APOLLO 16 ROCK SAMPLES: BASIC INVENTORY

The following pages are an inventory of all numbered Apollo 16 rock samples and are updated from the Apollo 16 Sample Information Catalog (1972); regolith and core samples are not included. Rock sample columns comprise the type of sample, its mass, a brief descriptive name, and the container(s) in which it was brought to earth.

Under SAMPLE TYPE, a blank indicates that the sample was an individually collected hand sample, in some cases chipped from boulders. An 'R' indicates that the sample was collected with many others by raking the regolith. A 'P' indicates that the sample was picked from a regolith sample during laboratory processing in Houston. Details on sample collection can be found in the Interagency Report: Astrogeology 51 (1972), the Apollo 16 Preliminary Science Report (1972), Bailey and Ulrich (1978), and AFGIT (1981).

The DESCRIPTION is not meant to be a formal classification nor to replace existing classifications. The descriptive names are not entirely mutually exclusive, because the categories are not precisely defined nor are all defined on similar bases, hence fail the criteria for formal classification. For samples for which thin sections have not been made the nature and genesis of a rock is far less well-known than for those for which thin sections do exist. Thus some of the rocks can be more specifically characterized than others, and this is partly reflected in the descriptive name. The descriptions contain few question marks, but actually in some cases are imprecise and may be altered following further study. The name given is not precisely the description given as the title line in the comprehensive descriptions in the main part of this catalog; the title line usually contains more information.

Early classifications of Apollo 16 rocks were given by Wilshire et al. (1973, and in AFGIT, in press) and Warner et al. (1973), and a general classification system for highlands rocks is presented and discussed by Stöffler et al. (1979, 1980).

The descriptive names used in the inventory are:

Basaltic impact melt: homogeneous, mainly subophitic to ophitic igneous texture, with clasts present in some but not all cases. Chemical data show meteoritic contamination.

Variolitic impact melt: homogeneous, igneous texture with radiating clusters of plagioclase, and interstitial glass and mafic minerals. Clasts are usually present, and chemical data show meteorite contamination.

Poikilitic impact melt: homogeneous, generally igneous texture with numerous tiny plagioclase grains embedded in larger oikocrysts of pyroxene (less commonly olivine). Inter-oikocryst areas contain ilmenite and glass. Clasts are usually conspicuous and more common than basaltic impact melts, and chemical data show meteorite contamination (some workers believe this texture to be metamorphic in origin). The use of the above three terms usually requires that thin section study has been made. In cases where there is evidence that the sample is an impact melt and is not aphanitic, but the texture cannot be identified, we have used the more general term crystalline impact melt.

Fine-grained impact melt: numerous clasts in a seriate size distribution embedded in a fine-grained (<50 um) melt matrix - the distinction between tiny clasts and the melt is usually difficult, but the melt includes laths of plagioclase and ilmenite.

Glassy impact melt: similar to the fine-grained impact melts but with more glass and larger laths of plagioclase.

The above two terms have been used for samples both with and without thin sections.

Glass, cindery glass, glassy breccia: these terms are used in a loose sense to split a gradational series, from near homogeneous glasses with few clasts through clearly polymict, clast-rich breccias with abundant glass in the matrix. The glassy impact melts are also gradational into this group; the distinction is that the glassy breccias may have several stages of glass production or distinct glass entities, whereas the glassy impact melts have glass produced in a single event. The glasses include both clear and devitrified glasses, and both spherical and irregular bodies.

Fragmental polymict breccia: polymict breccias characterized by angular, unequilibrated mineral and lithic clasts. They are mainly friable, although some are coherent and probably lightly sintered. They are a diverse group with variable colors and clast contents; most of the "light matrix breccias" in published studies are in this group.

Coherent polymict breccia: A catch-all phrase for mainly heterogeneous coherent polymict breccias with varied matrices from crystalline impact melt, to glassy, to those of unidentified character. Most of these are medium to dark gray in color.

Dilithologic breccias: Breccias which consist of two lithologies, one light-colored (cataclastic anorthosite or granoblastic material), the other dark-colored (usually fine-grained crystalline impact melt), generally referred to in published studies as "Black-and-White" breccias.

Regolith breccia: coherent to friable rocks which are lithified soils or at least contain abundant regolith-derived components such as glass beads, glass shards, and agglutuntic material; usually dark gray to brown.

Friable regolith clod: mainly disaggregated, often brown, clods which appear to have been loosely bound regolith.

Cataclastic anorthosite: near-monomineralic (plagioclase) rocks which are brecciated but commonly contain relict plagioclase grains a few millimeters across. If chemical or other data indicates a lack of meteoritic contamination the phrase Pristine cataclastic anorthosite is used. The modifiers noritic and troctolitic are also used.

Other sparsely-used descriptive names, for which explanation see the individual samples, are granoblastic anorthosite (60619), granoblastic troctolitic anorthosite (61577), poikiloblastic impactite (67955, 67746), granoblastic impactite (67566), and polymict granoblastic breccia (60035). They consist largely of materials with clearly metamorphic textures. Such lithic types are fairly common as smaller clasts in other polymict breccias. One sample (61576) is probably a single plagioclase crystal, and one sample (67667) is a pristine feldspathic lherzolite.

Finally, some of the descriptive names are combined forms (e.g. glassy impact melt/breccia) where two lithologies are conspicuous, and the prefix "meta-" is used in a few cases where a dominantly igneous texture has been modified by subsequent thermal effects.

The SAMPLE CONTAINER acronyms are:

DB	Documented bag
PDB	Padded documented bag
SCB	Sample collection bag
SRC	Sample return container

Further details of sample containers can be found in the Interagency Report: Astrogeology 51 (1972), and the Apollo 16 Sample Information Catalog (1972).

References Cited:

AFGIT (1981). Geology of the Apollo 16 area, central lunar highlands (G.E. Ulrich, C.A. Hodges and W.R. Muehlberger, eds.). U.S. Geol. Survey Prof. Paper No. 1048, 539 pp.

Apollo 16 Lunar Sample Information Catalog (1972). MSC 03210. Manned Spacecraft Center, Houston. 372 pp.

Apollo 16 Preliminary Science Report (1972). NASA SP-315. National Aeronautics and Space Administration, Washington, D.C.

Bailey N.G. and Ulrich G.E. (1975) Apollo 16 Voice Transcript. USGS-GD-74-030. United States Geological Survey, Flagstaff. 323 pp.

Interagency Report: Astrogeology 51 (1972). Prepared by the Geological Survey for the National Aeronautics and Space Administration. 252 pp.

Stöffler D., Knoll H.-D., Maerz U. (1979). Terrestrial and lunar impact breccias and the classification of lunar highlands rocks. Proc. Lunar Planet. Sci. Conf. 10th, p. 639-675.

Stöffler D., Knoll H.-D., Marvin U.B., Simonds C.H., and Warren P.H. (1980). Recommended classification and nomenclature of lunar highland rocks - a committee report. Proc. of the Conference on the Lunar Highlands Crust, p. 51-70.

Warner J.L., Simonds C.H., and Phinney W.C. (1973). Apollo 16 rocks: Classification and petrogenetic model. Proc. Lunar Sci. Conf. 4th, p. 481-504.

Wilshire H.G., Stuart-Alexander D.G. and Jackson E.D. (1973). Apollo 16 rocks: Petrology and classification. J. Geophys. Res. 78, 2379-2392.