60019 DARK GLASSY MATRIX BRECCIA (REGOLITH BRECCIA?) 1887 g

INTRODUCTION: 60019 is a coherent, medium-gray glassy breccia containing several large, light colored clasts (Fig. 1) which are mainly poikilitic and (more rarely) basaltic impact melts. Part of its surface has a rough glass coating.

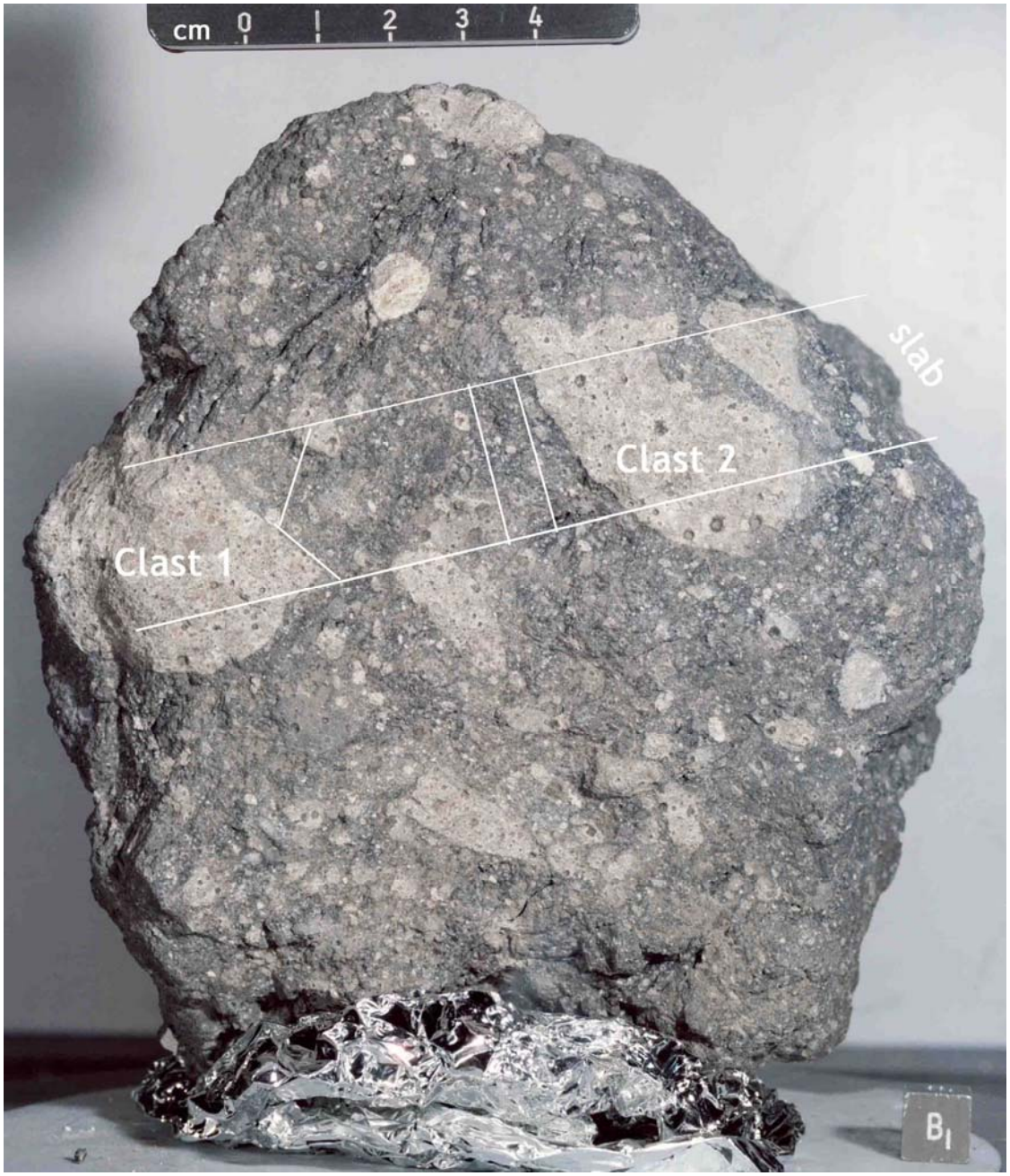

FIGURE 1. S-72-42574.

The sample location is not known precisely but was approximately 115 m west southwest of the Lunar Module. It was partly buried (poorly developed fillet). The sample is subrounded. The orientation is known and zap pits are present on some surfaces.

PETROLOGY: Macroscopically the rock consists of a dark aphanitic matrix with abundant clasts up to 5 cm (Fig. 1). Clasts vary from fine-grained, crystalline lithic fragments to glass and mineral fragments. The matrix has glass-lined cracks and glassy veins. Rust patches occur in both the matrix and the larger clasts.

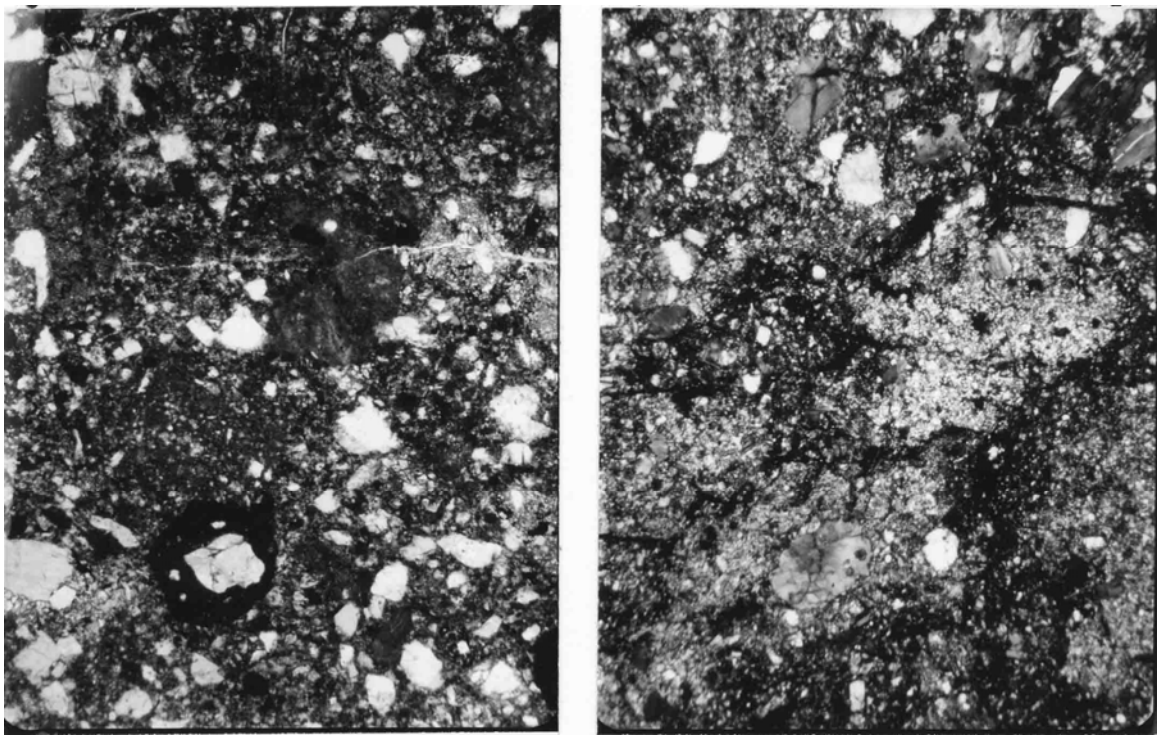

FIGURE 2.
a) 60019,14. general view, ppl. width 2 mm.
b) 60019,77. Clast l, poikilitic, xpl. width 2 mm.

Thin sections show that the matrix is brown, glassy, partly vesicular and contains glass fragments (Fig. 2). These characteristics and its chemistry (below) suggest that 60019 is lithified regolith or is largely derived from regolithic material. Most of the large clasts (e.g. clasts 1 and 2, Fig. 1) are poikilitic impact melts. Clast 1 is poikilitic with abundant fragments (Fig. 2) including granoblastic impactites, cataclastic anorthosite, and aluminous basalt. In places the poikilitic texture, characterized by pyroxene oikocrysts up to 1 mm, grades into basaltic texture. Other smaller clasts in the matrix include coarse, aluminous, impact basalts, aluminous breccias, and plagioclase and mafic mineral grains. One small (2x3 mm) coarse basalt may be of mare affinity; it is mafic and has conspicuous ilmenite.

Hansen et al.(1979b and unpublished) investigated a granoblastic impactite clast in 60019. Plagioclase compositions show little dispersion of major (An_{94-95}) or minor (K_2O 0.053%; FeO 0.098%; MgO 0.135%) elements. Olivine is Fo_{79}.

CHEMISTRY: Rose et al. (1975) report major and trace element analyses of both the matrix and clast 1. Cripe and Moore (1975) and Moore and Lewis (1976) report light elements for these same two lithologies. The matrix is chemically indistinguishable from Apollo 16 soils in all respects with the exception of rare-earths which are enriched in 60019. The poikilitic clast is more aluminous and less enriched in incompatible elements than most other Apollo 16 poikilitic rocks; this is at least in part a consequence of its abundant clasts.

RARE GASES: Bernatowicz et al. (1978) report xenon and krypton isotopic abundances from heating studies of a matrix sample. The sample contains substantial excess fission xenon and ^{129}Xe, suggesting that excess fission xenon is a global characteristic. The sample is rich in solar wind components, again suggestive of a significant regolith component.

PROCESSING AND SUBDIVISIONS: In October, 1974, two end pieces (,4 and ,5) and a slab were cut from 60019 (Figs. 1, 3). The slab itself was subdivided leaving two large pieces (,18 and ,23). Most subdivisions were made from a column down the center of the slab and from the region of clast 1.

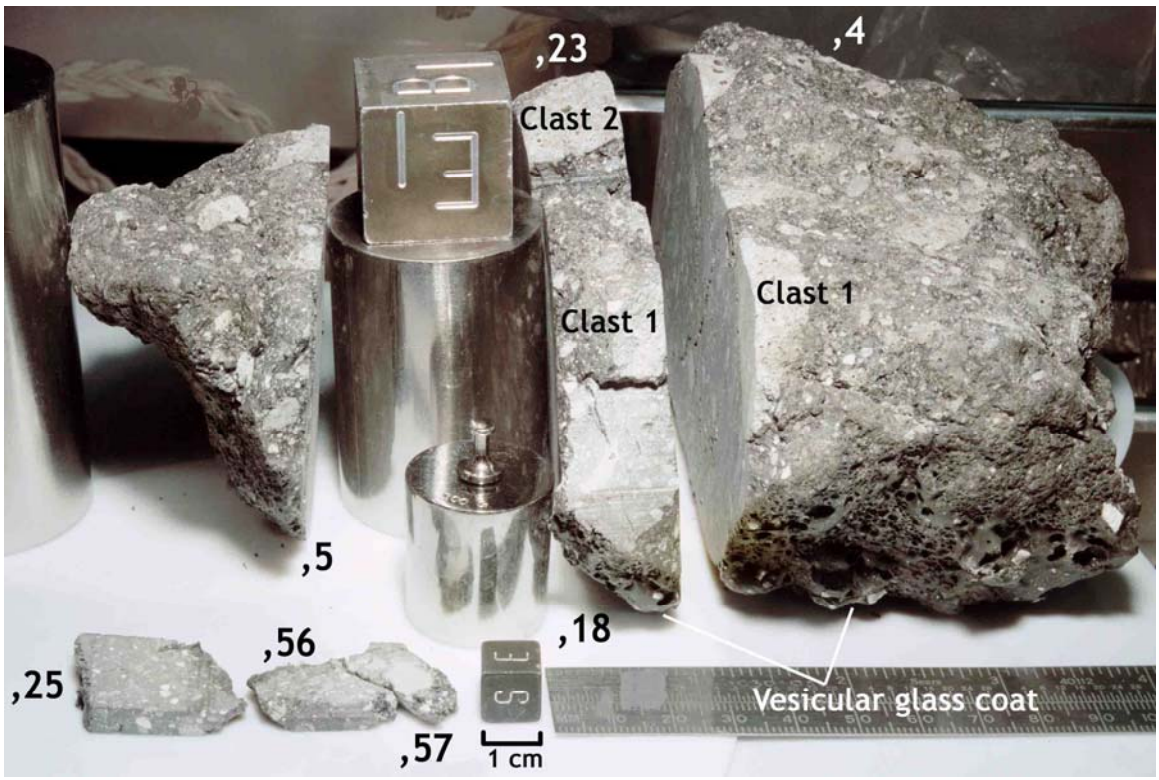

FIGURE 3. Saw cut subdivisions. S-74-32517.