

65715
Ancient Regolith Breccia
31.4 grams



Figures 1 and 2: Photos of 65715. Cube is 1 cm. S72-43417 and 416

Introduction

65715 is a rake sample collected as part of a comprehensive sample from soft soil at the base of Stone Mountain (Sutton et al. 1972). There are several other particles with similar appearance 65716 – 65719, 65725 – 65729, 65735 – 65739. See section on soil 65701.

McKay et al. (1986) found that 65715 was an “ancient regolith breccia”, because it had high $^{40}\text{Ar}/^{36}\text{Ar}$.

Petrography

Keil et al. (1972) and Ryder and Norman (1981) describe the sample as a friable grey and white breccia with abundant comminuted plagioclase. There is a wide variety of plagioclase-rich clasts from the highlands. McKay et al. reported a mode with mostly “anorthosite” lithic fragments and minor “vitric” material.

Hunter and Taylor (1981) report abundant “rust” on iron grains in 65715.

Joy et al. (2012) reported the maturity index $I_s/\text{FeO} = 0.6$ (immature) for 65715.

65715 contains mafic green glass (Wentworth and McKay 1988; Shearer et al. (1990).

Chemistry

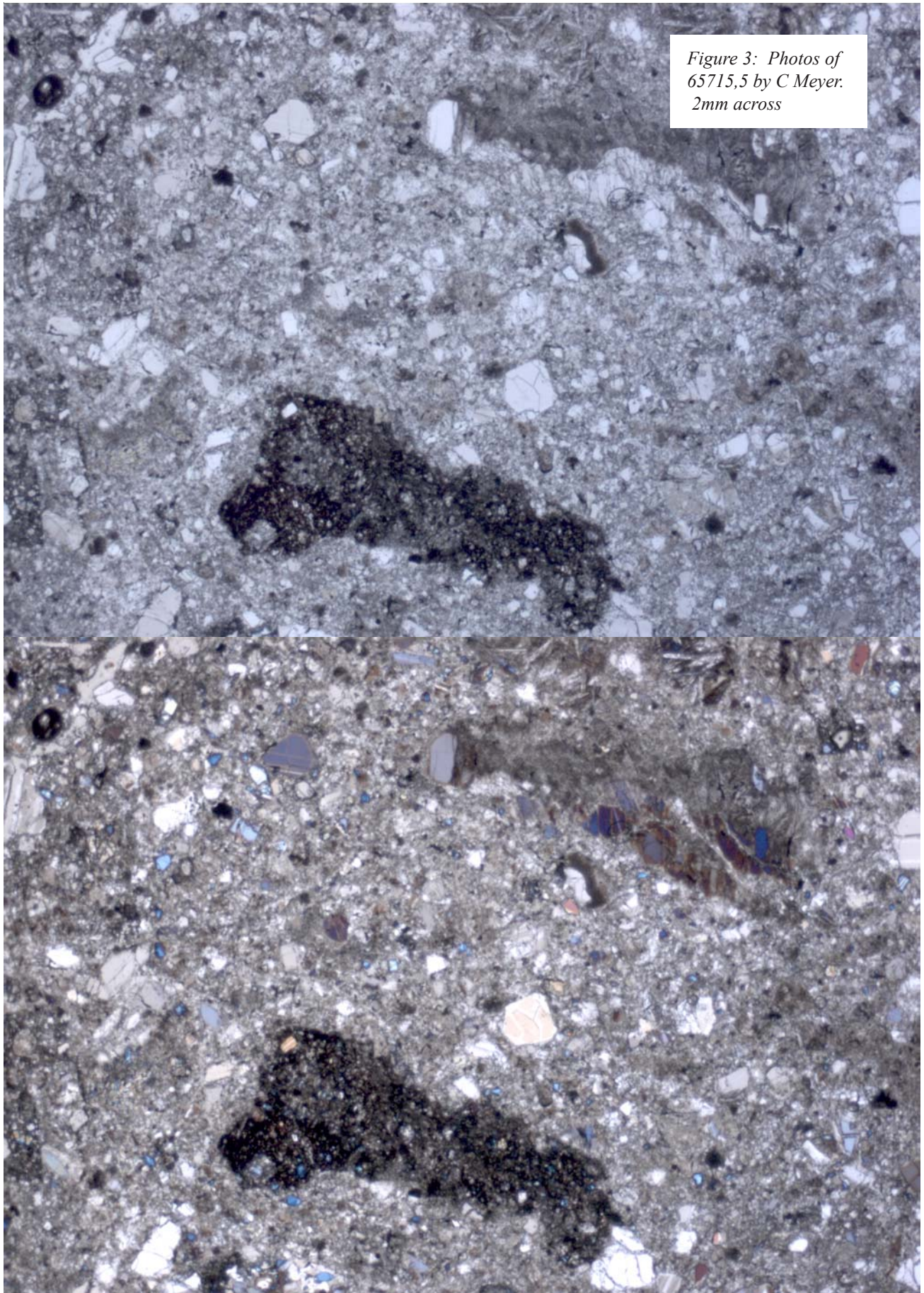
McKay et al. (1986) reported an analysis (table 1).

Other Studies

McKay et al. (1986) reported the rare gas content and isotopic ratios for 65715.

Processing

There are 4 thin sections.



*Figure 3: Photos of
65715,5 by C Meyer.
2mm across*

Table 1. Chemical composition of 65715.

reference	McKay86		Wentworth	
weight			glass	
SiO ₂ %			47.4	(c)
TiO ₂	0.48	(a)	1.33	(c)
Al ₂ O ₃	27	(a)	12.58	(c)
FeO	4.24	(a)	3.15	(c)
MnO	0.055	(a)	0.03	(c)
MgO	5.45	(a)	28.67	(c)
CaO	15.7	(a)	5.86	(c)
Na ₂ O	0.49	(a)	0.08	(c)
K ₂ O			0.2	(c)
P ₂ O ₅			0.07	(c)
S %				
sum				
Sc ppm	7.25	(a)	18	(b)
V	14	(a)	73	(b)
Cr	555	(a)	1294	(b)
Co	20.8	(a)	9	(b)
Ni	283	(a)		
Cu				
Zn				
Ga				
Ge ppb				
As				
Se				
Rb				
Sr	189	(a)	76	(b)
Y				
Zr	170	(a)	182	(b)
Nb				
Mo				
Ru				
Rh				
Pd ppb				
Ag ppb				
Cd ppb				
In ppb				
Sn ppb				
Sb ppb				
Te ppb				
Cs ppm	0.19	(a)		
Ba	133	(a)	80	(b)
La	13.7	(a)	5.8	(b)
Ce	35	(a)	17.4	(b)
Pr				
Nd	22	(a)	13.9	(b)
Sm	6.32	(a)	4.4	(b)
Eu	1.245	(a)	0.33	(b)
Gd				
Tb	1.1	(a)		
Dy			6.2	(b)
Ho				
Er			3	(b)
Tm				
Yb	4.24	(a)	2.9	(b)
Lu	0.607	(a)		
Hf	4.74	(a)		
Ta	0.5	(a)		
W ppb				
Re ppb				
Os ppb				
Ir ppb	6	(a)		
Pt ppb				
Au ppb	5.1	(a)		
Th ppm	2.43	(a)		
U ppm	0.59	(a)		

technique: (a) INAA, (b) Ion probe, e. probe

References for 65715

Butler P. (1972a) Lunar Sample Information Catalog Apollo 16. Lunar Receiving Laboratory. MSC 03210 Curator's Catalog. pp. 370.

Joy K.H., Kring D.A., Bogard D.D., McKay D.S. and Zolensky M.E. (2012) Re-examination of the formation ages of the Apollo 16 regolith breccias. *Geochem. Cosmochim. Acta* doi: 10.1016

Hunter R.H. and Taylor L.A. (1981) Rust and schreibersite in Apollo 16 highland rocks: Manifestations of volatile-element mobility. *Proc. 12th Lunar Planet. Sci. Conf.* 253-259.

Keil K., Dowty E., Prinz M. and Bunch T.E. (1972) Description, classification and inventory of 151 Apollo 16 rake samples from the LM area and station 5. Curator's Catalog, JSC.

LSPET (1973b) The Apollo 16 lunar samples: Petrographic and chemical description. *Science* **179**, 23-34.

LSPET (1972c) Preliminary examination of lunar samples. In Apollo 16 Preliminary Science Report. NASA SP-315, 7-1—7-58.

McKay D.S., Bogard D.D., Morris R.V., Korotev R.L., Johnson P. and Wentworth S.J. (1986) Apollo 16 regolith breccias: Characterization and evidence for early formation in the megaregolith. *Proc. 16th Lunar Planet. Sci. Conf.* in J. Geophys. Res. **91**, D277-D303.

Ryder G. and Norman M.D. (1980) Catalog of Apollo 16 rocks (3 vol.). Curator's Office pub. #52, JSC #16904

Shearer C.K., Papike J.J., Galbreath K.C., Wentworth S.J. and Shimizu N. (1990b) A SIMS study of lunar "komatiitic glasses". Trace element characteristics and possible origin. *Geochim. Cosmochim. Acta* **54**, 1851-1857.

Sutton R.L. (1981) Documentation of Apollo 16 samples. In Geology of the Apollo 16 area, central lunar highlands. (Ulrich et al.) U.S.G.S. Prof. Paper 1048.

Wentworth S.J. and McKay D.S. (1984) Density and porosity calculations for Apollo 15 and 16 regolith breccias (abs). *Lunar Planet Sci.* **XV**, 906-907. Lunar Planetary Institute, Houston.

Wentworth S.J. and McKay D.S. (1988) Glasses in ancient and young Apollo 16 regolith breccias: Populations and ultra-Mg glass. *Proc. 18th Lunar Planet. Sci. Conf.* 67-77. Lunar Planetary Institute, Houston.

C Meyer
2009

65715
31.4 g

