# 78135

Ilmenite Basalt

133.9 grams

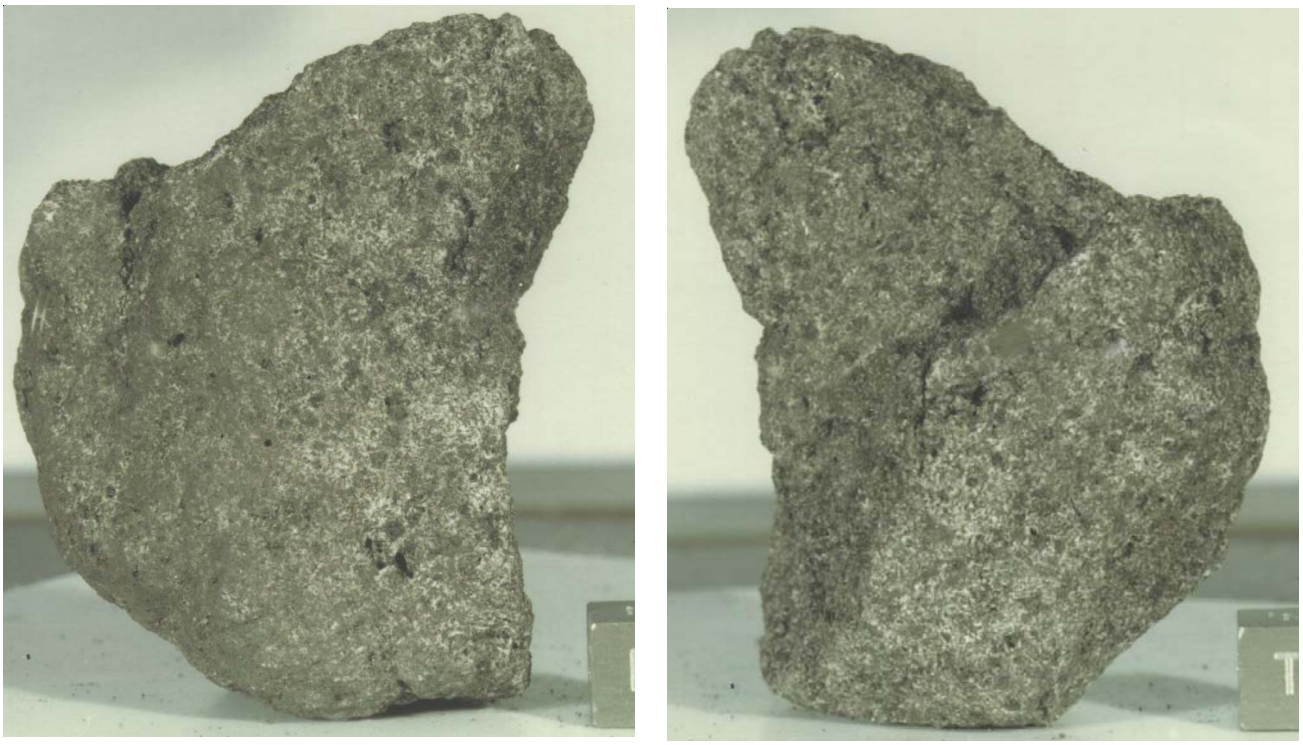


*Figure 1 a, b: Two side of 78135. NASA S73-15004 and 15003. Cube is 1 cm.*

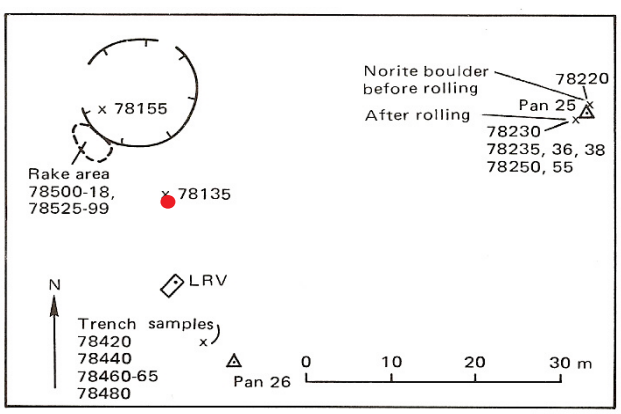



*Figure 2: Location of 78135 on map of station 8, Apollo 17.*

## Introduction

78135 is a medium-grained ilmenite basalt collected from the regolith at station 8, Apollo 17.

## Petrography

Brown et al. (1975) give the mode. In general, mineral chemistries have not been reported, although Brown et al. (1975) determined the composition of a Zr-rich mineral (table 2).

### Mineralogical Mode for 78135

| | Brown et al. 1975 |
|---|---|
| Olivine | 0.3 |
| Pyroxene | 50.7 |
| Plagioclase | 20.6 |
| Opaques | 24.4 |
| Silica | 4 |
| Mesostasis | - |

## Chemistry

Keith et al. (1974) and Fruchter et al. (1975) determined the K, U, Th by counting the natural radioactivity. Rhodes et al. (1976) reported both major and minor element contents by combined XRF, INAA and IDMS (table 1, figures 4, 5 and 6).

Gibson et al. (1976) reported 1895 ppm S.

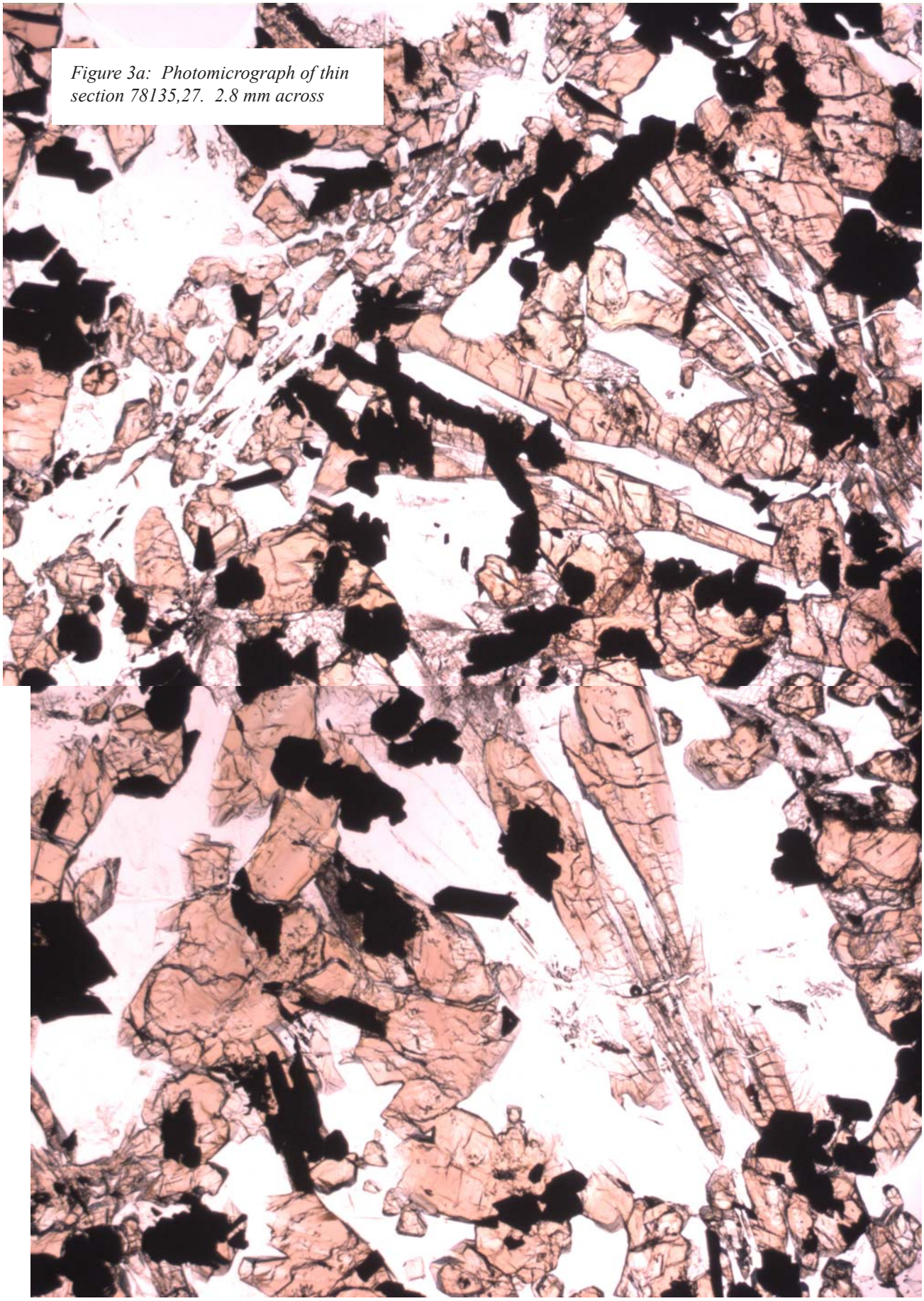


*Figure 3a: Photomicrograph of thin section 78135,27. 2.8 mm across*

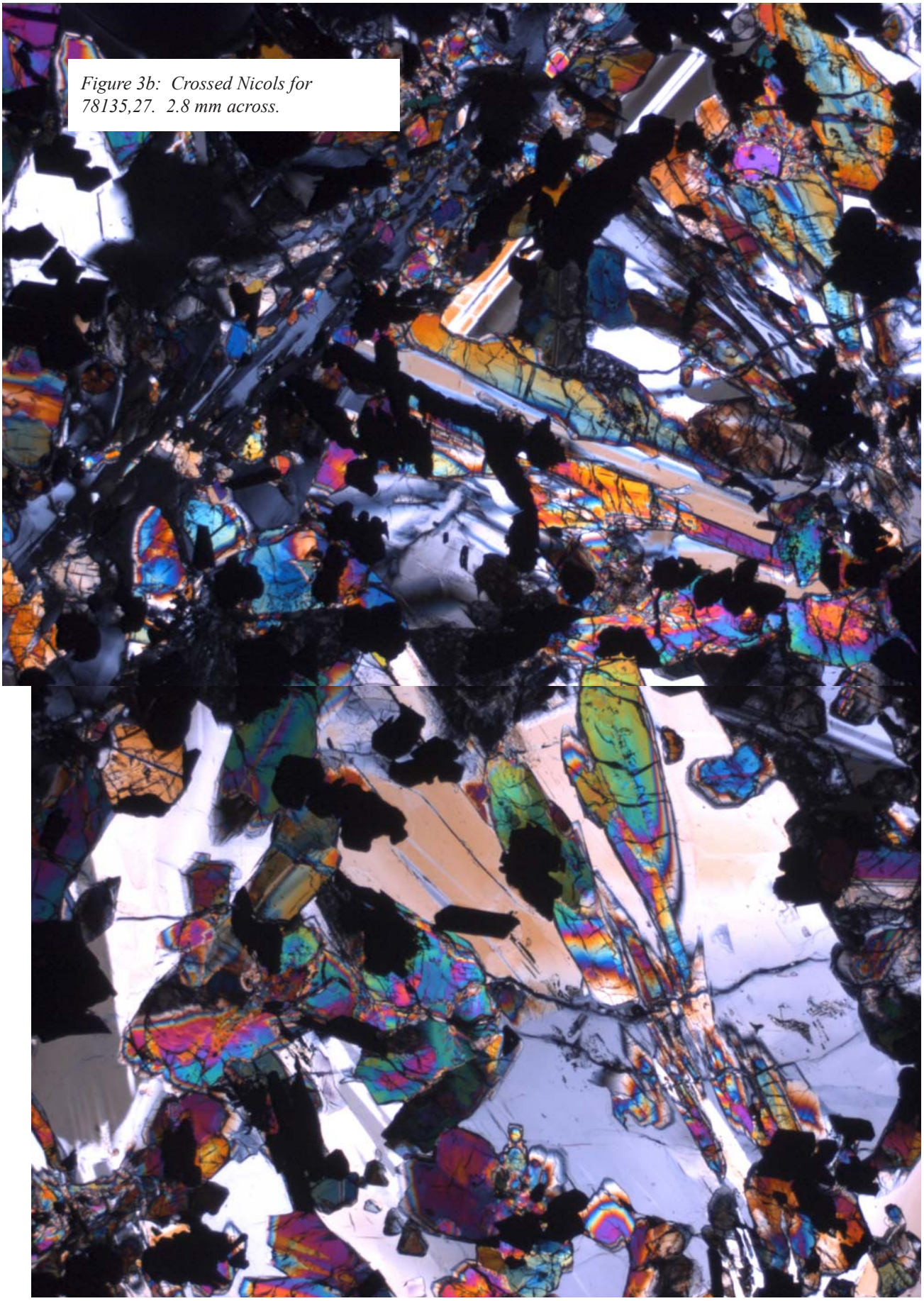


*Figure 3b: Crossed Nicols for 78135,27. 2.8 mm across.*

## Table 1. Chemical composition of 78135.

| *reference* | Rhodes76 | | Fruchter75 | Kieth74 | |
|---|---|---|---|---|---|
| *weight* | Nyquist76 | | | | |
| SiO2 % | 37.98 | (a) | | | |
| TiO2 | 12.89 | (a) | | | |
| Al2O3 | 8.38 | (a) | | | |
| FeO | 19.05 | (a) | | | |
| MnO | 0.27 | (a) | | | |
| MgO | 8.69 | (a) | | | |
| CaO | 10.71 | (a) | | | |
| Na2O | 0.36 | (a) | | | |
| K2O | 0.05 | (a) | 0.048 | 0.0525 | (d) |
| P2O5 | 0.04 | (a) | | | |
| S % | 0.18 | (a) | | | |
| *sum* | | | | | |
| | | | | | |
| Sc ppm | 84 | (b) | | | |
| V | | | | | |
| Cr | 3079 | (a) | | | |
| Co | 18.4 | (b) | | | |
| Ni | | | | | |
| Cu | | | | | |
| Zn | | | | | |
| Ga | | | | | |
| Ge ppb | | | | | |
| As | | | | | |
| Se | | | | | |
| Rb | 0.58 | (c ) | | | |
| Sr | 174 | (c ) | | | |
| Y | | | | | |
| Zr | | | | | |
| Nb | | | | | |
| Mo | | | | | |
| Ru | | | | | |
| Rh | | | | | |
| Pd ppb | | | | | |
| Ag ppb | | | | | |
| Cd ppb | | | | | |
| In ppb | | | | | |
| Sn ppb | | | | | |
| Sb ppb | | | | | |
| Te ppb | | | | | |
| Cs ppm | | | | | |
| Ba | 74 | (c ) | | | |
| La | 5.8 | (c ) | | | |
| Ce | 20.2 | (c ) | | | |
| Pr | | | | | |
| Nd | 22.4 | (c ) | | | |
| Sm | 9.43 | (c ) | | | |
| Eu | 1.93 | (c ) | | | |
| Gd | 14.9 | (c ) | | | |
| Tb | | | | | |
| Dy | 17 | (c ) | | | |
| Ho | | | | | |
| Er | 10.5 | (c ) | | | |
| Tm | | | | | |
| Yb | 9.21 | (c ) | | | |
| Lu | 1.33 | (b) | | | |
| Hf | 9.3 | (b) | | | |
| Ta | | | | | |
| W ppb | | | | | |
| Re ppb | | | | | |
| Os ppb | | | | | |
| Ir ppb | | | | | |
| Pt ppb | | | | | |
| Au ppb | | | | | |
| Th ppm | | | 0.35 | 0.26 | (d) |
| U ppm | | | 0.11 | 0.107 | (d) |

*technique: (a) XRF, (b) INAA, (c ) IDMS, (d) radiation count.*

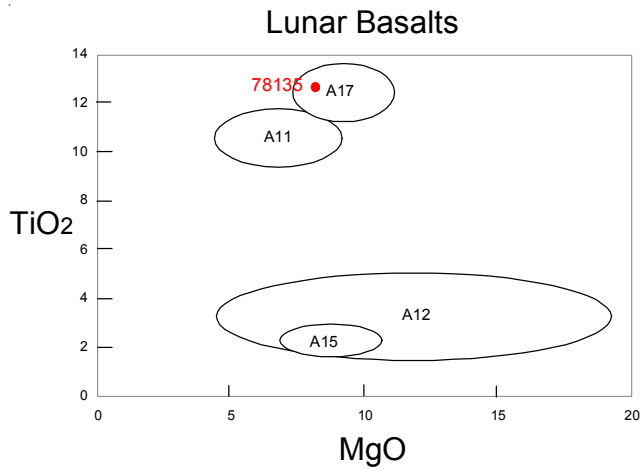



*Figure 4: Composition of lunar basalt.*

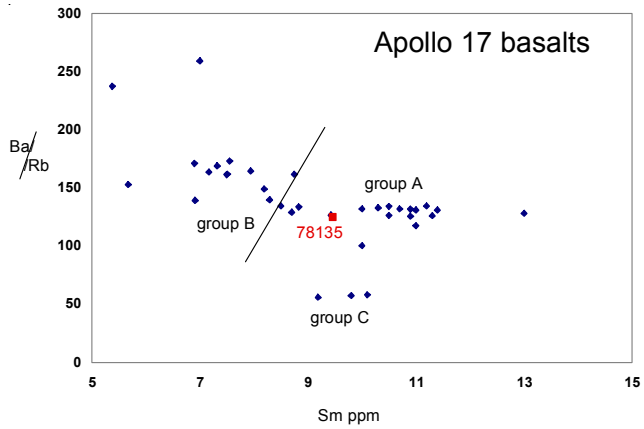



*Figure 5: Trace element characteristics of Apollo 17 basalts.*

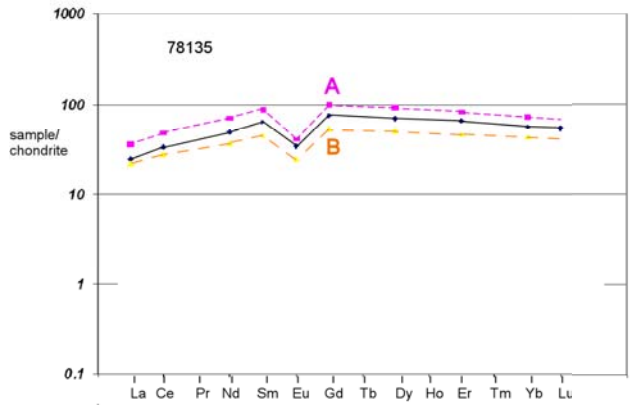



*Figure 6: Normalized rare-earth-element diagram for 78135 compared with A and B types of Apollo 17 basalt.*

## Radiogenic age dating

Nyquist et al. (1975) determined the Rb, Sr and $Sr^{87/86}$ for a "whole-rock" sample.

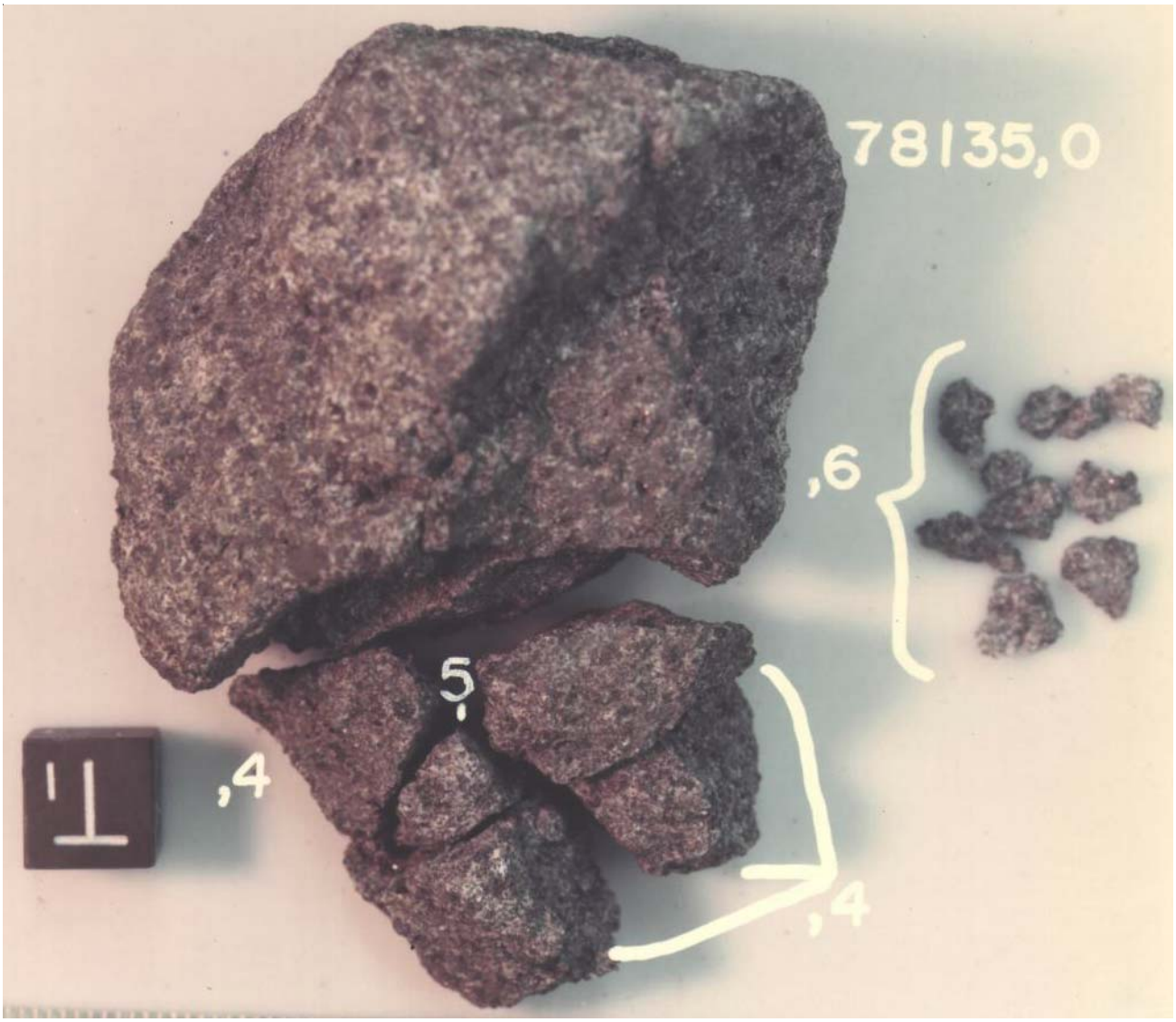
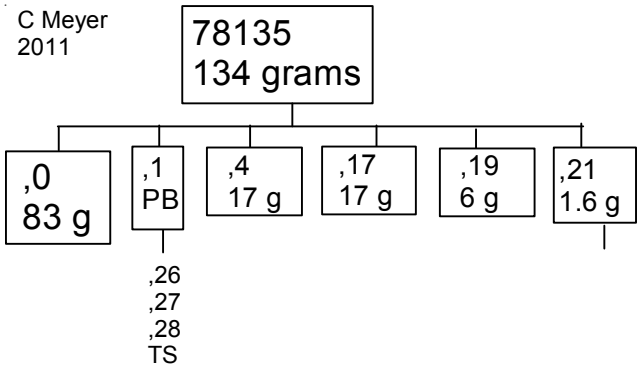



*Figure 7: Initial processing of 78135. Cube is 1 cm. S75-28690.*

**Table 2: Zr-rich mineral**
*(Brown et al. 1975)*

| | |
|---|---|
| TiO2 | 17.33 |
| FeO | 4.27 |
| MgO | 0.13 |
| CaO | 2.61 |
| Zr02 | 65.18 |
| Y2O3 | 6.82 |
| NbO5 | - |
| HfO2 | 0.45 |




## Cosmogenic isotopes and exposure ages

Drozd et al. (1977) determined the cosmic ray exposure age to be 126 m.y.

Keith et al. (1974) determined the cosmic-ray-induced activity of $^{22}$Na = 74 dpm/kg, $^{26}$Al = 42 dpm/kg, $^{46}$Sc = 76 dpm/kg, $^{48}$V = 18 dpm/kg, $^{54}$Mn = 180 dpm/kg and $^{56}$Co = 240 dpm/kg.

## Processing

Chipped, not sawn. Only three thin sections.

**References for 78135.**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Wolfe E.W., Bailey N.G., Lucchitta B.K., Muehlberger W.R., Scott D.H., Sutton R.L and Wilshire H.G. (1981) The geologic investigation of the Taurus-Littrow Valley: Apollo 17 Landing Site. US Geol. Survey Prof. Paper, 1080, pp. 280.