

**60666**  
Glass-coated Impact Melt Breccia  
16 grams



*Figure 1: Photo of 60666. Scale is cm/mm. S73-20466*

**Introduction**

60635 was collected as a rake sample near the LM (see section on 60600). It is a glass-coated impact-melt breccias with unusual Mg/Fe ratio. The age of the impact melt has been determined as 3.82 b.y.

**Petrography**

A complete description of 60666 is given in Dowty et al. (1974): it “contains only one large plagioclase relict” – which is “fractured and has fine deformation lamellae”. The interior impact melt portion of “60666 is fairly uniform, consisting of a few moderately small (0.2 mm) phenocrysts of olivine in a matrix of fine feathery olivine”.

**Mineralogy**

*Olivine:* Fo<sub>92</sub>

*Pyroxene:* none

*Plagioclase:* An<sub>96</sub>

*Spinel:* low Cr

*Metallic Iron:* up to 21% Ni, 1.3% Co.

**Chemistry**

Wasson et al. (1977) determined the composition of the dark glass (table 1). The interior has only been analyzed by Dowty et al. (1974). The analyses seems to have unusually high MgO. Ryder and Seymour (1982) also published preliminary data.

**Radiogenic age dating**

Norman et al. (2006) determined a Ar/Ar plateau age of 3.82 ± 0.02 b.y. for the interior clast (figure 3).

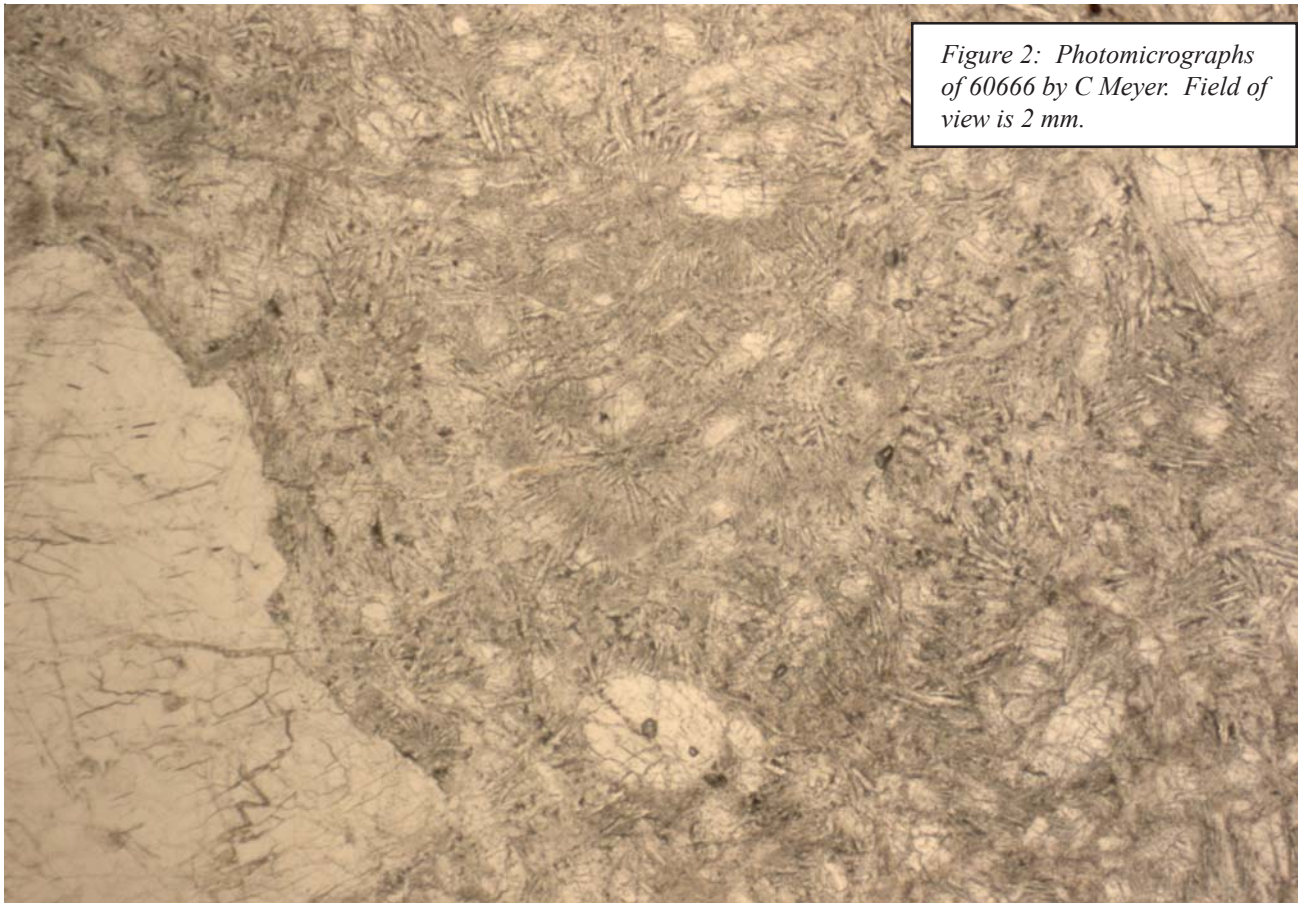
**Processing**

There are 2 thin sections.

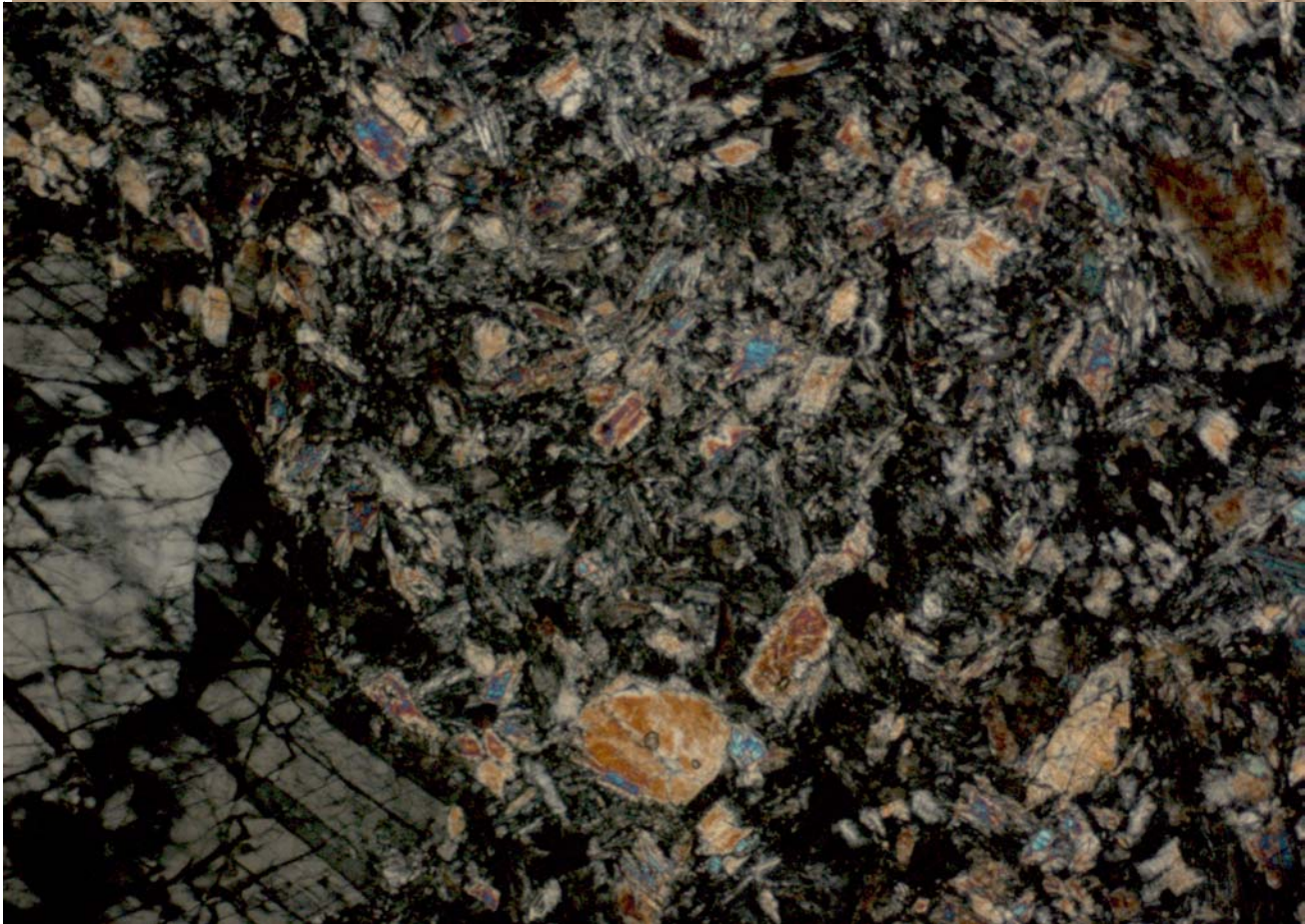
**Summary of Age Data for 60666**

|             |                  |
|-------------|------------------|
|             | Ar/Ar            |
| Norman 2006 | 3.82 ± 0.02 b.y. |





*Figure 2: Photomicrographs of 60666 by C Meyer. Field of view is 2 mm.*





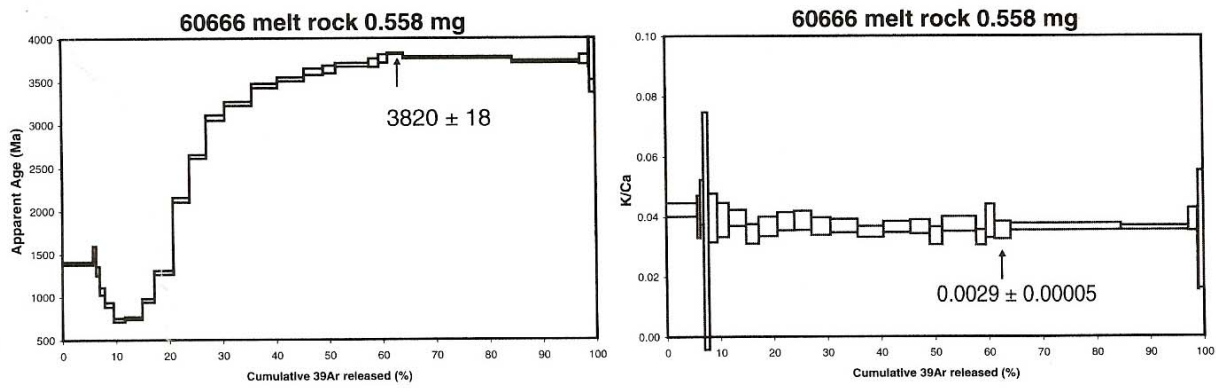
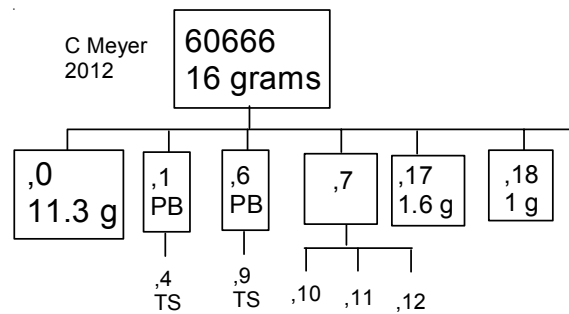


Figure 3: Age plateau for 60666 (Norman et al. 2006).



Figure 4: Processing of 60666. Scale in cm/mm. S73-20468



**Table 1. Chemical composition of 60666**

| reference weight               | Dowty74                | Wasson77 | Dowty74 glass |
|--------------------------------|------------------------|----------|---------------|
| SiO <sub>2</sub> %             | 42.7 (a)               |          | 45.1 (a)      |
| TiO <sub>2</sub>               | 0.21 (a)               | 0.5 (b)  | 0.27 (a)      |
| Al <sub>2</sub> O <sub>3</sub> | 20.8 (a)               | 29.7 (b) | 18.9 (a)      |
| FeO                            | 4.2 (a)                | 5.56 (b) | 5 (a)         |
| MnO                            | 0.05 (a)               | 0.07 (b) | 0.05 (a)      |
| MgO                            | 18.6 (a)               | 6.5 (b)  | 19 (a)        |
| CaO                            | 11.7 (a)               | 15.5 (b) | 11 (a)        |
| Na <sub>2</sub> O              | 0.39 (a)               | 0.47 (b) | 0.36 (a)      |
| K <sub>2</sub> O               | 0.1 (a)                | 0.08 (b) | 0.11 (a)      |
| P <sub>2</sub> O <sub>5</sub>  | 0.04 (a)               |          | 0.06 (a)      |
| S %                            |                        |          |               |
| sum                            |                        |          |               |
| Sc ppm                         |                        | 6.5 (b)  |               |
| V                              |                        | 27 (b)   |               |
| Cr                             |                        | 820 (b)  |               |
| Co                             |                        | 53 (b)   |               |
| Ni                             |                        | 800 (b)  |               |
| Cu                             |                        |          |               |
| Zn                             |                        | 6 (b)    |               |
| Ga                             |                        | 3.6 (b)  |               |
| Ge ppb                         |                        | 530 (b)  |               |
| As                             |                        |          |               |
| Se                             |                        |          |               |
| Rb                             |                        |          |               |
| Sr                             |                        |          |               |
| Y                              |                        |          |               |
| Zr                             |                        |          |               |
| Nb                             |                        |          |               |
| Mo                             |                        |          |               |
| Ru                             |                        | 46 (b)   |               |
| Rh                             |                        |          |               |
| Pd ppb                         |                        |          |               |
| Ag ppb                         |                        |          |               |
| Cd ppb                         |                        | 17 (b)   |               |
| In ppb                         |                        | 7.6 (b)  |               |
| Sn ppb                         |                        |          |               |
| Sb ppb                         |                        |          |               |
| Te ppb                         |                        |          |               |
| Cs ppm                         |                        |          |               |
| Ba                             |                        | 132 (b)  |               |
| La                             |                        | 11.4 (b) |               |
| Ce                             |                        | 28 (b)   |               |
| Pr                             |                        |          |               |
| Nd                             |                        | 19 (b)   |               |
| Sm                             |                        | 4.9 (b)  |               |
| Eu                             |                        | 1.2 (b)  |               |
| Gd                             |                        |          |               |
| Tb                             |                        | 1.02 (b) |               |
| Dy                             |                        | 7.4 (b)  |               |
| Ho                             |                        |          |               |
| Er                             |                        |          |               |
| Tm                             |                        |          |               |
| Yb                             |                        | 3.6 (b)  |               |
| Lu                             |                        | 0.49 (b) |               |
| Hf                             |                        | 3.8 (b)  |               |
| Ta                             |                        | 0.39 (b) |               |
| W ppb                          |                        |          |               |
| Re ppb                         |                        |          |               |
| Os ppb                         |                        |          |               |
| Ir ppb                         |                        | 28 (b)   |               |
| Pt ppb                         |                        |          |               |
| Au ppb                         |                        | 9 (b)    |               |
| Th ppm                         |                        | 1.69 (b) |               |
| U ppm                          |                        | 0.48 (b) |               |
| technique:                     | (a) e. probe, (b) INAA |          |               |

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