

71155**High-Ti Mare Basalt****26.15 g, 5 x 2.5 x 2.5 cm****INTRODUCTION**

71155 (Fig. 1) was described as a dark gray, intergranular basalt (Apollo 17 Lunar Sample Information Catalog, 1973). It contains a few zap pits on S, E, W, and T. Approximately 30% cavities are present, about 55% of which are vugs (up to 5mm) and 45% are vesicles (up to 3mm). Vesicles are particularly abundant on B and W. Some vesicles are lined with ilmenite and some with all minerals of this rock. Metal spherules are present in a few vesicles. About the top third of N and all of B and S display discoloration and rounding of the edges. All other

surfaces are freshly broken. This sample has an irregular shape and was collected from Station IA.

PETROGRAPHY AND MINERAL CHEMISTRY

Brown et al. (1975ab) described 71155 as a Type IA Apollo 17 ilmenite basalt in their petrographic classification. Consequently, the petrography and mineral chemistry are only described within the general confines of this classification, and only the range in olivine composition has been reported (F067.74). However, the modal

mineralogy was reported, demonstrating that 71155 is comprised of 6.1% olivine, 18.4% opaques, 23.3% plagioclase, 49.3% clinopyroxene, and 2.9% silica. Also, the composition of a "new" Zr-rich mineral found in 71155 was reported by these authors (Table 1).

During the preparation of this catalog, we examined thin sections 71155,28 and,29.71155 is a fine-grained (0.1-0.2mm) basalt containing olivine (up to 0.4mm) and ilmenite (up to 1mm long). Ilmenite exhibits "sawtooth" margins. Crulvospinel is usually present (~0.1mm) as inclusions in olivine,



Figure 1: Hand specimen photograph of 71155,0, from which two pieces have broken off
Cubic scale = 1 cm³.

occasionally rimmed by ilmenite (E1 Goresy et al., 1977). Discrete Cr-ulvospinel are also present, again displaying ilmenite rims (E1 Goresy et al., 1977). The reverse zoning of these spinels was attributed to subsolidus equilibration with ilmenite by El Goresy et al. (1977). Pyroxene and plagioclase are intergrown into "bowtie" structures. Silica, native Fe, and troilite form interstitial phases.

WHOLE-ROCK CHEMISTRY

The major and trace element chemistry (Table 2) of the same sub-sample was reported by Ma et al. (1979) and Warner et al. (1979). Rancitelli et al. (1974) reported the major element composition of 71155. Warner et al. (1979) described 71155 as a Type B Apollo 17 high-Ti basalt, containing 10.1 wt% TiO₂ with a MG# of 42.7. However, Rancitelli et al. (1974) reported a TiO₂ content of 13.00 wt% and a MG# of 43.6 71155 is further classified as a Type B2 Apollo 17

basalt using the criteria of Neal et al. (1990). The REE profile (Fig. 2) is LREE-depleted, with approximately constant HREE abundances at 30-35 times chondrite values. A negative Eu anomaly is present ($[Eu/Eu^*]_N = 0.52$). Determination of other radionuclide abundances have been made by Fruchter et al. (1975) and LSPET (1973).

ISOTOPES

All isotopic studies undertaken on 71155 to date have centered on the cosmic-ray induced radionuclides (LSPET, 1973; Keith et al., 1974ab; Rancitelli et al., 1974ab; Yokoyama et al., 1974). These data are presented in Table 3.

PROCESSING

Of the original 26.15g of 71155,0, a total of 21.88g remains. 71155,31 was irradiated for INAA and thin

section 71155,33 taken from this sub-sample. Other thin sections (71155,28-30) were taken from 71155,3.

Table 1: The Zr-rich mineral found in 71155,30.

Data from Brown et al. (1975).

71155,30	
SiO ₂ (wt %)	0.47
TiO ₂	5.86
Al ₂ O ₃	0.39
FeO	2.78
MnO	0.34
MgO	0.12
CaO	0.79
Na ₂ O	0.02
ZrO ₂	85.10
Cr ₂ O ₃	0.26
Y ₂ O ₃	1.74
Nb ₂ O ₃	0.20
RE ₂ O ₃	1.52
HfO ₂	0.81
TOTAL	100.10

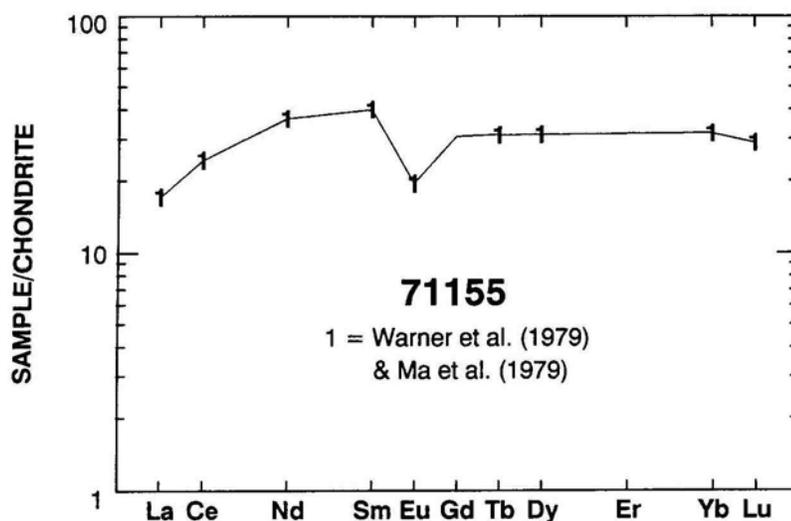


Figure 2: Chondrite-normalized rare earth element plot for 71155. The same analysis was reported by Ma et al. (1979) and Warner et al. (1979).

Table 2: Whole-rock chemistry of 71155.

	Sample 71155,31 Ref. 1 Method N	Sample 71155,0 Ref. 2 Method X
SiO ₂ (wt %)		37.19
TiO ₂	10.1	13.0
Al ₂ O ₃	9.2	8.68
Cr ₂ O ₃	0.488	
FeO	19.1	19.67
MnO	0.246	0.28
MgO	8	8.53
CaO	10.8	10.43
Na ₂ O	0.353	0.32
K ₂ O	0.048	0.036
P ₂ O ₅		0.092
S		0.18
Nb (ppm)		
Zr		
Hf	6.3	
Ta	1.3	
U		
Th		
W		
Y		
Sr		
Rb		
Li		
Ba		
Cs		
Be		
Zn		
Pb		
Cu		
Ni		
Co	23	
V	118	
Sc	81	
La	5.6	
Ce	21	
Nd	23	

Table 2: (Concluded).

	Sample 71155,31 Ref. 1 Method N	Sample 71155,0 Ref. 2 Method X
Sm	8.1	
Eu	1.49	
Gd		
Tb	1.8	
Dy	12	
Er		
Yb	6.9	
Lu	0.97	
Ga		
F		
Cl		
C		
N		
H		
He		
Ge (ppb)		
Ir		
Au		
Ru		
Os		

References: 1 = Warner et al. (1979); 2 = Rancitelli et al. (1974).
 Analysis by: N = INAA, X = XRF.

Table 3: Concentrations of Primordial Radioelements and Cosmogenic Radionuclides in 71155.
Cosmogenic Radionuclide Decay corrected to 2300 GMT, Dec.14,1972.

Sample Ref.	71155,0 1	71155,0 2	71155 3	71155,0 4	71155,0 4
K(ppm)		< 450			
K (%)	0.045 ± 0.012		0.040 ± 0.003	< 0.030	0.039 ± 0.003
Th (ppm)	0.29 ± 0.05	0.29 ± 0.05	0.31 ± 0.06	0.29 ± 0.05	0.31 ± 0.08
U (ppm)	0.13 ± 0.02	0.13 ± 0.02	0.118 ± 0.017	0.13 ± 0.02	0.109 ± 0.018
Th/U	2.20 ± 0.51	2.23	2.6	2.2 ± 0.5	2.8 ± 0.9
K/U	3460 ± 1070	< 3460	3400		3600 ± 700
²⁶ Al(dpm/Kg)		105 ± 4	105 ± 8	105 ± 4	93 ± 17
²² Na		112 ± 4	119 ± 11	112 ± 4	112 ± 24
⁵⁴ Mn		227 ± 30	160 ± 20	227 ± 40	160 ± 80
⁵⁶ Co		310 ± 20	310 ± 50	310 ± 20	280 ± 70
⁶⁰ Co		< 4.4		< 4	
⁴⁶ Sc		80 ± 4	81 ± 7	80 ± 4	81 ± 7
⁴⁸ V		< 60			

References: 1 = Fruchter et al. (1975); 2 = Rancitelli et al. (1974); 3 = Keith et al. (1974); 4 = Apollo 17 Preliminary Science Report (1973).