

**14051**  
Impact Melt Breccia  
191.3 grams



*Figure 1: Photo of 14051 showing zap pits and rounded surface. NASA S77-23488. Sample is 6 cm long.*

**Introduction**

This breccia sample was picked up on the flank of Cone Crater (Swann et al. 1971). It was sitting on the surface

and has been nicely rounded by micrometeorite bombardment on all sides (a potato) (figure 2). It is a blocky, subrounded rock with all surfaces lightly

covered by zap pits with or without glass linings (figure 1). Spall-like fractures occur locally. Irregular to rounded cavities 1-3 mm across may be clast molds. The sample is a coherent, fine-grained clastic rock having a small percentage of subrounded light and subordinate dark clasts in a medium-tan matrix.

### **Petrography**

14051 has the texture of an “impact melt rock”, similar to the large boulders at Apollo 17. The fine grain matrix has recrystallized with formation of distinct grains of poikilitic ilmenite (figure 4). The void space has consolidated into distinct, millimeter-sized vugs and vesicles. Stadermann et al. (1991) give the mode.

Lithic clasts are not digested (figure 4). A minor amount of glass is seen in thin section?

Twedell et al. (1978) mapped the surface of 14051 (figure 5).

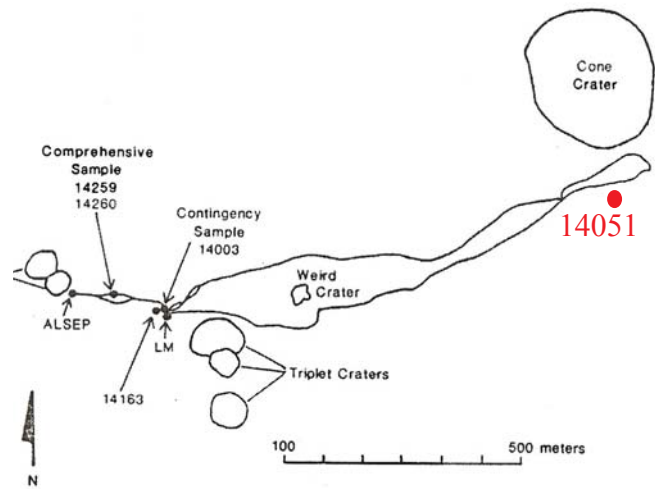


Figure 2: Map of Apollo 14 traverse to Cone Crater.

### **Chemistry**

The chemical composition of 14051 has not been reported.

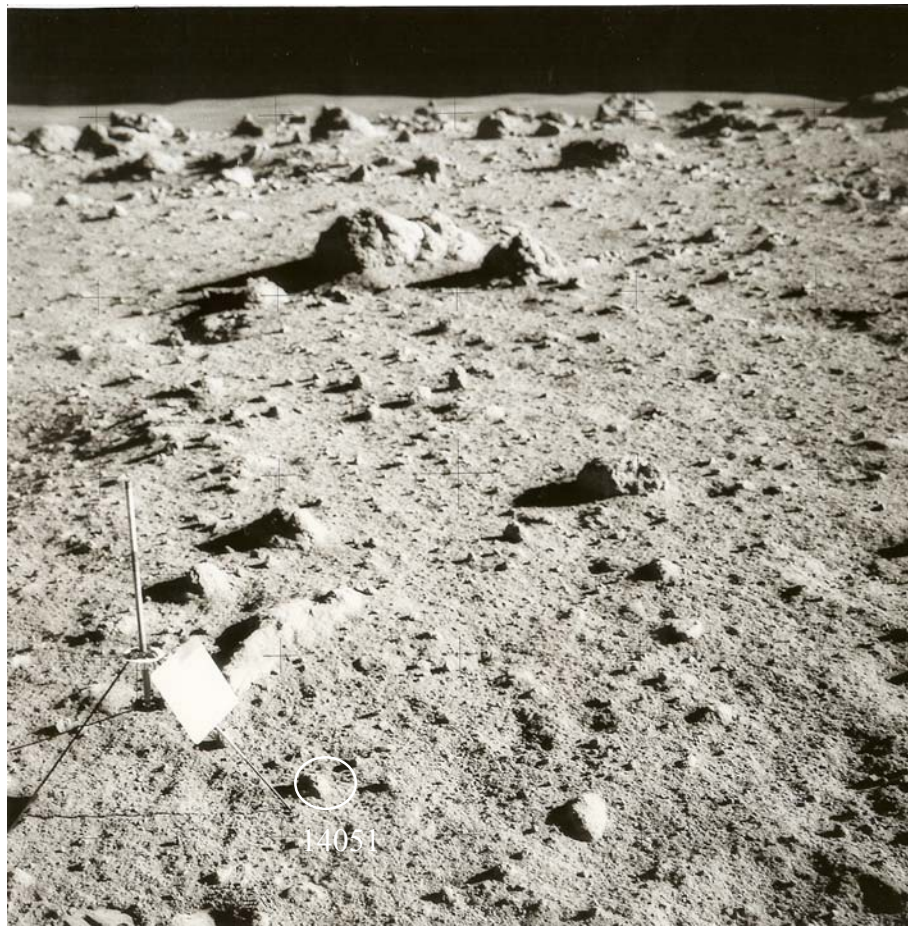
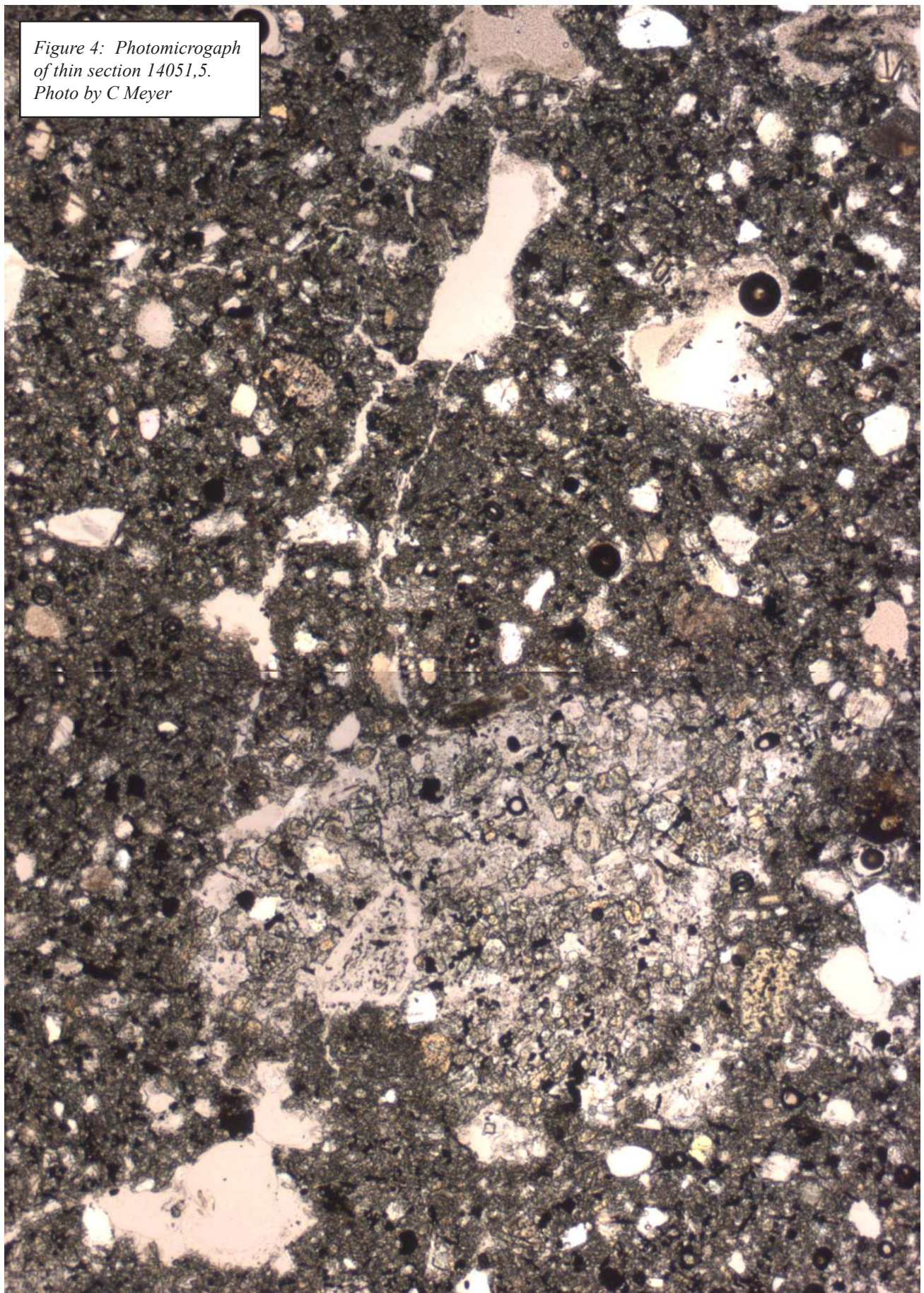


Figure 3: Photo of 14051 on lunar surface, with rim of Cone Crater in distance. AS14-68-9444.

Figure 4: Photomicrograph  
of thin section 14051,5.  
Photo by C Meyer



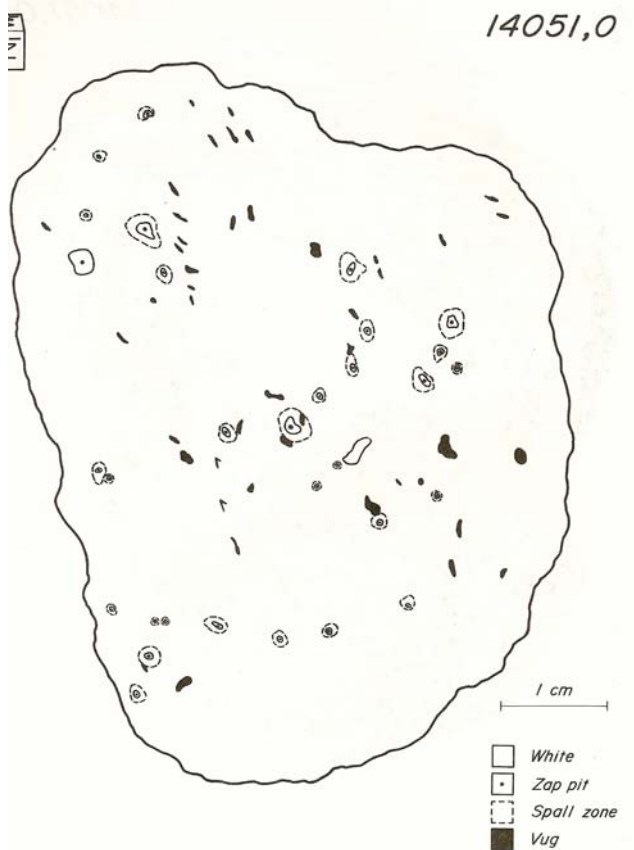
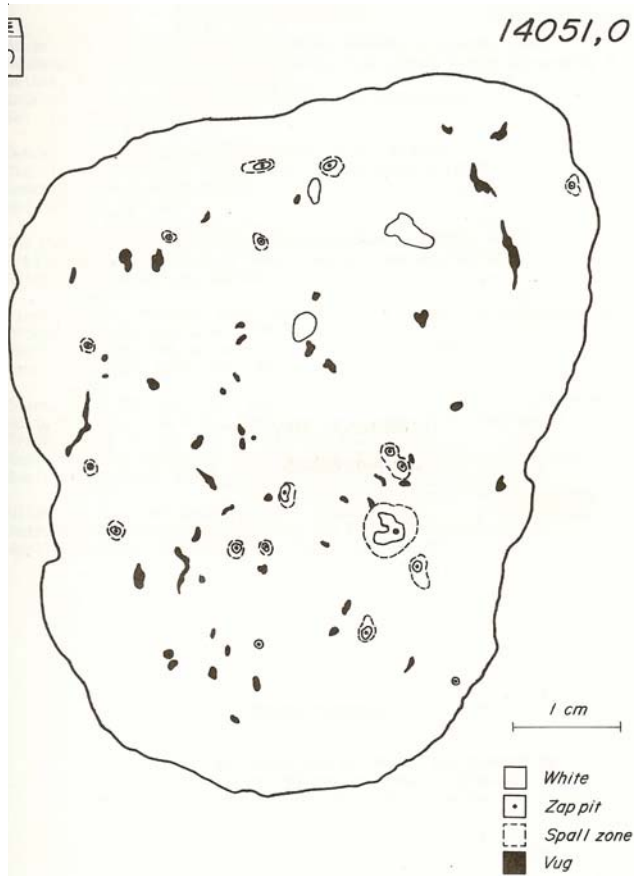


Figure 5: Maps of both side of 14051 showing zap pits (Twedell et al. 1978).

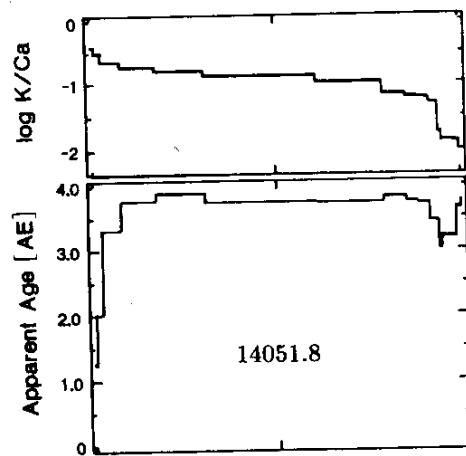


Figure 6: Ar plateau diagram for 14051 (Stadermann et al. 1991).

### Summary of Age Data for 14051

|                        | Ar/Ar                |
|------------------------|----------------------|
| Stadermann et al. 1991 | $3.71 \pm 0.05$ b.y. |

**Beware Ar control standard**

### Modal mineralogy of 14051

|                   | Stadermann et al. 1991 |
|-------------------|------------------------|
| Plagioclase       | 51.2 %                 |
| Pyroxene, olivine | 42.4                   |
| Spinel            | 0                      |
| Fe + FeS          | 0.3                    |
| Zircon            | 0.6                    |
| Ilmenite          | 3.3                    |
| Mesotasis         | 2.4                    |

### Radiogenic age dating

Stadermann et al. (1991) determined an Ar plateau age of  $3.71 \pm 0.05$  b.y. for 14051 (figure 6). They argue that Imbrium can't be older than that! But since it has an exposure age greater than Cone Crater, it may be exotic to the site. Nevertheless, this is a relatively young age for an impact melt rock, and needs to be checked.

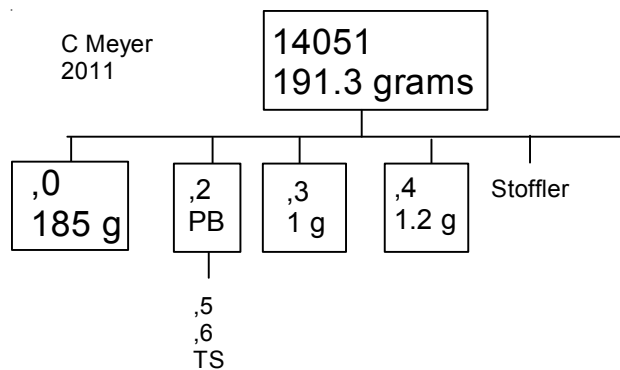
### Cosmogenic isotopes and exposure ages

Stadermann et al. (1991) determined an Ar exposure age of 47 m.y., which is older than Cone Crater. However, Swann et al. (1977) believed that the sample was part of the Cone Crater ejecta.

### Processing

14051 was returned in a Teflon bag in ALSRC 1006, which was sealed.

There are only two thin sections for 14051 and the sample has not been sawn.



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