64815

Poikilitic Impact Melt

20.9 grams

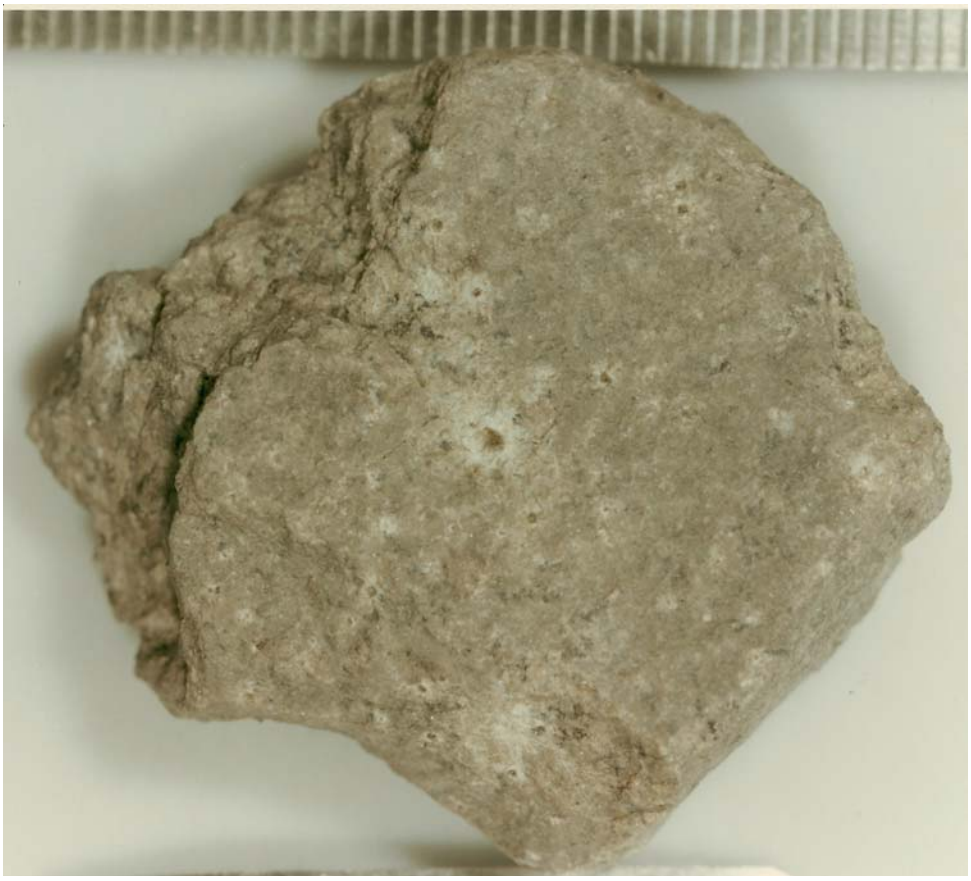


Figure 1: Photo of 64815. Scale in mm. S72-55316

Introduction

64815 is a rake sample collected from the rim of a small crater at station 4 on Stone Mountain – see section on 64801. It is an impact melt breccia with a coarse poikilitic texture and KREEP-like composition. The age has been determined to be 3.89 ± 0.01 b.y.

Petrography

According to Simonds et al. (1973) 64815 has a poikilitic texture with relatively coarse oikocrysts of orthopyroxene and some sort of (unspecified) metamorphic overprint (figure 2). The sample is said to resemble 60315 or 62235. Olivine chadocrysts are Fo_{70}; pyroxene oikocrysts are Wo_4En_{72}.

A more thorough petrographic description seems to be indicated.

Mineralogical Mode

From Simonds et al. 1973

Plagioclase	55 %
Pyroxene	34
Olivine	9
Opaque	2

Chemistry

64815 has been well analyzed (table 1, figure 3). Hubbard et al. (1973), Wasson et al. (1977), Wanke et al. (1976) and Ebihara et al. (1992) found consistent results. Trace elements show an addition of KREEP component (figure 3), and the relatively high Ni, Ir and Au give evidence of an impact origin.

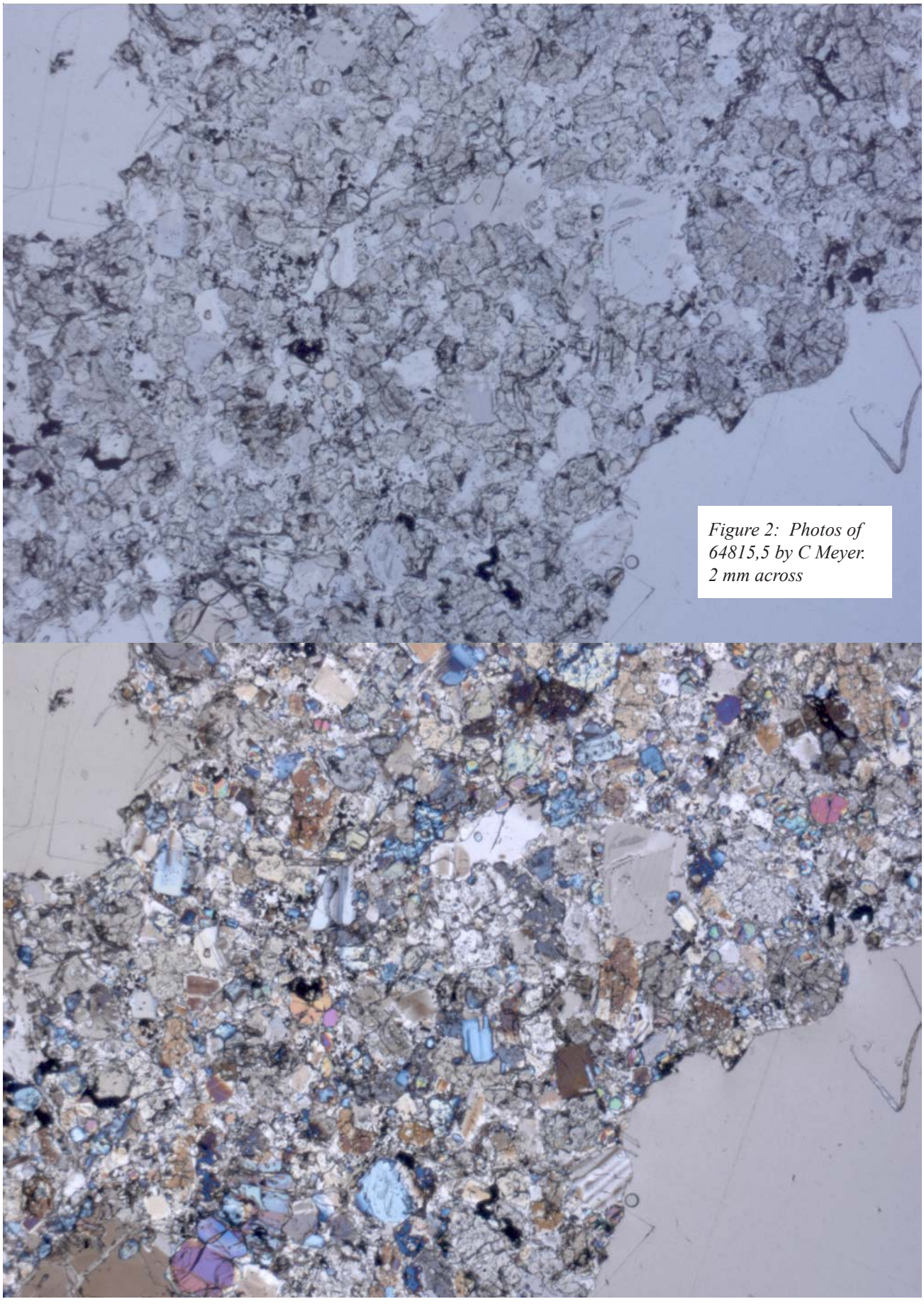


Figure 2: Photos of 64815,5 by C Meyer. 2 mm across

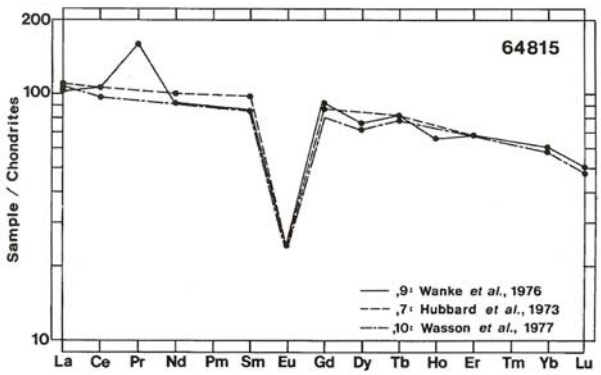


Figure 3: Normalized rare-earth-element diagram for 64815.

Radiogenic age dating

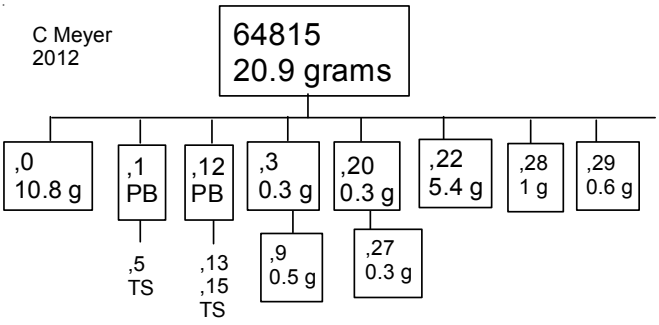
Nyquist et al. (1973) reported the isotopic composition of Sr. Norman et al. (2006) determined an age of 3.89 ± 0.01 b.y. for 64815 by the Ar/Ar plateau technique (figure 4).

Other Studies

Pearce and Simonds (1974) determined some magnetic properties of 64815.

Processing

There are three thin sections of 64815.



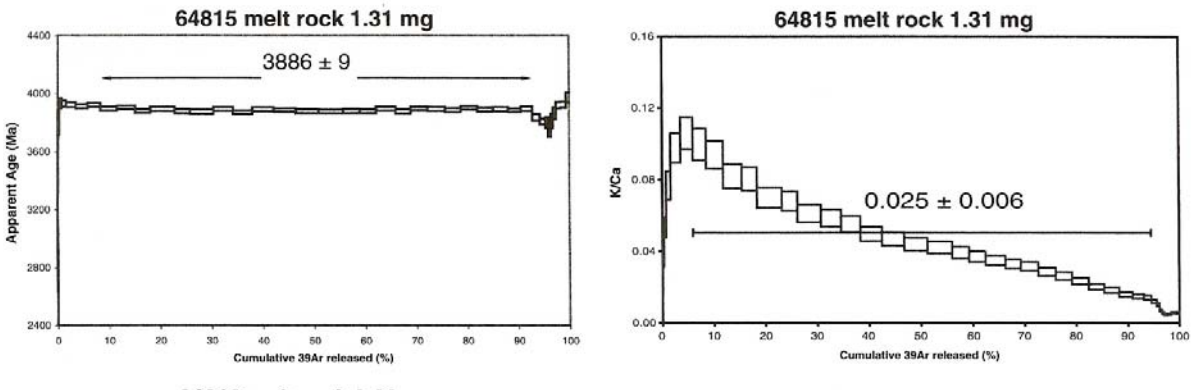


Figure 4: Ar/Ar plateau diagram for 64815 (Norman et al. 2006).

Table 1. Chemical composition of 64815.

reference	Wanke76		Hubbard73			Wasson77		McKinley83		Ebihara92	
weight			Weismann76								
SiO2 %	45.4	(c)	45.86		(b)			45.8	(e)		
TiO2	1.7	(c)	1.7	1.7	(a)	1.5	(d)	1.65	(e)		
Al2O3	17.9	(c)	17.33		(b)	20	(d)	17.7	(e)		
FeO	9.4	(c)	9.5		(b)	9.04	(d)	9.34	(e)		
MnO	0.12	(c)	0.12		(b)	0.11	(d)	0.13	(e)		
MgO	11.5	(c)	11.83		(b)	12.6	(d)	11.95	(e)		
CaO	12	(c)	12.05		(b)	11.76	(d)	12.05	(e)		
Na2O	0.52	(c)	0.47	0.47	(b)	0.53	(d)	0.5	(e)		
K2O	0.27	(c)	0.26	0.275	(a)	0.26	(d)	0.27	(e)		
P2O5	0.3	(c)	0.29		(b)						
S %	0.114	(c)			(b)						
sum											
Sc ppm	23.1	(c)				21.7	(d)				
V						51	(d)				
Cr	1740	(c)	1530	1534	(a)	1620	(d)			1980	(d)
Co	57	(c)				37.3	(d)				
Ni	830	(c)				460	(d)			787	(d)
Cu	14	(c)									
Zn						5.8	(d)			3.12	(d)
Ga	3.8	(c)				5.1	(d)				
Ge ppb	15700	(c)				1250	(d)				
As	178	(c)									
Se	210	(c)								194	(d)
Rb	6.42	(c)	7.02	7.016	(a)					6.38	(d)
Sr	132	(c)	144	144	(a)						
Y	114	(c)									
Zr	472	(c)		500	(a)	500	(d)				
Nb	31	(c)									
Mo											
Ru						51	(d)				
Rh											
Pd ppb										36.7	(d)
Ag ppb										2.06	(d)
Cd ppb						7	(d)			9.25	(d)
In ppb						3	(d)			3.24	(d)
Sn ppb											
Sb ppb										5.47	(d)
Te ppb										16.7	(d)
Cs ppm	0.33	(c)								0.315	(d)
Ba	340	(c)	349	349	(a)	410	(d)				
La	33.9	(c)	36.1	36.1	(a)	34.3	(d)				
Ce	95.9	(c)	93.7	93.7	(a)	86	(d)			117	(d)
Pr	13	(c)									
Nd	56	(c)	59.8	59.8	(a)	55	(d)			70.7	(d)
Sm	15.7	(c)	17.6	17.6	(a)	15.7	(d)				
Eu	1.72	(c)	1.68	1.68	(a)	1.7	(d)			1.99	(d)
Gd	22.6	(c)	21.9	21.9	(a)						
Tb	3.63	(c)				3.4	(d)			4.08	(d)
Dy	23.5	(c)	23.8	23.8	(a)	23	(d)				
Ho	4.7	(c)									
Er	13.8	(c)	13.7	13.7	(a)		(d)				
Tm		(c)									
Yb	12.2	(c)		12.6	(a)	11.7	(d)			13.4	(d)
Lu	1.72	(c)				1.64	(d)			2.08	(d)
Hf	12.2	(c)				11.1	(d)				
Ta	1.48	(c)				1.1	(d)				
W ppb	879	(c)									
Re ppb	1.5	(c)								1.57	(d)
Os ppb										15.4	(d)
Ir ppb	16	(c)				9	(d)			13.8	(d)
Pt ppb											
Au ppb	13.7	(c)				8.4	(d)			14.5	(d)
Th ppm	4.92	(c)				5.6	(d)				
U ppm	1.21	(c)	1.62	1.62	(a)	1.6	(d)			1.83	(d)

technique: (a) IDMS, (b) XRF, (c) various, (d) INAA, RNAA

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