

**72735**  
Impact Melt Breccia  
51.1 grams



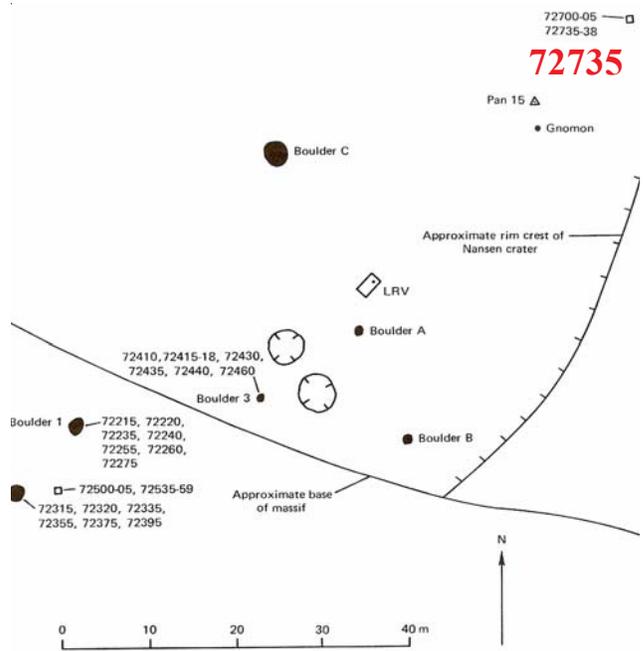
Figure 1: Photo of rake sample 72735 showing micrometeorite crater that nearly broke the sample. Scale and cube are 1 cm. NASA S73-19442. Note that if the micrometeorite had been a little larger or faster, we would have two samples!

**Introduction**

Rake sample 72735 has an unusual chemical composition. It has very high Rb and Zr! And it has low Mg/Fe and high Al.

72735 is rounded and pitted on all sides by exposure to space (figure 1). It was collected as a rake sample about 40 meters north of station 2 along with soil sample 72700 (see map).

Interestingly, Ryder and Dalrymple (1996) hypothesized that 72735 may be the one melt rock that is NOT ejecta from Serenitatis. So far, this hypothesis has not been tested.



**Station 2, Apollo 17**

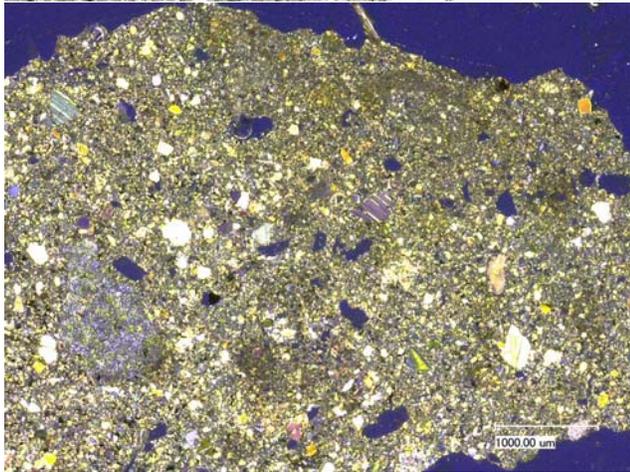
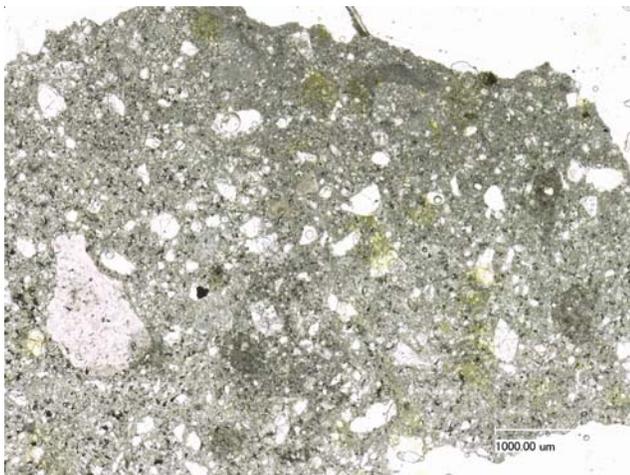


Figure 2: Photomicrographs of thin section 72735,12 by C Meyer @50x.

### **Petrography**

Warner et al. (1978) and Ryder (1993) describe 72735 as a crystalline matrix breccia. “Most of the plagioclase present in the matrix occurs in fine patches rather than as whole grains. Tiny patches of a K-rich interstitial silicate phase are common, particularly within the fine-grained plagioclase areas. Analyses of this phase in 72735 show it to be K-feldspar. Ilmenite is the chief opaque mineral and is present as rods or equant grains several microns wide or as irregular micropoikilitic crystals.” Chromite, rutile and baddelyite, troilite and metal are present in the matrix. Pyroxene and olivine composition is given in figure 4 and trends towards Fe enrichment.

Warner et al. (1978) briefly describe a variety of small clasts. One clast (figure 3) has “a cumulate texture, with 0.1-0.2 mm anhedral olivine (Fo<sub>86</sub>) grains poikilitically enclosed by a few large (>1 mm long) plagioclase (An<sub>92</sub>) crystals. The clast also contains one

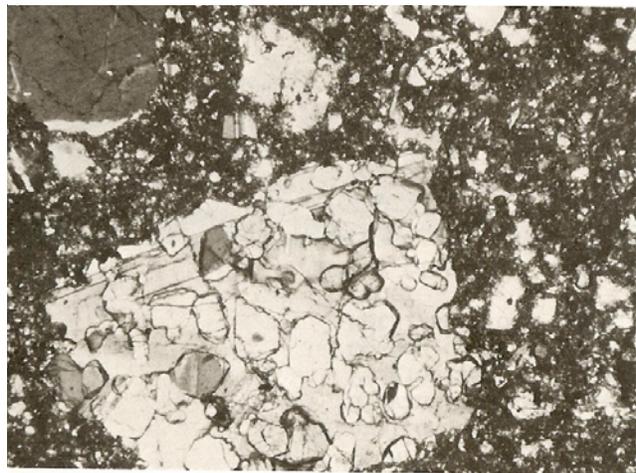


Figure 3: Troctolite clast in 72735 (from Warner et al. 1977).

~20 micron diameter crystal of pink spinel and trace amounts of ilmenite and chromite.”

### **Mineral Mode ( Warner et al. 1977)**

	Vol. %
Matrix	72.9
Mineral clasts	12.7
Lithic clasts	14.3
Mineral clasts	
Plagioclase	8
Olivine/Pyroxene	4.7
Opaque	tr.
Metal/troilite	
Other	
Lithic Clasts	
ANT	10.6
Devit. Anorthosite	2.4
Breccia	1.3
Other	tr.
Percent of matrix	
Plagioclase	52.7
Olivine/pyroxene	42.2
Opaque	1.2
Metal/troilite	0.3
Other	3.6

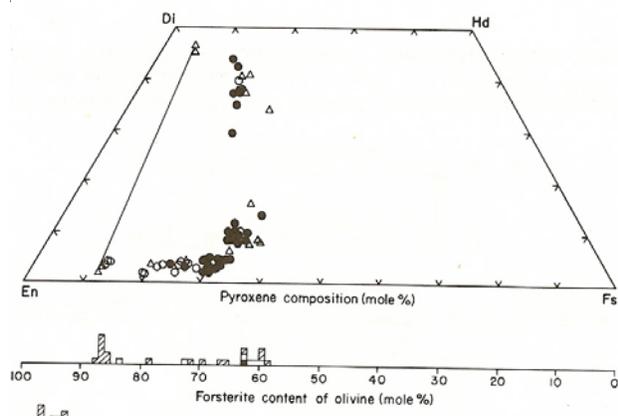


Figure 4: Pyroxene and olivine composition of 72735 (from Warner et al. 1977).

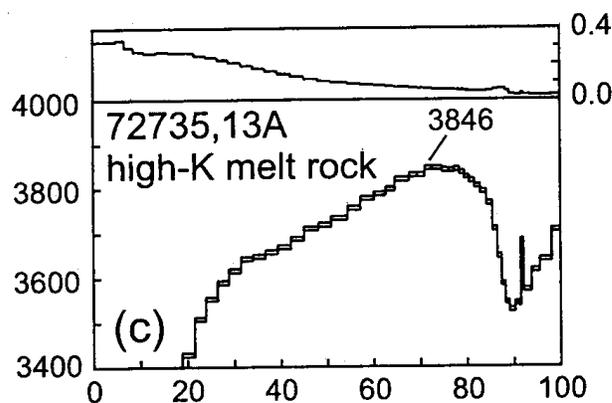


Figure 5: Argon<sup>39/40</sup> release curve for 72735 (Dalrymple and Ryder 1996).

### Chemistry

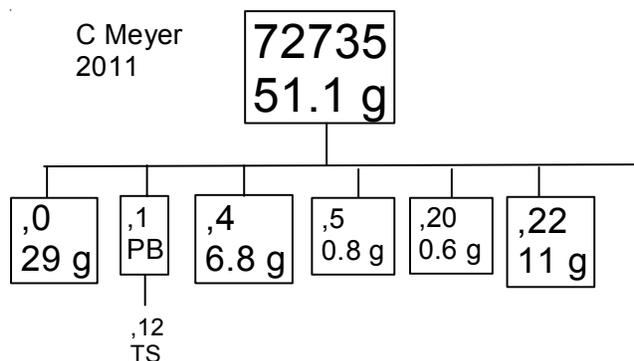
Dalrymple and Ryder (1996) repeated the analysis by Murali et al. (1977) and verified that this sample is “trace-element-rich” (table 1). The Rb content of 28 ppm is incredible!

### Radiogenic age dating

Dalrymple and Ryder (1996) attempted to obtain the age of 72735 by the Ar/Ar plateau technique (figure 5). However, they did not get a good plateau and can only report that the sample is at least 3.85 b.y. old.

### Processing

There is only one thin section of 72735.



**Table 1. Chemical composition of 72735.**

reference weight	Dalrymple96	Murali 77	Warner77
SiO2 %	48.2	(a)	50.1 (c)
TiO2	0.8	(a) 0.7	(b) 0.67 (c)
Al2O3	19.2	(a) 18	(b) 20.2 (c)
FeO	9	(b) 9.3	(b) 7.9 (c)
MnO	0.12	(a) 0.12	(b) 0.12 (c)
MgO	8.9	(a) 9	(b) 8.1 (c)
CaO	11.3	(a) 10.2	(b) 11.5 (c)
Na2O	0.63	(b) 0.54	(b) 0.68 (c)
K2O	0.82	(b) 0.73	(b) 0.89 (c)
P2O5			
S %			
sum			
Sc ppm	19.1	(b) 16	(b)
V		40	(b)
Cr	1432	(b) 1230	(b)
Co	25	(b) 17	(b)
Ni	167	(b) 91	(b)
Cu			
Zn			
Ga			
Ge ppb			
As			
Se			
Rb	28	(b)	
Sr	162	(b)	
Y			
Zr	590	(b) 880	(b)
Nb			
Mo			
Ru			
Rh			
Pd ppb			
Ag ppb			
Cd ppb			
In ppb			
Sn ppb			
Sb ppb			
Te ppb			
Cs ppm	0.88	(b)	
Ba	658	(b) 560	(b)
La	48.3	(b) 50.2	(b)
Ce	124.3	(b) 127	(b)
Pr			
Nd	80	(b)	
Sm	21.4	(b) 18.7	(b)
Eu	2.07	(b) 1.87	(b)
Gd			
Tb	4.6	(b) 3.9	(b)
Dy		27	(b)
Ho			
Er			
Tm			
Yb	17.4	(b) 15.1	(b)
Lu	2.4	(b) 2.3	(b)
Hf	17.7	(b) 23	(b)
Ta	2	(b) 2.3	(b)
W ppb			
Re ppb			
Os ppb			
Ir ppb	7.8	(b) 110	(b)
Pt ppb			
Au ppb	4.2	(b)	
Th ppm	9.1	(b) 2.9	(b)
U ppm	2.64	(b)	

technique: (a) fused-bead, eprobe, (b) INAA, (C) broad-beam e-probe

**References for 72735**

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