65055

Basaltic Impact Melt

500.8 grams

Figure 1: Photo of 65055 showing large zap pit. Cube is 1 cm. S72-43869.

Introduction

According to the Apollo 16 Catalog by Ryder and Norman, 65055 is an aluminous, basaltic impact melt. It is coherent and appears to be homogeneous throughout. It has been determined to be 3.96 b.y old by the Ar/Ar plateau technique.

Mineralogical Mode for 65055

	Vaniman 80
Olivine	-
Pyroxene	27.6
Plagioclase	68
Opaques	1.8
Meostasis	2
Glass	tr.

Petrography

Vaniman and Papike (1980) included 65055 in their study of "highland basalts". It has an intergranular, subophitic texture with euhedral to subhedral laths of plagioclase enclosing anhedral pyroxene (figure 2). There are rare anhedral clasts of plagioclase that are reported to have shock features(?). Pyroxene crystals are chemically zoned (figure 3). Metal, troilite, ilmenite and mesostasis are found in the intersticies. Olivine is not reported. Jessberger et al. (1977) also give a brief description.

Chemistry

Clark and Keith (1973) determined K, U and Th for the bulk sample. Norman et al. (2010) confirmed earlier analyses by Christian et al. (1976), Boynton et al. (1976) and Wasson et al. (1977). There is a high content of meteoritic siderophile elements Ni, Co, ir and Au (table).

Radiogenic age dating

Jessberger et al. (1977) determined the age of two portions of 65055 by Ar/Ar plateau technique (3.96 and 3.95 ± 0.02 b.y.). No plateau diagrams are given. Reimold et al. (1985) reported Sr isotopic data (whole rock).

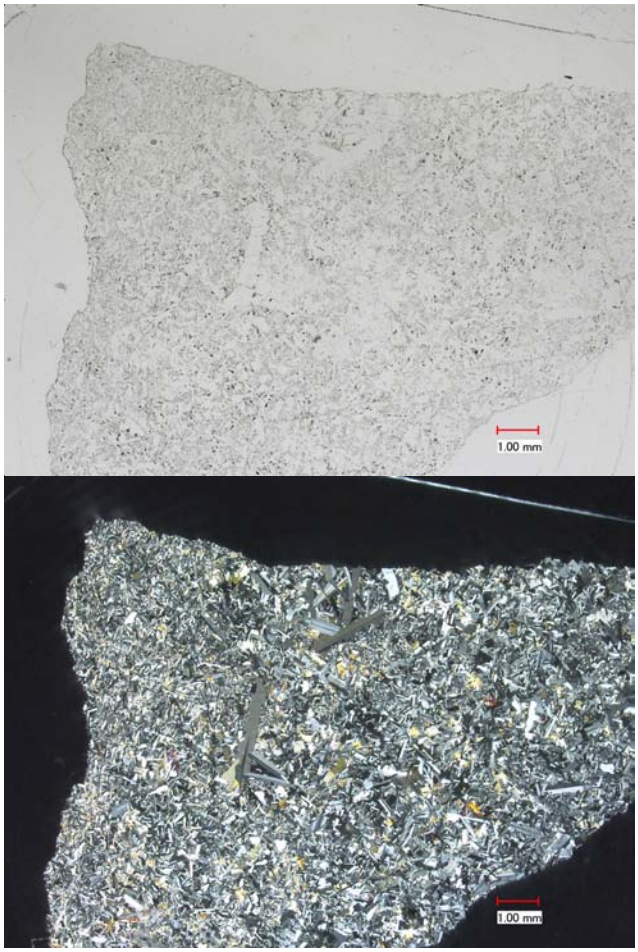


Figure 2: Photomicrographs of 65055,16 by C Meyer @20x

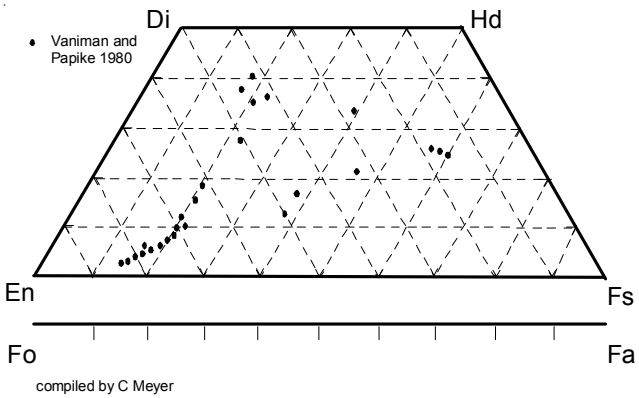


Figure 3: Pyroxene composition of 65055 (Vaniman and Papike 1980).

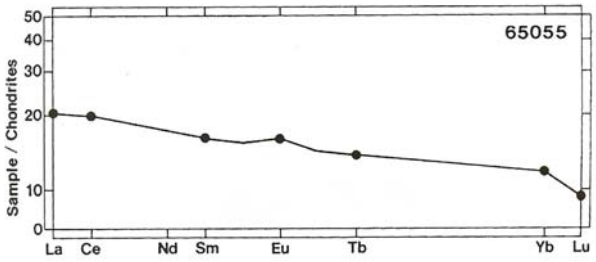


Figure 4: Normalized rare-earth-elemnt diagram for 65055 (Ryder and Norman 1980).

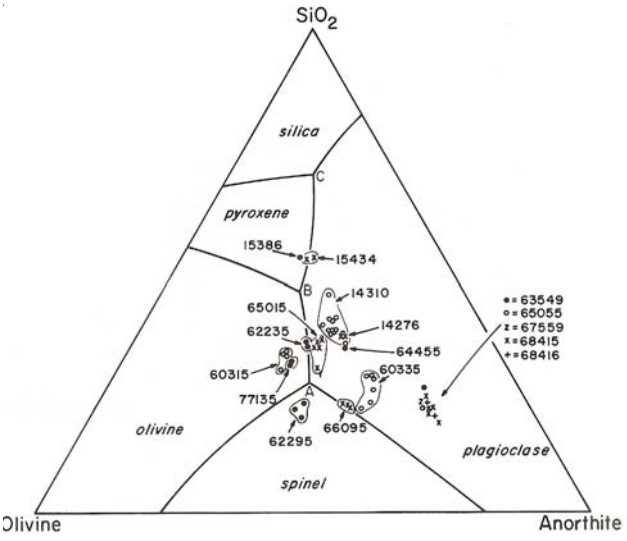


Figure 5: Composition of 65055 plotted on "Walker" diagram.

Cosmogenic isotopes and exposure ages

Jessberger et al. (1977) reported an ^{38}Ar exposure age of 2.3 +/- 0.5 m.y. Clark and Keith (1973) determined the cosmic-ray-induced activity as ^{22}Na =31 dpm/kg, ^{26}Al = 109 dpm/kg, ^{54}Mn = 3 dpm/kg, ^{56}Co = 5 dpm/kg and ^{46}Sc = 0.9 dpm/kg.

Processing

A slab was cut through the middle of 65055 (figures 6 and 7). There are nine thin sections.

Summary of Age Data for 65055

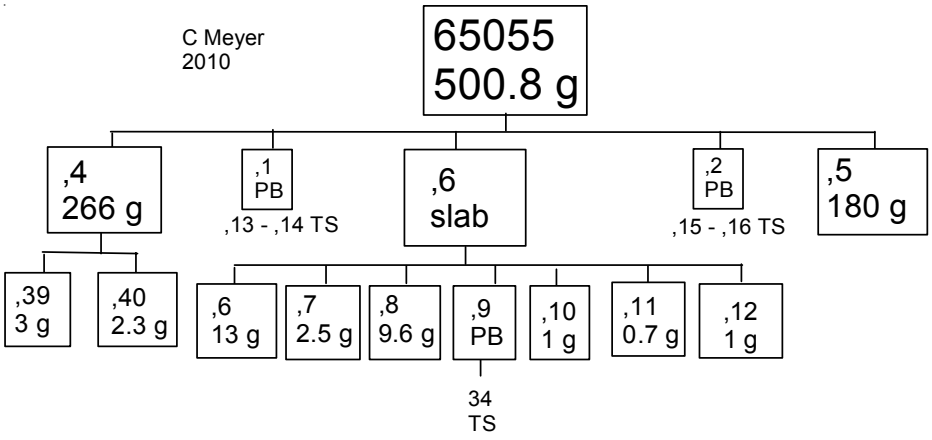
	Ar/Ar
Jessberger et al. 1977	3.96 ± 0.02 b.y
	3.95 ± 0.02

Caution:

Table 1. Chemical composition of 65055.

reference	Boynton76		Norman2010		Clark73		Christian76		Wasson77	
weight					whole					
SiO2 %			46.1	(b)			45.41	(d)		
TiO2	0.43	(a)	0.3	(b)			0.28	(d)	0.42	(a)
Al2O3	28.3	(a)	28.5	(b)			28.46	(d)	32.3	(a)
FeO	4.31	(a)	4	(b)			3.9	(d)	4.75	(a)
MnO	0.06	(a)	0.056	(b)			0.05	(d)	0.06	(a)
MgO	4.8	(a)	4.5	(b)			4.81	(d)	3.8	(a)
CaO	16.1	(a)	16	(b)			16.13	(d)	16	(a)
Na2O	0.48	(a)	0.42	(b)			0.44	(d)	0.5	(a)
K2O	0.07	(a)	0.06	(b)	0.07	(c)	0.13	(d)	0.08	(a)
P2O5							0.13	(d)		
S %										
sum										
Sc ppm	7.2	(a)	8	(b)			7.2	(d)	8.3	(a)
V	35	(a)	17.9	(b)			16	(d)	23	(a)
Cr	600	(a)	610	(b)			547	(d)	680	(a)
Co	29	(a)	13.8	(b)			12	(d)	22.6	(a)
Ni	392	(a)	116	(b)			150	(d)	170	(a)
Cu			3.6	(b)			2.4	(d)		
Zn	0.56	(a)	2.1	(b)			2	(d)	7	(a)
Ga	3	(a)	2.5	(b)					2.7	(a)
Ge ppb	240	(a)							100	(a)
As										
Se										
Rb			1.8	(b)			1	(d)		
Sr			175	(b)			140	(d)		
Y			22	(b)			19	(d)		
Zr			90	(b)			72	(d)		
Nb			5.7	(b)						
Mo										
Ru	26	(a)								
Rh										
Pd ppb										
Ag ppb										
Cd ppb	1.9	(a)	15	(b)					6	(a)
In ppb	6.4	(a)							6.4	(a)
Sn ppb			7	(b)						
Sb ppb			2.1	(b)						
Te ppb										
Cs ppm			0.087	(b)						
Ba	80	(a)	80	(b)			57	(d)	82	
La	6.2	(a)	6.73	(b)					7.4	
Ce	16	(a)	17.6	(b)					19	
Pr			2.43	(b)						
Nd			10.7	(b)					11	
Sm	2.6	(a)	3.08	(b)					3.3	
Eu	1	(a)	1.08	(b)					1.2	
Gd			3.51	(b)						
Tb	0.55	(a)	0.64	(b)					0.75	
Dy			4.02	(b)						
Ho			0.87	(b)						
Er			2.34	(b)						
Tm										
Yb	2.1	(a)	2.22	(b)			1.4	(d)	2.6	
Lu	0.29	(a)	0.32	(b)					0.35	
Hf	2.1	(a)	2.24	(b)					2.4	
Ta	0.3	(a)	0.27	(b)					0.3	
W ppb										
Re ppb										
Os ppb										
Ir ppb	10.2	(a)							10	
Pt ppb										
Au ppb	5	(a)							3	
Th ppm	0.8	(a)	1.22	(b)	1.18	(c)			1.26	
U ppm	0.41	(a)	0.32	(b)	0.311	(c)			0.3	

technique: (a) INAA, (b) ICP, (c) radiation counting, (d) 'microchemical'


C Meyer
2010
65055
500.8 g
,4
266 g
,1
PB
,13 - ,14 TS
,6
slab
,2
PB
,15 - ,16 TS
,5
180 g
,39
3 g
,40
2.3 g
,6
13 g
,7
2.5 g
,8
9.6 g
,9
PB
,10
1 g
,11
0.7 g
,12
1 g
34
TS

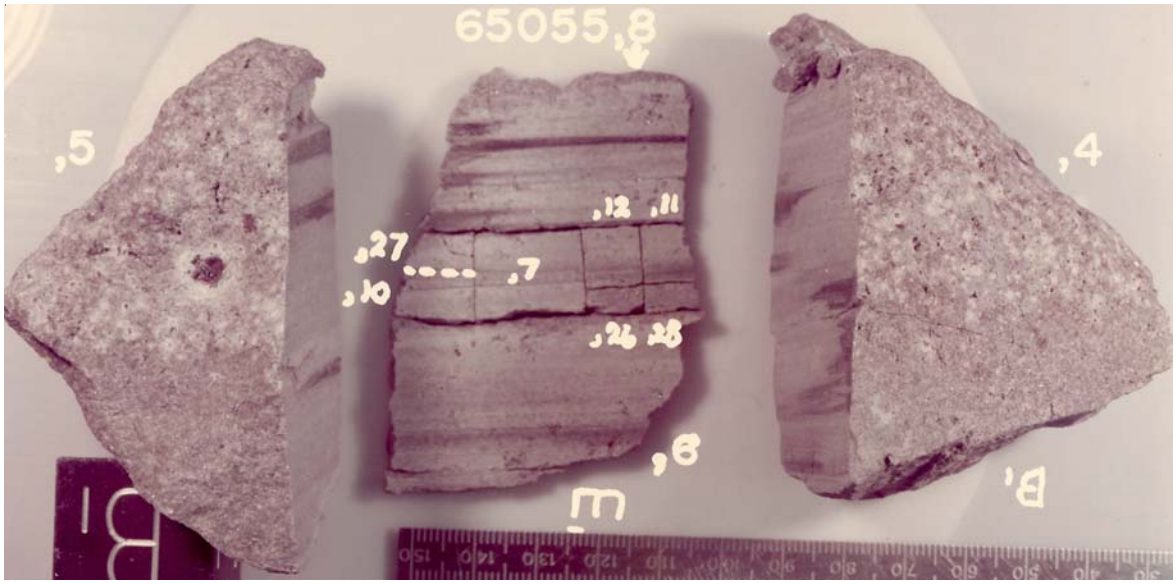


Figure 6: Processing photo of 65055 showing slab cut thru middle of sample.Cube is 1 inch. S75-22688. Compare with figure 1.

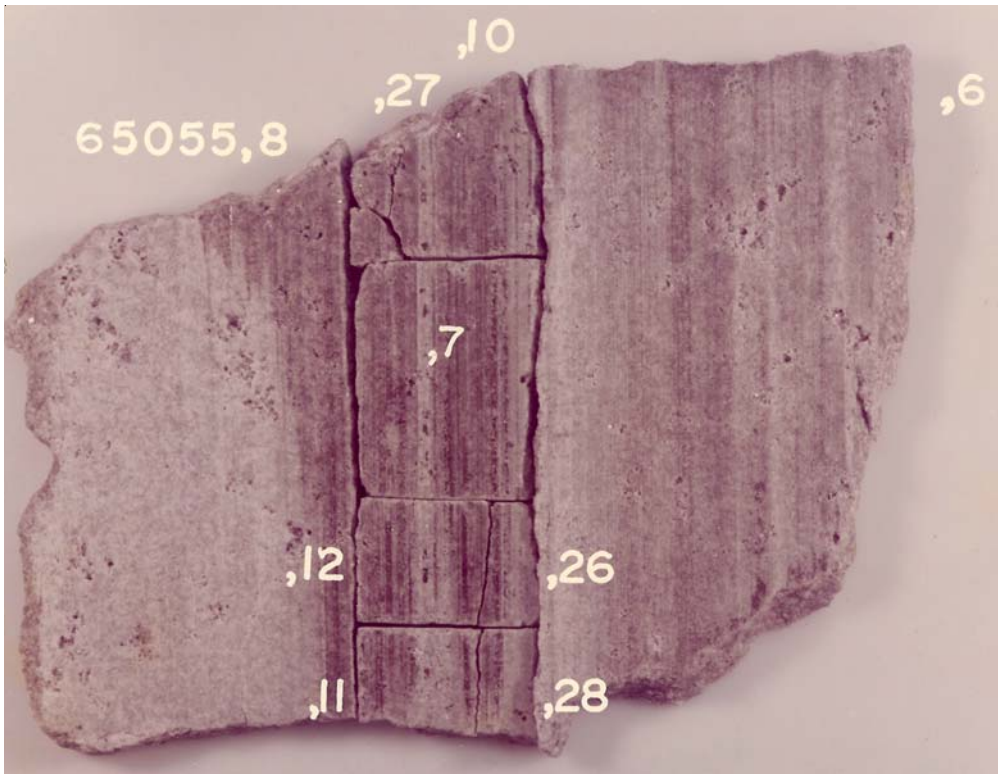


Figure 7: Slab ,8 and column cut from 65055. <12 is 1.4 x 1 cm for scale. Saw marks are evident. S75-22689.

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