62237 PRISTINE TROCTOLITIC ANORTHOSITE BRECCIA 62.4 g

INTRODUCTION: 62237 is a monomict breccia, uncontaminated by meteoritic siderophiles. Olivine compositions indicate an affinity with ferroan anorthosites but like 62236 it is less feldspathic (~85% plagioclase). Also like 62236, the sample is very light gray, subangular, and fairly coherent but with several penetrative fractures (Fig. 1).

62237 was collected from the rim of Buster Crater, adjacent to 62235 and 62236 and its orientation is known. Patina and a few zap pits occur on two faces.

FIGURE 1. S-72-38957.

PETROLOGY: Petrographic descriptions with phase analyses and interpretation are presented by Dymek et al. (1975) and Warren and Wasson (1977). Meyer (1979) reports minor element abundances in plagioclases (Table 1) and McKay et a1. (1978) calculate the possible range of Ti/Sm of the parent liquid.

62237 is brecciated (Fig. 2) and texturally inhomogeneous, with the original coarse (> 1 mm) grain size locally preserved. A mode by Dymek et al. (1975) has 83% plagioclase, 16% olivine, minor pyroxene, and small amounts of Cr-spinel, ilmenite, and troilite; Warren and Wasson (1977) estimate 89% plagioclase and 10% olivine. The mineral compositions reported by Dymek et al. (1975) (Fig. 3) are confirmed by Warren and Wasson (1977). Plagioclases and olivines have low abundances of minor elements. Pyroxenes include some complex, exsolved pigeonites. The mineral compositions are similar to those in 62236 and less mafic ferroan anorthosites. Dymek et al. (1975) stress that the olivine must be cumulate, not a product of a trapped liquid.

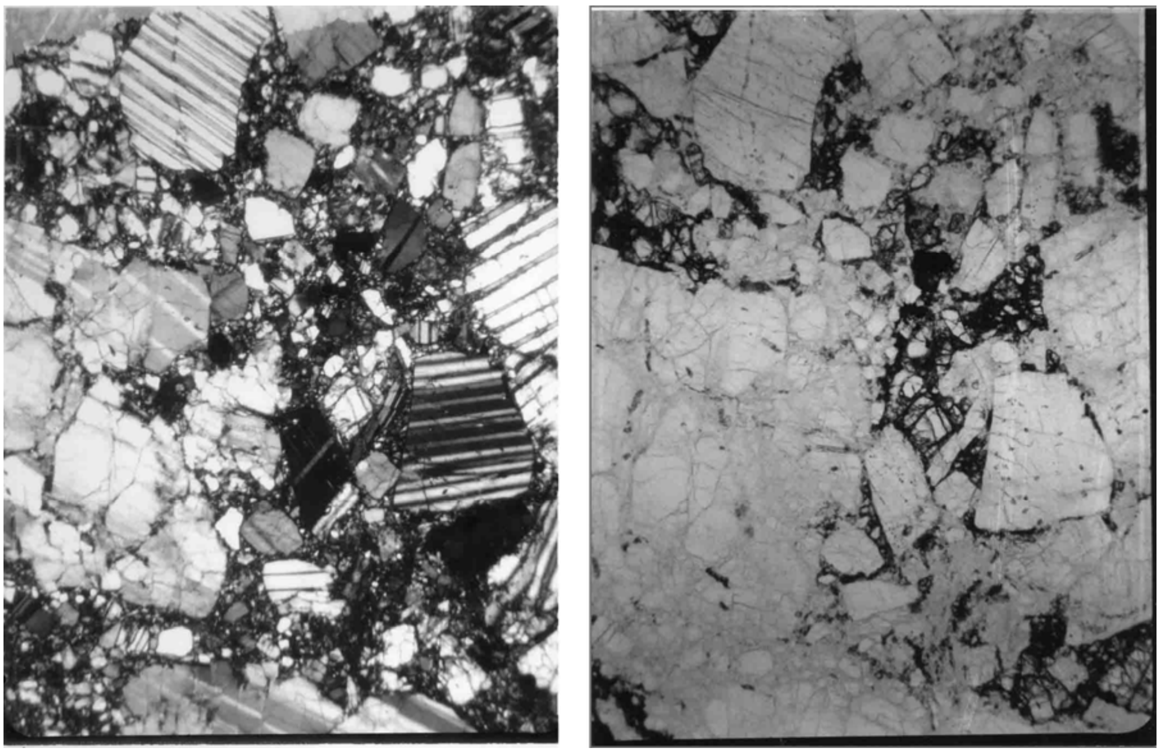

FIGURE 2. 62237,31, general view. Width 2 mm. a) xpl. b) same field, ppl.

TABLE 1. Ion probe analyses for minor elements (ppm) in 62237 plagioclase (Meyer, 1979).

	Li	Mg	Ti	Sr	Ba
grain a)	4	700			
grain b)	2.7	370	75	203	10

CHEMISTRY: Warren and Wasson (1978) report two analyses for major and trace (including siderophile) elements for a split of 62237, and Dymek et al. (1975) reconstruct the chemical composition from the mode and mineral analyses. K, U, Th and radionuclide abundance data are presented by Clark and Keith (1973) from γ-ray spectroscopy, and Schaeffer and Schaeffer (1977) report K and Ca abundances.

The chemistry (Table 2, Fig. 4) confirms the affinity with pristine ferroan anorthosites. The rare-earth abundances are similar to 62236 and much lower than pristine noritic and troctolitic rocks.

GEOCHRONOLOGY: Schaeffer and Schaeffer (1977) present Ar isotopic data. No plateau was obtained and the argon system is clearly extremely disturbed, with more than one trapped component. Individual releases give ages ranging from 2.49-5.68 b.y. with a total K-Ar "age" of 3.59 ± 0.05 b.y.

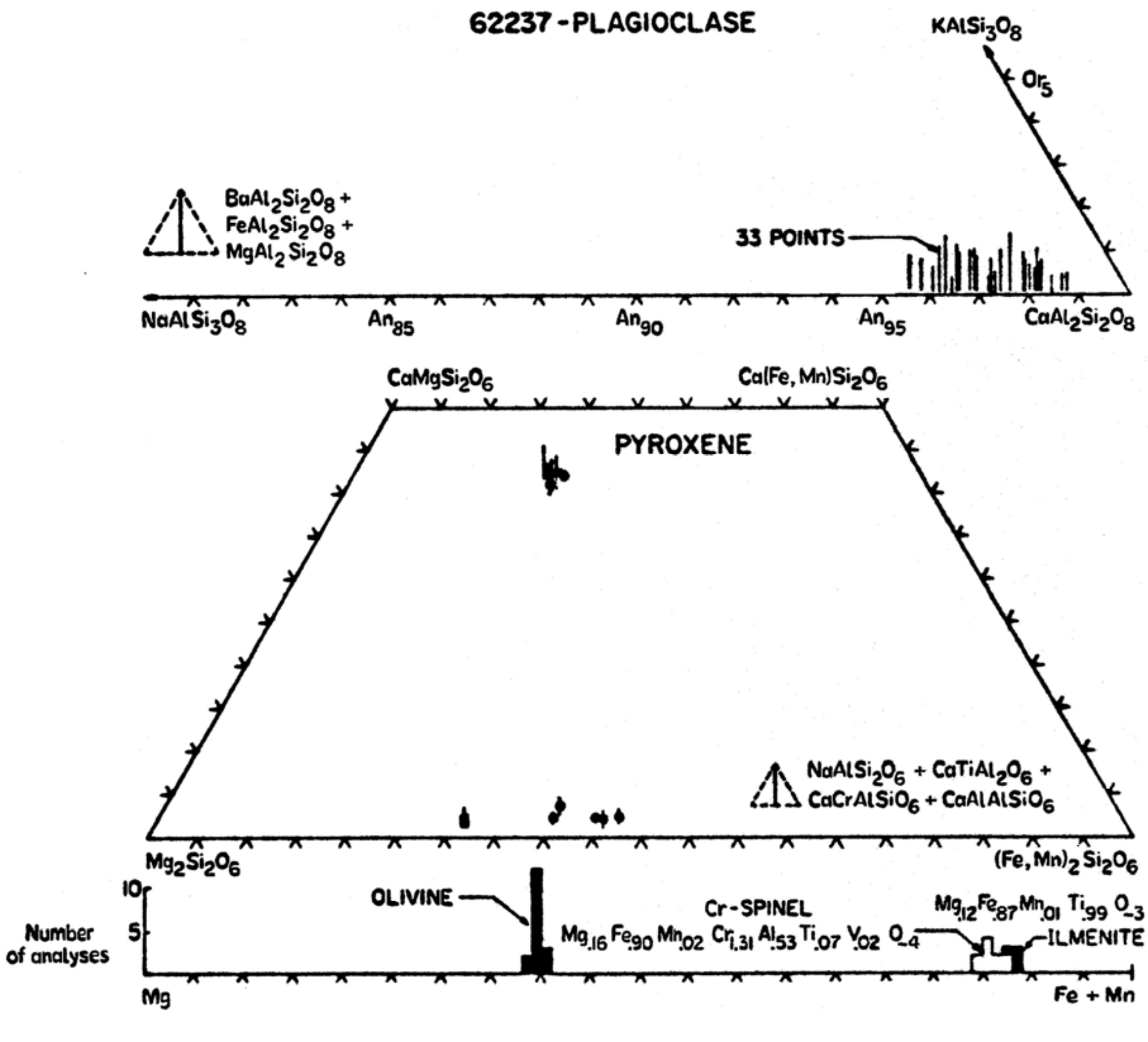

FIGURE 3. Mineral compositions; from Dymek et al. (1975).

EXPOSURE AGES: Schaeffer and Schaeffer (1977) calculate ^{38}Ar-Ca ages ranging from 24 to 2385 m.y. with an average of 32.9 m.y. The disturbed argon system makes the ages extremely unreliable.

PROCESSING AND SUBDIVISIONS: No saw cuts have been made, and most of the sample is preserved in two larger chips ,0 (37.9 g) and ,1 (8.9 g). A number of small chips in the range 0.5 - 2.0 g exist. The current thin sections are from a single potted butt (,4).

TABLE 2. Summary chemistry of 62237 (from Warren and Wasson, 1978).

SiO_2		Sr	
TiO_2	0.02 ?	La	0.19
Al_2O_3	31.1	Lu	0.015
Cr_2O_3	0.06	Rb	
FeO	4.8	Sc	4.4
MnO	0.05	Ni	5.8
MgO	4.2	Co	11.1
CaO	17.0	Ir ppb	0.015 ?
Na_2O	0.21	Au ppb	0.017
K_2O	0.013	C	
P_2O_5		N	
		S	
		Zn	1.6
		Cu	

Oxides in wt%; others in ppm except as noted

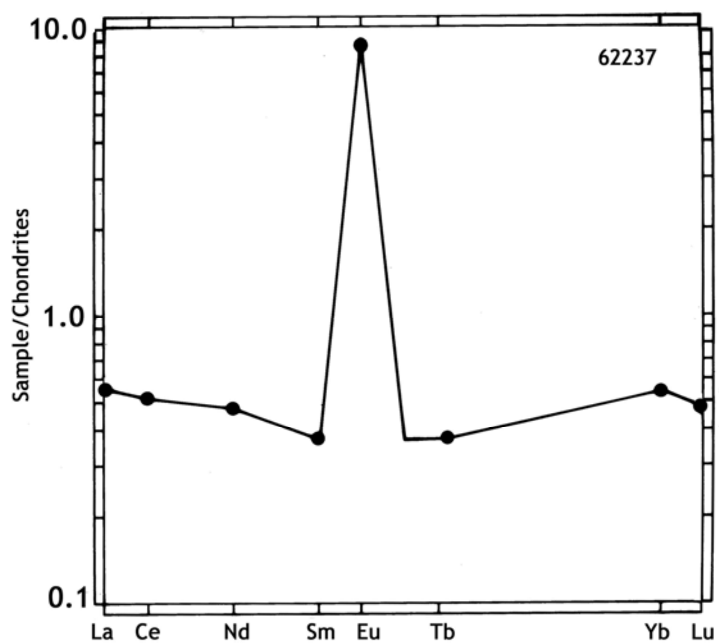

FIGURE 4. Rare earth elements; from Warren and Wasson (1978).