DRAFT

65325

Cataclastic Anorthosite

67.9 grams

Figure 1: Photo of 65235. Scale in mm/cm. NASA S72-47662.

Introduction

Lunar sample 65325 is a friable anorthosite very like 65315 from the same sample bag (and may have been part of it). It is chemically pristine (i.e. low Ir, low KREEP).

Petrography

The interior of 65325 is ~99% plagioclase (An_{97}) with ~ 1% orthopyroxene (Wo_2En_{63}), trace ilmenite and rust. The texture is that of a badly crushed rock with broken fragments of plagioclase (1.0 to 0.1 mm) arranged in a jumble (figure 2). It plots in the field of ferroan anorthosite (figure 4).

The glass coating attached to this sample has higher REE content than the glass attached to 65315 (figure 5).

Mineralogy

Olivine: none

Pyroxene: Warren and Wasson (1978) determined orthopyroxene was Wo_2En_{63}. Bersch et al. (1991) presented precise pyroxene analyses (figure 3).

Plagioclase: Warren and Wasson (1978) reported plagioclase was $An_{96\text{-}97}$.

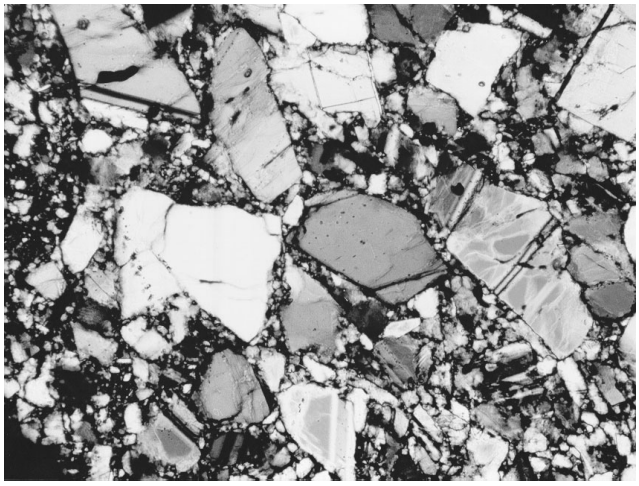

Figure 2: Photomicrograph of thin section 65325,6. Field of view is 1.3 mm. NASA S79-27681.

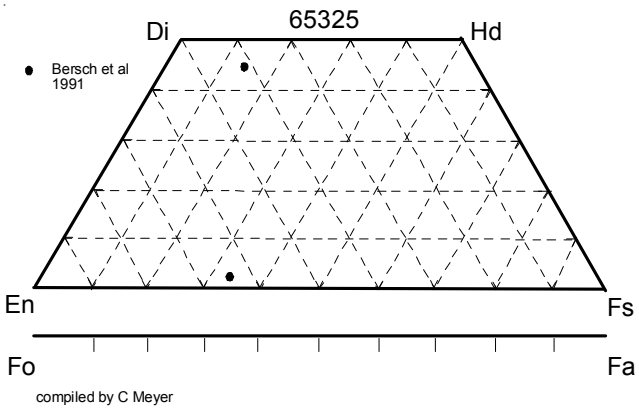

Figure 3: Pyroxene composition of 65325 (Bersch et al. 1991).

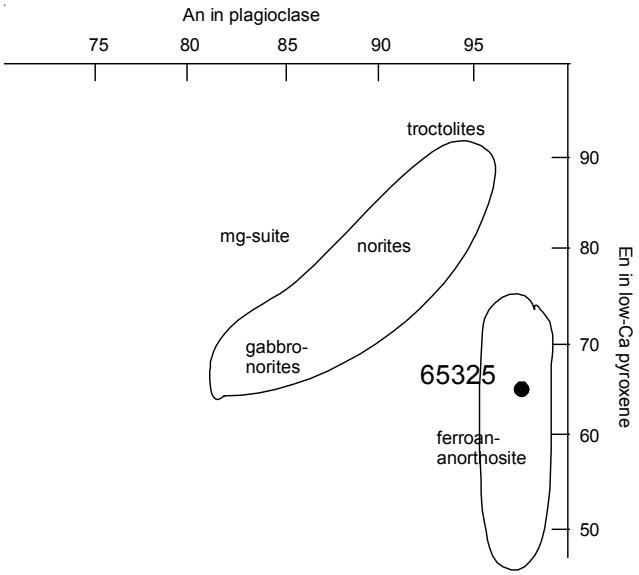

Figure 4: Plagioclase and pyroxene composition of 65325 (data from Warren and Wasson 1978).

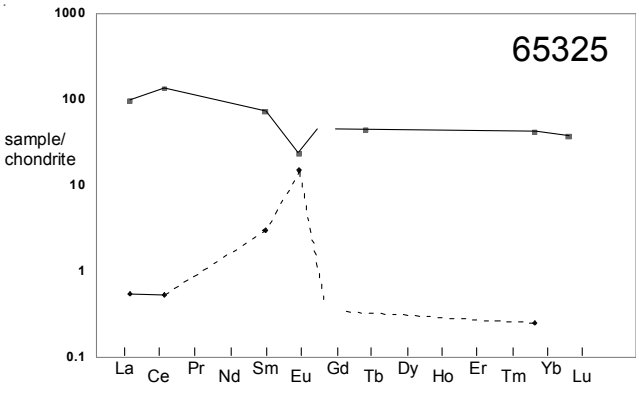

Figure 5: Normalized rare-earth-element composition diagram for 65325 and glass coating (data from Warren and Wasson 1978 and Morris et al. 1986).

Ilmenite: trace

Rust: Hunter and Taylor (1981) reported "rust".

Chemistry

Warren and Wasson (1978) and Ebihara et al. (1992) determined the composition of 65325 (table 1). Morris et al. (1986) found the glass coating was high in KREEP (figure 5). Cirlin and Housley (1981) determined Cd and Zn contents.

Other Studies

Cirlin and Housley (1981) showed that most of the Zn in 65235 was on the surface of the cracks (figure 6).

Table 1. Chemical composition of 65325.

						glass				
reference	Warren78			Ebihara92		Morris 86		Cirlin and Housley 1981		
weight						See 86				
SiO2 %		44.07	(b)			44.73	(c)			
TiO2						0.39	(c)			
Al2O3		35.1	(b)			26.51	(c)			
FeO	0.3	0.27	(b)			5.71	(c)			
MnO	0.008	0.008	(b)							
MgO		0.23	(b)			7.48	(c)			
CaO	19.6	19.7	(b)			14.82	(c)			
Na2O	0.39	0.38	(b)			0.35	(c)			
K2O						0.06	(c)			
P2O5										
S %										
sum										
Sc ppm	0.44	0.41	(b)			10.92	(b)			
V										
Cr	23.8	31.1	(b)			991	(b)			
Co	1.08	0.93	(b)			19	(b)			
Ni	<23	0.68	(b)	<2.22	(a)	364	(b)			
Cu										
Zn	24	20	(b)	19.7	(a)			1	1.3	<20 microns
Ga	4.49	4	(b)							
Ge ppb	16.1	39	(b)	10.8	(a)					
As										
Se				2.76	(a)					
Rb										
Sr										
Y										
Zr										
Nb										
Mo										
Ru										
Rh										
Pd ppb				<0.61	(a)					
Ag ppb				0.508	(a)					
Cd ppb	39	32	(b)	2.73	(a)			2.5		(d)
In ppb	<70	72	(b)	78	(a)					
Sn ppb										
Sb ppb				0.437	(a)					
Te ppb				1.27	(a)					
Cs ppm				0.0012	(a)					
Ba						273	(b)			
La	0.11	0.13	(b)			22.6	(b)			
Ce		0.32	(b)			81.1	(b)			
Pr										
Nd										
Sm	0.4	0.44	(b)			10.75	(b)			
Eu	0.78	0.83	(b)			1.32	(b)			
Gd										
Tb						1.61	(b)			
Dy										
Ho										
Er										
Tm										
Yb		0.04	(b)			6.78	(b)			
Lu						0.89	(b)			
Hf						6.94	(b)			
Ta						0.8	(b)			
W ppb										
Re ppb		0.015	(b)							
Os ppb										
Ir ppb	0.12	0.0076	(b)	0.017	(a)					
Pt ppb				<0.27	(a)					
Au ppb	0.052	0.021	(b)	<0.01	(a)					
Th ppm						4.09	(b)			
U ppm				0.001	(a)	1.08	(b)			

technique: (a) RNAA, (b) INAA, (c) emp, (d) FLAA

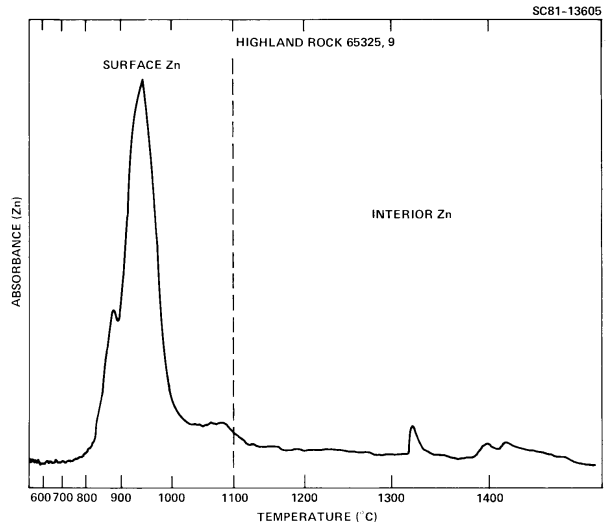

Figure 6: Thermal release profile of Zn in a pristine anorthostie 65325 showing that most of the Zn in this sample is on the surface of the cracks (from Cirlin and Hosely 1981).