

**72155****Basalt****238.5 g, 7 x 5 x 4 cm****INTRODUCTION**

72155 was described as a brownish gray, blocky to angular basalt containing no penetrative fractures (Apollo 17 Lunar sample Information catalog, 1973). A few zap pits are present on E, W, B, with many present on S and T (Fig. 1). The fabric was described as porphyritic with scarce olivine phenocrysts with the surface being hackly. Approximately 10% of the surface contains cavities as vugs and vesicles ranging from 1 x 2 cm to <1 mm. Vesicles have projecting crystals and linings of pyroxene and ilmenite. Extremely well developed flat black and gold hexagonal plates occur in the larger cavities. Some of these

crystals are up to 1 mm in diameter and have grown parallel to the cavity wall.

**WHOLE-ROCK CHEMISTRY**

The whole-rock chemistry of 72155 has been reported by Laul et al. (1974), Boynton et al. (1975), Shih et al. (1975), Wanke et al. (1975) and Rhodes et al. (1976). The different analyses demonstrate that 72155 is a high-Ti basalt ( $\text{TiO}_2 = 12.1\text{-}12.3$  - Table 1). The MG# exhibits slight variation from = 44.5 (Wanke et al., 1975; Rhodes et al., 1976) to 46.4 (Laul et al., 1974). The reported REE concentrations are somewhat variable which translates to variable profiles

(Fig. 2). However, all are LREE-depleted, with a maximum in the MREE. All have a negative Eu anomaly  $[(\text{Eu}/\text{u}^*)_{\text{N}} = 0.49\text{-}0.561]$ . Gibson et al. (1976) reported a whole-rock sulphur analysis for 72155 of  $1800 \pm 60$  ugS/g. Nyquist et al. (1975) reported Rb and Sr whole-rock compositions for 72155,23 of 0.612 ppm and 180 ppm, respectively. Nunes et al. (1974) reported the whole-rock U, Th, and Pb concentrations for 72155 as being 0.1182 ppm, 0.3879 ppm, and 0.2589 ppm, respectively. Eldridge et al. (1975) reported the K, Th, and U whole-rock concentrations of 72155,1 as being 495 ppm, 0.34 ppm, and 0.11 ppm, respectively.

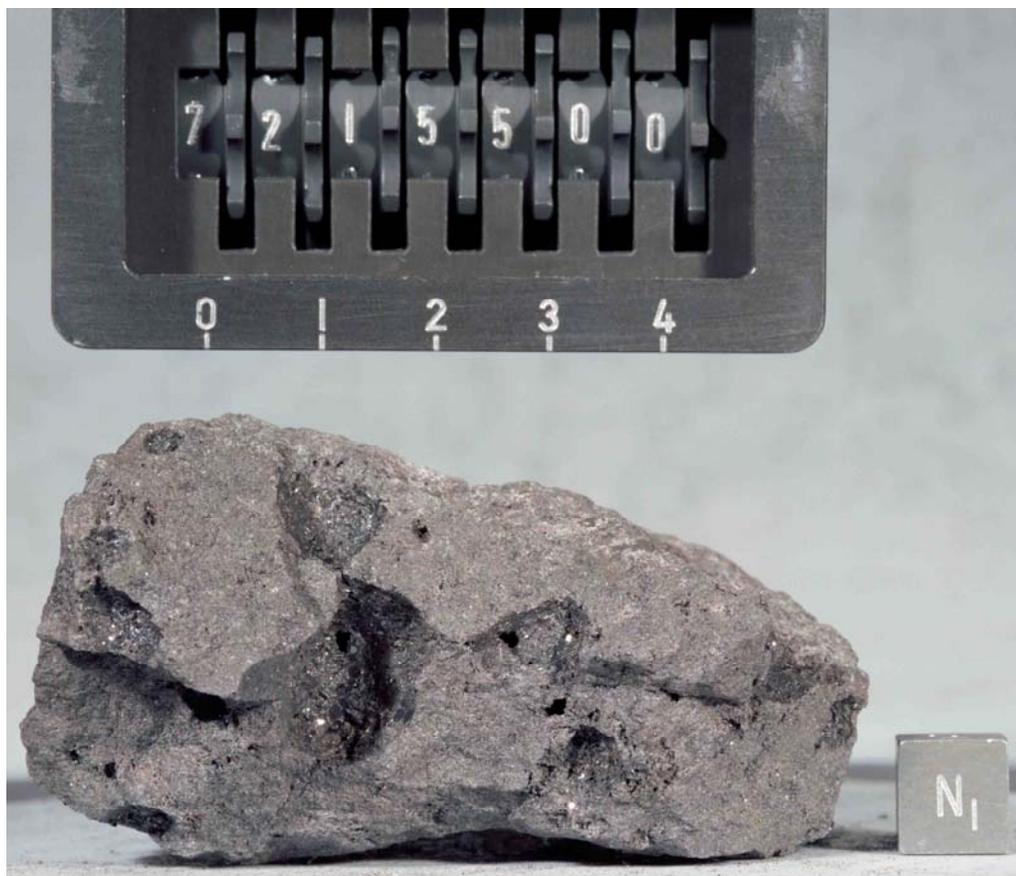


Figure 1: Sample 72155.

Table 1: Whole-rock chemistry of 72155

	Sample ,29 Method N Reference 1	Sample ,31 Method N,R Reference 2	Sample ,31 Method N,R Reference 2	Sample ,23 Method I,N Reference 3	Sample ,30 Method X,N,R Reference 4	Sample ,23 Method X Reference 5
SiO <sub>2</sub>					39.4	38.67
TiO <sub>2</sub>	12.1	12.3			12.2	12.32
Al <sub>2</sub> O <sub>3</sub>	8.0	8.88	8.50		8.54	8.64
Cr <sub>2</sub> O <sub>3</sub>	0.440	0.41	0.45		0.47	0.43
FeO	18.6	17.4	18.5		19.4	18.77
MnO	0.234	0.25	0.26		0.25	0.28
MgO	9				8.7	8.47
CaO	10.4	9.24	10.9		10.4	10.69
Na <sub>2</sub> O	0.40	0.81	0.8		0.77	0.4
K <sub>2</sub> O	0.072			0.07	0.07	0.07
P <sub>2</sub> O <sub>5</sub>					0.071	0.05
S (ppm)					1350	
Nb					22	
Zr				263	271	
Hf	8.7	8.6	9.0		8.82	
Ta	1.6		2.2		1.78	
U	0.3			0.126		
Th						
W						
Y					93	
Sr				186	195	
Rb				0.612		
Li				9.4	8.3	
Ba	90		100	82.2	85	
Cs						
Be						
Zn						
Pb						
Cu						
Zn		2.3	2.1			
Ni		1.9	1.0			
Co	20	20	20	19.1	19.5	
V	100					
Sc	80	77	80	81.4	84	
Cr	3010				3200	
La	7.2	6.5	7.3	11.4	7.08	
Ce	26	33	35	22.8	27.5	

Table 1: (Concluded).

	Sample ,29 Method N Reference 1	Sample ,31 Method N,R Reference 2	Sample ,31 Method N,R Reference 2	Sample ,23 Method I,N Reference 3	Sample ,30 Method X,N,R Reference 4	Sample ,23 Method X Reference 5
Nd	32			25.3	28	
Sm	10.2	10.2	11.2	10.5	10.8	
Eu	2.00	2.00	2.10	2.10	2.19	
Gd				16.6		
Tb	3.0	2.1	2.8		2.7	
Dy	18		16	18.8	20.5	
Er				11.1		
Yb	10	9.5	10.4	9.85	10.7	
Lu	1.5	1.37	1.48		1.44	
Ga		4.78	5.37			
F					49	
Cl					3.5	
Br					0.011	
C						
N						
H						
He						
Ge (ppb)		≤13	≤16			
Cd		1.0	2.5			
Te			0.14			
Ag						
Sb						
Ir						
As						
Au		0.082	0.34			
Ru						
Os						

Analysis by: N = INAA; X = X-ray fluorescence; R = RNAA; I = isotope dilution.

References: 1 = Laul et al. (1974); 2 = Boynton et al., (1975); 3 = Shih et al., (1975); 4 = Wänke et al. (1975); 5 = Rhodes et al. (1976).

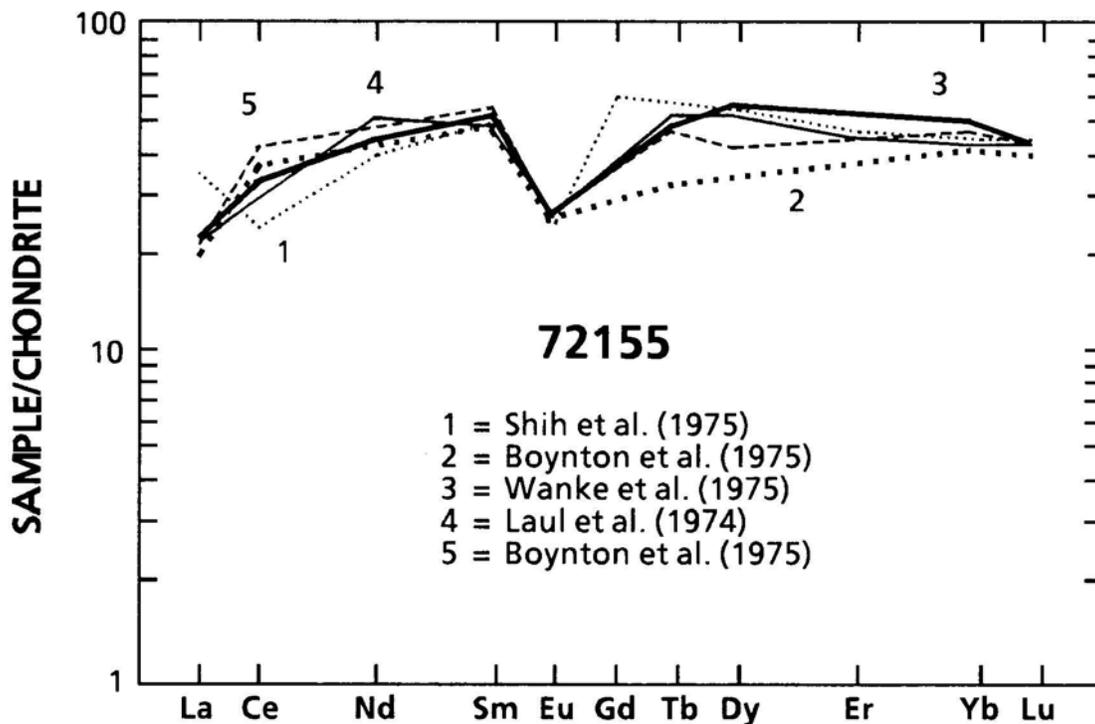


Figure 2: Rare-earth element profiles reported for 72155.

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### RADIOGENIC ISOTOPES

Nyquist et al. (1975) reported a whole-rock Sr isotope composition for 72155,23:  $^{87}\text{Rb}/^{86}\text{Sr} = 0.0098 \pm 3$ ;  $^{87}\text{Sr}/^{86}\text{Sr} = 0.69982 \pm 5$ . Model ages on the basis of BABI plus JSC bias (assuming  $I = 0.69910$ ) and of the Apollo 16 anorthosites at 4.6 Ga ( $I = 0.69903$ ) were reported as  $5.1 \pm 0.5$  and  $5.6 \pm 0.5$ . Nunes et al. (1974) reported a whole-rock lead isotope composition of 72155 as part of a study of Apollo 17 rock and soil samples. The results are presented in Table 2.

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### STABLE ISOTOPES

The oxygen isotope composition of 72155 was reported by Mayeda et al. (1975). These authors analyzed the  $s^{18}\text{O}$  of the individual minerals and included 72155,37 in a study of the whole moon  $s^{18}\text{O}$  composition. Results are presented in Table 3.

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### COSMOGENIC RADIONUCLIDES AND EXPOSURE AGES

Eldridge et al. (1975) determined the cosmogenic

radionuclide concentrations of 72155,1 as part of their study of the Taurus-Littrow region. The results were presented as follows:  $^{22}\text{Na} = 68 \pm 5$ ,  $^{26}\text{Al} = 54 \pm 3$ , and  $^{54}\text{Mn} = 125 \pm 10$  respectively, with concentrations in dpm/kg.

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### PROCESSING

72155,0 has been entirely subdivided. The largest remaining sub-sample is ,1 (160.6g), followed by ,2 (12.29g). A total of twelve thin sections are available: ,41; 42,45; ,65-,67; ,75-,80.

Table 2: Pb isotope composition of 72155. Data from Nunes et al. (1974).

	72155	72155 <sup>P</sup>	72155 <sup>C*</sup>
<sup>232</sup> Th/ <sup>238</sup> U	3.39		
<sup>238</sup> U/ <sup>204</sup> Pb	452		
<sup>206</sup> Pb/ <sup>204</sup> Pb@		343.7	352.7
<sup>207</sup> Pb/ <sup>204</sup> Pb@		205.5	274.9
<sup>208</sup> Pb/ <sup>204</sup> Pb@		313.9	-
<sup>206</sup> Pb/ <sup>204</sup> Pb*		433.6	459.6
<sup>207</sup> Pb/ <sup>204</sup> Pb*		258.3	274.9
<sup>208</sup> Pb/ <sup>204</sup> Pb*		391.3	-
<sup>207</sup> Pb/ <sup>206</sup> Pb*		0.5957	0.5982
<sup>208</sup> Pb/ <sup>206</sup> Pb*		0.9025	-

P = composition data; C\* = concentration data with samples spiked prior to digestion.

@ = observed ratios with <sup>208</sup>Pb spike contribution subtracted from Pb concentration data.

\* = analytical total Pb blanks ranged from 0.59 to 1.96 ng.

Table 3: Oxygen isotope data (s<sup>18</sup>O in per mil) for 72155. Mayeda et al. (1975).

	Cristobalite	Plagioclase	Pyroxene	Ilmenite
72155,37	7.02*	5.78	5.22	3.97

\* = mixture of cristobalite and glass.