12061

Ilmenite Basalt

9.5 grams

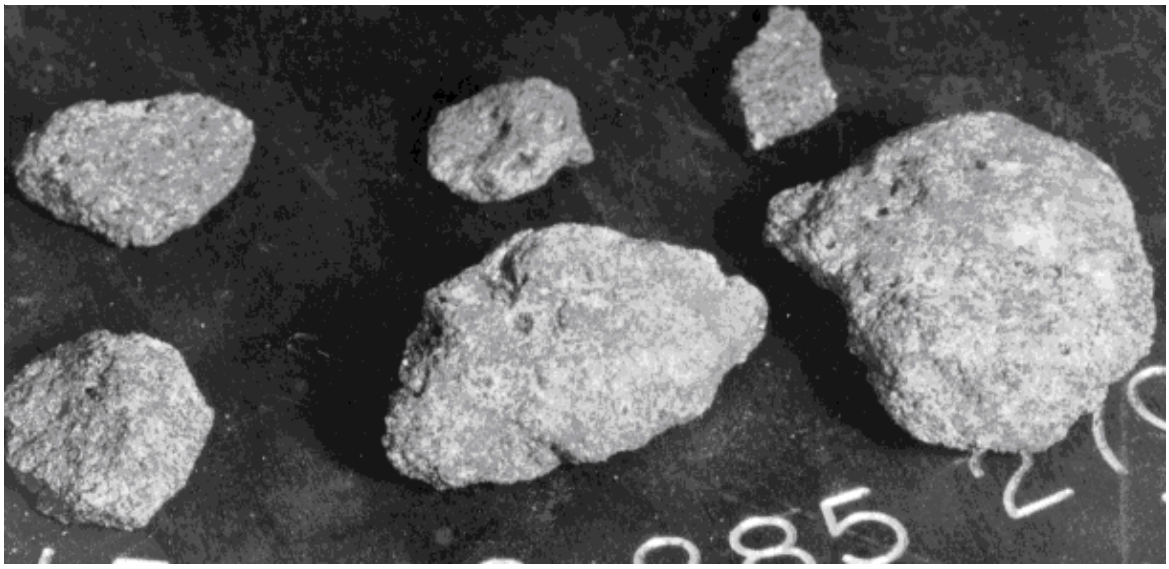

Figure 1: PET photo of 12061 showing several pieces. Note center piece has large zap pit. No scale. NASA # S69-61659.

Introduction

12061 is an ilmenite basalt with medium-grained ophitic to subophitc texture with high percentage of pyroxene. It has not been dated.

Petrography

Neal et al. (1994) show a picture of the texture of 12061 (figure 2) and give mineral analyses. In an appendix to their paper, they describe some olivine phenocrysts (Fo_{66}) as cores to pyroxene phenocrysts (<1.8 mm). Groundmass includes laths of plagioclase (1 mm), pyroxene, ilmenite, tridymite, glass with minute anhedral ulvöspinel, troilite and metal.

Mineralogy

Olivine: Olivine with a wide range of composition Fo_{66-30} is found as cores to pyroxene phenocrysts.

Pyroxene: The pyroxene quadrilateral is shown in figure 3.

Plagioclase: Plagioclase laths are An_{91-87}.

Metal: The metal grains in 12061 were analyzed by Neal et al. (1994) (figure 4).

Chemistry

The chemical composition of 12061 is given in table 1 and figure 5 and 6.

Radiogenic age dating

No age data.

There are 2 thin sections.

List of Photo #s for 12061

S69-61659 group

Mineralogical Mode for 12061

	Neal et al. 1994
Olivine	0.2
Pyroxene	64.6
Plagioclase	24.8
Ilmenite	4.2
Chromite +Usp	2.8
mesostasis	2.5
"silica"	0.5

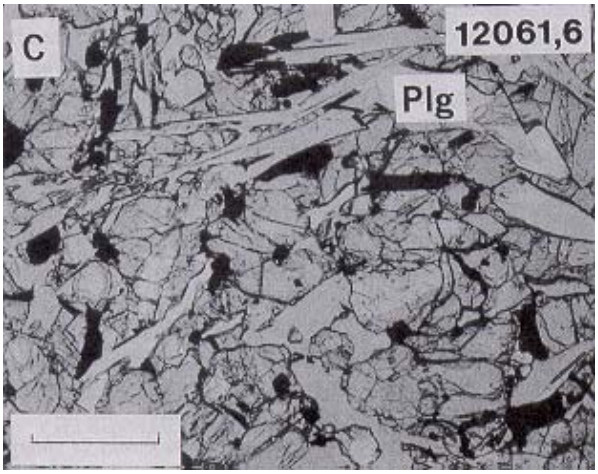

Figure 2: Photomicrograph of thin section of 12061,6. Scale is 0.5 mm. From Neal et al. 1994.

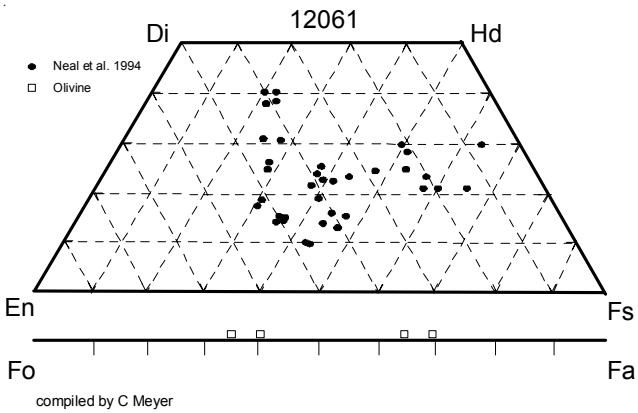

Figure 3: Olivine and pyroxene composition of 12061 (from Neal et al. 1994).

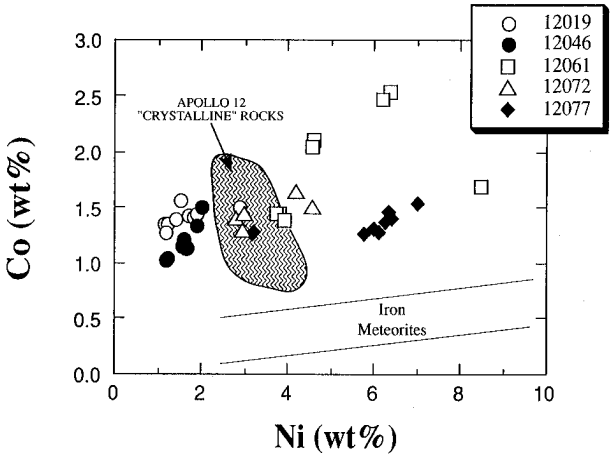

Figure 4: Ni and Co content of iron grains in 12061 and other Apollo 12 samples (from Neal et al. 1994).

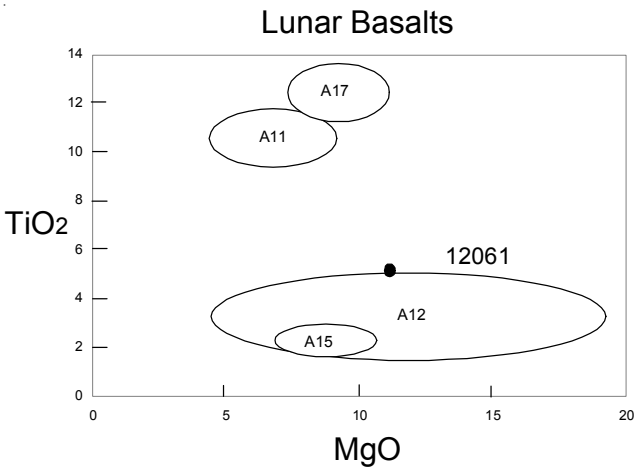

Figure 5: Composititon of 12065 compared with other lunar basalts.

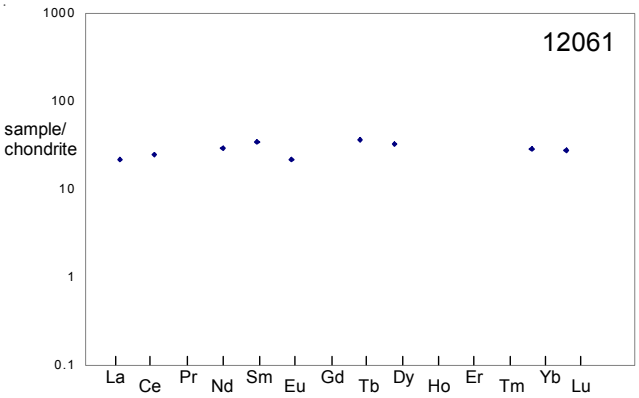

Figure 6: Normalized rare-earth-element composition of 12061 (data from Neal et al. 1994).

Table1. Chemical composition of 12061.

reference	Neal94	
weight	0.56 g	
SiO2 %		
TiO2	4.9	(a)
Al2O3	8.8	(a)
FeO	21.9	(a)
MnO	0.274	(a)
MgO	11.6	(a)
CaO	9.1	(a)
Na2O	0.276	(a)
K2O	0.057	(a)
P2O5		
S %		
sum		
Sc ppm	60.8	(a)
V	158	(a)
Cr	3210	(a)
Co	45.8	(a)
Ni	48	(a)
Cu		
Zn		
Ga		
Ge ppb		
As		
Se		
Rb		
Sr	149	(a)
Y		
Zr		
Nb		
Mo		
Ru		
Rh		
Pd ppb		
Ag ppb		
Cd ppb		
In ppb		
Sn ppb		
Sb ppb		
Te ppb		
Cs ppm		
Ba		
La	5.2	(a)
Ce	15.1	(a)
Pr		
Nd	13.4	(a)
Sm	5.2	(a)
Eu	1.25	(a)
Gd		
Tb	1.35	(a)
Dy	8.1	(a)
Ho		
Er		
Tm		
Yb	4.7	(a)
Lu	0.69	(a)
Hf	3.6	(a)
Ta	0.49	(a)
W ppb		
Re ppb		
Os ppb		
Ir ppb		
Pt ppb		
Au ppb		
Th ppm	0.56	(a)
U ppm		
technique	*(a) INAA*	

References for 12061

James O.B. and Wright T.L. (1972) Apollo 11 and 12 mare basalts and gabbros: Classification, compositional variations and possible petrogenetic relations. *Geol. Soc. Am. Bull.* **83**, 2357-2382.

LSPET (1970) Preliminary examination of lunar samples from Apollo 12. *Science* **167**, 1325-1339.

Neal C.R., Hacker M.D., Snyder G.A., Taylor L.A., Liu Y.-G. and Schmitt R.A. (1994a) Basalt generation at the Apollo 12 site, Part 1: New data, classification and re-evaluation. *Meteoritics* **29**, 334-348.

Neal C.R., Hacker M.D., Snyder G.A., Taylor L.A., Liu Y.-G. and Schmitt R.A. (1994b) Basalt generation at the Apollo 12 site, Part 2: Source heterogeneity, multiple melts and crustal contamination. *Meteoritics* **29,** 349-361.