

68519

Glass-coated Impact Melt Breccia

10.56 grams

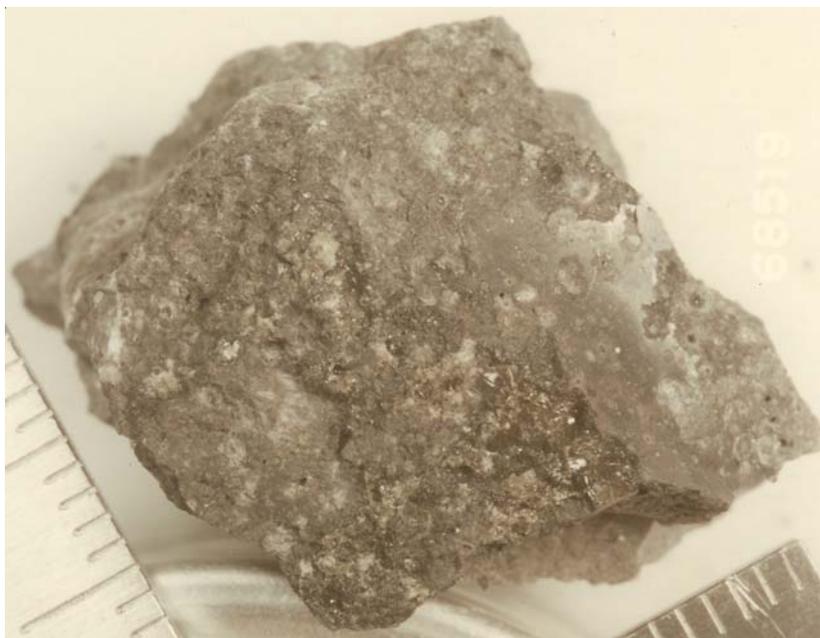


Figure 1: Photo of 68519. Scale in cm/mm. S72-49569

Introduction

68519 is a rake sample collected from station 8 soil in an area thought of have disturbance from South Ray Crater – see section on 68501. This small lithic fragment had a glass coat that has been partially chipped away by micrometeorite bombardment.

Petrography

Ryder and Norman (1980) described 68519 as a “clast-rich impact melt”. The matrix consists of about 75% plagioclase laths, less than 150 microns, with interstitial mafic minerals. Opaque phases are small and not well-developed and include armalcolite, Fe-metal and troilite. Hunter and Taylor (1981) looked for rust. Numerous inclusions of plagioclase indicate that the protolith was a breccia (figure 2).

Compositional variation of Apollo 16 impact-melt rocks is discussed by Korotev (1994).

Chemistry

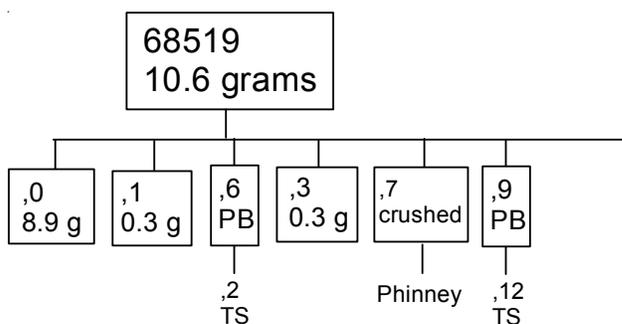
68519 appears to have a high Mg/Fe ratio.

Radiogenic age dating

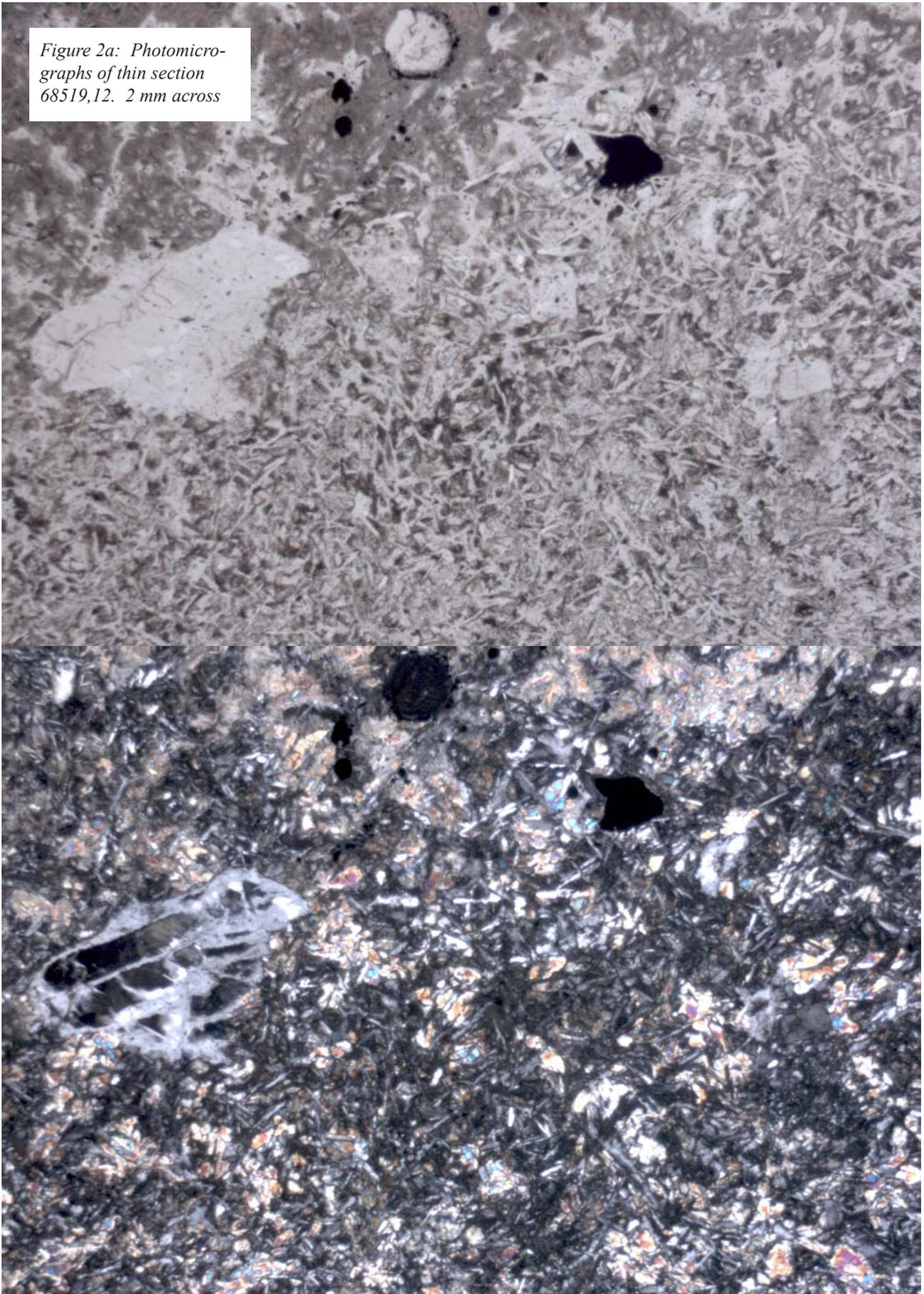
Norman et al. (2006) attempted to date 68519, but found that there was no Ar plateau. Age may be about 3.9 b.y., but who knows?

Processing

There are 2 thin sections.



*Figure 2a: Photomicrographs of thin section
68519,12. 2 mm across*



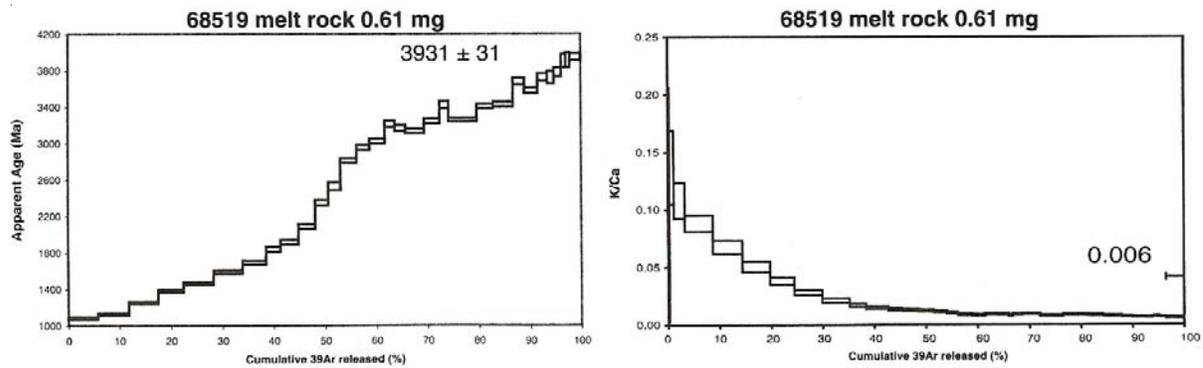


Figure 3: *Ar/Ar* pleateau diagram for 68519 (Norman et al. 2006).

References for 68519

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Norman M.D., Duncan R.A. and Huard J.J. (2006) Identifying impact events within the lunar cataclysm from ⁴⁰Ar-³⁹Ar ages and compositions of Apollo 16 impact melt rocks. *Geochim. Cosmochim. Acta* **70**, 6032-6049.

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Table 1. Chemical composition of 68519.

reference	glass		anor	
	Morris86	Ryder82	See87	
<i>weight</i>				
SiO ₂ %	45.65	(b) 46	(a) 45.2	(b)
TiO ₂	0.44	(a)	0.05	(b)
Al ₂ O ₃	26	(a) 23.5	(a) 30.82	(b)
FeO	4.87	(a) 5	(a) 1.93	(b)
MnO			0.03	(b)
MgO	7.77	(b) 9.3	(a) 4.78	(b)
CaO	14.55	(a) 14.6	(a) 16.61	(b)
Na ₂ O	0.51	(a) 0.47	(a) 0.6	(b)
K ₂ O	0.14	(a) 0.19	(a) 0.05	(b)
P ₂ O ₅				
S %				
<i>sum</i>				
Sc ppm	5.61	(a) 7.1	(b)	
V				
Cr	749	(a)		
Co	35	(a) 39	(b)	
Ni	553	(a)		
Cu				
Zn				
Ga				
Ge ppb				
As				
Se				
Rb				
Sr				
Y				
Zr				
Nb				
Mo				
Ru				
Rh				
Pd ppb				
Ag ppb				
Cd ppb				
In ppb				
Sn ppb				
Sb ppb				
Te ppb				
Cs ppm				
Ba	144	(a)		
La	13.22	(a) 16.9	(b)	
Ce	46.5	(a)		
Pr				
Nd				
Sm	6.21	(a) 7.8	(b)	
Eu	1.13	(a) 1.2	(b)	
Gd				
Tb	1.14	(a)		
Dy				
Ho				
Er				
Tm				
Yb	3.96	(a)		
Lu	0.51	(a) 0.81	(b)	
Hf	4.28	(a)		
Ta	0.61	(a)		
W ppb				
Re ppb				
Os ppb				
Ir ppb				
Pt ppb				
Au ppb				
Th ppm	2.34	(a)		
U ppm	0.86	(a)		

technique: (a) fused bead e. prob and INAA