# **10032** Ilmenite Basalt 3.1 grams



Figure 1: Lunar basalt fragment 10032. NASA S75-31697. Cube is 1 cm.

#### **Introduction**

10032 was collected as part of the contingency sample from the regolith in front of the LM (Sutton and Schaber 1971). It is a fine grained ilmenite basalt (figure 1).

The age of 10032 has been determined as 3.6 b.y. with an exposure to cosmic rays of 140 m.y.

# **Petrography**

Beaty and Albee (1978) studied the mineral chemistry in 10032 and group it other fine-grained vesicular specimen in the high K suite of Apollo 11 basalts. It is ilmenite rich and has a grain size about 100 micron. High K glass is found in the intersticies.

# **Mineralogy**

**Olivine:** The most magnesium olivine in 10032 is  $Fo_{69}$  (Beaty and Albee 1978).

*Pyroxene:* Some of the large augite grains in 10032 have pigeonite cores (figure 2).

Plagioclase: Plagioclase in 10032 is An<sub>78-70</sub>.

*Ilmenite:* Ilmenite has about 1 % MgO.

# **Mineralogical Mode of 10032**

Beaty and Albee 1978
0.11
52.61
22.16
16.45
6.66
0.94
0.72
0.24

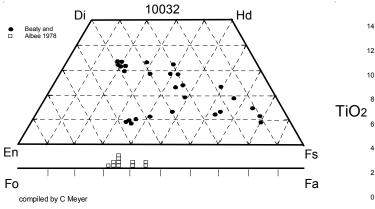
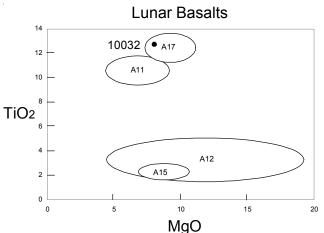


Figure 2: Pyroxene and olivine composition of 10032 (from Beaty and Albee 1978).



*Figure 3: Composition of 10032 compared with other Apollo basalts..* 

*Phosphate:* The phosphate has 2.3 % fluorine.

# **Chemistry**

The composition of 10032 has been determined by calculation based on mineral mode and mineral composition (table 1, figure 3).

#### **Radiogenic age dating**

The age of 10032 was determined aboput 3.6 b.y. by the Ar/Ar plateau technique (Guggisberg et al. 1979) (figure 4).

## Cosmogenic isotopes and exposure ages

Guggisberg et al. (1979) determined and <sup>37</sup>Ar/<sup>38</sup>Ar age of 139 b.y.

#### **Other Studies**

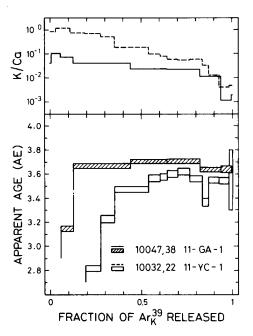
The total organic carbon content of 10032 was determined by hydrogen flame ionization pyrolysis (Ponnamperuma et al. 1970).

Funkhouser et al. (1970) and Bogard et al. (1971) reported the abundance and isotopic composition of rare gasses from 10032.

#### **Processing**

Apollo 11 samples were originally described and cataloged in 1969 and "re-cataloged" by Kramer et al. (1977). There are 7 thin sections.

**List of Photo #s for 10032** S75-31697



*Figure 4: Argon release pattern (Guggisberg et al. 1979).* 

Summary of Age Data for 10032

Guggisberg et al. 1979Ar/Ar plateau $3.58 \pm 0.06$  b.y. (poorly defined)

reference weight SiO2 % TiO2 Al2O3 FeO MnO MgO CaO Na2O K2O P2O5 S % sum	Beaty 78 39.49 13.06 7.08 19.37 0.27 8.81 10.21 0.45 0.28 0.11 0.36	(a) (a) (a) (a) (a) (a) (a) (a) (a) (a)	
Sc ppm V Cr Co Ni Cu Zn Ga Ge ppb As Se Rb Sr Y Zr Nb Mo Ru Rh Pd ppb Ag ppb Cd ppb In ppb Sb ppb Cd ppb In ppb Sb ppb Cd ppb In ppb Sb ppb Cs ppm Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Y b Lu Hf Ta W ppb Ag ppb Cs ppm Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Y b Lu Hf Ta W ppb Ag ppb Cs ppm Ho Er Dy Ho Er Dy Ho Er Dy Ho Er Dy Ho Er Dy Ho Er Dy Ho Er Dy Ho Er Dy Ho Er Dy Ho Er Dy Ho Er Dy Ho Er Dy Ho Er Dy Ho Cs ppm Cs ppm Cs ppm Ba Cc Pr Nd Sm Eu Gd Tb Dy Ho Er Ho Er Dy Ho Er Tm Dy Er Dy Ho Er Dy Ho Er Ho Er Dy Dy Ho Er Dy Dy Dy Ho Er Dy Ho Er Dy Ho Er Dy Dy Dy Ho Er Dy Dy Dy Dy Dy Ho Er Dy Dy Dy Dy Dy Dy Dy Dy Dy Dy Dy Dy Dy	(a) elec.	Probe +	- point count

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