**72501 and 72530**  
Landslide Soil  
1061 and 18 grams

**Introduction**

72501 is a soil sample collected about 5 meters from boulder 2 at station 2 on the landslide off of the South Massif at Apollo 17 (Wolfe et al. 1981). It contained one rock fragment - 72505. A large rake sample (72535-559) was collected adjacent to this soil sample. The rock fragments from this location are all impact melt breccias – similar to the adjacent boulder (72315). 72530 is the residue in the bag for the rake sample and may contain material abraded off of the rake samples – mixed with some soil.

Station 2 is located on the bottom slope of the South Massif, but in close proximity of Nansen Crater (figures 5 and 6). Soil sample 72320 was collected about 5 meters away. 72700 was collected on the other side of Nansen Crater.

**Petrography**

72501 is one of the soils that Papike et al. (1982) considered a “reference” soil. It is a mature soil with maturity index $I_s/FeO = 81$ (Morris 1978), average grain size 59 microns (Graf 1992) and high agglutinate content. The grain size distribution was determined by Butler and King (1974) and Green et al. (1975) and the mineralogic mode given by Heiken and McKay (1974) and Simon et al. (1981). Meyer (1973) cataloged the 4 – 10 mm coarse-fines. Bence et al. (1974) and Jolliff et al. (1996) studied several coarse-fines from 72503 (figures 7 and 8).

**Chemistry**

This is an Al-rich and Fe-poor soil (figure 1), derived from feldspathic impact melt rocks from high up on the South Massif (rim of Serenitatis basin?). Laul et al. (1981) also reported the composition as function of grain size. The rare earth pattern is distinctive of a high KREEP component (figure 9). Krahenbuhl et al. (1977) studied the distribution of volatile elements (Cd, Ge, Hg, In, Sb and Zn) as function of grain size.

LSPET (1973), Moore et al. (1974) and DesMarais et al. (1975) reported 125 and 135 ppm carbon, respectively. Müller (1974) determined nitrogen = 70 ppm.

**Mineralogical Mode for 72501**

<table>
<thead>
<tr>
<th></th>
<th>Simon et al. 1981</th>
<th>Heiken 1974</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(90 to 1000 micron)</td>
<td>(90 to 150 micron)</td>
</tr>
<tr>
<td>Mare basalt</td>
<td>2.9</td>
<td>3.3</td>
</tr>
<tr>
<td>feldspathic basalt</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>anorthosite, norite</td>
<td>5.2</td>
<td>2.7</td>
</tr>
<tr>
<td>breccias, light</td>
<td>2.4</td>
<td>8.7</td>
</tr>
<tr>
<td>poikilitic breccias</td>
<td>9.7</td>
<td>12.6</td>
</tr>
<tr>
<td>mafic mineral</td>
<td>5.2</td>
<td>6</td>
</tr>
<tr>
<td>plagioclase</td>
<td>10.9</td>
<td>6.3</td>
</tr>
<tr>
<td>opaque</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>glass</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>agglutinate</td>
<td>37.6</td>
<td>48</td>
</tr>
<tr>
<td>dark breccias</td>
<td>22.6</td>
<td>8.3</td>
</tr>
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</table>

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Lunar Sample Compendium  
C Meyer 2010
p/n. Norris et al. (1983) reported carbon = 109 ppm and nitrogen = 94 ppm in 72501. Most carbon and nitrogen are implanted by the solar wind, and are a measure of soil maturity (figure 2). Goel et al. (1975) found 92 ppm nitrogen.

**Radiogenic age dating**

Particles from 72503 have been dated by Schaeffer and Husain (1974) with the $^{40}$Ar/$^{39}$Ar plateau technique (figure 10).

**Cosmogenic isotopes and exposure ages**

Goswami and Lal (1974) determined the fossil SCR nuclear track density.

Curtis and Wasserburg (1977) determined the isotopic ratio for Gd to determine the total flux of neutrons.

**Other Studies**

Hua et al. (1976) determined the ultraviolet spectra. Durrani and Hwang (1975) produced “glow curves” for 72501 to compare with samples from different depths in the station 8 trench (figure 11).

Merlivat (1974) reported the hydrogen content and isotopic ratio of 72501.

Silver (1974) determined the U, Th and Pb isotope system for 72500 and other Apollo 17 soils.

Rees and Thode (1974) reported the isotopic composition of sulfur.

Bogard et al. (1974) and Hubner et al. (1974) reported the rare gas content and isotopic ratios and Wieler et al. (1983) reported rare gas content and isotopic ratios for mineral separates (plagioclase, pyroxene and agglutinate) from 72501.
Figure 5: Location of 72500 near Nanson Crater. AS17-138-21045

Figure 6: Map showing locations of soils and boulders at station 2, Apollo 17.
Summary of Age Data for 72503

Ar/Ar

Schaeffer et al. 1974 3.96 ± 0.02 b.y.
Table 1. Chemical composition of 72501.

<table>
<thead>
<tr>
<th>reference weight</th>
<th>Lspet73</th>
<th>Rhodes74</th>
<th>philpotts74</th>
<th>Chou76</th>
<th>Brunfelt74</th>
<th>Jollif96</th>
<th>Miller74</th>
<th>Scoon74</th>
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<tbody>
<tr>
<td>SiO₂ %</td>
<td>45.2</td>
<td>45.12</td>
<td>45.17</td>
<td>1.17</td>
<td>21.3</td>
<td>20.2</td>
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<tr>
<td>TiO₂</td>
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<td>1.56</td>
<td>1.55</td>
<td>8.62</td>
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<tr>
<td>Al₂O₃</td>
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<tr>
<td>MgO</td>
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<td>10.08</td>
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<td>9.9</td>
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<tr>
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<td>0.47</td>
<td>0.45</td>
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<tr>
<td>K₂O</td>
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<td>0.164</td>
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<tr>
<td>P₂O₅</td>
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<td>0.15</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>S %</td>
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</tbody>
</table>

Sc ppm 45.17 | 18 (d) | 19 (a) | 17.7 (a) | 18.9 (a) | 3.8 (a)  | 6 (a)  | 45 (a)  | 163 (a) | 209 (a)  | (a) |
Cr 1437 | 1476 (c) | 1450 (a) | 1390 (a) | 1495 (a) | 101 (a)  | 143 (a) | 1485 (a) | 1450 (a) | 1495 (a) | (a) |
Co 31 | 32 (a) | 38 (a) | 27.6 (a) | 28.6 (a) | 23.1 (a) | 21.2 (a) | 241 (a) | 231 (b) | 250 (a) | (a) |
Ni 250 | 241 (a) | 231 (b) | 250 (a) | 250 (a) | 288 (c) | 248 (a) | 288 (c) | 248 (a) | 250 (a) | (a) |
Cu 4.077 | 4.6 (c) | 3.8 (a) | 6 (a) | 6 (a) | 6 (a) | 6 (a) | 6 (a) | 6 (a) | 6 (a) | (a) |
Zn 18 | 17 (d) | 21 (b) | 20 (a) | 26 (a) | 4.5 (a) |          |         |         |         |     |
Ge ppb 368 | 400 (d) |         |         |         |          |         |         |         |         |     |
As 160 | 155 (c) | 155 (c) | 101 (a) | 143 (a) | 101 (a)  | 143 (a) | 101 (a) | 143 (a) | 143 (a) | (a) |
Se 220 | 200 (a) | 259 (c) | 248 (a) |         |          |         |         |         |         |     |
Sr Y 64 | 63 (b) | 64 (a) | 63 (b) | 63 (b) |          |         |         |         |         |     |
Zr 11 | 11 (a) | 11 (a) | 11 (a) | 11 (a) |          |         |         |         |         |     |
Nb Mo Ru Rh Pd ppb 42 | 39 (d) | 2.8 | 2.1 | (d) |         |         |         |         |         |     |
Cd ppb 2.8 | 2.5 (d) |         |         |         |         |         |         |         |         |     |
In ppb 2.8 | 2.5 (d) |         |         |         |         |         |         |         |         |     |
Sn ppb 2.8 | 2.5 (d) |         |         |         |         |         |         |         |         |     |
Sb ppb 2.8 | 2.5 (d) |         |         |         |         |         |         |         |         |     |
Te ppb 6.58 | 6.33 (c) |         |         |         |          |         |         |         |         |     |
Cs ppm 6.1 | 6.1 (a) | 27.8 (c) | 29 (a) | 26.5 (a) |          |         |         |         |         |     |
Ba 190 | 200 (c) | 211 (c) | 186 (a) | 209 (a) | 163 (a)  | 209 (a) | 186 (c) | 209 (a) | 209 (a) | (a) |
La 18 | 17.1 (c) | 17.1 (a) | 17.3 (a) | 17.3 (a) |          |         |         |         |         |     |
Ce 47 | 46 (c) | 44.6 (c) | 47 (a) | 45.4 (a) |          |         |         |         |         |     |
Pr 30 | 29 (a) | 29 (a) | 28.6 (a) | 28.6 (a) |          |         |         |         |         |     |
Nd 8.2 | 8.1 (a) | 8.1 (a) | 7.99 (a) | 8.45 (a) |          |         |         |         |         |     |
Sm 1.33 | 1.33 (c) | 1.33 (c) | 1.33 (c) | 1.33 (c) |          |         |         |         |         |     |
Eu 0.87 | 0.84 (a) | 0.82 (a) | 0.82 (a) | 0.82 (a) |          |         |         |         |         |     |
Gd 0.14 | 0.14 (c) | 0.14 (c) | 0.14 (c) | 0.14 (c) |          |         |         |         |         |     |
Tb 1.7 | 1.6 (a) | 1.6 (a) | 1.6 (a) | 1.6 (a) |          |         |         |         |         |     |
Dy 11 | 11 (a) | 11 (a) | 11 (a) | 11 (a) |          |         |         |         |         |     |
Ho 6.58 | 6.33 (c) |          |         |         |          |         |         |         |         |     |
Er Yb 6 | 6.2 (a) | 5.9 (a) | 6.15 (a) | 6.15 (a) |          |         |         |         |         |     |
Lu 0.87 | 0.84 (a) | 0.82 (a) | 0.82 (a) | 0.82 (a) |          |         |         |         |         |     |
Hf 6.1 | 6.1 (a) | 6.1 (a) | 6.1 (a) | 6.1 (a) |          |         |         |         |         |     |
Ta 0.84 | 0.84 (a) | 0.84 (a) | 0.84 (a) | 0.84 (a) |          |         |         |         |         |     |
W ppb 520 |         |         |         |         |          |         |         |         |         |     |
Re ppb 6.58 | 6.33 (c) |          |         |         |          |         |         |         |         |     |
Os ppb 6.58 | 6.33 (c) |          |         |         |          |         |         |         |         |     |
Ir ppb 8 | 8 (a) | 9 (a) | 7.9 (a) | 7.9 (a) |          |         |         |         |         |     |
Pt ppb 4 | 5 (a) | 5.5 (a) | 3.8 (a) | 3.8 (a) |          |         |         |         |         |     |
Th ppm 2.9 | 3 (a) | 3 (a) | 3.14 (c) | 3.14 (c) |          |         |         |         |         |     |
U ppm 1 | 1 (a) | 0.87 (c) | 0.87 (c) | 0.87 (c) |          |         |         |         |         |     |

**technique:** (a) INAA, (b) XRF, (c) IDMS, (d) RNAA, (e) wet
### References for 72501


Meyer C. (1973) Apollo 17 Coarse Fines (4-10 mm) Sample Location, Classification and Photo Index. Curator Report. pp. 182.


