Introduction

78597 is a vuggy, medium-grained high-Ti basalt (figure 1 and 3). It was collected as part of a rake sample and large comprehensive sample at station 8, Apollo 17 (figure 2).

Petrography

78597 is an olivine-microoporhritic ilmenite basalt with large olivine grains set in a predominantly variolitic groundmass (figure 5). Plagioclase laths in the groundmass have hollow cores (interfaciculate) and are bundled in sheaths with intergrown pyroxene. Ilmenite occurs in chains. Trace tranquillityite has been reported (Warner et al. 1978).

Chemistry

Warner et al. (1975) and Rhodes et al. (1976) reported the chemical composition of 78597 (table 1, figures 6,
7 and 8). Note that the Rb content is low, compared with other Apollo 17 basalts.

Gibson et al. (1976) reported 1990 ppm S.

**Radiogenic age dating**
Nyquist et al. (1976) studied the Rb-Sr isotope system, but did not determine an age. However, the age of Apollo 17 basalt is 3.72 b.y.

**Cosmogenic isotopes and exposure ages**
O’Kelley et al. (1974) determined the cosmic-ray-induced activity of $^{22}$Na = 33 dpm/kg, $^{26}$Al = 48 dpm/kg, $^{40}$Sc = 25 dpm/kg, $^{54}$Mn = 80 dpm/kg and $^{56}$Co = 80 dpm/kg.

**Processing**
There is only one (small) thin section of 78597.

**Mineralogical Mode**

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Mode (%)</th>
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<tbody>
<tr>
<td>Olivine</td>
<td>5.9</td>
</tr>
<tr>
<td>Pyroxene</td>
<td>42.2</td>
</tr>
<tr>
<td>Plagioclase</td>
<td>29.5</td>
</tr>
<tr>
<td>Opaques</td>
<td>16.5</td>
</tr>
<tr>
<td>Silica</td>
<td>5.4</td>
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<tr>
<td>Meostasis</td>
<td>0.5</td>
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</tbody>
</table>
Figure 5: Photomicrograph of thin section 78597.11. 2.8 mm across

Lunar Sample Compendium
C Meyer 2011
Table 1. Chemical composition of 78597.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Weight</th>
<th>SiO2 %</th>
<th>TiO2</th>
<th>Al2O3</th>
<th>FeO</th>
<th>MnO</th>
<th>MgO</th>
<th>CaO</th>
<th>Na2O</th>
<th>K2O</th>
<th>P2O5</th>
<th>S %</th>
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</thead>
<tbody>
<tr>
<td>Eldridge74</td>
<td>Nyquist76</td>
<td>38.54 (d)</td>
<td>12.39 (d)</td>
<td>8.85 (d)</td>
<td>19.67 (d)</td>
<td>0.29 (d)</td>
<td>7.83 (d)</td>
<td>10.94 (d)</td>
<td>0.04 (d)</td>
<td>0.046 (a)</td>
<td>0.11 (d)</td>
<td>0.19 (d)</td>
</tr>
<tr>
<td>Rhodes76</td>
<td></td>
<td>38.54 (d)</td>
<td>12.39 (d)</td>
<td>8.85 (d)</td>
<td>19.67 (d)</td>
<td>0.29 (d)</td>
<td>7.83 (d)</td>
<td>10.94 (d)</td>
<td>0.04 (d)</td>
<td>0.046 (a)</td>
<td>0.11 (d)</td>
<td>0.19 (d)</td>
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<tr>
<td>Warner75</td>
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<td>38.54 (d)</td>
<td>12.39 (d)</td>
<td>8.85 (d)</td>
<td>19.67 (d)</td>
<td>0.29 (d)</td>
<td>7.83 (d)</td>
<td>10.94 (d)</td>
<td>0.04 (d)</td>
<td>0.046 (a)</td>
<td>0.11 (d)</td>
<td>0.19 (d)</td>
</tr>
</tbody>
</table>

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

Figure 6: Composition of lunar basalts.

Figure 7: Trace element characteristics of Apollo 17 basalts.

Figure 8: Normalized rare-earth-element diagram for 78597 compared with A and B types of Apollo 17 basalt.
References for 78597


LSPET (1973) Apollo 17 lunar samples: Chemical and petrographic description. Science 182, 659-672.


Ryder G (1993) Catalog of Apollo 17 rocks. Vol. 1 South Massif

