

60665

Vesicular glass with Anorthosite clast

90.1 grams



Figure 1: Chalky white clasts in rake sample 60665. NASA S80-26191. Scale bar at top is in mm/cm.

Introduction

60665 is a rake sample from the regolith near the Lunar Module. It contains chalky white clasts loosely held by black vesicular glass (figure 1), one of which has been thin sectioned (figure 2).

Petrography

Dowty et al. (1974a) and Warner et al. (1976b) describe the white clast in 60665. It is a cataclastic anorthosite of the ferroan type based on the plagioclase and pyroxene composition (figure 4). The CIPW norm

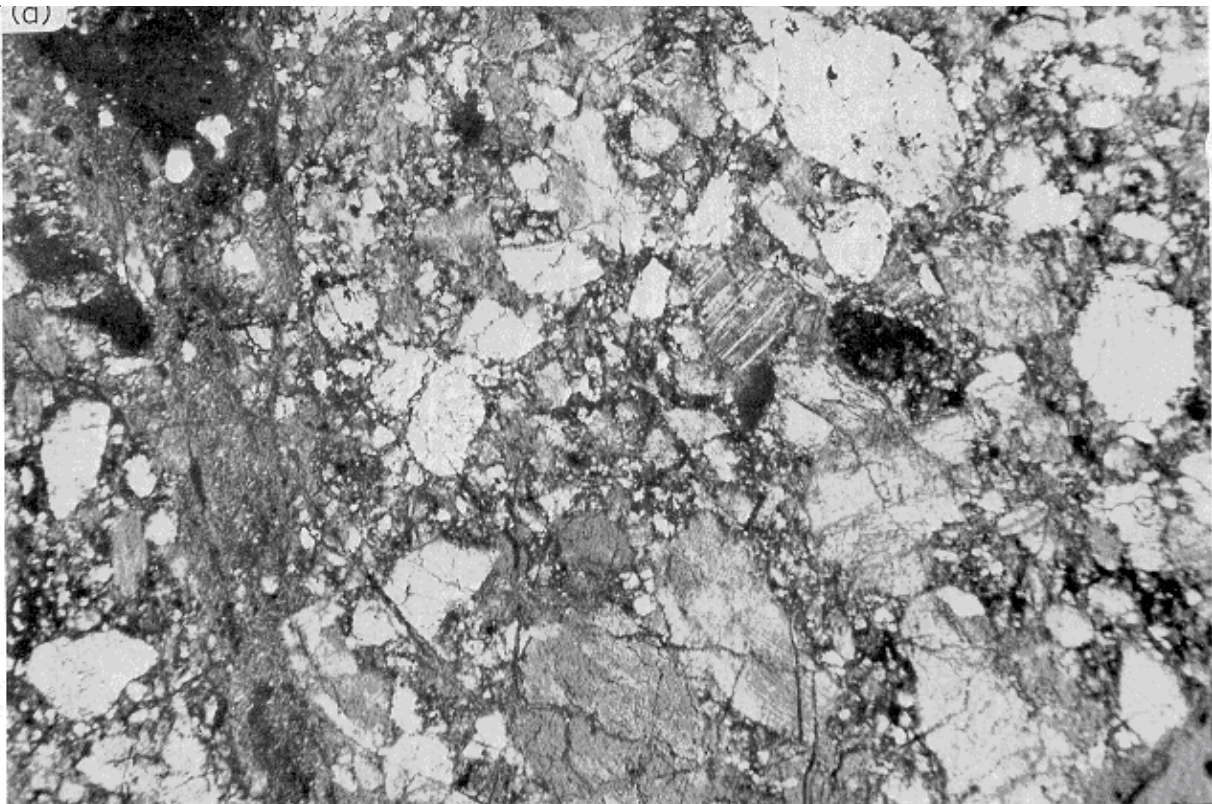


Figure 2: Thin section photomicrograph for 60665 (from Dowty et al. 1974). Width of photo is 4 mm.

calculation indicates it is about 97 % plagioclase and ~2% pyroxene. Trace amount of olivine, ilmenite and chromite are reported (Dowty et al. 1974a).

Mineralogy

Olivine: Olivine in 60665 is iron rich (Fo₆₂₋₆₈).

Pyroxene: Dowty et al. (1974a) plotted the pyroxene analyses (figure 3).

Plagioclase: Hansen et al. (1979) reported the minor element composition of plagioclase (An_{96.4}).

Ilmenite: Ilmenite in 60665 has 2.4% MgO.

Chromite: Chromite in 60665 has 2.4% TiO₂, 1-3% MgO and 11-13% Al₂O₃.

Chemistry

The glass was analyzed as part of a study of many glass particles at Apollo 16 (See et al. 1986, Morris et al. 1986). The anorthosite clast has been analyzed by broad beam electron probe only (table 1).

Radiogenic age dating

Not available

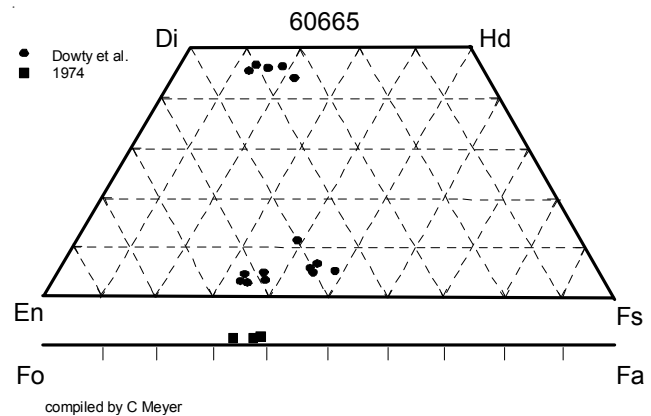


Figure 3 : Pyroxene and olivine composition of 60665 (from Dowty et al. 1974a).

Table 1. Chemical composition of 60665.

	anorthosite	glass	
reference	Dowty 74a	Morris 86	
weight	Warner 76	See 86	
SiO ₂ %	44.6	(a) 45.47	(c)
TiO ₂	0.01	(a) 0.46	(c)
Al ₂ O ₃	35.1	(a) 26.13	(c)
FeO	0.4	(a) 5.62	(c)
MnO	0.01	(a)	
MgO	0.26	(a) 7.01	(c)
CaO	19.1	(a) 14.9	(c)
Na ₂ O	0.46	(a) 0.52	(c)
K ₂ O	0.03	(a) 0.56	(c)
P ₂ O ₅	0.02	(a) 0.14	(c)
S %			
sum			
Sc ppm		6.52	(b)
V			
Cr		781	(b)
Co		51	(b)
Ni		843	(b)
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		149	(b)
La		13.1	(b)
Ce		35.5	(b)
Pr			
Nd			
Sm		5.82	(b)
Eu		1.12	(b)
Gd			
Tb		1.04	(b)
Dy			
Ho			
Er			
Tm			
Yb		3.79	(b)
Lu		0.55	(b)
Hf		4.12	(b)
Ta		0.45	(b)
W ppb			
Re ppb			
Os ppb			
Ir ppb			
Pt ppb			
Au ppb			
Th ppm		1.63	(b)
U ppm		0.58	(b)

technique: (a) broad beam elec. Probe, (b) INAA, (c) elec. Probe

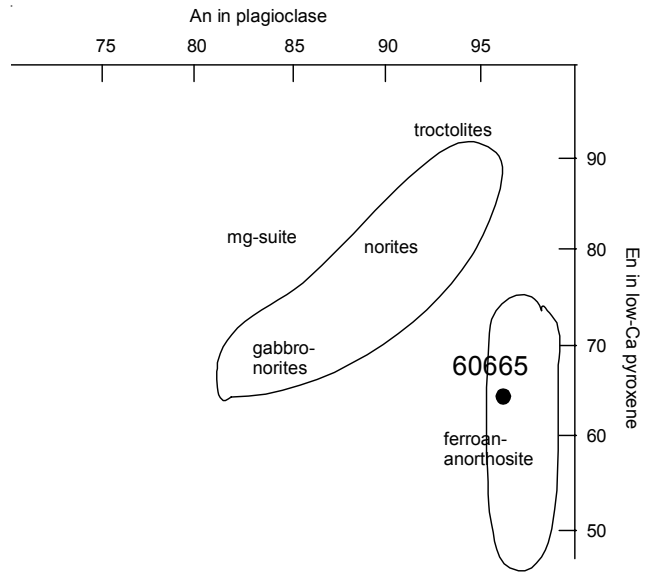


Figure 4: Composition of plagioclase and pyroxene in 60665 anorthosite.

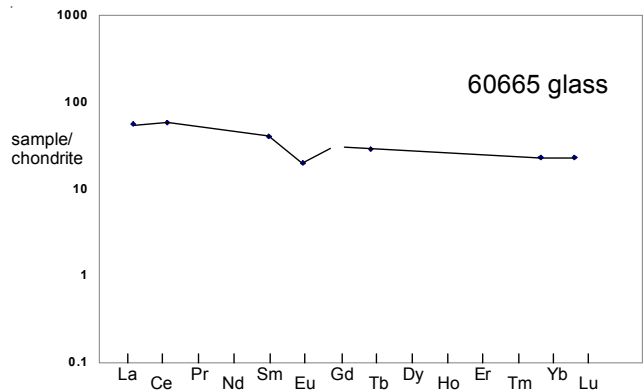
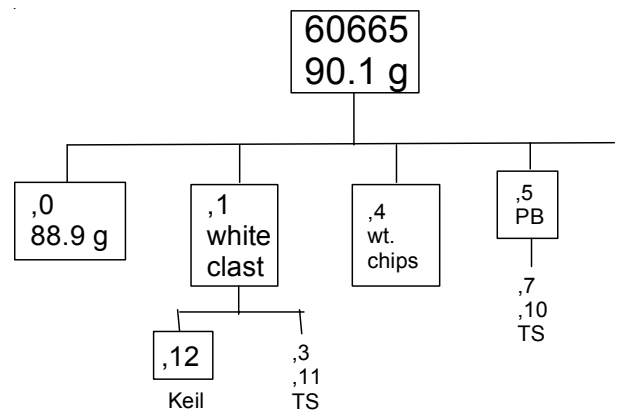


Figure 5: Noramlized rare-earth-element diagram for 60665 (data from Morris et al. 1986).



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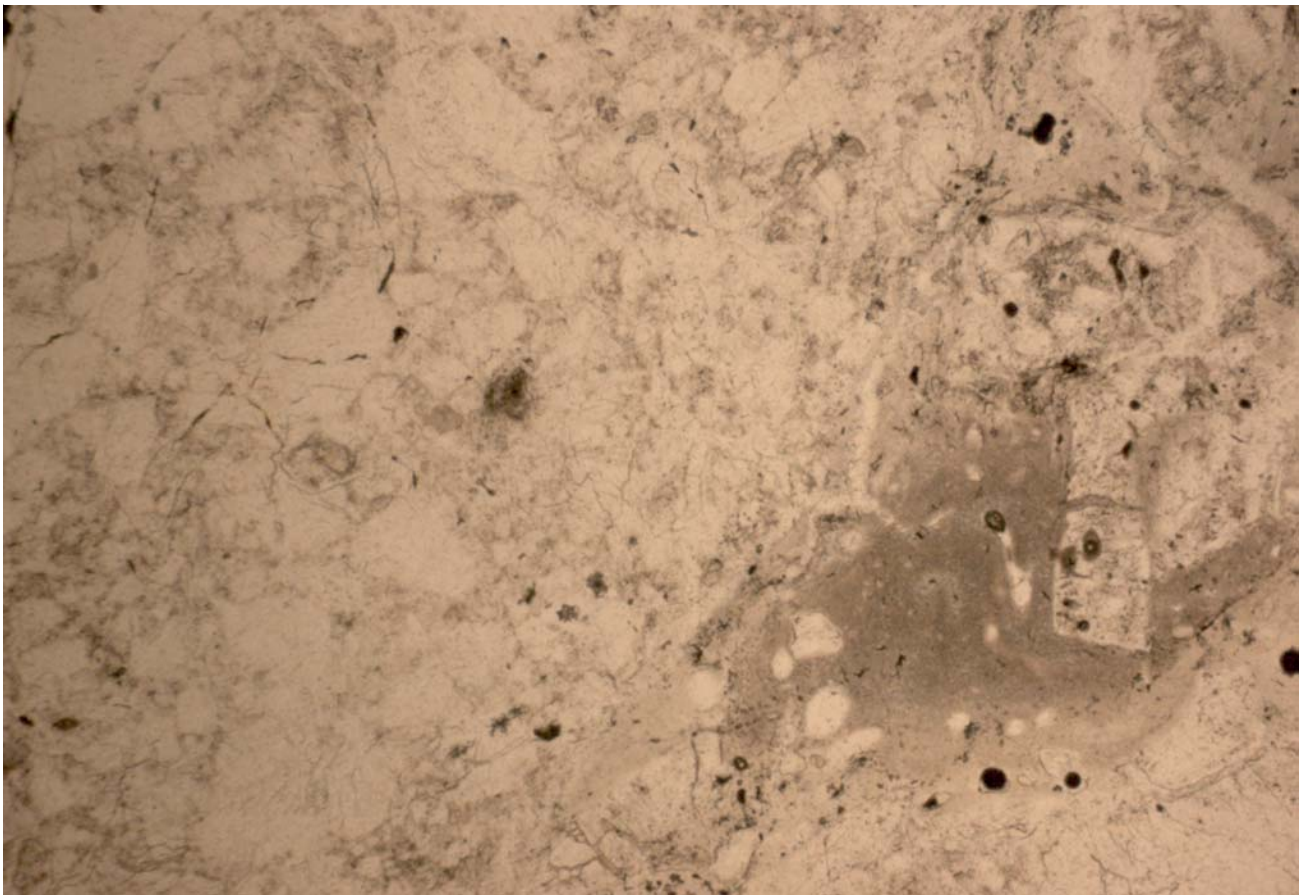


Figure 6: Photomicrograph of this section 60665,3 as taken by C Myer. 2 mm across.