66035 FRAGMENTAL POLYMICT BRECCIA 211.4 g

INTRODUCTION: 66035 is a moderately coherent, light gray breccia with abundant dark and light clasts. Two large, coarse-grained clasts occur on the B and W surfaces respectively (Fig. 1). A very thin film of glass partially coats the N surface.

This rock was collected from the base of Stone Mountain about 10 cm from 66055. Its lunar orientation is known. Zap pits are abundant on all surfaces.

PETROLOGY: A general petrographic description is given in the Apollo 16 Lunar Sample Information Catalog (1972), and Grieve et at. (1974) describe a variety of impact melt clasts. The breccia is fragmental and polymict, containing light and dark clasts, including glass spheres, in a matrix of comminuted mineral grains (Fig. 2).

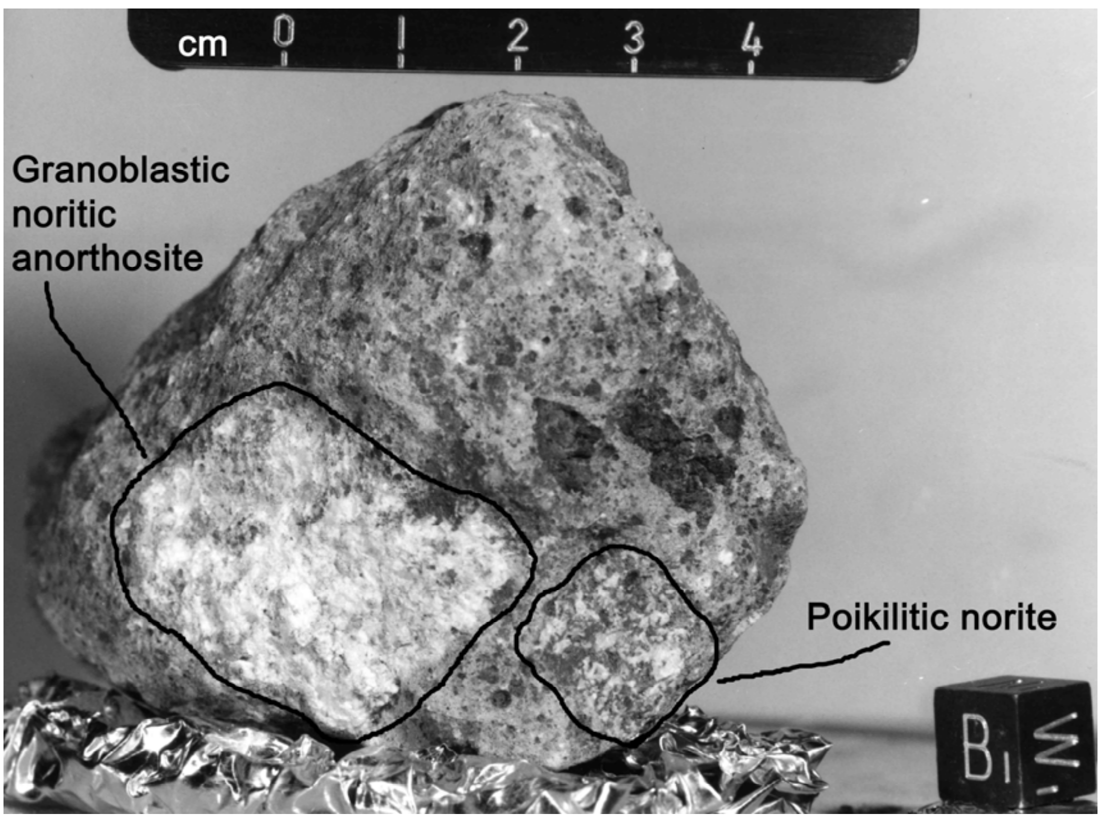

FIGURE 1. S-72-41303.

The 3.5 cm white clast (Fig. 1) is a noritic anorthosite with a coarse granoblastic texture (Fig. 2). It is not chemically pristine. The grain boundaries are smooth, and small, anhedral pyroxenes reside in triple junctions. Plagioclase is An_{94-95}; pyroxene is heterogeneously distributed and is principally $Wo_{3-6}En_{66-68}$ (Fig. 3) (Warren and Wasson, 1978, 1979). We have also observed a limited amount of pyroxene exsolution (Fig. 2). The norm of Warren and Wasson's (1978) analysis shows 9% olivine, 4% orthopyroxene and 3% clinopyroxene.

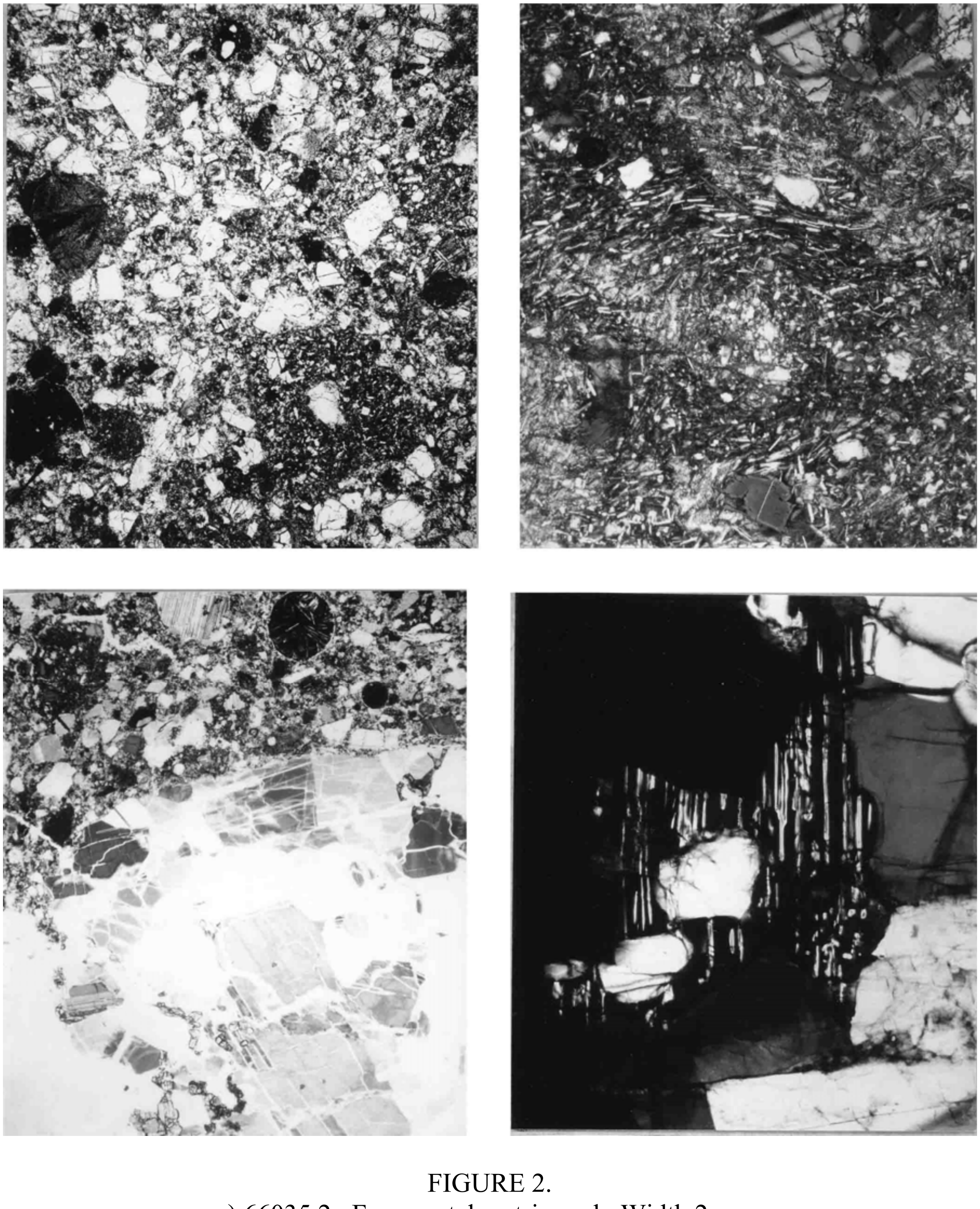

FIGURE 2.
a) 66035,2. Fragmental matrix, ppl. Width 2 mm.
b) 66035,2. Poikilitic clast, xpl. Width 1 mm.
c) 66035,14. Noritic anorthosite clast and fragmental matrix, partly xpl. Width 2 mm.
d) 66035,14. Exsolved pyroxene in noritic anorthosite clast, xpl. Width 0.5 mm.

The coarse-grained poikilitic norite clast (Fig. 1) is described in the Apollo 16 Lunar Sample Information Catalog as having 55-60% plagioclase with the remainder deep honey-colored pyroxene enclosing a trace of opaques.

Other clasts include fragments of finer-grained poikilitic (Fig. 2) and basaltic impact melts, clast-rich vitric matrix breccia, abundant mineral grains, rusty metal and a varied glass population. Grieve et at. (1974) recognize several compositional groups of glass clasts, including high-MgO "troctolitic" glasses, high-SiO_2 "granitic" glasses, plagioclase glasses, glasses with compositions approximating Apollo 16 poikilitic melt rocks ("Fra Mauro basalt") and glasses with local soil compositions.

Warren and Wasson (1979) also note a 200 x 100 µm, porous olivine fragment with the composition $Fo_{97.5}$, $Fa_{1.3}$ and 1.2 mole % Ca_2SiO_4 (Fig. 3). They interpret this grain to be of meteoritic origin.

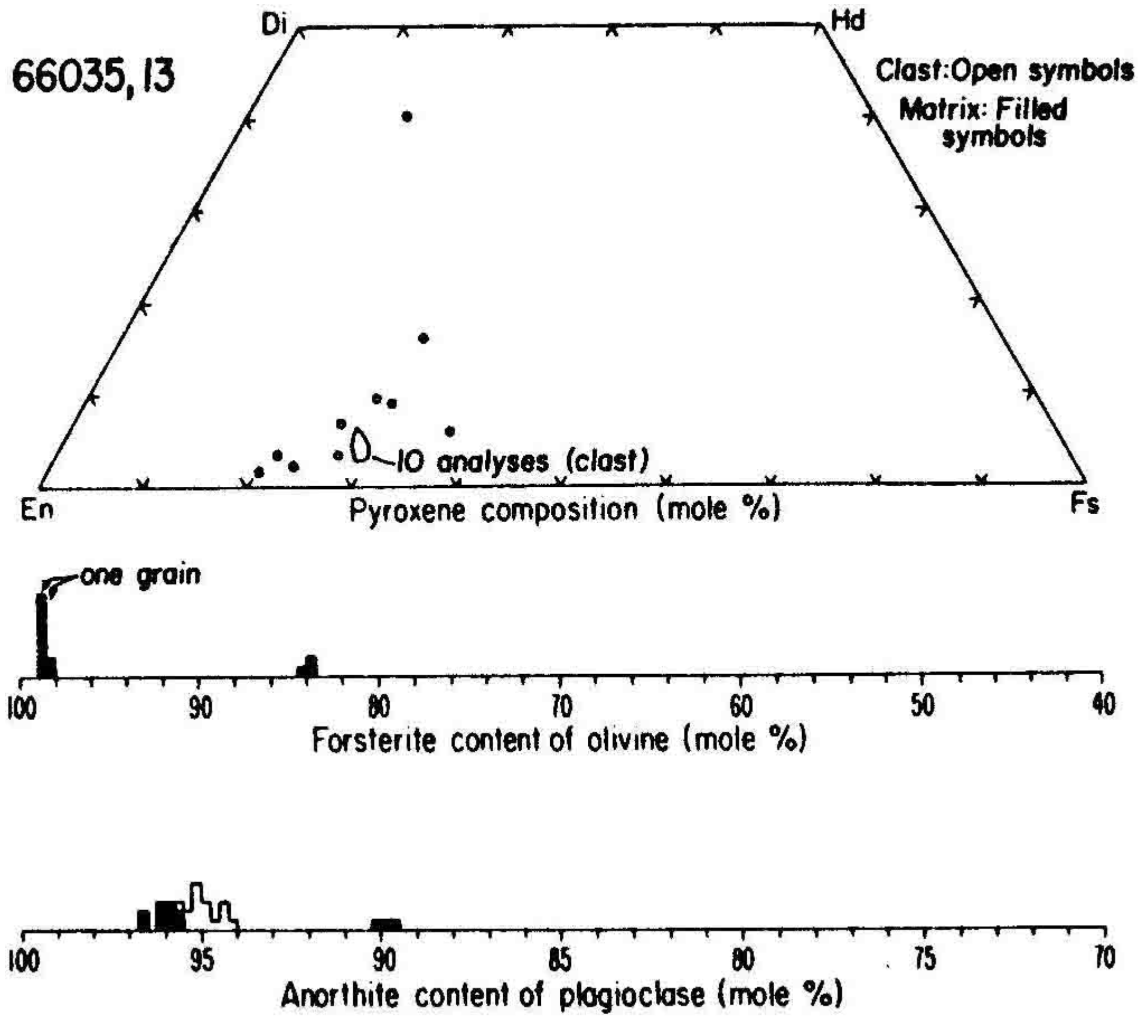

FIGURE 3. Mineral compositions, from Warren and Wasson (1979).

CHEMISTRY: Eldridge et al. (1973) proved K (K_2O 0.09%), U (0.49 ppm), and Th (1.87 ppm) abundances in the bulk rock as determined by gamma-ray spectroscopy. The levels of these elements in 66035 are very similar to those of the local soils.

Warren and Wasson (1978, 1979) report major and trace element: abundances for the large white clast (Table 1). It is very aluminous and has low levels of lithophile elements (Fig. 4) but has been contaminated by meteoritic siderophile elements and is therefore not chemically pristine. The tabulated values of Cr and Mn for this clast are erroneously low by a factor of ten in Warren and Wasson (1978). The correct values are given in Warren and Wasson (1979).

EXPOSURE AGE: ^{26}Al and ^{22}Na abundances in the whole rock are given without comment by Eldridge et al. (1973).

PROCESSING AND SUBDIVISIONS: 66035 has never been sawn. A few chips of matrix have been taken for thin sections. Wasson received allocations from both the large white clast and the poikilitic norite clast. The largest single piece remaining is ,0 (197 g).

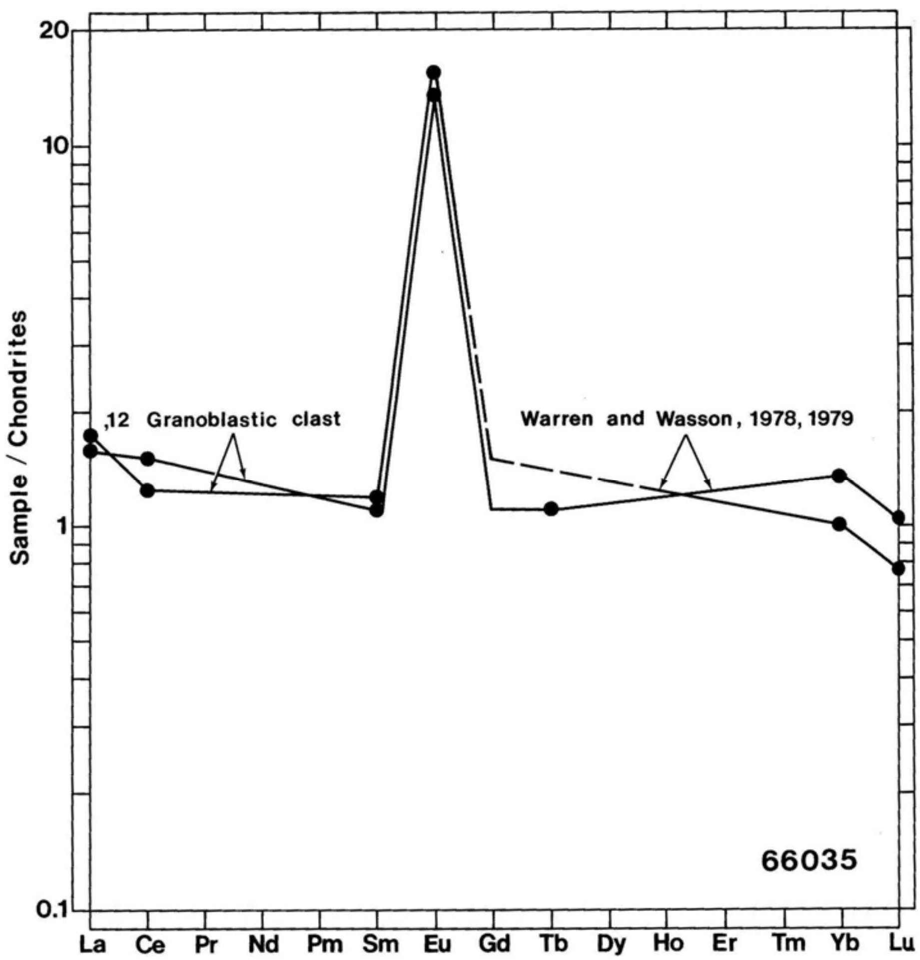

FIGURE 4. Rare earths.

TABLE 1. Summary chemistry of granoblastic clast in 66035.

SiO_2	44.3
TiO_2	0.076
Al_2O_3	30.4
Cr_2O_3	0.036
FeO	3.0
MnO	0.037
MgO	4.2
CaO	17.0
Na_2O	0.42
K_2O	0.013
P_2O_5	
Sr	
La	0.56
Lu	0.031
Rb	
Sc	2.7
Ni	20.4
Co	7.5
Ir ppb	0.60
Au ppb	0.14
C	
N	
S	
Zn	0.9
Cu	

Oxides in wt%; others in ppm except as noted.