

INTRODUCTION: 67667 is a monomict breccia (Fig. 1) with ~70 to 80% mafic minerals, and uncontaminated with meteoritic material. Few grains are larger than 100 μm . It is a rake sample collected 30 m east of the White Breccia boulders and has many zap pits.



FIGURE 1. S-78-27395.

PETROLOGY: Petrographic descriptions and microprobe analyses are given by Steele and Smith (1973), Warren and Wasson (1978, 1979) and Hansen et al. (1979b, and unpublished). It is an extremely mafic rock (Table 1), though modally heterogeneous; Steele (1979, pers. comm.) notes that a microprobe search of thin section ,1 failed to find high-Ca pyroxene, whereas Warren and Wasson (1978) find ~15% high-Ca pyroxene in thin section ,6. Warren and Wasson (1978) note that in the Streckeisen (1973) classification their sample of 67667 would be termed a “meta-olivine gabbro norite,” but choose to emphasize its unique character among lunar samples by referring to it as a “feldspathic lherzolite.”

TABLE 1. Modal analyses of 67667,1.

<u>.1 Steele and Smith (1973)</u>		<u>.6 Warren and Wasson (1978)</u>	
Plagioclase	30%	Plagioclase	20%
Olivine	20%	Olivine	50%
Low-Ca pyroxene	50%	Low-Ca pyroxene	~15%
		High-Ca pyroxene	15%
		Ilmenite	2%
		Cr, spinel, troilite, Fe-metal	Tr

67667 is brecciated (Fig. 2) with few grains larger than 100 μm or less than $\sim 5 \mu\text{m}$. It is not porous and portions may have been melted. A few areas appear themselves to be clasts (Fig. 2). The plagioclase is commonly shocked or badly strained, and mafic minerals fractured. Silicate mineral compositions are shown in Figure 3 and appear to be restricted. Metal grains (Fig. 4) are outside of the “meteoritic” range.

CHEMISTRY: A major and trace element analysis is given by Warren and Wasson (1979) and is summarized in Table 2 and Figure 5. The low siderophile abundances demonstrate that it is uncontaminated with meteoritic material. The norm of the analysis is in rough agreement with Warren and Wasson's (1979) mode but has only $\sim 5\%$ high-Ca pyroxene. The REE pattern of 67667 is unusual among lunar samples in being flat and lacking a Eu anomaly.

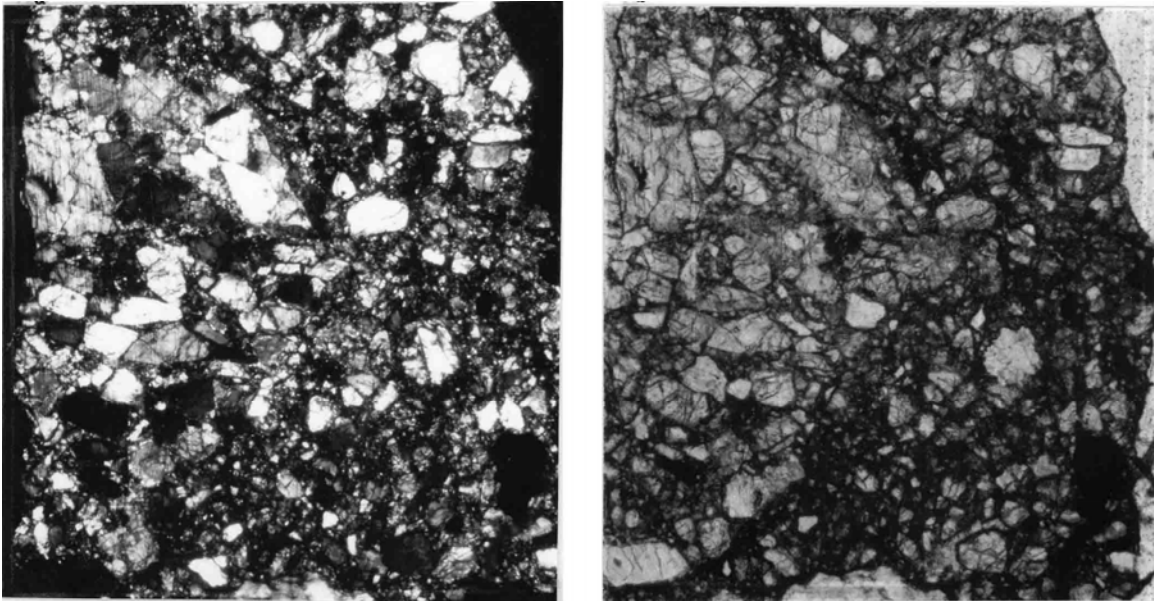


FIGURE 2. 67667,1 . General view. Width 2 mm.
a) xpl. b) ppl.

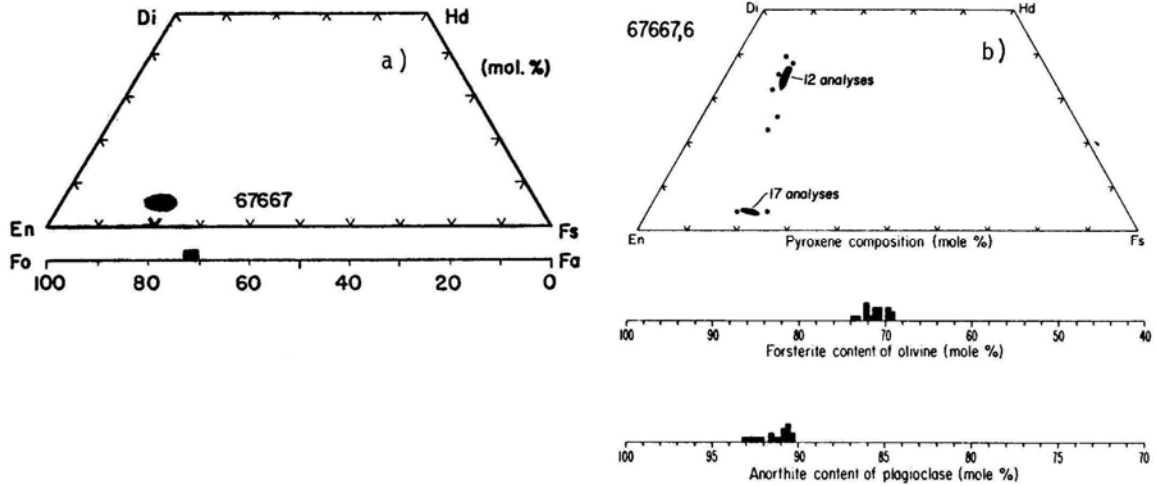


FIGURE 3. Mineral compositions.
 a) from Steele and Smith (1973). b) from Warren and Wasson (1979).

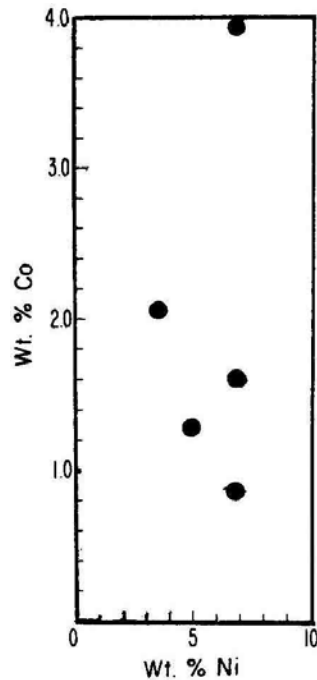


FIGURE 4. Metal compositions, from Warren and Wasson (1979).

PROCESSING AND SUBDIVISIONS: A chip was removed to make thin section ,1. The main subsequent subdivisions are shown in Figure 1. ,3 was allocated for chemistry, ,4 for radiogenic isotope studies, and ,2 for a potted butt for thin sections. A small chip from ,0 was allocated for further chemical analyses (meteoritic siderophiles and volatiles).

TABLE 2. Summary chemistry of 67667 (Warren and Wasson,1979).

SiO ₂	42.4	Sr	
TiO ₂	1.04	La	3.6
Al ₂ O ₃	7.6	Lu	0.32
Cr ₂ O ₃	0.38	Rb	
FeO	17.2	Sc	24.4
MnO	0.20	Ni	4.4
MgO	26.4	Co	26
CaO	5.3	Ir ppb	0.013
Na ₂ O	0.158	Au ppb	0.029
K ₂ O	0.023	C	
P ₂ O ₅		N	
		S	
		Zn	
		Cu	

Oxides in wt%; others in ppm except as noted.

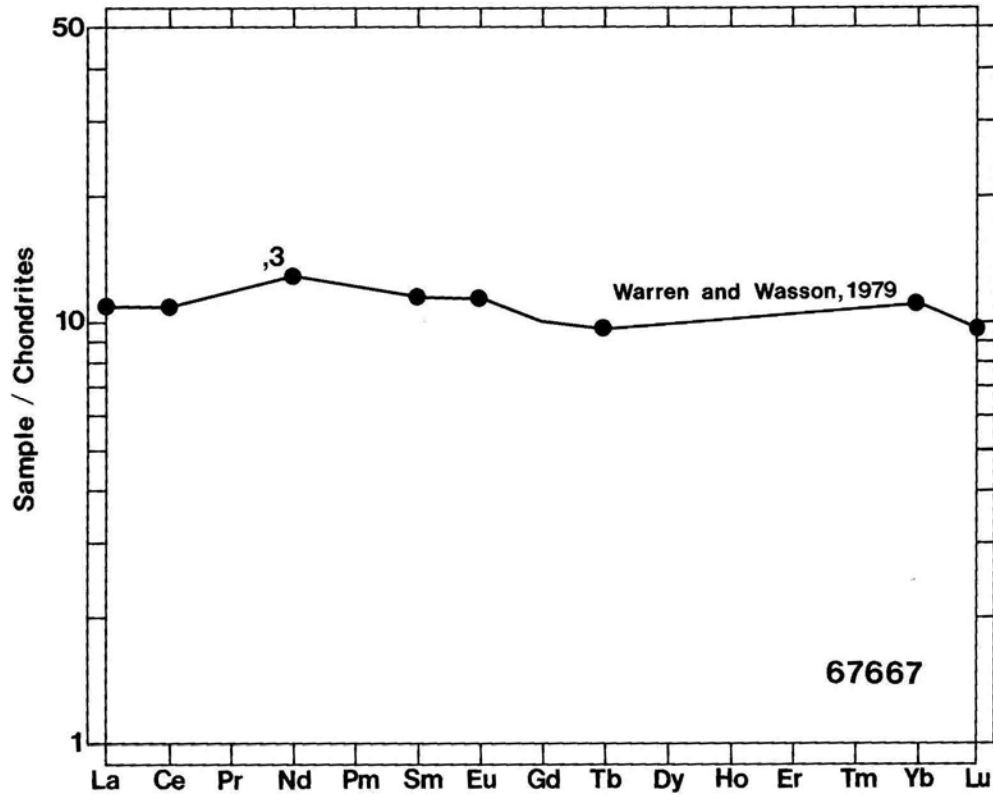


FIGURE 5. Rare earths.