

10074
Regolith Breccia
55.5 grams



Figure 1: Photo of 10074,1. NASA S76-20396. Sample is 3.5 cm across.

Introduction

10074 is a coherent, glass-matrix regolith breccia. Figure 1 show an abundance of lithic clast – mostly mare basalt.

Petrography

Simon et al. (1984) included breccia 10074 in their comprehensive study of Apollo 11 regolith breccias – their mode is given in the table. They calculated that it had about 26 % highland component, but couldn't directly identify that many clasts of highland rock. They found 10074 had the least amount of agglutinate component of the Apollo 11 regolith breccias they studied (figure 3).

Simon's Mode for 10074

	S	L
Mare Basalt	6.2	11
Highland Component	0.9	1.8
Regolith breccia	1.1	0.3
Agglutinate	1.4	0.9
Pyroxene	8.4	
Olivine	0.2	
Plagioclase	3.4	
Ilmenite	1.8	0.6
Orange glass	2	0.8
Other glass	3.5	2.2
Matrix	51 %	

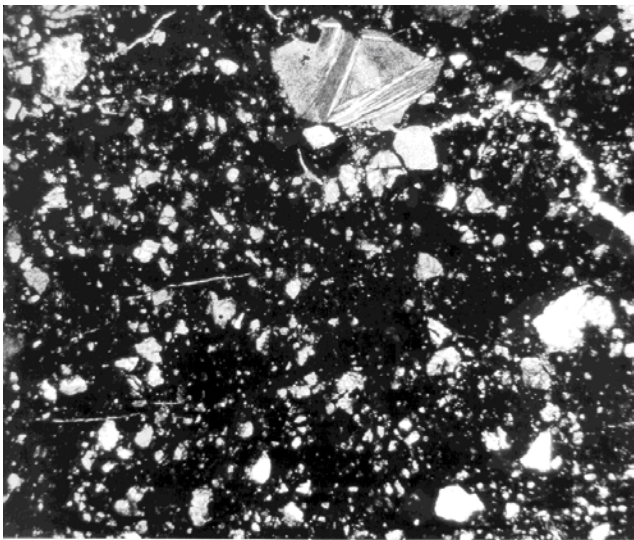


Figure 2: Photomicrograph of matrix of 10074,7.
NASA S76-26317.

Chemistry

Rhodes and Blanchard (1981) found that the composition of 10074 was similar to that of the other regolith breccias and 10084 (figures 3 and 4).

Processing

Apollo 11 samples were originally described and cataloged in 1969 and “recataloged” by Kramer et al. (1977). There are 6 thin sections.

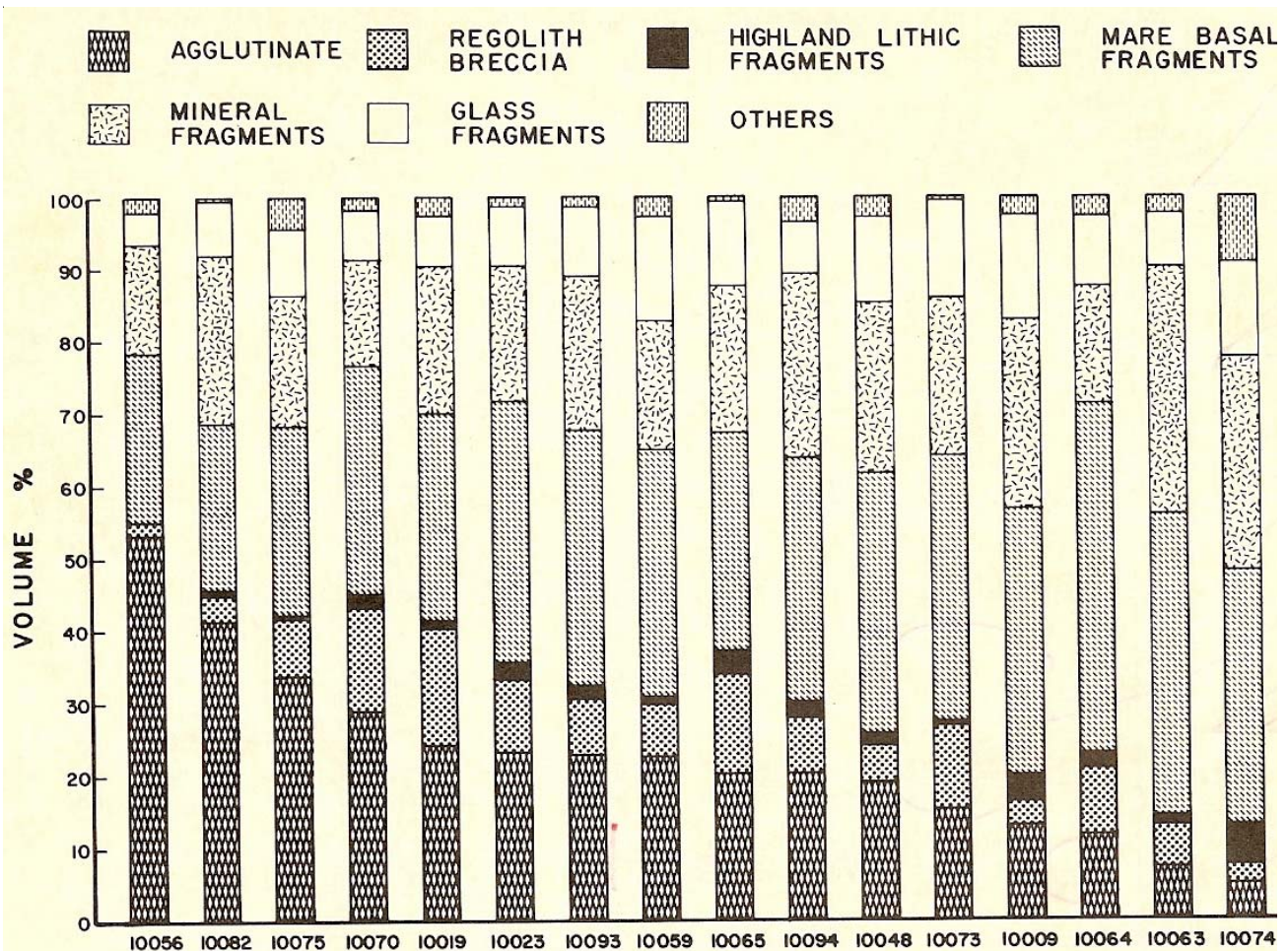


Figure 3: Comparison of lithic components in Apollo 11 breccias (from Simone et al. 1984).

Table 1. Chemical composition of 10074.

reference weight	Goles 70	Rhodes81	
SiO ₂ %	41.3	41.5	(b)
TiO ₂	7.8	7.49	(b)
Al ₂ O ₃	15.3	13.25	(b)
FeO	15.3	15.69	(b)
MnO	0.18	(a) 0.23	(b)
MgO	6.8	7.82	(b)
CaO	13	11.91	(b)
Na ₂ O	0.5	(a) 0.48	(b)
K ₂ O		0.18	(b)
P ₂ O ₅		0.11	(b)
S %			
sum			
Sc ppm	53.7	(a) 58	(c)
V	78	(a) 46	
Cr	1770	(a) 2070	(b)
Co	30.9	(a) 31	
Ni		162	
Cu	10	(a)	
Zn		41	
Ga		7	
Ge ppb			
As			
Se			
Rb		3.7	
Sr		153	
Y		102	
Zr	500	(a) 314	
Nb		19	
Mo			
Ru			
Rh			
Pd ppb			
Ag ppb			
Cd ppb			
In ppb			
Sn ppb			
Sb ppb			
Te ppb			
Cs ppm			
Ba	280	(a) 208	
La	13.8	(a) 18.3	
Ce	55	(a) 52	
Pr			
Nd			
Sm	11.5	(a) 13.6	
Eu	1.73	(a) 1.68	
Gd			
Tb	2.8	(a) 2.7	
Dy			
Ho	5	(a)	
Er			
Tm			
Yb	12	(a) 10.5	
Lu	1.7	(a) 1.58	
Hf	11.9	(a) 10.4	
Ta	1	(a) 1.4	
W ppb			
Re ppb			
Os ppb			
Ir ppb			
Pt ppb			
Au ppb			
Th ppm		2	(c)
U ppm	0.49	(a)	
technique	(a) INAA, (b) XRF, (c) INAA		

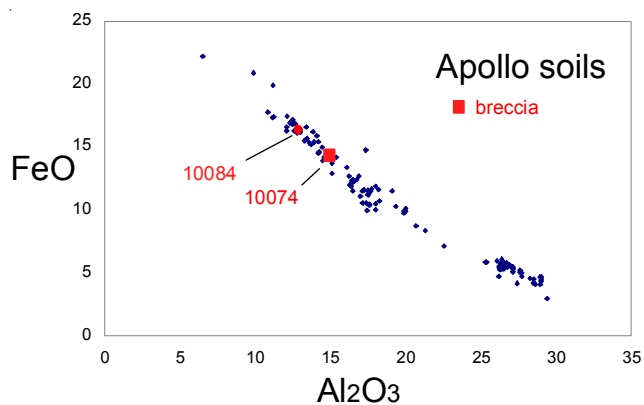


Figure 4: Composition of 10074 compared with Apollo soils.

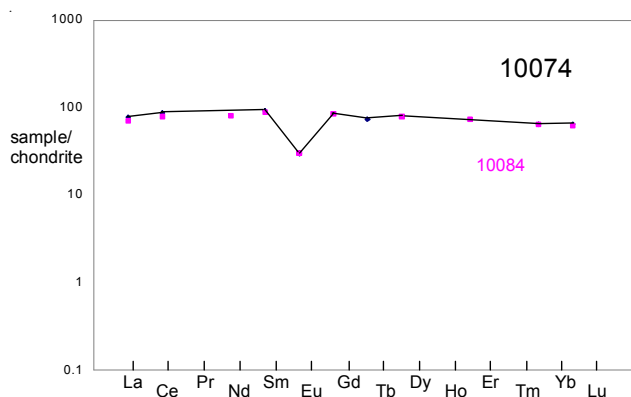
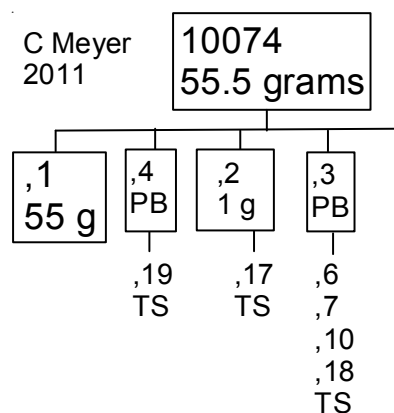


Figure 5: Normalized rare earth element diagram for breccia 10074 compared with soil 10084 (data from Wiesmann et al. 1975).



References for 10074

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

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.