64535 DILITHOLOGIC (CATACLASTIC ANORTHOSITE AND VITROPHYRIC IMPACT MELT) BRECCIA 257 g

INTRODUCTION: 64535 is a dilithologic breccia made up of ~90% white, friable, anorthositic material and the remainder a dark, coherent, glassy impact melt that coats and intrudes the anorthosite (Fig. 1). A mixed zone along the contact on the B surface is apparent. The mottled clast-like areas within the anorthosite (Fig. 1) can best be interpreted as intrusive veins related to the glass coating. The morphologic similarity to the mixed contact zone is apparent and macroscopic examination reveals at least one direct connection between the glass coat and a clast-like area very similar to those in Figure 1, but on the S surface. These areas appear to be restricted to the exterior of the rock: none were observed along cracks that penetrate to the interior of the anorthosite.

This rock was collected as a rake sample from the upper slope of Stone Mountain, on the rim of a small, subdued crater. Lunar orientation is unknown. Zap pits and patina are present on the N, E, S and T surfaces.

PETROLOGY: 64535 is composed of essentially two lithologies: a white, cataclastic anorthosite and a dark, intruding impact melt (Fig. 2). The latter is referred to as mesostasis-olivine-plagioclase rock by Warner et al. (1973) who provide an analysis of its mesostasis.

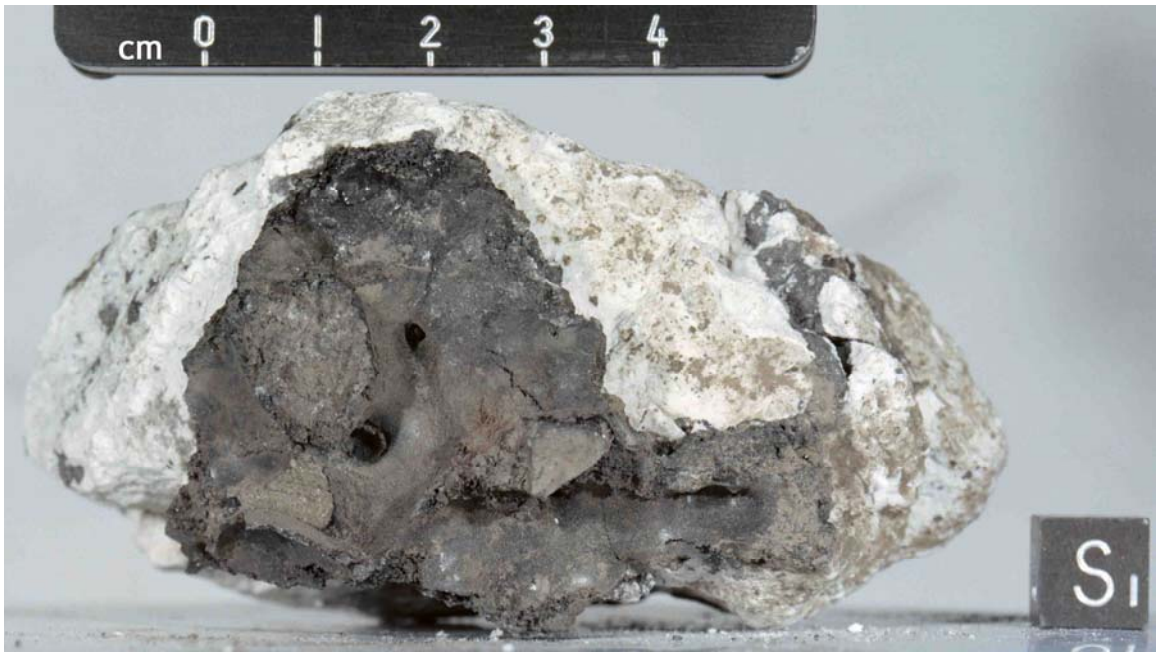

FIGURE 1a. S-72-43409.

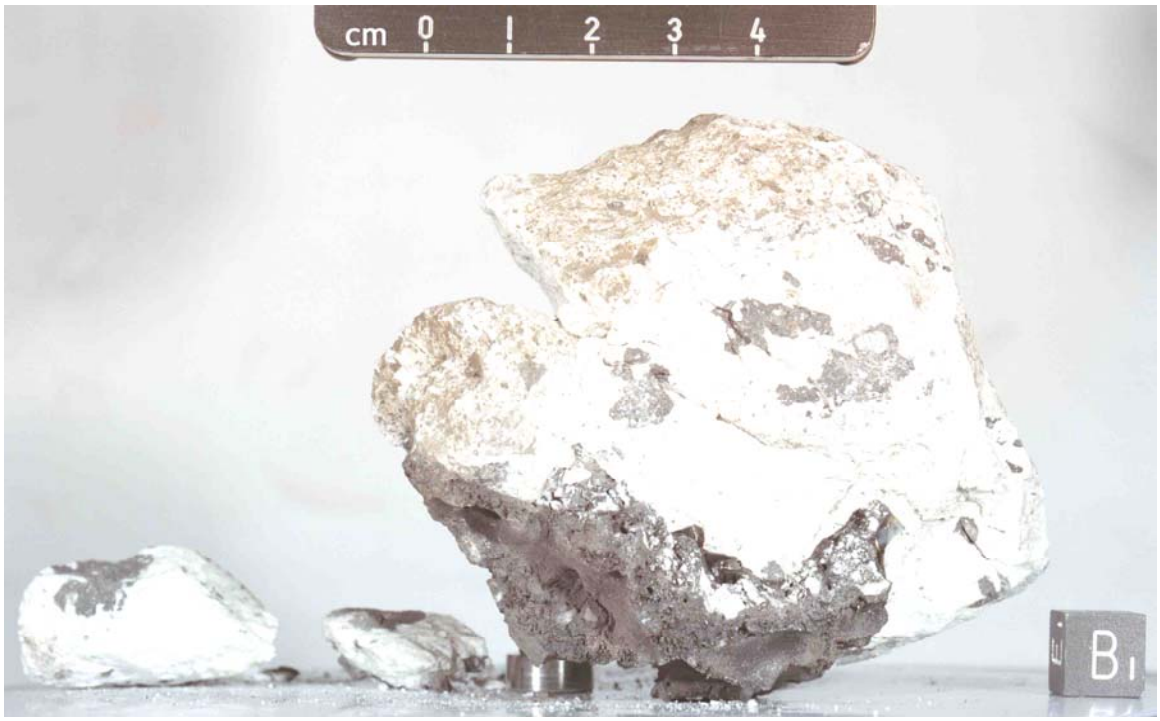

FIGURE 1b. S-72-43420.

The cataclastic anorthosite appears to be monomict and may be pristine but no mineral or chemical analyses have been published. Pre-cataclasis grain size ranged to >1 mm. In places a granoblastic texture has been preserved (Fig. 2). Mafic minerals are very rare (<2%) and generally occur as discrete grains interstitial to plagioclase.

The impact melt is a very fine-grained vitrophyre with tiny (a few μm's), blocky to lathy plagioclase crystals in a glassy matrix. Irregularly shaped Fe-metal grains (up to ~1 mm) with associated troilite and a more-poorly-reflecting opaque are common. Angular xenocrysts of plagioclase and, less commonly, mafic minerals are also present. The contact between the two lithologies is irregular but sharp (Fig. 2). No chilled margins were observed.

CHEMISTRY: The only published chemical data on 64535 are Ca and K abundances on a white chip (,7) by Jessberger et al. (1977). K is very low (123 ppm) and the Ca abundance (16.2% CaO) is consistent with this split being virtually pure anorthosite.

GEOCHRONOLOGY: An ^{40}Ar-^{39}Ar plateau age of 3.98 ± 0.02 b.y. on a white chip (Fig. 3) is reported by Jessberger et al. (1977).

EXPOSURE AGE: An ^{38}Ar exposure age of 1.9 ± 0.2 m.y. on a white chip (,7) (Jessberger et al., 1977) is consistent with the excavation of 64535 by the South Ray Crater event.

PROCESSING AND SUBDIVISIONS: In 1975 a large chip (,3) was taken from the E face and subdivided (,3-,10) for allocations (Fig. 4). In 1979 a second round of allocations was made by subdividing ,9 and by taking a few chips of both anorthosite and glass from ,0. The largest single piece remaining is ,0 (233.0 g).

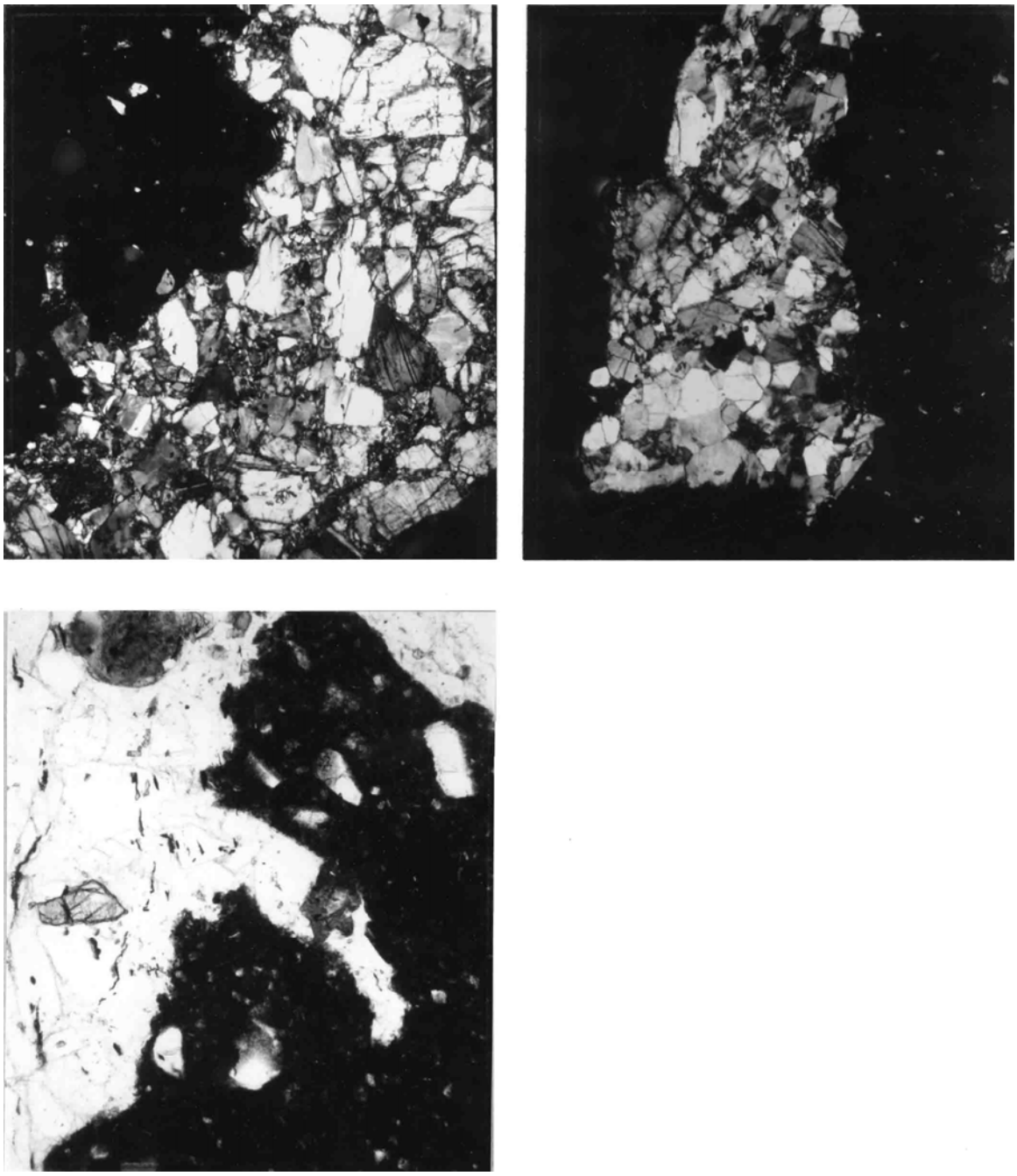

FIGURE 2. a) 64535,13, anorthosite and impact melt, xpl. Width 2 mm.
b) 64535,13, anorthosite, pre-cataclasis texture, xpl. Width 2 mm.
c) 64535,14, anorthosite, impact melt contact, ppl. Width 1 mm.

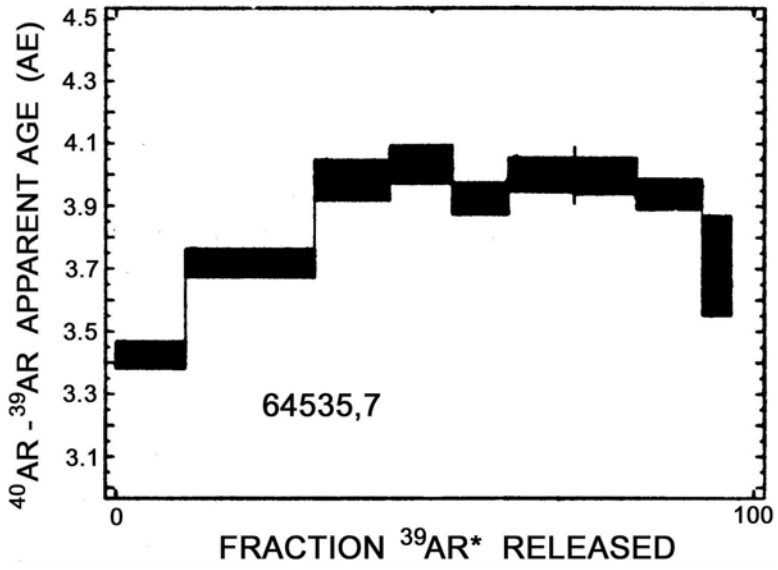

FIGURE 3. Ar releases, from Jessberger et al.(1977).

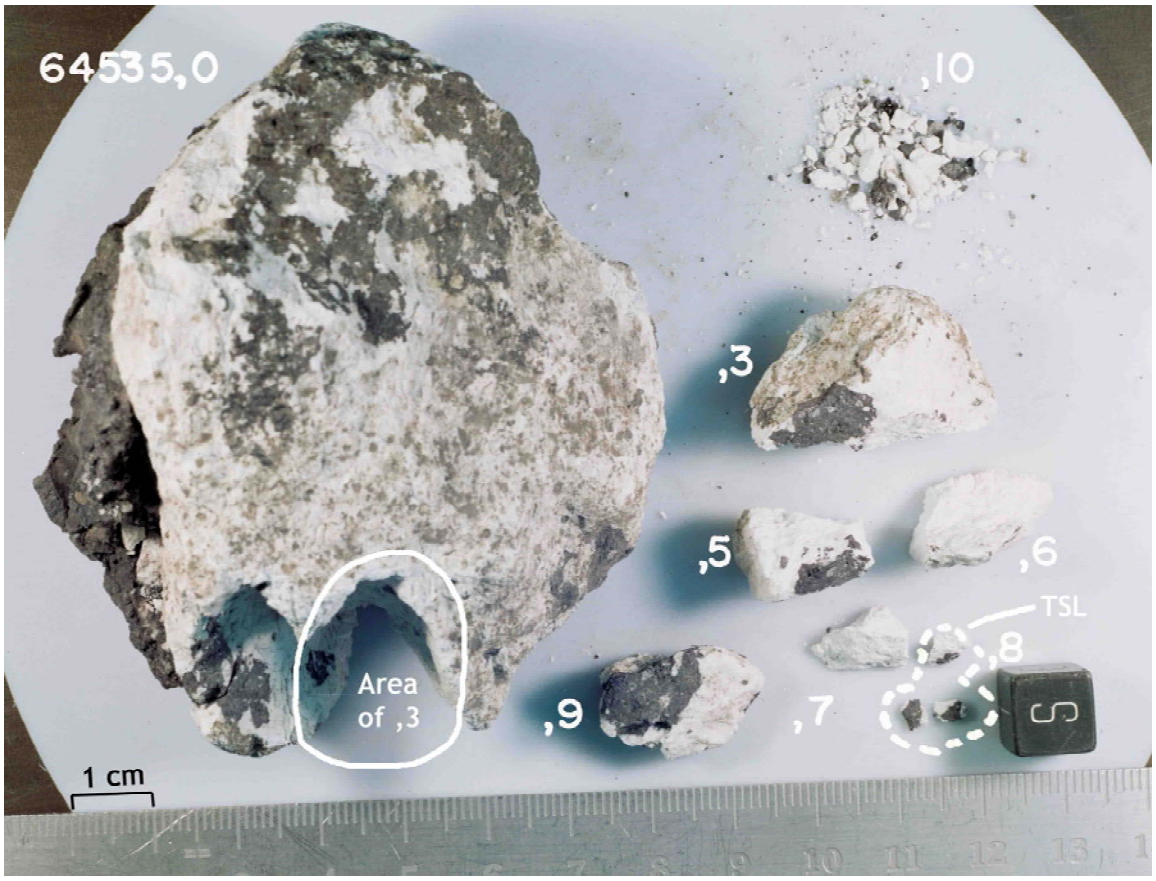

FIGURE 4. S-75-23039.