

15623      MEDIUM-GRAINED OLIVINE-NORMATIVE      ST. 9A      3.00 g  
MARE BASALT

**INTRODUCTION:** 15623 is a medium-grained, olivine-bearing mare basalt which is very vesicular (Fig. 1). Small yellow-green olivines are visible but are not phenocrysts. In chemistry, 15623 is a fairly magnesian member of the Apollo 15 olivine-normative mare basalt group. It is tough and was collected as part of the rake sample from Station 9A.

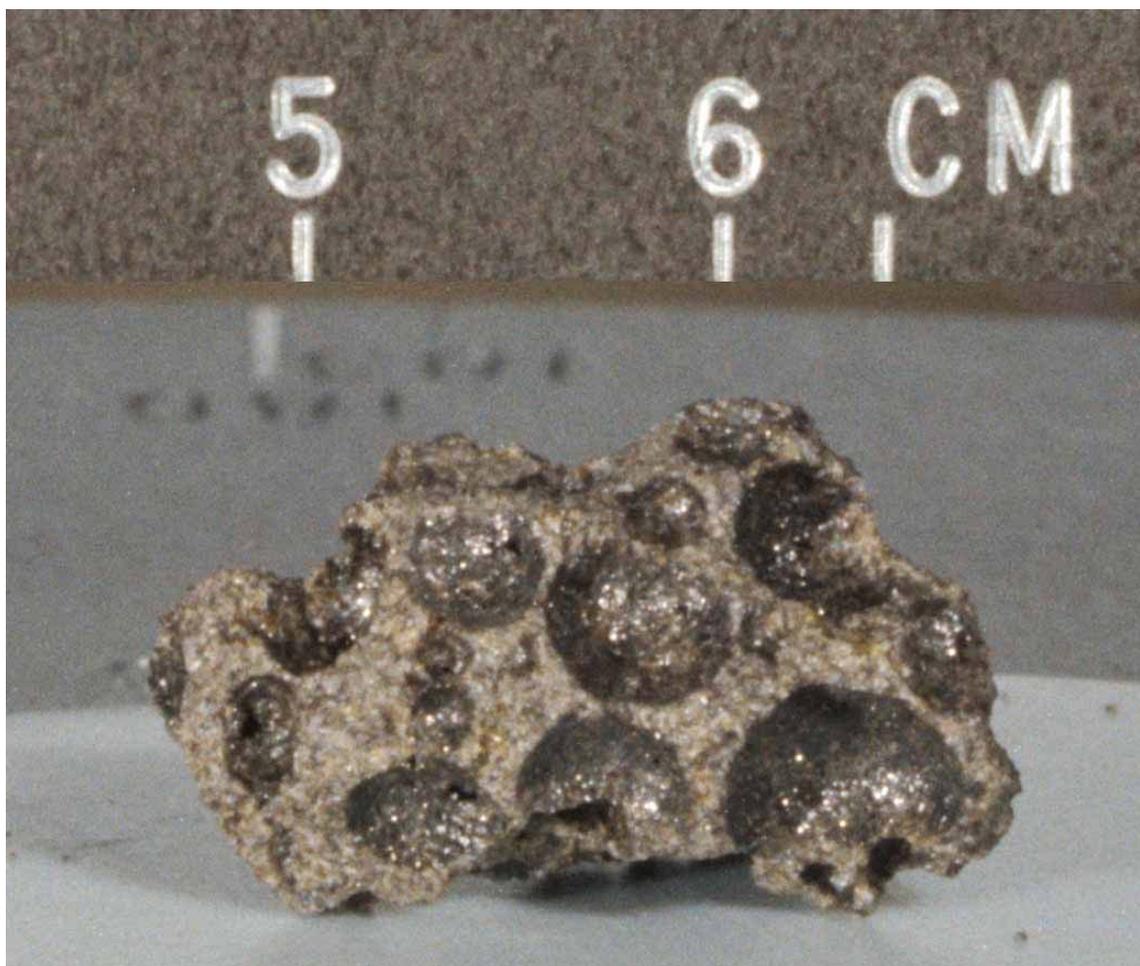


Figure 1. Pre-chip view of 15623. S-71-49313

**PETROLOGY:** 15623 is a medium-grained, olivine-bearing mare basalt (Fig. 2). Most of the olivines are small (less than 1 mm across) and not phenocrysts, and many occur as inclusions or cores in pyroxenes. Most pyroxenes and plagioclases are also less than 1 mm. The pyroxenes are mosaic-zoned. Dowty et al. (1973b) described 15623 as an

olivine microgabbro. They reported a mode of 61% pyroxene, 24% plagioclase, 9% olivine, 6% opaques, and no miscellaneous or silica phases. They noted the presence of many small chromites, but ulvospinel and ilmenite are actually the dominant opaque phases. Dowty et al. (1973a) modified the mode slightly to 63% pyroxene, 26% plagioclase, 7% olivine, and 4% opaques. Dowty et al. (1973c) tabulated microprobe analyses of pyroxene, olivine, plagioclase, Si-K glass, and Fe-metal, and Nehru et al. (1973) tabulated spinel group and ilmenite analyses. Nehru et al. (1974) noted that the boundary between chromite cores and ulvospinel mantles is sharp. The metal contains 1.2 to 1.8% Co and 8.0 to 9.4% Ni in general, though some have Ni contents as low as 2.1 to 4.7%. The ilmenite contains 0.38 to 1.65% MgO. The mineral chemistry (Fig. 3) is typical of Apollo 15 olivine-normative mare basalts.

**CHEMISTRY:** A bulk rock analysis is listed in Table 1 and the rare earths shown in Figure 4. This analysis shows 15623 to be a low-TiO<sub>2</sub>, high-MgO member of the Apollo 15 olivine-normative mare basalt group, although MgO is imprecisely determined. A defocussed beam microprobe analysis (Table 2) has even lower TiO<sub>2</sub>, probably subject to a large sampling error, but MgO closer to the average for this basalt group.

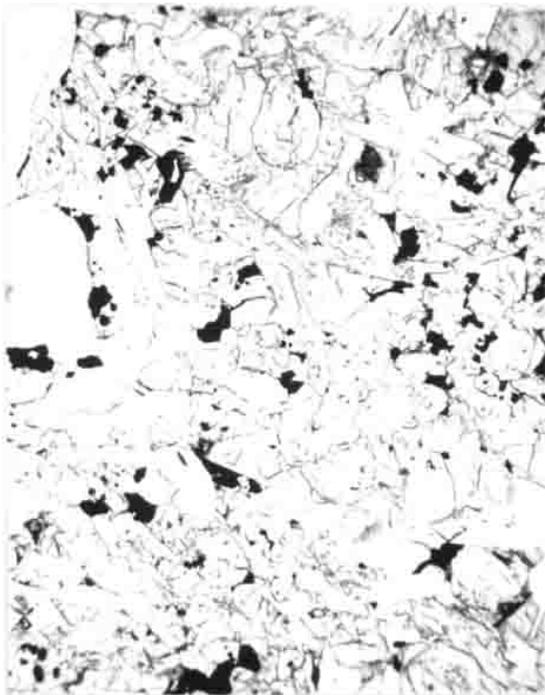


Fig. 2a

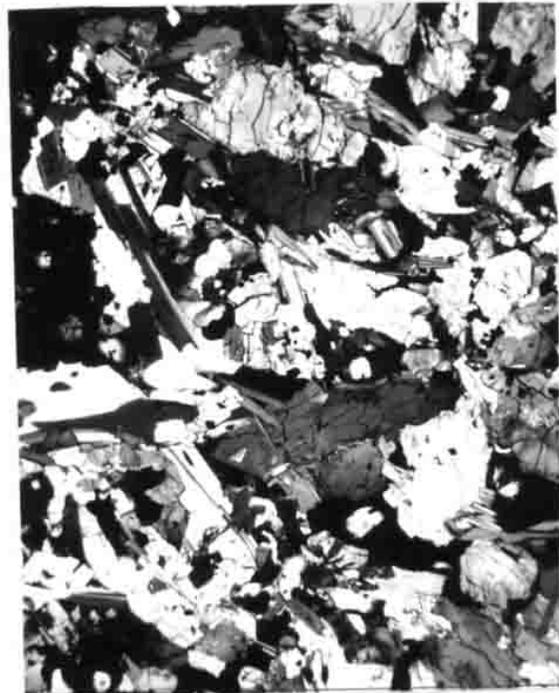


Fig. 2b

Figure 2. Photomicrographs of 15623,3.  
Width about 3 mm. a) transmitted light; b) crossed polarizers.

PROCESSING AND SUBDIVISIONS: Original chipping produced several small chips, most labeled ,1. The largest, ,2, was potted and produced thin sections ,3 and ,9. In 1977, more chipping produced ,4 which was used for chemical analysis and to make thin section ,8. ,0 is now 2.05 g.

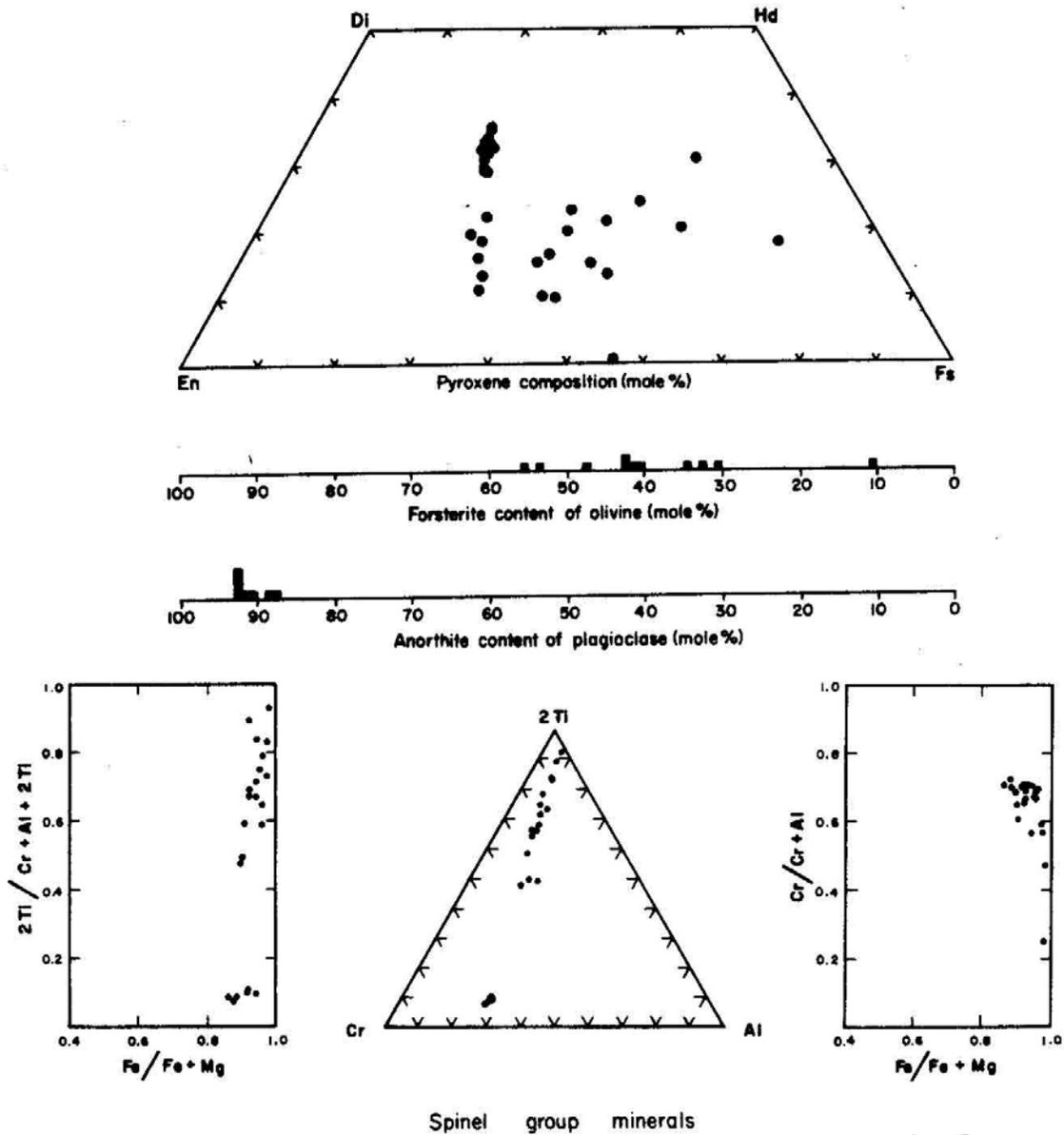


Figure 3. Chemistry of minerals in 15623 (Dowty et al., 1973b).



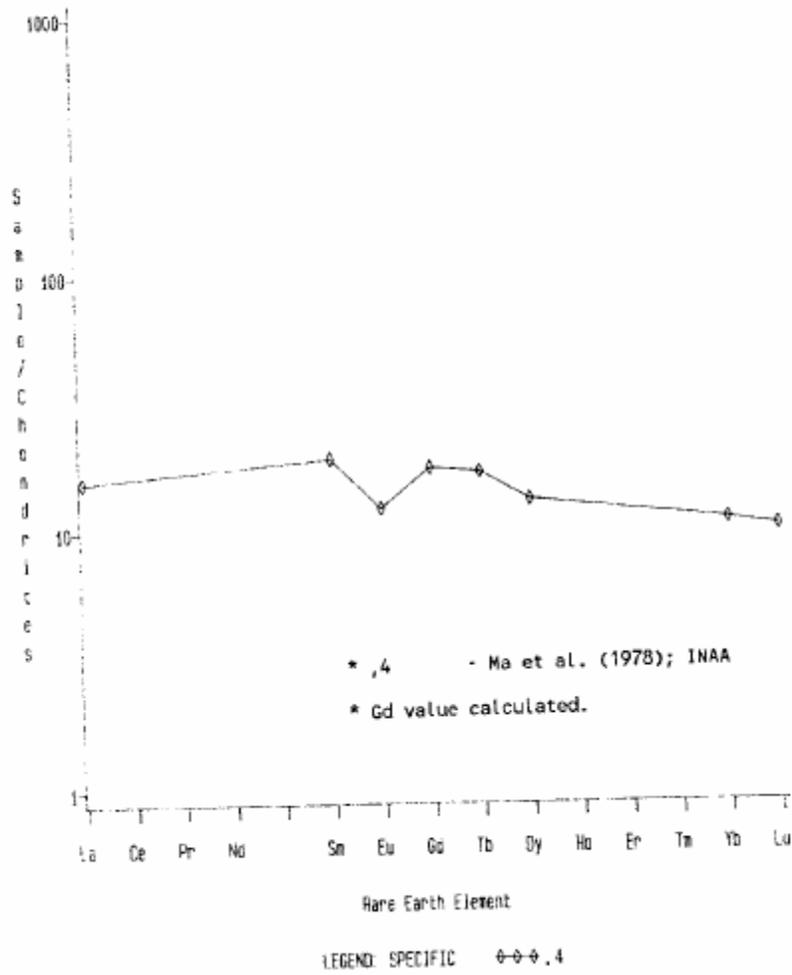


Figure 4. Rare earths in 15623.

TABLE 15623-2. Defocussed beam bulk analysis (Dowty et al., 1973a,b)

Wt%	SiO <sub>2</sub>	45.1
	TiO <sub>2</sub>	1.46
	Al <sub>2</sub> O <sub>3</sub>	8.6
	FeO	23.1
	MgO	11.4
	CaO	9.5
	Na <sub>2</sub> O	0.30
	K <sub>2</sub> O	0.02
	P <sub>2</sub> O <sub>5</sub>	0.17
ppm	Cr	4110
	Mn	1705