60215 CATACLASTIC ANORTHOSITE, PARTLY GLASS-COATED 386 g

INTRODUCTION: 60215 is a coherent, cataclastic anorthosite with very low porosity. A dark, vesicular glass coats ~15% of the rock's surface (Fig. 1). The bulk of the rock is probably a monomict breccia although the presence of basaltic impact melt clasts indicates at least some mixing. On the basis of very low Ni and Co concentrations the anorthosite has not been contaminated by meteoritic siderophiles.

Zap pits and patina are abundant on the lunar-up side. The opposite surface is devoid of pits, indicating a simple exposure history. The sample was collected about 115 m southwest of the Lunar module.

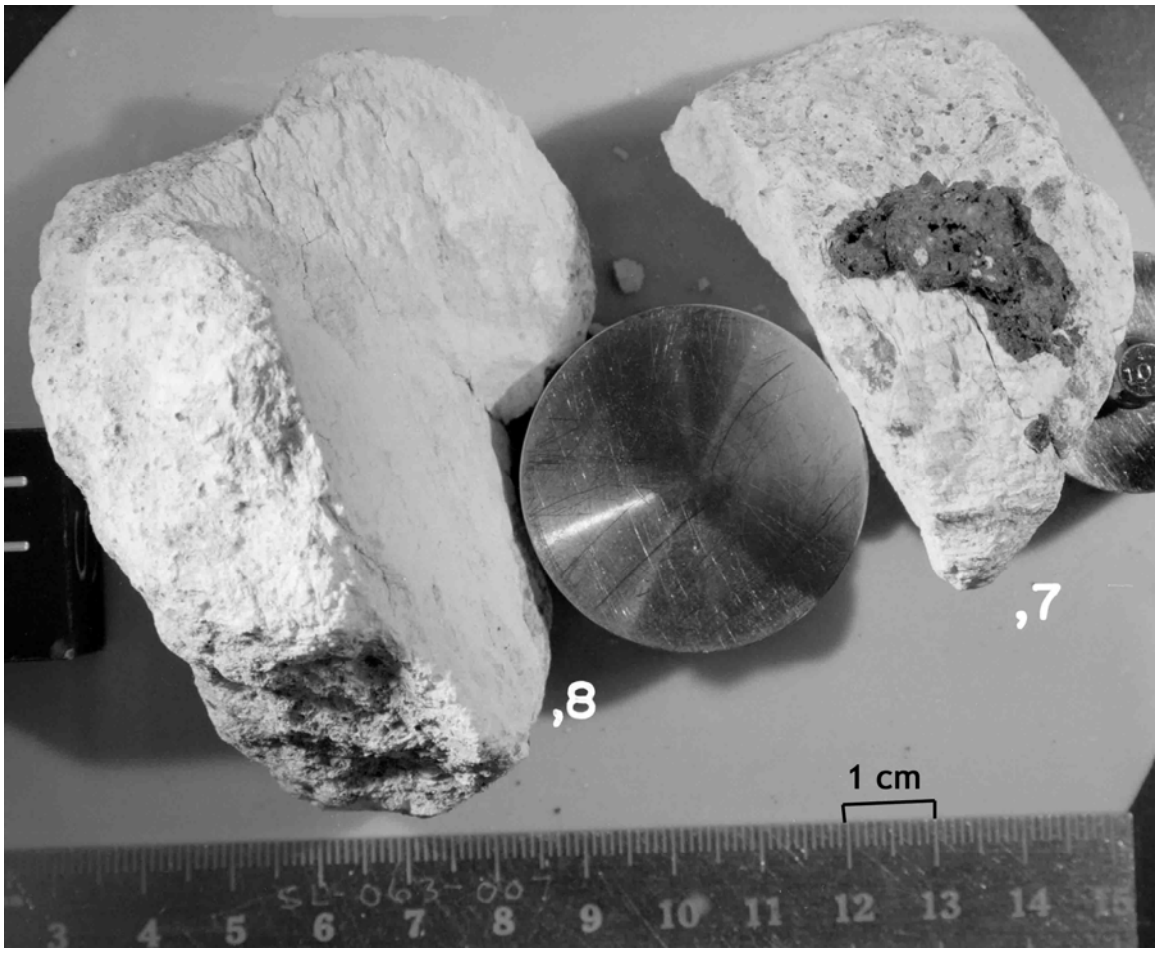


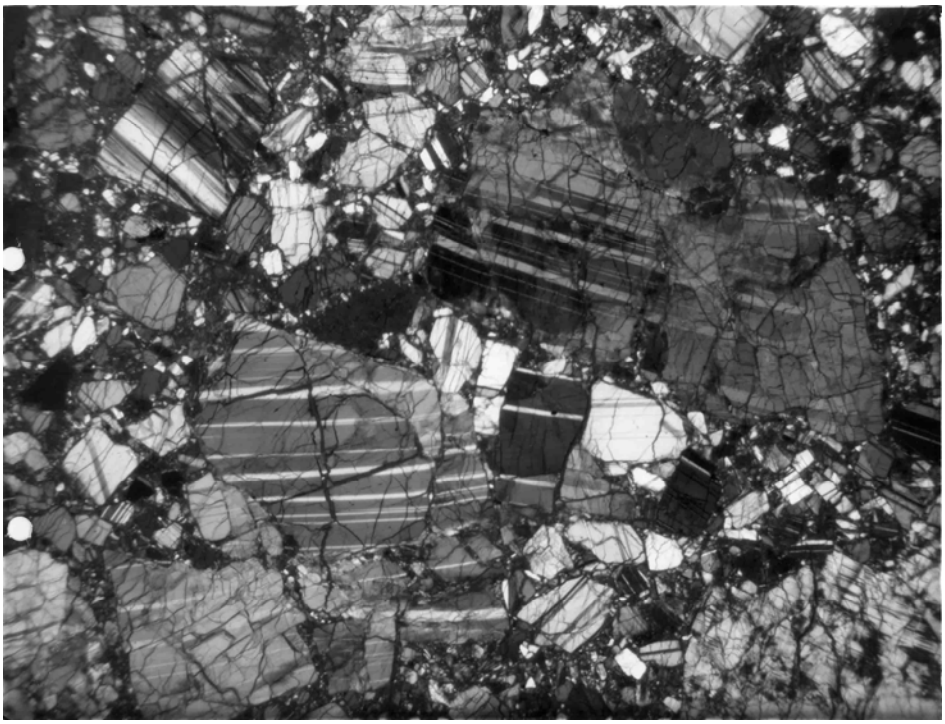
FIGURE 1. Scale in cm. S-74-32059.

PETROLOGY: Meyer and McCallister (1973), Dixon and Papike (1975), Ishii et al. (1976) and the Apollo 16 Lunar Sample Information Catalog (1972) provide petrographic information. Seriate plagioclase mineral clasts (An_{96}) up to 4 mm long make up 97% of the rock (Fig. 2). Small amounts of maskelynite are present and some grains have been recrystallized to a fibrous or microgranular texture. Accessory minerals include orthopyroxene ($En_{62-68}Wo_{1-2}$; Fig. 3), augite (En_{44},Wo_{44}), rare olivine (Fo_{78}), metal, troilite and ilmenite. Pyroxenes occur as discrete grains without exsolution lamellae (Meyer and McCallister, 1973; Dixon and Papike, 1975).

Lithic clasts are predominantly anorthositic, compositionally identical to the mineral clasts. One large anorthosite clast contains a nest of disaggregated orthopyroxene significantly more calcic than the mineral clasts ($En_{63}Wo_{5}$) and a single grain of Cr-spinel (Meyer and McCallister, 1973). Fragments of basaltic impact melt (troctolitic basalt; Meyer and McCallister, 1973) account for up to 3% of one thin section (,13). These clasts are small (<0.8 mm) and angular, and have subophitic to intersertal textures (Fig. 2). Plagioclase in these fragments is An_{94} and olivine is Fo_{80-90}. Minor phases include interstitial glass and sulfides.

CHEMISTRY: Rose et al. (1975) (split ,30 erroneously published as ,33), Cripe and Moore (1975) and Moore and Lewis (1976) report chemical data for the anorthosite. Meyer and McCallister (1973) provide defocussed electron beam analyses (DBA) of two "troctolitic basalt" clasts. The anorthosite is nearly pure plagioclase with $A1_2O_3$ >35% (Table 1). The low Ni and Co contents indicate a lack of meteoritic contamination. Total sulfur is among the lowest ever measured in a lunar rock. The compositions of the two troctolitic basalt clasts are different (Table 1).

PROCESSING AND SUBDIVISIONS: In 1972, 60215 was cut into two main pieces (Fig. 1). Allocations were made from chips taken from both of these pieces. Several interior and exterior chips of both tile anorthosite and the glass coat exist.



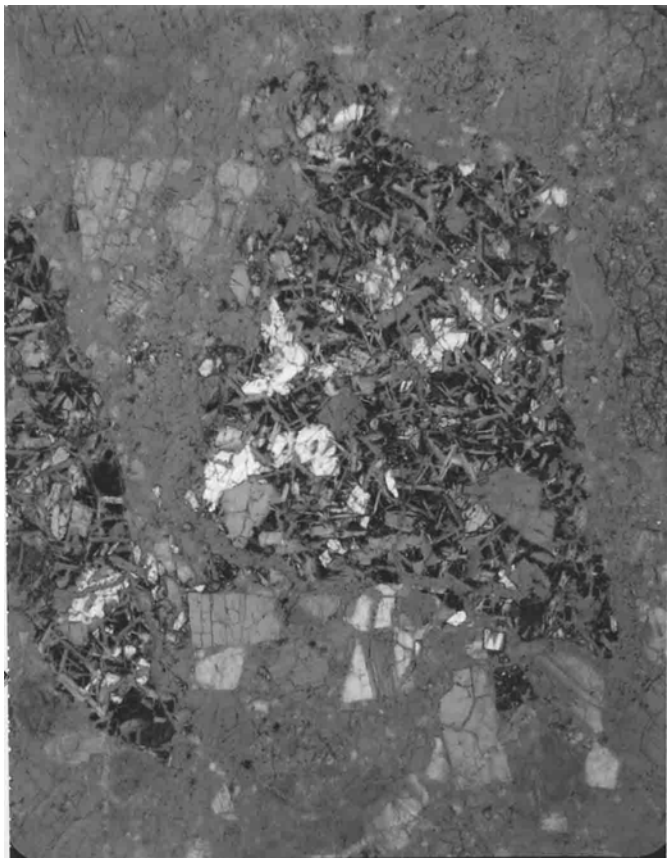


FIGURE 2. a) 60215 anorthosite, xpl. Width about 3mm. S-72-43966.
b) 60215,14. Basaltic clasts, partly xpl. Width 1 mm.

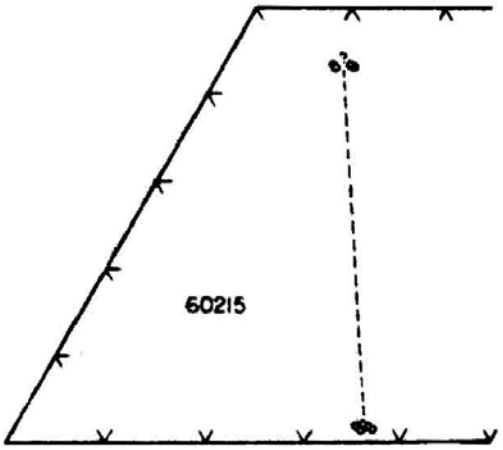


FIGURE 3. Pyroxenes; from Dixon and Papike (1975).

TABLE 1. Summary chemistry of 60215 lithic types.

	Bulk anorthosite	Troctolitic basalt clasts(DBA)	
SiO_2	44.50	47.8	44.7
TiO_2	0.0	0.15	0.83
Al_2O_3	35.53	24.3	21.2
Cr_2O_3	0.05	0.16	<0.16
FeO	0.15	5.1	8.32
MnO	0.01	0.18	0.13
MgO	0.14	5.62	14.1
CaO	19.34	15.5	10.6
Na_2O	0.40	0.45	0.63
K_2O	0.02	0.01	0.22
P_2O_5	0.0		
Sr	121		
La	<10		
Lu			
Rb	<1		
Sc	<2		
Ni	1.8		
Co	<2		
Ir ppb			
Au ppb			
C	17		
N	105		
S	<6		
Zn	<4		
Cu	1.8		

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