

15683 FINE-GRAINED OLIVINE-NORMATIVE ST. 9A 22.00 g
MARE BASALT

INTRODUCTION: 15683 is a fine-grained, olivine porphyritic mare basalt which is vuggy (Fig. 1). In chemistry it is an average-to-evolved Apollo 15 olivine-normative mare basalt. It has an ^{40}Ar - ^{39}Ar plateau age of 3.27 ± 0.06 b.y. The sample is coherent but with a few non-penetrative fractures. 15683 was collected as part of the rake sample from Station 9A.

PETROLOGY: 15683 is a fine-grained, olivine-phyric mare basalt (Fig. 2). The olivines are less than 1 mm across. Pyroxenes and small olivines are granular and partly enclosed by plagioclase, which are generally irregular laths up to 1 mm long. Cristobalite, fayalite, chromite, ulvospinel, and ilmenite are also present. Steele et al. (1980) reported analyses for minor elements made with the ion probe: 14 ppm Li, 1330 ppm Mg, 380 ppm K, 325 ppm Ti, 290 ppm Sr, and 20 ppm Ba for a composition of $\text{An}_{90.5}$. The data are similar to those of other mare basalts.



Figure 1. Pre-chip view of 15683. S-71-49887

CHEMISTRY: Bulk analyses are listed in Table 1 and the rare earths shown in Figure 3. The sample is an Apollo 15 olivine-normative basalt; the high Ti, the rare earths, and the low MgO indicate that it is a rather evolved variety.

RADIOGENIC ISOTOPES AND GEOCHRONOLOGY: Husain et al. (1972) reported an ^{40}Ar - ^{39}Ar plateau age of 3.27 ± 0.06 b.y., and a K-Ar age of 2.86 b.y. Husain (1974) presented the Ar stepwise-heating release isotopic data and revised the plateau age to 3.36 ± 0.03 b.y. Only 29% of the argon is released in the plateau region. 23% of the $^{40}\text{Ar}^*$ had been lost and the K-Ar age was 2.95 ± 0.07 b.y.

RARE GAS AND EXPOSURE: Husain et al. (1972) reported a ^{38}Ar -Ca exposure age of 290 ± 19 m.y., revised to 310 ± 14 m.y. by Husain (1974) in which the Ar stepwise heating release isotopic data are tabulated.

PROCESSING AND SUBDIVISIONS: Chipping produced pieces ,1 to ,4. ,2 was used to produce thin sections ,2 and ,8. Other chips were used for chemical and isotopic analyses. ,0 is now 19.25 g.

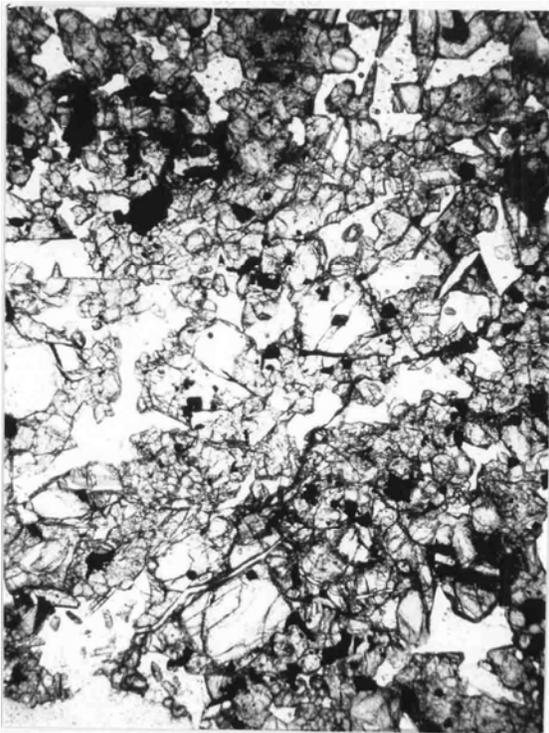


Fig. 2a



Fig. 2b

Figure 2. Photomicrographs of 15683,8. Widths about 3 mm.
a) transmitted light; b) crossed polarizers.

TABLE 15683-1. Bulk rock chemical analyses

		,4	,3
Wt %	SiO ₂	45.8	
	TiO ₂	2.91	
	Al ₂ O ₃	8.04	
	FeO	22.8	
	MgO	9.60	
	CaO	9.37	9.2
	Na ₂ O	0.297	
	K ₂ O	0.053	0.041
	P ₂ O ₅		
	(ppm)	Sc	40.5
V			
Cr		3970	
Mn		2130	
Co		49	
Ni			
Rb		0.8	
Sr			
Y			
Zr			
Nb			
Hf		2.5	
Ba			
Th			
U			
Pb			
La		5.26	
Ce		14.6	
Pr			
Nd		11.1	
Sm		4.20	
Eu		0.98	
Gd		5.6	
Tb		0.93	
Dy		5.96	
Ho		1.06	
Er		2.9	
Tm			
Yb		2.44	
Lu		0.362	
Li			
Be			
B			
C			
N			
S			
F			
Cl			
Br			
Cu			
Zn	3(a)		
(ppb)	I		
	At		
	Ga	4100	
	Ge		
	As		
	Se		
	Mo		
	Tc		
	Ru		
	Rh		
	Pd		
	Ag		
	Cd		
	In		
	Sn		
	Sb		
	Te		
	Cs	38	
	Ta		
	W		
	Re		
	Os		
	Ir		
	Pt		
Au			
Hg			
Tl			
Bi			

References and methods:

- (1) Helmke *et al.* (1973); INAA, RNAA, AAS.
- (2) Husain (1974); Ar-isotopes, irradiation.

Notes:

(a) ± 1 ppm

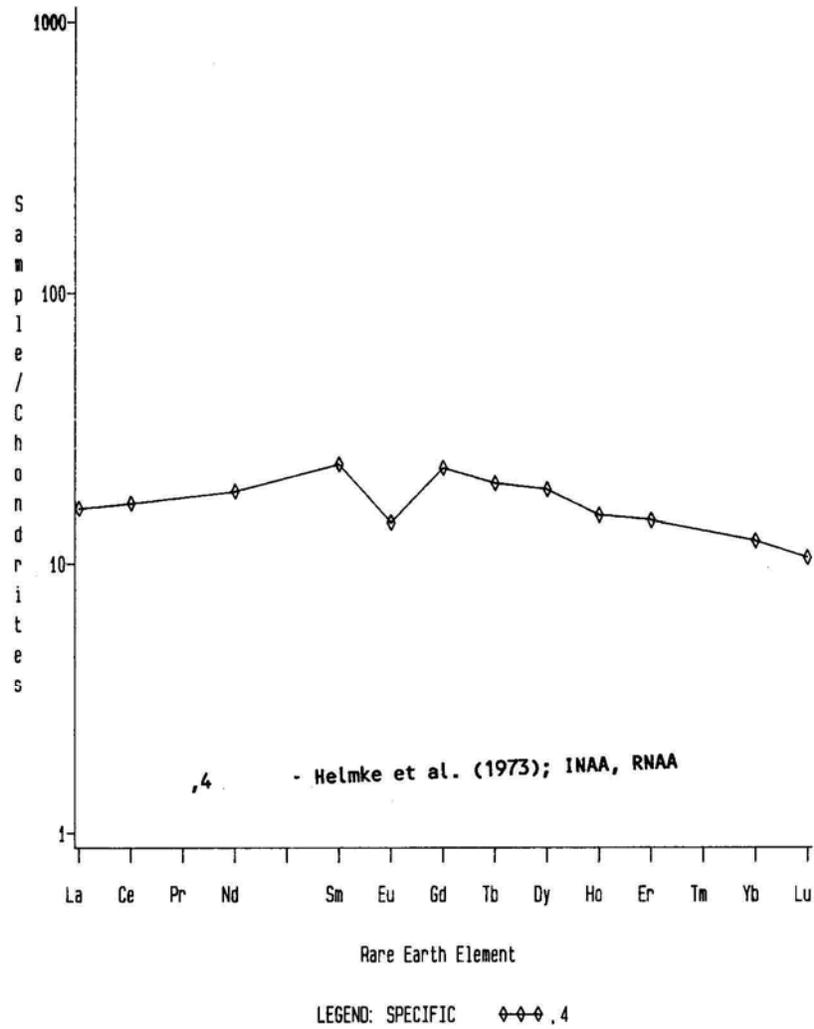


Figure 3. Rare earths in 15683.

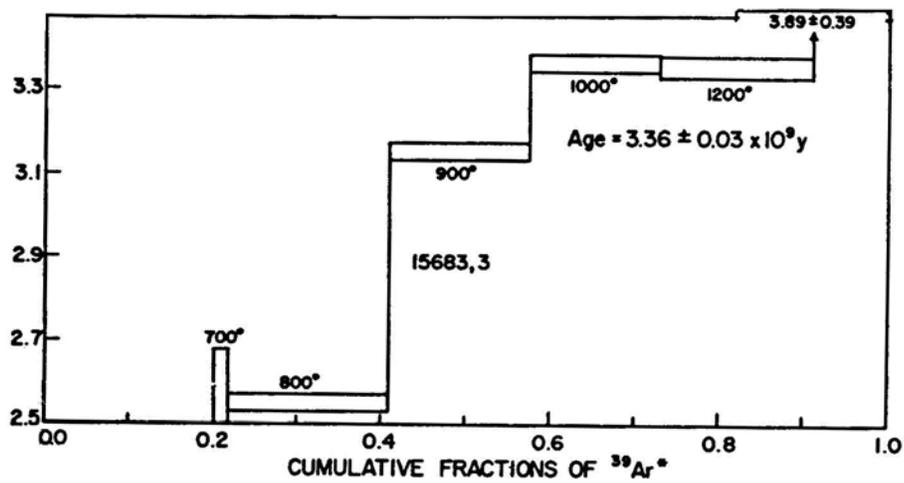


Figure 4. ^{40}Ar - ^{39}Ar plateau age for 15683 (Husain, 19741).