15669 FINE-GRAINED OLIVINE-NORMATIVE MARE BASALT ST. 9A 4.40 g

INTRODUCTION: 15669 is a fine-grained, olivine-porphyritic mare basalt which is vesicular (Fig. 1). The olivines are small but visible macroscopically. In chemistry, the sample is an average Apollo 15 olivine-normative mare basalt. Most surfaces are fresh with part of the "N" face apparently exposed. 15669 was collected as part of the rake sample from Station 9A.

PETROLOGY: 15669 is a fine-grained, vesicular basalt which is olivine-phyric (Fig. 2). The texture, grain size, mode, and mineral chemistry are very similar to 15665. Dowty et al. (1973b) reported a mode of 59% pyroxene, 20% plagioclase, 10% olivine, 7% opaques, 4% miscellaneous, and no silica phase. Dowty et al. (1973a) adjusted this slightly to 60% pyroxene and 3% miscellaneous. They noted the amoeboid, corroded, resorbed olivines and that the ilmenites were patchy and skeletal. Dowty et al. (1973c) tabulated microprobe analyses of Fe-metal, olivines, pyroxenes, and plagioclases; and Nehru et al. (1973) tabulated microprobe analyses of spinel group minerals and ilmenites. Nehru et al. (1974) listed a representative chromite analysis and noted that resorbed and rounded chromite grains without mantles of ulvospinel were present. The limited mineral chemical data (Fig. 3) is similar to that for 15665 and other fine-grained Apollo 15 olivine-normative mare basalts.

CHEMISTRY: A bulk chemical analysis by Ma et al. (1978) (Table 1, Fig. 4) shows that 15669 is an average member of the Apollo 15 olivine-normative mare basalt group. A defocussed beam microprobe analysis by Dowty et al. (1973a,b) (Table 2) has similar magnesium but appears to be anomalously high in FeO and TiO_2 and low in Al_2O_3.

PROCESSING AND SUBDIVISIONS: Single chips ,1 and ,2 were taken from the "N" end. Thin sections ,3; ,7; and ,8 were made from daughters of ,2. ,1 was further subdivided to produce material for chemical analysis and is now small chips. ,0 is now 3.21 g.

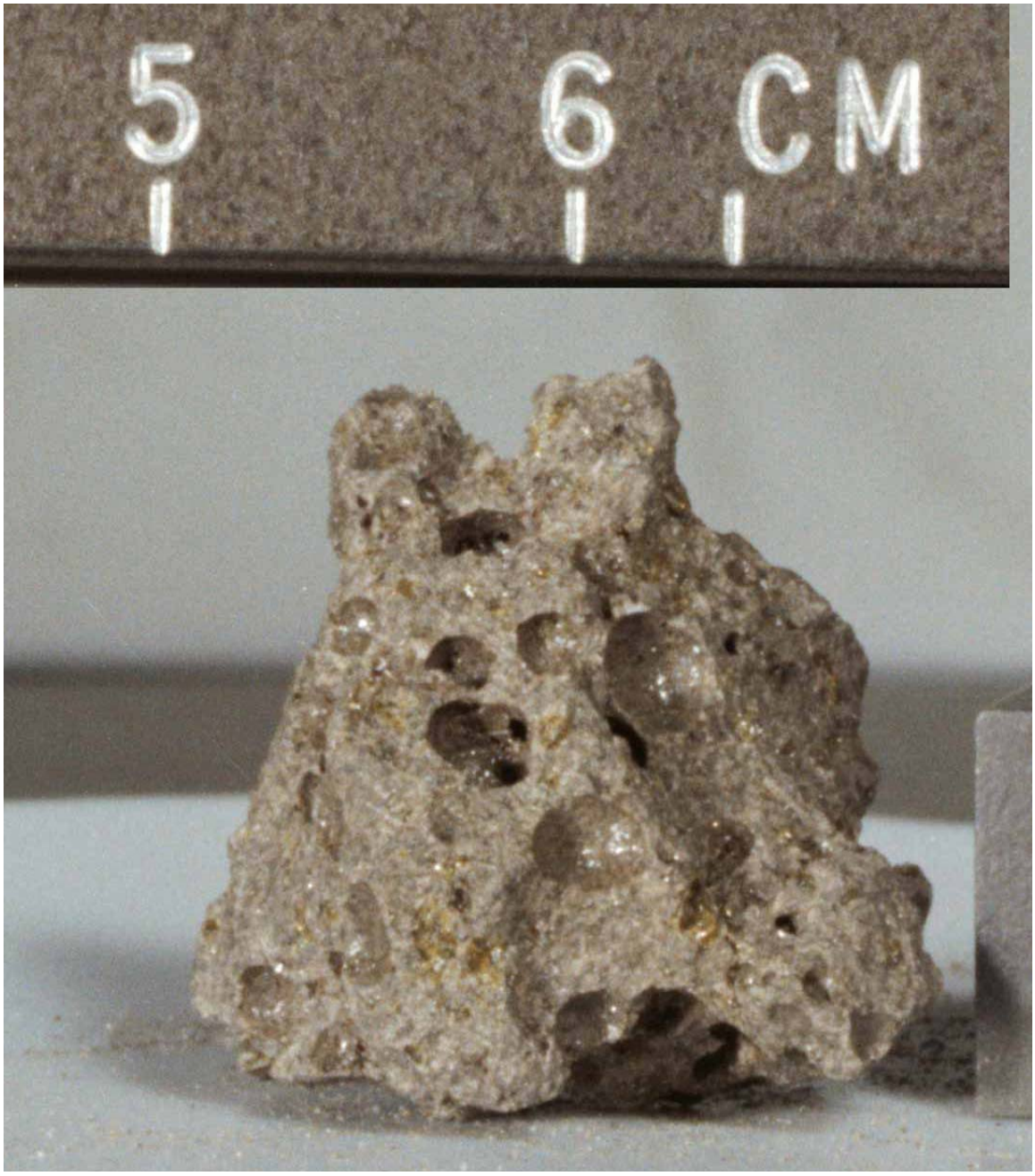

Figure 1. Pre-chip view of 15669. S-71-49545

Fig. 2a

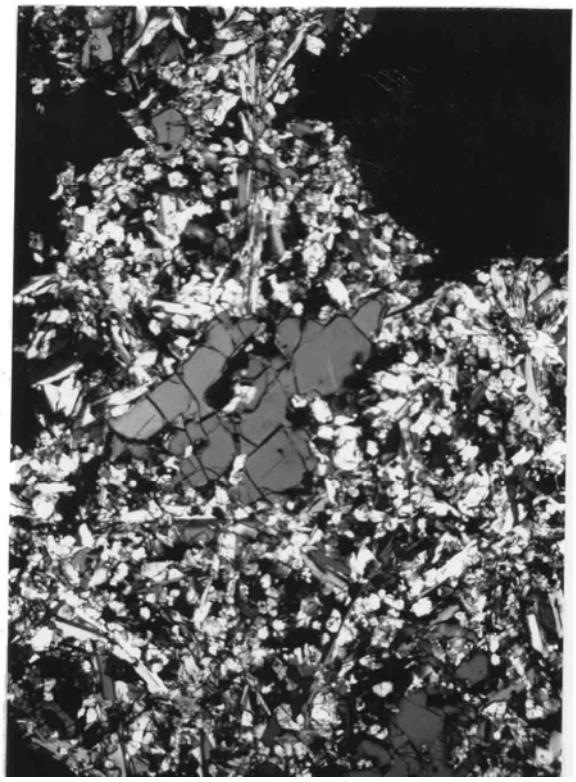

Fig. 2b

Figure 2. Photomicrographs of 15669,2.
Widths about 3 mm. a) transmitted light; b) crossed polarizers.

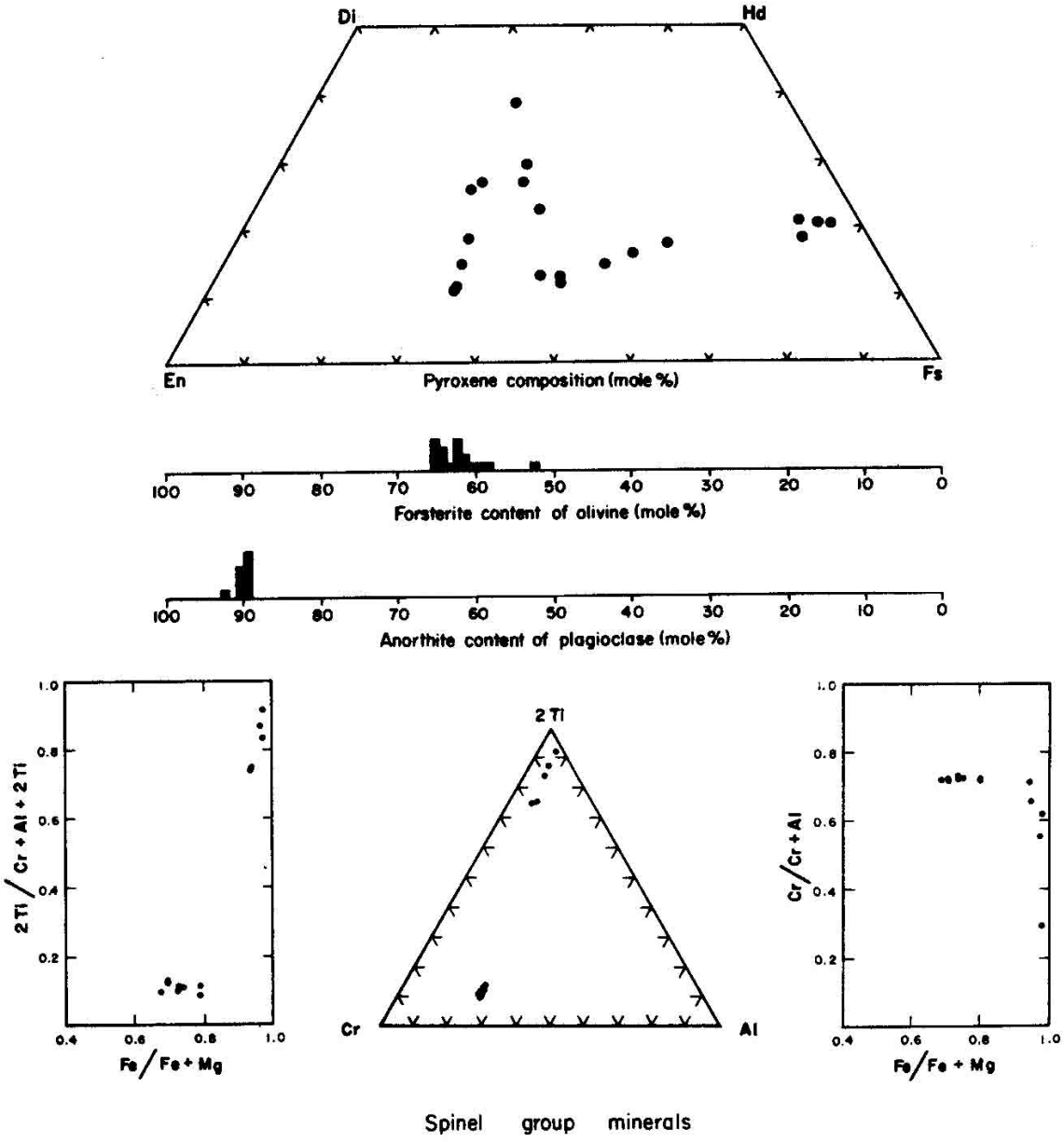

Figure 3. Chemistry of minerals in 15669
(Dowty et al., 1973b).

TABLE 15669-1. Bulk rock chemical analysis

		,4
Wt %	SiO2	
	TiO2	2.4
	Al2O3	9.3
	FeO	22.3
	Mg	10
	CaO	11.3
	Na2O	0.267
	K2O	0.040
	P2O5	
(ppm)	Sc	41
	V	203
	Cr	3670
	Mn	2080
	Co	45
	Ni	65(a)
	Rb	
	Sr	
	Y	
	Zr	
	Nb	
	Hf	2.6
	Ba	55(b)
	Th	
	U	
	Pb	
	La	5.1
	Ce	
	Pr	
	Nd	
	Sm	3.5
	Eu	0.87
	Gd	
	Tb	0.8
	Dy	4.4
	Ho	
	Er	
	Tm	
	Yb	2.1
	Lu	0.32
	Li	
	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	370
	W	
	Re	
	Os	
	Ir	
	Pt	
	Au	
	Hg	
	Tl	
	Bi	

References and methods:

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

Notes:

(a) ± 45 ppm
(b) ± 35 ppm

(1)

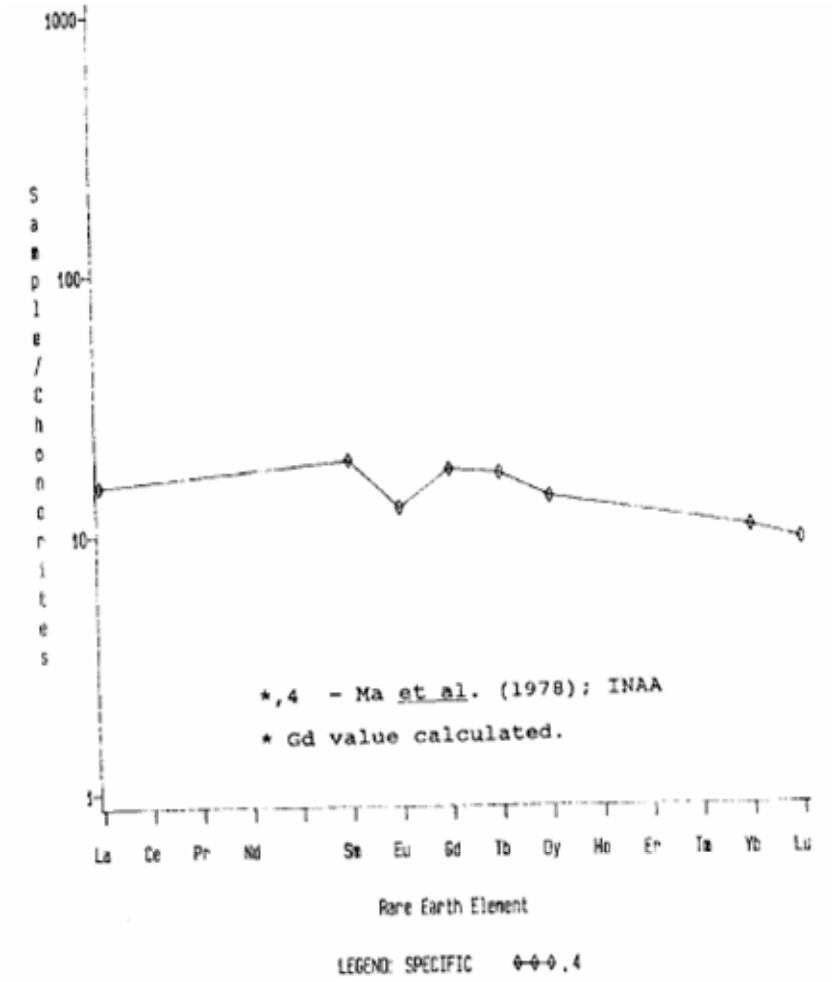

Figure 4. Rare earths in 15669.

TABLE 15669-2. Defocussed beam microprobe bulk analysis (Dowty et al., 1973a, b)

Wt %	SiO2	44.3
	TiO2	3.1
	Al2O3	8.0
	FeO	24.3
	MgO	10.1
	CaO	9.4
	Na2O	0.31
	K2O	0.03
	P2O5	0.07
ppm	Cr	2465
	Mn	2170