

10075
Regolith Breccia
53 grams



Figure 1: Photo of lunar breccia 10075,3(about 5 cm across). NASA S76-20322.

Introduction

10075 is a typical Apollo 11 regolith breccia, made up out of typical components of the Apollo 11 soil. It has a rounded top surface with many micrometeorite “zap” pits (figure 1).

Petrography

Simon et al. (1984) included breccia 10075 in their comprehensive study of Apollo 11 regolith breccias – their mode is given in the table. They calculated that it had the highest percentage of highland component (27%), but couldn’t directly identify that many fragments. Kramer et al. (1977) noted that 10075 had “several interesting large lithic clasts”. One of these is pictured in Simon et al.

Chemistry

The chemical analysis of 10075 by Goles et al. (1970) is significantly different from that of Rhodes and Blanchard (1981). However, the composition of 10075 is similar to that of the other Apollo 11 regolith breccias and 10084 (figures 2 and 3).

Processing

Apollo 11 samples were originally described and cataloged in 1969 and “recataloged” by Kramer et al. (1977). There are 4 thin sections.

Simon’s Mode for 10075

	S	L
Mare Basalt	4.3	9.9
Highland Component	0.1	
Regolith breccia	2.8	1.3
Agglutinate	7.4	10.5
Pyroxene	5.2	
Olivine	0.2	
Plagioclase	2	0.4
Ilmenite	1.6	
Orange glass	2.1	0.7
Other glass	2.2	2.4
Matrix	46.9 %	

Table 1. Chemical composition of 10075.

reference weight	Goles 70	Rhodes81	
SiO ₂ %	42.36	41.7	(b)
TiO ₂	7.5	7.35	(b)
Al ₂ O ₃	15.3	13.77	(b)
FeO	15.6	15.41	(b)
MnO	0.2	(a) 0.23	(b)
MgO	7.8	7.93	(b)
CaO	11.9	12.12	(b)
Na ₂ O	0.45	(a) 0.44	(b)
K ₂ O		0.15	(b)
P ₂ O ₅		0.11	(b)
S %			
sum			
Sc ppm	56.8	(a) 58	
V	85	(a) 52	
Cr	1790	(a) 2040	
Co	28.7	(a) 26	
Ni		166	
Cu			
Zn		35	
Ga		7	
Ge ppb			
As			
Se			
Rb		3.2	
Sr		157	
Y		97	
Zr		295	
Nb		18	
Mo			
Ru			
Rh			
Pd ppb			
Ag ppb			
Cd ppb			
In ppb			
Sn ppb			
Sb ppb			
Te ppb			
Cs ppm			
Ba	430	(a) 198	(a)
La	14.9	(a) 21.3	(a)
Ce	50	(a) 45	(a)
Pr			
Nd			
Sm	11.5	(a) 11.6	(a)
Eu	1.62	1.6	(a)
Gd			
Tb	3.1	(a) 2.7	(a)
Dy			
Ho	5.4	(a)	
Er			
Tm			
Yb	11.2	(a) 9.38	(a)
Lu	1.89	(a) 1.37	(a)
Hf	8.8	(a) 9.2	(a)
Ta	1.4	(a) 1.5	(a)
W ppb			
Re ppb			
Os ppb			
Ir ppb			
Pt ppb			
Au ppb			
Th ppm		1.7	(a)
U ppm	0.52	(a)	

technique: (a) INAA, (b) XRF

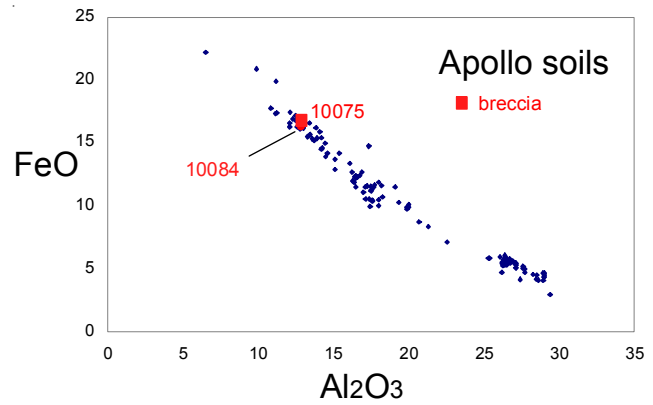


Figure 2: Composition of 10075 compared with that of 10084 and other Apollo soil samples.

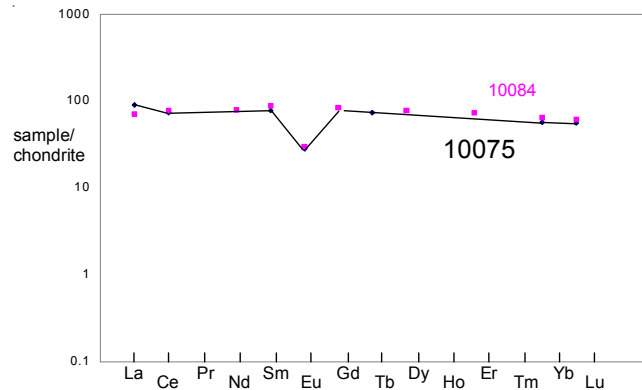
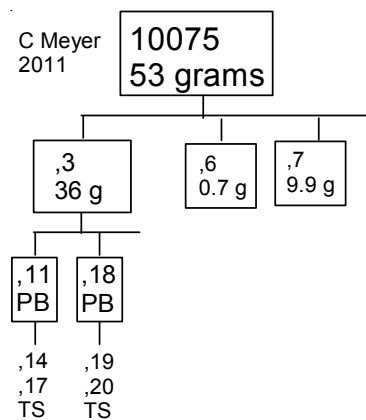


Figure 3: Normalized rare earth element diagram for breccia 10075 compared with soil 10084 (data from Wiesmann et al. 1975).



References for 10075

Fruland Ruth M. (1983) Regolith Breccia Workbook. Curatorial Branch Publication # 66. JSC 19045.

Goles G., Randle K., Osawa M., Schmitt R.A., Wakita H., Ehmann W.D. and Morgan J.W. (1970) Elemental abundances by instrumental activation analyses in chips from 27 lunar rocks. *Proc. Apollo 11 Lunar Sci. Conf.* 1165-1176.

King E.A. *and a cast of thousands* (1969) Lunar Sample Information Catalog, Apollo 11. Lunar Receiving Laboratory, MSC 412 pp

Kramer F.E., Twedell D.B. and Walton W.J.A. (1977) **Apollo 11 Lunar Sample Information Catalogue** (revised). Curator's Office, JSC 12522

Lofgren G.E. (1971b) Devitrified glass fragments from Apollo 11 and Apollo 12 lunar samples. *Proc. 2nd Lunar Sci. Conf.* 949-955

LSPET (1969) Preliminary examination of lunar samples from Apollo 11. *Science* **165**, 1211-1227.

Phinney W.C., McKay D.S., Simonds C.H. and Warner J.L. (1976a) Lithification of vitric- and clastic-matrix breccias: SEM photography. *Proc. 7th Lunar Sci. Conf.* 2469-2492.

Rhodes J.M. and Blanchard D.P. (1981) Apollo 11 breccias and soils: Aluminous mare basalts or multi-component mixtures? *Proc. 12th Lunar Planet. Sci. Conf.* 607-620.

Schmitt H.H., Lofgren G., Swann G.A. and Simmons G. (1970) The Apollo 11 samples: Introduction. *Proc. Apollo 11 Lunar Science Conf.* 1-54.

Simon S.B., Papike J.J. and Shearer C.K. (1984) Petrology of Apollo 11 regolith breccias. *Proc. 15th Lunar Planet. Sci. Conf.* in *J. Geophys. Res.* **89**, C109-132.