

**65777 – 16.5 grams**  
**65778 – 12.2 grams**  
**Poikilitic Impact Melt Breccia**



Figure 1: Photo of 65777. Sample is 3.5 cm. S72-48813



Figure 2: Thin section photo of 65777 (from Warner et al. 1976).

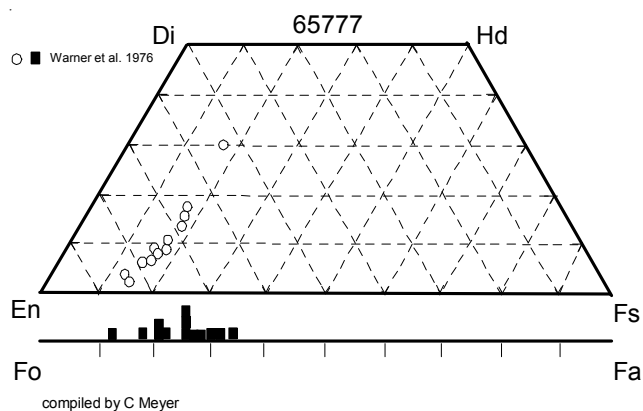


Figure 3: Pyroxene and olivine composition of 65777 (Warner et al. 1976).

**Introduction**

65777 and 65778 were collected as a rake sample from station 5 – see section on 65701.

65777 has been dated at 3.7 b.y.

**Petrography**

Keil et al. (1972) and Warner et al. (1976) found 65777 and 65778 were coherent crystalline impact melt breccias with poikilitic texture. The interlocking pigeonite oikocrysts include rounded grains of augite



Figure 4: Photo of thin section 65777,5 by C Meyer. 2 mm across

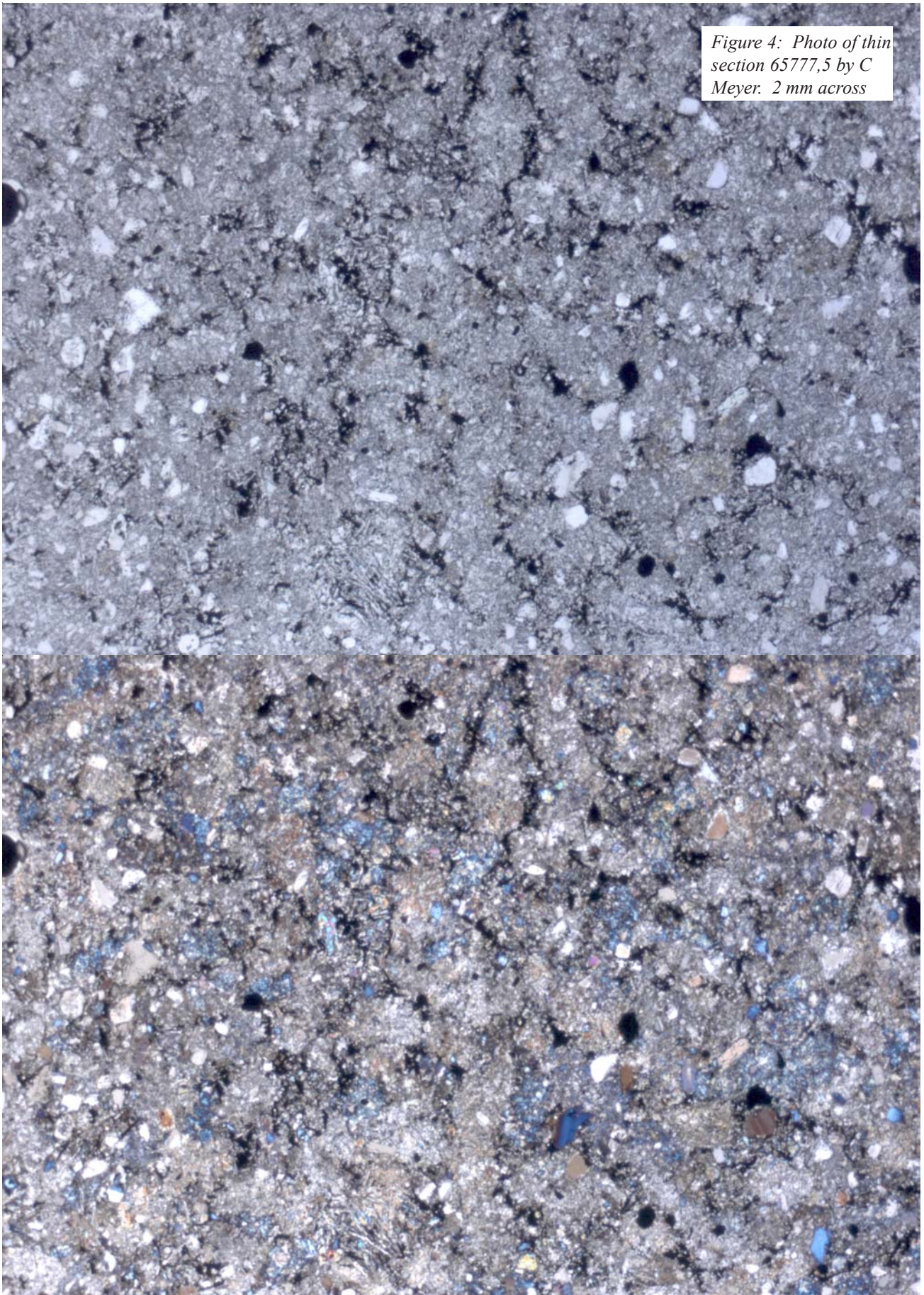






Figure 5: Photo of 65778. Scale is in mm.. S72-48815

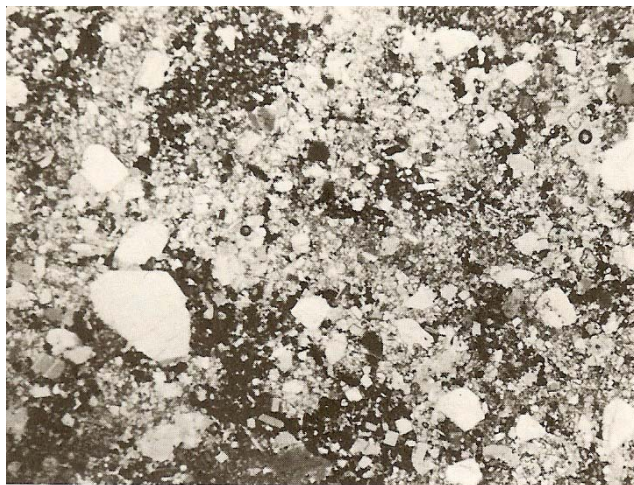


Figure 6: Photomicrograph of thin section of 65778 (from Warner et al. 1976).

and olivine, and laths and relict clasts of plagioclase (figures 2, 4 and 6).

Reimold and Borchardt (1984) studied the petrology of 65777, comparing it with that of 65015 and 62235, which are similar rocks. They found 11 % of the sample was made of small areas of sub-ophitic basalt.

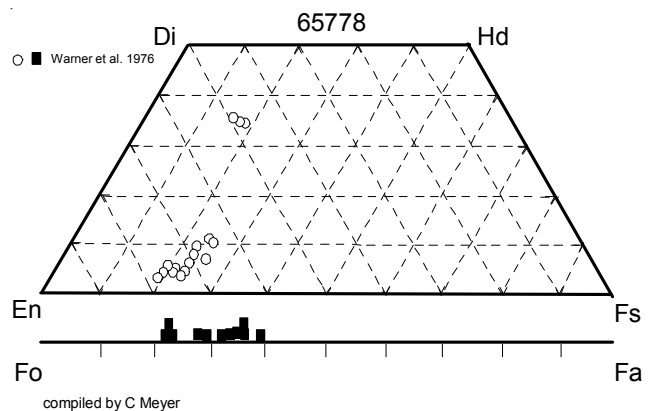


Figure 7: Composition of olivine and pyroxene in 65778 (Warner et al. 1976).

Compositional variation of Apollo 16 impact-melt rocks is discussed by Korotev (1994).

### **Chemistry**

Warner et al. (1976) and Laul and Schmitt (1973) reported the composition of 65777 (table 1). It is enriched in trace elements characteristic of KREEP. Reimold and Borchardt (1984) determined the composition of regions within 65777 that had distinctive melt texture.

**Radiogenic age dating**

Schaeffer and Schaeffer (1977) determined an Ar/Ar age of  $3.70 \pm 0.02$  b.y. for 65777 (figure 8). Norman et al. (2006) should have included these samples in their study.

**Cosmogenic isotopes and exposure ages**

Schaeffer and Schaeffer (1977) determined an exposure age of 8 m.y. for 65777.

**Processing**

There are 3 thin sections of 65777 and two for 65778.

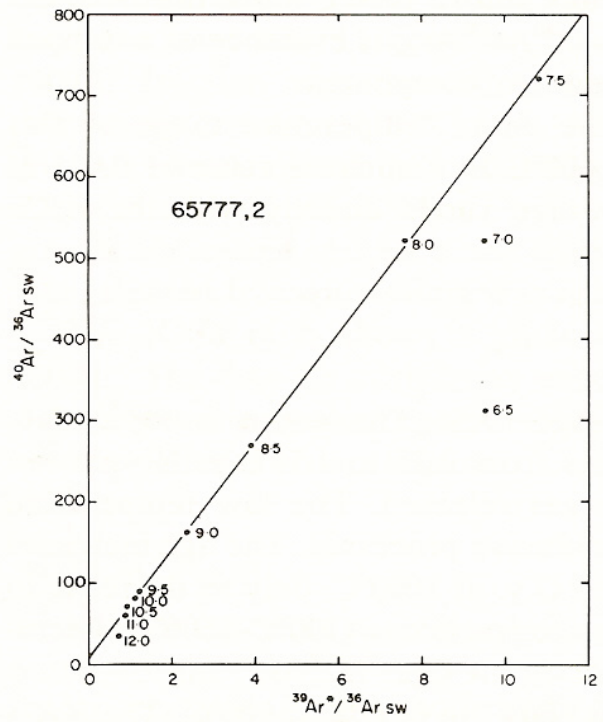
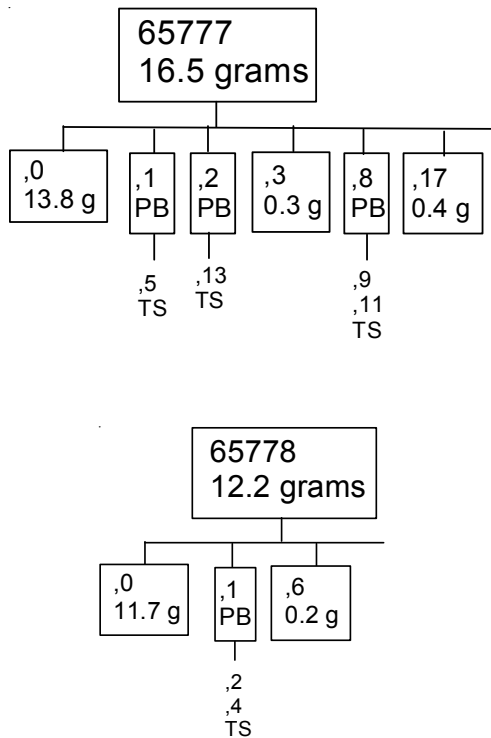


Figure 8: Isochron diagram for K/Ar dating of 65777 (Schaeffer and Schaeffer (1977)).

**References for 65777**

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**Table 1. Chemical composition of 65777**

| reference weight               | Laul73 | Warner76 | Reimold84<br>subophitic areas |       |       |     |
|--------------------------------|--------|----------|-------------------------------|-------|-------|-----|
| SiO <sub>2</sub> %             |        | 47.7     | (b)                           | 46.42 | 45.8  | (b) |
| TiO <sub>2</sub>               | 1.2    | (a) 1.21 | (b)                           | 2.67  | 1.2   | (b) |
| Al <sub>2</sub> O <sub>3</sub> | 18.5   | (a) 20.3 | (b)                           | 17.18 | 17.8  | (b) |
| FeO                            | 9      | (a) 7.7  | (b)                           | 7.78  | 3.8   | (b) |
| MnO                            | 0.106  | (a) 0.07 | (b)                           | 0.04  | 0.03  | (b) |
| MgO                            | 10     | (a) 11   | (b)                           | 11.34 | 14.13 | (b) |
| CaO                            | 11.3   | (a) 12.1 | (b)                           | 10.96 | 9.91  | (b) |
| Na <sub>2</sub> O              | 0.66   | (a) 0.71 | (b)                           | 0.44  | 0.92  | (b) |
| K <sub>2</sub> O               | 0.37   | (a) 0.45 | (b)                           | 1.76  | 0.78  | (b) |
| P <sub>2</sub> O <sub>5</sub>  |        | 0.43     | (b)                           | 1.38  | 0.42  | (b) |
| S %                            |        |          |                               |       |       |     |
| sum                            |        |          |                               |       |       |     |
| Sc ppm                         | 14     | (a)      |                               |       |       |     |
| V                              | 35     | (a)      |                               |       |       |     |
| Cr                             | 1164   | (a)      |                               |       |       |     |
| Co                             | 59     | (a)      |                               |       |       |     |
| Ni                             | 1100   | (a)      |                               |       |       |     |
| Cu                             |        |          |                               |       |       |     |
| Zn                             |        |          |                               |       |       |     |
| Ga                             |        |          |                               |       |       |     |
| Ge ppb                         |        |          |                               |       |       |     |
| As                             |        |          |                               |       |       |     |
| Se                             |        |          |                               |       |       |     |
| Rb                             |        |          |                               |       |       |     |
| Sr                             |        |          |                               |       |       |     |
| Y                              |        |          |                               |       |       |     |
| Zr                             | 620    | (a) 1200 | (b)                           |       |       |     |
| Nb                             |        |          |                               |       |       |     |
| Mo                             |        |          |                               |       |       |     |
| Ru                             |        |          |                               |       |       |     |
| Rh                             |        |          |                               |       |       |     |
| Pd ppb                         |        |          |                               |       |       |     |
| Ag ppb                         |        |          |                               |       |       |     |
| Cd ppb                         |        |          |                               |       |       |     |
| In ppb                         |        |          |                               |       |       |     |
| Sn ppb                         |        |          |                               |       |       |     |
| Sb ppb                         |        |          |                               |       |       |     |
| Te ppb                         |        |          |                               |       |       |     |
| Cs ppm                         |        |          |                               |       |       |     |
| Ba                             | 530    | (a)      |                               |       |       |     |
| La                             | 53     | (a)      |                               |       |       |     |
| Ce                             | 145    | (a)      |                               |       |       |     |
| Pr                             |        |          |                               |       |       |     |
| Nd                             | 90     | (a)      |                               |       |       |     |
| Sm                             | 23     | (a)      |                               |       |       |     |
| Eu                             | 2.03   | (a)      |                               |       |       |     |
| Gd                             |        |          |                               |       |       |     |
| Tb                             | 4.5    | (a)      |                               |       |       |     |
| Dy                             | 30     | (a)      |                               |       |       |     |
| Ho                             |        |          |                               |       |       |     |
| Er                             |        |          |                               |       |       |     |
| Tm                             |        |          |                               |       |       |     |
| Yb                             | 15     | (a)      |                               |       |       |     |
| Lu                             | 2.1    | (a)      |                               |       |       |     |
| Hf                             | 17     | (a)      |                               |       |       |     |
| Ta                             | 2      | (a)      |                               |       |       |     |
| W ppb                          |        |          |                               |       |       |     |
| Re ppb                         |        |          |                               |       |       |     |
| Os ppb                         |        |          |                               |       |       |     |
| Ir ppb                         | 17     | (a)      |                               |       |       |     |
| Pt ppb                         |        |          |                               |       |       |     |
| Au ppb                         | 22     | (a)      |                               |       |       |     |
| Th ppm                         | 8.8    | (a)      |                               |       |       |     |
| U ppm                          | 3      | (a)      |                               |       |       |     |

technique: (a) INAA, (b) broad beam e probe

**Table 2. Chemical composition of 65778.**

| reference weight               | Warner76 |
|--------------------------------|----------|
| SiO <sub>2</sub> %             | 47.3 (a) |
| TiO <sub>2</sub>               | 0.88 (a) |
| Al <sub>2</sub> O <sub>3</sub> | 21.6 (a) |
| FeO                            | 6.8 (a)  |
| MnO                            | 0.06 (a) |
| MgO                            | 9.7 (a)  |
| CaO                            | 12.5 (a) |
| Na <sub>2</sub> O              | 0.52 (a) |
| K <sub>2</sub> O               | 0.29 (a) |
| P <sub>2</sub> O <sub>5</sub>  | 0.27 (a) |
| S %                            |          |
| sum                            |          |
| (a) DBA                        |          |

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