



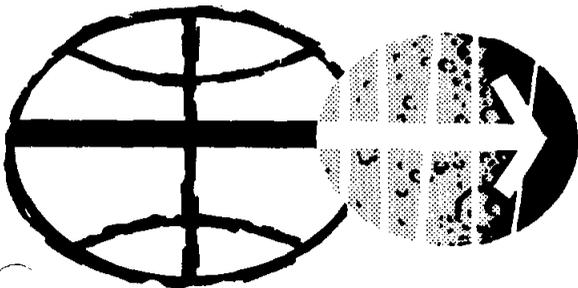
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

DESCRIPTION, CLASSIFICATION, AND INVENTORY  
OF 151 APOLLO 16 RAKE SAMPLES FROM THE  
LM AREA AND STATION 5

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## Abstract

One hundred fifty-one Apollo 16 rake samples from the LM area and station 5 were studied macroscopically and with the aid of a stereomicroscope, while still in the nitrogen cabinet containers in the Lunar Receiving Laboratory, Manned Spacecraft Center, Houston, Texas. The rocks are described and classified into 8 groups, namely anorthosites (20); troctolitic and noritic crystalline rocks (apparently igneous) (3); gray, fine-grained crystalline rocks (18); gray vesicular glass (usually devitrified), with clasts of anorthosite or plagioclase (20); glassy agglutinates (6); gray and white microbreccias and breccias (33); soil clods (37); and brownish soil breccias (14). Classification of certain individual rocks is often difficult because they grade from one type into the other. Hence, detailed microscopic study in thin section, combined with bulk and mineral analysis will be necessary for a more definite classification of certain rocks.

### 1. Introduction

In the present report, descriptions and classifications of 151 Apollo 16 rake samples from the LM area and station 5 are presented. The purpose of this study is to provide a preliminary classification of the rake samples, based on macroscopic and stereomicroscopic study of the rocks while they were still in the nitrogen cabinets at the Lunar Receiving Laboratory, Manned Spacecraft Center, Houston, Texas, in an attempt to provide a petrologic basis for further allocations of rake samples to Principal Investigators working in various scientific disciplines. Furthermore, this preliminary classification should aid these Principal Investigators in interpreting their analytical data before more detailed mineralogic, petrologic, and bulk chemical data are available.



The classification proposed here closely follows that established by the Preliminary Examination Team for these rocks. However, modifications were made, both in regard to the classification principle as well as the classification of individual rocks. Since macroscopic and stereomicroscopic study of these rocks was performed while the samples were still in the nitrogen cabinets only limited sample access was available, and the classification proposed here is by necessity preliminary. Detailed mineralogic, petrologic, and chemical studies will commence when these samples are allocated and may prompt modifications in this classification. However, it is believed that the basic classification of these rocks into 8 groups is realistic and will be maintained, in principle, even after more detailed work.

## 2. Sample locations

The samples studied here are from two collection sites, namely the LM area (60000 numbering sequence) and station 5 (65000 (numbering sequence)). The specific locations of these stations in relation to the other sampling sites and major morphological features in the vicinity of the landing site are shown in Fig. 1.

## 3. Classification

### 3.1. General characterization

The 151 rock samples were classified on the basis of macroscopic and stereomicroscopic studies of the textures and mineral contents. This classification is therefore limited by the resolution of the stereomicroscope and by the difficulties encountered in accurately identifying minerals. On the basis of texture and mineral content, the rake samples

were divided into 8 groups. These are anorthosites (20) (group 1); troctolitic and noritic crystalline rocks (apparently igneous) (3) (group 2); gray, fine-grained crystalline rocks (18) (group 3); gray vesicular glass (usually devitrified), with clasts of anorthosite or plagioclase (20) (group 4); glassy agglutinates (6) (group 5); gray and white microbreccias and breccias (33) (group 6); soil clods (37) (group 7); and brownish soil breccias (14) (group 8). A general characterization of the 8 rock groups is given below.

### 3.1.1. Anorthosites (20) (group 1)

60515, 60516, 60517, 60518, 60519, 60618, 60619, 60628, 60629, 65325, 65326, 65327, 65328, 65329, 65335, 65336, 65359, 65759, 65766, 65789.

Almost all anorthosites have at least 98% feldspar, with mafic minerals occurring only as tiny specks, too small to be identifiable conclusively in the stereomicroscope. Clear feldspar crystals larger than 2 mm are often present, but only as islands in finely comminuted material; all rocks have been shocked. Many have crusts of dark glass on one or more surfaces.

60618 has vesicles (?) in some parts, and some of these appear to be lined with metal. The rock immediately surrounding the vesicles is darker. 65359 has gray clots that are possibly foreign clasts or re-crystallized feldspar or glass. 65759 and 65766 appear to be clasts of anorthosite broken out of breccias

### 3.1.2. Troctolitic and noritic crystalline rocks (apparently igneous) (3) (group 2)

60635, 65785, 65795

60635 is a very vuggy, fine-grained rock. The mafic mineral that

makes up 10% of the rock is probably pyroxene and is also very fine-grained.

65785: Most of the rock appears to be fine-grained and plagioclase-rich, but there is one area with olivine and red spinel poikilitically enclosed in plagioclase.

65795: This is a troctolitic anorthosite or troctolite, fairly coarse (grain size about 0.2-0.4 mm) with about 10% olivine. There is also about 2% of an orange brown phase which is probably pyroxene, and some opaques. Shock effects do not appear to be severe.

### 3.1.3. Gray, fine-grained crystalline rocks (18) (group 3)

#### A. Tough

(i) With "clasts" of plagioclase

60525, 60527, 60615, 60616, 60617, 60636, 65357, 65358

(ii) without "clasts" of plagioclase

60526, 60626, 60627, 65777, 65778, 65779

#### B. Friable

60625, 65365

#### C. Vuggy, with plagioclase and anorthosite clasts

60667, 60675

All rocks of this group have a gray fine-grained crystalline matrix which usually has a marbled appearance, with irregular patches of white material (undoubtedly plagioclase) surrounded by gray or slightly brownish material. Many of the specimens are encrusted with gray, vesicular glass (group 4). Rocks of this group do not appear to be primary igneous rocks, but may have formed by recrystallization of either (or both) the gray vesicular glass (group 4) or some kind of microbreccia (possibly group 6).

Rocks of subgroups A (i) contain clear plagioclase clasts, sometimes 2 mm or larger, but there are usually only a few such clasts.

Rocks of subgroup A (ii) appear to lack plagioclase "clasts" but are otherwise similar to A (i).

Rocks of subgroup B are also similar to A (i) but appear to be friable. 65365 has plagioclase clasts, 60625 does not.

Rocks of subgroup C are somewhat darker than those of group A and B and have a very rough, irregular surface and many vugs. For these particular rocks, origin by recrystallization from the gray vesicular glass (group 4) seems most likely.

3.1.4. Gray vesicular glass (usually devitrified), with clasts of anorthosite or plagioclase (20) (group 4)

60528, 60529, 60645, 60646, 60647, 60648, 60649, 60655, 60665, 60666, 60668, 60669, 60677, 60678, 60679, 65348, 65349, 65355, 65356, 65366.

All of these rocks are vesicular, most with 10% or more vesicles, and all contain white clasts. Some also contain clasts of microbreccias or gray, fine-grained crystalline rocks. The degree of devitrification varies; parts of some specimens are shiny and translucent (glassy) whereas others are completely devitrified with grain sizes approaching 0.1 mm. In some of the latter rocks, interlocking laths (of plagioclase?) can be seen on the walls of vesicles.

65366 consists of flakes of glass which once covered an anorthosite specimen. The flakes are about 1-2 mm thick and usually have anorthosite adhering to one surface. They are not as vesicular as most of the other rocks in this group.

3.1.5. Glassy agglutinates (6) (group 5)

65585, 65586, 65587, 65767, 65776, 65788

Rocks of this group are vesicular glass fragments, highly irregular in shape (ropy, blobby, etc.) which have apparently incorporated clasts of

various kinds. Their color is sometimes yellow-greenish and they may be melted and vitrified brown soil.

### 3.1.6. Gray and white microbreccias and breccias (33) (group 6)

#### A. Clasts of both plagioclase and gray crystalline rock.

60535, 60639, 60656, 60676, 65337, 65338, 65339, 65345, 65346, 65347, 65715, 65716, 65717, 65718, 65719, 65725, 65726, 65727, 65728, 65729, 65735, 65736, 65737, 65738, 65739.

#### B. Clasts primarily of plagioclase or anorthosite

60657, 60658, 60659, 65757, 65758, 65765, 65786, 65787

These are friable to coherent rocks, with clast sizes ranging from microbreccia (<1.0 mm) to fine breccia (>1.0 mm). The matrix appears to be finely granulated clast material (i.e., mostly feldspar). In most rocks, the clasts are almost exclusively anorthosite, plagioclase crystals, gray fine-grained crystalline rocks, and sometimes gray vesicular glass. Other kinds of clasts, such as green spherules and yellow mafic silicate grains are sparse. The matrix is gray and most clasts are white, giving a salt and pepper appearance.

60639 has a basalt clast (the only basaltic rock found in the rake samples studied here).

65337 has greater variety of clasts than most, including spherules, olivine (?), and pyroxene (?) grains.

65728 has blue-green and red clasts, possibly grains of mafic silicates.

### 3.1.7. Soil clods (37) (group 7)

65515, 65516, 65517, 65518, 65519, 65525, 65526, 65527, 65528, 65529, 65535, 65536, 65537, 65538, 65539, 65545, 65546, 65547, 65548, 65549, 65555, 65556, 65557, 65558, 65559, 65565, 65566, 65567, 65568, 65569, 65575, 65576, 65577, 65578, 65579, 65588, 65755.

These rocks are friable (to disintegrated) clods of orange to yellowish brown soil, with a fine ( $< 0.05$  mm), remarkably uniform grain size. A few clasts are sometimes present.

65529 has several spherules.

65536 has one spherule.

65575 has some crystalline clasts.

65579 has a clast of gray glass.

65755 has several kinds of clasts.

### 3.1.8. Brownish soil breccias (14) (group 8)

60637, 60638, 65745, 65746, 65747, 65748, 65749, 65756, 65768, 65769, 65775, 65925, 65926, 65927.

These breccias are generally friable. They contain clasts that are similar to those in group 6 breccias; i.e., anorthosite and plagioclase and gray, fine-grained crystalline rocks, plus occasionally other types of clasts. However, the matrix of these rocks appears to be the same type of brownish soil that is in the clods (group 7), perhaps somewhat recrystallized. Some rocks are coated with glass similar to that in the glassy agglutinates (group 5).

## 3.2 ROCK DESCRIPTION

### 3.2.1 Anorthosites (Group 1)

Generic No.: 60515,0  
Rock Type: Anorthosite

Weight (g): 16.74

Dimensions (cm): 3 x 2.5 x 7

Color (fresh): White (N9)

Shape: Rounded

Variability: None

Coherence: intergranular - moderately coherent  
fracturing - few

Fabric/texture: Isotropic/fine granular, sugary

Cavities (%): None

Surface: Granulated

Zap pits: Few to many, depending upon location. Often lined by black or colored glass.

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99		Very fine		Appears finely comminuted.
Mafic minerals	Dark	1			See comments below (1)	

Special Features: (1) Mafic minerals usually occur as tiny (<0.05 mm) grains scattered throughout the plagioclase. The exact mineralogical character cannot be determined under the binocular microscope, except that small amounts of opaques appear to be present.



Generic No.: 60516,0  
Rock Type: Anorthosite

Weight (g): 7.91

Dimensions (cm): 3.2 x 2.0 x 1.5; 0.4 and 0.3 - two flakes

Color (fresh): White (N9)

Shape: Subangular to rounded

Variability: None

Coherence: intergranular - moderately coherent  
fracturing - few

Fabric/texture: Isotropic/inequigranular, sugary

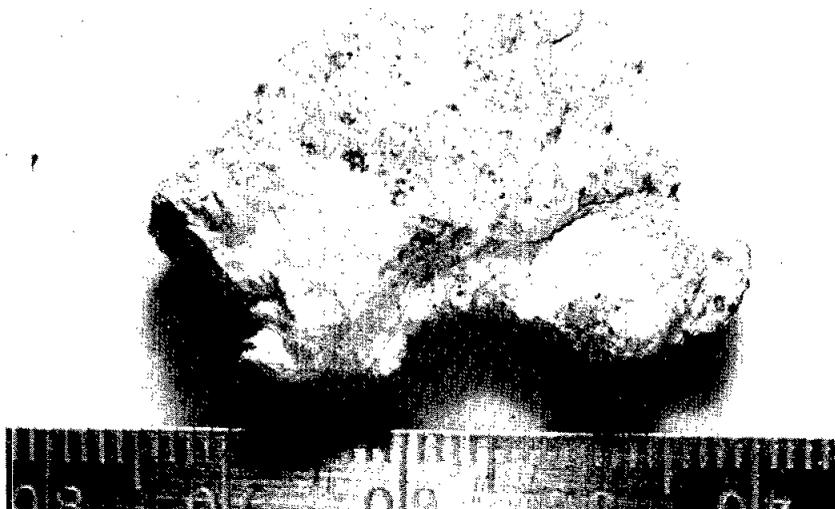
Cavities (%): None

Surface: Granular to irregular

Zap pits: Few to many, depending upon location on rock. Often black or colored glass lining.

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99	Irreg	Up to 2 mm		Some large crystals, but mostly finely comminuted.
Mafic minerals	Dark	1				See comments below (1)

Special Features: (1) Mafic minerals usually occur as tiny (<0.05 mm) grains scattered throughout the plagioclase. The exact mineralogical character cannot be determined under the binocular microscope, except that small amounts of opaques appear to be present.

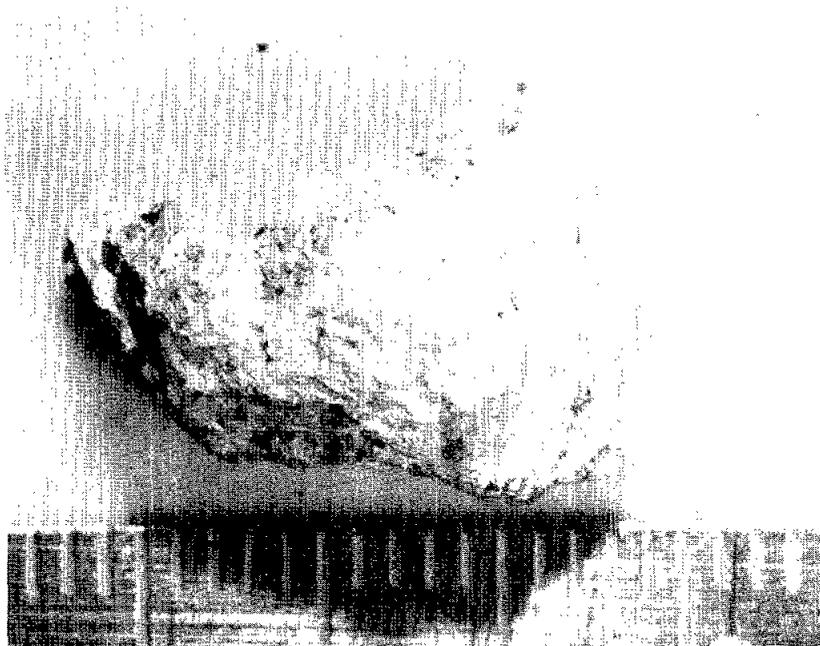


Generic No.: 60517,0  
Rock Type: Anorthosite

Weight (g): 1.23  
Dimensions (cm): 1.6 x 1.1 x 0.7  
Color (fresh): White (N9)  
Shape: Subangular  
Variability: None  
Coherence: intergranular - moderately coherent  
                  fracturing - few  
Fabric/texture: Isotropic/fine granular; sugary  
Cavities (%): None  
Surface: Granulated  
Zap pits: Few to many, depending upon which face of rock is studied.  
            Often, zap pits are lined by black or colored glass

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99		Very fine		Appears finely comminuted
Mafic minerals	Dark	1				See comments below (1)

Special Features: (1) Mafic minerals usually occur as tiny (<0.05 mm) grains scattered throughout the plagioclase. The exact mineralogical character cannot be determined under the binocular microscope, except that small amounts of opaques appear to be present.

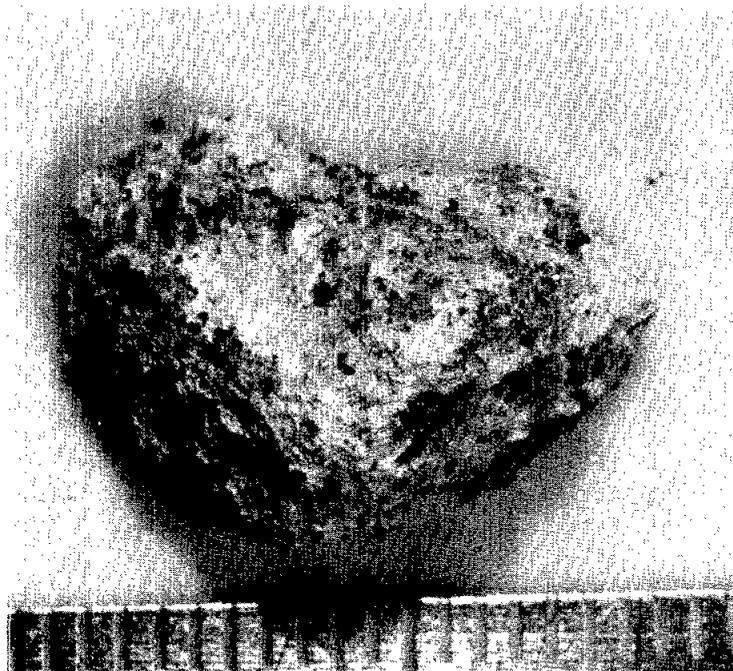


Generic No.: 60518,0  
Rock Type: Anorthosite

Weight (g): 1.12  
Dimensions (cm): 1.5 x 1.1 x 0.6  
Color (fresh): White (N9)  
Shape: Subangular  
Variability: None  
Coherence: intergranular - moderately coherent  
fracturing - few  
Fabric/texture: Isotropic/fine granular, sugary  
Cavities (%): None  
Surface: Granulated  
Zap pits: Few; often with black or colored glass lining

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99		Very fine		Appears finely comminuted
Mafic minerals	Dark	1			See comments below (1)	

Special Features: (1) Mafic minerals usually occur as tiny (<0.05 mm) grains scattered throughout the plagioclase. The exact mineralogical character cannot be determined under the binocular microscope, except that small amounts of opaques appear to be present.



Generic No.: 60519,0  
Rock Type: Anorthosite

Weight (g): 0.50

Dimensions (cm): 0.8 × 0.5 × 0.5  
0.8 × 0.4 × 0.4

Color (fresh): White (N9)

Shape: Subangular

Variability: None

Coherence: intergranular - moderately coherent  
fracturing - few

Fabric/texture: Isotropic; fine granular; sugary

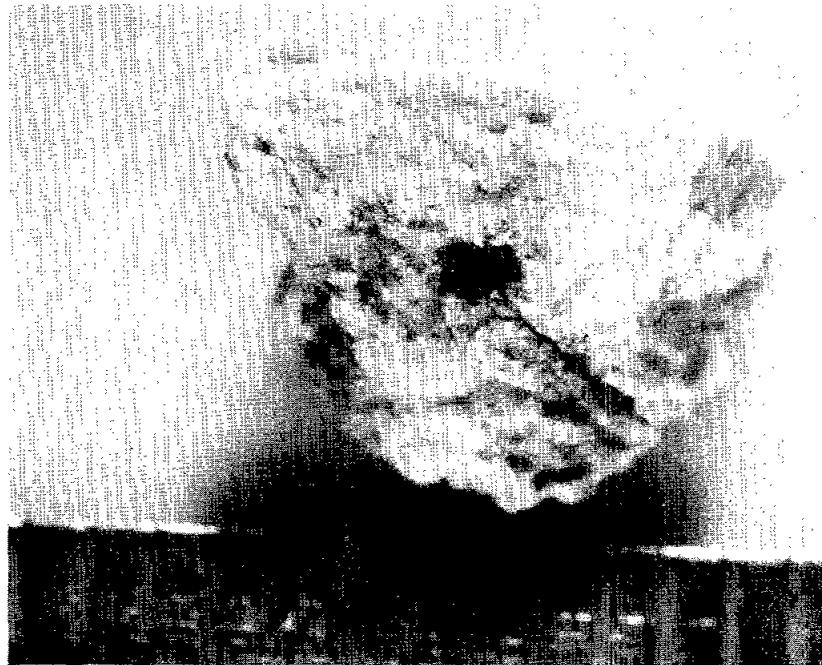
Cavities (%): None

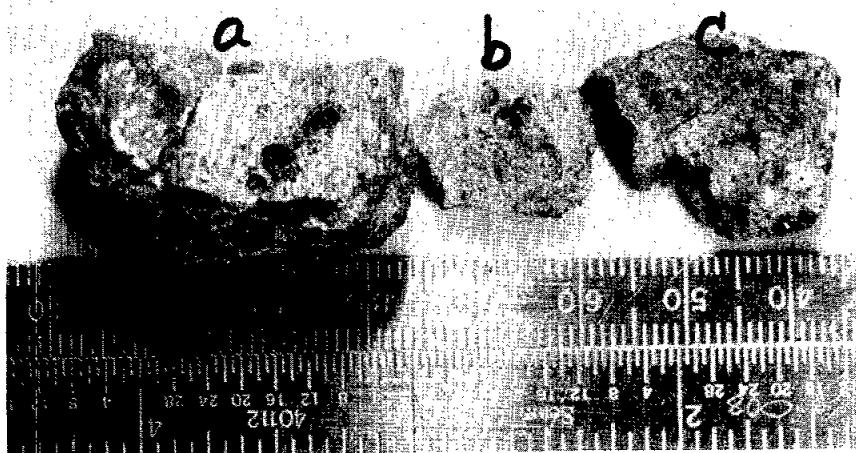
Surface: Granulated

Zap pits: Few; often with black or colored glass lining

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99		Very fine		Appears finely comminuted
Mafic minerals	Dark	1				See comments below (1)

Special Features: (1) Mafic minerals usually occur as tiny (<0.05 mm) grains scattered throughout the plagioclase. The exact mineralogical character cannot be determined under the binocular microscope, except that small amounts of opaques appear to be present.





60618

Generic No.: 60618,0  
Rock Type: Anorthosite  
 (brecciated)

Weight (g): 21.67  
Dimensions (cm): 4.0 x 2.3 x 1.5  
 2.4 x 1.8 x 0.5  
 1.8 x 1.2 x 0.3

Color (fresh): Light gray (N7)

Shape: Angular

Variability: None

Coherence: intergranular - tough  
 fracturing - few

Fabric/texture: Isotropic. Breccia. Large plagioclase crystals (often >0.5 cm) embedded in fine-grained plagioclase matrix.

Cavities (%): Few (<5%). Some localized cavities, with apparent metallic lining. Some cavities have pink to lavender crystals. Vesicles.

Zap pits: Few. Glass lined by white, clear, gray glass. Some have dark glass.

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	Clear	99	Angular		Extreme	
Pink to lavender phase		<0.1	Crystals	<0.02		Perhaps spinel
Nickel-iron	Dark	<0.1	Irreg	<0.02		Perhaps nickel-iron
Splash metal	Lining cavities, or streaky on surface					

Special Features: Several round cavities, maximum 4 mm in diameter to <0.05 mm, have smooth interiors and sometimes appear to be lined by metal. They are highly localized in certain parts of the rock. Where the cavities are located, the color of the surrounding rock is darker (medium gray). Beady areas of splash glass occur.

Generic No.: 60619,0  
Rock Type: Anorthosite

Weight (g): 28.0

Dimensions (cm): 3.5 x 2.8 x 2.0

Color (fresh): Light gray (N7) to very light gray (N5)

Shape: Rounded

Variability: None

Coherence: intergranular - coherent  
fracturing - very few

Fabric/texture: Isotropic. Equigranular, sugary

Cavities (%): None

Surface: Granulated

Zap pits: Few to many depending upon location. Some are glass lined (clear or dark), others are not.

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	Clear to very light gray	99+		<1.0		
Opagues	Dark	<0.1				

Special Features: Has an area of splash glass (brownish-black); largest is ~4 mm in diameter.



Generic No.: 60628,0  
Rock Type: Anorthosite

Weight (g): 6.86

Dimensions (cm): 2.5 x 2.2 x 1.2

Color (fresh): White (N9)

Shape: Subangular

Variability: None

Coherence: intergranular - friable to coherent, crushed  
fracturing - very few

Fabric/texture: Isotropic, crushed

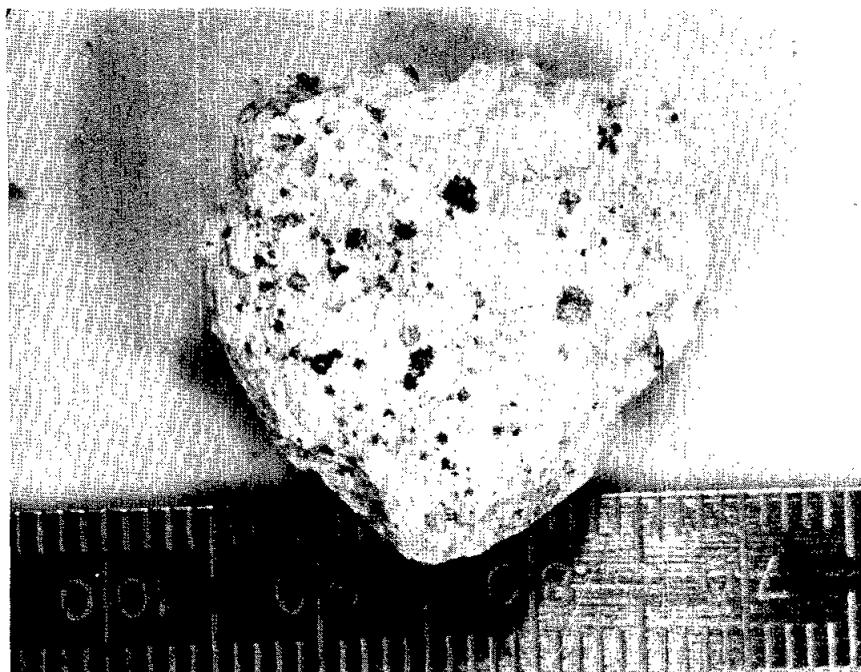
Cavities (%): None

Surface: Granulated

Zap pits: Many, on one side only. Splash glass (medium gray to clear)  
occurs on the same side

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u> <u>Dom.</u> <u>Range</u>	<u>Comments</u>
Plagioclase	White	99+	Irreg	Highly variable	

Special Features: Some of the plagioclase crystals are clear, whereas others are milky.



Generic No.: 60629,0  
Rock Type: Anorthosite

Weight (g): 4.92

Dimensions (cm): 2.3 x 2.0 x 1.1

Color (fresh): White (N9)

Shape: Subangular

Variability: Yes. One side of the anorthosite has attached devitrified glass (medium dark gray, N4)

Coherence: intergranular - coherent  
fracturing - few

Fabric/texture: Isotropic, sugary

Cavities (%): None, but some in the glass

Surface: Granulated

Zap pits: Many, lined by clear to dark greenish-gray glass.

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99+				Extremely fine-grained
Glass	Medium dark gray (N4)	99+				

Special Features: This rock is 4/5 anorthosite, and, at one end, it has attached devitrified glass (1/5) which in turn contains inclusions of anorthosite.



Generic No.: 65325  
Rock type: Anorthosite

Weight (g): 67.84

Dimensions (cm): 6.7 x 4.8 x 3.0

Color (fresh): White (N9)

Shape: Subrounded

Variability: None for bulk of rock: some crust present (1)

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/Inequigranular (powdery to granular)

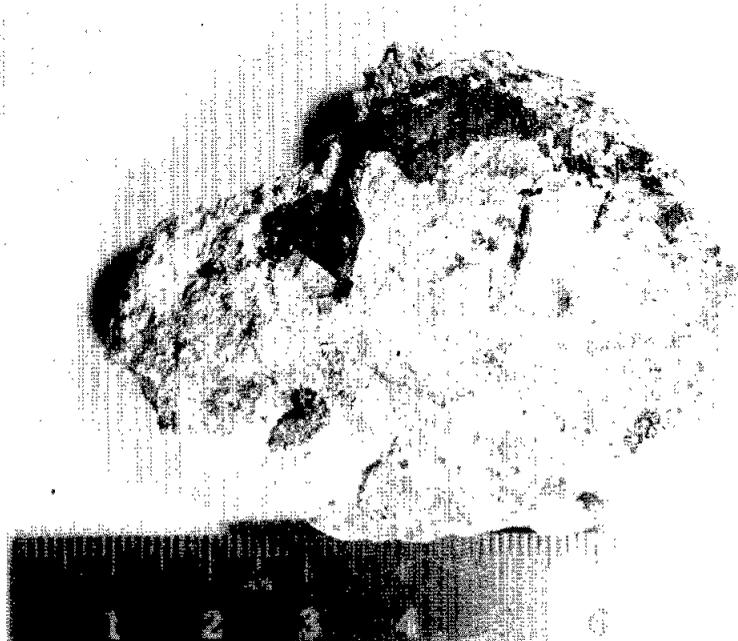
Cavities (%): None

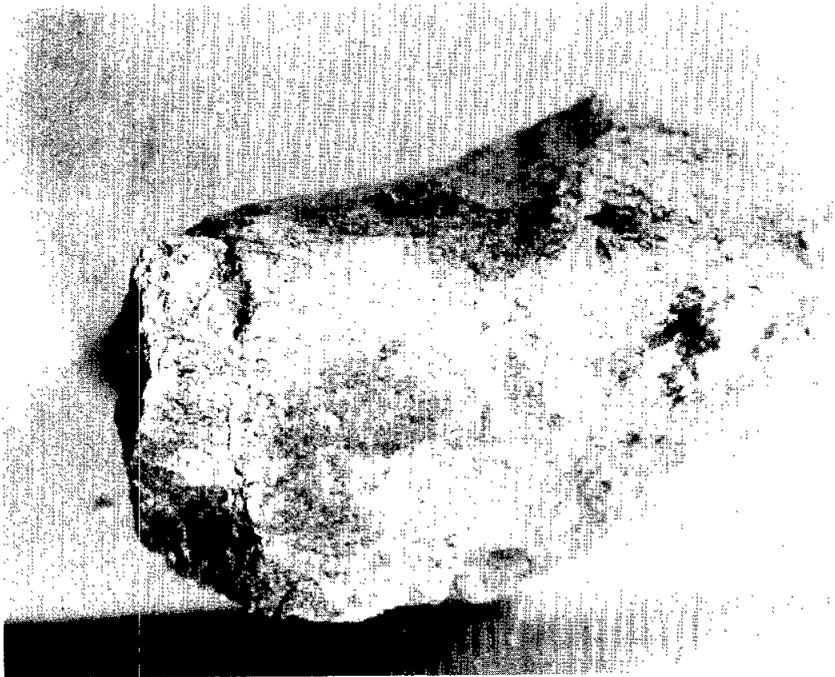
Surface: Granular - irregular (anorthosite), smooth (glass crust)

Zap pits: Few (many lined with dark glass)

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99	Irreg	~1	Up to 2	Many clear grains as islands in finely comminuted plagioclase
Maf. Sil.	Dark	1-	?	<.05		Tiny grains dispersed throughout rock
Opaque	Metallic	<0.1	Irreg	<.05		Probably Fe-Ni or troilite

Special Features: (1) A partial crust of dark brown glass on one surface.





65326

Generic No.: 65326  
Rock Type: Anorthosite

Weight (g): 36.40  
Dimensions (cm): 4.2 x 2.8 x 2.5  
Color (fresh): Very light gray (N8)  
Shape: Subrounded  
Variability: Little or none  
Coherence: intergranular - moderately friable  
                  fracturing - few  
Fabric/texture: Isotropic/inequig (powdery to granular)  
Cavities (%): None  
Surface: Granulated to irregular.  
Zap pits: Very few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	90-95	Irreg	~1 mm	Up to 2	Many clear grains as islands in finely comminuted plagioclase
Gray "clasts"	Light gray (N7)	5-10	Irreg	~5	1 to 10	Probably not mafic silicate, though part could be. Some areas are definitely recrystallized plagioclase.
Maf. sil.	Dark	<1	?	<0.05		
Opaque	Metallic	<0.01	Irreg	<0.05		Probably nickel-iron

Special Features: A few slickensides. Note small patches of orange dust or powdery material on one face.

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Generic No.: 65327  
Rock Type: Anorthosite

Weight (g): 6.97

Dimensions (cm): 2.6 x 2.0 x 1.3

Color (fresh): White (N9)

Shape: Subrounded

Variability: None (see [1])

Coherence: intergranular - friable, coherent  
fracturing - few

Fabric/texture: Isotropic inequigran (powdery to granular)

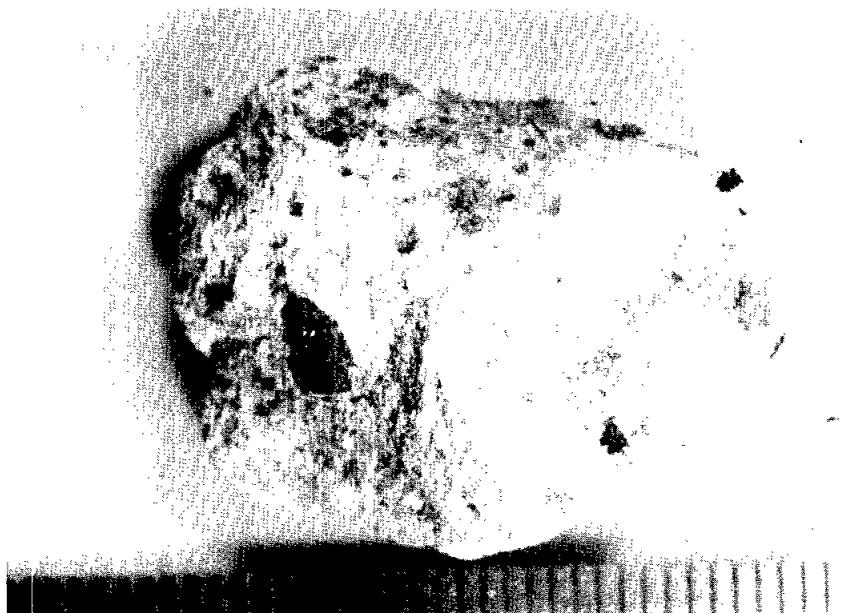
Cavities (%): None

Surface: Granular - irregular

Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99+	Irreg	~ 1	Up to 1.5	Clear grains as islands in finely comminuted plagioclase
Maf. Sil.	Honey yellow	< 1	Irreg	< 0.1	Up to 0.2	Very few recognizable crystals (larger ones). Tiny grains are extremely sparse
Opaque	Metallic	< 0.1	Irreg	< 0.05		Nickel-iron

Special Features: (1) One or two small areas of dark glass crust.



Generic No.: 65328  
Rock Type: Anorthosite

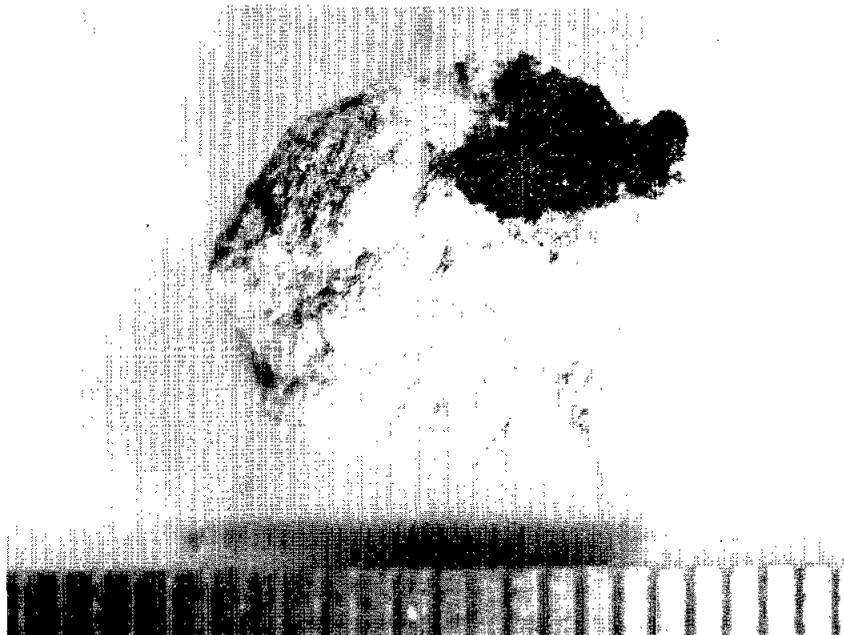
Weight (g): 1.28  
Dimensions (cm): 1.2 x 1.1 x 0.5  
Color (fresh): White (N9)  
Shape: Subrounded  
Variability: None in anorthosite (see [1]).  
Coherence: intergranular - friable  
                  fracturing - few  
Fabric/texture: Isotropic inequigran (powdery to granular)  
Cavities (%): None  
Surface: Irregular - granulated  
Zap pits: Very few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99.0+	Inreg	~1	Up to 2	Clear grains as islands in finely comminuted plagioclase.
Maf. Sil.	Dark	1-	?	<0.05		All or almost all present as tiny included grains
Opaque	Metallic	<0.1	Inreg	<0.05		Probably nickel-iron

Special Features: (1) Dark glass crust present on one face.

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Generic No.: 65329  
Rock Type: Anorthosite

Weight (g): 1.92  
Dimensions (cm): Anorthosite  
Color (fresh): White (N9) to very light gray (N8)  
Shape: Subangular  
Variability: None  
Coherence: intergranular - friable  
fracturing - few, some penetrative  
Fabric/texture: Isotropic/inequigranular (powdery to granular)  
Cavities (%): None  
Surface: Irregular to granulated  
Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	98+	Irreg	~1	Up to 2	Clear grains as islands in finely comminuted plagioclase
Maf. silicate	Dark	2-	?	< 0.05		



Generic No.: 65335  
Rock Type: Anorthosite

Weight (g): 1.63  
Dimensions (cm): 1.4 x 1.2 x 1.0  
Color (fresh): White (N9) to light gray (N7)  
Shape: Rounded  
Variability: None  
Coherence: intergranular - friable  
                  fracturing - few  
Fabric/texture: Isotropic/inequigran (powdery to granular)  
Cavities (%): None  
Surface: Irregular - granulated  
Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99	Irreg	~ 1		Clear grains as islands in finely comminuted plagioclase
Maf. Sil.	Dark	1	?	< 0.05		

Special Features: This specimen is abraded and covered with some dust, so that minor constituents are difficult to pick out.

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Generic No.: 65336  
Rock Type: Anorthosite

Weight (g): 0.60  
Dimensions (cm): 1.5 x 0.8 x 0.4  
Color (fresh): White  
Shape: Subangular  
Variability: None (see [1])  
Coherence: intergranular - friable  
                  fracturing - few  
Fabric/texture: Isotropic/inequigranular (powdery to granular)  
Cavities (%): None  
Surface: Irregular to granulated  
Zap pits: Very few

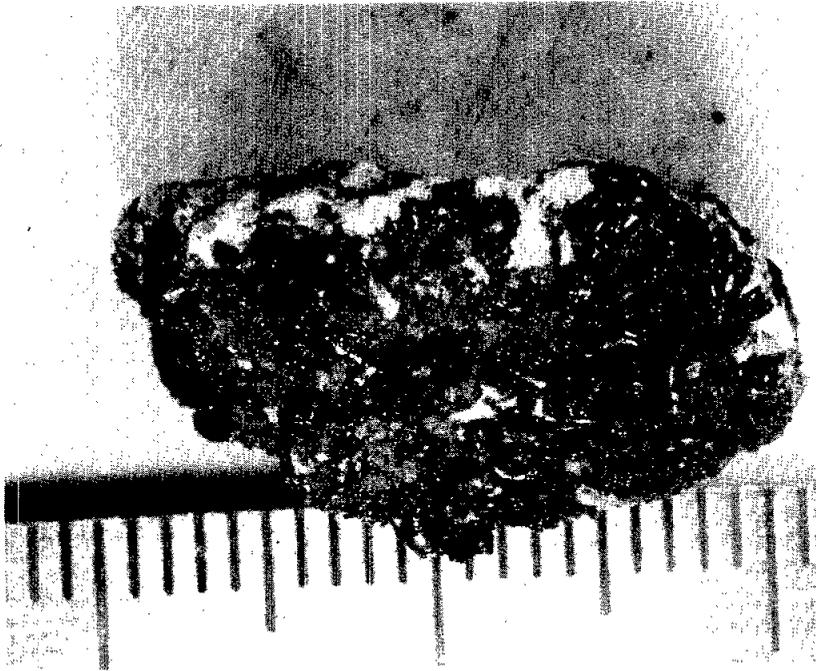
<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99	Irreg	~		Clear grains as islands in finely comminuted plagioclase
Maf. sil.	Dark	1	?	<0.05		

Special Features: (1) Some dark glass or very large zap pits on surface.

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65359

Generic No.: 65359  
Rock Type: Anorthosite with  
gray clots

Weight (g): 2.53  
Dimensions (cm): 1.8 x 1.1 x 1.0  
Color (fresh): White (N9) to medium light gray (N6)  
Shape: Subrounded  
Variability: Yes  
Coherence: intergranular - coherent - friable  
fracturing - few  
Fabric/texture: Isotropic/granular - powdery  
Cavities (%): None  
Surface: Granulated  
Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	95+	Irreg	1		
Dark clots (small)	Medium dark gray	3?				
Gray clot (large)	Medium light gray	2	Rounded, broken	3x5		Only one visible

Special Features: This rock appears to be mainly anorthosite, but it contains gray to dark gray clots of varying size. Some of the small, dark ones may be mafic silicates. One large (3 x 5 mm) gray clot appears to be finely crystalline and has hackly fracture. It is gray but could be mostly feldspar. One surface is covered with dark, bubbly highly reflective glass. This appears to have intruded the anorthosite in some areas. Also near this surface are some rusty (orange) areas (small veins, etc.).

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Generic No.: 65759,0  
Rock Type: Plagioclase clast

Weight (g): 3.11  
Dimensions (cm): 2.1 x 1.4 x 0.8  
Color (fresh): Very light gray (N8)  
Shape: Subangular  
Variability: None  
Coherence: intergranular - coherent  
                  fracturing - some  
Fabric/texture: Isotropic. One large plagioclase clast, brecciated  
Cavities (%): None  
Surface: Beady splash glass drops on surface  
Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99				
Matrix	Gray	1				
Glass	Dark	< 0.1				

Special Features: This is probably a large anorthosite clast broken out of a gray and white breccia, similar to 65758,0. A yellow-brown limonite or lawrencite stain of considerable size is present.

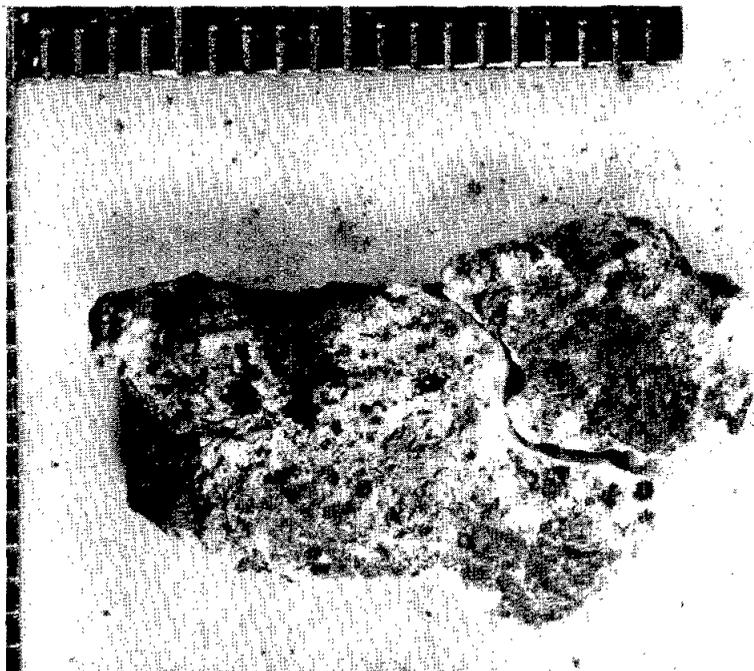


Generic No.: 65766,0  
Rock Type: Plagioclase clast

Weight (g): 1.01  
Dimensions (cm): 1.8 x 1.0 x 0.5  
0.9 x 0.9 x 0.5  
Color (fresh): White (N9) to medium light gray  
Shape: Subangular  
Variability: None  
Coherence: intergranular - coherent  
fracturing - few  
Fabric/texture: Isotropic. Clast of plagioclase  
Cavities (%): None  
Surface: Irregular, somewhat sugary in places  
Zap pits: Few, glass lined (colorless)

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	98				
Soil, Matrix		2				

Special Features: This rock consists of two plagioclase clasts (two fragments) that have attached minute amounts of soil and very little of what appears to be gray matrix material. These rocks may represent plagioclase clasts broken out of a gray and white breccia. In places, reddish-brown, small spots and grains (?) are observed.



Generic No.: 65789  
Rock Type: Anorthosite

Weight (g): 12.24

Dimensions (cm): 3.5 x 2.2 x 1.5

Color (fresh): White (N9) to very light gray (N8)

Shape: Blocky, subangular

Variability: None (see [1])

Coherence: intergranular - moderately coherent  
fracturing - few

Fabric/texture: Isotropic, inequigranular (granular to powdery)

Cavities (%): None

Surface: Granulated

Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	99+	Variable	~1		Clear crystals as islands in finely comminuted plagioclase
Maf. sil.	Dark	<0.5				Some very tiny grains included in plagioclase

Special Features: (1) One small patch of brown glass.



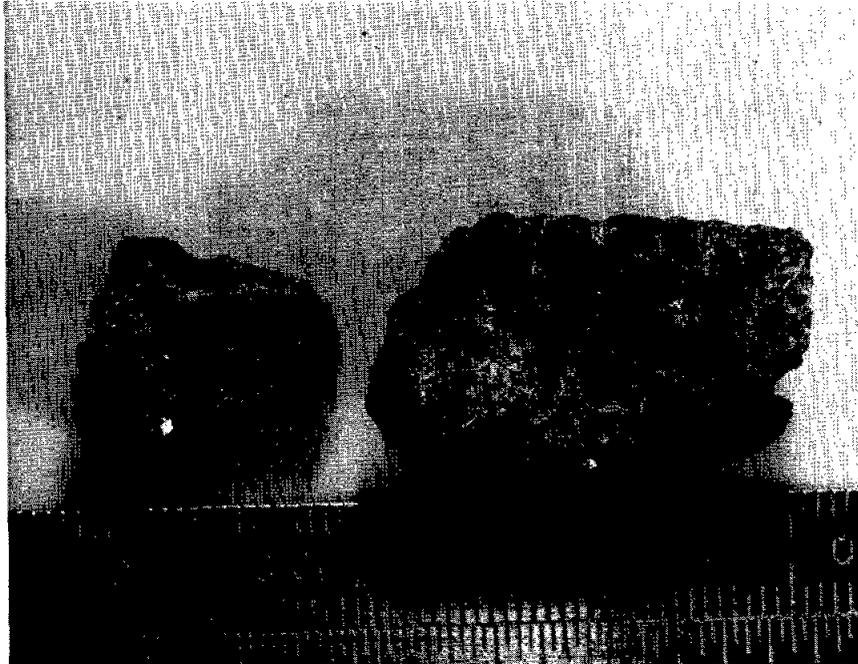
3.2.2 Troctolitic and noritic crystalline rocks (apparently igneous) (Group 2)

Generic No.: 60635,0  
Rock Type: Noritic anorthosite

Weight (g): 15.05  
Dimensions (cm): 3.3 x 2.4 x 1.7  
2.0 x 1.4 x 0.7  
Color (fresh): Medium light gray (N6)  
Shape: Subrounded to subangular  
Variability: None  
Coherence: intergranular - tough  
fracturing - few (very)  
Fabric/texture: Isotropic/ophitic  
Cavities (%): Vugs (35%)  
Surface: Irregular  
Zap pits: Very few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	Clear	90+	Laths	1.0	<3.0	
Mafics	Dark	10-	Irreg		<0.02	Probably pyroxene

Special



Generic No.: 65785,0  
Rock Type: Fine-grained,  
plagioclase rich with  
troctolitic areas

Weight (g): 5.16

Dimensions (cm): 2.1 x 1.5 x 1.2

Color (fresh): Light gray (N7)

Shape: Subangular

Variability: Certain parts of the rock appear somewhat coarser  
grained than others.

Coherence: intergranular - tough to coherent  
fracturing - few

Fabric/texture: Isotropic

Cavities (%): None

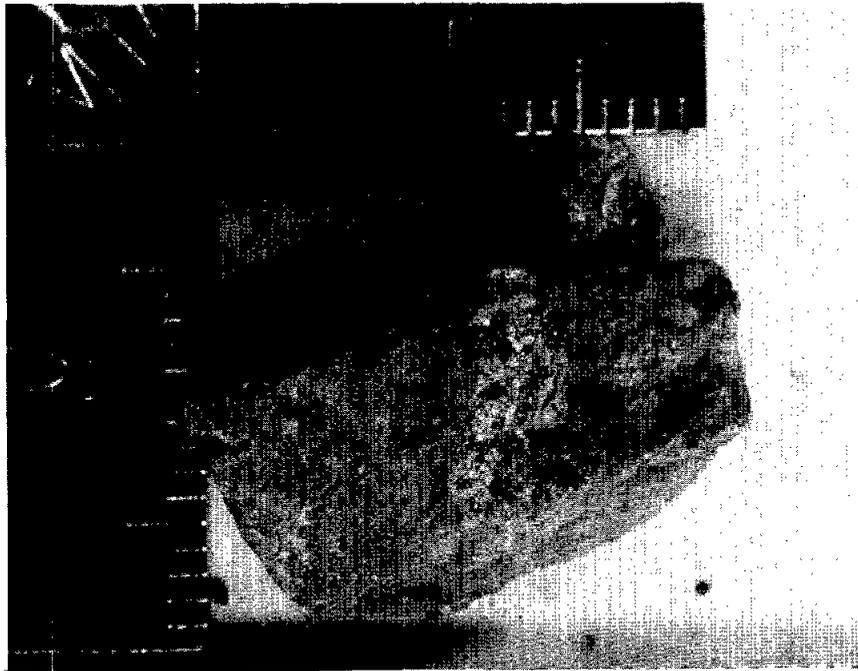
Surface: Smooth to granulated

Zap pits: None

Special Features: This specimen consists of a fine-grained feldspar-  
rich main mass with which is associated a troctolite area, consisting  
of feldspar (<4 mm), olivine (yellow)(<1 mm), and spinel (red) (<1 mm)  
(comparatively coarser grained).

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Generic No.: 65795  
Rock Type: Troctolitic  
anorthosite

Weight (g): 6.84  
Dimensions (cm): 2.0 x 1.9 x 1.5  
Color (fresh): Very light gray (N8) to medium light gray (N6)  
Shape: Rounded  
Variability: None  
Coherence: intergranular - friable  
fracturing - few  
Fabric/texture: Isotropic/equiangular  
Cavities (%): Possibly a few vugs  
Surface: Granulated  
Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	90+	Sub-hedral	0.4		Elongation usually about 2/1
Maf. sil.	Yellow	10-	Irreg	0.4		Probably olivine
Maf. sil.	Orange brown	2		0.2		Probably pyroxene, but possibly spinel
Opaque	Black	3	Rounded	0.1		



### 3.2.3 Gray, fine-grained crystalline rocks (Group 3)



60525

Generic No.: 60525,0  
Rock Type: Gray, tough, fine-grained crystalline rock, with clasts

Weight (g): 12.84  
Dimensions (cm): 3.7 x 2.1 x 1.5  
Color (fresh): Medium gray (N5)  
Shape: Rounded  
Variability: None  
Coherence: intergranular - tough  
                   fracturing - few  
Fabric/texture: Isotropic; very fine-grained, tough matrix containing several white and two or three yellow clasts.  
Cavities (%): Very few (<1%) lined with plagioclase crystals  
Surface: Granulated  
Zap pits: Few; often lined by colored (brown) glass

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix	Medium dark gray (N4)	95	---	<0.05		Marbled with white material
Plagioclase	White (N9)	5	Irreg to round	Up to 2.0		Probably clasts
Mafic silicate	Yellow	<1	Irreg to round	Up to 1.0		Probably clasts
Maf. sil. or oxide	Red to orange	<0.1	Angular	<0.1		Apparently oxidized metal or sulfide or lawrencite

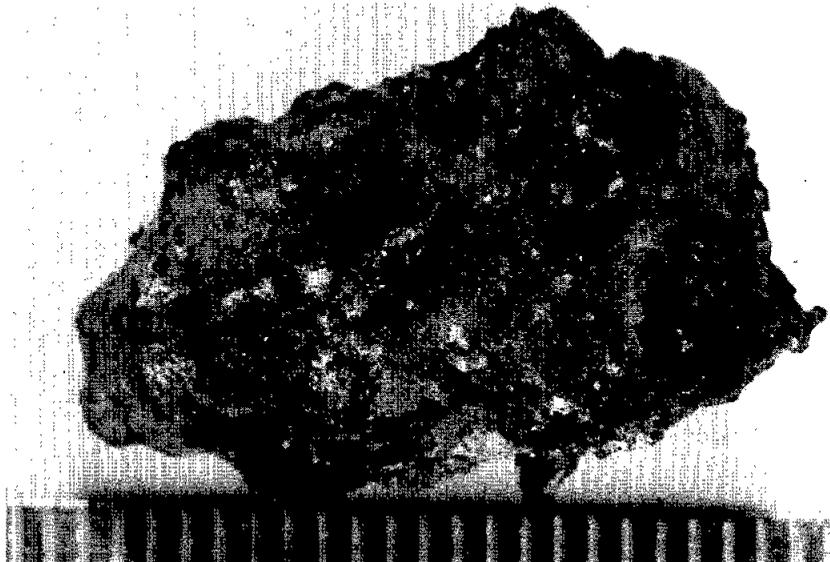
Special Features: This is a highly recrystallized rock. Examination under the stereo microscope does not allow us to decide whether the parent material was a microbreccia (more likely) or an igneous rock.

Generic No.: 60527,0  
Rock Type: Gray, tough, fine-grained crystalline rock

Weight (g): 7.36  
Dimensions (cm): 2.0 x 1.3 x 1.3  
 1.5 x 1.4 x 1.2  
Color (fresh): Medium gray (N5)  
Shape: Irregular (see [1])  
Variability: See (1)  
Coherence: intergranular - tough  
 fracturing - none  
Fabric/texture: Isotropic. Extremely fine-grained tough rock of marbled appearance (see [1])  
Cavities (%): Very few, very small vugs  
Surface: Smooth to hackly (see [1])  
Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix						
(a)	White	50	Irreg	<0.05		Probably plagioclase
(b)	Dark	50	Irreg	<0.05		
Plagioclase	White	<0.1	Irreg	0.7		One clast

Special Features: (1) Both rocks are rectangular with rather smooth and flat faces and are partially covered by a thick rind of glassy, highly vesicular material that is partly recrystallized. This rock has a marbled texture, consisting of 50% white material in irregular patches <0.05 mm in diameter that are surrounded by dark material. The rock and its texture is similar to 60526,0, but it is even finer-grained. The rind (glassy, partly recrystallized) occasionally contains white clasts of plagioclase.





60615

Generic No.: 60615,0

Rock Type: Gray, tough, fine-grained crystalline rock (1)

Weight (g): 32.97

Dimensions (cm): 4.3 x 2.8 x 2.3

Color (fresh): Medium light gray (N6)

Shape: Subrounded

Variability: None

Coherence: intergranular - tough  
fracturing - few

Fabric/texture: Isotropic; very fine-grained, tough matrix of light-dark marbled texture; sometimes sugary.

Cavities (%): 10% vugs, some of which reach large dimensions (up to 13 mm in diameter); some are smoothly lined, non-glassy. Others are irregularly lined, with sugary crystals.

Surface: Irregular to granulated

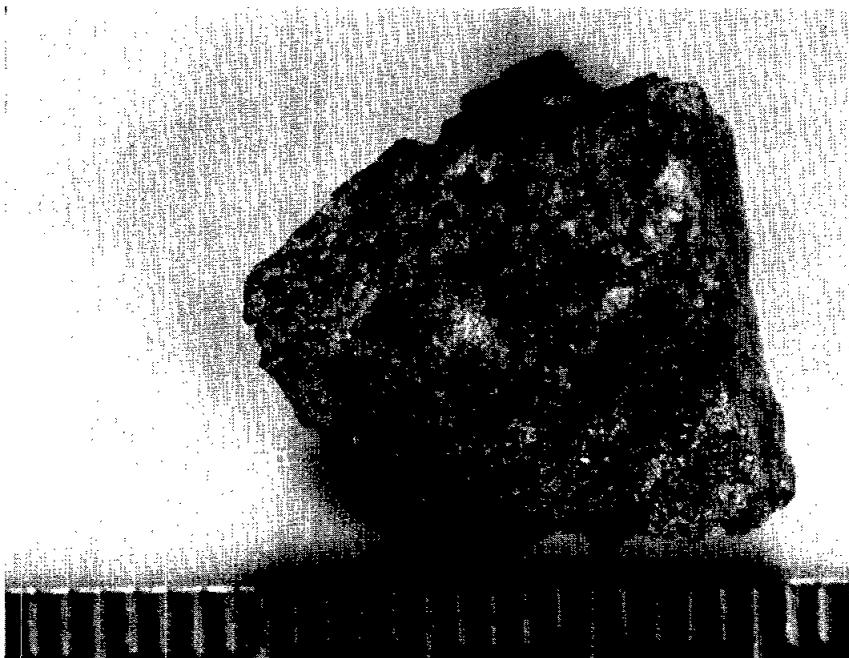
Zap pits: Few to many, depending upon location. Often lined by dark or colored glass (greenish-gray).

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix						
(a)	White	50	Irreg	<0.1		Probably plagioclase
(b)	Dark	50	Irreg	<0.1		
Plagioclase	White	1	Angular	<1.0		A few clasts

Special Features: (1) This rock contains only few white clasts, probably of plagioclase (<1%). Millimeter - sized areas of splash glass, a few microns thick and usually dark in color (olive-black), are observed on one side of the rock (3 areas). This rock has a marbled texture, consisting of 50% white material in irregular patches <0.1 mm in diameter that are surrounded by dark material. The nature of the parent material (microbreccia vs. igneous) cannot be identified under the stereo microscope. NOTE: This rock is not as tough as the type example of this group (e.g., 60616).

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60616

Generic No.: 60616,0  
Rock Type: Gray, tough, fine-grained crystalline rock (1)

Weight (g): 3.40  
Dimensions (cm): 1.6 x 1.4 x 1.2  
Color (fresh): Medium gray (N5)  
Shape: Angular to subangular  
Variability: None  
Coherence: intergranular - tough (very)  
                   fracturing - few  
Fabric/texture: Isotropic; extremely fine-grained, tough matrix  
                   of light-dark marbled texture.  
Cavities (%): A few tiny vugs (<0.2 mm)  
Surface: Smooth to hackly. Blocky, has flat, smooth faces  
Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix						
(a)	White	50	Irreg	<0.05		Probably plagioclase
(b)	Dark	50	Irreg	<0.05		
Plagioclase	Very light gray	1	Angular	<3.0		A few clasts
Opagues	Dark	0.1				

Special Features: (1) This rock has only few clasts of white to light gray (N8) color (plagioclase, up to 3 mm in diameter). This rock has a marbled texture, consisting of 50% white material in irregular patches <0.05 mm in diameter that are surrounded by dark material. Extremely tough and fine-grained rock, considered to be the toughest of the group. The nature of parent material (microbreccia vs. igneous) cannot be identified under the stereo microscope.

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60617

Generic No.: 60617,0  
Rock Type: Gray, tough, fine-grained crystalline rock, with clasts

Weight (g): 2.77  
Dimensions (cm): 1.8 x 1.3 x 1.0  
Color (fresh): Medium gray (N5)  
Shape: Subangular  
Variability: None  
Coherence: intergranular - tough  
fracturing - few  
Fabric/texture: Isotropic; fine-grained, tough matrix of light-dark marbled texture.  
Cavities (%): Few (from 3 mm to 0.05 mm)  
Surface: Granulated  
Zap pits: Few, some are lined by dark and colored glass

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix						
(a)	White	45+	Irreg	<0.1		Probably plagioclase
(b)	Dark (grayish black)	45+	Irreg	<0.1		
Plagioclase	White	10-	Angular	<1.0		Probably plagioclase
Opakes	Dark	0.1				

Special Features: Millimeter-sized areas of splash glass of dark color are observed. The rock has a marbled texture of white material surrounded by dark material. The nature of the parent material (microbreccia vs. igneous) cannot be identified under the stereo microscope.

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Generic No.: 60636,0

Rock Type: Gray, tough, fine-grained crystalline rock

Weight (g): 35.65

Dimensions (cm): 4.2 x 2.8 x 2.2

Color (fresh): Medium light gray (N6)

Shape: Subangular

Variability: None

Coherence: Intergranular - tough  
fracturing - few

Fabric/texture: Isotropic. Extremely fine-grained, with incrustations of minerals in vugs, and large yellowish crystals <3 mm in diameter.

Cavities (%): Few, but very vuggy.

Surface: Highly irregular

Zap pits: Few, some splash glass.

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix	Medium light gray	95+				Extremely fine-grained and dense
Yellow crystals		4-			< 3 mm	

Special Features: This rock is extremely fine-grained, with larger crystals in the matrix. Vugs are full of small crystals that should be studied separately.



Generic No.: 65357  
Rock Type: Gray fine-grained  
 crystalline rock

Dimensions (cm): 3.5 x 2.1 x 1.6  
Color (fresh): Medium light gray to light gray (N6-N7)  
Shape: Subrounded  
Variability: None  
Coherence: intergranular - coherent  
 fracturing - few  
Fabric/texture: Isotropic/equigranular(?)  
Cavities (%): None  
Surface: Granulated to hackly  
Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	50-60			To 0.5	One or two "clasts" up to 2 mm.
Maf. sil.	Yellow yellow-brown	30-40			To 0.5	
Opakes	Dark	<10			<0.1	In patches and streaks, most appears very fine

Special Features: Marbled texture. Coarser than most in this group.



Generic No.: 65358  
Rock Type: Gray fine-grained  
crystalline rock

Weight (g): 7.02  
Dimensions (cm): 2.8 x 1.7 x 1.1  
Color (fresh): Medium light gray (N6)  
Shape: Subangular  
Variability: None  
Coherence: intergranular - tough  
                  fracturing - few  
Fabric/texture: Isotropic/equigranular to porphyritic  
Cavities (%): 2% vugs  
Surface: Hackly  
Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	10	Irreg	~1		
Dark clots	Medium dark gray	5(?)	Irreg/ angular	<0.5		These may be maf. sil. or some may be plagioclase
Groundmass or matrix	Medium light gray					(1)

Special Features: (1) The groundmass is too fine to distinguish minerals, except for plagioclase which is surely present. Other component(s) are gray. Marbled texture.



Generic No.: 60526,0  
Rock Type: Gray, tough, fine-grained crystalline rock without clasts

Weight (g): 8.42  
Dimensions (cm): 2.2 x 2.0 x 1.2  
Color (fresh): Medium light gray (N6)  
Shape: Angular  
Variability: None  
Coherence: intergranular - tough  
                   fracturing - none  
Fabric/texture: Isotropic; very fine-grained tough rock of marbled appearance  
Cavities (%): Very few very small vugs  
Surface: Smooth to hackly  
Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix						
(a)	White	50	Irreg	<0.1		Probably plagioclase
(b)	Dark	50	Irreg	<0.1		

Special Features: This rock has a marbled texture, consisting of 50% white material in irregular particles <0.1 mm in diameter that are surrounded by dark material. Some of the dark material occasionally tends toward a brownish tint. This rock is similar to 60525,0, but lacks the clasts and is somewhat coarser. Also, it's surface is smoother than that of 60525,0. The nature of the parent material (microbreccia vs. igneous rock) cannot be identified under the stereomicroscope.



Generic No.: 60626,0  
Rock Type: Gray, fine-grained  
crystalline

Weight (g): 15.87

Dimensions (cm): 3.1 × 2.9 × 1.4  
2.6 × 1.8 × 1.2  
1.3 × 0.8 × 0.4

Color (fresh): Light gray (N7) to medium light gray (N6)

Shape: Subrounded

Variability: None

Coherence: intergranular - coherent  
fracturing - many, particularly in medium-sized specimen

Fabric/texture: Isotropic to weakly laminated in places; apparently shocked

Cavities (%): None in rock, but cavities are within glass that occurs in  
depressions

Surface: Granulated

Zap pits: Very few. Glass lined. Certain areas have many zap pits

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix						
(a)	White	70	Irreg	<0.02		Probably plagioclase
(b)	Dark	30	Irreg	<0.02		
Rusty spots						Perhaps oxidized lawrencite or limonite

Special Features: The rock is marbled - textured, with light material surrounded by dark material. Very fine grained. The rock contains exposed veins of glass that are black to green (dark yellow-green) (106Y4/4).



Generic No.: 60627,0  
Rock Type: Gray, fine-grained  
crystalline rock

Weight (g): 12.09  
Dimensions (cm): 3.2 x 2.3 x 1.1  
Color (fresh): Light gray (N7)  
Shape: Subrounded  
Variability: None  
Coherence: intergranular - coherent  
fracturing - few  
Fabric/texture: Isotropic. Very fine-grained; marbled  
Cavities (%): None  
Surface: Smooth  
Zap pits: Many, often glass lined.

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix						
(a)	White	90+	Irreg	<0.1		Probably plagioclase
(b)	Dark	10-	Irreg			
Metal	Dark	<1				

Special Features: Splash glass (olive gray) occurs. This is a very fine-grained rock of marbled texture. It is similar to rock 60625,0.



Generic No.: 65777,0

Rock Type: Gray, tough, fine-grained crystalline rock

Weight (g): 16.53

Dimensions (cm): 3.3 x 2.4 x 1.1

Color (fresh): Light gray (N7)

Shape: Subangular

Variability: None

Coherence: intergranular - very tough  
fracturing - few

Fabric/texture: Isotropic. Extremely fine-grained, crystalline rock with marbled (white-gray) appearance

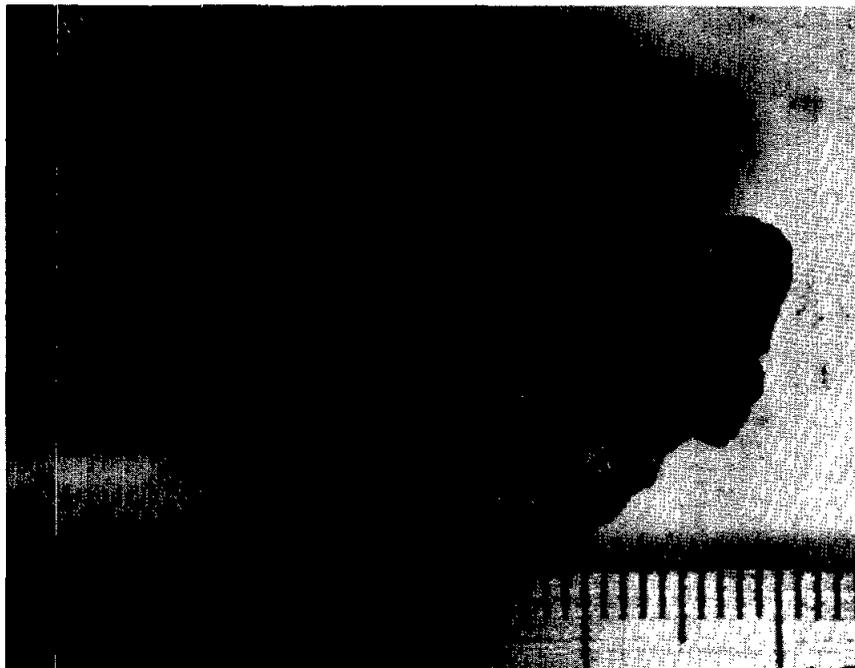
Cavities (%): Extremely few

Surface: Granulated to smooth

Zap pits: Few. Some splash glass is observed. Zap pits are lined by clear to medium dark gray glass.

Special Features: This is one of the extremely fine-grained crystalline rocks, with a marbled texture too fine to identify phase. The ratio of light to dark is about 50:50. A few metal beads were observed on the surface.

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Generic No.: 65778,0  
Rock Type: Gray coherent  
crystalline rock

Weight (g): 12.22

Dimensions (cm): 2.9 x 2.0 x 1.1

Color (fresh): Light gray (N7)

Shape: Subangular

Variability: None

Coherence: intergranular - coherent  
fracturing - few

Fabric/texture: Isotropic. Crystalline with marbled texture  
(relatively coarse in comparison to 65777).

Cavities (%): Few

Surface: Smooth to granulated

Zap pits: Many

Special Features: This is a relatively dense crystalline rock of pronounced light and dark (marbled) texture. The light material is surrounded by the dark. This rock may represent a recrystallized breccia transitional to the gray, tough, fine-grained crystalline rock (e.g., 65777,0).

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Generic No.: 65779,0  
Rock Type: Gray, tough, fine-grained crystalline rock

Weight (g): 12.71  
Dimensions (cm): 2.6 x 2.3 x 1.5  
Color (fresh): Very light gray (N8) to light gray (N7)  
Shape: Subrounded  
Variability: None  
Coherence: intergranular - tough  
                  fracturing - few  
Fabric/texture: Isotropic. Gray fine-grained crystalline rock with marbled texture  
Cavities (%): None  
Surface: Smooth to granular  
Zap pits: It has a 4 mm diameter zap crater of dark greenish gray glass  
Special Features: This rock has rusty spots (lawrencite-limonite(?)) all over.

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Generic No.: 60625,0

Rock Type: Gray, friable, fine-grained, crystalline rock.

Weight (g): 117.0

Dimensions (cm): 6.8 x 5.7 x 3.5

Color (fresh): Light gray (N7)

Shape: Rounded

Variability: None

Coherence: intergranular - friable  
fracturing - very few

Fabric/texture: Isotropic. Extremely fine-grained (1).

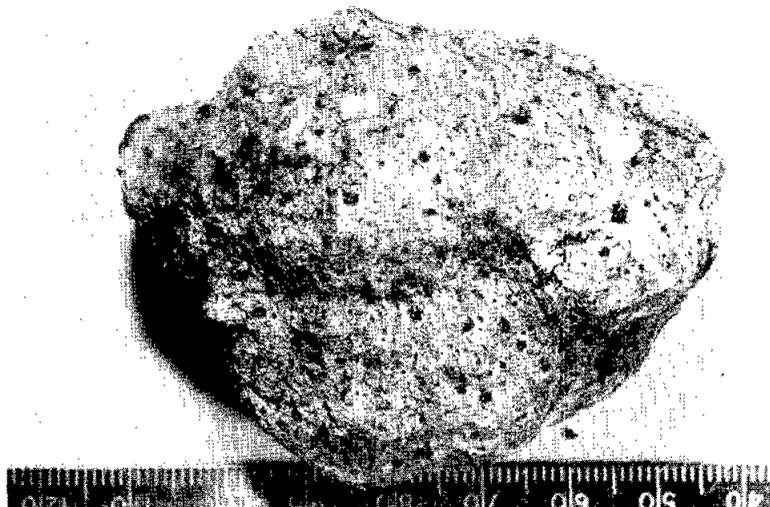
Cavities (%): None

Surface: Smooth. In certain areas, glassy veins are exposed

Zap pits: Very many. Should be studied by someone like Horz interested in zap pits. Long exposure is indicated. Glass-lined clear to medium gray. Some without glass.

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	90+		Extremely fine	Identification ambiguous	
Mafics	Dark	10-	Questionable		May be finely crushed plagioclase	
Brown mineral, opaque	Resembles limonite or oxidized lawrencite				Probably Ni-Fe and sulfide (2)	

Special Features: (1) This is an extremely fine-grained rock that is friable. Areas of grayish-black splash glass are present. (2) A brownish mineral resembling limonite was observed in several areas. May be lawrencite oxidized by traces of oxygen in the nitrogen cabinet. This rock should be dated.

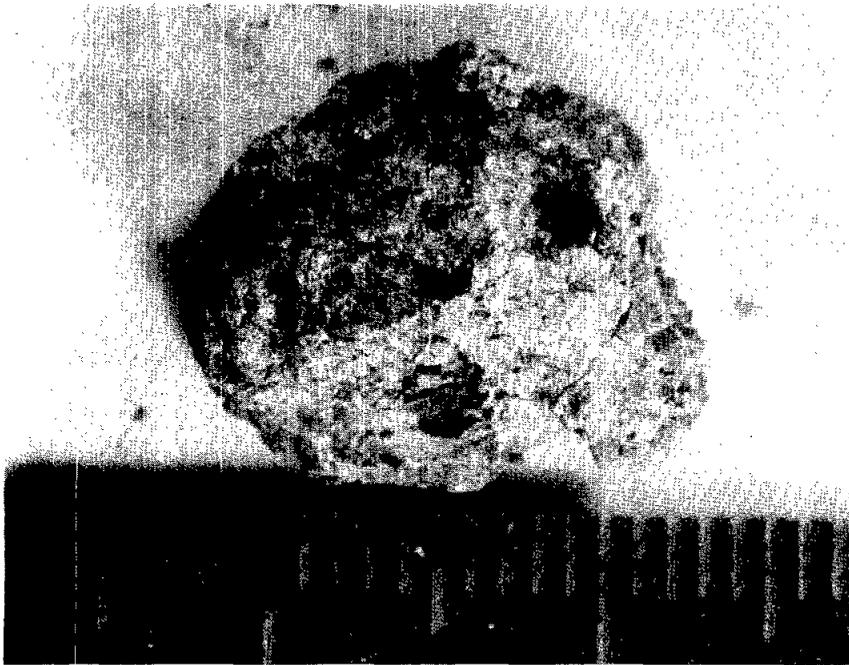


Generic No.: 65365  
Rock Type: Gray fine-grained,  
friable crystalline rock

Weight (g): 2.16  
Dimensions (cm): 1.6 x 1.1 x 1.1  
Color (fresh): Light gray (N7)  
Shape: Subrounded  
Variability: None  
Coherence: intergranular - friable  
fracturing - few  
Fabric/texture: Isotropic/equigranular  
Cavities (%): None  
Surface: Granulated  
Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	<5	Irreg	~1		Few clasts
Gray clots	Medium light gray	5	Angular			Fine grained crystalline

Special Features: Most of the rock appears to be finely comminuted, and only a few larger plagioclase crystals remain. It is not possible to identify mafic minerals or even estimate proportions because of fine grain size. Possibly a shocked version of the gray, tough crystalline rock.

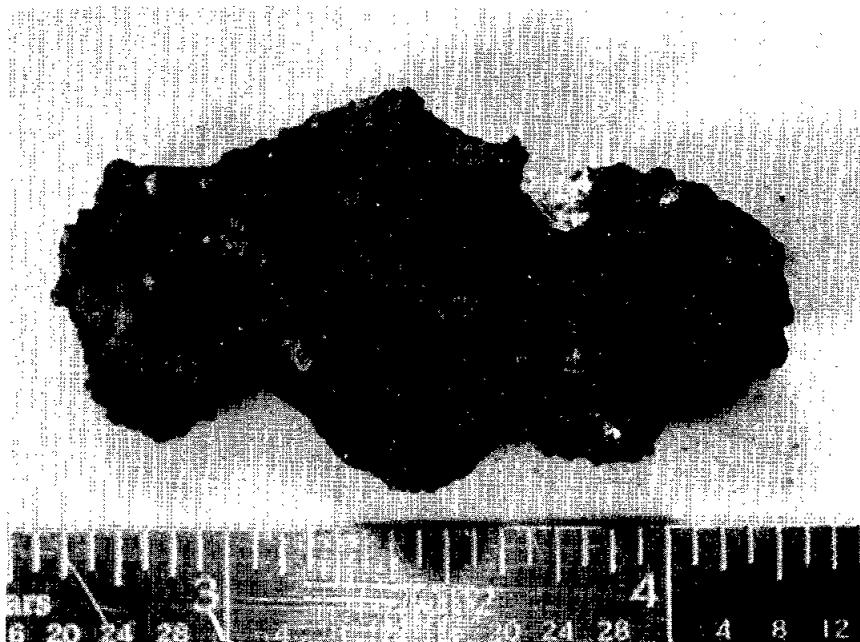


Generic No.: 60667,0  
Rock Type: Gray, tough, cry-  
stalline vuggy rock with  
clasts

Weight (g): 7.66  
Dimensions (cm): 4.0 x 2.4 x 0.8  
Color (fresh): Medium gray (N5)  
Shape: Subangular  
Variability: None  
Coherence: intergranular - tough  
fracturing - few (very)  
Fabric/texture: Isotropic. Extremely fine-grained crystalline rock  
with white clasts and feldspar crystals.  
Cavities (%): Many vugs  
Surface: Very rough  
Zap pits: Very few; some splash glass in certain places

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Crystalline matrix		90				
Plagioclase and anorthosite	Clear white	10		<0.5		
Opagues						Probably metal and sulfide

Special Features: This is a gray, tough, crystalline rock with many  
clasts (white). It is different from other members of this group in  
that it has many vugs. It contains a 0.5 cm anorthosite breccia clast.

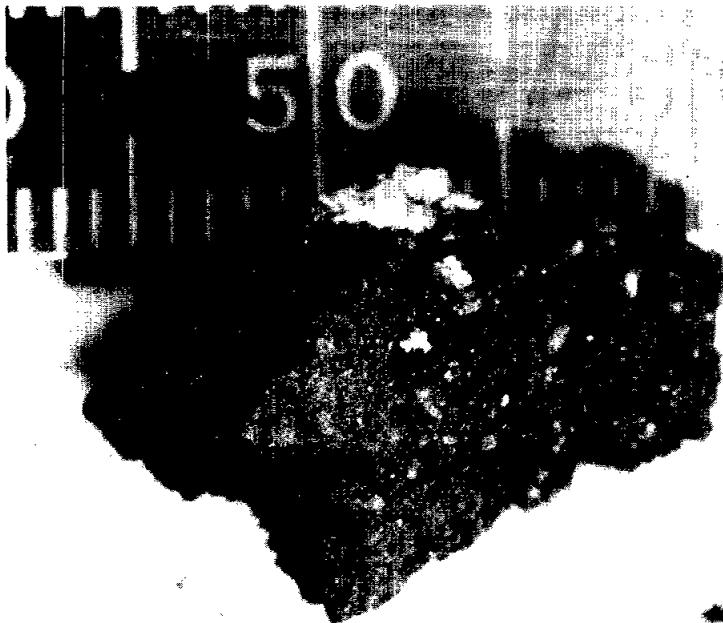


Generic No.: 60675,0  
Rock Type: Gray, tough,  
crystalline vuggy rock,  
with clasts.

Weight (g): 1.30  
Dimensions (cm): 1.8 x 1.1 x 0.5  
Color (fresh): Medium dark gray (N4)  
Shape: Subangular  
Variability: None  
Coherence: intergranular - tough  
fracturing - few  
Fabric/texture: Isotropic. Very fine crystalline (extremely vuggy).  
Cavities (%): Many vugs  
Surface: Smooth to rough  
Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray, fine-crystalline matrix		85				
Plagioclase and anorthosite		15	Irreg	<4.0		

Special Features: This is a gray, tough, crystalline, vuggy rock similar to 60667. It may actually represent the most recrystallized form of the gray, devitrified glass. It contains both clear plagioclase crystals as well as anorthosite inclusions.



3.2.4 Gray vesicular glass (usually devitrified), with clasts of anorthosite or plagioclase (Group 4).

Generic No.: 60528,0

Rock Type: Gray, vesicular glass,  
devitrified

Weight (g): 2.94

Dimensions (cm): 2.0 x 1.2 x 1.3

Color (fresh): Medium gray (N5) to medium dark gray (N4)

Shape: Very irregular

Variability: None

Coherence: intergranular - tough  
fracturing - none

Fabric/texture: Isotropic; highly vesicular, partly devitrified glass

Cavities (%): Many vesicles (10-20%)

Surface: Mostly smooth to irregular

Zap pits: Very few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Glass	Dark gray	95+				Mostly devitrified
Plagioclase	White	5-	Irreg	0.5	<1.5	Probably clasts (1)
Mafic silicate	Brown	<0.1	Irreg		~1.0	Probably pyroxene clast

Special Features: (1) It is often difficult to distinguish between true plagioclase clasts that are enclosed in the glass, and white dust covering parts of the surface. Specimen 60528,0 resembles the partly devitrified glass rind covering rock 60527,0.



Generic No.: 60529,0  
Rock Type: Gray, vesicular  
glass, devitrified

Weight (g): 1.24  
Dimensions (cm): 1.2 x 1.3 x 1.1  
Color (fresh): Medium dark gray (N4)  
Shape: Rounded on one side, otherwise irregular  
Variability: None  
Coherence: intergranular - tough  
                  fracturing - very few  
Fabric/texture: Isotropic; vesicular, largely devitrified glass  
Cavities (%): 10% vesicles  
Surface: Mostly smooth  
Zap pits: Very few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Glass	Dark gray	98+				Mostly devitrified
Plagioclase	White	2-	Irreg	<0.5		Probably clasts

Special Features: This material is highly devitrified to the point that the beginning of a marbled, light-dark texture, can be seen. The wall of one vesicle is lined by small dendritic crystals.

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Generic No.: 60645,0

Rock Type: Gray vesicular glass,  
devitrified, with white clasts

Weight (g): 33.5

Dimensions (cm): 4.2 x 3.4 x 3.4

Color (fresh): Medium gray (N5)

Shape: Angular

Variability: None

Coherence: intergranular - tough  
fracturing - none

Fabric/texture: Isotropic; devitrified, vesicular glass with white  
anorthosite clasts

Cavities (%): Highly vesicular

Surface: Irregular

Zap pits: Few, glass lined

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Devitrified glass	Medium gray	95				
Plagioclase	White	5	Variable	<6.0		Clasts



Generic No.: 60646,0

Rock Type: Gray vesicular glass  
devitrified, with white clasts

Weight (g): 3.39

Dimensions (cm): 2.2 x 1.5 x 1.4

Color (fresh): Medium gray (N5)

Shape: Angular

Variability: None

Coherence: intergranular - tough  
fracturing - none

Fabric/texture: Isotropic. Devitrified, vesicular glass with white  
anorthosite clasts

Cavities (%): Highly vesicular

Surface: Irregular

Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Devitrified glass	Medium gray	95+				
Plagioclase	White	5-	Variable	<1.0		Clasts



Generic No.: 60647,0  
Rock Type: Gray, vesicular glass,  
devitrified, with white clasts

Weight (g): 1.76

Dimensions (cm): 2.2 x 1.4 x 1.0

Color (fresh): Medium gray (N5)

Shape: Angular

Variability: None

Coherence: Intergranular - tough  
fracturing - none

Fabric/texture: Isotropic. Devitrified, vesicular glass with white  
and gray clasts

Cavities (%): Highly vesicular

Surface: Irregular

Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Devitrified glass	Medium gray	80				
Plagioclase	White	5	Irreg		<4.0	Clasts
Gray, tough crystalline rock fragments	Gray	15	Irreg		<9.0	Clasts



Generic No.: 60648,0

Rock Type: Gray, vesicular glass  
devitrified, with white clasts

Weight (g): 2.84

Dimensions (cm): 2.2 x 1.8 x 0.6

Color (fresh): Medium gray (N5)

Shape: Angular

Variability: None

Coherence: intergranular - tough  
fracturing - none

Fabric/texture: Isotropic. Devitrified, slightly vesicular glass,  
with white clasts

Cavities (%): Less vesicular than others in this group

Surface: Irregular

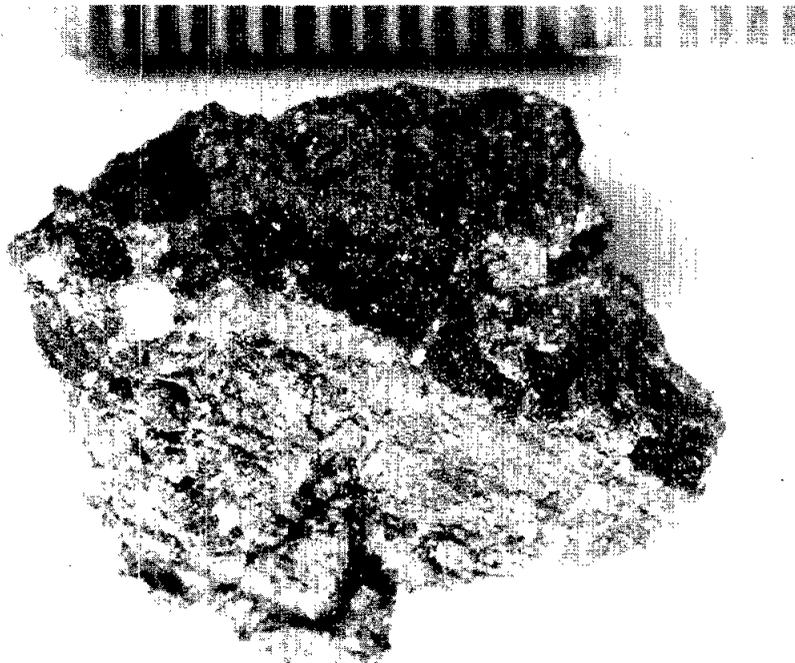
Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Devitrified glass matrix	Medium gray	65				
Plagioclase	White	35	Subrounded inclusions		<3.0	Clasts

Special Features: Devitrified, slightly vesicular glass, with white clasts. Has a salt and pepper appearance. One side has shiny glass. Also, slickenside.

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Generic No.: 60649,0  
Rock Type: Gray, vesicular,  
glass. Devitrified, with  
white clasts

Weight (g): 1.03  
Dimensions (cm): 1.5 x 1.0 x 0.5  
Color (fresh): Medium gray (N5)  
Shape: Angular  
Variability: None  
Coherence: intergranular - tough  
fracturing - none  
Fabric/texture: Isotropic. Devitrified, slightly vesicular glass  
with white clasts  
Cavities (%): Less vesicular than others in this group  
Surface: Irregular  
Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Devitrified glass matrix	Medium gray	65				
Plagioclase	White	35	Sub- rounded inclu- sions	<1.0		Clasts

Special Features: Devitrified, slightly vesicular glass with white  
clasts. Has a salt and pepper appearance.



Generic No.: 60655,0

Rock Type: Gray, vesicular glass,  
devitrified, with white clasts

Weight (g): 8.63

Dimensions (cm): 2.4 x 2.0 x 1.5

Color (fresh): Medium gray (N5)

Shape: Subangular

Variability: Yes, there is a bit more fresher glass on one side of  
the rock than on the others.

Coherence: intergranular - tough  
fracturing - few

Fabric/texture: Isotropic. Devitrified, vesicular glass, with white  
clasts

Cavities (%): 15% vesicles

Surface: Irregular

Zap pits: Few; glass lined

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Devitrified glass matrix	Medium gray	75+				
Plagioclase	White	25-		<3.0		Clasts

Special Features: Devitrified, vesicular glass, with white plagioclase  
clasts.

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Generic No.: 60665,0

Rock Type: Gray, vesicular glass,  
partly devitrified, with white  
clasts

Weight (g): 90.1

Dimensions (cm): 6.5 x 4.8 x 2.8

Color (fresh): Medium dark gray (N4)

Shape: Irregular, bomb-like

Variability: None

Coherence: intergranular - tough  
fracturing - few

Fabric/texture: Isotropic; partly devitrified, gray glass with  
clast inclusion

Cavities (%): Many vesicles

Surface: Smooth to rough

Zap pits: Few, glass lined; they are rather small

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Vesicular glass	Medium dark gray	70				
Plagioclase	White	35		<2.0		Clasts
Gray and white micro- breccia		5		<1.0		Clasts

Special Features: This sample consists of gray, vesicular, partly devitrified glass that contains white plagioclase and gray and white microbreccia clasts. The inclusions are <2.0 cm.



Generic No.: 60666,0

Rock Type: Gray, vesicular glass,  
devitrified, with white clasts

Weight (g): 15.95

Dimensions (cm): 3.5 x 2.3 x 2.3

Color (fresh): Medium dark gray (N4)

Shape: Subangular

Variability: None

Coherence: intergranular - tough  
fracturing - few

Fabric/texture: Isotropic. Gray vesicular glass, devitrified, with clasts

Cavities (%): Many vesicles

Surface: Smooth to rough

Zap pits: Few, glass lined

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Glass, partly devitrified		70				
Anorthosite and gray crystalline clasts	White Gray	30	Irreg to rounded	1.2		Clasts



Generic No.: 60668,0

Rock Type: Gray vesicular glass,  
devitrified, with white clasts

Weight (g): 2.91

Dimensions (cm): 2.1 x 1.5 x 1.0

Color (fresh): Dark gray (N3)

Shape: Angular

Variability: None

Coherence: intergranular - tough  
fracturing - few

Fabric/texture: Isotropic. Gray, vesicular glass, devitrified, with  
clasts

Cavities (%): Many vesicles

Surface: Rough

Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Devitrified glass	Dark gray	90				
Plagioclase	White	10	Angular to rounded			Clasts

Special Features: This rock is still covered by a considerable amount  
of dust, part of which may be welded to the glass. The glass is de-  
vitrified and extremely fine-grained crystalline.



Generic No.: 60669,0

Rock Type: Gray, vesicular glass,  
devitrified, with white clasts

Weight (g): 2.54

Dimensions (cm): 2.8 x 1.5 x 1.3

Color (fresh): Medium dark gray (N4)

Shape: Angular

Variability: None

Coherence: intergranular - tough  
fracturing - few

Fabric/texture: Isotropic. Vesicular, devitrified glass with white  
clasts

Cavities (%): Many vesicles

Surface: Smooth to rough

Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Devitrified glass	Medium dark gray	95				
Plagioclase	White	5		<1.0		Clasts



Generic No.: 60677,0

Rock Type: Gray, vesicular, glass,  
devitrified, with white clasts

Weight (g): 5.23

Dimensions (cm): 2.4 x 2.2 x 1.5

Color (fresh): Medium dark gray (N4)

Shape: Angular

Variability: None

Coherence: intergranular - glass: tough  
clasts: friable  
fracturing - none in glass

Fabric/texture: Isotropic. Gray vesicular devitrified glass with  
white clasts

Cavities (%): Highly vesicular glass

Surface: Rough

Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Devitrified glass	Medium dark gray	85+				
Plagioclase		5	Irreg	<3.0		Clasts
Micro- breccia clast		10	Blocky	14x2		

Special Features: The glass contains a large, white clast (14 x 2 mm) that in itself is a microbreccia containing inclusions of the gray, tough, crystalline rock.



Generic No.: 60678,0

Rock Type: Gray, vesicular glass,  
devitrified, with white clasts

Weight (g): 1.25

Dimensions (cm): 2.0 x 1.2 x 0.7

Color (fresh): Medium dark gray

Shape: Angular

Variability: None

Coherence: intergranular - glass: tough  
clast: friable  
fracturing - none in glass

Fabric/texture: Isotropic. Gray, vesicular, devitrified glass,  
with white clasts

Cavities (%): Highly vesicular glass

Surface: Rough

Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Devitrified glass		85				
Plagioclase		5				Clasts
Microbreccia clast		15		8.0		Clasts

Special Features: This rock is very similar to 60677,0. One single spinel was observed in microbreccia clast (reddish-brown).



Generic No.: 60679,0

Rock Type: Gray, vesicular glass,  
devitrified, with white clasts

Weight (g): 2.96

Dimensions (cm): 2.7 x 1.4 x 1.0

Color (fresh): Medium dark gray (N4)

Shape: Angular

Variability: None

Coherence: intergranular - glass: tough  
clast: friable  
fracturing - none in glass

Fabric/texture: Isotropic. Gray vesicular, devitrified glass, with  
white clasts

Cavities (%): Highly vesicular glass

Surface: Rough

Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Devitrified glass	Medium dark gray	85				
Plagioclase microbreccia	White	5				Clasts
		10	13.0			Clasts

Special Features: This rock resembles 60677,0.

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Generic No.: 65348  
Rock Type: Gray vesicular glass  
with white clasts

Weight (g): 11.66

Dimensions (cm): 2.3 x 2.7 x 2.0

Color (fresh): Glass medium gray - medium dark gray (N4)-(N5).

Clasts white

Shape: Irregular

Coherence: intergranular - tough  
fracturing - very few

Fabric/texture: Isotropic/vesicular glass with granular or brecciated  
inclusions

Cavities (%): 5% vesicles in glass

Surface: Glass, smooth (dust covered), clasts, granulated

Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Glass	Medium gray (N5)	90	Irreg			Vesicular, not devitrified, many dust particles, etc. adhering
Anorthositic clasts	White	8	Subang	3		
Recry- stallized clasts	Light gray	2.5	Subang	3		Looks like gray- tough crystalline rocks (coarser varieties)

Special Features: Large vesicle or cavity through very center of specimen. This is possibly transitional to glassy agglutinate.



Generic No.: 65349

Rock Type: Gray vesicular glass,  
devitrified, with (few) white  
clasts

Weight (g): 7.58

Dimensions (cm): 2.0 x 1.9 x 1.9

Color (fresh): Medium dark gray (N4) to medium gray (N5)

Shape: Irregular

Variability: None

Coherence: intergranular - glass, tough  
fracturing - few

Fabric/texture: Isotropic/vesicular glass (devitrified)

Cavities (%): 5-10% vesicles

Surface: Smooth - granular

Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Anorthosite clasts	White	2.5(?)	Irreg	2x4		Only 1 or 2 white clasts

Special Features: Glass has completely devitrified. Interlocking  
laths can be seen on walls of vesicles.

---



Generic No.: 65355  
Rock Type: Gray vesicular  
glass, devitrified

Weight (g): 4.94  
Dimensions (cm): 1.5 x 1.9 x 1.4  
Color (fresh): Medium gray (N5)  
Shape: Irregular - rounded  
Variability: None  
Coherence: intergranular - tough  
fracturing - few  
Fabric/texture: Isotropic/devitrified  
Cavities (%): 5-10% vesicles  
Surface: Surface irregular where in contact with soil, some vesicles  
filled with soil.  
Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Anorthosite clasts	White	<3	Angular	1.5		Only one or two visible



Generic No.: 65356

Rock Type: Gray vesicular glass  
with white clasts

Weight (g): 2.53

Dimensions (cm): 1.5 x 1.3 x 1.3

Color (fresh): Medium gray (N5)

Shape: Irregular

Variability: None

Coherence: intergranular - tough  
fracturing - few

Fabric/texture: Isotropic vesicular glass (devitrified)

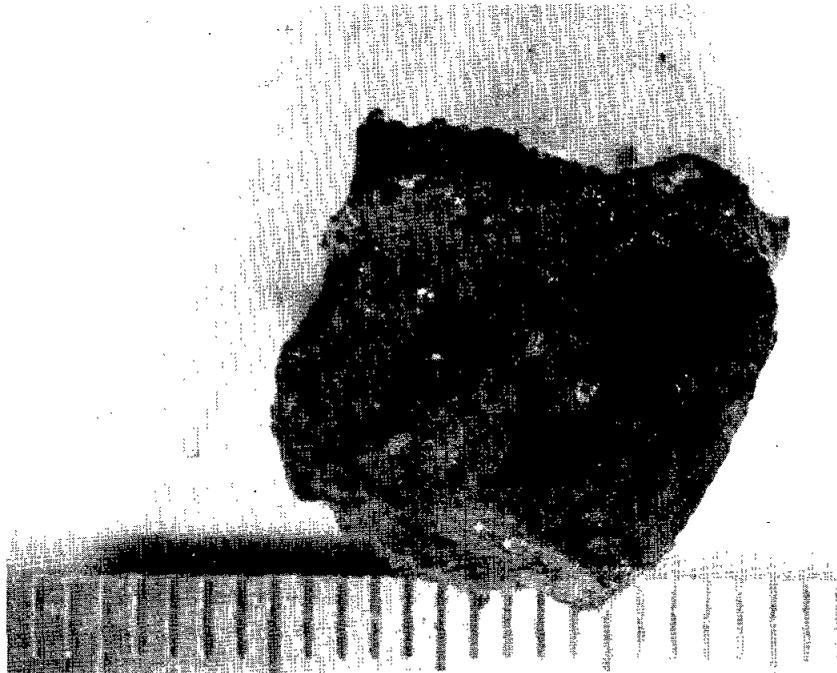
Cavities (%): 10-15% vesicles

Surface: Glass smooth (finely granulated) dust covered to irregular;  
clasts granulated to irregular

Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Anorthosite clasts	White	10	Mostly rounded	0.5	To 1.5	

Special Features: Glass probably devitrified.



Generic No.: 65366  
Rock Type: Dark glass flakes

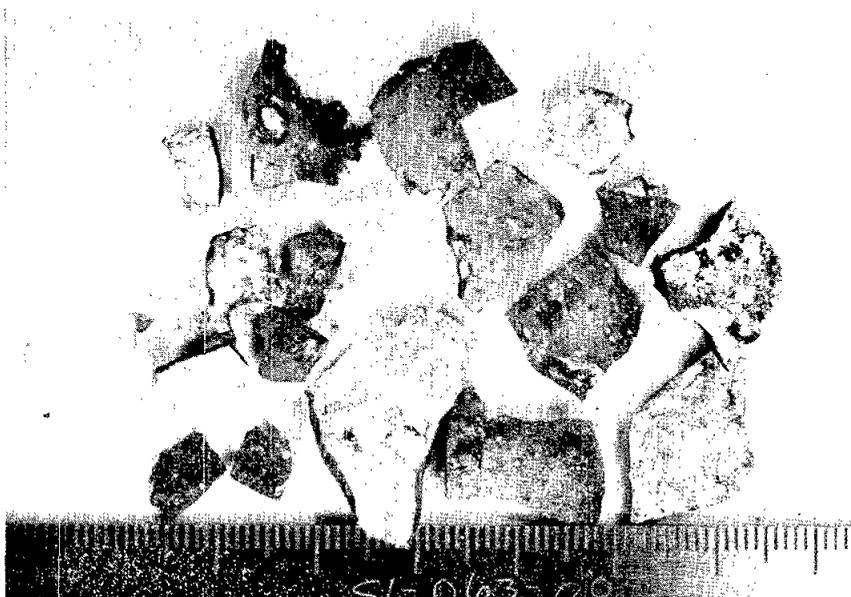
Weight (g): 8.48  
Dimensions (cm): See (1)  
Color (fresh): Medium-dark gray (N4)  
Shape: Slabby (flaky)  
Variability: None in glass  
Coherence: intergranular - tough  
fracturing - very few  
Fabric/texture: Isotropic/glassy (possibly devitrified)  
Cavities (%): <2% vesicles  
Surface: Smooth, dust adherent  
Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Glass flakes	Medium dark gray					
Anorthosite	White					

Special Features: These are glass flakes and a few irregular pieces, which were once part of a rind on anorthosite; most have anorthosite adhering to one surface. Anorthosite is identical to 65325 et seq. The glass is not as vesicular as the rinds on gray fine-grained crystalline rock, or the gray glass with white clasts.

Some of the flakes contain small anorthosite clasts. Some of the fragments are small pieces of anorthosite.

(1) About 20 fragments in all. Usually about 1 - 2 mm thick. Up to 2 cm in largest dimension.



### 3.2.5 Glassy agglutinates (Group 5).

Generic No.: 65585,0  
Rock Type: Vesicular, glassy  
aggluflinate

Weight (g): 9.294

Color (fresh): Dusky yellow green (5GY 5/2)

Shape: Ropy, cindery

Variability: Yes, bubbles are not homogeneously distributed

Coherence: intergranular - tough

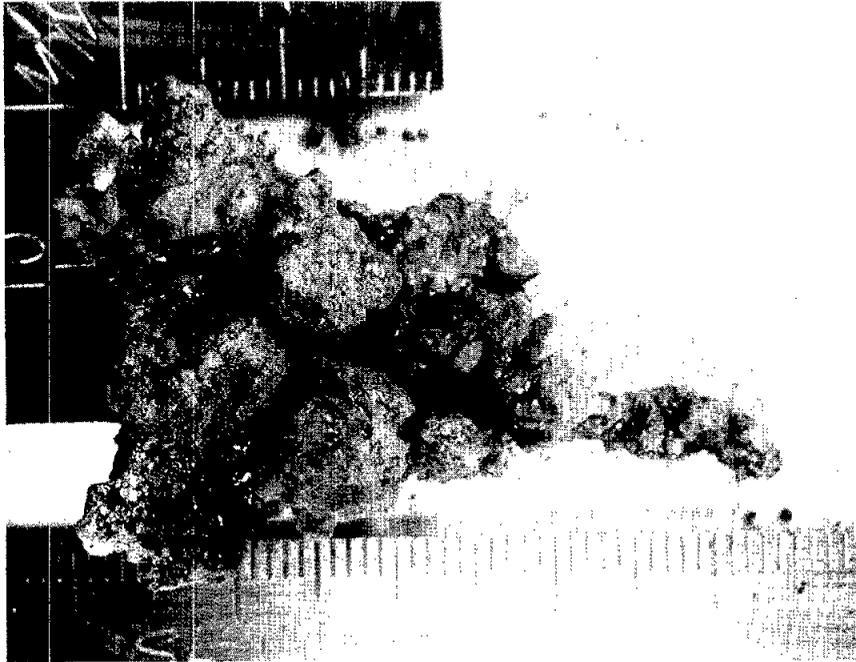
Fabric/texture: Isotropic; glass bubbly

Cavities (%): Highly vesicular, bubbly in places

Surface: Bubbly

Special Features: Areas with few bubbles are dark greenish - gray (5GY 4/1), whereas areas with many bubbles are dusky yellow - green (5GY 5/2).

---



Generic No.: 65586,0  
Rock Type: Vesicular, glassy,  
agglutinate

Weight (g): 6.763

Color (fresh): Dusky, yellow green (5GY 5/2)

Shape: Ropy, highly irregular

Variability: Yes, bubbles are not homogeneously distributed

Coherence: intergranular - glass; tough  
soil; friable

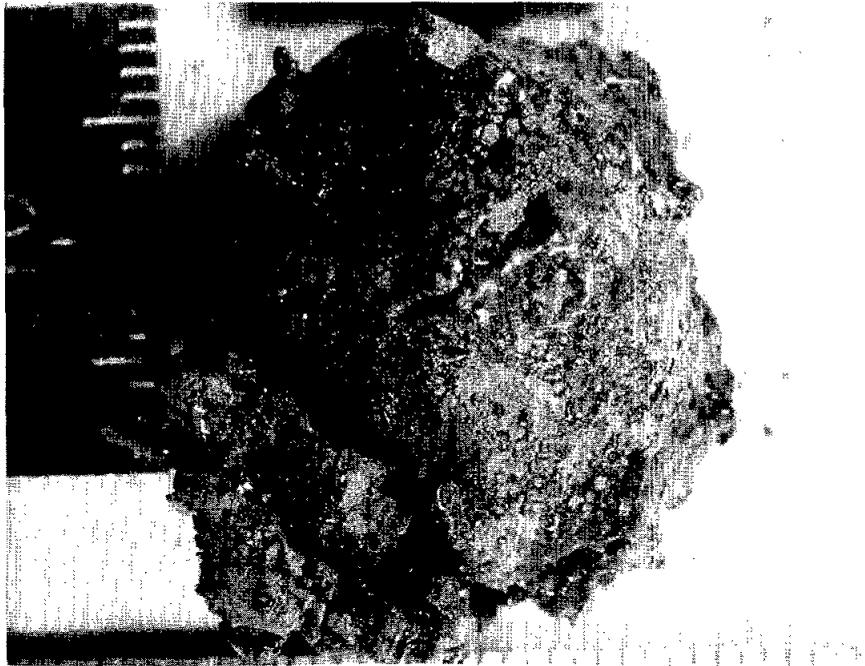
fracturing - few but very long fractures

Cavities (%): Highly vesicular; bubbly in places

Surface: Bubbly

Special Features: This vesicular glassy agglutinate covers a soil clod. The soil clod is less friable than in sample 65515,0. The glassy cover on the soil is comparatively thin (<0.1 mm). There are areas in the glass that are streaky white.

---



Generic No.: 65587,0  
Rock Type: Vesicular, glassy  
agglutinate

Weight (g): 2.141

Color (fresh): Dusky yellow green (5GY 5/2)

Shape: Ropy, highly irregular

Variability: Yes, bubbles are not homogeneously distributed

Coherence: intergranular - glass - tough  
soil - friable

fracturing - few, but very long fractures

Cavities (%): Highly vesicular, bubbly in places

Surface: Bubbly

Special Features: Compare rock 65585,0. This vesicular glassy agglutinate covers a soil clod. The soil clod is less friable than in sample 65515,0. The glassy cover on the soil is comparatively thin (<0.1 mm). There are areas in the glass that are streaky white.

---



Generic No.: 65767,0  
Rock Type: Vesicular, glassy  
agglutinate

Weight (g): 17.51  
Dimensions (cm): 3.3 x 2.8 x 1.6  
Color (fresh): White (N9) to medium dark gray (N4)  
Shape: Angular, ropy  
Variability: None  
Coherence: intergranular - tough  
                  fracturing - none  
Fabric/texture: Isotropic. Glassy vesicular agglutinates with large  
                  anorthosite clast  
Cavities (%): Many vesicles  
Surface: Very ropy, glass is smooth  
Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Glass	Medium dark gray	70				
Plagioclase	White	30		<20.0		Clasts

Special Features: This rock consists of very vesicular, glassy agglutinate into which are embedded anorthosite clasts up to 2.0 cm in diameter.



Generic No.: 65776,0  
Rock Type: Glassy agglutinate

Weight (g): 2.33

Dimensions (cm): 1.3 x 1.1 x 1.0

Color (fresh): Medium gray (N5)

Shape: Blocky

Variability: None

Coherence: intergranular - tough  
fracturing - few

Fabric/texture: Isotropic. Glassy agglutinate with rock and mineral inclusions.

Cavities (%): Vesicles

Surface: Very rough

Zap pits: Very few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Glass	Medium gray	90				
Plagioclase	White	10				Clasts

Special Features: This is a glassy agglutinate with rock and mineral inclusions. The inclusions are <4.0 mm in diameter.

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Generic No.: 65788  
Rock Type: Glassy agglutinate

Weight (g): 9.52  
Dimensions (cm): 2.6 x 2.3 x 1.3  
Color (fresh): Medium dark gray (N4)  
Shape: Irregular  
Variability: Some; see below  
Coherence: intergranular - tough  
                  fracturing - few  
Fabric/texture: Glassy agglutinate  
Cavities (%): Highly vesicular (large vesicles)  
Surface: Powdery  
Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Dark glass	Dark brown		Irreg			
Anorthosite clasts	White	10	Irreg	2(?)	Up to 10	
Gray crystalline clasts	Medium light gray	5	Sub-rounded	~1		

Special Features: This is a piece of vesicular glass which has a lot of soil, etc. stuck to its surface. It also contains a number of large clasts.



### 3.2.6 Gray and white microbreccias and breccias (Group 6)

x

60535,0



Generic No.: 60535,0  
Rock Type: Light gray and white,  
 coherent microbreccia

Weight (g): 7.23  
Dimensions (cm): 2.5 x 2.1 x 1.3  
Color (fresh): Medium gray (N5) to medium light gray (N6) with a brownish cast.  
Shape: Subrounded  
Variability: None, but has glass on one surface  
Coherence: intergranular - coherent  
 fracturing - none  
Fabric/texture: Isotropic, with the exception of what appears to be a slickenside on one side of the rock. Microbreccia  
Cavities (%): None  
Surface: Irregular to smooth  
Zap pits: Many on one side, very few on other

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase clasts	White	5	Mostly angular	Up to 1.0		
Matrix	Gray	95		<0.05		(1)
Orange-brown silicate		0.1	Angular	<0.1		Clast

Special Features: (1) The matrix consists of <0.05 mm diameter grains of white and dark color, probably representing plagioclase and mafic silicates. Grain size of matrix is distinctly finer than the clasts.

Generic No.: 60639,0  
Rock Type: Gray breccia

Weight (g): 175.1

Dimensions (cm): 8.0 x 5.8 x 4.5

Color (fresh): Light gray (N7) to medium gray (N5)

Shape: Subangular

Variability: One side encrusted by devitrified glass

Coherence: intergranular - friable to coherent  
fracturing - few

Fabric/texture: Gray breccia, encrusted completely on one side by glass. Continued (1) below.

Cavities (%): Few vesicles in the glass

Surface: Variable

Zap pits: Highly localized areas of zap pits, both in matrix as well as anorthosite fragments.

Special Features: (1) The breccia consists of centimeter-sized fragments of anorthosite, basalt, and gray, tough, crystalline rocks. The anorthosite is 99 percent plagioclase (fine-grained). One fragment of basaltic material of ophitic texture is touching it. The basalt contains ilmenite (mm-sized), feldspar, enclosing reddish-brown pyroxene. Plagioclase laths in the basalt are approximately 1 mm long.

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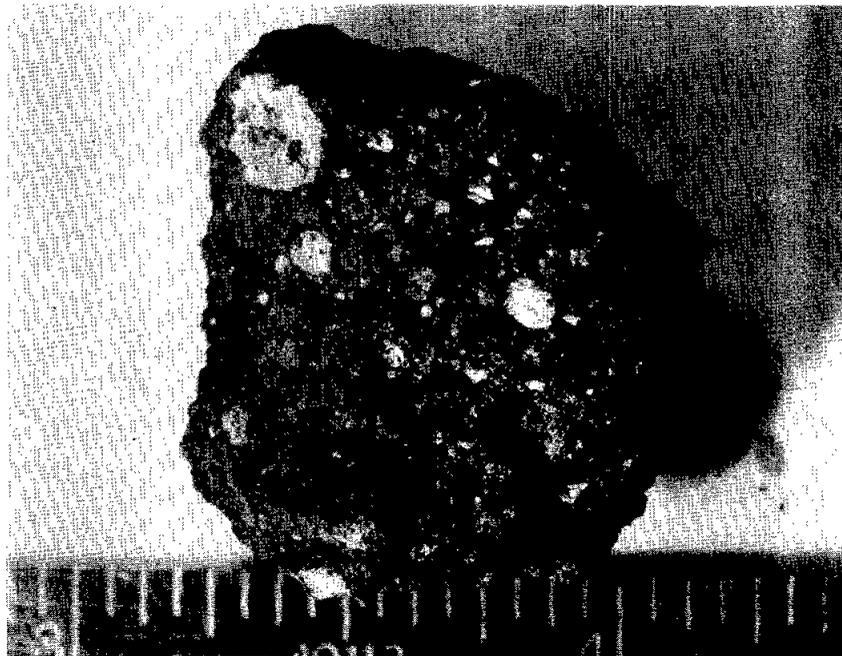
Generic No.: 60656,0  
Rock Type: Gray and white,  
fine breccia

Weight (g): 11.23  
Dimensions (cm): 2.9 x 2.5 x 1  
Color (fresh): Medium gray (N5)  
Shape: Subrounded  
Variability: None  
Coherence: intergranular - tough  
fracturing - few  
Fabric/texture: Isotropic. Fine breccia, consisting of white clasts  
embedded into a gray, partly glassy matrix.  
Cavities (%): Few  
Surface: Smooth to granular  
Zap pits: Few, glass lined

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix	Medium gray	70				Partly glassy
Plagioclase	White	25		<5.0		Clasts
Gray, tough crystalline rocks; and miscellaneous pieces		5				Clasts

Special Features: This rock is transitional to the gray, vesicular  
glass, devitrified with white clasts.

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Generic No.: 60676,0

Rock Type: Gray and white breccia  
with partly glassy matrix

Weight (g): 8.92

Dimensions (cm): 3.1 x 1.8 x 1.3

Color (fresh): Medium dark gray (N4)

Shape: Subangular

Variability: None

Coherence: intergranular - tough  
fracturing - few

Fabric/texture: Isotropic. Gray and white breccia, partly glassy matrix.

Cavities (%): Few vesicles

Surface: Rough

Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix		65				
Gray crystalline rock		25		<17		Clasts
Plagioclase		10		<3.0		Clasts

Special Features: This rock is transitional to 60656,0, but has more glass in the matrix.





65337

Generic No.: 65337

Rock Type: Gray and white breccia

Weight (g): 11.57

Dimensions (cm): 3.2 x 2.1 x 1.4

Color (fresh): Light gray (N7)

Shape: Subrounded

Variability: None

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Irregular - granulated

Zap pits: Very few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase rich clasts	White- light gray	20	Irreg rounded	~1	To 2	Some clasts (anor- thositic) seem to have light-yellow maf. sil. also. Some are single feldspar grains.
Gray crystalline clasts	Med. gray- med. light gray	5	Irreg	0.5		Gray fine-grained crystalline rock like larger specimens
Spherules	Variable	3-5	Spheri- cal	0.5	To 1	Most are green glass, but there are many clear, some brownish.
Maf. sil. clasts	Variable	2	Irreg	0.5	To 1	There are a few green-yellow grains which may be olivine, and also some orange to brown grains (pyroxene).
Opaque	Metallic	<1	Irreg	0.2	To 0.5	Mostly nickel-iron (at least this is identifiable). Some metal or troilite grains appear tarnished.
Matrix	White- light gray	70				Mostly finely comminuted plagioclase



65338

Generic No.: 65338

Rock Type: Gray and white breccia

Weight (g): 2.65

Dimensions (cm): 1.7 x 1.7 x 1.0

Color (fresh): Very light gray (N8)

Shape: Subrounded-subangular

Variability: Some (see [1])

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/fine breccia

Cavities (%): Up to 30% vesicles (?) in some areas

Surface: Irregular

Zap pits: Few (indistinct)

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray crystalline clasts	Light gray	10-15	Angular	<1		One large gray clast about 5 x 5 x 4 mm, a few others.
Plagioclase-rich clasts	White	10	Irreg	~1		There may be mafic silicates in some of these. Some are single plagioclase crystals.
Colored clasts	Yellow-green	2	Rounded	~0.5		Could be glass or olivine.
Matrix	Light gray					Mostly finely comminuted plagioclase.

Special Features: (1) Some vesicular areas, but most is homogeneous non-vesicular breccia. One patch, 1.5 mm diameter, of once-molten, highly reflective material on surface; looks like metal. Also a similar area of dark glass. The surface is powdery.

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Generic No.: 65339

Rock Type: Gray and white breccia

Weight (g): 1.62

Dimensions (cm): 1.0 x 1.0 x 1.0

Color (fresh): Very light gray (N8)

Shape: Rounded

Variability: None

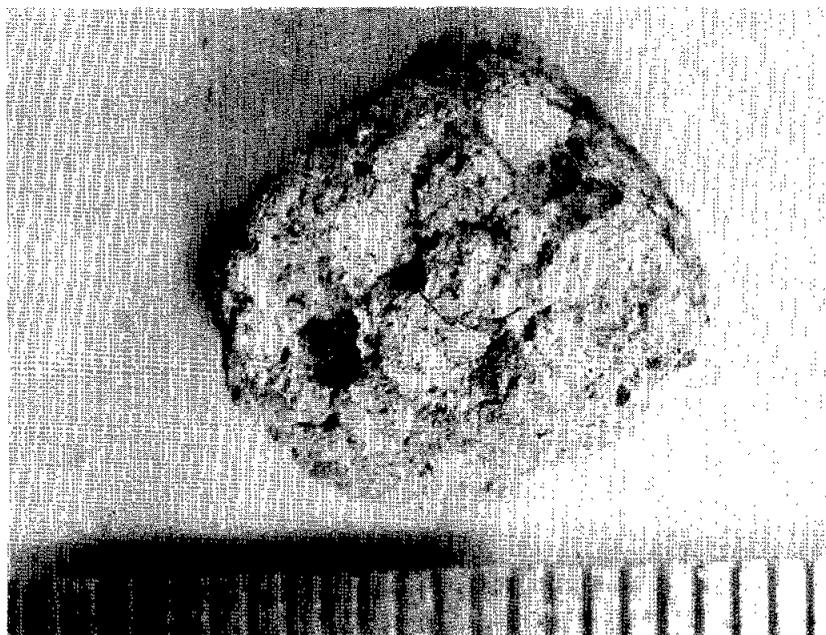
Coherence: intergranular - friable  
fracturing - few

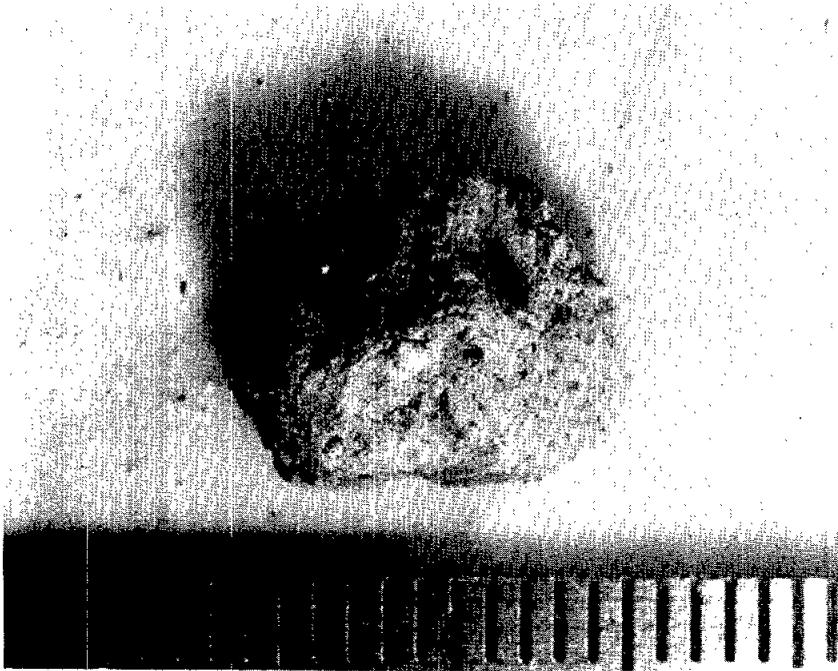
Fabric/texture: Isotropic/micro-fine breccia

Cavities (%): None

Surface: Irregular - granulated

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Feldspar-rich clasts	White	10(?)	Rounded to irreg	~1		Most are single plagioclase grains
Gray aphanitic clasts	Light to med. gray	10(?)	Angular	~1		Some of these may be dark gray glass (devitrified).
Yellow orange clasts		1		<0.1		
Matrix	White	80-85				Mostly finely comminuted plagioclase





65345

Generic No.: 65345

Rock Type: Gray and white breccia

Weight (g): 0.86

Dimensions (cm): 1.1 x 0.8 x 0.8

Color (fresh): Light gray (N7)

Shape: Rounded

Variability: None

Coherence: Intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/microbreccia - fine breccia

Cavities (%): None

Surface: Irregular

Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase rich clasts	White	10?	Irreg	~0.5	To 1.5	Many are single plagioclase grains
Gray aphanitic clasts	Light med. gray	20	Angular	~0.5	To 1	Some are probably dark, devitrified glass
Maf. sil. (?)	Brown yellow	3	Rounded angular	~0.3		Possibly maf. sil., possibly glass
Spinel(?)	Red orange	<0.1	Rounded	0.1		
Matrix	White very light gray					Mostly plagioclase finely comminuted but dark material is present also.

Special Features: This specimen shows more small clasts, possibly more of a gradation from matrix to large clasts than preceding microbreccias.

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Generic No.: 65346

Rock Type: Gray and white breccia

Weight (g): 0.80

Dimensions (cm): Three pieces: 2 - 6 mm diameter; 1 - 6 x 5 x 3

Color (fresh): Light gray (N7)

Shape: Subrounded - subangular

Variability: None

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/microbreccia - fine breccia

Cavities (%): None

Surface: Irregular

Zap pits: Few - if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray aphanitic clasts	Light-med. gray	20	Angular well-rounded	~0.7		Some are glass (devitrified). Some may be spherules
Plag-rich clasts	White	20-15	Irreg rounded	~0.5		Many are single grains of plagioclase
Metal	Metallic	1	Irreg rounded	<0.5		
Matrix	White					Mostly finely comminuted feldspar



Generic No.: 65347

Rock Type: Gray and white breccia

Weight (g): 0.43

Dimensions (cm): 1.0 x 0.6 x 0.4

Color (fresh): Light gray (N7) to very light gray (N8)

Shape: Subrounded, subangular

Variability: None

Coherence: intergranular - friable  
fracturing - few

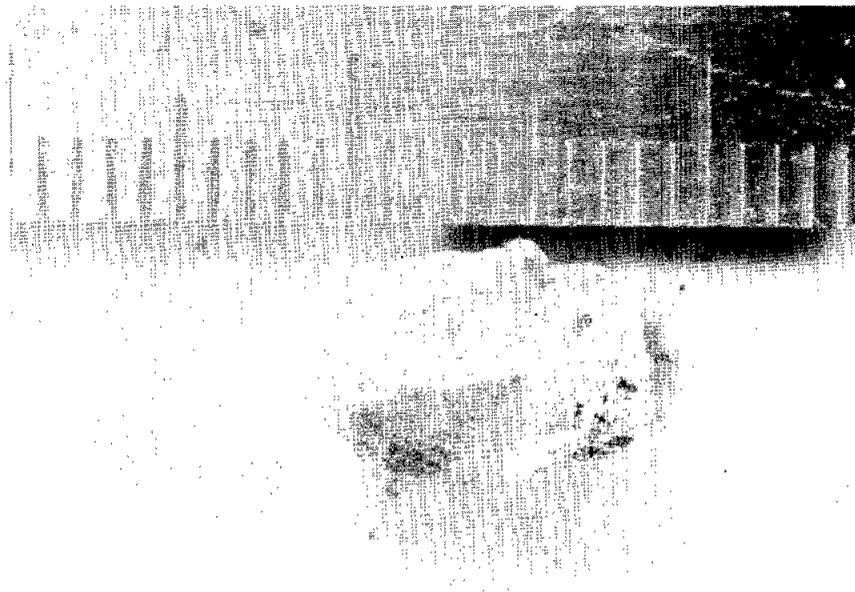
Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Irregular

Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray crystalline clasts	Dark-medium light gray	15-20	Ang-rounded	<0.05	To 2	Many are probably devit. glass. Most are small
Plag-rich clasts	White	10	Irreg-subrounded	<1	To 1.5	Mostly single grains
Matrix	White-light gray					Mostly finely comminuted plagioclase



Generic No.: 65715

Rock Type: Gray and white breccia

Weight (g): 31.36

Dimensions (cm): Three: 4.0 × 3.3 × 2.1  
2.0 × 1.3 × 0.6  
0.6 diameter

Color (fresh): Light gray (N7)

Shape: Rounded

Variability: None

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Granular to powdery

Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plag.-rich clasts	White	5-10	Irreg	1		Mostly single grains
Gray cryst. clasts	M. lt. gray	10-20	Irreg.-rounded	1		
Dark glass clasts	M. dk. gray	5	Angular	0.7		
Matrix	Light gray					Mostly comminuted plagioclase

Special Features: Identical to 65337 etc. (1) Largest piece: 4.0 × 3.3 × 2.1; second piece 2.0 × 1.3 × 0.6; third piece: about 0.6 diameter (rounded. One or two pieces of orange material (oxidized).

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Generic No.: 65716

Rock Type: Gray and white breccia

Weight (g): 14.28

Dimensions (cm): Three: 2.8 x 2.1 x 1.7  
0.8 diameter  
0.8 diameter

Color (fresh): Light gray (N7)

Shape: Rounded

Variability: None

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/microbreccia

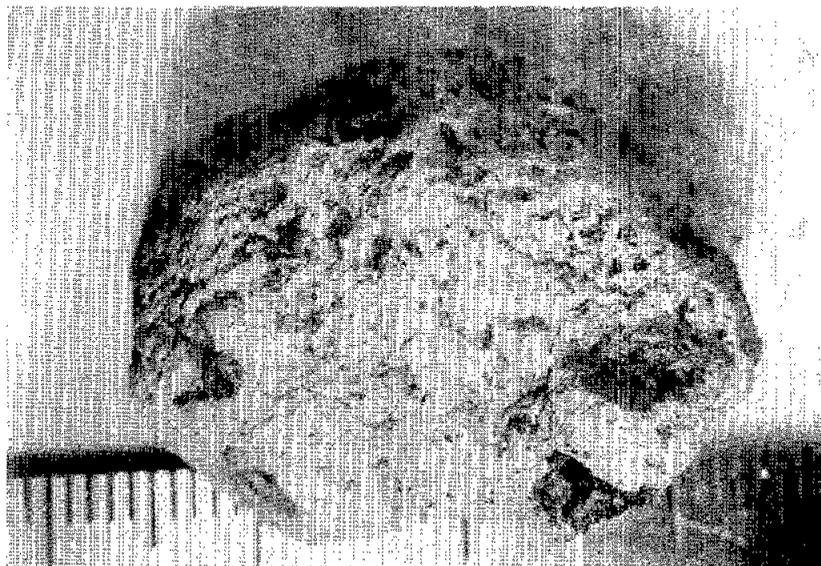
Cavities (%): None

Surface: Granulated to powdery

Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plag-rich clasts	White	10	Subrounded	1		Mostly single grains
Gray cryst. clasts	M. lt. gray	10	Angular	0.5		
Dark glass clasts	M. dk. gray	5	Irregular	0.5		
Matrix	Lt. gray					Mostly finely comminuted plagioclase

Special Features: (1) Large piece: 2.8 x 2.1 x 1.7.  
Two smaller pieces about 0.8 diameter.



Generic No.: 65717

Rock Type: Gray and white breccia

Weight (g): 7.415

Dimensions (cm): 3.0 x 2.1 x 1.3

Color (fresh): Medium light gray (N6) with brown cast

Shape: Subrounded

Variability: None (?)

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Powdery (dust covered) - granulated

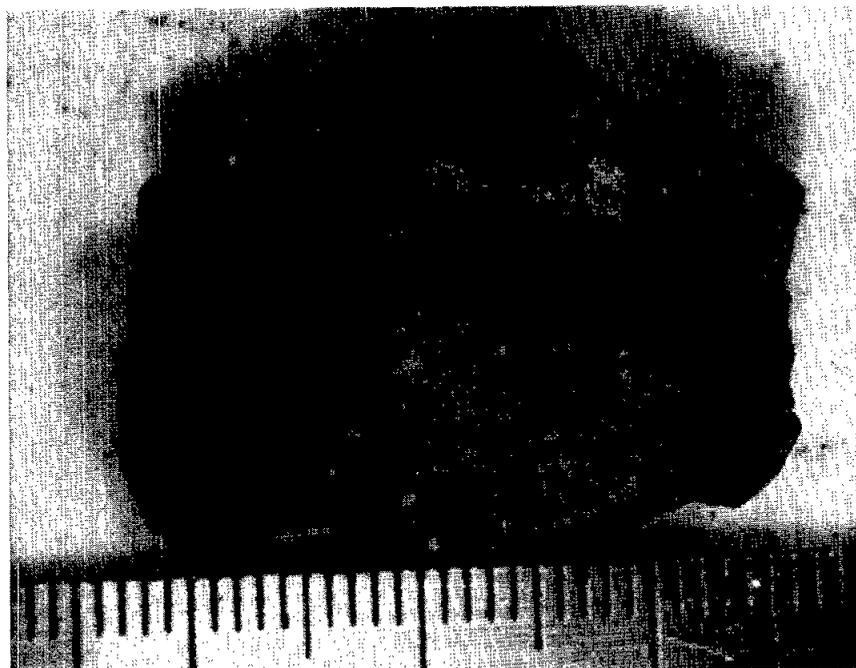
Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plag-rich clasts	White	10	Sub-rounded	1		
Gray cryst. clasts	Med. gray	10	Angular	1		

Matrix

Special Features: This specimen is almost entirely covered with finely powdered material (dust?).

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Generic No.: 65718

Rock Type: Gray and white breccia

Weight (g): 10.61

Dimensions (cm): (1)

Color (fresh): Light gray (N7)

Shape: Subrounded

Variability: None

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Granular to powdery

Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plag-rich clasts	White	10	Sub-rounded	1		
Gray cryst. clasts	M. lt. gray	20	Angular			
Matrix	Light gray					

Special Features: (1) Large piece: 2.6 x 2.1 x 2.1; second piece 1.0 x 0.5 x 0.3; third, and fourth less than 0.4 diameter.

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Generic No.: 65719  
Rock Type: Gray and white breccia

Weight (g): 7.04  
Dimensions (cm): 2.3 x 2.0 x 2.0  
Color (fresh): Light gray (N7)  
Shape: Subrounded  
Variability: None  
Coherence: intergranular - friable  
fracturing - few  
Fabric/texture: Isotropic/microbreccia  
Cavities (%): None  
Surface: Powdery to granulated  
Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray cryst. clasts	Med. gray	10-15	Angular	2		
Plag-rich clasts	White	5	Sub-rounded	1		Mostly single grains
Maf. sil. clasts	Yellow	1	Rounded	0.5		Maybe glass



Generic No.: 65725

Rock Type: Gray and white breccia

Weight (g): 5.19

Dimensions (cm): 2.5 x 1.9 x 1.2

Color (fresh): Light gray (N7)

Shape: Subangular

Variability: None

Coherence: intergranular - moderately coherent  
fracturing - few

Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Granulated

Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray crystalline clasts	Medium gray	20-30	Angular	~1	Up to 5	
Plagioclase rich clasts	White	5		0.5		Mostly single grains



109



65726.0

Generic No.: 65726

Rock Type: Gray and white breccia

Weight (g): 5.19

Dimensions (cm): 2.4 x 1.2 x 1.1

Color (fresh): Light gray

Shape: Subrounded

Variability: None

Coherence: intergranular - friable

Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Granular to powdery

Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray crystalline clasts	Medium gray & darker	15	Angular	0.5		
Plagioclase rich clasts	White	5	Sub- rounded	0.5-1		

Special Features: One large medium dark gray clast (3 x 5 mm) contains smaller white clasts itself.

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Generic No.: 65727

Rock Type: Gray and white breccia

Weight (g): 4.30

Dimensions (cm): Large piece: 2.2 x 1.4 x 1.3  
Small: 0.4 diameter

Color (fresh): Light gray (N7)

Shape: Subrounded

Variability: None

Coherence: intergranular - friable, moderately coherent  
fracturing - few

Fabric/texture: Isotropic/microbreccia

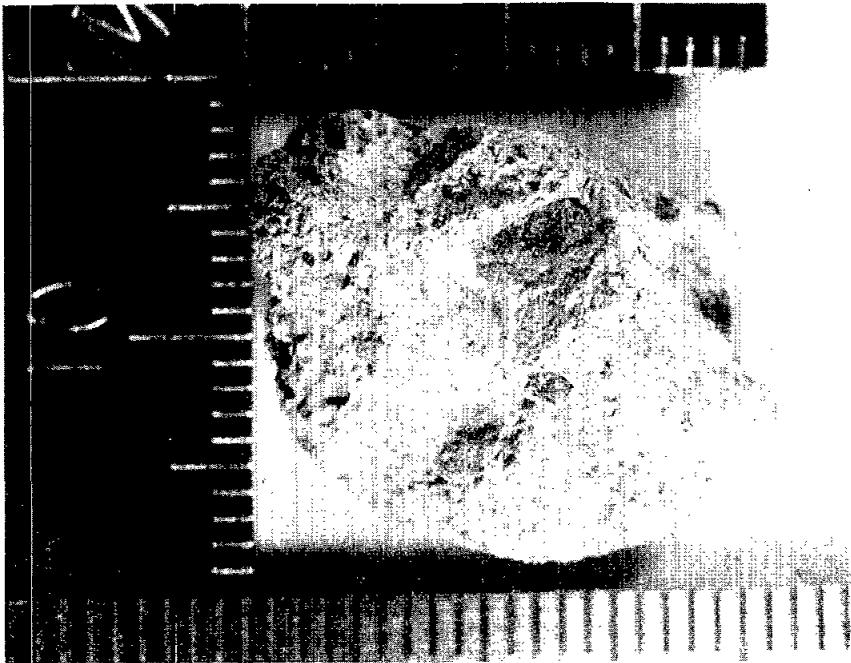
Cavities (%): None

Surface: Powdery-granulated

Zap pits: Few if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray crystalline clasts	Medium light gray	20-30	Rounded	1-2	Up to 5	
Plagioclase rich clasts	White	5-10		~1		
Matrix	Light gray					Mostly comminuted feldspar

Special Features: Larger gray clasts and lower clast/matrix than usual for this group.



Generic No.: 65728  
Rock Type: Gray and white  
microbreccia

Weight (g): 4.22  
Dimensions (cm): 2.1 x 1.4 x 1.3  
Color (fresh): Light gray (N7)  
Shape: Subrounded  
Variability: None  
Coherence: intergranular - friable  
fracturing - few  
Fabric/texture: Isotropic/microbreccia  
Cavities (%): None  
Surface: Powdery - granulated  
Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray crystalline clasts	Medium light gray	15	Angular-rounded	0.5-2	Up to 4	
Plagioclase rich clasts	White	<5				
Matrix						Mostly comminuted plagioclase
Miscellaneous clasts						

Special Features: One bluish-green clast (possibly green glass) (0.5 mm). One dark clast 1 mm diameter is transparent dark red; possibly glass. One or two pale orange-pink, small (0.5 mm) clasts.



Generic No.: 65729

Rock Type: Gray and white breccia

Weight (g): 3.81

Dimensions (cm): 2.2 x 1.3 x 1.2

Color (fresh): Light gray (N7)

Shape: Subrounded

Variability: None

Coherence: intergranular - friable, moderately coherent  
fracturing - few

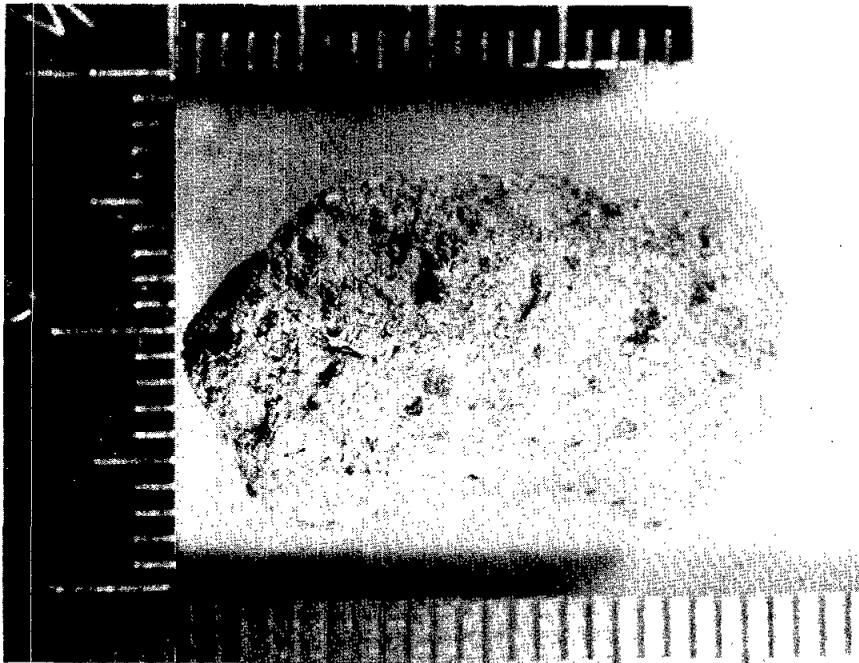
Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Powdery-granulated

Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray crystalline clasts	Medium light gray	15-20	Round-sub-angular	~1		
Plagioclase rich clasts	White	5-10	Sub-rounded			Mostly single grains
Matrix	Light gray					Mostly comminuted plagioclase



Generic No.: 65735

Rock Type: Gray and white breccia

Weight (g): 4.26

Dimensions (cm): Two: 1.9 x 1.8 x 1.0  
1.5 x 1.4 x 1.1

Color (fresh): Medium light gray (N6)

Shape: Subangular

Variability: Some, due to size of some clasts

Coherence: intergranular - friable  
fracturing - few

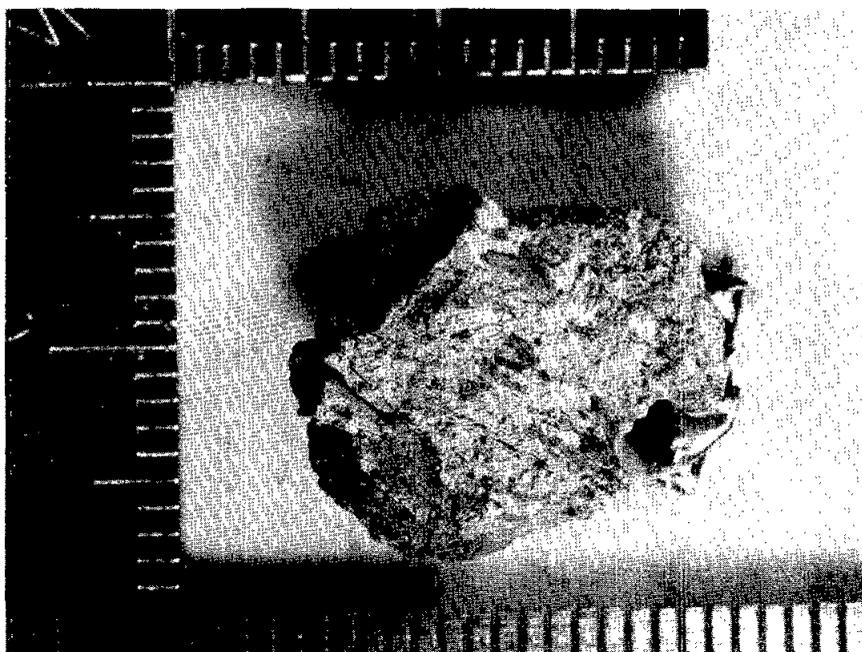
Fabric/texture: Isotropic/microbreccia; fine breccia

Cavities (%): None

Surface: Powdery to granulated

Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase rich clasts	White	10-20	Sub-rounded	~1		Mostly single grains
Gray crystalline clasts	Medium light gray	10-15	Angular sub-rounded	~1		One very large? Broken off from one surface
Mafic silicate	Yellow	2	Rounded			One large clast (2-5 mm) in each piece and a few small clasts



Generic No.: 65736

Rock Type: Gray and white breccia

Weight (g): 2.74

Dimensions (cm): 1.6 x 1.3 x 1.0  
3.0 x 0.3 x 0.2  
0.15 diameter

Color (fresh): Light gray (N7)

Shape: Subangular

Variability: None

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Granulated - powdery

Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray crystalline clasts	Medium light gray	15-20	Angular-rounded	~1	Up to 5	
Plagioclase rich clasts	White	5-10	Sub-rounded	~1		
Matrix	Light gray					Mostly comminuted feldspar



Generic No.: 65737

Rock Type: Gray and white breccia

Weight (g): 0.85

Dimensions (cm): 1.4 × 1.0 × 0.5

Color (fresh): Light gray (N7)

Shape: Subrounded

Variability: None

Coherence: intergranular - friable  
fracturing - few

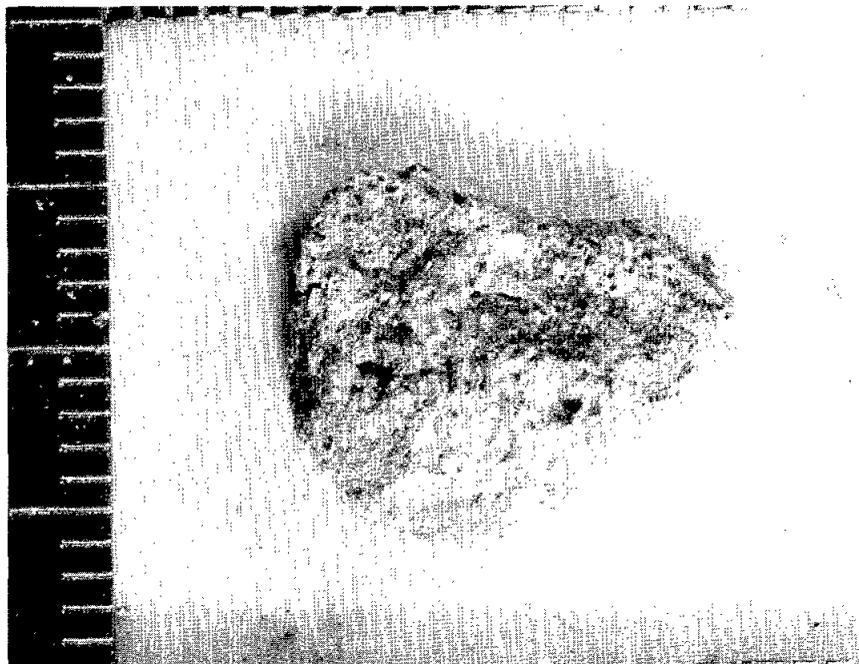
Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Granulated to powdery

Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase rich clasts	White	10	Sub- rounded	~1	Up to 3	
Gray crystalline clasts	Medium light	10-20	Angular- rounded	0.5	Up to 3	
Matrix	Light gray					Mostly commin- uted plagioclase



Generic No.: 65738

Rock Type: Gray and white breccia

Weight (g): 1.17

Dimensions (cm): 1.5 x 1.0 x 0.6

Color (fresh): Light gray to very light gray (N7)

Shape: Subangular

Variability: None

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Irregular, powdery to granulated

Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase rich clasts	White	10-20	Sub- rounded	~1	Up to 4	
Gray crystalline clasts	Medium light gray	10	Sub- angular	~1		
Matrix	Light gray					



Generic No.: 65739

Rock Type: Gray and white breccia

Weight (g): 0.95

Dimensions (cm): 1.2 x 0.8 x 0.7

Color (fresh): Light gray (N7)

Shape: Subrounded

Variability: None

Coherence: intergranular - friable  
fracturing - few

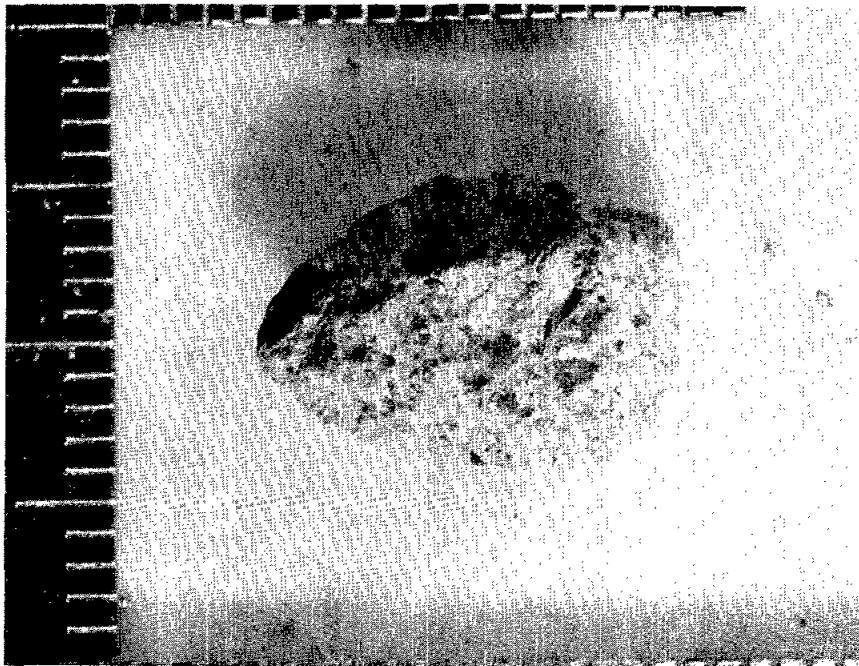
Fabric/texture: Isotropic/microbreccia

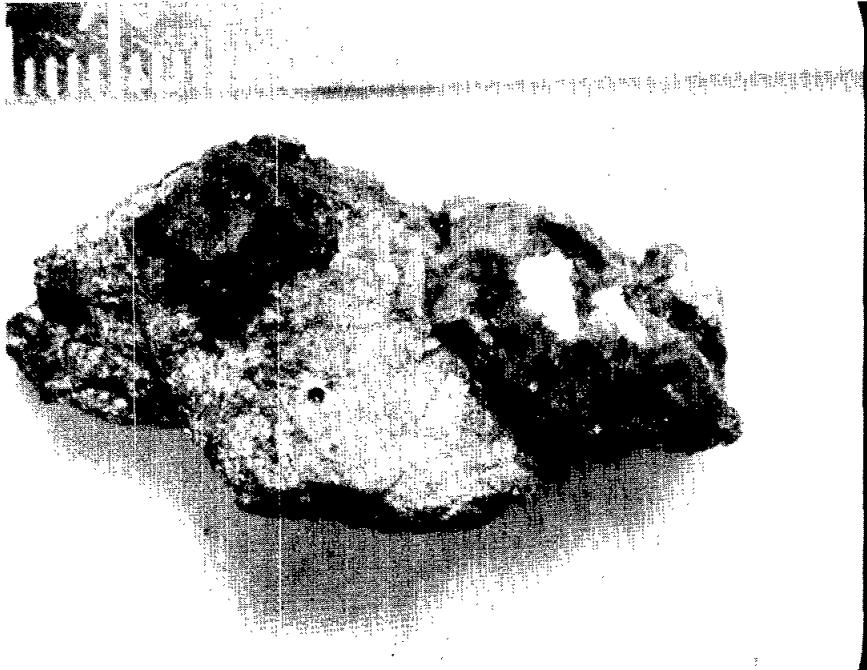
Cavities (%): None

Surface: Powdery-granulated

Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray crystalline clasts	Medium light gray	10-20	Sub-rounded	~1		
Plagioclase rich clasts	White	5-10	Irreg-subrounded	~1		
Matrix	Light gray					Mostly comminuted plagioclase





60657

Generic No.: 60657,0  
Rock Type: Gray and white  
microbreccia

Weight (g): 6.05  
Dimensions (cm): 3.3 x 1.8 x 0.8  
Color (fresh): Medium light gray (N6) to light gray (N7)  
Shape: Subrounded  
Variability: Yes, two ends of the rock have attached glass (see [1])  
Coherence: intergranular - tough  
fracturing - few  
Fabric/texture: Isotropic microbreccia, consisting of white clasts,  
embedded into a light gray, crystalline matrix  
Cavities (%): None, vesicles in attached glass  
Surface: Mostly smooth to granulated  
Zap pits: Few, glass lined

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Microbreccia						
(a) Matrix	Light gray	60		<0.01		
(b) Plagio- clase	White	40		<1.0		Clasts
(a) Devitri- fied glass		80				
(b) Anor- thosite	White	20		<4.0		Clasts

Special Features: (1) This rock is a gray and white microbreccia, with no apparent glass in the matrix. However, two large areas of partly devitrified vesicular glass are attached to two ends of the rock. The glass in itself contains <4 mm anorthosite fragments (white). Annealed breccia.

---

Generic No.: 60658,0  
Rock Type: Gray and white  
breccia

Weight (g): 5.47

Dimensions (cm): 2.5 x 1.6 x 0.8

Color (fresh): Light gray (N7)

Shape: Subangular

Variability: None

Coherence: intergranular - coherent  
fracturing - few

Fabric/texture: Isotropic. Fine breccia consisting of a light gray matrix, into which are embedded white clasts

Cavities (%): None. One big fracture into which glass flowed.  
Vesicles in the glass.

Surface: Smooth to granulated

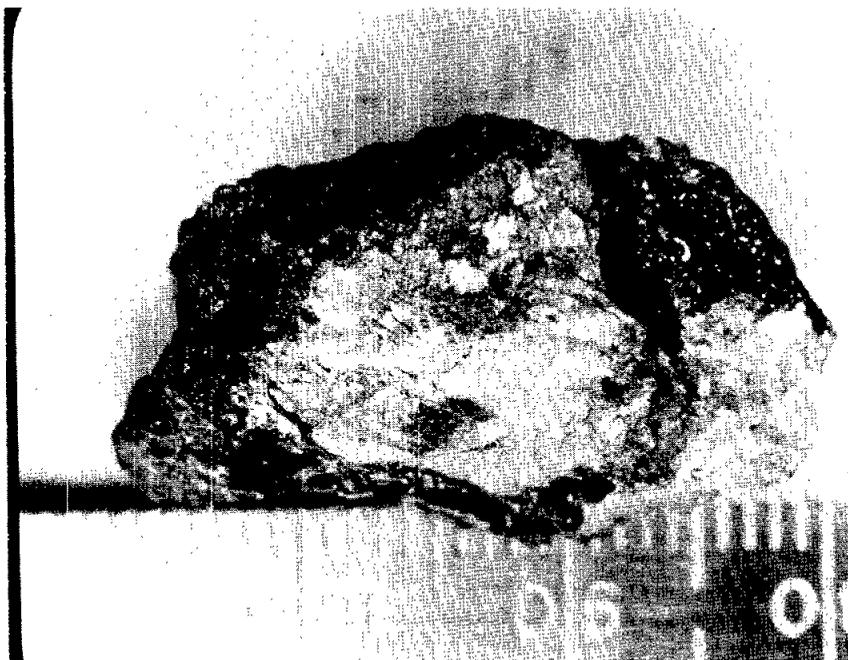
Zap pits: Few, glass lined

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix	Light gray	55				
Plagioclase	White	45	Irreg to rounded	<30		Clasts

Special Features: This fine breccia is similar to rock 60657,0. It is partly coated by a greenish-black vesicular, shiny glass. The glass also contains a few whitish inclusions.

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Generic No.: 60659,0

Rock Type: Gray and white breccia

Weight (g): 22.20

Dimensions (cm): 3.9 x 3.0 x 1.5

Color (fresh): Light gray (N7)

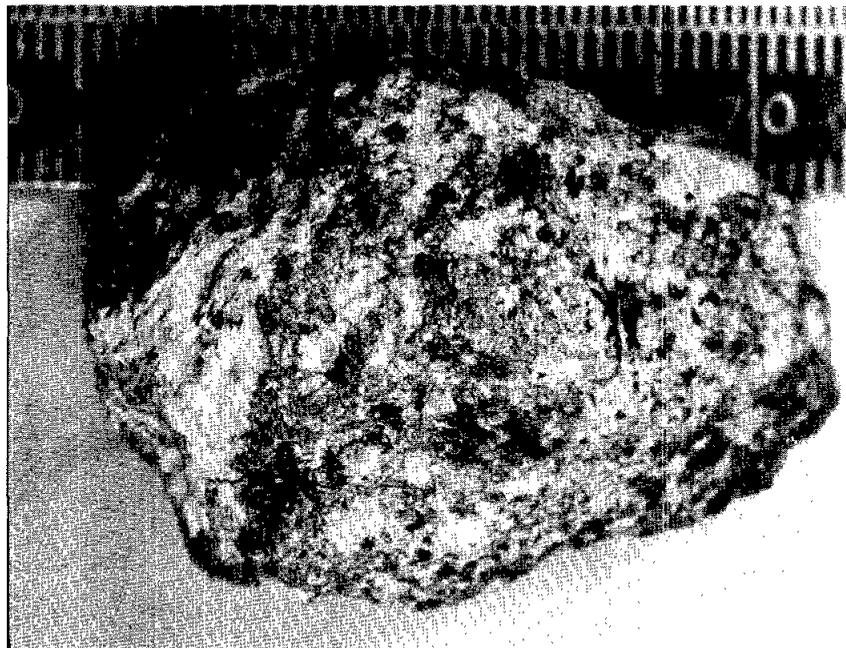
Shape: Subrounded

Variability: None

Coherence: intergranular - coherent  
fracturing - few, some large ones

Fabric/texture: Isotropic. Breccia consisting of a gray matrix into which are embedded many white clasts

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix	Medium gray	60				
Plagioclase	White	40	Angular to rounded	Up to 2.0		Clasts
Clasts	Green	<0.1		<2.0		
Brownish-red mineral		In matrix				Possibly spinel



Generic No.: 65757,0

Rock Type: Gray and white breccia

Weight (g): 26.20

Dimensions (cm): 4.0 x 3.0 x 2.0

Color (fresh): Medium gray (N5)

Shape: Subangular

Variability: Certain parts of the surface have a dark glass coat

Coherence: intergranular - coherent  
fracturing - few

Fabric/texture: Isotropic. Breccia, with large (centimeter sized) white plagioclase clasts.

Cavities (%): Vesicles in the glass that coats the surface

Surface: Irregular

Zap pits: Very few, glass lined

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix	Medium gray	65				
Plagioclase	White	25				Clasts
Glass	Dark	10				Surface

Special Features: The glass covering part of the surface is clear and glassy in places, in others it is devitrified.

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Generic No.: 65758,0

Rock Type: Gray and white breccia

Weight (g): 5.95

Dimensions (cm): 2.4 x 1.9 x 1.1

Color (fresh): Very light gray (N8) to medium gray (N5)

Shape: Subangular

Coherence: intergranular - coherent  
fracturing - some

Fabric/texture: Isotropic. Breccia consisting of gray matrix and white clasts

Cavities (%): None

Surface: Granulated

Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray matrix	Gray	25		Very fine-grained		
Plagioclase		75				Clasts

Special Features: This appears to essentially consist of one large plagioclase clast, with the remainder being fine-grained matrix.

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Generic No.: 65765,0  
Rock Type: Gray and white breccia

Weight (g): 1.12  
Dimensions (cm): 1.7 x 1.0 x 0.5  
Color (fresh): White (N9) to medium dark gray (N4)  
Shape: Subangular  
Variability: Yes, see (1)  
Coherence: intergranular - coherent  
                  fracturing - very few  
Fabric/texture: Isotropic. Gray and white breccia  
Cavities (%): None  
Surface: Granulated  
Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase	White	75	Sub- rounded		~10.0	Clast
Gray matrix	Gray	23				
Soil and glass		2				

Special Features: (1) This rock consists of one large anorthosite clast that makes up approximately 3/4 of the rock. On one side, attached to the white clast, is gray, brecciated material, and on the back side, the rock is covered by a thin layer of the same material, plus some soil and glass. The gray matrix has smaller clasts of plagioclase.



Generic No.: 65786,0  
Rock Type: Gray and white,  
coherent fine breccia

Weight (g): 83.02  
Dimensions (cm): 6.4 x 4.2 x 3.0  
Color (fresh): Light gray (N7)  
Shape: Subangular  
Variability: None  
Coherence: intergranular - coherent  
fracturing - fair amount  
Fabric/texture: Isotropic. Fine breccia  
Cavities (%): None  
Surface: Smooth to granulated  
Zap pits: Splash glass (dark greenish gray 5GY 4/1)

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix	Gray	85				
Plagioclase	White	15				Clasts

Special Features: Beautiful slickenside (5 cm).

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Generic No.: 65787,0

Rock Type: Gray coherent  
microbreccia

Weight (g): 8.28

Dimensions (cm): 3.0 x 2.0 x 1.0

Color (fresh): Light gray (N7)

Shape: Subangular

Variability: None

Coherence: intergranular - coherent  
fracturing - few

Fabric/texture: Isotropic. Gray microbreccia

Cavities (%): None

Surface: Smooth to granulated

Zap pits: Few, and some splash glass

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix	Gray	60				
Plagioclase	White	40				Clasts

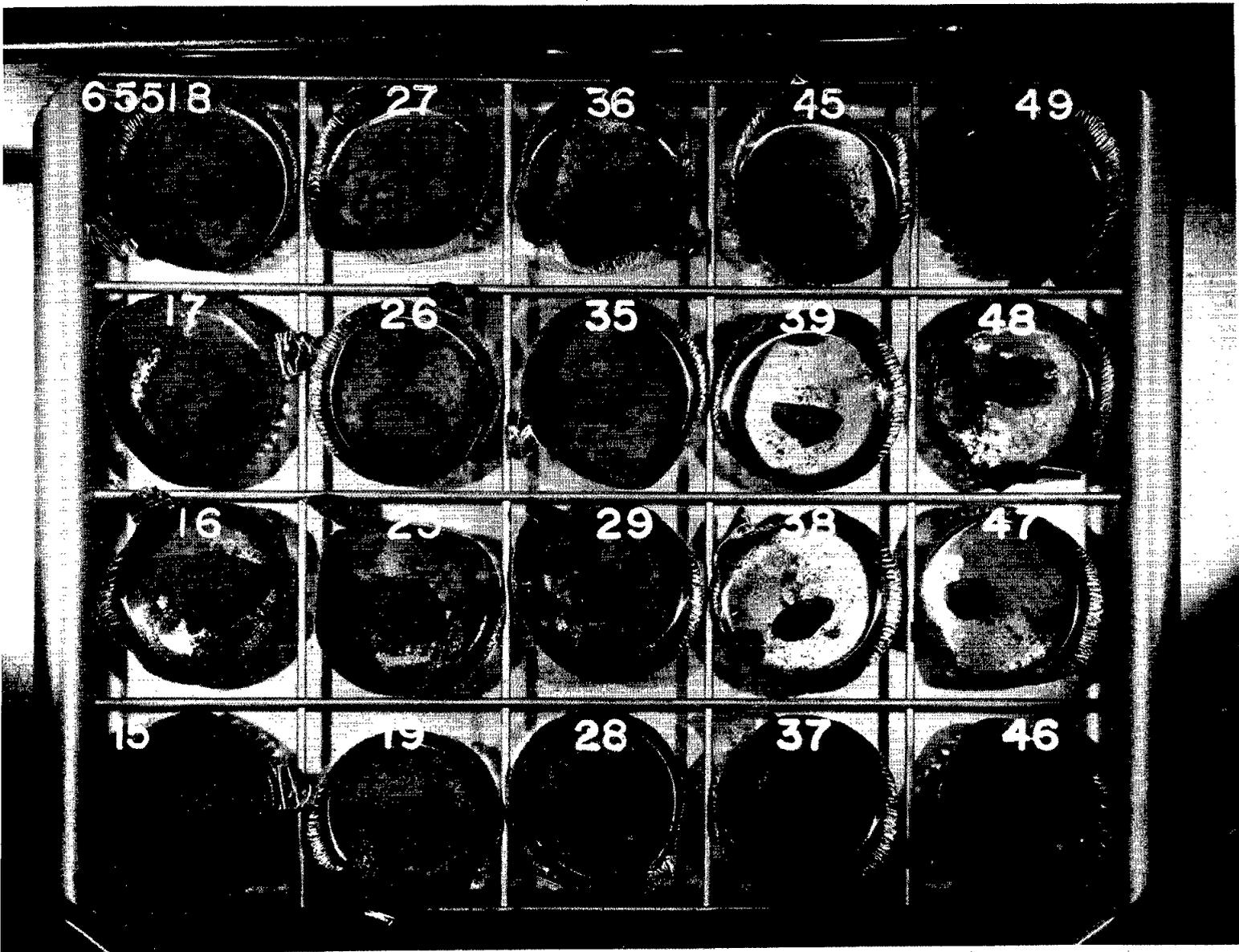
Special Features: This rock is transitional from the gray breccias to the gray, tough, crystalline rocks.

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### 3.2.7 Soil clods (Group 7)



Generic No.: 65515,0

Rock Type: Soil clod

Weight (g): 50.25

Dimensions (cm): 5.3 x 2.9 x 3.0

Color (fresh): Between very pale orange (10YR 8/2) and yellowish brown (10YR 6/2)

Shape: Rounded

Variability: None

Coherence: intergranular - extremely friable  
fracturing - none

Fabric/texture: Isotropic. Soil clod. Extremely friable.

Surface: Smooth

Zap pits: None

Special Features: The soil clods are characterized by a generally uniform small (<0.1 mm) grain size. This specimen contains a 6 mm, very friable white inclusion of similar small grain size. We decided not to measure the dimensions of specimens in this group because they are extremely friable and are falling apart, thus constantly changing dimensions.

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Generic No.: 65516,0

Rock Type: Soil clod

Weight (g): 10.485

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Rounded

Variability: None

Coherence: intergranular - extremely friable  
fracturing - none

Fabric/texture: Isotropic. Soil clod. Extremely friable

Surface: Smooth

Zap pits: None

Special Features: Contains a few metal grains and a few plagioclase crystals that are discernible. Compare rock 65515,0.

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Generic No.: 65517,0

Rock Type: Disintegrated soil  
clod

Weight (g): 11.848

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Soil

Variability: None

Coherence: intergranular - extremely friable

Fabric/texture: Soil

Special Features: Compare rock 65515,0

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Generic No.: 65518,0

Rock Type: Soil clod

Weight (g): 9.477

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Fabric/texture: Isotropic. Soil clod, extremely friable.

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0.

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Generic No.: 65519,0

Rock Type: Soil clod

Weight (g): 10.579

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Fabric/texture: Isotropic. Soil clod, extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0.

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Generic No.: 65525,0

Rock Type: Soil clod

Weight (g): 7.483

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Fabric/texture: Isotropic. Soil clod, extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0.

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Generic No.: 65526,0

Rock Type: Soil clod

Weight (g): 3.545

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Fabric/texture: Isotropic. Soil clod.

Surface (face): Smooth

Zap pits: None

Special Features: Compare rock 65515,0.

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Generic No.: 65527,0

Rock Type: Soil clod

Weight (g): 2.890

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Fabric/texture: Isotropic. Soil clod

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0

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Generic No.: 65528,0

Rock Type: Soil clod

Weight (g): 3.082

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0

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Generic No.: 65529,0

Rock Type: Soil clod

Weight (g): 2.555

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Rounded

Variability: None

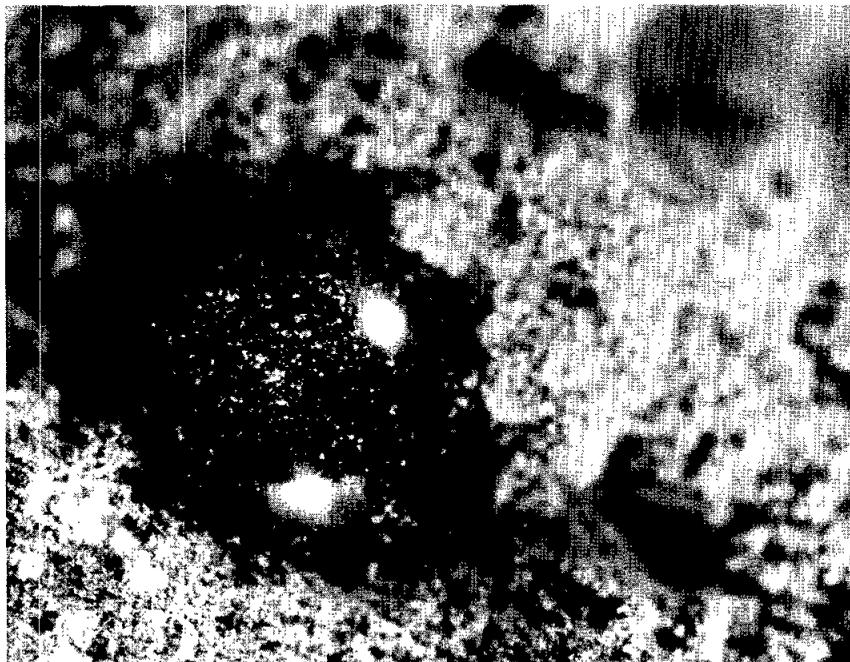
Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Several small glass beads are exposed on the surface. A very large spherule is exposed on the other side (~4 mm in diameter). Compare rock 65515,0.

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Generic No.: 65535,0

Rock Type: Soil clod

Weight (g): 2.658

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0.

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Generic No.: 65536,0

Rock Type: Soil clod

Weight (g): 1.575

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: A 0.5 mm green glass fragment is exposed on the surface. Compare rock 65515,0.

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Generic No.: 65537,0

Rock Type: Soil clod

Weight (g): 2.426

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0

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Generic No.: 65538,0

Rock Type: Soil clod

Weight (g): 2.342

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0.

---

---

Generic No.: 65539,0

Rock Type: Soil clod

Weight (g): 2.180

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0

---

---

Generic No.: 65545,0

Rock Type: Soil clod

Weight (g): 1.797

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0

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---

Generic No.: 65546,0

Rock Type: Soil clod

Weight (g): 1.346

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0

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---

Generic No.: 65547,0

Rock Type: Soil clod

Weight (g): 1.587

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0.

---

---

Generic No.: 65548,0

Rock Type: Soil clod

Weight (g): 3.023

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0

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---

Generic No.: 65549,0

Rock Type: Soil clod

Weight (g): 2.094

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

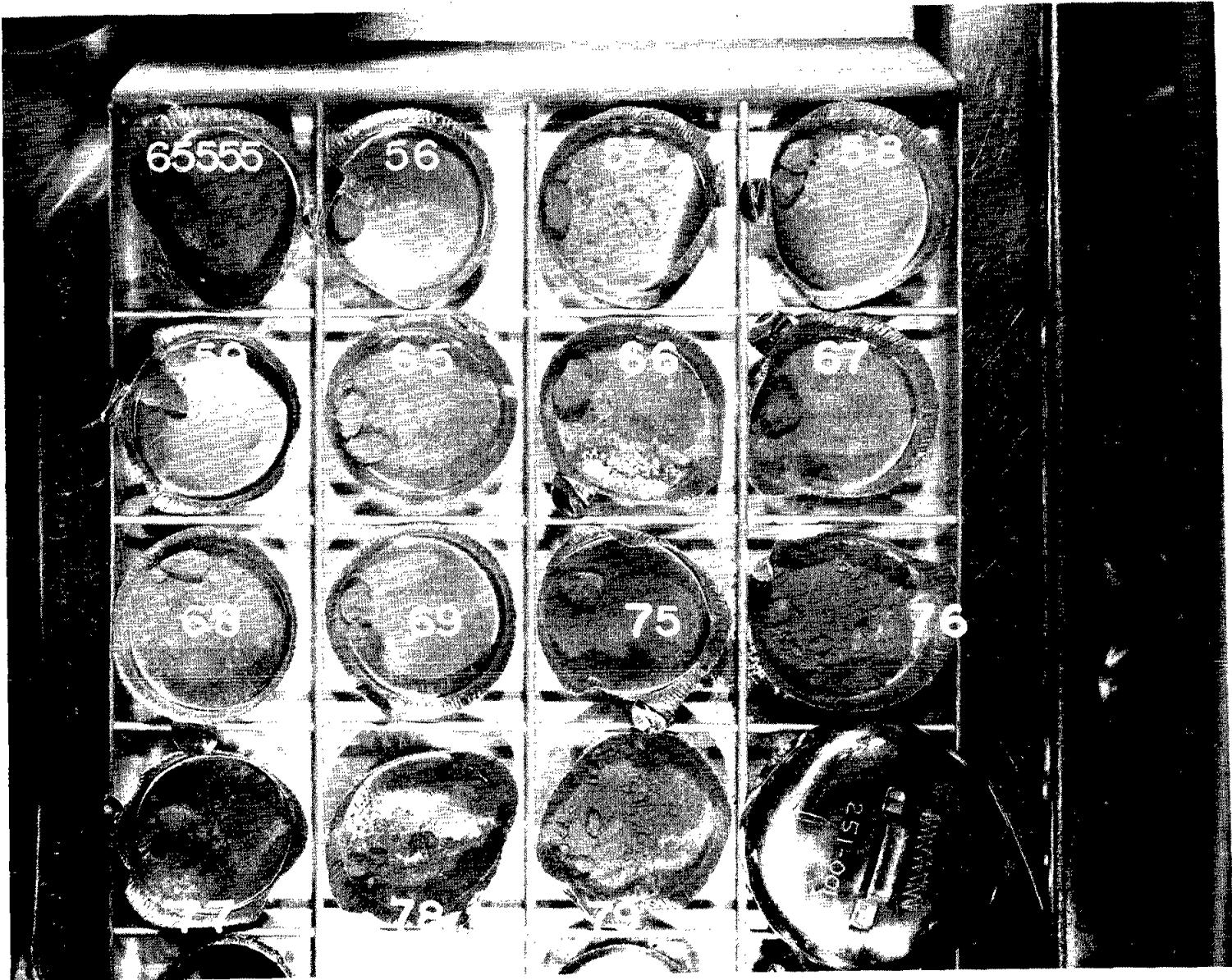
Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0

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---



Generic No.: 65555,0

Rock Type: Soil clod

Weight (g): 2.202

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0.

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---

Generic No.: 65556,0

Rock Type: Soil clod

Weight (g): 1.17

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Round

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0

---

---

Generic No.: 65557,0

Rock Type: Soil (former clod)

Weight (g): 3.295

Color (fresh): 10YR 8/2 to 10YR 6/2

Shape: Soil

Variability: None

Coherence: intergranular - extremely friable

Surface: Smooth

Zap pits: None

Special Features: Compare rock 65515,0

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---

Generic No.: 65558,0  
Rock Type: Soil clod

Weight (g): 1.695  
Color (fresh): 10YR 8/2 to 10YR 6/2  
Shape: Round  
Variability: None  
Coherence: intergranular - extremely friable  
Surface: Smooth  
Zap pits: None  
Special Features: Compare rock 65515,0.

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---

Generic No.: 65559,0  
Rock Type: Soil clod

Weight (g): 1.533  
Color (fresh): 10YR 8/2 to 10YR 6/2  
Shape: Round  
Variability: None  
Coherence: intergranular - extremely friable  
Surface: Smooth  
Zap pits: None  
Special Features: Compare rock 65515,0

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---

Generic No.: 65565,0  
Rock Type: Soil clod

Weight (g): 0.852  
Color (fresh): 10YR 8/2 to 10YR 6/2  
Shape: Round  
Variability: None  
Coherence: intergranular - extremely friable  
Surface: Smooth  
Zap pits: None  
Special Features: Compare to rock 65515,0

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---

Generic No.: 65566,0  
Rock Type: Soil clod

Weight (g): 1.998  
Color (fresh): 10YR 8/2 to 10YR 6/2  
Shape: Round  
Variability: None  
Coherence: intergranular - extremely friable  
Surface: Smooth  
Zap pits: None  
Special Features: Compare to rock 65515,0

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Generic No.: 65567,0  
Rock Type: Soil clod

Weight (g): 1.289  
Color (fresh): 10YR 8/2 to 10YR 6/2  
Shape: Round  
Variability: None  
Coherence: intergranular - extremely friable  
Surface: Smooth  
Zap pits: None  
Special Features: Compare rock 65515,0

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Generic No.: 65568,0  
Rock Type: Soil clod

Weight (g): 0.808  
Color (fresh): 10YR 8/2 to 10YR 6/2  
Shape: Round  
Variability: None  
Coherence: intergranular - extremely friable  
Surface: Smooth  
Zap pits: None  
Special Features: Compare rock 65515,0

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---

Generic No.: 65569,0  
Rock Type: Soil clod

Weight (g): 0.873  
Color (fresh): 10YR 8/2 to 10YR 6/2  
Shape: Round  
Variability: None  
Coherence: intergranular - extremely friable  
Surface: Smooth  
Zap pits: None  
Special Features: Compare rock 65515,0

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---

Generic No.: 65575,0  
Rock Type: Soil clod (3)

Weight (g): 0.907  
Color (fresh): 10YR 8/2 to 10YR 6/2  
Shape: Somewhat angular  
Variability: None  
Coherence: intergranular - friable  
Surface: Smooth  
Zap pits: None  
Special Features: Several inclusions of yellow and white crystalline material are observed. This sample is somewhat less friable than the others in this group.

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Generic No.: 65576,0  
Rock Type: Soil clod

Weight (g): 0.906  
Color (fresh): 10YR 8/2 to 10YR 6/2  
Shape: Rounded  
Variability: None  
Coherence: intergranular - extremely friable  
Surface: Smooth  
Zap pits: None  
Special Features: Compare rock 65515,0

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---

Generic No.: 65577,0  
Rock Type: Soil (former clod)

Weight (g): 0.706  
Color (fresh): 10YR 8/2 to 10YR 6/2  
Shape: Soil  
Variability: None  
Coherence: intergranular - extremely friable  
Special Features: Compare rock 65515,0

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---

Generic No.: 65578,0  
Rock Type: Soil (former clod)

Weight (g): 0.320  
Shape: Soil  
Color (fresh): 10YR 8/2 to 10YR 6/2  
Coherence: intergranular - extremely friable  
Special Features: Compare rock 65515,0

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---

Generic No.: 65579,0  
Rock Type: Soil clod

Weight (g): 0.612  
Shape: Round  
Coherence: intergranular - extremely friable  
Surface: Smooth  
Zap pits: None  
Special Features: One clod contains a fragment of irregularly shaped vesicular, devitrified, medium dark gray glass (5 mm diameter).  
Compare rock 65515,0.

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---

Generic No.: 65588,0  
Rock Type: Soil clod

Weight (g): 9.629  
Color (fresh): 5Y 8/1  
Shape: Round to subangular  
Variability: None  
Coherence: intergranular - friable  
Surface: Smooth  
Zap pits: None  
Special Features: Somewhat less friable than 65515,0

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---



Generic No.: 65755,0  
Rock Type: Soil clod

Weight (g): 1.42

Dimensions (cm): 1.5 x 1.3 x 0.5

Color (fresh): 10YR 7/2

Shape: Subrounded

Variability: None

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic. Soil clod rich in white clasts (<10%)

Surface: Smooth

Zap pits: None

Special Features: This soil clod has many more white plagioclase inclusions than the type clod in 65515,0; 0.5 mm dark glass spherule and same size, milky white plagioclase grains are observed.

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### 3.2.8 Brownish soil breccias (Group 8)

Generic No.: 60637,0  
Rock Type: Light brownish-  
gray microbreccia

Weight (g): 7.98  
Dimensions (cm): 3.1 x 1.8 x 1.7  
Color (fresh): Light brownish gray  
Shape: Subrounded  
Variability: None  
Coherence: intergranular - friable to coherent  
fracturing - few  
Fabric/texture: Isotropic microbreccia  
Cavities (%): None  
Surface: Smooth to granulated  
Zap pits: Few

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix	Light brownish gray	95				
Plagioclase	White	5	Irreg to rounded		<1.0	Clasts



Generic No.: 60638,0  
Rock Type: Light brownish-  
gray microbreccia

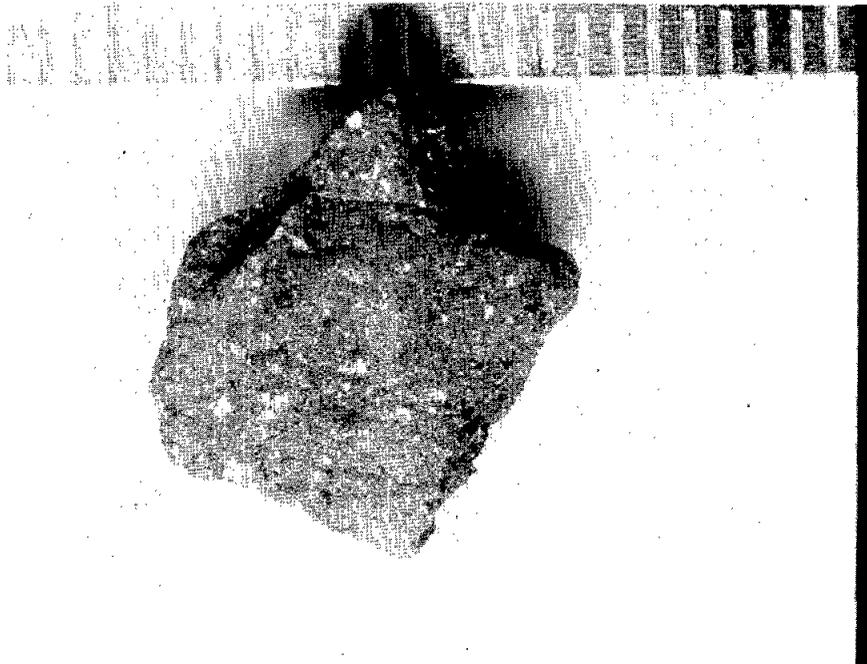
Weight (g): 0.72  
Dimensions (cm): 1.2 x 1.0 x 0.4  
Color (fresh): Light brownish gray (5YR 6/1)  
Shape: Angular  
Variability: None  
Coherence: intergranular - friable to coherent  
fracturing - few  
Fabric/texture: Isotropic; microbreccia  
Cavities (%): None  
Surface: Smooth to granulated  
Zap pits: Few

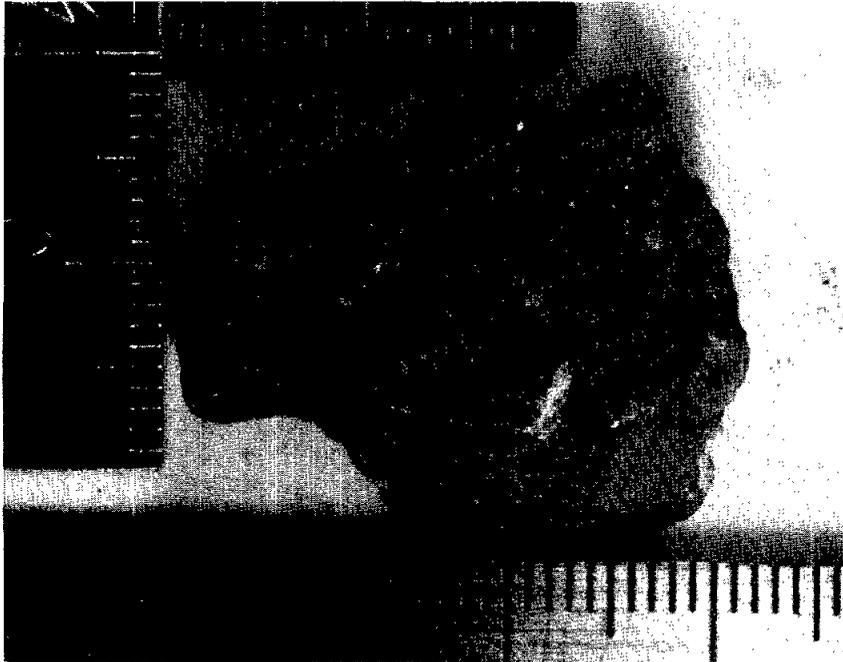
<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix	Light brownish gray	95				
Plagioclase	White	5	Irreg to rounded		<1.0	Clasts

Special Features: This rock resembles rock 60637,0

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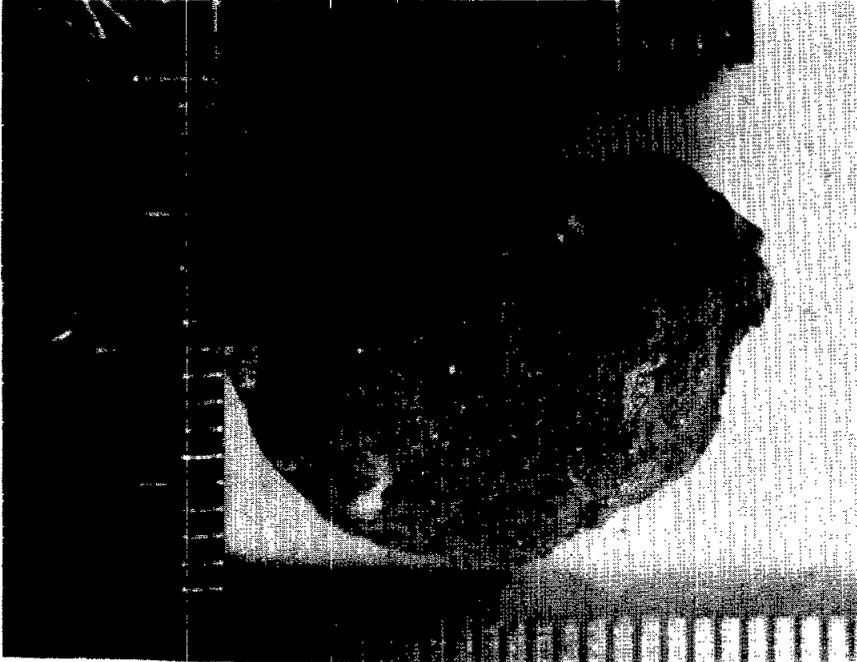
65745

Generic No.: 65745  
Rock Type: Brown soil  
microbreccia

Weight (g): 7.76  
Dimensions (cm): 2.6 x 2.2 x 1.2  
Color (fresh): Medium light gray (N6) to light brownish gray (5YR 6/1)  
Shape: Subrounded; subangular  
Variability: None  
Coherence: intergranular - friable  
fracturing - few  
Fabric/texture: Isotropic/microbreccia  
Cavities (%): None  
Surface: Powdery  
Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray crystalline clasts	Medium light gray	5-10	Sub-angular-rounded	0.5		
Plagioclase rich clasts	White	5-10	Sub-angular-rounded	0.5	Up to 3	Some single grains of plagioclase lithic fragments with maf. sil. opaque
Dark glass spherules	Brownish black	1-2	Spheres	<0.5	Up to 1	
Maf. sil.	Yellow	<1	Irreg	0.5		One or two grains
Metallic		<1	Irreg	0.1		Iron-nickel
Matrix	Light brownish gray					Very fine grain size

Special Features: This is distinct from white breccias 65715 to 65739. In this, the matrix is apparently soil (mostly).



65746

Generic No.: 65746  
Rock Type: Brownish soil  
microbreccia

Weight (g): 4.19  
Dimensions (cm): 1.8 x 1.6 x 1.1  
Color (fresh): Medium dark gray (N6) to light brownish gray (5YR 6/1)  
Shape: Subrounded  
Variability: None  
Coherence: intergranular - friable  
fracturing - few  
Fabric/texture: Isotropic; microbreccia  
Cavities (%): None  
Surface: Powdery  
Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Gray crystalline clasts	Medium light gray	5	Sub-angular-rounded	0.5		
Plagioclase rich clasts	White light gray	10-20	Rounded	~1		
Gray vesicular glass clasts	Medium gray	10	Irreg		Up to 5	One very large (5 mm)
Gray clasts	Green	<2	Irreg			Probably green glass
Matrix	Brownish gray					Brownish soil

Special Features: One of the white clasts (2 mm diameter) has a pinkish brown phase, possibly spinel, in plagioclase. Another has yellow-brown phase and plagioclase.

Generic No.: 65747  
Rock Type: Brownish soil  
microbreccia

Weight (g): 0.82

Dimensions (cm): 1.2 x 1.0 x 0.5  
0.3 x 0.2 x 0.2

Color (fresh): Medium light gray (N6) to light brownish gray (5YR 6/1)

Shape: Rounded

Variability: None

Coherence: intergranular - friable  
fracturing - few

Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Powdery

Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase rich clasts	White	20	Sub-rounded	~0.8		
Gray crystalline clasts	Medium light gray	10-15	Angular-sub-rounded	~1		
Maf. sil.	Yellow	<2	Irreg			One clast 1 mm
Matrix	Brownish gray					Brown soil - very fine



Generic No.: 65748  
Rock Type: Brownish soil  
microbreccia

Weight (g): 0.97  
Dimensions (cm): 1.5 x 1.0 x 0.6  
Color (fresh): Medium light gray (N6) to light brownish gray (5YR 6/1)  
Shape: Subrounded  
Variability: None  
Coherence: intergranular - friable  
fracturing - few  
Fabric/texture: Isotropic/microbreccia  
Cavities (%): None  
Surface: Powdery  
Zap pits: Few, if any

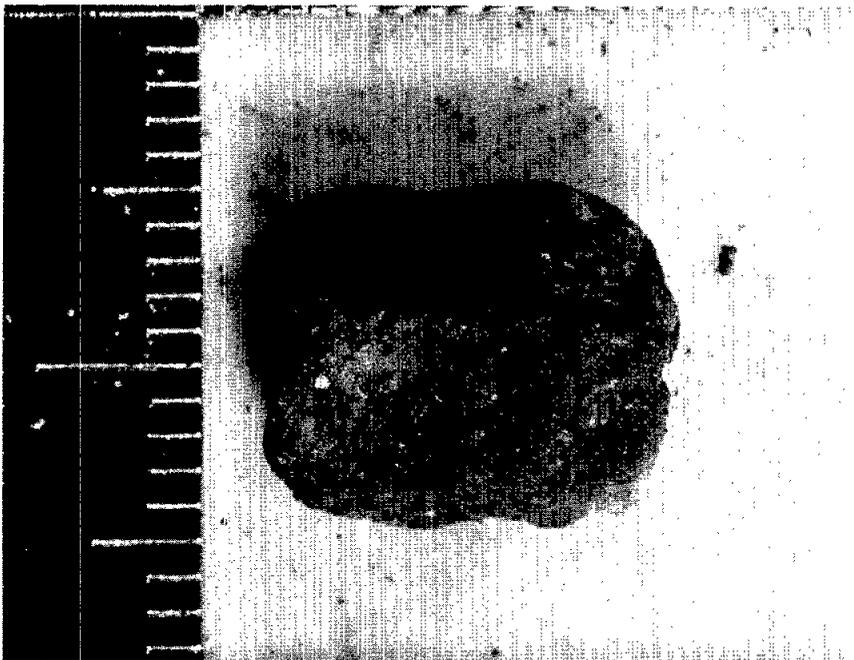
<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase rich clasts	White	10-15	Sub-round-sub-angular	0.5		
Gray crystalline clasts	Medium light gray	10	Subround subangular	1.0		
Matrix	Brownish gray					Very fine grained-brown soil



Generic No.: 65749  
Rock Type: Brownish soil  
microbreccia

Weight (g): 0.95  
Dimensions (cm): 1.1 x 0.9 x 0.7  
Color (fresh): Medium light gray (N6) to light brownish gray (5YR 6/1)  
Shape: Subangular  
Variability: None  
Coherence: intergranular - friable  
fracturing - few  
Fabric/texture: Isotropic/microbreccia  
Cavities (%): None  
Surface: Powdery  
Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase rich clasts	White	10	Sub-rounded	0.5		
Gray crystalline clasts	Medium light gray	10	Sub-rounded to subangular	0.8		
Matrix						Brown soil, fine-grained



Generic No.: 65756,0

Rock Type: Friable, fine breccia

Weight (g): 0.770

Dimensions (cm): 1.1 x 1.0 x 0.5

Color (fresh): Light brownish gray (5YR 6/1)

Shape: Subangular

Variability: None

Coherence: intergranular - friable  
fracturing - very few

Fabric/texture: Isotropic. Fine breccia

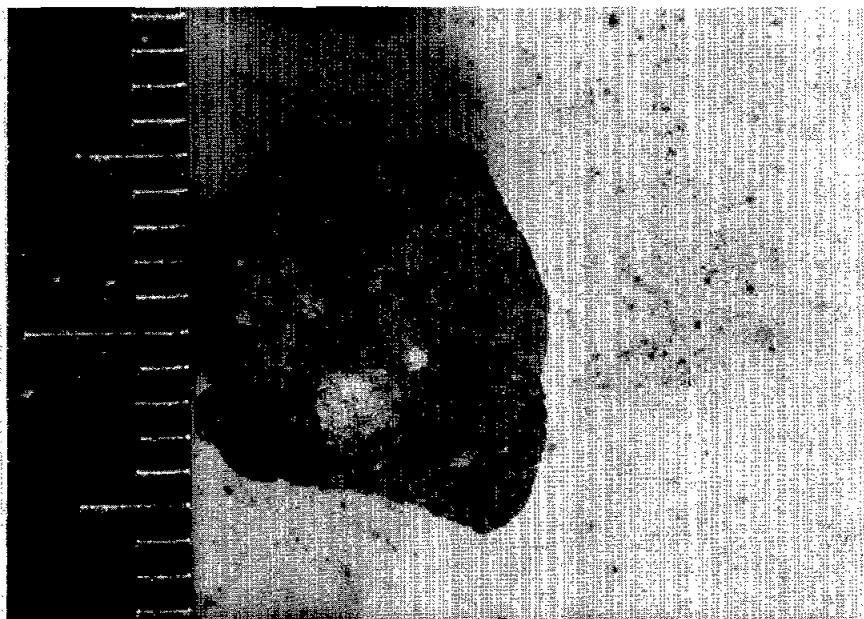
Cavities (%): Some

Surface: Granular

Zap pits: None

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Matrix		80		Very fine		
Plagioclase		20				Clasts

Special Features: This rock consists of a fine-grained, friable, light brownish-gray matrix into which are embedded predominantly plagioclase grains predominantly 3 mm in diameter; there is also a light canary yellow mineral, possibly pyroxene, associated with the feldspar. This "breccia" is transitional to a soil clod.



Generic No.: 65768,0  
Rock Type: Friable, fine  
breccia, covered by glass

Weight (g): 3.25

Dimensions (cm): 2.0 x 1.6 x 0.8

Color (fresh): Light brownish gray (5YR 6/1)

Shape: Subrounded

Variability: None

Coherence: intergranular - friable to coherent  
fracturing - few

Fabric/texture: Isotropic. Fine breccia, with glass cover

Cavities (%): Vesicles in the glass

Surface: Irregular

Special Features: This is a friable, fine breccia that is covered 2/3 by a thin coating of bubbly, vesicular, gray-green glass. This glass is similar to the yellow-green glassy agglutinates. Contains a variety of rock and mineral inclusions. The matrix is similar to soil clods. One face shows a slickenside approximately 1 cm in length.

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Generic No.: 65769,0

Rock Type: Friable microbreccia,  
covered by glass

Weight (g): 2.74

Dimensions (cm): 1.5 x 1.3 x 1.0

Color (fresh): Light brownish gray (5YR 6/1)

Shape: Subangular

Variability: None

Coherence: intergranular - friable to coherent  
fracturing - few

Fabric/texture: Isotropic; microbreccia, with glass cover

Cavities (%): Vesicles in the glass

Surface: Irregular

Zap pits: None apparent

Special Features: This is a friable microbreccia that is covered 2/3 by glass (thin coating; bubbly, vesicular, gray green). This glass is similar to the yellow-green glassy agglutinates. Contains a variety of rock and mineral inclusions. The matrix is similar to soil clods. One face shows a slickenside.

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Generic No.: 65775,0  
Rock Type: Fine breccia

Weight (g): 3.50

Dimensions (cm): 1.9 x 1.5 x 0.9

Color (fresh): Light brownish gray (5YR 6/1)

Shape: Subangular

Variability: None

Coherence: intergranular - friable to coherent  
fracturing - none

Fabric/texture: Isotropic. Fine-breccia

Cavities (%): Vesicles in the glass

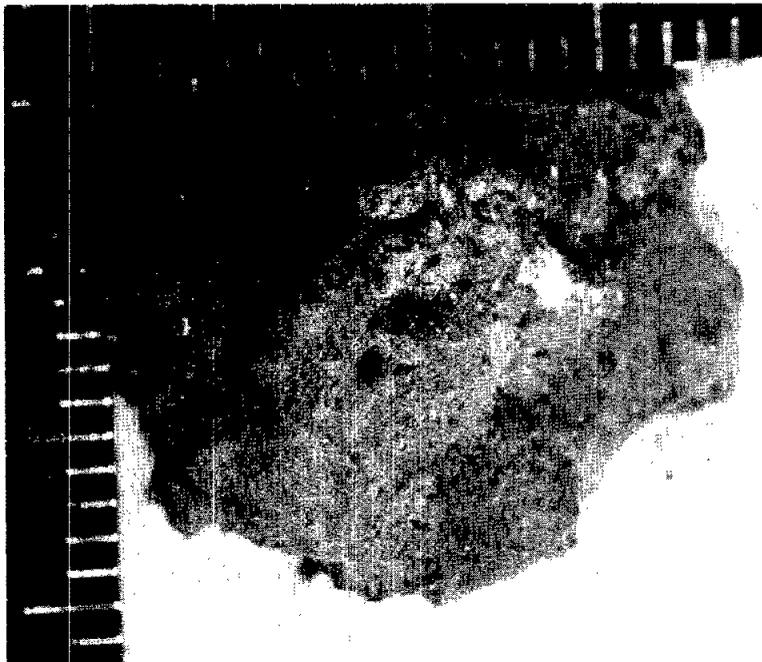
Surface: Irregular

Zap pits: None apparent

Special Features: This is a friable fine breccia to which is attached a glass corresponding to 10% of the surface area.

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---



Generic No.: 65925  
Rock Type: Brownish soil  
microbreccia

Weight (g): 3.82  
Dimensions (cm): 1.4 x 1.1 x 0.7  
1.5 x 1.2 x 0.8  
Color (fresh): Medium light gray (N6) to light brownish gray (5YR 6/1)  
Shape: Subangular - subrounded  
Variability: None  
Coherence: intergranular - friable  
fracturing - few  
Fabric/texture: Isotropic/microbreccia  
Cavities (%): None  
Surface: Powdery  
Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase clasts	White	15		0.5	Up to 1.5	
Gray crystalline clasts	Medium light gray	10			~1	
Matrix						Brown soil-very fine



Generic No.: 65926  
Rock Type: Brownish soil  
microbreccia

Weight (g): 3.03

Dimensions (cm): Three - 1.4 x 0.9 x 1.1; 0.4 diameter; 0.2 diameter

Color (fresh): Medium light gray (N6) to light brownish gray

Shape: Subrounded

Variability: None

Coherence: intergranular - friable  
fracturing - few

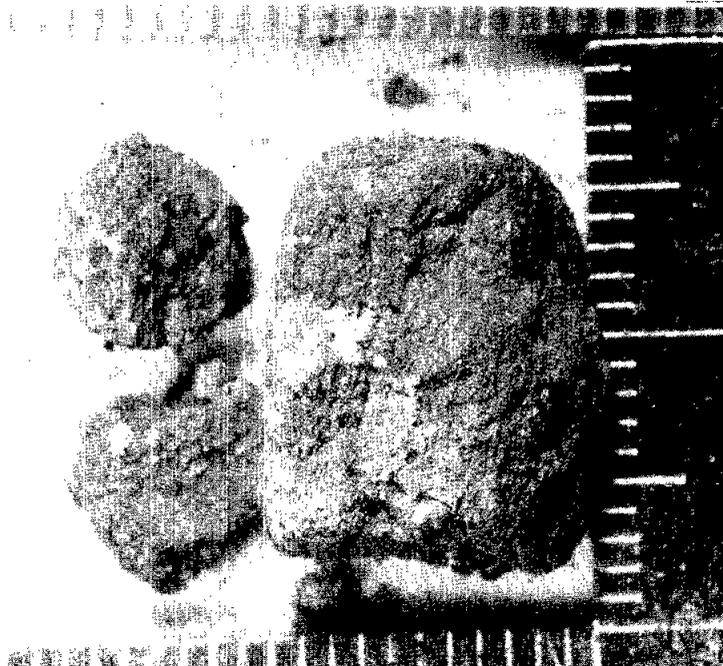
Fabric/texture: Isotropic/microbreccia

Cavities (%): None

Surface: Powdery

Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase rich clasts	White	10		0.5		
Gray crystalline clasts	Medium light gray	10		~1		
Matrix	Brownish gray					Brown soil - very fine



Generic No.: 65927  
Rock Type: Brownish soil  
microbreccia

Weight (g): 0.72  
Dimensions (cm): 1.0 x 0.9 x 0.7  
Color (fresh): Medium light gray (N6) to light brownish gray (5YR 6/1)  
Shape: Subangular  
Variability: None  
Coherence: intergranular - friable  
fracturing - few  
Fabric/texture: Isotropic/microbreccia  
Cavities (%): None  
Surface: Powdery  
Zap pits: Few, if any

<u>Component</u>	<u>Color</u>	<u>% of Rock</u>	<u>Shape</u>	<u>Size (mm)</u>		<u>Comments</u>
				<u>Dom.</u>	<u>Range</u>	
Plagioclase rich clasts	White	10	Irreg-subrounded	0.5	To 1.5	
Gray crystalline clasts	Medium light gray	10	Sub-rounded subangular	~1		
Maf. sil. clasts	Yellow	<2		~1		One or two clasts



#### 4. Sample Inventory

Sample Number	Weight (in grams)	Rock Type
60515,0	16.74	Anorthosite
60516,0	7.91	Anorthosite
60517,0	1.23	Anorthosite
60518,0	1.12	Anorthosite
60519,0	0.50	Anorthosite
60525,0	12.84	Gray fine-grained crystalline rock
60526,0	8.42	Gray fine-grained crystalline rock
60527,0	7.36	Gray fine-grained crystalline rock
60528,0	2.94	Gray vesicular glass
60529,0	1.24	Gray vesicular glass
60535,0	7.23	Gray & white microbreccia
60615,0	32.97	Gray fine-grained crystalline rock
60616,0	3.40	Gray fine-grained crystalline rock
60617,0	2.77	Gray fine-grained crystalline rock
60618,0	21.67	Anorthosite
60619,0	28.00	Anorthosite
60625,0	117.00	Gray fine-grained crystalline rock
60626,0	15.87	Gray fine-grained crystalline rock
60627,0	12.09	Gray fine-grained crystalline rock
60628,0	6.86	Anorthosite
60629,0	4.92	Anorthosite
60635,0	15.05	Troctolitic or noritic crystalline rock
60636,0	35.65	Gray fine-grained crystalline rock
60637,0	7.98	Brownish soil breccia
60638,0	0.72	Brownish soil breccia
60639,0	175.10	Gray & white microbreccia
60645,0	33.50	Gray vesicular glass
60646,0	3.39	Gray vesicular glass
60647,0	1.76	Gray vesicular glass
60648,0	2.84	Gray vesicular glass
60649,0	1.03	Gray vesicular glass
60655,0	8.63	Gray vesicular glass
60656,0	11.23	Gray & white microbreccia
60657,0	6.05	Gray & white microbreccia
60658,0	5.47	Gray & white microbreccia
60659,0	22.20	Gray & white microbreccia
60665,0	90.10	Gray vesicular glass
60666,0	15.95	Gray vesicular glass
60667,0	7.66	Gray fine-grained crystalline rock
60668,0	2.91	Gray vesicular glass
60669,0	2.54	Gray vesicular glass
60675,0	1.30	Gray fine-grained crystalline rock
60676,0	8.92	Gray & white microbreccia
60677,0	5.23	Gray vesicular glass
60678,0	1.25	Gray vesicular glass
60679,0	2.96	Gray vesicular glass
65325,0	67.84	Anorthosite
65326,0	36.40	Anorthosite

Sample Number	Weight (in grams)	Rock Type
65327,0	6.97	Anorthosite
65328,0	1.28	Anorthosite
65329,0	1.92	Anorthosite
65335,0	1.63	Anorthosite
65336,0	0.60	Anorthosite
65337,0	11.57	Gray & white microbreccia
65338,0	2.65	Gray & white microbreccia
65339,0	1.62	Gray & white microbreccia
65345,0	0.86	Gray & white microbreccia
65346,0	0.80	Gray & white microbreccia
65347,0	0.43	Gray & white microbreccia
65348,0	11.66	Gray vesicular glass
65349,0	7.58	Gray vesicular glass
65355,0	4.94	Gray vesicular glass
65356,0	2.53	Gray vesicular glass
65357,0		Gray fine-grained crystalline rock
65358,0	7.02	Gray fine-grained crystalline rock
65359,0	2.53	Anorthosite
65365,0	2.16	Gray fine-grained crystalline rock
65366,0	8.48	Gray vesicular glass
65515,0	50.25	Soil clod
65516,0	10.485	Soil clod
65517,0	11.848	Soil clod
65518,0	9.477	Soil clod
65519,0	10.579	Soil clod
65525,0	7.483	Soil clod
65526,0	3.545	Soil clod
65527,0	2.890	Soil clod
65528,0	3.082	Soil clod
65529,0	2.555	Soil clod
65535,0	2.658	Soil clod
65536,0	1.575	Soil clod
65537,0	2.426	Soil clod
65538,0	2.342	Soil clod
65539,0	2.180	Soil clod
65545,0	1.797	Soil clod
65546,0	1.346	Soil clod
65547,0	1.587	Soil clod
65548,0	3.023	Soil clod
65549,0	2.094	Soil clod
65555,0	2.202	Soil clod
65556,0	1.17	Soil clod
65557,0	3.295	Soil clod
65558,0	1.695	Soil clod
65559,0	1.533	Soil clod
65565,0	0.852	Soil clod
65566,0	1.998	Soil clod
65567,0	1.289	Soil clod
65568,0	0.808	Soil clod
65569,0	0.873	Soil clod
65575,0	0.907	Soil clod
65576,0	0.906	Soil clod

Sample Number	Weight (in grams)	Rock Type
65577,0	0.706	Soil clod
65578,0	0.320	Soil clod
65579,0	0.612	Soil clod
65585,0	9.294	Glassy agglutinate
65586,0	6.763	Glassy agglutinate
65587,0	2.141	Glassy agglutinate
65588,0	9.629	Soil clod
65715,0	31.36	Gray & white microbreccia
65716,0	14.28	Gray & white microbreccia
65717,0	7.415	Gray & white microbreccia
65718,0	10.61	Gray & white microbreccia
65719,0	7.04	Gray & white microbreccia
65725,0	5.19	Gray & white microbreccia
65726,0	5.19	Gray & white microbreccia
65727,0	4.30	Gray & white microbreccia
65728,0	4.22	Gray & white microbreccia
65729,0	3.81	Gray & white microbreccia
65735,0	4.26	Gray & white microbreccia
65736,0	2.74	Gray & white microbreccia
65737,0	0.85	Gray & white microbreccia
65738,0	1.17	Gray & white microbreccia
65739,0	0.95	Gray & white microbreccia
65745,0	7.76	Brownish soil breccia
65746,0	4.19	Brownish soil breccia
65747,0	0.82	Brownish soil breccia
65748,0	0.97	Brownish soil breccia
65749,0	0.95	Brownish soil breccia
65755,0	1.42	Soil clod
65756,0	0.770	Brownish soil breccia
65757,0	26.20	Gray & white microbreccia
65758,0	5.95	Gray & white microbreccia
65759,0	3.11	Anorthosite
65765,0	1.12	Gray & white microbreccia
65766,0	1.01	Anorthosite
65767,0	17.51	Glassy agglutinate
65768,0	3.25	Brownish soil breccia
65769,0	2.74	Brownish soil breccia
65775,0	3.50	Brownish soil breccia
65776,0	2.33	Glassy agglutinate
65777,0	16.53	Gray fine-grained crystalline rock
65778,0	12.22	Gray fine-grained crystalline rock
65779,0	12.71	Gray fine-grained crystalline rock
65785,0	5.16	Troctolitic or noritic crystalline rock
65786,0	83.02	Gray & white microbreccia
65787,0	8.28	Gray & white microbreccia
65788,0	9.52	Glassy agglutinate
65789,0	12.24	Anorthosite
65795,0	6.84	Troctolitic or noritic crystalline rock
65925,0	3.82	Brownish soil breccia
65926,0	3.03	Brownish soil breccia
65927,0	0.72	Brownish soil breccia

5. Samples with brown to reddish, rust-like spots

In a number of rock specimens, relatively abundant spots of brown to reddish color were noted that resembled, in some cases, "limonite"-spots commonly found around metallic nickel-iron grains in stone meteorites. However, in case of the lunar samples, no association with metal was apparent.

The following rocks were found to have the brown to reddish spots:

Anorthosites (group 1): 65326, 65359, 65759, 65766.

Gray fine-grained crystalline rocks (group 3): 60525, 60625, 65779.

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