

INTRODUCTION: 60035 is a coherent, whitish breccia (Fig. 1) consisting mainly of a variety of feldspathic impactites with granoblastic and poikiloblastic textures (Fig. 2). Macroscopically the breccia is homogeneous and cut by a few veins of dark glass. It is partly coated with black glass which apparently once entirely coated the rock.

The sample was collected about 190 m south-southwest of the Lunar Module where it was partly buried. Its orientation is known and zap pits are common on the “lunar up” surface, rare to absent on others. 60035 was originally set aside as a posterity sample and only recently made available for study.



FIGURE 1. S-72-38300.

PETROLOGY: R. Warner et al. (1980) provide petrographic information. Thin sections from widely separated portions of the rock consist of a variety of crystalline anorthositic, troctolitic, and noritic lithologies that grade in size from clasts to a finer-grained matrix.

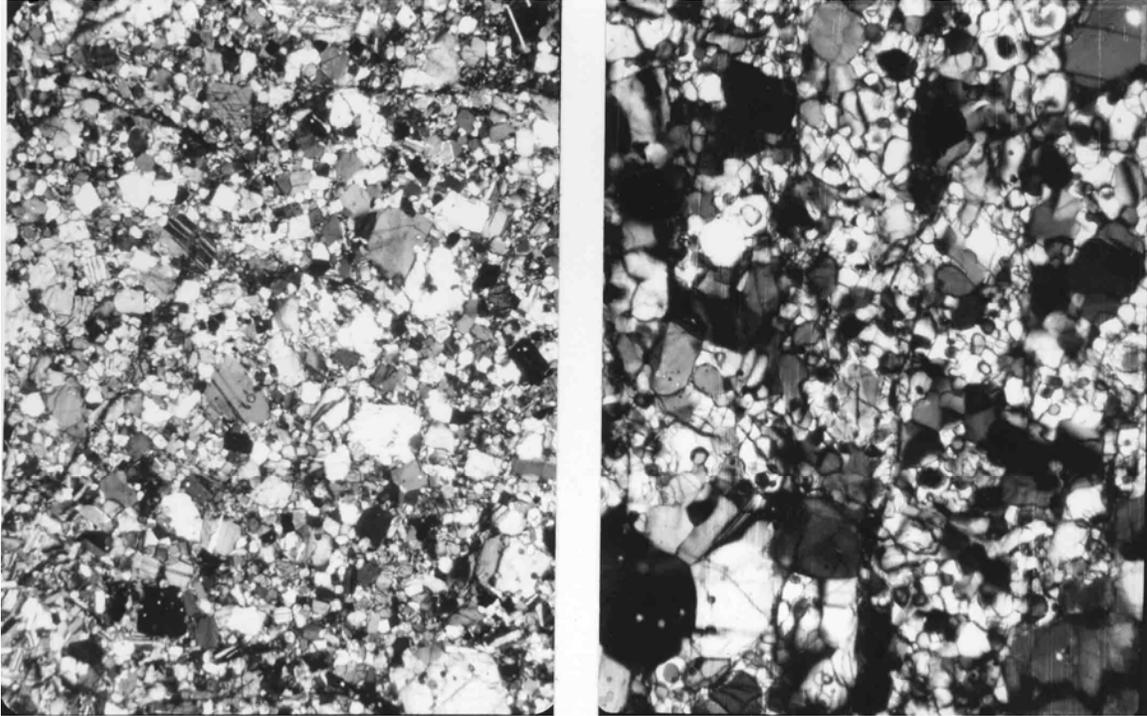


FIGURE 2. 60035,18.

- a) granoblastic, xpl. width 2 mm.
- b) poikiloblastic, xpl. width 1 mm.

The most common lithic type recognized by R. Warner et al. (1980) is poikiloblastic anorthositic norite (Fig. 2). Low-Ca pyroxene oikocrysts enclose small rounded to subequant grains of plagioclase. At least two distinct populations of pyroxene compositions were found; one more Fe-rich than the other (Fig. 3). More calcic plagioclases (An_{97-98}) are associated with the Fe-rich group. Minor amounts of olivine are present.

Granoblastic anorthositic troctolite clasts (70-80% plagioclase) are also common (Fig. 2). The grain size within these clasts is variable (0.05-0.25 mm). Larger plagioclase grains typically show shock effects such as cataclasis or undulose extinction. Olivine is Fo_{76-82} .

One large (4x8 mm) clast grades from fine-grained (0.05-0.25 mm) granular troctolite (~50% olivine, 50% plagioclase) through a coarser (up to 0.8 mm) zone with >60% plagioclase to another fine-grained (0.05 mm) area with low-Ca pyroxene more abundant than olivine. The mafics in this clast are considerably more magnesian (olivine ~ Fo_{88} ; low-Ca pyroxene Wo_3En_{86}) than other mafics in this rock.

Other lithic types include cataclastic anorthosite, basaltic impact melt with lathy plagioclase, and mineral clasts of plagioclase, rare olivine, spinel and a variety of opaque phases including chromite, ilmenite, troilite and metal. Most metal grains analyzed by R. Warner et al. (1980) have ~6% Ni and 0.0% Co (Fig. 4). Metal in the magnesian granular troctolite is exceptional: 36-51% Ni and 1.2-1.9% Co.

CHEMISTRY: The only chemical analysis of 60035 is an average defocused electron beam analysis (DBA) of the glass coat presented in R. Warner et al. (1980), reproduced in Table 1.

PROCESSING AND SUBDIVISIONS: 60035 was initially set aside as a posterity sample, and has only recently been made available for study. Three small unlocated chips were used to make the first thin sections (,4 ,5 ,6) and then three chips (,8 ,10 ,13) from different areas of the rock were taken to make thin sections ,16 and ,17; ,18 and ,19; and ,20 and ,21 respectively. Subsequently slab was cut (Fig. 5). The slab broke into several pieces, and the sawing produced many small chips. Some of these have been allocated to Schmitt for chemical analyses.

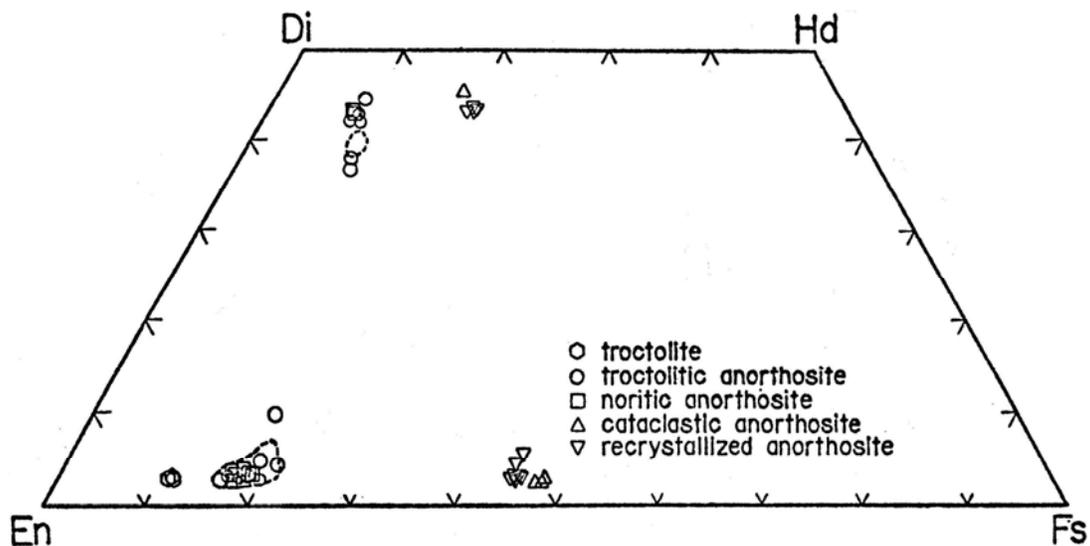


FIGURE 3. Pyroxenes;
from Warner et al. (1980).

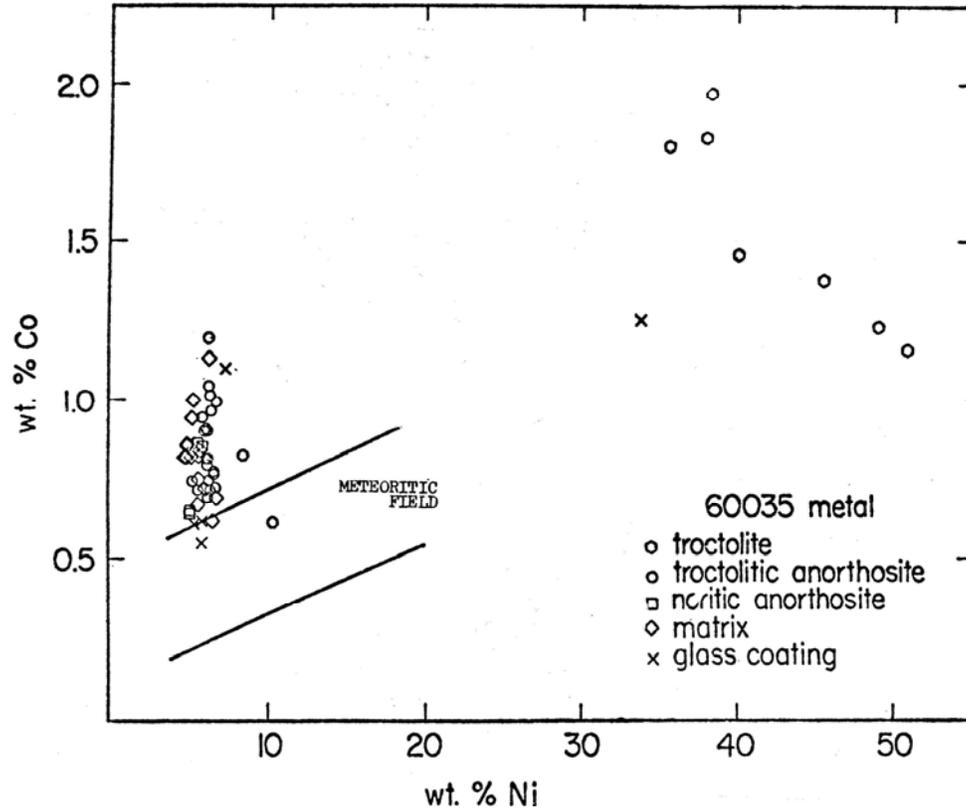


FIGURE 4. Metals; from R. Warner et al. (1980)

TABLE 1.

Average DBA of 60035 glass coat

SiO ₂	44.3
TiO ₂	0.29
Al ₂ O ₃	29.4
Cr ₂ O ₃	0.12
FeO	5.1
MnO	0.04
MgO	5.7
CaO	15.8
Na ₂ O	0.25
K ₂ O	0.06
P ₂ O ₅	0.01

Oxides in wt%

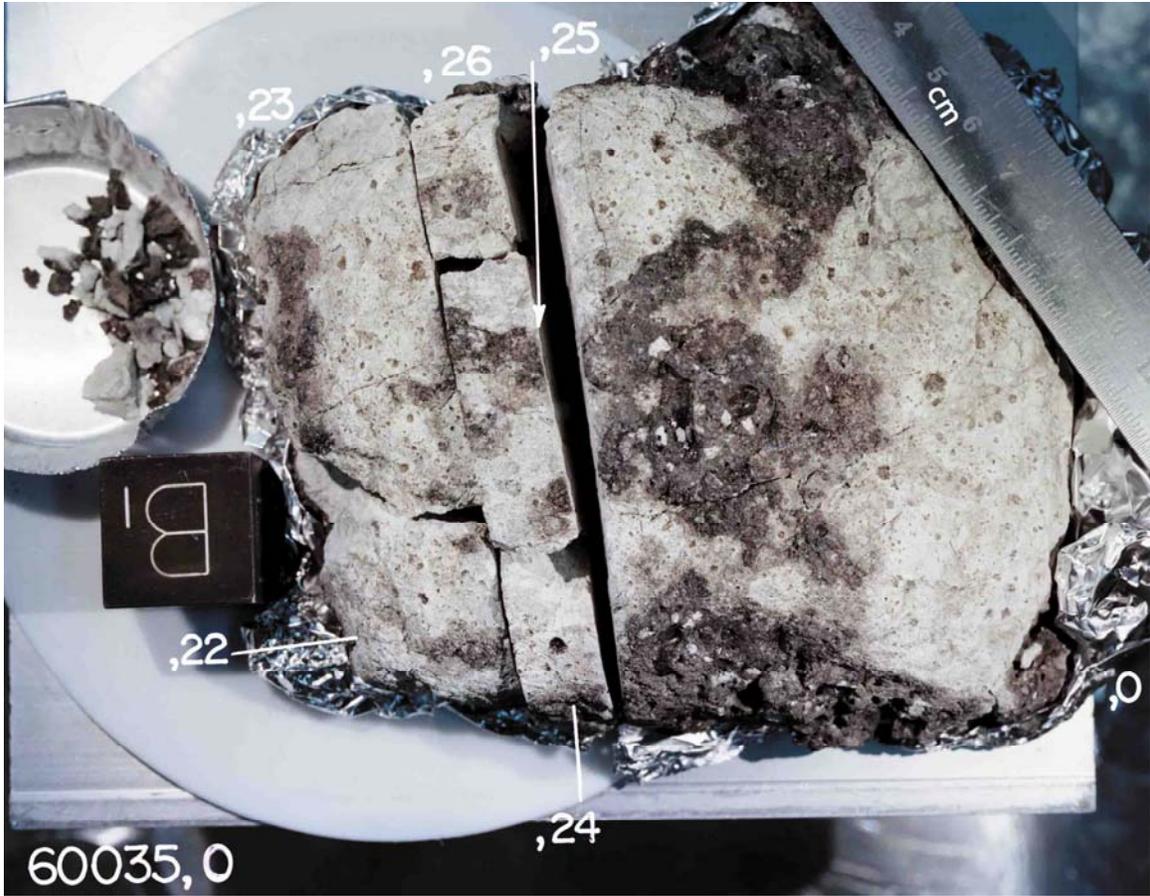


FIGURE 5. Post sawing. S-80-35183.