15636 COARSE-GRAINED OLIVINE-NORMATIVE MARE BASALT ST. 9A 336.7 g

INTRODUCTION: 15636 is a coarse-grained olivine-bearing mare basalt (Fig. 1). The olivines do not form phenocrysts but are visible as yellow-green crystals macroscopically. The sample is a magnesian member of the Apollo 15 olivine-normative mare basalt group. The sample has several fresh surfaces but one end is rounded. It was collected as part of the rake sample at Station 9A.

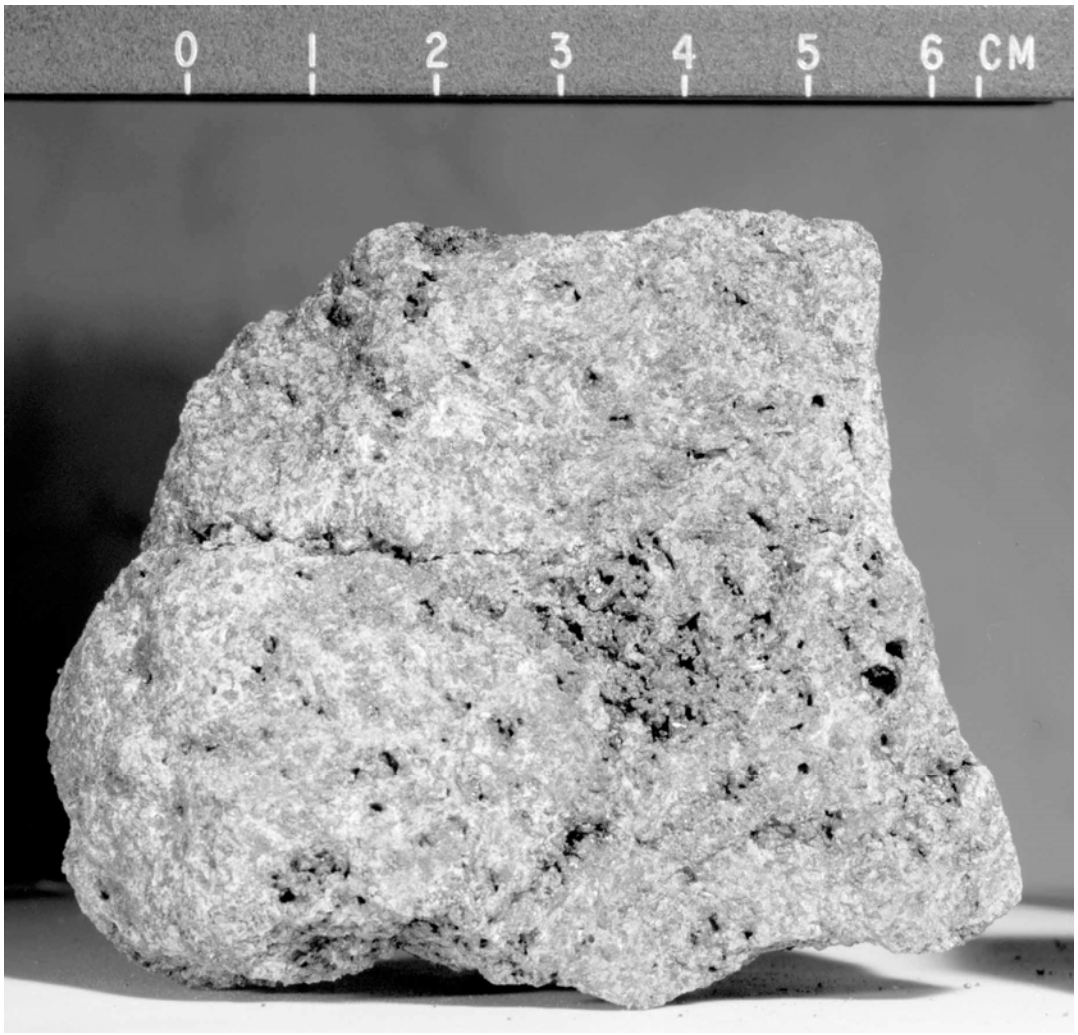

Figure 1. Pre-split view of 15636. S-71-52023

PETROLOGY: 15636 consists of anhedral, embayed olivines, and large pyroxenes and plagioclases (Fig. 2). The pyroxenes are anhedral pigeonites, zoned to augite, and are twinned; they are generally about 1 mm across but rarely reach 3 mm. The rims are

browner than the interiors and are inclusion-rich. The plagioclases are anhedral and 1 or 2 mm across. The larger olivines are scattered, embayed, and about 1 mm or less across; some smaller (less than 200 microns) olivines are euhedral and embedded in the plagioclases. Some of the phenocrysts embedded in plagioclase have sharp crystal faces (e.g., Fig. 2). Several olivine crystals contain silicate liquid inclusions. Residual phases include cristobalite, Fe-olivine, sulfide, and glass. Chromite occurs in olivine and pyroxene, and ulvospinel is common. Ilmenite, and some ulvospinel, tends to be associated with the residual fayalite and cristobalite.

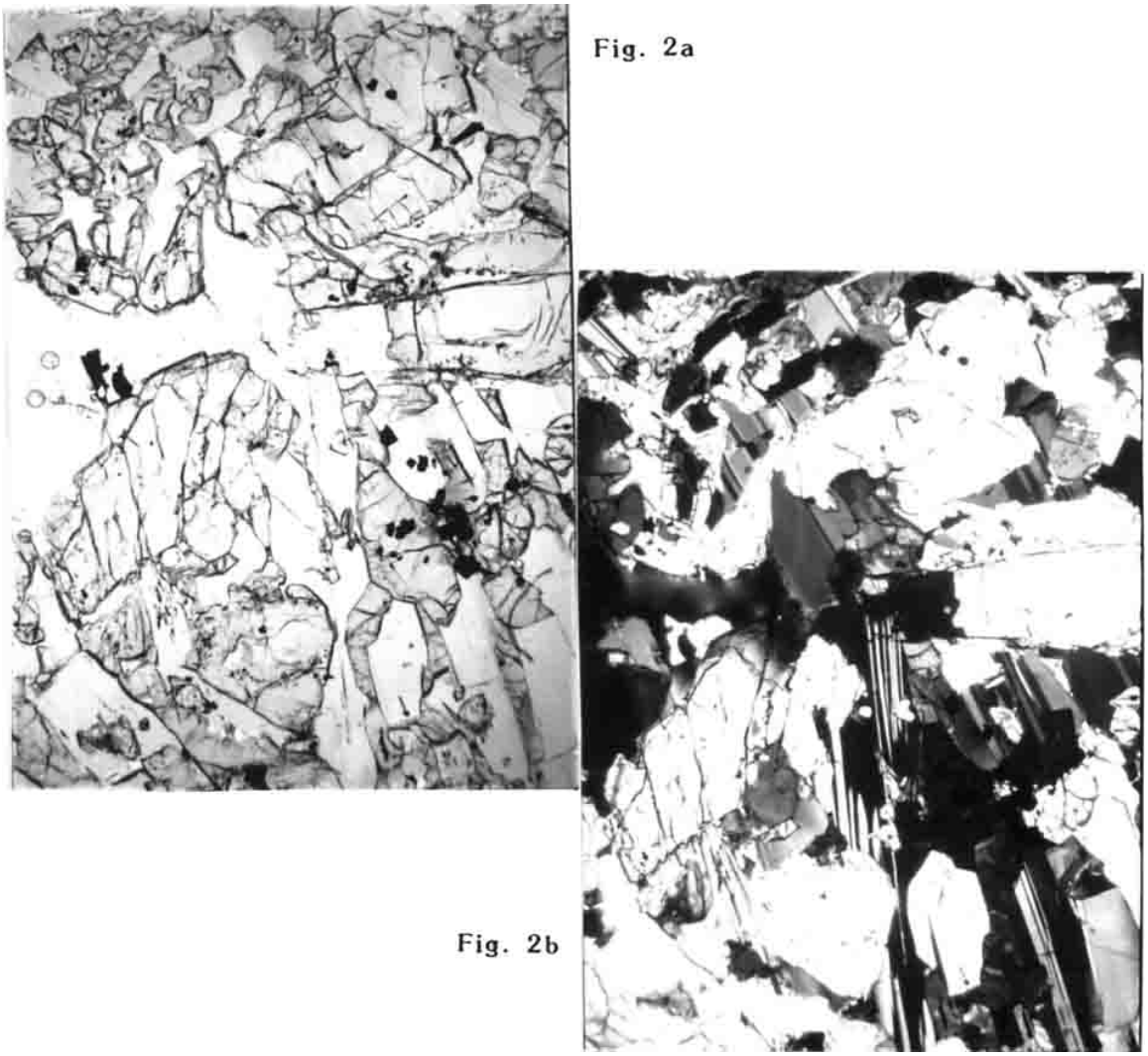

Figure 2. Photomicrographs of 15636,8.
Widths about 3 mm. a) transmitted light; b) crossed polarizers.

CHEMISTRY: Chemical analyses are listed in Table 1 and rare earths shown in Figure 3. The major element analyses differ, and the rare earths of the Fruchter et al. (1973) analyses are much lower than is normal for Apollo 15 mare basalts; this analysis is perhaps much less reliable and subject to some sampling problems resulting from the

coarse grain size. The analysis of Chappell and Green (1973) is almost identical with their analysis of 15622 and they suggested it was the same rock, broken up. However, 15622 is much more vesicular and probably much finer grained. The analysis is one of the most magnesian of the Apollo 15 olivine-normative basalts, but Chappell and Green did not have enough evidence to distinguish a primitive magma from a cumulate origin for the rock. Compston et al. (1972) noted the systematically lower Rb derived from their XRF analysis (reported in Chappell and Green, 1973), and the more-reliable ID/MS data.

PHYSICAL PROPERTIES: Gose et al. (1972) and Pearce et al. (1973) measured a magnetic intensity of 3.2 x 10^{-6} emu/g for the whole rock, an intensity about average for Apollo 15 mare basalts.

PROCESSING AND SUBDIVISIONS: Several small pieces were chipped off ,0 (now 325.8 g) to make the allocations. The thin sections (,8 and ,9) were made from an unused returned chip (,4).

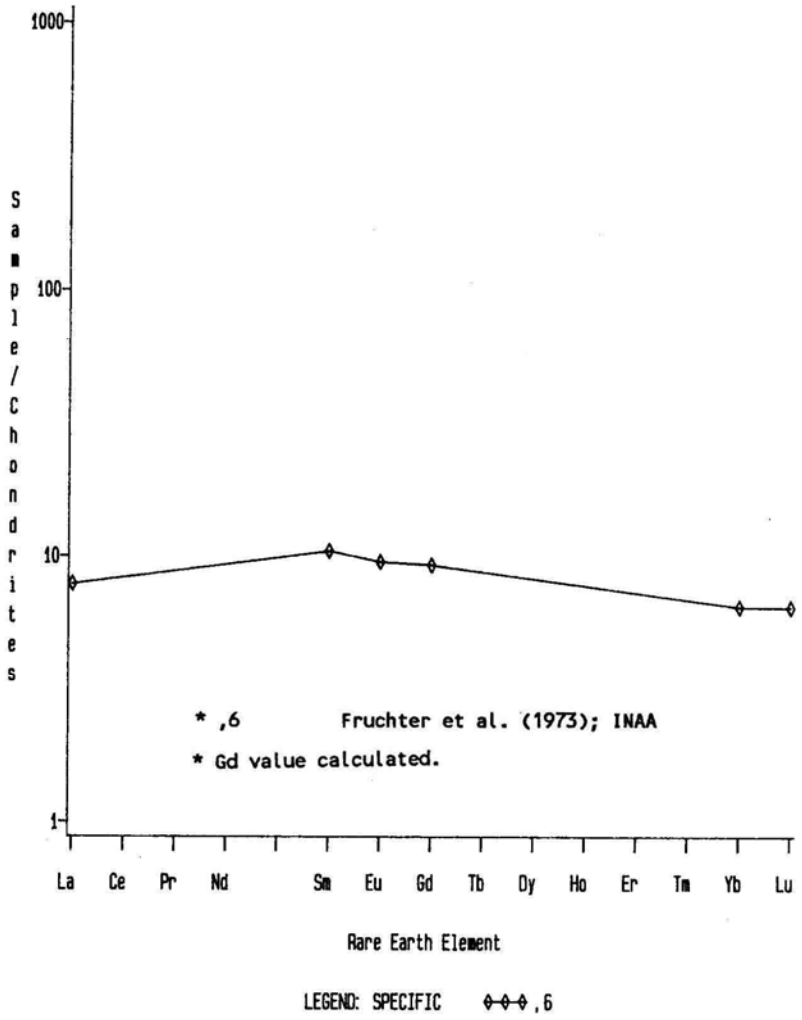

Figure 3. Rare earths in a split of 15636.

TABLE 15636-1. Bulk rock chemical analysis

			,6	,5
Wt %	SiO_2	44.58		
	TiO_2	2.22		
	Al_2O_3	8.55	9.8	
	FeO	22.67	19.61	
	MgO	11.32		
	CaO	9.58		
	Na_2O	0.26	0.247	
	K_2O	0.04		
	P_2O_5	0.07		
(ppm)	Sc		35	
	V			
	Cr	3840	3540	
	Mn	2400		
	Co		52	
	Ni			
	Rb	0.52		0.72
	Sr	94.6		90.9
	Y	21		
	Zr	77		
	Nb	6		
	Hf		1.3	
	Ba			
	Th			
	U			
	Pb			
	La		2.6	
	Ce			
	Pr			
	Nd			
	Sm		1.9	
	Eu		0.66	
	Gd			
	Tb			
	Dy			
	Ho			
	Er			
	Tm			
	Yb		1.3	
	Lu		0.22	
	Li			
	Be			
	B			
	C			
	N			
	S	500		
	F			
	Cl			
	Br			
	Cu			
	Zn			
(ppb)	I			
	At			
	Ga	2900		
	Ge			
	As			
	Se			
	Mo			
	Tc			
	Ru			
	Rh			
	Pd			
	Ag			
	Cd			
	In			
	Sn			
	Sb			
	Te			
	Cs			
	Ta			
	W			
	Re			
	Os			
	Ir			
	Pt			
	Au			
	Hg			
	Tl			
	Bi			
		(1)	(2)	(3)

References and methods:

(1) Chappell and Green (1973), Compston et al. (1972); XRF
(2) Fruchter et al. (1973); INAA
(3) Compston et al. (1972); ID/MS