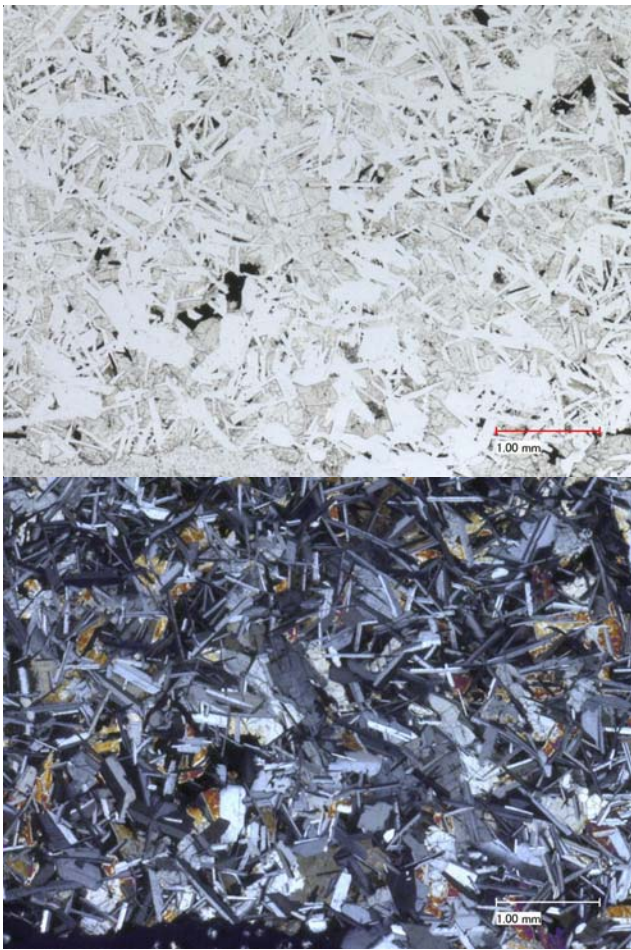


Figure 3a: Photomicrographs of 14073,10 by C Meyer @ 50 x.

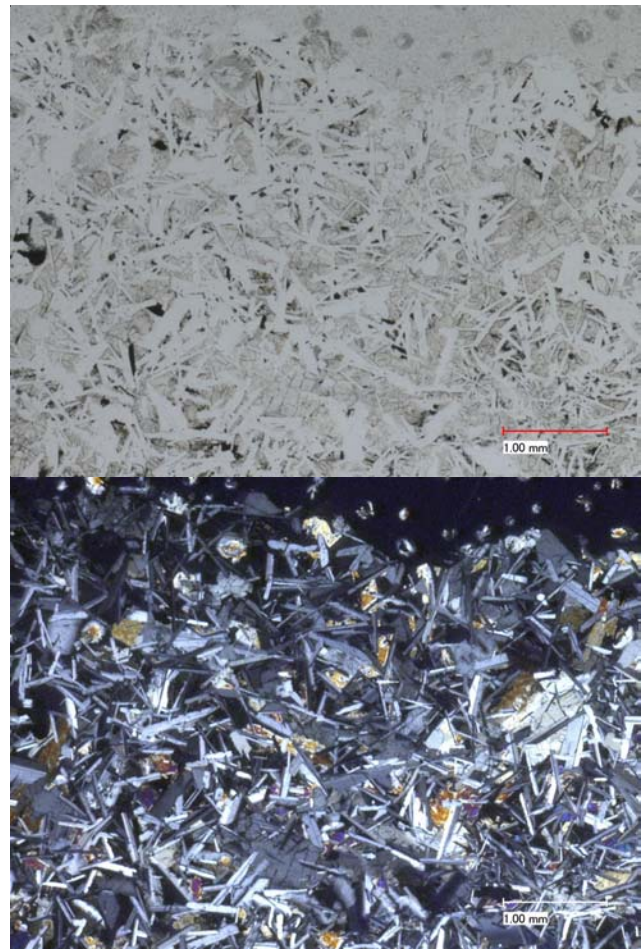


Figure 3b: Photomicrographs of 14073,11 by C Meyer @ 50 x.

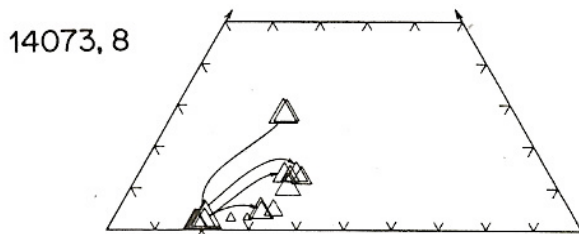


Figure 4: Composition of pyroxene in 14073 (Gancarz et al. 1971).

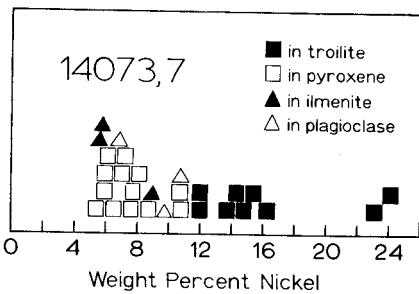


Figure 5: Composition of metallic iron in 14073 (ElGoresy et al. 1972).

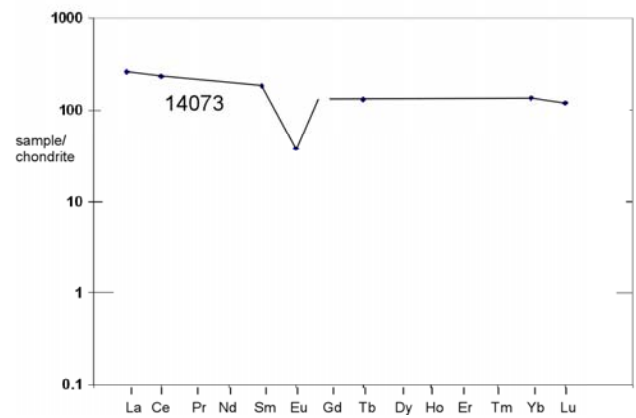


Figure 6: Normalized rare-earth-element diagram for 14073 (Laul et al. 1972).

Table 1. Chemical composition of 14073.

reference	Laul72		Tera72	14310	
	powder	frag.		Philpotts 72	
weight					
SiO ₂ %				48.3	(c)
TiO ₂	1.2	1.3	(a)	1.25	(c)
Al ₂ O ₃	20	20.8	(a)	20.74	(c)
FeO	8.9	8.2	(a)	7.78	(c)
MnO	0.12	0.108	(a)	0.11	(c)
MgO				8	(c)
CaO	13	12.8	(a)	11.61	(c)
Na ₂ O	0.76	0.737	(a)	0.76	(c)
K ₂ O	0.48	0.49	(a)	0.52	(c)
P ₂ O ₅				0.38	(c)
S %					
sum					
Sc ppm	21	18.7	(a)		
V	45	29	(a)		
Cr	1341	1026	(a)	1163	(b)
Co	18	18	(a)		
Ni					
Cu					
Zn					
Ga					
Ge ppb					
As					
Se					
Rb				12.7	(b)
Sr				180.9	(b)
Y					
Zr	810	660	(a)	893	(b)
Nb					
Mo					
Ru					
Rh					
Pd ppb					
Ag ppb					
Cd ppb					
In ppb					
Sn ppb					
Sb ppb					
Te ppb					
Cs ppm					
Ba	660	600	(a)	649	(b)
La	60	61	(a)		
Ce	196	142	(a)	143	(b)
Pr					
Nd				87.9	(b)
Sm	26.4	27	(a)	24.6	(b)
Eu	2.2	2.1	(a)	2.09	(b)
Gd					
Tb		4.8	(a)		
Dy				31.7	(b)
Ho					
Er				19.3	(b)
Tm					
Yb	21	22	(a)	18.1	(b)
Lu	2.9	2.9	(a)	2.66	(b)
Hf	17	21	(a)	21	(b)
Ta		2.4	(a)		
W ppb					
Re ppb					
Os ppb					
Ir ppb					
Pt ppb					
Au ppb					
Th ppm	8	11	(a)	11.8	(b)
U ppm		2.6	(a)	3.22	(b)

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

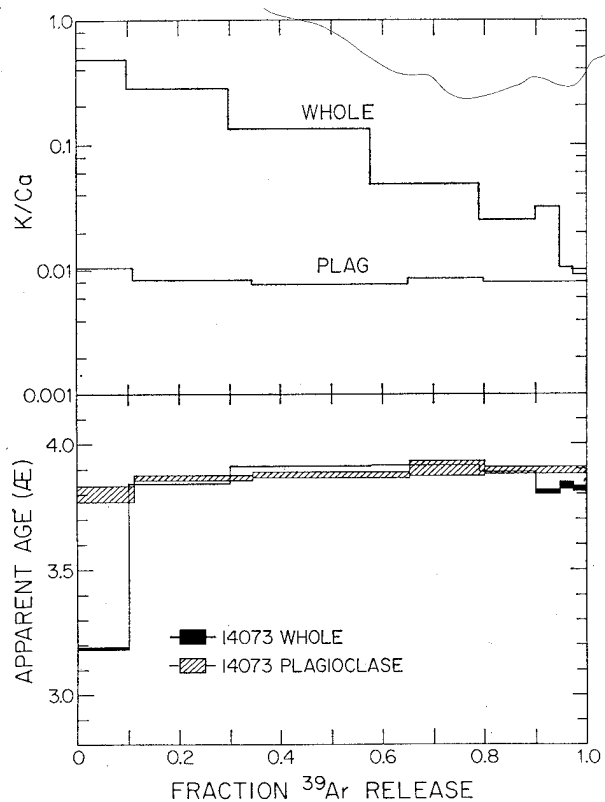
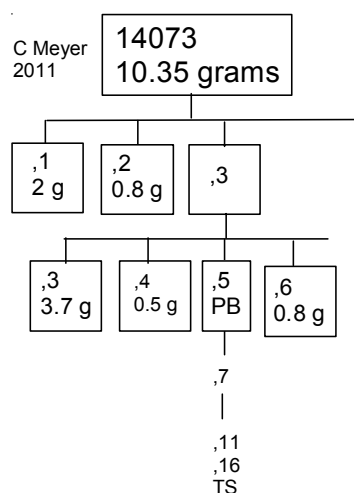


Figure 7: Ar plateau diagram for 14073 (Turner 1972).

Summary of Age Data for 14073

Papanastassiou 1971 Ar/Ar Rb/Sr 3.88 ± 0.04 b.y.
 Turner et al. 1972 3.88 ± 0.05

Caution: Beware of decay constants



References for 14073

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