65095

Regolith Breccia

560.1 grams

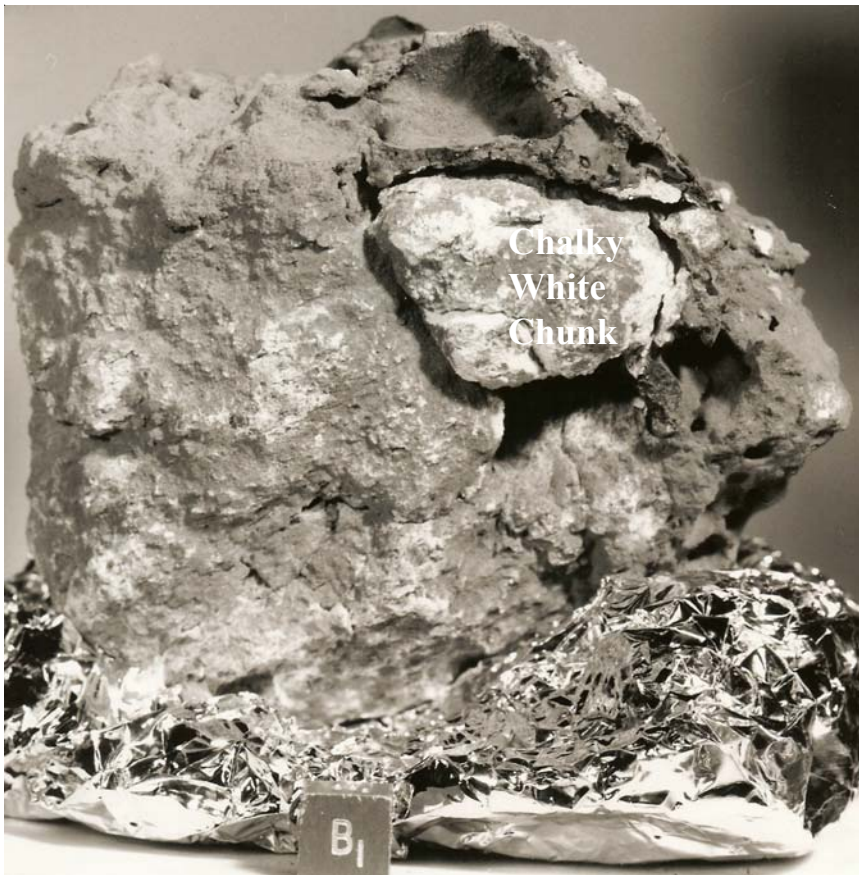

Figure 1: PET photo of 65095 before dusting. The 'chalky white chunk' is different in texture from the rest of sample (figure 2). S72-40975. Cube is 1 cm.

Introduction

About half of this sample has a thick coat of black glass (figure 1). Most of the sample is a feldspathic regolith breccia (figure 2), but there is also a unique "chalky white chunk" neatly tucked between the regolith breccia and the black glass coat (figure 1). The main portion of 65095 has a friable white matrix with large grey breccia clasts.

Petrography

McKay et al. (1986) reported that although this is a regolith breccia, it has very low maturity (Is/FeO = 0), very low solar wind rare gas and no agglutinates. The matrix has a high proportion of clasts including grains of plagioclase, mafic minerals, metal, troilite, ilmenite, spinel as well as clasts of poikilitic and basaltic impact melt, cataclastic anorthosite and rare

Mineralogical Mode

McKay et al. 1986	>500 mic.	20-500 mic.	
Plutonic rock frag.	2.9	3.8	
Poik. Matrix	0	10	
Subophitic matrix		82.1	8.6
Intergranular matrix	1.7	2.7	
Granulitic	0	1	
Vitric breccias	9.2	0	
Frag. Breccias	1.6	0.3	
Plagioclase	2.4	44.9	
Olivine	0	2.7	
Pyroxene	0	1.7	
Metal	0	0.3	
Glass	1.7	10.3	
Agglutinates	0	0	
Spheres	0	0	

Figure 2: Photo (faded) of 65095,21 showing light matrix with dark breccia clasts. Sample also has thick glass coat on one side. S79-38062.

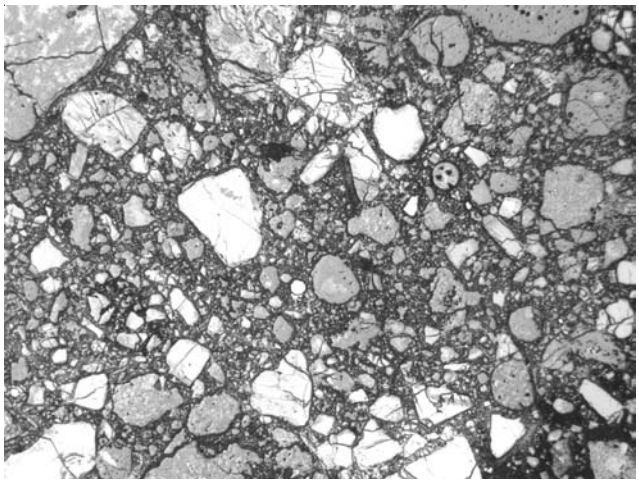

Figure 3: Reflected light image of thin section of 65095 showing porous matrix with glass beads.

mafic vitrophyres. There are also fragments of glass in the matrix indicating that the sample may be a regolith breccia.

Ryder and Norman (1980) and Butler (1972) describe thin sections ,13 ,14 ,15 as a "crushed anorthosite".

Significant Clast

Chalky White Chunk: ,20 TS,49 TS,13

Figure 1 shows a relatively large chunk of white material (~15 g) that is distinctly separated from the rest of the sample. Bickel and Warner (1978) reported that thin section ,49 contained a coarse-grained ferroan anothosite (figure 4). The chalky appearance may mean that this fragment has been highly shocked.

Mineralogy

Metal: Misra and Taylor (1975) reported the Ni and Co content of iron grains (figure 5).

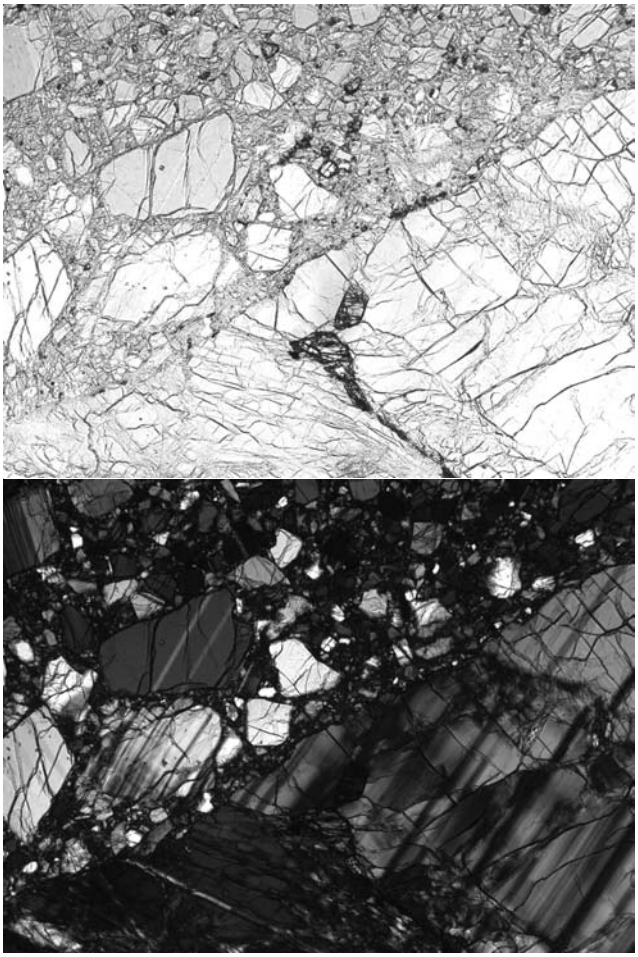

Figure 4: Photomicrographs of thin section of chalky white clast. Top is plane polarized light and bottom is crossed polarized. Field of view is 2 mm.

Rust: Hunter and Taylor (1981) report minor rust around metal grains.

Glass: Wentworth and McKay (1988), and Shearer et al. (1990) describe and analyze mafic glass beads with "komatiitic" composition. The outer black glass coating was analyzed by See et al. (1986).

Chemistry

McKay et al. (1986), Korotev (1996), Morris et al. (1986), Krahenbuhl et al. (1973) and Eldridge et al. (1973) reported the chemical composition of the 65095 (table 1). All splits have high Ni, Ir and Au indicating meteoritic contamination. However, the "chalky white chunk" has apparently not been analyzed (Korotev?).

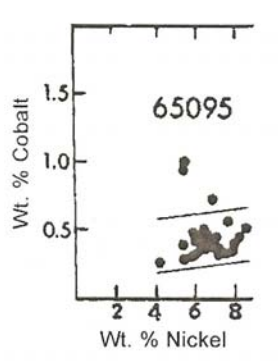

Figure 5: Co and Ni in metalic iron in 65095 (Misra and Taylor 1975).

Radiogenic age dating

There are no age data for 66095

Cosmogenic isotopes and exposure ages

The cosmic ray induced activity of 65095 is "saturated" with ^{26}Al = 104 dpm/kg and ^{22}Na = 28 dpm/kg (Eldridge et al. 1973).

Other Studies

The $^{40}Ar/^{36}Ar$ ratio of this sample is extremely high (480), normally found in ancient regolith breccias (McKay et al. 1986)

The magnetic properties of 65095 were studied by Sigiura et al. (1978) and others (figure 6).

Processing

First the "chalky white chuck" was removed and three thin sections of it were made. Later the bulk sample broke along a penetrating fracture into two large pieces and several smaller ones. There are 16 thin section. The sample has not been sawn.

Table 1. Chemical composition of 65095.

reference	McKay86	Korotev96		See86			Morris86		Eldridge73		Krahenbuhl73	
weight				glass	lithic							
SiO2 %				45.14	45.09	(d)						
TiO2	0.53			0.33	0.79	(d)						
Al2O3	26.2			25.45	21.59	(d)						
FeO	4.9	1.92	(a)	6.09	6.99	(d)	7.09	(a)				
MnO				0.08	0.12	(d)						
MgO	6.95			8.1	13.1	(d)						
CaO	15.4	17.7	(a)	14.06	11.96	(d)						
Na2O	0.444	0.402	(a)	0.58	0.52	(d)	0.56	(a)				
K2O				0.06	0.15	(d)			0.094	(b)		
P2O5												
S %												
sum												
Sc ppm	7.35	3.16	(a)				6.73	(a)				
V	14		(a)									
Cr	696	260	(a)				912	(a)				
Co	27.9	8.1	(a)				73	(a)				
Ni	428	120	(a)				1417	(a)			235	(c)
Cu												
Zn											8.65	(c)
Ga												
Ge ppb											730	(c)
As												
Se											104	(c)
Rb											1.1	(c)
Sr	167	176	(a)									
Y												
Zr	250	70	(a)									
Nb												
Mo												
Ru												
Rh												
Pd ppb												
Ag ppb											2	(c)
Cd ppb											288	(c)
In ppb												
Sn ppb												
Sb ppb											1.94	(c)
Te ppb											68	(c)
Cs ppm	0.12		(a)								0.055	(c)
Ba	161	57	(a)				168	(a)				
La	16.2	4.01	(a)				11.3	(a)				
Ce	42	10.3	(a)				30.4	(a)				
Pr												
Nd	24		(a)									
Sm	7.56	1.86	(a)				5.16	(a)				
Eu	1.21	0.96	(a)				0.98	(a)				
Gd												
Tb	1.38	0.38	(a)				1.1	(a)				
Dy												
Ho												
Er												
Tm												
Yb	5	1.29	(a)				3.43	(a)				
Lu	0.714	0.179	(a)				0.52	(a)				
Hf	5.58	1.36	(a)				3.61	(a)				
Ta	0.6	0.15	(a)				0.52	(a)				
W ppb												
Re ppb											0.663	(c)
Os ppb												
Ir ppb	11.8	1.7	(a)								6.43	(c)
Pt ppb												
Au ppb	7.5	2.8	(a)								5.45	(c)
Th ppm	2.7	0.64	(a)				2.97	(a)	1.96	(b)		
U ppm	0.67	0.18	(a)				0.96	(a)	0.52	(b)	0.29	(c)

technique: (a) INAA, (b) radiation couting, (c) RNAA, (d) elec. Probe

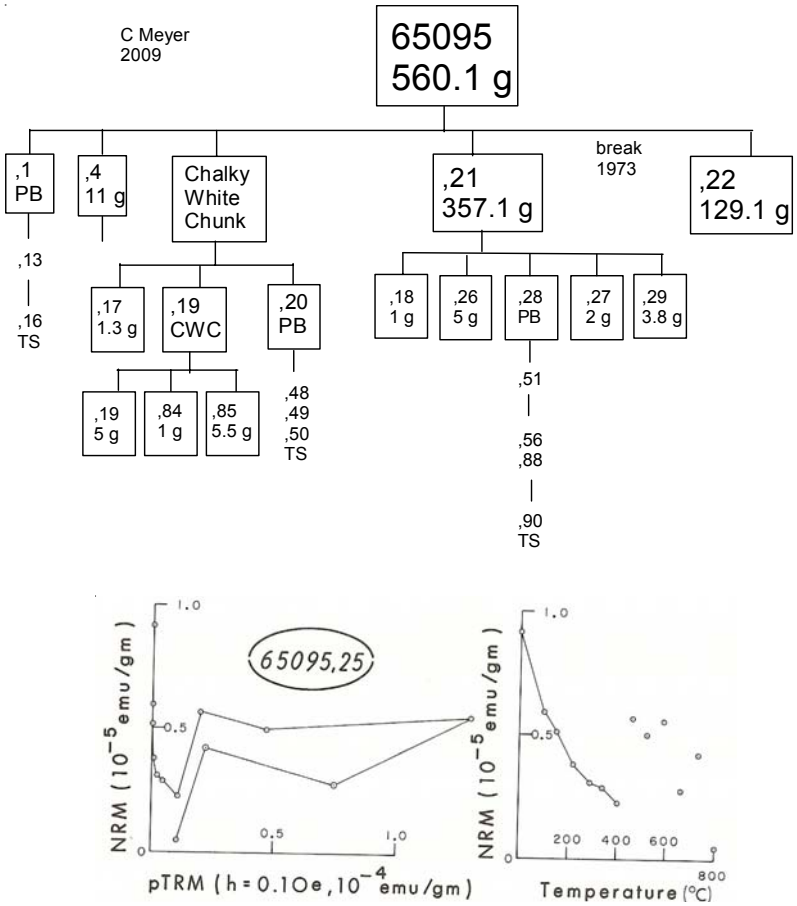

Figure 6: Magnetic properties of 65095 (Sugiura et al. 1978).

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