67095

Basaltic Impact Melt

339.8 grams

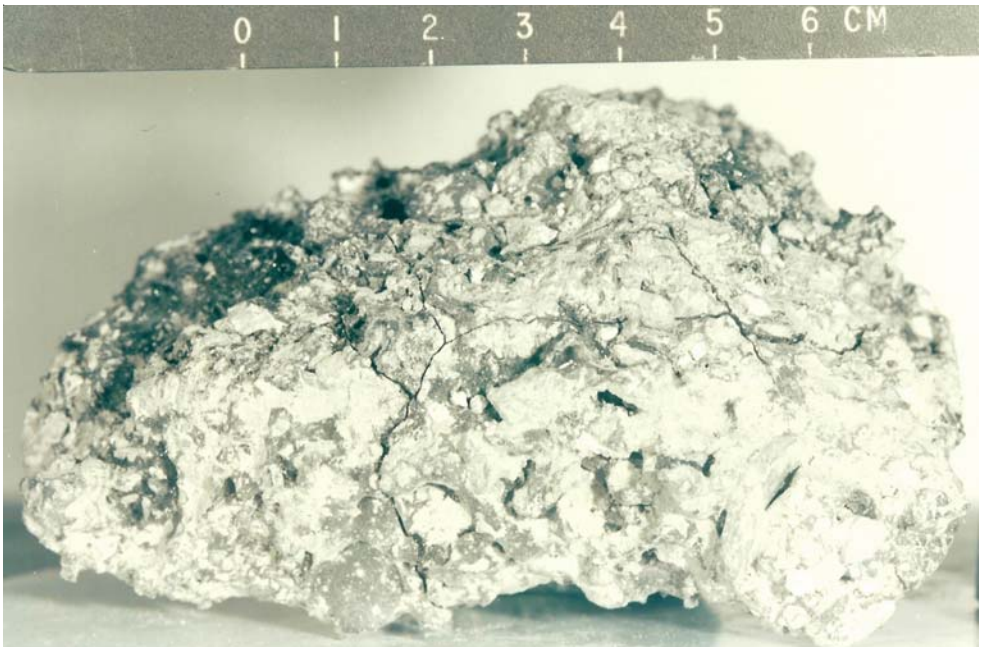


Figure 1: Glass coated sample 67095. Scale in cm. S72-37788.

Introduction

67095 is a glass-coated basaltic impact melt (figure 1) or "bomb". It was found inside the rim of North Ray Crater. It has not been dated, but the exposure to cosmic rays is 50 m.y. (the age of North Ray Crater).

Petrography

The only petrographic description of 67095 is found in Warren and Wasson (1978). They calculate that it is about 62% plagioclase (An_{90-95}), 17% pyroxene ($En_{47}Fs_{13}Wo_{40}$-$En_{59}Fs_{27}Wo_{14}$) and 12% olivine (Fo_{78-83}). Figures 2a, b illustrate the interior texture. Large plagioclase laths and some plagioclase inclusions dominate the texture.

Chemistry

Warren and Wasson (1978) and Lindstrom and Salpus (1981) reported the chemical composition of the interior (figure 3). See et al. (1986) and Morris et al. (1986) determined the chemical composition of the glass coating. Rancitelli et al. (1973) determined K, U, Th for bulk sample (including glass coat). There are significant amounts of meteoritic siderophiles in the interior.

Radiogenic age dating

67095 has not been dated.

Cosmogenic isotopes and exposure ages

Drozd et al. (1974) determined ^{81}Kr exposure age of 50.2 m.y. Fruchter et al. (1978) determined the cosmic-ray-induced activity of ^{26}Al = 67.9 dpm/kg and ^{53}Mn = 261 dpm/kg. Rancitelli et al. (1973) determined ^{22}Na = 56 dpm/kg and ^{26}Al = 89 dpm/kg.

Processing

A slab was cut through the middle of 76095. There are 21 thin sections of 67095 (yet no good description!).

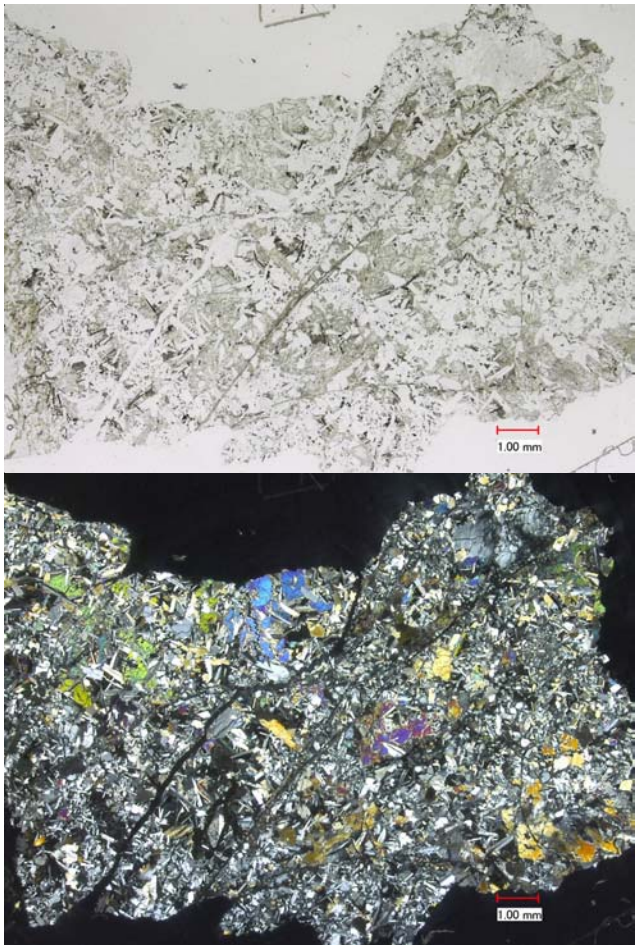


Figure 2a: Photomicrographs of thin section 67095,38 by C Meyer @20x.

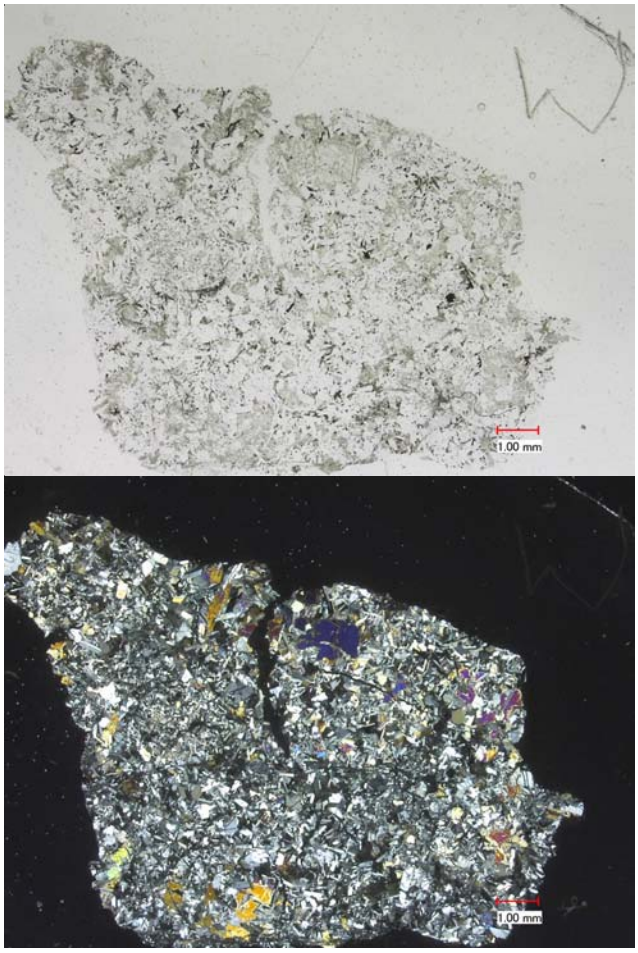


Figure 2b: Photomicrographs of thin section 67095,54 by C Meyer @20x.

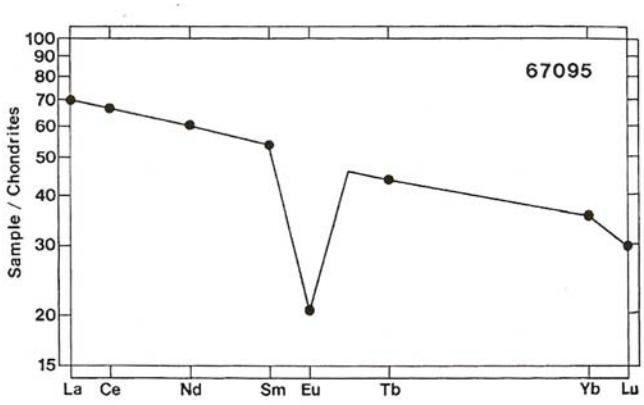


Figure 3: REE of 67095.

Table 1. Chemical composition of 67095.

reference	Laul 74		Palme78		Warren 78			See86		Morris86		Lindstrom81				Rancitelli73
weight								glass	interior	glass				glass		
SiO2 %			49		46.2	46.6		45.78	47.3		(b)					
TiO2	0.66	(a)			0.73	0.72	(a)	0.63	0.71		(b)					
Al2O3	21.7	(a)	23.7		21.8	21.77	(a)	27.29	22.2		(b)					
FeO	5.8	(a)	5.5		5.34	5.71	(a)	4.66	5.6		(b)	5.18	5.18	4.87	(a)	
MnO	0.08	(a)	0.08		0.08	0.08	(a)	0.07	0.08		(b)					
MgO	12	(a)	9.28		11.47	11.29	(a)	5.53	11		(b)					
CaO	12.4	(a)	13.5		12.6	12.5	(a)	15.6	12.8		(b)	14.3	14.4	16.3	(a)	
Na2O	0.59	(a)	0.68		0.64	0.62	(a)	0.61	0.61		(b)	0.65	0.715	0.576	(a)	
K2O	0.25	(a)	0.31		0.26	0.28	(a)	0.13	0.27		(b)					0.23
P2O5																
S %																
sum																
Sc ppm	8.4	(a)	11.2	(a)	9.4	9.3	(a)			9.97	(a)	9.25	11.9	8.7	(a)	
V	30	(a)														
Cr	960	(a)	1120	(a)	1020	1050	(a)			666	(a)	1055	1138	691	(a)	
Co	10	(a)	6.36	(a)	9.6	19.8	(a)			24	(a)	5.4	3.52	17.1	(a)	
Ni	120	(a)	90	(a)	99	271	(a)			255	(a)	65	45	230	(a)	
Cu																
Zn					4.9	5.1	(a)									
Ga			3.8	(a)	3.4	3.6	(a)									
Ge ppb					276	286	(a)									
As																
Se																
Rb																
Sr			180	(a)								138	169	161	(a)	
Y																
Zr	250	(a)	370	(a)	330	350	(a)									
Nb																
Mo																
Ru																
Rh																
Pd ppb																
Ag ppb																
Cd ppb					5.5	3.6	(a)									
In ppb					20	0.9	(a)									
Sn ppb																
Sb ppb																
Te ppb																
Cs ppm																
Ba	220	(a)	270	(a)	223	250	(a)			217	(a)	230	320	150	(a)	
La	21.4	(a)	27.6	(a)	21.3	21.8	(a)			16.07	(a)	22.5	31.5	11.8	(a)	
Ce	50	(a)	75.6	(a)	55	55	(a)			57.7	(a)	61.2	83.8	32.4	(a)	
Pr																
Nd	33	(a)	46	(a)	31	35	(a)									
Sm	8.9	(a)	11.7	(a)	8.9	9.6	(a)			8.32	(a)	10.5	14.6	5.59	(a)	
Eu	1.4	(a)	1.46	(a)	1.34	1.42	(a)			1.07	(a)	1.4	1.51	1.3	(a)	
Gd																
Tb	1.9	(a)	2.42	(a)	1.8	2	(a)			1.29	(a)	2.36	3.31	1.3	(a)	
Dy	12	(a)	15.9	(a)												
Ho																
Er																
Tm																
Yb	6.4	(a)	8.8	(a)	6.5	7	(a)			5.64	(a)	7.35	10.2	4	(a)	
Lu	0.9	(a)	1.22	(a)	0.9	0.99	(a)			0.74	(a)	1.02	1.43	0.57	(a)	
Hf	6.3	(a)	9.35	(a)	7	7.2	(a)			5.69	(a)	8.02	11.3	4.5	(a)	
Ta	0.83	(a)	1.16	(a)	0.76	0.8	(a)			0.63	(a)	1.03	1.45	0.635	(a)	
W ppb																
Re ppb					0.43	0.57	(a)									
Os ppb																
Ir ppb	4	(a)			3.73	4.36	(a)									
Pt ppb																
Au ppb	4	(a)	2	(a)	2.77	6.77	(a)									
Th ppm	3.2	(a)	3.65	(a)	3.3	3.5	(a)			2.72	(a)	3.55	5.01	2.12	(a)	3.98
U ppm	0.8	(a)	1.1	(a)	1.1	1	(a)			1.02	(a)	0.98	1.28	0.59	(a)	1.18
technique	*(a) INAA, (b) elec probe*															

Table 2. Chemical composition of 67095 cont.

reference	Hertogen77		
weight	int.	glass	
SiO2 %			
TiO2			
Al2O3			
FeO			
MnO			
MgO			
CaO			
Na2O			
K2O			
P2O5			
S %			
sum			
Sc ppm			
V			
Cr			
Co			
Ni	49	129	(z)
Cu			
Zn	4.26	2.27	(z)
Ga			
Ge ppb	66.8	80.3	(z)
As			
Se	157	100	(z)
Rb	7.94	6.42	(z)
Sr			
Y			
Zr			
Nb			
Mo			
Ru			
Rh			
Pd ppb	2.7	6.8	(z)
Ag ppb	1.1	1	(z)
Cd ppb	2.3	2.3	(z)
In ppb	2	4.6	(z)
Sn ppb			
Sb ppb	0.53	0.48	(z)
Te ppb	2.8	3.4	(z)
Cs ppm	0.347	0.29	(z)
Ba			
La			
Ce			
Pr			
Nd			
Sm			
Eu			
Gd			
Tb			
Dy			
Ho			
Er			
Tm			
Yb			
Lu			
Hf			
Ta			
W ppb			
Re ppb			
Os ppb			
Ir ppb	1.38	5.81	(z)
Pt ppb			
Au ppb	1.17	2.02	(z)
Th ppm			
U ppm	1.36	1.07	(z)
technique:	*(z) RNAA*		

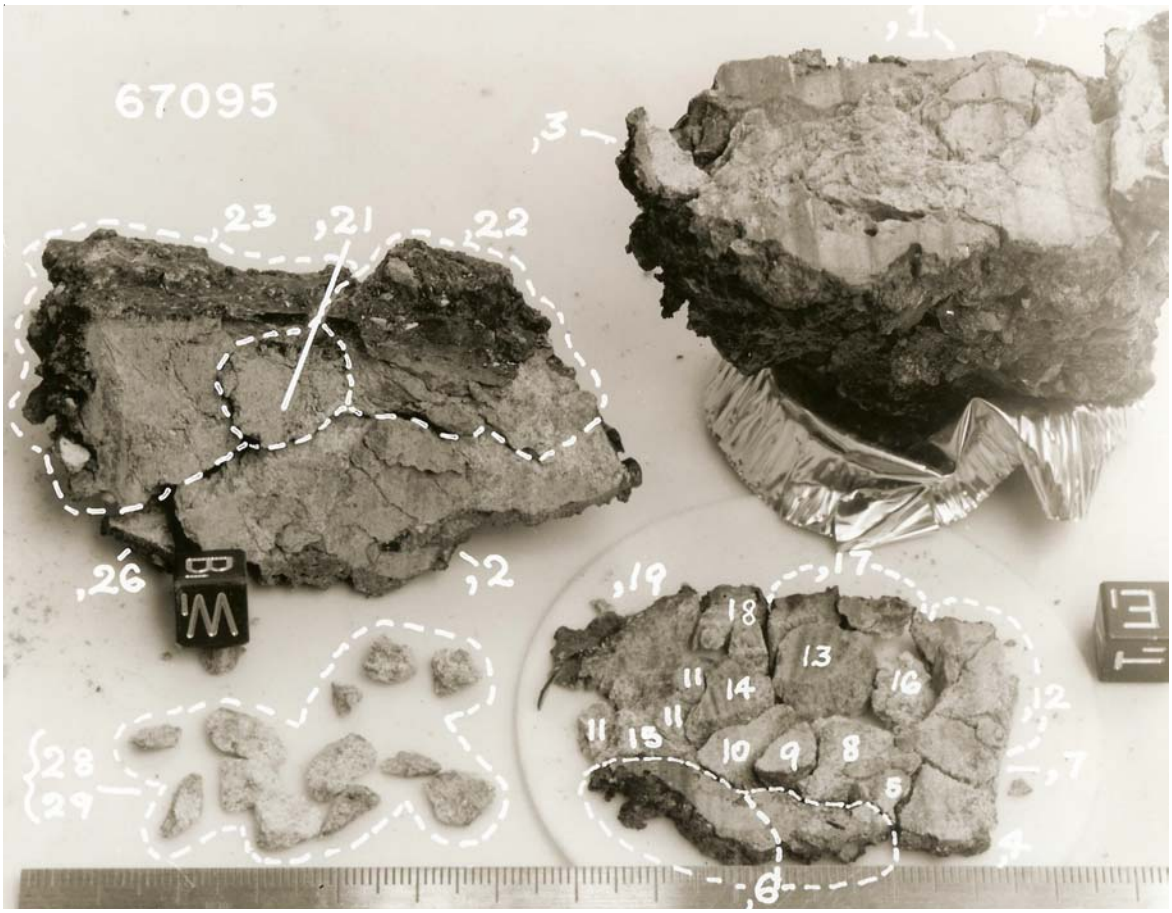
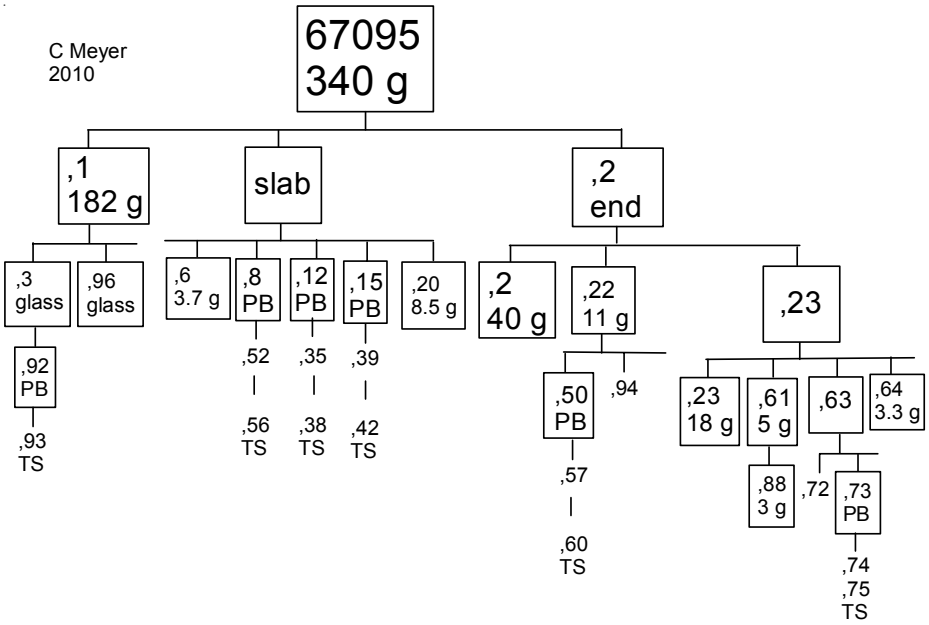


Figure 4: Subdivision of 67095, showing slab pieces and end pieces. Cube is 1 cm. S73-33246.



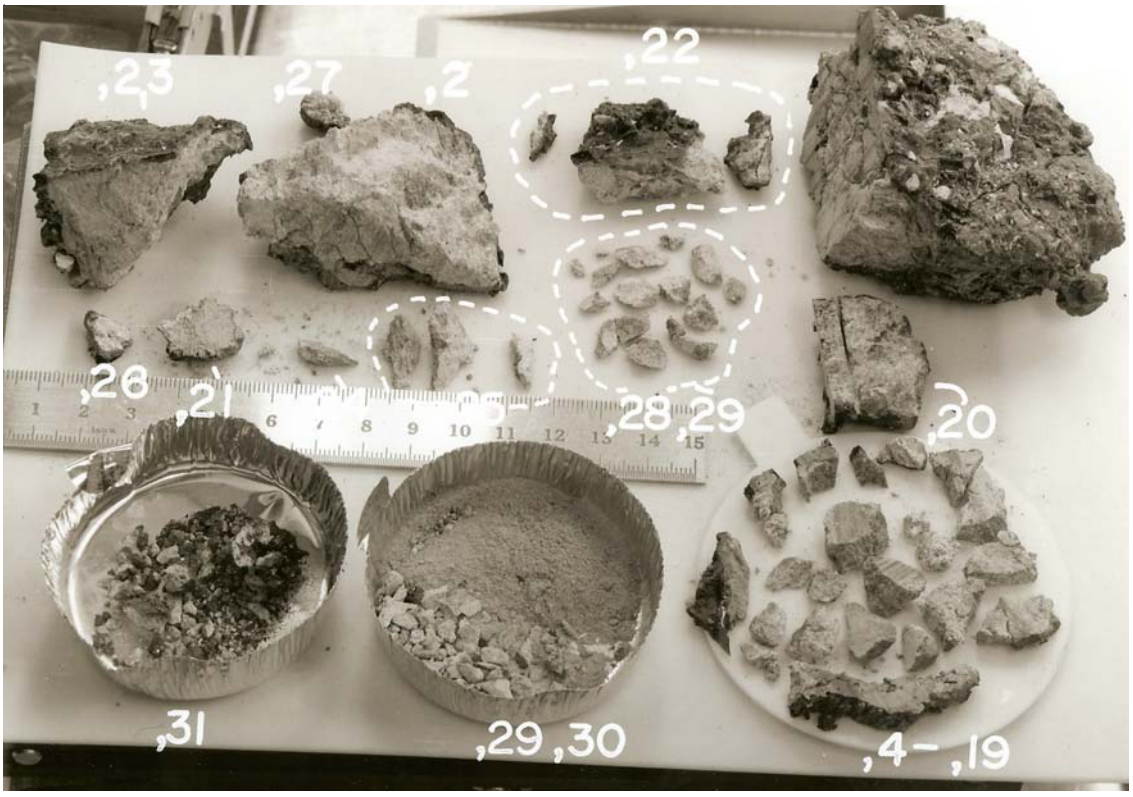


Figure 5: Subdivision of 67095. Scale in cm. S73-33247.

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