

15649 FINE-GRAINED OLIVINE-NORMATIVE ST. 9A 6.20 g
MARE BASALT

INTRODUCTION: 15649 is a fine-grained, olivine-bearing mare basalt which is not vesicular and has few vugs (Fig. 1). Like 15648 it is pale-colored, but is not brecciated or melted; it does appear to be shocked-fractured. Small yellow-green olivines are visible macroscopically. In chemistry the sample is an average member of the Apollo 15 olivine-normative mare basalt group. 15649 was collected as part of the rake sample at Station 9A.

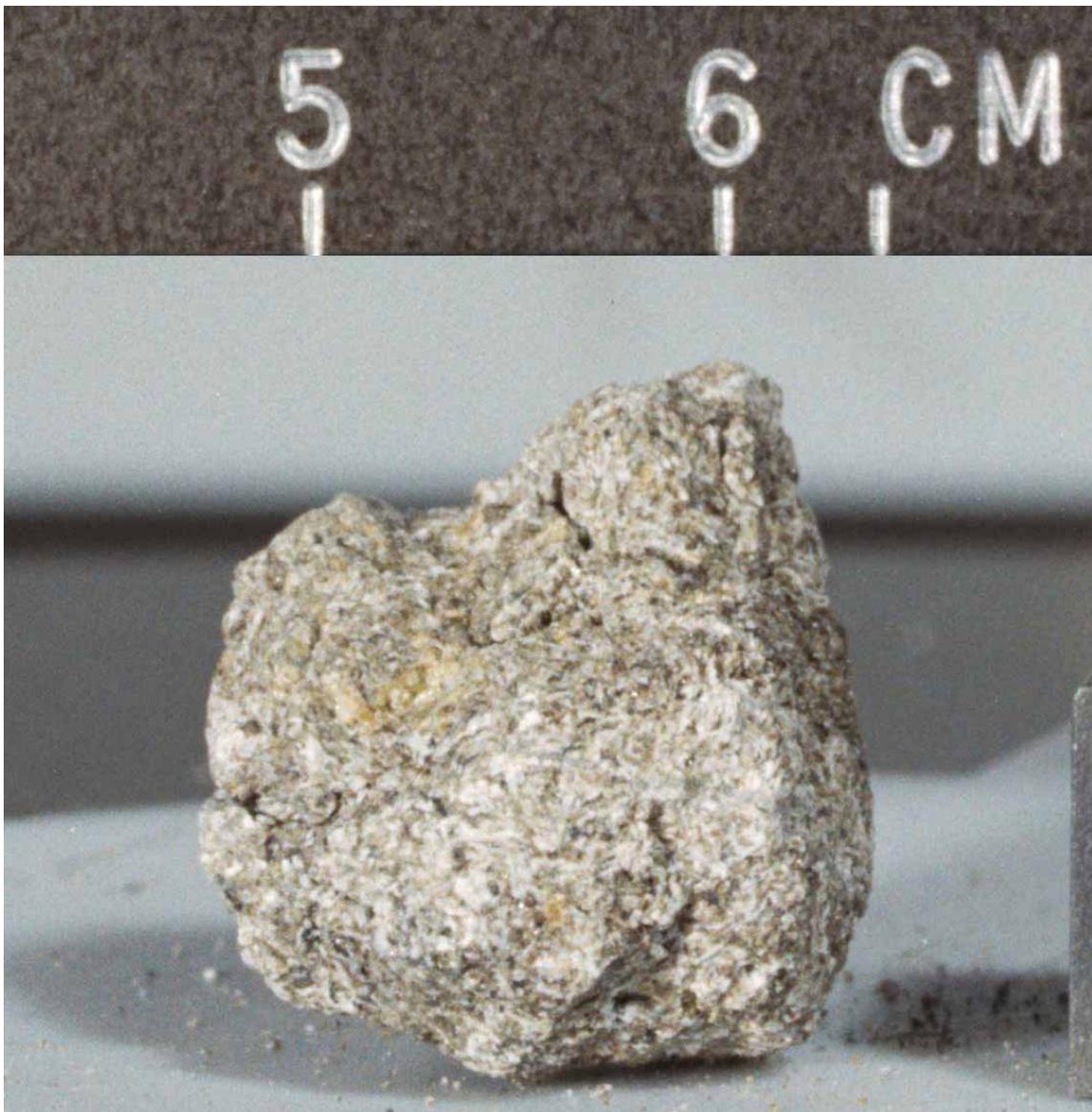


Figure 1. Pre-chip view of 15649. S-71-49587

PETROLOGY: 15649 is a moderately fine-grained, subophitic, olivine-bearing mare basalt (Fig. 2). It appears to be shock-fractured. Pyroxenes and plagioclases are generally less than half a millimeter long; the plagioclases form stubby crystals. The olivines are up to about 1 mm and some are zoned and phenocrystic, but many are smaller. Fayalite is present but cristobalite is rare to absent. Opaque phases include chromite, ulvospinel, ilmenite, Fe-metal (rare), and troilite. Ma et al. (1978) referred to 15649 as an olivine microgabbro. Steele et al. (1972a) plotted the compositions of plagioclases: An_{93-89} and Fe of 0.4 to 0.6%, similar to Apollo 12 and other Apollo 15 mare basalt plagioclases.

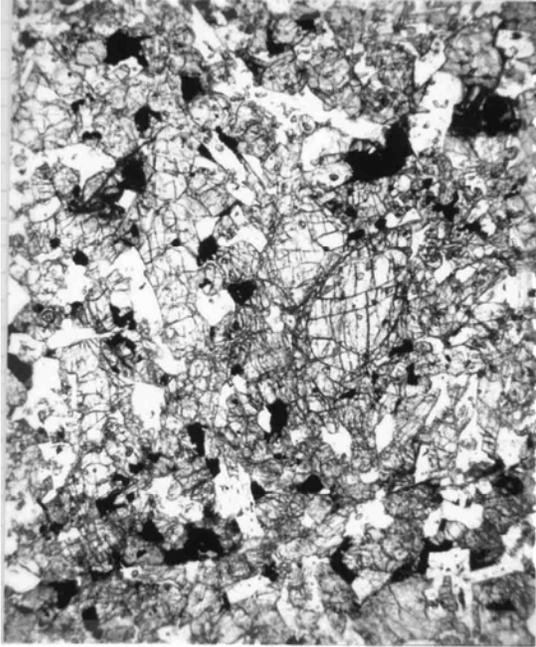


Fig. 2a

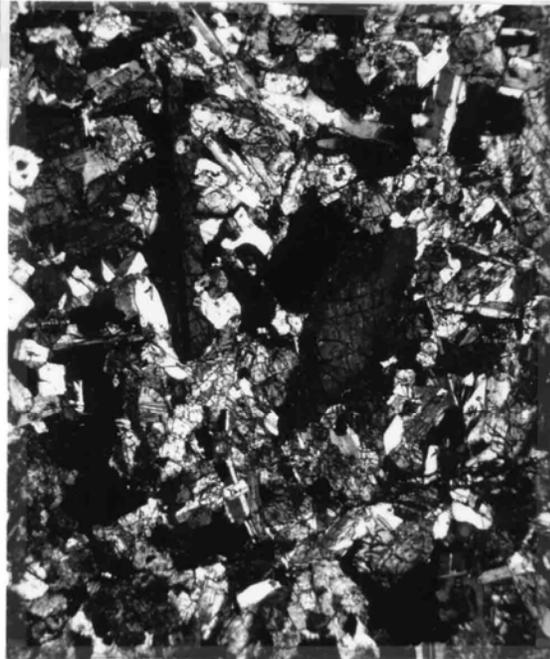


Fig. 2b

Figure 2. Photomicrographs of 15649,6. Widths about 3 mm. a) transmitted light; b) crossed polarizers.

CHEMISTRY: A bulk chemical analysis (Table 1, Fig. 3) shows 15649 to be a fairly average member of the Apollo 15 olivine-normative mare basalt group, perhaps Mg-enriched but the Mg is imprecisely determined. The composition is very similar to 15648.

PROCESSING AND SUBDIVISIONS: In 1971, chipping produced ,1 (several chips) and ,2 (single chip). ,2 was used to make thin sections ,4 and ,6. In 1977, two chips (,10) were removed from ,1 (leaving it mainly as small chips and fines) and used for chemical analysis and to make thin section ,12. ,0 is now 4.42 g.

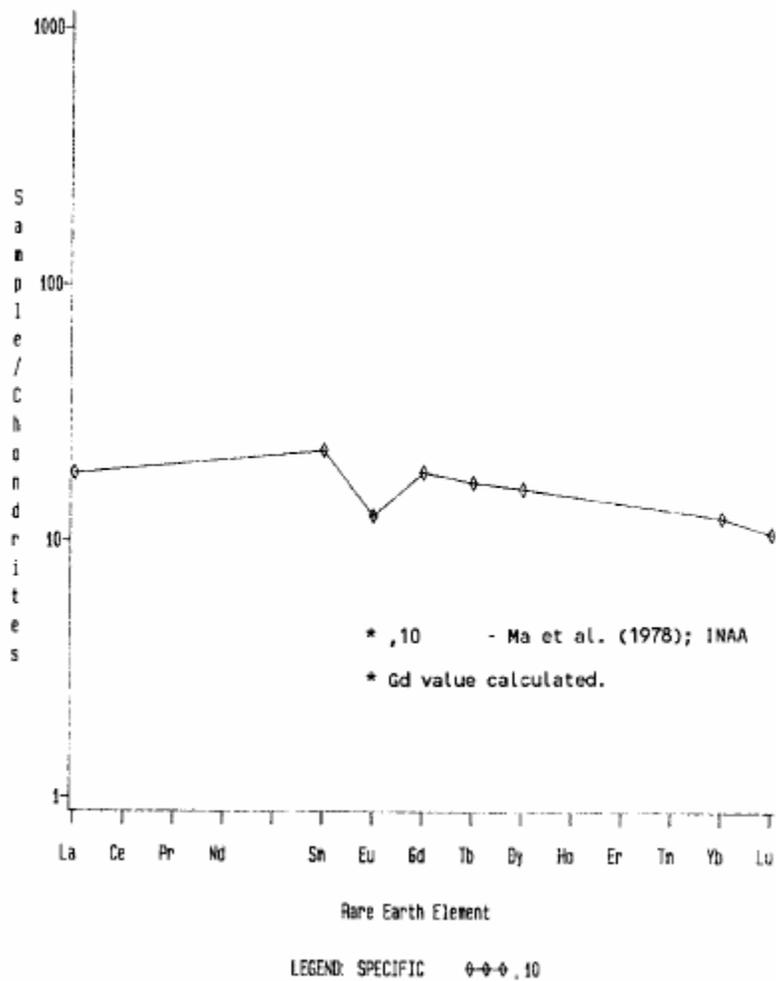


Figure 3. Rare earths in 15649.

TABLE 15649-1. Bulk rock chemical analysis

		.10
Wt %	SiO ₂	
	TiO ₂	2.2
	Al ₂ O ₃	9.1
	FeO	21.7
	MgO	12
	CaO	9.1
	Na ₂ O	0.255
	K ₂ O	0.042
	P ₂ O ₅	
(ppm)	Sc	38
	V	174
	Cr	3590
	Mn	2015
	Co	46
	Ni	20(a)
	Rb	
	Sr	
	Y	
	Zr	
	Nb	
	Hf	2.8
	Ba	70(b)
	Th	
	U	
	Pb	
	La	6.1
	Ce	
	Pr	
	Nd	
	Sm	4.1
	Eu	0.87
	Gd	
	Tb	0.8
	Dy	5.1
	Ho	
	Er	
	Tm	
	Yb	2.5
	Lu	0.37
	Ll	
Be		
B		
C		
N		
S		
F		
Cl		
Br		
Cu		
Zn		
(ppb)	I	
	At	
	Ga	
	Ge	
	As	
	Se	
	Mo	
	Tc	
	Ru	
	Rh	
	Pd	
	Ag	
	Cd	
	In	
	Sn	
	Sb	
	Te	
	Cs	
	Ta	480
	W	
	Re	
	Os	
	Ir	
Pt		
Au		
Hg		
Tl		
Pb		

(1)

References and methods:

(1) Ma et al. (1978); INAA

Notes:

(a) +20 ppm
(b) +5 ppm